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### **VISION**

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## TEXTBOOK REQUIREMENTS

**Amirdinova Zilola\***

\*1st Year Master's Degree of "Philology"  
Faculty of "Uzbek Language and Literature",  
Department of Samarkand State University,  
UZBEKISTAN

Email id: javlonbekamirdinov@mail.ru

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### ABSTRACT

*The state examines modern textbooks, the requirements for them, and the role of these textbooks in the upbringing of the younger generation. This state provides recommendations for future textbooks and its role in improving the quality of education. Only by paying attention to these processes in good time will everyone grow up in good physical and psychological shape. If we look at the work done in recent years, everyone has a sense of care and responsibility for the future of the younger generation. In particular, President Sh.Mirziyoyev has repeatedly commented on schools, the conditions there, especially the quality of education, the environment in these institutions, and legislation has been passed in this regard, and its practical implementation in our lives is clearly rejected.*

**KEYWORDS:** *Textbook, Education, Modern Knowledge, SES, Future Generation, New Design and Worldview, Conscious Patriotism, Perfect Person, Noble Goal.*

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### INTRODUCTION

Since time immemorial, mankind has paid great attention to the education of the future generation. It is known from world experience that the young generation is educated, enlightened and intelligent from an early age, from the moment it is born and even from the moment its heart starts beating in its mother's body. Only by paying attention to these processes in good time will everyone grow up in good physical and psychological shape. If we look at the work done in recent years, everyone has a sense of care and responsibility for the future of the younger generation. In particular, President Sh. Mirziyoyev has repeatedly commented on schools, the conditions there, especially the quality of education, the environment in these institutions, and legislation has been passed in this regard, and its practical implementation in our lives is clearly rejected. Future generation must be the backbone and pride of this independent country. In the words of our president, "there is no future for an industry that is not based on science" [1]. Special attention must therefore be paid to educational institutions and their teaching aids, especially textbooks [2].

Today's new generation of textbooks, in which the specificity of the topics covered and the information presented is gradually improved in accordance with modern requirements, including the outlook of the younger generation, taking into account their psycho-physiological aspects, is felt to be moving.

To this day, many of our literature scholars create textbooks based on their experiments and research. A great deal of work has been done in this area for each training manual. If we list the names of scholars who have worked on literature textbooks and continue to do so, and see what they have done, we can be sure that the field has its own way. In particular, we can list the authors of literature textbooks for 8th grades: A. Kattabekov, V. Rakhmonov, A. Zununov, S. Olim, S. Akhmedov, R. Kochkarov. Practical work in this area will, of course, be carried out in accordance with the regulations set out in the SES and the Education Act. Following the instructions in the training documents is particularly important in achieving this goal. If we look at the new version of the Education Act, Article 9 of this document is called 'General Secondary and Secondary Specialised Education', and this article gives many of the skills and competences that need to be acquired in education:

- Basic secondary education (V-IX grades)
- Secondary education (X-XI grades)

“According to the basic secondary education curriculum, knowledge provides pupils with the necessary level of knowledge and skills and develops their ability to think independently and analyse”.

From the above, it can be said that the created literature textbooks should be able to provide the student with knowledge and information at the level of these requirements, otherwise the textbook will not be justified, and that is, it will not meet modern requirements.

Also, “in basic secondary education (after grade VII), measures are being taken to build basic knowledge and skills in vocational education, vocational diagnosis and career guidance will be enhanced” [3].

The requirements of the SES for the teaching of literature are as follows:

Students should have the following knowledge, skills, and competencies related to literary education.

- Read text accurately, quickly, and expressively;
- Be able to recite 4-5 literary texts by heart.;
- To know the President's works, to be able to observe them on the basis of the ideas put forward in them;
- To talk about the independence and festivals of our country, and to understand the content of literary works that evoke love for the homeland;
- Distinguish between modern and classic literary genres;
- Be able to think independently, orally and in writing, on any given topic;
- Be able to think and analyze independently about the means of artistic representation based on the text;
- Be able to vividly express their impressions of the work they read;
- Be able to think about other people's feelings and emotions;
- Be able to write essays on various topics;



- Be able to evaluate the qualities of the nature of the writers studied;
- Be able to react to and justify the actions of literary heroes;
- Be able to reveal the qualities of high-spirited and intellectually mature literary heroes;
- To feel the artistic appeal of a musical or color work and to express it in words;
- Be able to understand and react to the characteristics of the artistic symbols depicted in the studied works;
- Be able to express an independent opinion on the characteristics of literary heroes in the studied works;
- Be able to understand the national characteristics of the characters in the works of art studied;
- Be able to independently apply knowledge of literary theory to reading practice;
- Be able to evaluate literary and historical periods and writers' works.

From the above sources, it is possible to get some information about the requirements for literature textbooks. The most important thing is that the textbook should be age-appropriate, instill good qualities in the pupil and embellish his or her taste and inner world. In doing so, it is important to educate in the spirit of national and universal values, which is the main task of a literature textbook [4].

In conclusion, school textbooks must conform to the current era of development, to national values, in a new spirit that reflects our identity, both in terms of design and content. Textbooks should be designed so that the intelligent young generation growing up in today's age of technology can read these books with interest. At the same time, the information in these textbooks should realistically and vividly reflect the experience of our ancestors over the centuries. Textbooks reflecting these aspects are the main source and tool of real knowledge.

#### REFERENCES

1. Mirziyoyev Sh. Together we will build a free and prosperous, democratic state of Uzbekistan. Speech at the joint session of the Oliy Majlis of the Republic of Uzbekistan dedicated to the inauguration of the President of the Republic of Uzbekistan. Tashkent, "Uzbekistan". 2016. p.14
2. Mirziyoyev Sh. Humanism, kindness and creativity are the foundation of our national idea. Image Publishing House. 2017.
3. Salayev F., Kurbaniozov G. Explanatory dictionary of literary terms. A new generation. 2010. P.170.
4. Boboyev T. Fundamentals of Literary Studies. Tashkent - "Uzbekistan". 2002.

## CHALLENGES IN DIAGNOSIS OF PANCREATIC CANCER

Dr Sanjeev Kumar Jain\*

\*Professor,  
Department of Anatomy, Faculty of Medicine,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- drskjain2005@rediffmail.com

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### ABSTRACT

*Pancreatic cancer is a rising cause of cancer-related mortality, although survival rates have remained low over the past several decades. Pancreatic cancer biology, difficulties in early detection, and the absence of defined worldwide standards in evaluating suspected pancreatic masses are all factors that contribute to its high death rate. The purpose of this review is to give an update on the present status of pancreatic cancer diagnosis as well as to assess the advantages and limits of existing diagnostic technologies. Imaging using computed tomography, magnetic resonance imaging, endoscopic ultrasonography, and positron emission tomography, as well as tissue acquisition by tiny needle aspiration, are the primary modalities addressed. We also discuss advancements in tissue collection methods and the potential for customized cancer treatment. Screening of high-risk people, potential biomarkers, and frequent mimickers of pancreatic cancer are also discussed, as well as future research paths that may lead to early pancreatic cancer diagnosis. Pancreatic cancer detection that is timely or accurate may help to improve the disease's present dismal prognosis.*

**KEYWORDS:** *Diagnosis; Endoscopic; Imaging; Pancreatic Cancer; Pitfalls; Screening.*

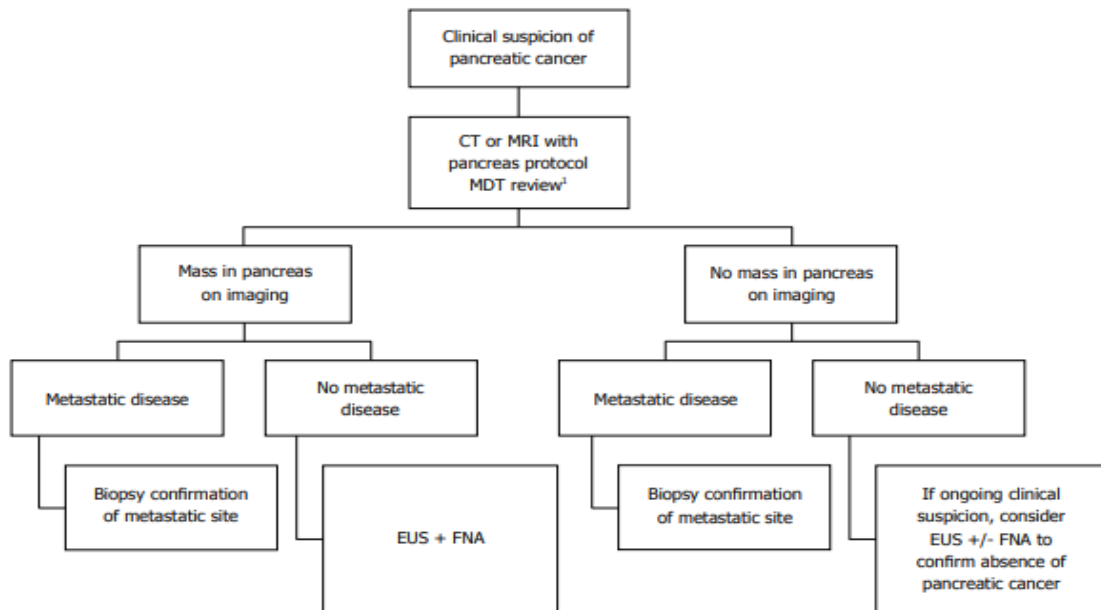
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### 1. INTRODUCTION

In Western societies, pancreatic cancer is the fourth largest cause of cancer-related mortality, and it is expected to overtake lung cancer as the second leading cause within a decade. In America, it has an average yearly incidence rate of 12.5 per 100,000 people (representing 3% of all malignancies), but a disproportionately high mortality rate of 10.9 per 100,000 people. The overwhelming majority of pancreatic cancers are already metastatic at the time of first diagnosis, making it difficult to detect at an early stage. At the time of diagnosis, only 9.7% of pancreatic cancers are at the local stage. In almost 40 years, these deplorable survival statistics have remained unchanged. Over 90% of pancreatic cancers are due to ductal adenocarcinoma and its variations. Weight loss, jaundice, malabsorption, discomfort, dyspepsia, and nausea are common symptoms of pancreatic cancer; nevertheless, many individuals are asymptomatic, but no early warning signals of pancreatic cancer have been identified. Cigarette smoking, high BMI and lack of physical exercise, diabetes, and chronic pancreatitis are all known risk factors for pancreatic cancer[1]. Hereditary Breast and Ovarian Cancer Carriers of the gene germline mutations,

familial atypical multiple mole melanoma syndrome (FAMMMM), Peutz-Jeghers syndrome, hereditary pancreatitis, Hereditary Nonpolyposis Colorectal Cancer (Lynch Syndrome), as well as familial pancreatic cancer are among the inherited cancer syndromes connected to pancreatic cancer. These higher-risk populations may be a suitable target for early detection and screening initiatives[2].

The primary goal of this study was to analyze or compare the appropriateness and accuracy of the existing pancreatic cancer diagnostic methods. Currently, scientists lack efficient screening or diagnostic methods for diagnosing pancreatic cancer at an early stage, when it is more likely to be curable. As a result, in order to guide future research, a comprehensive knowledge of presently existing diagnostic technology, including its advantages and limits, is essential. The dangers and mimickers of pancreatic cancer, as well as biomarkers and existing screening programs for high-risk people, will be addressed.



**Figure 1: An algorithm for evaluating a patient who is suspected of having pancreatic cancer [3].**

CT is recommended as the first modality in the diagnosis of suspected pancreatic cancer by a number of worldwide standards. MDCT, in particular, is better done using a pancreas-specific methodology. The typical MDCT pancreas protocol is a helical type scan that captures interval pictures of 0.5 to 1 sub-millimeters, including two phases: pancreatic parenchymal phase at 30 - 50 seconds as well as portal venous phase at 65 to 70 seconds, despite considerable inter-institutional heterogeneity. Scanners with 128 and 256 slices make up the bulk of contemporary scanners. It entails the intake of neutral oral contrast as well as the injection of intravenous high iodine concentration contrast at a rate of 3 to 5 mL per second. The pancreatic phase is characterized as a transition between the arterial and hepatic phases in which the pancreas is maximally enhanced to show the contrast between tumor and pancreatic parenchyma as well as the peri-pancreatic arteries and veins.

On CT, pancreatic cancer shows as an ill-defined mass that enhances weakly in comparison to surrounding normal pancreatic tissue, making it hypodense on arterial phase scans in 75 percent to 90 percent of cases, but is dense on delayed scans. From lowest to highest specificity, shows two views of a pancreatic malignancy that has abutted the splenic artery on CT imaging.

CT performs well in the diagnosis of pancreatic cancer when compared to other imaging modalities. A comprehensive meta-analysis evaluating different imaging modalities for the detection of pancreatic cancer showed that CT, which was comparable to MRI, had a combined sensitivity and specificity of 89 percent and 90 percent, respectively. Due to the collection of thin collimation pictures, better time and frequency resolution, and the use of multi-planar reconstruction and 3D method, there has been a documented improvement in the identification of pancreatic cancer, with current indications of sensitivity up to 96 percent for MDCT[4].

## **1.1. Stability**

T4 illness is defined as a tumor that surrounds a vascular by more than 180 degrees and causes blockage of the SMV/portal vein without surgical alternatives for repair. According to recent research, CT has a sensitivity of 52 percent to 91 percent for unresectable illness and specificities of 92 percent to 100 percent. Different generations of MDCT equipment had no effect on these results, according to one research. CT may also detect distant intra-abdominal and/or lung metastases, which is significant considering the long time it takes to diagnose pancreatic cancer. Ascites, peritoneal thickening, contrast adjustment, nodular bowel clot formation, or researchers should examine infiltration of the omentum are all CT findings of peritoneal carcinomatosis.

## **1.2. Technique Of Fine Needle Aspiration**

For EUS, several sample retrieval methods have been explored, including "fanning," "slow draw," and "wet suction" (WEST). Fanning, which includes sampling several regions inside a lesion with each pass, was shown to be better than conventional method in randomized trials, and fewer passes were needed to establish the diagnosis. Diagnostic accuracy, technical failure, and complication rates, on the other hand, were all the same. Lower scores for blood contamination were associated with a greater sensitivity of cancer detection using the "slow pull" method, which provides minimal negative pressure by gently and continuously withdrawing the stylet from the needle. Finally, the WEST technique, that involves flushing the needle with 5 mL of salt solution to replace the column of air within the needle's lumen to enhance aspirate quality, resulted in greater better cellularity as well as specimen appropriateness in cell blocks and specimen adequacy, but no difference in the amount of blood contamination.

## **1.3. Endoscopic Retrograde Cholangiopancreatography With Ultrasound:**

Because the pancreas is a retroperitoneal organ, transabdominal ultrasound's sensitivity in identifying pancreatic cancer is low, and it is not utilized in the diagnosis or staging of pancreatic cancer. According to research, sensitivity ranges from 48% to 89 percent, with lower specificity and accuracy, with rates varying depending on the size of the tumor and the degree of expertise of the operator. Due to possible problems such as pancreatitis as well as perforation, endoscopic retrograde cholangiopancreatography (ERCP) plays a less significant role in pancreatic cancer detection, and is mostly utilized as a treatment method. In patients with invasive pancreatic cancer, ERCP may offer biliary and pancreatic duct brushing cytology, as well as provide biliary drainage in blocking head of pancreas cancer. Pancreatic duct stenosis, blockage, narrowing, and

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aberrant branches of the main pancreatic duct, and obstruction as well as encasement of the common bile duct may all be seen during an ERCP. Few studies have looked at ways to obtain cytological samples during ERCP by inserting an endoscopic naso-pancreatic drainage (ENPD) tube into the main pancreatic duct and collecting pancreatic juice repeatedly - a technique known as serial pancreatic juice aspiration cytologic examination or "SPACE." Only a few small-scale studies have looked at the usage of this method, with encouraging results, but further study is needed before it can be recommended.

#### **1.4. Program Screening:**

Because of the low incidence of pancreatic cancer and the absence of a cheap, simple, and reliable screening test, pancreatic cancer screening is not practical in the general population. However, around 5% to 10% of pancreatic tumors are caused by a known genetic mutation or have a family history of the disease. Early detection methods in asymptomatic persons at high risk of pancreatic have been established because pancreas cancer patients develop symptomatic later in the course of the illness (individuals with a 5 percent or more lifetime risk of pancreatic cancer). Familial pancreatic cancer (at least two first-degree relatives with pancreatic cancer) as well as inherited pancreatic syndromes such as Peutz-Jeghers syndrome (lifetime risk of pancreatic cancer 36 percent), familial atypical numerous mole melanoma syndrome (lifetime risk 17 percent), hereditary pancreatitis (lifetime risk 49 percent), and PALB2 mutagenesis are among the high-risk groups.

#### **1.5. Perils, Pitfalls, And Subtleties In Pancreatic Cancer Diagnosis:**

When suspicion of pancreatic cancer develops, multimodal imaging methods and tissue collection as described above may be used to make a conclusive diagnosis in the majority of patients. Nonetheless, there are a few instances in which diagnostic findings are difficult to differentiate from other benign pancreatic diseases. Given the varying treatment consequences, accurate diagnosis in these situations is critical, and it often depends on detecting and interpreting radiological or endoscopic nuances, stressing the need of close cooperation with specialist institutions[5].

#### **1.6. Pancreatitis With A Sliver Of Chronic Pancreatitis:**

Pancreatic cancer is often misdiagnosed as focal chronic pancreatitis. It may develop a focal mass and, as a result, produce pancreatic and biliary ductal blockage, which may seem similar to that caused by ductal adenocarcinoma. In certain instances, standard imaging methods such as CT and MRI are insufficient to differentiate the two. CE-EUS and elastography may be used to differentiate between pancreatic cancer and pseudotumor chronic pancreatitis, depending on the degree of inflammation and fibrosis. In these instances, EUS guided biopsy is critical, and in biopsy-negative patients, careful monitoring is advised[5].

#### **1.7. Pancreatitis Due To Autoimmunity:**

Autoimmune pancreatitis may show clinically in a similar way to pancreatic cancer, with painless jaundice, new-onset diabetes mellitus, and elevated levels of blood tumor markers. It is most common in those over 60 years old. Serum IgG4 levels are typically elevated in autoimmune pancreatitis, but they may also be slightly elevated in 4% to 7% of pancreatic malignancies. However, IgG4 has a high specificity for autoimmune pancreatitis, particularly when serum IgG4 levels are substantially elevated to at least twice the upper limit of normal.



Figure 5 shows a smooth, diffusely expanded homogeneous gland with delayed enhancement and a capsule-like ring, which is typical of autoimmune pancreatitis. If there is localized involvement, autoimmune pancreatitis may also show as a tumor on CT[6].

Annular pancreas is a kind of pancreatic that has a Annular pancreas is a rare congenital migratory anomaly that results from the ventral anlage's inadequate rotation around the duodenum, causing the pancreas to encircle the second portion of the duodenum. These individuals are asymptomatic, and the discovery on CT or MRI is typically an accident. An expert radiologist should be able to tell the difference between an annular pancreas and a pancreatic mass, as well as the pancreatic duct surrounding the second portion of the duodenum[6].

### **1.8. Perspectives As Well As Future Directions:**

Future research should concentrate on developing novel diagnostic methods with better diagnostic accuracy to improve outcomes in pancreatic cancer. We should also strive to create better methods for assessing cancer risk, allowing for improved targeting of screening programs and better patient selection for surgery. Apart from the ones already mentioned, needle based confocal laser endomicroscopy (n-CLE) is a promising new diagnostic technique in development, in which a probe is managed to pass through with a 19-gauge EUS needle for real-time visualization of vasculature at the microscopic level in pancreatic cysts, resulting in an optical biopsy. Similarly, for ambiguous pancreato-biliary stricture, probe-based confocal laser endomicroscopy (p-CLE) may be utilized during an ERCP[7].

Chromosome rearrangements leading to gene disruption and novel potential drivers in pancreatic carcinogenesis have been discovered by whole genetic testing of pancreatic adenocarcinoma. The development of pancreatic cancer focus panel testing is currently underway, which may lead to tumor subtyping and the development of tumor-specific targeted treatments. These and other breakthroughs in genetic knowledge, such as the discovery of numerous microRNAs implicated in the control of abnormal cell replication, make them viable diagnostic and prognostic indicators[8]–[10].

## **DISCUSSION**

Pancreatic cancer is becoming a more common cause of cancer-related death, despite the fact that survival rates have stayed low for decades. The high mortality rate of pancreatic cancer is due to its biology, challenges in early diagnosis, and the lack of established global standards in assessing suspicious pancreatic masses. The goal of this review is to provide an update on the current state of pancreatic cancer diagnosis and to evaluate the benefits and limitations of current diagnostic tools. The main modalities covered include computed tomography, neuroimaging, endoscopic ultrasonography, or positron emission tomography, as well as tissue collection by small needle aspiration. The new standard for identifying the stage of the primary lesion as well as the existence of metastatic disease is still cross-sectional imaging. Because it is better at identifying small lesions and getting a tissue diagnosis, EUS has developed into a powerful diagnostic tool that should be used in combination with other techniques. While research is ongoing, routine biomarkers have no role in the diagnosis of pancreatic cancer at this time. Atypical circumstances may develop, making the distinction between malignant and benign pancreatic lesions challenging; in these cases, a radiologist with pancreato-biliary expertise should be contacted.

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## CONCLUSION

While early detection of pancreatic cancer remains difficult, advances in diagnostic equipment and methods over the past decade should lead to better results. The use of EUS and/or MRI to screen high-risk patients is advised and has shown promise in early detection. We recommend CT or MRI as first-line investigations in patients with suspected pancreatic cancer, with the decision between the two based on cost, availability, and local competence. Such cross-sectional imaging techniques are still the gold standard for determining the stage of the original lesion as well as the presence of distant metastases. EUS has evolved into a strong diagnostic tool that should be used in conjunction with other methods, since it is better at detecting tiny lesions and obtaining a tissue diagnosis. While research is continuing, there is no place for regular biomarkers in the detection of pancreatic cancer at this time. Atypical instances may arise, making it difficult to distinguish between malignant and benign pancreatic lesions; in these situations, a radiologist with pancreato-biliary competence should be consulted.

## REFERENCES:

1. D. Tartaglia *et al.*, “Less is more: an outcome assessment of patients operated for gallstone ileus without fistula treatment,” *Int. J. Surg. Case Rep.*, 2017.
2. G. Younan, M. Schumm, F. Ali, and K. K. Christians, “Gallbladder Volvulus in a Patient with Type I Choledochal Cyst: A Case Report and Review of the Literature,” *Case Rep. Surg.*, 2016.
3. L. Zhang, S. Sanagapalli, and A. Stoita, “Challenges in diagnosis of pancreatic cancer,” *World J. Gastroenterol.*, vol. 24, no. 19, pp. 2047–2060, 2018.
4. H. Watson *et al.*, “Does a second resection provide a survival benefit in patients diagnosed with incidental T1b/T2 gallbladder cancer following cholecystectomy?,” *HPB*, 2017.
5. B. Ren *et al.*, “Tumor microenvironment participates in metastasis of pancreatic cancer,” *Molecular Cancer*. 2018.
6. A. McGuigan, P. Kelly, R. C. Turkington, C. Jones, H. G. Coleman, and R. S. McCain, “Pancreatic cancer: A review of clinical diagnosis, epidemiology, treatment and outcomes,” *World Journal of Gastroenterology*. 2018.
7. H. Zhu, T. Li, Y. Du, and M. Li, “Pancreatic cancer: Challenges and opportunities,” *BMC Medicine*. 2018.
8. R. J. Torphy, Y. Zhu, and R. D. Schulick, “Immunotherapy for pancreatic cancer: Barriers and breakthroughs,” *Annals of Gastroenterological Surgery*. 2018.
9. R. Hundal and E. A. Shaffer, “Gallbladder cancer: Epidemiology and outcome,” *Clinical Epidemiology*. 2014.
10. L. R. Yates *et al.*, “Genomic Evolution of Breast Cancer Metastasis and Relapse,” *Cancer Cell*, 2017.

## A REVIEW OF LEADERSHIP STYLES AND EMPLOYEE COMMITMENT

**Aditya Sharma\***

\*Professor,  
Department of Management, Faculty of Commerce,  
Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [adityahr2018@gmail.com](mailto:adityahr2018@gmail.com)

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### ABSTRACT

*The current study is a review of the literature on leadership styles and their efficacy in team-building inside organizations. This article aims to evaluate the research in the field of work performance, with an emphasis on leadership styles. Both leadership types and styles were examined in connection to organizational productivity, as well as role stresses and ambiguity. By influencing team members' work performance, leaders are said to have a beneficial effect on the efficiency of the company. Furthermore, the literature study delves into the ideas of role stressors including role ambiguity and role conflict, which are often cited as the leading causes of work unhappiness and poor performance. Understanding the nature of role stressors and the possible sources of these stressors can assist companies in taking charge of their role stressor management. In addition, it was discovered that the literature on the connection between work performance and job collaboration was rather contradictory. As a result, it's critical to comprehend the nature of various leadership styles and evaluate their effect on addressing various organizational issues.*

**KEYWORDS:** *Job Performance, Leadership Styles, Role Ambiguity, Role Conflict, Work Performance.*

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### 1. INTRODUCTION

The crucial significance of team effectiveness has been regarded the primary goal of numerous studies over the past two decades. The presence of a leader who can inspire and offer a vision for their subordinates is required in the process of managing teams and guaranteeing their performance [1]. Leaders are said to establish sensible goals for their subordinates and provide them sufficient authority to accomplish the organization's objectives. One of the most rapidly growing fields of study is that which examines the impact of leaders on team performance. The position of the leader is considered as one of the most important instruments for team members. The reason for this is because leaders are critical in establishing collective norms and helping team members in confronting and resolving problems that occur in the team environment.

Because of the important impact that leaders have on team members, new methods for leaders to offer value to team members have emerged.

The leaders' management style is critical to the teamwork's success [2]. Many times, leaders are unaware of their subordinates' primary needs and desires, or they fail to recognize the differences amongst the team members. As a consequence of numerous problems that were not recognized in a timely manner among team members, team members' productivity has decreased.

## **1.1. Leadership Styles:**

There are many different types of leaders. As a result, picking a particular style of leadership and claiming that it would work in all situations is challenging. In other words, it is difficult to conclude that one style of leadership is the most desired and that others are ineffective [3]. The environment, circumstance, and followers all influence the kind of leadership that is chosen.

### **1.1.1. Person-Focused Leadership:**

Transformational, consideration, empowerment, and motivating conduct are the four types of behavior that may be utilized to evaluate the idea of person-focused leadership.

### **1.1.2. Directive Leadership:**

This style of leadership is described as one in which the leader communicates with his or her followers in a straightforward and clear manner. Subordinates will be expected to produce anticipated outcomes in return for being given the appropriate direction, advice, and assistance.

### **1.1.3. Supportive Leadership:**

Supportive leadership requires a thorough knowledge of subordinates' needs and desires in order to provide them with the appropriate assistance. To demonstrate this kind of leadership effectiveness, leaders must establish pleasant contact with their subordinates as well as a positive working atmosphere.

### **1.1.4. Participative Leadership:**

Participative leadership is focused with taking into account subordinates' opinions and suggestions. Before making a final decision, these contributions will be evaluated in detail. This style of leadership emphasizes establishing high and difficult objectives for subordinates in order to guarantee that they continue to develop.

## **1.2. Leadership Types:**

### **1.2.1. Passive laissez-faire leadership:**

This kind of management does not have direct influence over their subordinates. The majority of the team members are expected to have a lot of experience. As a result, the majority of them do not need constant monitoring and supervision. Team members may suffer from a lack of communication, feedback for improvement, and, ultimately, they may fail to reach the project completion date because to the leadership's shortcomings.

### **1.2.2. Transformational Leadership:**

Transformational leaders are said to have a balanced approach to their job. This may be explained by the fact that they assist their subordinates in resolving some of the more difficult difficulties while also teaching them how to deal with problems in a similar setting. As a result,

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experts think that transformational leaders play a role in raising their workers' motivation levels up to the point of self-actualization. Furthermore, charm and intellectual stimulation are two of the most frequent characteristics used to characterize the personality of transformative leaders. A facilitator is another term for transformational leadership; in this instance, team members and leaders encourage each other to reach high levels of performance and motivation. As a result, it is one of the most often used forms of leadership, in which team members support one another via various methods in order to accomplish corporate objectives and long-term plans. Unlike other kinds of leadership, this type of leadership encourages team members to communicate openly. As a result, greater levels of motivation, work satisfaction, commitment, productivity, and performance were associated with transformational leadership.

### **1.2.3. Transactional Leadership:**

Transactional leadership is described as a leadership style in which the leader rewards or punishes the employee for completing a task. Several leadership studies have shown that when transactional leadership is used in an organization, mutual trust develops between the leader and the task-holder. Employees will be disciplined if subordinates make mistakes in their job. As a result, workers may not provide their best effort because they are scared of making a mistake. As a consequence, they are less inclined to take on new initiatives or acquire new abilities. Employees who perform at their best, on the other hand, are rewarded for their efforts, which motivates them to work even more.

## **1.3. Impact of Role Stressors on Job Performance:**

### **1.3.1. Leadership and Organization Performance:**

Traditionally, a large number of studies have emphasized on the significance of in-role conduct. Furthermore, the research have mostly focused on the types of behavior such as job performance and task performance, which are critical for an organization's successful functioning. In order to assess work performance, role criteria are critical [4]. The position considers conduct to be an essential element in determining work effectiveness. The fulfillment of necessary tasks and obligations is described as in-role conduct. Previous research in the area has shown that addressing role ambiguity has a beneficial impact on work satisfaction. However, few researchers have looked at the impact of position ambiguity on work cooperation. Increased work collaboration is associated with higher levels of employee job satisfaction. Employees that are pleased and happy are more inclined to collaborate with their coworkers by sharing and exchanging information, according to research. In this respect, it should be noted that the bulk of research have concentrated on establishing a link between work satisfaction and job performance.

### **1.3.2. Role Conflict and Role Ambiguity:**

According to role theory research, there are two major reasons why an increase in role ambiguity leads to work-related conflict. The main and most often cited cause is stress, which may arise as a consequence of job ambiguity [5]. Stress may develop as a consequence of completing unpleasant activities or working in an atmosphere with no organizational rules. Furthermore, an increase in role stresses makes resolving role disputes at work more challenging. In this respect, some of the most significant conflict theories should be mentioned. According to the conventional view of conflict, it is seen as a process that must be dealt with and handled appropriately; otherwise, it may create various tensions among workers, lowering their job



satisfaction and commitment levels. Contrary to popular belief, the human resources perspective on conflict indicates that it is an unavoidable process. As a result, it is normal for individuals to see conflict in many situations. Furthermore, continuing instances of conflict are seen to have an important role in promoting competitiveness and leading to the development of more constructive ideas, according to a human resource perspective on conflict. As a result, the second explanation given by role theory may be linked to the human resource perspective of conflict, which states that disputes are an unavoidable aspect of the workplace.

Position ambiguity is caused by unclear and ambiguous expectations within a certain role, particularly in the workplace [6]. Furthermore, role ambiguity occurs when an individual's job and associated duties are not clearly defined. It may have a detrimental impact on the worker's organizational performance if it is not dealt with in accordance with the required procedures. Employees may accomplish more positive outcomes by fulfilling organizational work criteria when their role duties are well defined and clear expectations are established.

## **2. LITERATURE REVIEW**

The research results on the impact of different leadership styles on innovation are examined by Kesting et al [7]. To do so, they develop a framework that categorizes research results into four groups: people, means, effects, and innovation goals/outcomes. Using this approach, they assess articles in the categories of interactive leadership, charismatic leadership, directive and participatory leadership, transformational leadership, strategic & CEO leadership, transactional & instrumental leadership, and shared & distributed leadership. They uncover strong evidence that leadership expectations differ depending on the stage and kind of innovation.

Watson's research on group work may be broken down into many categories [8]. Group level, organizational level, group process, and group effectiveness are among these levels. According to Watson's research, boosting open communication and supportiveness at the group and organizational levels has a beneficial impact. Important aspects of the group process, such as open communication and supportiveness, have also been discovered to improve group performance.

Ahmad et al. investigated ethics-related leadership, including ethical leadership and other ethic-related leadership ideas, to better understand the importance of ethics and morality in different leadership concepts [9]. A comprehensive analysis of ethical leadership, as well as its similarities and differences from other leadership styles, was also included in this study. Another objective of this study was to give definitions and scales for each leadership style, as well as to demonstrate how ethical leadership varies from each. The conclusion of the study and future directions are provided at the end.

Success in the global market, according to Boehnke, is mainly reliant on a manager's ability to lead their employees [10]. The study's main result was that outstanding leadership performances were universal across all nations.

Nanjundeswaras et al. examine and assess studies on leadership styles and their effects on many areas of work life quality [11]. In today's worldwide competitive environment, a good leadership style is needed to reduce turnover. It is only through the employment of successful leadership styles that it is possible to achieve business objectives in a productive way. Leadership styles have an impact on employee performance and productivity.

### 3. DISCUSSION

Strategic planning is seen to be a need for leadership. Leadership is shown to be critical in establishing a shared vision and commitment. The search of an effective leadership style is inextricably linked to the collective work strategy. Organizations must be mindful of the possible effect of role stresses in today's highly competitive environment. Role stressors such as role ambiguity and role conflict are determined to be the most significant cause of work discontent and job performance, as evidenced by the evaluation of existing literature and the results of the present study. Understanding the nature of role stressors and the possible causes of role stress can assist businesses in taking charge of role stressor management.

The least successful kind of leadership is laissez-faire leadership. According to many research, the present leadership style is the least productive. The majority of these research identified laissez-faire leaders as the primary perpetrators of role conflict. Subordinates may have difficulty defining their duties and daily chores because of the nature of laissez-faire leadership. The role uncertainty among subordinates is encouraged by laissez-faire leadership. According to the findings of the present research, there is a link between laissez-faire leadership and role ambiguity. It's also worth noting that, while giving their subordinates full authority and independence in carrying out everyday duties, laissez-faire leaders are heavily reliant on them for ultimate decision-making.

Role conflict is an issue that is becoming more prevalent among team members. Role conflict may lead to a variety of negative outcomes, including decreased productivity, strained relationships, and even absenteeism. The matrix organizational structure employed by the leaders is one of the possible causes of role conflict. Subordinates suffer certain disadvantages as a consequence of the matrix organization, such as mixed communication and reporting lines, greater rivalry for resources, and, in many cases, dealing with diverse management styles of the leaders and managers. Transformational leaders provide clear and straightforward coaching to each follower so that the organization's members are not confused about their responsibilities. As a result, transformational leaders almost always avoid the problem of role ambiguity, implying that transformational leaders have a negative effect on role ambiguity, which is supported by the present study's results.

Transactional leaders pay close attention to each team member's tasks and responsibilities since it's critical to define each employee's position in the company to avoid role conflicts. According to a study of the research, certain traits shown by transactional leaders are more likely to have a negative effect on role conflict by reducing the likelihood of it occurring. Transactional leaders signify that followers and he agree on the significance of each job detail that must be completed within a specific time frame. As a consequence, it has been discovered that having more transactional leaders reduces the probability of job ambiguity.

It is thought that resolving role ambiguity and disagreement improves work effectiveness. It has been discovered that improving work performance has a beneficial impact on boosting job collaboration. The literature study reveals that the connection between work performance and job collaboration has been a source of debate in the past. Recent research, however, indicates that there is a link between work performance and job collaboration. Role theory proposes that the organizational environment plays a significant role in defining people' primary roles since these norms clearly indicate what is expected of them. The function of leaders, as well as their

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qualities and leadership styles, are critical to increasing the workforce's effectiveness and production. The study's results indicate that role ambiguity and conflict are influenced by transactional and transformational leadership.

#### 4. CONCLUSION

In terms of collaboration and communication, motivation, goal-setting, and decision-making, each leadership style is distinct. The research offers a literature evaluation that includes transformational, transactional, and laissez-faire leadership, based on a review of the literature. The impact of different leadership styles on role conflict and ambiguity is investigated. The purpose of this study is to examine the impact of transformational, transactional, and laissez-faire leadership styles and characteristics on resolving role ambiguity and conflict in order to improve work performance.

It is essential for leaders to consider the negative consequences of role ambiguity and conflict, which are harmful to staff productivity and effectiveness. A comprehensive knowledge of employee requirements, as well as a clear image of the negative consequences of role ambiguity and conflict, may motivate leaders to take effective steps to improve the organizational climate, allowing workers to reach their full potential. If done correctly, leaders may help their businesses become more inclusive places to work by using active and dynamic procedures that address workplace stresses including role conflict and ambiguity. Furthermore, leaders and their management styles are important in resolving role disputes and identifying the primary causes of role stresses. For example, the mentoring function, which is present in all kinds of leadership, is critical in coping with role stresses.

The literature study may be used to support the argument that the field of leadership is very varied, with many undiscovered aspects of leadership that can be important to the success of organizations. Furthermore, future study may examine different leadership theories and determine their impact on overcoming role stresses. Trait theory is one of the most significant leadership theories. Future study may examine the significance of particular leadership qualities that can enhance work performance and collaboration based on trait theory.

#### REFERENCES:

1. E. M. Park and J. H. Seo, "The impact analysis of leadership types to organizational commitment and organizational performance," *Indian J. Sci. Technol.*, 2016, doi: 10.17485/ijst/2016/v9i41/103937.
2. "The Impact of the Leadership Style on the Organizational Climate in a Public Entity," *Manag. Dyn. Knowl. Econ.*, 2014.
3. E. H. Al Khajeh, "Leadership styles on organizational performance," *J. Hum. Resources Manag. Res.*, 2018.
4. K. Naik and S. R. Srinivasan, "A study on impact of Job role stressors on Frontline employee role performance towards the customers," *Int. J. Bus. Econ. Dev.*, 2016.
5. E. M. Sutanto and F. K. Wiyono, "Analysis of the Effects of Role Overload and Role Conflict on Performance through Job Stress as a Mediating Variable in the Cellular Phone Trading Centers in Surabaya," *J. Econ. Bus. Account. Ventur.*, 2017, doi: 10.14414/jebav.v19i3.517.

6. V. S. Gahlan, K. Singh, G. S. Verdana, K. Singh, V. S. Gahlan, and K. Singh, "The effect of role overload and role ambiguity on job performance of IT professionals in India," *IUP J. Manag. Res.*, 2014.
7. P. Kesting, J. P. Ulhøi, L. J. Song, and H. Niu, "The impact of leadership styles on innovation - a review," *J. Innov. Manag.*, 2016, doi: 10.24840/2183-0606\_003.004\_0004.
8. W. E. Watson, L. Johnson, and G. D. Zgourides, "The influence of ethnic diversity on leadership, group process, and performance: An examination of learning teams," *Int. J. Intercult. Relations*, 2002, doi: 10.1016/S0147-1767(01)00032-3.
9. I. Ahmad, Y. Gao, and S. M. Hali, "A Review of Ethical Leadership and Other Ethics-Related Leadership Theories," *Eur. Sci. Journal, ESJ*, 2017, doi: 10.19044/esj.2017.v13n29p10.
10. K. Boehnke, N. Bontis, J. J. Distefano, and A. C. Distefano, "Transformational leadership: an examination of cross-national differences and similarities," *Leadersh. Organ. Dev. J.*, 2003, doi: 10.1108/01437730310457285.
11. T. S. Nanjundeswaras and D. R. Swamy, "Review Paper: Leadership styles," *Adv. Manag.*, 2014.

## ASSESSING THE UK'S GEOSTRATEGIC WATER FOOTPRINT

**Dr Dilip Meena\***

\*Assistant Professor,  
Department of Dermatology,  
Venereology & Leprosy,  
Faculty of Medicine,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- dilip.aiims@gmail.com

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### ABSTRACT

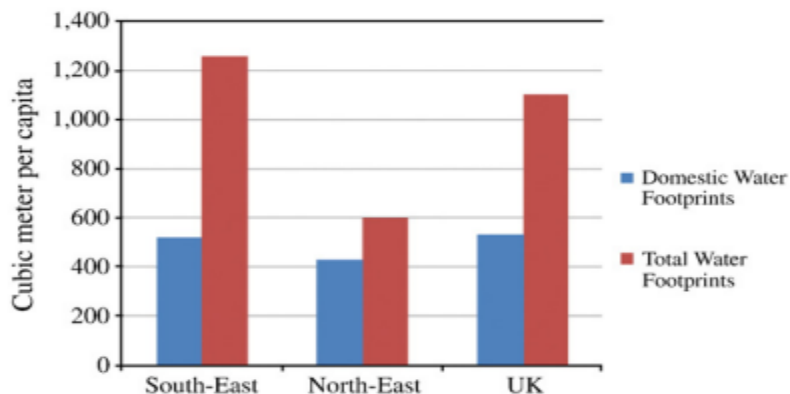
*The water footprint idea was recently proposed as a key indication for human-induced water use. The entire amount of water consumed during the production and consumption of products and services, as well as direct water consumption by people, is referred to as the water footprint. Water is used both directly and indirectly in manufacturing processes. As a result, estimating the water is necessary. We may use footprint to calculate the overall amount of water used throughout the whole global supply chain. In this article, we will discuss To assess the impact, build a regional input–output (IO) model that includes water consumption coefficients. For the South-East and North-East, respectively, residential water footprints for various usage categories Water used directly and indirectly throughout the regional supply chain in England and the United Kingdom. In we also compute overall water footprints, which include both residential and industrial water usage. Water used in other nations to make products and services that are imported and consumed in the area multi-regional input–output (MRIO) model was used to investigate the situation. In addition, both footprints contain the amount of water used directly by homes. In terms of the two areas, we can see a significant regional difference in regional (domestic) income. Water footprints between the water-scarce South-East and the water-rich North-East of the country England. We discovered that the South-East has a 22 percent larger household water footprint per capita than the rest of the country The North-East has the highest household water footprint per capita. Agriculture, food, and other major water users Hotel and catering, as well as products and electricity and gas production. Total water footprints per capita in the United States (1257 m<sup>3</sup> in the south-east/year) are almost double those in the north-east (597 m<sup>3</sup>)/year). Only the supply chain impacts and related water usage are included in the household water footprint. Inside regional borders, which are often more important to policymakers and water corporations Watersheds or borders are two terms for the same thing. The entire water footprint enables global impacts to be assessed and promotes global supply. In terms of resource use; it is also bringing concepts of justice and equality.*

**KEYWORDS:** Consumption, Products and Services, Production, Supply Chain, Water Footprint.

## 1. INTRODUCTION

The water footprint idea was recently proposed as a key indication for human-induced water use. The entire amount of water consumed during the production and consumption of products and services, as well as direct water consumption by people, is referred to as the water footprint. Water is used both directly and indirectly in manufacturing processes. As a result, estimating the water is necessary[1][2]. We may use footprint to calculate the overall amount of water used throughout the whole global supply chain. In this paper, we will discuss to assess the impact; build a regional input–output (IO) model that includes water consumption coefficients. For the South-East and North-East, respectively, residential water footprints for various usage categories Water used directly and indirectly throughout the regional supply chain in England and the United Kingdom. In we also compute overall water footprints, which include both residential and industrial water usage.

Water used in other nations to make products and services that are imported and consumed in the area multi-regional input–output (MRIO) model was used to investigate the situation. In addition, both footprints contain. The amount of water used directly by homes. In terms of the two areas, we can see a significant regional difference in regional (domestic) income. Water footprints between the water-scarce South-East and the water-rich North-East of the country England. We discovered that the South-East has a 22 percent larger household water footprint per capita than the rest of the country. The North-East has the highest household water footprint per capita. Agriculture, food, and other major water users Hotel and catering, as well as products and electricity and gas production. Total water footprints per capita in the United States/year) are almost double those in the north-east (597 m<sup>3</sup>)/year).Only the supply chain impacts and related water usage are included in the household water footprint. Inside regional borders, which are often more important to policymakers and water corporations within their respective administrative jurisdictions, concerned with the availability and demand of water resources Watersheds or borders are two terms for the same thing. The entire water footprint enables global impacts to be assessed and promotes global supplyIn terms of resource use, it is also bringing concepts of justice and equality.



**Figure 1: Water Footprints per Capita (M<sup>3</sup> /Year).**



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## 2. DISCUSSION

The total amount of water used by all sectors of the economy. If UFL is higher than 1, however, a unit change in all sectors' final demand will result in an above-average rise in sector is water consumption. We may claim that these sectors are important in terms of water usage whet backward and/or forward linkage indices are higher than [3]. We utilized data from the UK Office for National Statistics (ONS) and EUROSTAT's 2001 national IO table, trade data from HM Revenue and Customs, and foreign input–output data from the Stockholm Environment Institute's Global Trade Analysis Project (GTAP) (SEI). We then divided the data into 28 sectors<sup>7</sup>, which corresponded to the available water usage information. The LQs were calculated using Gross Value Added (GVA). The Office for National Statistics provided GVA statistics for the two areas (ONS). The ONS also provided statistics on household expenditures.

REWARD (Regional and Welsh Appraisal of Resource Productivity and Development) and the ONS were used to calculate direct water usage in industrial and service sectors in 1999. Based on Hoekstra and Chap again, direct water usage for agriculture is calculated. The Environment Agency provided statistics on household water usage. Water footprints in the United Kingdom: findings and debate The UK's water usage has gotten a lot of attention, particularly in the South-East of England, which is the driest part of the country. We compute a variety of metrics to compare and evaluate the water footprint trends in the two research areas and the United Kingdom. The direct water coefficients enable us to identify which sectors have a greater water intensity and, as a result, use more water in the production of products and services. The domestic water footprint indicates how much water is used directly and indirectly inside the research area, while the total water footprint shows how much water is consumed globally. We can determine the main sectors having the greatest impact on total water usage within an area by assessing backward and forward connections[4].

### **Coefficients of Direct Water**

We can measure both direct water coefficients for each industrial sector and indirect water consumption, which incorporates inputs from other sectors, after building the South-East regional IO table and using the water multiplier. We can demonstrate how much internal or external water is needed to generate certain products and services to meet the region's requirements. The direct water coefficients of 28 sectors in the South-East, North-East, and UK are shown in Table 1. Table 1 shows that agriculture is the most water-intensive sector, using more than 2000 m<sup>3</sup> of water for 1,000 pounds of sectoral output. Water intensity is likewise extremely high in the Fishery and Forestry sectors, despite the fact that absolute water use is relatively low due to low sectoral production. Electricity and gas production, followed by leather products, textiles, chemicals, and metal products, need the most water input per unit of output.

For example, in the North-East and South-East, the Retail and Trade sector requires less than 1 m<sup>3</sup> of direct water inputs per thousand pounds of sectoral output, while Hotel, Accommodation, and Catering, which is typically considered a water-intensive sector, only requires 1.80 m<sup>3</sup> and 1.71 m<sup>3</sup> per thousand pounds of output, respectively. In terms of water intensity, there are also some geographical variations. In particular, the water intensity in the Leather Products sector in the South-East is almost double that in the North-East, while the water intensity in the Chemicals sector in the North-East is around 2.5 times that in the South-East.

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Table 1 also shows that per capita home direct water consumption in the wealthier South-East is much higher than in the North-East. The South-household East's direct water consumption per capita is approximately 17 percent greater than the North-East's, and about 9% more than the UK average. Water footprints for the South-East, the North-East, and the United Kingdom[5]

The water footprint depicts the amount of direct and indirect water used to create products and services, including water used in manufacturing and as inputs from other industries. In the United Kingdom, the household and total water footprints are about 32 Giga-m<sup>3</sup> per year (Gm<sup>3</sup>/yr) and 66 Giga-m<sup>3</sup> per year (Gm<sup>3</sup>/yr), respectively. The overall water footprint is more than double that of the UK residential water footprint, which is comparable to Hoekstra and Chap gain's previous estimates of 73 Gm<sup>3</sup>/yr (2008). The main difference between this study and that of Hoekstra and Chap again is that they provide a very detailed measurement of water consumption from agricultural products, but the measurements for industry and service sectors are rather limited, whereas we measure detailed sectoral water footprints across the entire supply chain in this study. The sectoral specifics include the important and policy-relevant information. We aggregated[6]the available 76 sectors to 28 sectors due to a lack of specific sectoral water usage statistics, creating a bias by combining a larger number of different goods into one sector. This bias is minimized by covering the most water-intensive as well as the most [7]significant economic sectors. Shows the water footprints of the South-East, the North-East, and the United Kingdom.[3] Agriculture, food products, electricity and gas production, retail and trade, and hotels, accommodation and catering all have quite large domestic water footprints in the UK, as seen in Table 2. Agriculture, Electricity, and Gas Production, for example, consume a large amount of water from the UK domestic water resources due to their high direct water input, whereas Food Products, Retail and Trade, and Hotels, Accommodation, and Catering receive a large amount of water indirectly by purchasing goods and services from other water-intensive sectors like Agriculture and Fishery.

However, since it imports a significant quantity of virtual water from outside, Food Products (approximately 18 Gm<sup>3</sup>/year) surpasses Agriculture (about 11.5 Gm<sup>3</sup>/year) and becomes the UK's biggest water user. Similarly, by importing a significant quantity of water from other global areas, livestock, leather products, and chemicals become major water users with considerably larger overall water footprints than domestic water footprints. In conclusion, we can observe that more than 55 percent of the entire water footprint in the UK, or approximately 35 Gm<sup>3</sup>, is reliant on water supplies from other parts of the globe. Agriculture, food products, and electricity and gas production are major users of domestic water resources in the North and South East. Chemicals, retail and trade, and hotels, accommodation, and catering, on the other hand, have substantial regional domestic water footprints owing to their high outputs and therefore water use in both areas. The South-East has a household water footprint that is about four times that of the North-East. Table 2 also shows a significant geographical variation in total water footprints between the North-East and the South-East. The South-overall East's water footprint is six times greater than the North-total East's water footprint. Food Products are the biggest water user in the South-East, while Agriculture remains the top water user in the North-East. In terms of total water footprints, retail and trade, hotels, accommodation and catering, and education are also major water consumers in both areas.

Surprisingly, the overall water footprint for Chemicals in the North-East is considerably lower than its domestic water footprint, since approximately 60% of its sectoral production is utilized

to export products to other areas or countries. The disparity between total and household water footprints in the South-East is 2.5 times (SE) and 1.5 times (NE), respectively, larger than the difference in the North-East. It implies that the South-East relies on water supplies from outside its area much more than the North-East.

Furthermore, in the North-East and South-East, there are significant geographical differences in water footprints per capita. Figure 1 shows that the household water footprints per capita in the Southeast are about 22 gallons. 531 m<sup>3</sup> per year and 1101 m<sup>3</sup> per year/year in the United Kingdom, when the total amount of water used is the global water footprint per capita is almost twice that of the domestic water footprint. This implies that half of the water used in the UK comes from the sea.

#### Areas outside of the United Kingdom

Analysis of inter-industry linkages Identifying inter-industry linkages is a common use of inter-industry linkage analysis. 'Crucial sections' (Dreier, 2002). Backward links show how a single entity may be linked to another. As a result, an increase in final demand has an impact on a sector's providers[8].

Backward linkages are a measure of how interconnected different sectors are. Rely on inputs from other industries. Forward links are a measure of how far something has progressed. The degree to which different sectors provide inputs to each other. The whole economic system. Sectors in which have a higher than one backward and forward linkage index[9] Considered to be important economic areas The inter-industry linkage analysis is used in this research to investigate which major or leading industries have the most impact on the economy as a whole the procedure for consuming water The main water usage sectors are shown in Tables 3 and 4 based on the data Based on the precise findings of backward and forward connections in theThe south-east and north-east are two of the most populous regions in the country. Table 3 shows the results for both areas. Agriculture, Fisheries, and Water Supply are the industries with the most backwardness. With regard to connections (column sum of water footprint multipliers)

Electricity and Gas Production come in second and third, respectively, in terms of total water use. Sector. There are no significant backward links in the service sector. In terms of forward linkages (the total of the water footprints in each row), the greatest values are observed in the (multipliers) in both areas. Agriculture and Fisheries are the most important industries, followed by Food and Wat Supply. Sectors. In terms of the service industries, hotels and lodging and the catering, retail, and trade sectors all have a lot of potential[10].

### 3. CONCLUSION

We used a multi-region input-output paradigm with water consumption to evaluate and compare the household and total water footprints for the UK as well as the Southeast and North-East of England in this study. This approach enables us to investigate the connections between the study areas' production structure and water usage. We were able to identify the major water users in the two areas by comparing different water-related variables and evaluating forward and backward connections.

In terms of household water footprints, we discovered that agriculture is the biggest water user in the UK, as well as in the South-East and North-East, with significant direct water consumption.

Food products and service sectors such as retail and trade, as well as hotels, accommodation, and catering, have significant indirect water consumption, which implies that their production needs a lot of water since they buy goods and services from other water-intensive industries. Backward Linkages (BL) and Forward Linkages (FL) in the South-East and North-East are shown in Table.

This is further supported by their greater forward connections, which indicate that these sectors would result in a significant rise in regional water demand. Due to significant virtual water shares from other global regions, certain sectors, such as Leather Products, Electric Machinery, and Furniture and Other Manufacturing, have greater overall water footprints than domestic water footprints.

There were also significant regional differences between the South-East and the North-East. Food Products, rather than Agriculture, have the greatest overall water impact in the Southeast. In contrast to the North-East, the chemical, retail, and trade sectors, as well as hotels, accommodation, and catering, account for a substantial portion of regional domestic water footprints in the South-East. In order to plan water supply and promote sustainable water use, each economic sector's direct and indirect water consumption must be considered. The entire water footprint also enables worldwide impacts to be assessed and helps global supply chain management in terms of water consumption, while also bringing ideas of justice and equality in resource usage.

## REFERENCES

1. N. Jackson, M. Konar, and A. Y. Hoekstra, "The water footprint of food aid," *Sustain.*, 2015.
2. A. E. Ercin and A. Y. Hoekstra, "Water footprint scenarios for 2050: A global analysis," *Environ. Int.*, 2014.
3. P. P. Miglietta, F. De Leo, M. Ruberti, and S. Massari, "Mealworms for food: A water footprint perspective," *Water (Switzerland)*, 2015.
4. L. Marston, Y. Ao, M. Konar, M. M. Mekonnen, and A. Y. Hoekstra, "High-Resolution Water Footprints of Production of the United States," *Water Resour. Res.*, 2018.
5. X. Luan, P. Wu, S. Sun, Y. Wang, and X. Gao, "Quantitative study of the crop production water footprint using the SWAT model," *Ecol. Indic.*, 2018.
6. I. Cazcarro, A. Y. Hoekstra, and J. Sánchez Chóliz, "The water footprint of tourism in Spain," *Tour. Manag.*, 2014.
7. X. Bai, X. Ren, N. Z. Khanna, N. Zhou, and M. Hu, "Comprehensive water footprint assessment of the dairy industry chain based on ISO 14046: A case study in China," *Resour. Conserv. Recycl.*, 2018.
8. V. Subramaniam and Z. Hashim, "Charting the water footprint for Malaysian crude palm oil," *J. Clean. Prod.*, 2018.

9. A. E. Ercin, M. M. Aldaya, and A. Y. Hoekstra, "The water footprint of soy milk and soy burger and equivalent animal products," *Ecol. Indic.*, 2012.
10. D. Zhao and J. Liu, "A new approach to assessing the water footprint of hydroelectric power based on allocation of water footprints among reservoir ecosystem services," *Phys. Chem. Earth*, 2015.

## A SYSTEMATIC REVIEW OF THE BLOCKCHAIN OF THINGS BEYOND BITCOIN

**Gulista Khan\***

\*Associate Professor,  
Department of Computer Science,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- gulista.engineering@gmail.com

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### ABSTRACT

*The Internet of Things (IoT) is a term that refers to a digital ecosystem that includes a variety of internet-connected gadgets. It brings the physical and digital worlds closer together, allowing for new applications and services. Blockchain, a distributed ledger technology, has emerged as a potential option for ensuring trust in decentralized networks. Blockchain provides the immutability, verifiability, and trust of a distributed ledger in a decentralized network, which may be helpful in establishing trust in the Internet of Things. However, combining IoT with Blockchain poses a number of difficulties. The application of Blockchain in the IoT is a very new and fast-moving subject. As a result, a thorough literature study is required to comprehend what has been presented on the subject. A comprehensive review with a focus on Bitcoin has just been published. We provide a systematic assessment of current work on Blockchain and IoT in this article, with a wider emphasis on Blockchain platforms than Bitcoin. Our research summarizes what has been done so far in the field of Blockchain and IoT.*

**KEYWORDS:** Applications, Bitcoin, Blockchain, Infrastructure, Internet Of Things.

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### 1. INTRODUCTION

The Internet of Things (IoT) is a term used to describe a network of physical objects and computer platforms that are linked together through the Internet. While the Internet component of the Internet of Things is self-evident, the Things also comprise sensors, actuators, computers, mobile phones, and people who interact with other gadgets (i.e. humans or devices). Blockchain is a game-changing technology that uses a decentralized and distributed network to keep track of all transactions in a single ledger. The ledger cannot be tampered with, and every data is verified, thanks to blockchain. The combination of Blockchain with IoT may allow for the verifiable and trustworthy automation of physical operations among decentralized devices. Blockchain solutions, on the other hand, need costly processing and large storage overheads by definition [1]. Furthermore, a significant number of IoT devices have limited resources. If the difficulties are solved, however, the Blockchain's connection with the Internet of Things (which we refer to as the Blockchain of Things) has the potential to transform the future.



The limited computing and storage capability of IoT devices, the intensive computational requirements of Blockchain, and the decentralized design of security to meet the Blockchain of Things (BIoT) architecture, adhoc connectivity, and trust are just a few of the major challenges that must be overcome to enable the Blockchain of Things. We felt it was critical to perform a comprehensive literature study to obtain an overview of the present state-of-the-art since Blockchain and IoT are both new, and their combination is currently an actively studied subject. Conoscenti et al. performed a systematic study on Blockchain and IoT — at the time, the most of the publications in the field were focused on Bitcoin, the first cryptocurrency powered by Blockchain [2]. This was owing to the scarcity of Blockchain and IoT literature at the time of authoring. The degree of academic and industry advances in the Blockchain of Things has risen dramatically in recent years. We provide a more current literature assessment on the usage of Blockchain and IoT that isn't limited to Bitcoin in this paper.

We collect and organize relevant material in order to give an overview of current work from various viewpoints. To begin, we search for potential correlations between the various Blockchain platforms utilized in the literature and the application domains provided in the literature. Second, we examine the literature's contribution and analyze the various research goals. We highlight any study gaps and future research possibilities based on statistical and exploratory analyses.

## 4.1. Background:

Blockchain is a distributed ledger technology (DLT) that maintains a visible, immutable, and auditable record of transactions or digital interactions. It was given the name 'Blockchain' because it records transactions in blocks and chains each block (using encryption). Although it is best recognized for its use in cryptocurrencies such as Bitcoin, Blockchain is currently being used in a variety of fields to create decentralized trust.

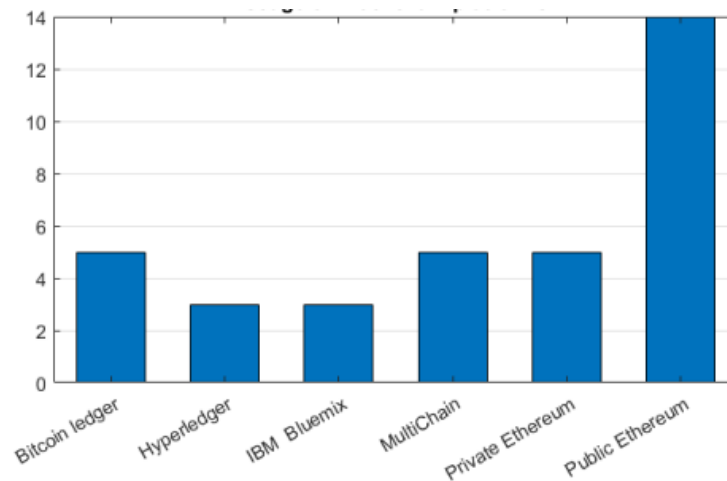
The participating nodes of a Blockchain system jointly manage the data in issue; no one central authority is needed or trusted to do so. Each node has its own copy of the ledger, which they maintain up to current. A consensus algorithm among the nodes decides on any modification or update to the ledger. As a consequence, a Blockchain system not only eliminates the need for a centralized master to maintain the ledger, but also ensures the system's availability.

## 2. DISCUSSION

We began by presenting the contribution of Conoscenti et al.'s previous systematic review [2]. Its primary goal was to see whether there was any literature that supported the idea of a private-by-design IoT, as well as to investigate the variables that influence the degree of integrity, anonymity, and flexibility of Blockchain, with a focus on Bitcoin. The authors conclude that scalability is an important criterion that Bitcoin does not presently meet, despite its popularity for its stability. Furthermore, the authors argue that Bitcoin merely guarantees pseudonymity, which is insufficient to make IoT devices anonymous.

A large number of publications have built and assessed Blockchain systems, while others have simply suggested an architecture or framework. In the literature, more than ten Blockchain systems have been discovered, with the most frequently used Blockchain platforms listed in Figure 1 along with the number of publications where they were used. Blockchain platforms2

that are used in less than three articles are not shown for brevity's sake, but may be found in the footnotes.



**Figure 1: Usage of Blockchain platforms**

According to statistics, the public Ethereum Blockchain is the most often used platform among scientists. The Ethereum Blockchain-based papers address the transparency issues in transactive energy systems by utilizing Smart contracts to monitor and control interactions between customers and prosumers [3]. Ethereum is also being utilized as the foundation for a vehicle-to-vehicle communication network for transportation systems [4]. Surprisingly, Bitcoin is not as well-known in IoT as it is in cryptocurrencies. It's mainly utilized in smart home applications to enable bitcoin payments between smart IoT devices and their owners [5]. MultiChain3, an open source Blockchain platform utilized in research articles that concentrate on edge computing, resource virtualization, and application placement, is used just as often in the literature as Bitcoin [6]. Finally, writers that evaluate the usage of a cloud-hosted Blockchain vs a locally hosted Blockchain utilize IBM's Bluemix, while authors who investigate a swarm of mobile devices such as robots and drones employ Hyperledger to offer a communication infrastructure [7].

## 4.2. Application Area:

### 4.2.1. Transportation:

The most often studied application area of BIoT is transportation systems. Smart vehicle systems, vehicle-to-vehicle networking, and intelligent transportation systems are all part of it. Future smart cars will be outfitted with computing units that are rich in resources, allowing them to interact, share data, and create a network of smart vehicles. The blockchain technology is being used to allow a decentralized and tamper-proof data exchange for smart car software upgrades [8]. They compare the existing local software update, which needs a car to be physically present at a nearby station, to their Blockchain-based automotive software delivery. Several writers also utilize blockchain as an infrastructure to maintain vehicle public keys [9]. It's utilized to create a vehicular network with dynamic discovery and a data-sharing platform that doesn't need centralized administration [10]. On a more practical level, Blockchain has been used to develop a business model based on rewarded user interactions. For example, a vehicular announcement forwarding system is intended to encourage users to transmit vehicle announcements without disclosing their identities in exchange for a certain quantity of

Creditcoin [11]. Yang et al. have created a decentralized reputation system based on Blockchain to assess the legitimacy of received messages [12].

#### **4.2.2. Transactive Energy:**

Microgrids and energy markets are part of the transactive energy application field. The majority of the writers used Blockchain to solve two primary issues: safeguarding the system against fraudulent transactions, such as people trying to sell or purchase an excessive quantity of energy, and maintaining the privacy of users and their personal information [13]. Other writers have proposed energy auctions, in which users with surplus energy may sell to the highest bidder using a smart contract's auction mechanism, obviating the requirement for a third party [14]. Yan et al. looked at Blockchain from a new perspective to rebuild existing distributed energy transaction patterns in order to enable decentralized real-time transactions and intelligent energy trading contracts utilizing an automated trust mechanism [15].

#### **4.2.3. Smart Cities and Homes:**

The smart home application area is generally regarded as a typical use case for the IoT system as a whole. In a similar context, Blockchain is being used to guarantee the availability and immutability of data gathered from mobile sensors distributed over a large region, such as a farm.

#### **4.2.4. Drones and Robots:**

Blockchain was often portrayed in the drone and robot literature as a communication platform to enable autonomous mobile device communications. Blockchain, for example, is being used to reliably arrange communication among a system of autonomous unmanned air vehicles (UAV). As a result, they will be able to coordinate their activities, share data, and make choices together. A network of multi-vendor drones is described that utilizes Blockchain to securely transmit information between them, particularly in crowded settings where collisions are unavoidable. Multi-vendor drones may share network infrastructures without competing for channels and GPS locations thanks to the Blockchain-based platform. Furthermore, Blockchain technology is being investigated in swarm robotic systems to offer robust security, robot autonomy, and collaborative decision-making.

#### **4.2.5. Manufacturing:**

The manufacturing application field was covered in just a few publications. An overview of potential Blockchain applications in manufacturing is given, with many use cases addressed, including improving cloud-based and on-demand manufacturing capabilities. In addition, a Blockchain-based distributed network is used to provide a cross-enterprise knowledge and service exchange architecture while preserving trust among the many participants.

### **4.3. Constrained nature of IoT:**

The low-resource nature of devices in terms of storage, power, and computing capacity creates a BIoT issue. The Blockchain of Things thus integrates high-cost calculations into low-capacity devices.

Benefiting from fog computing, a collection of computing resources at the edge of the IoT network, so that limited devices may request resources readily in order to maintain the

Blockchain, is a simple solution that is difficult to implement. The suggested architecture consists of three layers: devices, fog, and cloud. Each fog node is connected to a Blockchain-based SDN4 (software defined networking) controller network that provides localized and timely service delivery. The cloud layer is utilized for monitoring and analytics over a large region. In comparison to conventional cloud-based infrastructure, the authors assessed the performance of their system and came to the conclusion that fog computing provides high availability, real-time data transmission, and low latency. Other authors proposed an edge computing service for mobile Blockchain, with a focus on resource management marketing strategies and pricing schemes. Finally, a high-resource node known as the management hub is used to retrieve information from the Blockchain in lieu of limited IoT devices, while a separate node known as the manager is in charge of maintaining the Blockchain and registering IoT devices to the Blockchain. The authors assessed their solution and concluded that it was scalable.

#### **4.4. Blockchain Scalability:**

Mining, encryption, and decryption are among the CPU-intensive operations found in blockchain. In addition to managing the Blockchain, storing it is a problem since it is an ever-growing ledger. As a result, a Blockchain node must be able to process transactions cooperatively, store the ledger, and maintain the Blockchain network.

A framework for a lightweight Blockchain overlay network is presented, which uses a lightweight time-based consensus algorithm instead of the resource-intensive power of work and power of stake algorithms. It also separates the transaction and data flows, allowing data packets to be sent via the overlay network's most efficient routes. The overlay network was intended to be controlled jointly by high-resource devices, and the authors conducted a qualitative study to validate the network's resistance against cyber-attacks. A significant amount of research is being done to meet the storage needs of the expanding ledger. A fragmented ledger method, for example, is suggested to enable participating nodes to save just a portion of the data relevant to their profile, decreasing the total size. Similarly, in systems containing transferable entities, a block summarization technique is used to decrease the total ledger size. Their innovative approach enables nodes to save changes in the block sequence rather than the individual blocks. The summary is performed on a subset of the original chain's blocks.

Conoscenti et al.'s previous systematic study focused on the best of its time, the Blockchain of Things [2]. It was mostly centered on Bitcoin, which may be linked to the massive Bitcoin craze in 2015. Our research not only provides a more up-to-date overview of the Blockchain of Things, but it also emphasizes the use of other Blockchain platforms such as Ethereum, MultiChain, and Hyperledger. Since 2016, the quantity of publications on the Blockchain of Things has increased significantly.

In terms of Blockchain systems, the most commonly used is Ethereum, which is a public blockchain, followed by MultiChain, Bitcoin, and a private Ethereum. Ethereum is utilized in all application areas, while Bitcoin is primarily used to enable cryptocurrency payments in the smart home application field. Nonetheless, the usage of many platforms across various application domains demonstrates the Blockchain of Things' promise.

The literature reveals that the areas of most interest are transportation and transactive energy uses. The smart home and smart city application areas are often cited as typical use cases for the wider IoT system, according to our research. Blockchain has been used to create a distributed

data sharing platform, network infrastructure, and a transparent record of actions in general. It's worth mentioning that there are certain IoT application areas where Blockchain has yet to be deployed. Firefighting and underground mining, for example.

Forming a fog computing with available computing resources or edge computing, where a high-resource node acts as an access point to the resource restricted IoT devices, are two methods suggested to solve the limited resource in IoT. Several efforts have been made to address Blockchain's high resource needs. These include using a lightweight consensus method, storing summarized block information instead of real blocks, and dividing complicated calculations to execute on a high-resource machine without losing trust. A number of publications demonstrated the deployment of decentralized access control and device authentication in the Blockchain of Things.

In most studies, the high cost of Blockchain calculations and the time it takes to verify a block are cited as the major barriers to the Blockchain of Things' usability. Others believe that the major barrier to the adoption of the Blockchain of Things is the absence of clear inter-service communication protocols and Blockchain-to-Blockchain interoperability.

### 3. CONCLUSION

We performed a comprehensive literature study on the subject of Blockchain and IoT in this article. To give an overview of the state-of-the-art on the Blockchain of Things, we gathered and analyzed accessible academic literature. An overview of Blockchain systems, application areas, and research contributions was given.

There has been a lot of study on the infrastructure around Blockchain, such as deployment and storage, however more academic research might be done to propose an efficient Blockchain protocol with less computing needs. The interoperability of Blockchain platforms may be explored in order to enable various systems to collaborate. Fog computing for the Blockchain of Things has a lot of promise, but more study is needed across various Blockchain platforms and application areas.

### REFERENCES

1. A. Dorri, S. S. Kanhere, R. Jurdak, and P. Gauravaram, "LSB: A Lightweight Scalable Blockchain for IoT Security and Privacy," *ArXiv e-prints*, 2017.
2. M. Conoscenti, A. Vetro, and J. C. De Martin, "Blockchain for the Internet of Things: A systematic literature review," 2016, doi: 10.1109/AICCSA.2016.7945805.
3. R. Xu, Y. Chen, E. Blasch, and G. Chen, "BlendCAC: A smart contract enabled decentralized capability-based access control mechanism for the IoT," *Computers*, 2018, doi: 10.3390/computers7030039.
4. A. OUTCHAKOUCHT, H. ES-SAMAALI, and J. Philippe, "Dynamic Access Control Policy based on Blockchain and Machine Learning for the Internet of Things," *Int. J. Adv. Comput. Sci. Appl.*, 2017, doi: 10.14569/ijacsa.2017.080757.
5. A. Xu, M. Li, X. Huang, N. Xue, J. Zhang, and Q. Sheng, "A blockchain based micro payment system for smart devices," *Int. J. Des. Anal. Tools Intergrated Circuits Syst.*, 2016.
6. V. Strobel and M. Dorigo, "Blockchain Technology for Robot Swarms: A Shared

Knowledge and Reputation Management System for Collective Estimation,” *LNCS*, 2018.

7. M. Samaniego and R. Deters, “Hosting virtual IoT resources on edge-hosts with blockchain,” 2017, doi: 10.1109/CIT.2016.71.
8. M. Steger, A. Dorri, S. S. Kanhere, K. Römer, R. Jurdak, and M. Karner, “Secure Wireless Automotive Software Updates Using Blockchains: A Proof of Concept,” 2018.
9. M. Cebe, E. Erdin, K. Akkaya, H. Aksu, and S. Uluagac, “Block4Forensic: An Integrated Lightweight Blockchain Framework for Forensics Applications of Connected Vehicles,” *IEEE Commun. Mag.*, 2018, doi: 10.1109/MCOM.2018.1800137.
10. B. Leiding, P. Memarmoshrefi, and D. Hogrefe, “Self-managed and blockchain-based vehicular ad-hoc networks,” 2016, doi: 10.1145/2968219.2971409.
11. L. Li *et al.*, “CreditCoin: A Privacy-Preserving Blockchain-Based Incentive Announcement Network for Communications of Smart Vehicles,” *IEEE Trans. Intell. Transp. Syst.*, 2018, doi: 10.1109/TITS.2017.2777990.
12. Z. Yang, K. Zheng, K. Yang, and V. C. M. Leung, “A blockchain-based reputation system for data credibility assessment in vehicular networks,” 2018, doi: 10.1109/PIMRC.2017.8292724.
13. A. Laszka, A. Dubey, M. Walker, and D. Schmidt, “Providing privacy, safety, and security in IoT-based transactive energy systems using distributed ledgers,” 2017, doi: 10.1145/3131542.3131562.
14. A. Hahn, R. Singh, C. C. Liu, and S. Chen, “Smart contract-based campus demonstration of decentralized transactive energy auctions,” 2017, doi: 10.1109/ISGT.2017.8086092.
15. H. YAN, B.-B. HUANG, and B.-W. HONG, “Distributed Energy Transaction Pattern and Block Chain Based Architecture Design,” *DEStech Trans. Environ. Energy Earth Sci.*, 2018, doi: 10.12783/dteees/epee2017/18091.



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## AN EXAMINATION OF HOW MUCH WATER IS NEEDED FOR COAL-FIRED POWER PRODUCTION WATER FOOTSTEPS IN GRAY AND BLUE

**Bhagwan\***

\*Assistant Professor,  
Department of Mechanical Engineering,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- Bhagwan.engineering@tmu.ac.in

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### ABSTRACTS

*Despite the fact that water scarcity is inextricably linked to coal-fired power production, water footprint studies are few. This research seeks to overcome this restriction by performing the first-ever water footprint analysis of coal-based power production in China to educate decision-makers on how to minimize freshwater use and wastewater outflow. In 2015, 1 kWh of energy generated 1.78 10<sup>3</sup> m<sup>3</sup> of gray water footprint in China, which is 1.3 times more than the blue water footprint score of 1.35 10<sup>3</sup> m<sup>3</sup> /kWh. Although the national total gray water footprint grew substantially from 2006 to 2015 as power producing capacity expanded, the water footprint of 1 kWh of energy supply reduced. The blue water footprint showed the opposite tendency. Gray water footprint was dominated by indirect processes, whereas direct freshwater use contributed 63.6 percent to blue water footprint. Transportation, direct freshwater use, direct air emissions, and coal washing may all be improved, resulting in significant environmental advantages. Phosphorus, mercury, hexavalent chromium, arsenic, COD, and BOD5 were also important components of the gray water footprint. According to the findings, combining rail and water transportation should be emphasized. The planned shift to a high coal washing rate and the construction of pithead power plants may help to alleviate environmental costs, but water supplies in coal-producing areas must be addressed.*

**KEYWORDS:** *Water Footprint Life Cycle Assessment Coal-Based Electricity Time Course Transportation.*

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### 1. INTRODUCTION

Human activities and industrial processes need electricity. Global power output has risen significantly in recent years as the global economy and population have grown. Coal-fired power plants now produce about 40% of worldwide electricity (IEA, 2017), with China accounting for 65.2 percent of global energy production capacity (NBSC, 2017). Because water is required at all stages of power production, coal-based electricity generation has a high water sensitivity (IEA, 2016). Throughout the life cycle of power production in China, over 6% of total industrial

freshwater use and 7% of wastewater outflow have been recorded (NBSC, 2016a; NBSC, 2016b). High wastewater discharge has substantial effects on water habitats, such as freshwater eutrophication and ecotoxicity, in addition to increasing water shortages (Cui et al., 2012). The operating stage of power plants, in example, accounts for 4.7 percent of China's total industrial freshwater consumption and 1.6 percent of the country's wastewater discharge, while the coal mining and washing phases account for 1.3 and 5.5 percent, respectively (NBSC, 2016a; NBSC, 2016b). Furthermore, in water management of electricity production, the water demand and emissions that are simultaneously generated in other indirect phases (e.g., building construction and waste disposal) should be addressed (Fthenakis and Kim, 2010). As a result, comprehensive studies of the water used and released throughout China's coal-based power generation's full life cycle are required.

[1] Water footprint (WF) is a comprehensive indicator for evaluating water resource consumption (blue and green WFs) and pollution status (gray WF) caused by human activities in spatial and temporal dimensions; it takes into account all direct and indirect processes (Hoekstra et al., 2011). Hoekstra was the one who originally suggested WF (Hoekstra et al., 2011).

[2] Agricultural fields (Cao et al., 2018; Lovarelli et al., 2016) and regional levels (Hoekstra and Mekonnen, 2012; Pellicer-Martinez and Martinez-Paz, 2018) have been the subject of WF research. Systematic and comprehensive examinations of industrial operations, especially at the business level, on the other hand, remain few. Furthermore, conventional techniques fail to evaluate complex industrial processes across their whole life cycle (Berger et al., 2012), as well as air and soil pollutants that affect water quality (ISO, 2014). These techniques also make it impossible to compare various goods (Rigout and Pfizer, 2013). The life cycle assessment (LCA) approach was suggested by the Worldwide Organization for Standardization as an international standard for WF analysis (ISO, 2014). This approach involves an inventory study similar to that used in conventional methods (e.g., virtual water) and analyzes [3] the environmental effect of a product's, process's, or activity's full life cycle. Bayart et al. (2010) presented a general framework that incorporates freshwater usage into LCA among the researchers that have researched WF technique. Meanwhile, a number of water scarcity methods have been published improved the WF technique by taking atmospheric evaporation recycling into account. Environmental effects were mostly generated from water scarcity in the research described above, which has an impact on agricultural irrigation, food production, and ecosystem variety. The majority of recent case studies on LCA-based WF analysis have simply merged LCA findings with blue WF results [2](Jefferies et al., 2012). Gray WF, on the other hand, has a higher environmental effect than blue WF. As a result, gray WF should be investigated statistically to determine its effect on water supplies. Too far, the majority of gray WF quantification has been predicated on pollutant concentration. The environmental destiny of pollutants in water, soil, and atmospheric media, as well as the exposure route and harmful consequences on people and the environment, have been largely ignored in most research. Ridoutt and Pfister (2013), for example, used the ReCiPe technique to investigate harmful consequences. The ReCiPe technique, on the other hand, is well-known for evaluating toxicity effects using a multi-media fate and multi-pathway intake approach (Fig.1; Goedkoop et al., 2013). WF is a metric for determining how much water is eaten and contaminated by human activities (Hoekstra et al., 2011); therefore, toxicity analysis in gray WF assessment should only evaluate the effect of water media based on multi-pathway intake (e.g., fish and water intake; Bulle et al., 2013). The line between LCA and WF analyses is shown in Fig. 1.

The steady-state concentration of pollutants in water media should be utilized to determine the intake factor for WF analysis since pollutants released to multi-media (e.g., soil, plant, air, and sediment) may enter water media. Because of the system boundary of WF (Fig. 1; ISO, 2014; Bulle et al., 2013), toxicity effects from steady-state concentrations of contaminants in other media through multi-pathway intake should be avoided. As a result, Ridoutt and Pfister (2013)'s toxicity impact overstated WF (Fig.S1). Furthermore, differences in regional water resource availability and quality have been overlooked in gray WF evaluations, despite the fact that both may influence water media's capacity to tolerate contaminants. At the moment, research on WF analysis in electricity production is scarce, with only a few exceptions: hydropower (Mekonnen and Hoekstra, 2012; Herath et al., 2011), biofuels (Gerbens-Leenes et al., 2009), and water usage during electricity generation receiving attention (Shaikh et al., 2017). The few research available on LCA-based WF analysis of electricity concentrate on blue WF, such as those published by Fthenakis and Kim (2010), Mekonnen et al. (2015), and Ou et al (2016). Gray WF has only been studied a few times. Furthermore, no WF study of coal-based energy has been performed using the LCA model to our knowledge. As a result, the current study aims to: (1) quantify the WF of China's coal-based electricity generation, including the gray and blue WF scores, using the LCA method at the macro level; (2) analyze the time course of WF from 2006 to 2015; (3) identify the key direct and indirect influencing factors throughout the entire electricity generation stages; and (4) provide useful suggestions for improving water management in China[4].

### 1.1. Define the goal and scope of the project

To offer a comparable baseline for all analytical findings and inventories, the functional unit was established as 1 kWh of power supply in this research. Coal mining and washing, transportation (coal, building materials, chemicals, and solid waste), and three power generating methods (subcritical, supercritical, and ultra-critical) were all taken into account. Waste disposal, direct waste emissions, power plant infrastructure (i.e., equipment and buildings), and land occupancy are all involved in each step.

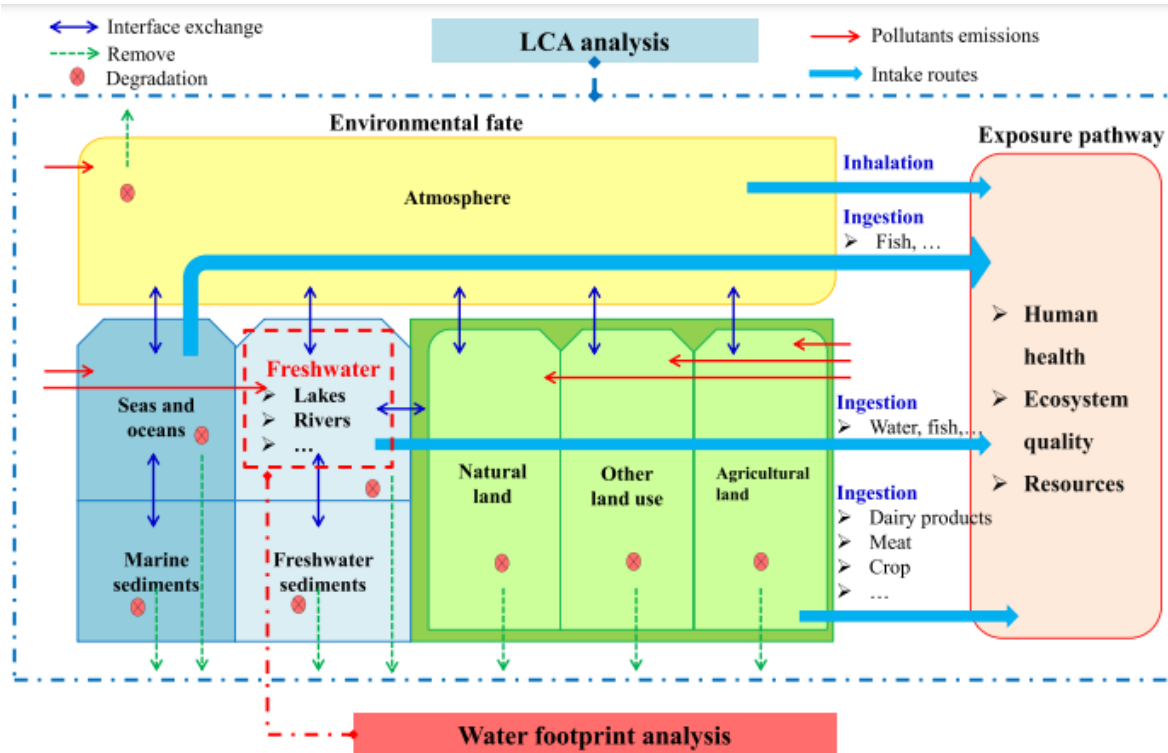
Furthermore, [5]direct WF reflects water used and waste produced on-site (i.e., wastewater, waste gas, and solid waste), while indirect WF represents water consumed and waste generated from raw material manufacturing, transportation, and other relevant indirect supply chain activities[6].

The gray and blue WFs were used in this research, but the green WF was left out since rainfall is often used in agriculture. At the midway level, five categories were considered: carcinogens, non-carcinogens, freshwater ecotoxicity, aquatic eutrophication, and water shortage. In this research, the revised characterization variables in three previous categories from the USEtox<sup>TM</sup> model were used. Based on the studies of Li et al. (2016) and Zhang et al. (2016), this model tracks the emissions, environmental destiny, exposure pathway, intake routes, risk, and harm in China (2016). This research took into account only contaminants that reach waterways via direct emissions and migration (Fig. 1). The aquatic 548 characterization factors eutrophication were derived using the IMPACT World+ mode since it can be utilized globally. X. Ma et al. / Science of the Total Environment The characterization factors used for water scarcity were those reported by Berger et al. (2014), who linked annual water consumption to availability in over 11,000 basins and took into account atmospheric evaporation recycling effects and product integration of freshwater (i.e., surface and ground water). Following that, the five categories were divided into gray (carcinogens, noncarcinogens, freshwater ecotoxicity, and freshwater

eutrophication) and blue (water shortage) WFs. According to Hoekstra et al's definition, the gray WF value was determined from the condition of regional water resources in China (2011). The regional water quality condition and resource amount (surface and ground water) in China are shown in Figures 3a and b, respectively (MEPC, 2015; NBSC, 2017). Finally, a WF analysis was performed.

**2. DISCUSSION**

The impact of a 5% change in key processes on the analysis findings was investigated in order to assess the connections between input variables and analysis results. The major categories have been discovered. Except for non-carcinogens, where the sensitivity of gray WF and its relevant midpoints was dramatically reduced, transportation showed the greatest change in gray WF and its important midpoints. Transportation emissions were somewhat higher than direct air emissions. Forth most significant factor was direct freshwater ingestion, which was blue WF. Transportation and coal mining come next. In the meanwhile, optimizing the gray and black variations were the least variable in coal mining and coal washing. [7] Blue WFs, and so forth. Specifically, the research found that the transit distance of by truck, coal was transported to power generating facilities across a distance of around 100 kilometers. Rail and water transport, on the other hand, played significant roles in Chinese history average distance of 600 kilometers. in the year 2015. Figure 1 discloses the Comparison of LCA and WF analysis.



**Figure 1: Comparison of LCA and WF analysis.**

On the other hand, transmission losses in China have accounted for approximately 6% of total energy supply during the last ten years, which is greater than transmission losses in Luxembourg (1.5%) and Slovakia (3.7%) (Treyer and Bauer, 2016). Furthermore, distribution transformer

losses account for 40% to 50% of overall losses in China (MIIT, 2015). Because of the country's high need for long-distance transmission owing to its distribution disparity in coal output and large area, China's ability to decrease power supply line loss is restricted. However, if the loss rate of distribution transformers is lowered by 20%, the national total WF would fall by 6.8 10<sup>7</sup> m<sup>3</sup> in 2015. Furthermore, China's power coal washing capacity was 1.5 10<sup>9</sup> t in 2015, with a 53.5 percent washing rate, which is lower than the worldwide advanced level of 75 percent for the UK in 1998 (Ode and Cocker ill, 2008) and 90 percent for the US in 2006. (Ghosh, 2013). China's coal, on the other hand, is of low quality. The average calorific value of power coal in China is 19.3 MJ/kg lower than in the United Kingdom (24.5 MJ/kg), and the ash content is 1.9 percent compared to 6.3 percent in the United Kingdom. 1.5 percent, 4.3 percent, 67.8%, 5.6 percent, and 12.6 percent Others Mining of coal Crude oil is a kind of crude oil that is used Chemicals that aren't organic Landfill for transportation an u q an u q an u q an u q aa brand new aci h port ue Others: 60.5 percent 2.5 percent 20.6 perc On the other hand, transmission losses in China have accounted for approximately 6% of total energy supply during the last ten years, which is greater than transmission losses in Luxembourg (1.5%) and Slovakia (3.7%) (Treyer and Bauer, 2016). Furthermore, distribution transformer losses account for 40% to 50% of overall losses in China (MIIT, 2015). Because of the country's high need for long-distance transmission owing to its distribution disparity in coal output and large area, China's ability to decrease power supply line loss is restricted (Fig. 7). However, if the loss rate of distribution transformers is lowered by 20%, the national total WF would fall by 6.8 10<sup>7</sup> m<sup>3</sup> in 2015. Furthermore, China's power coal washing capacity was 1.5 10<sup>9</sup> t in 2015, with a 53.5 percent washing rate, which is lower than the worldwide advanced level of 75 percent for the UK in 1998 (Odeh and Cocker ill, 2008) and 90 percent for the US in 2006. (Ghosh, 2013). China's coal, on the other hand, is of low quality. The average calorific value of power coal in China is 19.3 MJ/kg lower than in the United Kingdom (24.5 MJ/kg), and the ash content is 1.9 percent in China. China continues to be the world's biggest mercury emitter (Zhao et al., 2015), with emissions from the coal power generating chain (about 455 t in 2015) serving as the primary sour. Mercury's high toxicity poses a [8] significant danger to human health and ecosystems, including damage to the nervous system and prenatal brain development. It is critical to improve China's coal washing rate in this regard. Furthermore, if 100 million tons of raw coal are chosen, roughly 1.8 10<sup>7</sup> t of gangue may be removed (CCPUA, 2017). The gray and blue WFs arising from coal transportation may be reduced by 1.6 10<sup>7</sup> m<sup>3</sup> and 3.6 10<sup>6</sup> m<sup>3</sup>, respectively, if the washing rate is increased to 90%. The major coal-producing areas in China (Fig. 7a), which include the provinces of Shanxi, Inner Mongolia, and Shaanxi, account for approximately 65 percent of total coal output (NBSC, 2017). 0.E+00 2.E+09 4.E+09 6.E+09 8.E+09 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 China's power generating sites are 0.E+00 2.E+09 4.E+09 6.E+09 8.E+09 554 X. Ma et al. / Science of the Total Environment 636 (2018) 547–557 primarily concentrated in the eastern coastal are Science of the Total Environment 636 (2018) 547–557 (Fig. 7b). The Chinese government developed the "West-East energy transmission project" to turn western coal resources into economic benefits and alleviate power shortages in the eastern areas. The project includes, for example, the transfer of about 7.4 10<sup>10</sup> kWh of energy from pithead power plants in Shanxi Province (NBSC, 2017). Meanwhile, the aforementioned coal producing locations' water resources account for just 3.4 percent of the country's total resources (NBSC, 2017). Electricity transmission to neighboring provinces may result in about 2.5 10<sup>8</sup> m<sup>3</sup> WF, accounting for 19.1% of Shanxi Province's total industrial water



use. Notably, Shanxi Province's water resources per capita are less than 500 m<sup>3</sup> per capita per year, indicating extreme water shortage (UNESCO, 2015). Electricity transmission will result in a 3% reduction in Shanxi Province's 257.1 m<sup>3</sup>/capita/year water resources (Fig.3 b). As a result, although coal-based power transmission has reduced energy demand and environmental deterioration[9] in the eastern areas, it exacerbates the western regions' already severe water scarcity. Balancing the contradictions of coal scarcity in the east and water scarcity in the west is a problem that the Chinese government must solve. In the coal cleaning business, a similar scenario exists. Coal washing will use 6.5 10<sup>7</sup> m<sup>3</sup>, 6.3 10<sup>7</sup> m<sup>3</sup>, and 3.6 10<sup>7</sup> m<sup>3</sup> freshwater in Shanxi, Inner Mongolia, and Shaanxi Provinces, respectively, assuming a 90% washing rate. These figures resulted in an increase of 80% in 0 0-805 There is no information available. Between 2011 and 2013, the calorific value of power coal dropped from 19.11 MJ/kg to 18.78 MJ/kg (CCPUA, 2017). The rise in gray WF induced by 1 kWh of energy supply during this time was mostly due to this reduction (Fig. 6a). The coal cleaning sector should be promoted since it can decrease ash content and improve heating power. Furthermore, the United Nations Environment Program stated that by removing coal gangue using coal washing technology, up to 78 percent mercury may be eliminated (UNEP, 2002). According to Liang et al. (2016), the average mercury concentration in coal gangue is 181.9 ng/g (n = 60), which is greater than the mercury concentration in raw coal (102.5 ng/g, n = 60) in China. China continues to be the world's biggest mercury emitter (Zhao et al., 2015), with emissions from the coal power generating chain (about 455 t in 2015) serving as the primary source (Zhang et al., 2015; UNEP, 2013). Mercury's high toxicity poses a significant danger to human health and ecosystems, including damage to the nervous system and prenatal brain development[10]. It is critical to improve China's coal washing rate in this regard. Furthermore, if 100 million tons of raw coal are chosen, roughly 1.8 10<sup>7</sup> t of gangue may be removed (CCPUA, 2017). The gray and blue WFs arising from coal transportation may be reduced by 1.6 10<sup>7</sup> m<sup>3</sup> and 3.6 10<sup>6</sup> m<sup>3</sup>, respectively, if the washing rate is increased to 90%. The major coal-producing areas in China (Fig. 7a), which include the provinces of Shanxi, Inner Mongolia, and Shaanxi, account for approximately 65 percent of total coal output (NBSC, 2017). 0.E+00 2.E+09 4.E+09 6.E+09 8.E+09 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 China's power generating sites are 0.E+00 2.E+09 4.E+09 6.E+09 8.E+09 Eutrophication of aquatic ecosystems Scarcity of water Figure. Timeline of China's coal-based power supply: a, midpoint WF of 1 kWh of electricity supply; b, national total WF; c, major heavy metal emissions throughout the life cycle of 1 kWh of electricity supply/ Science of the Total Environment 636 (2018) 547–557 (Fig. 7b). The Chinese government developed the "West-East energy transmission project" to turn western coal resources into economic benefits and alleviate power shortages in the eastern areas. The project includes, for example, the transfer of about 7.4 10<sup>10</sup> kWh of energy from pithead power plants in Shanxi Province (NBSC, 2017). Meanwhile, the aforementioned coal producing locations' water resources account for just 3.4 percent of the country's total resources (NBSC, 2017). Electricity transmission to neighboring provinces may result in about 2.5 10<sup>8</sup> m<sup>3</sup> WF, accounting for 19.1% of Shanxi Province's total industrial water use. Notably, Shanxi Province's water resources per capita are less than 500 m<sup>3</sup> per capita per year, indicating extreme water shortage (UNESCO, 2015). Electricity transmission will result in a 3% reduction in Shanxi Province's 257.1 m<sup>3</sup>/capita/year water resources (Fig.3 b). As a result, although coal-based power transmission has reduced energy demand and environmental deterioration in the eastern areas, it exacerbates the western regions' already severe water scarcity. Balancing the



contradictions of coal scarcity in the east and water scarcity in the west is a problem that the Chinese government must solve. In the coal cleaning business, a similar scenario exists. Coal washing will use 6.5 107 m<sup>3</sup>, 6.3 107 m<sup>3</sup>, and 3.6 107 m<sup>3</sup> freshwater in

When expanding the energy sector, the government should take into account the limitations on water resources and limit the size of coal power.

### 3. CONCLUSION:

This research utilized the LCA approach to do a WF analysis of coal-based power production during the last ten years. In 2015, gray WF in China was 1.3 times that of blue WF, with aquatic eutrophication, non-carcinogens, and carcinogens accounting for the majority of the environmental load. Indirect WF dominated the impact in gray WF (i.e., over 84 percent), whereas direct WF contributed 63.6 percent to blue WF. Transportation, coal mining and washing, crude oil production, and landfill all contributed to the problem. Meanwhile, since 2013, the overall gray WF in the United States has exceeded the blue WF. indirect processes are causing an increase in environmental burdens. The contribution of direct labor is measured at each stage of the life cycle. The amount of wastewater discharged was minimal, but air contaminants were abundant. (e.g., arsenic and mercury) that entered water via migration influenced the total gray WF by 15.6 percent. Meanwhile, chromium, TP Indirect processes were dominated by mercury to air, whereas direct processes were dominated by (VI), arsenic, mercury to soil, COD, and BOD. processes. Arsenic was also involved in direct processes, accounting for 27.3 percent of total gray WF. In the last 10 years, there has been a 30% drop in It was discovered that COD emissions were present. A minimal decrease, on the other hand, was achieved. TP and heavy metal emissions have been found. These findings suggest that Phosphorus, arsenic, and mercury discharge should all be prioritized in China's Five-Year Plan. Sensitivity studies revealed that the government should promote rail transit in conjunction with water transportation. In order to manage WF, road traffic must be restricted simultaneously. Improving the pace at which coal is washed may also assist to minimize environmental impacts. Arising from air pollution and traffic, particularly in the case of mercury released into the atmosphere the government, on the other hand, should set reasonable limits. Western areas rely on coal-fired power due to a severe lack of water supplies. Despite this, the research has a number of flaws. Studies on interregional WF flow, for example, should be included. Aside from that, our study team will take into account a wider range of environmental factors. In the future, gray WF assessment will have ramifications[9].

### REFERENCE:

1. A. Gunatilaka, "Water security and related issues in Sri Lanka: The need for integrated water resource management (IWRM)," *J. Natl. Sci. Found. Sri Lanka*, 2008, doi: 10.4038/jnsfsr.v36i0.8045.
2. Y. Zhang, J. H. Zhang, Q. Tian, Z. H. Liu, and H. L. Zhang, "Virtual water trade of agricultural products: A new perspective to explore the Belt and Road," *Sci. Total Environ.*, 2018, doi: 10.1016/j.scitotenv.2017.11.351.
3. K. G. M. Thilina, E. Hossain, and M. Moghadari, "Cellular OFDMA Cognitive Radio Networks: Generalized Spectral Footprint Minimization," *IEEE Trans. Veh. Technol.*, 2015, doi: 10.1109/TVT.2014.2353646.

4. K. Cheng *et al.*, “Adaptive allocation modeling for a complex system of regional water and land resources based on information entropy and its application,” *Water Resour. Manag.*, 2015, doi: 10.1007/s11269-015-1099-3.
5. M. M. Rojas-Downing *et al.*, “Food Footprint as a Measure of Sustainability for Grazing Dairy Farms,” *Environ. Manage.*, 2018, doi: 10.1007/s00267-018-1101-y.
6. M. Kucukvar, M. Noori, G. Egilmez, and O. Tatari, “Stochastic decision modeling for sustainable pavement designs,” *Int. J. Life Cycle Assess.*, 2014, doi: 10.1007/s11367-014-0723-4.
7. Á. Galán-Martín, P. Vaskan, A. Antón, L. J. Esteller, and G. Guillén-Gosálbez, “Multi-objective optimization of rainfed and irrigated agricultural areas considering production and environmental criteria: a case study of wheat production in Spain,” *J. Clean. Prod.*, 2017, doi: 10.1016/j.jclepro.2016.06.099.
8. T. C. Ponsioen and H. M. G. van der Werf, “Five propositions to harmonize environmental footprints of food and beverages,” *J. Clean. Prod.*, 2017, doi: 10.1016/j.jclepro.2017.01.131.
9. V. Kanakoudis, S. Tsitsifli, and A. Papadopoulou, “Integrating the carbon and water footprints’ costs in the water framework directive 2000/60/EC full water cost recovery concept: Basic principles towards their reliable calculation and socially just allocation,” *Water (Switzerland)*, 2012, doi: 10.3390/w4010045.
10. J. Ma and J. Peng, “Research progress on water footprint,” *Shengtai Xuebao/ Acta Ecol. Sin.*, 2013, doi: 10.5846/stxb201305131040.

## WATER FOOTPRINTS AND WATER ALLOCATION IN A SUSTAINABLE MANNER

Teshu Kumar\*\*

\*Assistant Professor,  
Department of Agricultural Sciences,  
Faculty of Agriculture Science,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- gpsingh.agriculture@tmu.ac.in

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### ABSTRACT

*Water footprint assessment (WFA) is a rapidly expanding area of study. This Special Issue includes a collection of articles that advance the subject or demonstrate novel applications. The first seven articles are WFA studies on a regional scale, ranging from urban to continental; the following five papers are global in scope; and the last five papers are focused on water sustainability from a commercial perspective. The collection of articles demonstrates that the historical image of a town depending on its hinterland for water and food is no longer accurate: urban consumers' water impact is worldwide. Even while water is and will remain a public resource with government playing a key role, it has become apparent that smart water administration is no longer the sole province of government. With the majority of water utilized in the production of food and other consumer products, and product supply chains becoming more complicated and global, consumers, businesses, and investors are becoming increasingly conscious of their involvement. Interest in sustainable water use is growing rapidly in both civil society and the business community, but due to companies' lack of transparency regarding their direct and indirect water use, we still have a long way to go before we can expect them to effectively contribute to making water footprints more sustainable on a large scale.*

**KEYWORDS:** *Green, Blue, Grey Water Footprint; Water Scarcity; Water Pollution; Sustainability; Efficiency; Equity; Water Stewardship.*

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### 1. INTRODUCTION

The scientific subject of Water Footprint Assessment (WFA) is quickly developing, as shown by the exponential increase in the number of papers published in this area. Water footprint research has grown more intense than ecological footprint research, with over 140 scholarly articles on the topic published in the Web of Science database in 2014. WFA is the study of the relationship between human consumption and the use of fresh water to manufacture the goods consumed. The water footprint (WF) is a multi-dimensional assessment of freshwater consumption by a producer or consumer, both directly and indirectly. The green and blue components of the consumptive WF reflect rainfall and surface/groundwater consumption, respectively; the

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derivative WF, often known as the grey WF, represents the amount of water needed to digest contaminants entering freshwater systems. The WF[1] of consumption by individuals within a certain area is made up of two parts: an internal WF (freshwater consumption and pollution inside the area) and an external WF (freshwater consumption and pollution elsewhere for manufacturing goods imported by and eaten within the region). The WF idea is therefore inextricably connected to the concept of virtual water commerce. Because an importing area does not need to utilize its own water resources, trade in water-intensive goods saves water resources[2]. Sustainability, vol. 8, no. 20, available at [www.mdpi.com/journal/sustainability](http://www.mdpi.com/journal/sustainability) to manufacture them locally.

To determine the environmental sustainability of water usage in a river basin, the WF must be compared to the maximum sustainable WF, which is determined by the basin's available water resources. Given available runoff, storage capabilities, and environmental flow criteria, the maximum sustainable blue WF in a river basin refers to the volume of renewable freshwater that is maximally accessible over time within a year for consumptive purposes. The maximum sustainable ground-WF, which takes into account groundwater recharge, maximum tolerable groundwater level drop, and necessary base flow to the river, may be distinguished from the maximum sustainable surface-WF. The available runoff to absorb pollutants determines the maximum sustainable grey WF in a river basin.

To comprehend the efficiency of a process or product's water usage, one must evaluate the WF in the perspective of what is realistically[3] feasible given best available technology and practice, for which benchmarks are becoming more accessible. Water usage equity may be investigated by comparing WFs across communities and comparing WFs of different individuals to equitable shares given the restricted supply. This Special Issue contains a compilation of articles that advance the subject of WFA or demonstrate novel applications. The first seven articles are WFA investigations on a regional scale, ranging from urban to continental. Then there are five articles with a global scope, followed by five papers on water stewardship and WF from a business perspective. In this editorial, we place the articles in the context of the field's ongoing evolution and make some broad conclusions.2. WFA on a National and International Scale The ecological footprint concept, which looks at land requirements to sustain consumption, is based on the understanding that the essence of cities is that they contain concentrations of people who rely on the rural environment for their food supply, resulting in a footprint that extends beyond the city's boundaries . The majority of research in the area of water footprint assessment is conducted at the river basin, national, and global levels, thus application at the urban level is still in its infancy.

Offer the first overview of studies on cities' water footprint in this Special Issue. They notice that a variety of techniques are utilized to estimate the[4] WF of consumption. According to Hoekstra et al. [4, the bottom-up approach involves multiplying consumption volumes in an area by the WFs of the products consumed, as measured at the point of production, whereas the top-down approach involves calculating the WF of consumption in an area as the WF of production in the area plus the virtual water imports to the area minus the virtual water exports. Other methods include using environmentally extended input-output (EEIO) models, which use economic input-output tables and thus take into account sector-level data, and life cycle assessment (LCA) models, which use databases to estimate the environmental, including water, and health impacts of products over their entire life cycle. Paterson et al. predict that hybrid methods incorporating

the aforementioned methodologies will be increasingly used to combine scales and accessible information[5]. Demonstrate in their research of the WF of consumption in Beijing that the WF of consumers in this megacity is approximately ten times more than the volume of accessible water resources, resulting in a large external WF.

Rush forth and Riddell contribute methodologically by estimating intra-metropolitan area virtual water flows utilizing commodity and labor flows to quantify the WF of the Phoenix Metropolitan Area in examine WF at the river basin level—still the most frequent level for water analyses—and investigates the sustainability of WF of agricultural production in the Duero River Basin in Spain from a production rather than a consumption viewpoint. Despite the Duero basin's relative humidity, their study indicates that the present blue WF of crop cultivation produces considerable or severe water stress in two to five months each year, and that future irrigation expansion may obstruct a shift to more sustainable water usage. Lopez and Bautista-Capitally look at the effect of planting date on the WF of dry bean output in Mexico's main producing area. Sustainability 2016, 8, 20 3 of 6 is the first research to examine the sensitivity of WFs in crop production to sowing date, demonstrating that a wise sowing date may significantly decrease the blue conducted a research at the national level, including a production viewpoint. It examines changes in WF of crop production in Spain over a fifty-year period at the provincial level, demonstrating the effects of various mechanisms such as an increase in overall production and a relative shift from growing cereals, legumes, and fodder crops for domestic consumption to producing horticultural products, fruits, and olives for export. In a thorough research covering Latin America and the Caribbean, integrate consumer and production views. This research is unique in that it looks at ways to assess not only the environmental sustainability of WFs at a high spatial resolution, but also their economic efficiency based on WF benchmarks and social equity of water allocation by comparing WF levels across countries and contrasting WF levels in agriculture with levels of malnutrition. Ironically, the region's high levels of malnutrition coincide with plentiful water and food production, as well as extensive utilization of land and water for export commodities like soybeans.

## 2. DISCUSSION:

In this Special Issue is a first attempt to examine inter-annual variations in the WF of production and consumption for forty nations from 1995 to 2009. They discover, in particular, that the physical and economic effect of economic development on water supplies has been substantially reduced compared to what might have been. Schwarz look at how interregional virtual water flows have changed between five global regions from 1986 to 2011. Their findings back with previous research that shows the global virtual water trade has grown significantly over time. They also demonstrate that, owing to high trade values and low related virtual water volumes, the move toward high-value exports is advantageous for low-income nations in terms of regional economic water efficiency. Since 2000, the economic water efficiency of trade has improved in all areas, with Europe having the highest return to virtual water exports[6].

The majority of international virtual water commerce is related to food Are the first to examine the WF of global food assistance, which had hitherto been overlooked in studies of virtual water trade. In 2005, the WF of global food assistance was about 0.5 percent of the WF of international food commerce and 2.0 percent of the WF of land grabbing (water appropriation linked with major agricultural land transactions), according to the researchers. The research also discovered a substantial overlap between nations receiving food assistance and those experiencing land grabs.



With greater attention being paid to interactions between water, land, food, energy, and climate, there is a need to examine water, land, carbon, and other footprints more coherently and to place the various footprints in the context of local, regional, or global planetary limits. [7]

Address the problem of reducing carbon footprint in the transportation sector via greater use of biofuels would ultimately raise the sector's WF, echoing previous results. They show that biofuels can reduce global warming potential by about 50% over the product life cycle, but that blue water consumption will increase by a factor of 19. In a life-cycle based case study on passenger cars, they show that biofuels can reduce global warming potential by about 50% over the product life cycle, but that blue water consumption will increase by a factor of 19. Fang et al. have taken up the issue of connecting the environmental footprint research with the planetary borders literature in a comprehensive analysis that places the carbon, water, and land footprints of 28 countries in the context of assigned planetary limits. The planetary carbon boundary is assigned to country-specific shares based on population size per country, while nation-specific environmental limits for land and water resource usage are defined by land and water availability inside national borders, according to the research. Environmental sustainability ratios are computed for each nation and kind of footprint as the ratio of a footprint to the appropriate boundary. The method of allocating planetary boundaries to country level will remain a contentious issue in our opinion, because any allocation mechanism is essentially normative; however, the strength of an analysis like that conducted by Fang et al. is that it shows the implications at the country level given a given allocation rationale. Future research may demonstrate the consequences of alternative allocation rationales, such as downscaling planetary boundaries for land and water to nations based on population, similar to the method used to downscale the planetary boundary for greenhouse gas emissions[8].

## **2.1. Water Footprints of Corporations:**

Since 2008, there has been a surge in interest in WFA as a tool for analyzing corporate water sustainability, risk, and stewardship. Atonally and Ruin contribute to this Special Issue by expanding on the example of Barilla, an Italian business that has used WF accounting as part of its corporate social responsibility strategy. The company's goal is to provide so-called environmental product declarations that indicate their goods' environmental, carbon, and water footprints. The research looks at the impact of various durum wheat types on the size and color composition of the water footprint, demonstrating the possibility of conserving blue water resources in a dry environment. is the first WFA analysis of a Science Park, including a case study of Taiwan's Hinchey Science Park. Using an input-output model, the research reveals that three of the six industrial sectors at the Science Park were more reliant on foreign water supplies between 2001 and 2006, relieving Taiwan's water crisis.

Contribute to this Special Issue with a study of data center WF, taking into account both the WF of cooling and the indirect WF of the energy consumed. Outbound data traffic from data centers is projected to produce a WF of 1 to 205 liters per gigabyte (approximately equivalent to the WF of 1 kg of tomatoes at the high end of the range). Typically, energy consumption accounts for the vast majority of a data center's WF[9].

Sojamo addresses the important question of whether corporate water stewardship—proactive corporate engagement in water management and governance—really offers a solution to global water challenges, as often suggested, or whether it can instead be viewed as a form of "blue-



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washing" and cover-up of efforts to ensure continued and enhanced private access to scarce water resources. The article suggests that the stewardship agenda would benefit from: explicit acknowledgement of power imbalances between corporations and other parties; more careful and systematic evaluation and enhancement of corporations' legitimacy to engage in public good and common pool water stewardship initiatives in South Africa, based on the findings of a case study of corporations active in water stewardship initiatives in South Africa.

Any attempt toward corporate water sustainability and water stewardship must start with transparency regarding a company's operational and supply-chain water use and contamination. Linne examine the water transparency of the Netherlands' top 75 publicly traded businesses. They create and use a unique approach to evaluate businesses based on their water transparency, which is defined as how much information a firm publicly reveals about its direct and indirect claim on freshwater resources, as well as what it does to minimize that claim. The approach is comprised of a checklist that may be completed using data from annual reports, sustainability reports, and company websites. The findings reveal significant variations in openness across and within sectors, as well as the fact that businesses disclose more about their operations than their supply chain. The greatest transparency score was just 43% (on a scale of 0–100%), with 34 out of 75 businesses receiving a score of 0, suggesting that corporate openness on water usage is improving but still at a low level[10].

### 3. CONCLUSION:

The paper in this Special Issue, as well as the evolution of the WFA discipline in general, demonstrate that connecting various geographical levels of analysis remains a significant issue. Water resource problems have traditionally been seen to be most important at the local to river basin level. Freshwater resources have a global character, according to WF research, since water used to produce export goods may increase local water consumption and scarcity, while importing water-intensive commodities can relieve the strain on local water resources. The old image of a town depending on its hinterland for water and food is no longer accurate: the water footprint of a city's customers is worldwide. We've progressed to the point where we can measure and map such footprints, but we're still a long way from knowing how to manage footprints in a sustainable manner. Even while water is and will remain a public good with government playing a key role, it has become apparent that smart water administration is no longer the sole province of government. Consumers, businesses, and investors all play an essential role. Despite the rapidly growing interest in sustainable water use in both civil society and the business community, the lack of transparency of companies' direct and indirect water use means that we still have a long way to go before we can expect companies to effectively contribute to making water footprints more sustainable on a large scale[5].

### REFERENCES:

1. D. Wichelns, "Water productivity and water footprints are not helpful in determining optimal water allocations or efficient management strategies," *Water Int.*, 2015.
2. Á. Galán-Martín, P. Vaskan, A. Antón, L. J. Esteller, and G. Guillén-Gosálbez, "Multi-objective optimization of rainfed and irrigated agricultural areas considering production and environmental criteria: a case study of wheat production in Spain," *J. Clean. Prod.*, 2017.
3. R. R. Rushforth and B. L. Ruddell, "The vulnerability and resilience of a city's water

footprint: The case of Flagstaff, Arizona, USA,” *Water Resour. Res.*, 2016.

4. D. Zhao and J. Liu, “A new approach to assessing the water footprint of hydroelectric power based on allocation of water footprints among reservoir ecosystem services,” *Phys. Chem. Earth*, 2015.
5. A. S. Atzori, C. Canalis, A. H. D. Francesconi, and G. Pulina, “A Preliminary Study on a New Approach to Estimate Water Resource Allocation: The Net Water Footprint Applied to Animal Products,” *Agric. Agric. Sci. Procedia*, 2016.
6. A. Y. Hoekstra, A. K. Chapagain, and G. Zhang, “Water footprints and sustainable water allocation,” *Sustainability (Switzerland)*. 2016.
7. M. Xu, C. Li, X. Wang, Y. Cai, and W. Yue, “Optimal water utilization and allocation in industrial sectors based on water footprint accounting in Dalian City, China,” *J. Clean. Prod.*, 2018.
8. G. Liu, L. Shi, and K. W. Li, “Equitable allocation of blue and green water footprints based on land-use types: A case study of the Yangtze River economic belt,” *Sustain.*, 2018.
9. A. Y. Hoekstra, “Sustainable, efficient, and equitable water use: the three pillars under wise freshwater allocation,” *Wiley Interdisciplinary Reviews: Water*. 2014.
10. C. Li, M. Xu, X. Wang, and Q. Tan, “Spatial analysis of dual-scale water stresses based on water footprint accounting in the Haihe River Basin, China,” *Ecol. Indic.*, 2018.

## WATER FOOTPRINTS AND VIRTUAL WATER PROVIDE LITTLE INSIGHT INTO IMPORTANT POLICY ISSUES

Teshu Kumar\*

\*Assistant Professor,  
Department of Agriculture Sciences,  
Faculty of Agriculture Science,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [teshukumar@gmail.com](mailto:teshukumar@gmail.com)

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### ABSTRACT

*Much of the research on virtual water and water footprints focuses on the potential water savings that may be achieved when water-scarce nations purchase water-intensive agricultural products from countries with greater water resources. Some of the published estimates of prospective national and global water savings from international commerce are very high, and they do not represent actual or potential water savings. Consumers of imported goods in one nation put pressure on water resources in another, according to recent contributions to the virtual water literature. Some writers argue that consumers are partially to blame for water resource issues in remote areas due to international commerce. Although one of the goals of virtual water analysis is to identify possibilities for increasing water security, there is virtually little discussion of the possible effects of the prescriptions resulting from the study on farm families in developed and developing nations. It's critical to think about the inherent faults in the virtual water and water footprint viewpoints more thoroughly, especially when making policy choices.*

**KEYWORDS:** *Agricultural, Consumers, Potential, Virtual Water, Water Footprints.*

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### 1. INTRODUCTION

Much of the current research on virtual water and water footprints may be categorized into one or more of the following groups: More advanced techniques of calculating the 'flows of water embedded' in the products and services that nations exchange via international commerce are used in the following examples.[1] Attempts to broaden the scope of water footprint analysis to include pollution. Descriptions of the unobserved effects of consumers in one country's consumption of imported products on water resources in another. These improvements in methodology and scope help to increase our knowledge of water allocation and usage, but they only offer a limited amount of insight into policy choices for dealing with critical issues about water and other vital resources.

The absence of consideration of opportunity costs limits the policy usefulness of the virtual water and water footprint views. Using a national or regional comparison. It's also crucial to assess the

manufacturing opportunity costs of each trade partner. This research will uncover comparative advantages that may lead both parties to trade agreements that will increase their net benefits. By design, virtual water mimics the use of absolute advantage rather than comparative advantage. As a result, the views of virtual water and water footprint are insufficient for establishing optimum trading methods[2]. Much of the current work on virtual water and water footprints is based on a misunderstanding of this conceptual restriction. Many writers advocate or imply that nations with limited water resources should import water-intensive products and services from countries with greater water resources.

At first sight, such[3] a prescription seems appealing, yet it lacks conceptual foundation. Comparing water endowments isn't enough to figure out the best trading methods. The policy suggestions resulting from discussions of virtual water and water footprints may be misleading and even detrimental if opportunity costs are not considered. In the recent literature, three new issues with studies of virtual water and water footprints have emerged: Several writers offer dubious estimates of the national and global water savings achieved via virtual water trading. Some argue that customers in importing nations put pressure on water resources in exporting countries by shopping on worldwide marketplaces for products and services.

In both developed and developing nations, there is virtually little consideration of the effects of water usage or changes in water allocations on farm families. Given the widespread interest in virtual water and water footprints among academics, practitioners, and members of the general public, it is critical that writers treat these topics with more attention and thoroughness than is represented in the current literature. The main aim of this article is to elicit serious debate on these issues. Is there a link between virtual water trade and national and global water savings? Several writers have calculated the amount of water saved by importing agricultural and animal products from another nation. Hoekstra and Chap again used a framework to compare water needs in importing and exporting nations. Some writers additionally add up their national water savings estimates to get a worldwide estimate of the amount of water saved as a result of virtual water trading .Some of the studies focus on a single crop or animal product, while others look at a variety of agricultural products. According to Mekonnen & Hoekstra, [4]wheat production has a worldwide water footprint of 1,088 billion m<sup>3</sup> per year from 1996 to 2005.

The authors also take into account the fact that when nations export crops, they lose water. Thailand, for example, loses an estimated 2.27 billion m<sup>3</sup> of water each year as a result of its 416,000 tons of broken rice shipment to Indonesia. Given that the rice could have been grown in Indonesia with just 1.29 billion m<sup>3</sup> of water, a worldwide water loss of 0.98 billion m<sup>3</sup> is also projected. This conclusion is based on estimations of virtual water content of 5,455 m<sup>3</sup> per ton of rice in Thailand and 3,103 m<sup>3</sup> per ton of rice in Indonesia. Some of the projected national water savings and losses are substantial. Through agricultural and livestock imports, Japan saves an estimated 94 billion m<sup>3</sup> per year, while Mexico saves an estimated 65 billion m<sup>3</sup> and Algeria saves an estimated 45 billion m<sup>3</sup> per year.

The magnitude of these projected water savings should cause one to stop and evaluate if the methodology used to calculate them is accurate. The highly industrialized nations of Japan, Germany, and the Republic of Korea are among the eleven countries with the greatest projected yearly net water savings via international commerce in agricultural goods. Each of these nations has less than 0.15 hectares of arable land per person, and agriculture employs less than 5% of the population. Every nation has a robust agricultural industry, although it contributes for less than

3% of gross domestic output. For many years, none of the nations have been food self-sufficient. Similar findings may be made about other nations that have seen significant net water savings as a result of foreign commerce. Except for Russia, all of the nations in Table 1 have less than 0.30 hectares of arable land per person. The percentage of inhabitants engaged in agriculture is less than 10% in six of the nations.

Agriculture contributes for less than 5% of gross domestic output in each of the nations. on national agricultural production (Japan, Italy, Germany, Republic of Korea, and the UK). Local and regional water shortages may restrict output in certain regions or years, but these nations' agricultural industries are usually supported by sufficient water resources. In such circumstances, the idea of national water savings enabled through agricultural product trade seems misguided. It is unclear, for example, if Japan really saves 94 billion m<sup>3</sup> of water per year. Japan is unable to use that amount of water to increase agricultural and livestock output. Japan's government and people decided long ago that the country would become a highly industrialized nation with significant service and manufacturing sectors. To maintain economic growth, Japan and many other industrialized nations must import agricultural and animal goods. Japan and other nations will not return to their agricultural past due to limited quantities of arable land per person and highly urbanized populations. Many of the nations classified as net water importers in the virtual water literature have modest quantities of arable land per person. A collection of information that has been collected into a data set[3].

## 2. DISCUSSION

The Aral Sea's decline was brought about by Moscow's strategic choices regarding Central Asia's growth as a key source of irrigated cotton and wheat. Consumers are not to blame for policy flaws that have resulted in inefficient water distribution and usage in far-flung areas. Consumers will require more information than is given in virtual water and water footprint estimates if they want to voice their preferences for smart water usage today. Knowing the water footprint of coffee, tea, or pizza isn't enough; you also need to understand the opportunity costs and livelihood consequences of water allocation and usage in producing areas. The water needed to make a steak in Oklahoma is significantly different than the water required to grow cattle in Ghana. The consequences for one's livelihood are likewise vastly different.

Consumers who spend time and effort in changing their choices to promote smart water use need to know the whole picture, in part to ensure that their efforts do not damage farm families unintentionally. To summarize, virtual water and water footprint estimates exclude the most critical elements of water distribution and usage. Some readers may be interested in empirical estimates of water savings and losses, as well as graphical representations of [4]water flowing across the world via international commerce in products and services. Another tendency in the virtual water and water footprint literature is the attribution of responsibility for water resource issues in one nation to customers in another country who consume imported products and services. According to Van Oel et al., the Netherlands' average yearly per capita water footprint is 2,300 m<sup>3</sup>. 89 percent of it is considered external, since it represents water used in other countries to create products and services that are imported into the Netherlands. Nations in Europe account for almost half of the external water footprint, while Latin American countries account for 20%.

According to Van Oil et al.,[6] the Dutch external water footprint has the largest effect in countries where water is limited. Exports to the Netherlands from China, India, Spain, Turkey, Pakistan, Sudan, South Africa, and Mexico are all taken into account. Due to the scarcity of water in these nations, the authors argue that the Dutch have a detrimental effect through consuming imported agricultural and industrial products. They write, "While these countries do not contribute the most to Dutch consumers' external water footprint in absolute terms, the impact of Dutch consumption in these countries deserves serious attention, because the negative externalities of Dutch consumption are considered to be the most serious in these countries." The authors provide no data or analysis of the effects of Dutch consumption or export-oriented production in any of these nations.

According to the authors, Japan's need for cotton puts a strain on water supplies in Pakistan, China, and India. India, Uzbekistan, Pakistan, Turkey, and China are all affected by European demand. According to the authors, European consumers indirectly contribute approximately 20% to the Aral Sea's desiccation via their use of cotton goods. In all, foreign demand for cotton products is responsible for about "half of the world's water issues linked to cotton cultivation and processing". Many observers of water issues in Central Asia and elsewhere may be skeptical about assigning blame for such problems on customers in far-flung places.

In most nations, producers and consumers react to the prices they see on local and foreign markets. [7]they may be unaware of negative externalities connected with industrial operations in their own country or in nations with whom they trade internationally in many instances. Furthermore, negative externalities may have a detrimental impact on Virtual Water and Water Footprints and Important Policy Questions 645.endure, even if a group of customers or a nation changes its trade approach in an attempt to sway producers. Focusing on the policy environment in producing areas is a more useful way to improve resource management. State and national governments are mainly responsible for the preservation and smart use of natural resources. Water allocation and usage problems occur most often when public policies fail to provide the right signals about water shortages or water quality concerns. Policy inadequacy is the responsibility of state and national governments, and they usually have the power to establish programs to encourage the prudent use of natural resources.

Public authorities, on the other hand, do not always behave in the best interests of resource conservation. For example, Moscow's decision to expand irrigated agriculture in Central Asia at the cost of the Aral Sea was made many years ago. The unavoidable consequence of such policy choice could not have been avoided by European consumers. The almost total absence of concern for the lives of individuals involved in productive activities, whether in industrialized or developing nations, is perhaps the most significant shortcoming of the virtual-water and water-footprint approaches. Many of the articles describing water requirements and depicting the movement of embedded water around the world include one or more statements about the potential water savings made possible by reducing water-intensive crop production in water-scarce regions. Countries may also conserve water by importing crops grown in rainy climates rather than utilizing surface water to grow the same crops locally. Such remarks reveal a skewed perspective on production and consumption.

From the standpoint of water resources propose that cotton grown in Brazil is preferable than cotton grown in Argentina since the growth circumstances in Brazil are superior. The authors also favor cotton grown in India over cotton grown in Pakistan since Pakistan has less effective



rainfall. As a result, Pakistan's cotton production is mostly irrigated. They also claim that cotton[8] grown in India uses less groundwater and surface water per ton than cotton grown in Pakistan. Cotton production's significance in sustaining lives and contributing to economic development in both countries is ignored in such a water-centric comparison of production circumstances. From a virtual-water and water-footprint viewpoint, look at water usage, crop output, and agricultural trade in Spain. They claim that by exposing its agricultural sector to global markets, Spain has conserved significant amounts of water and that international commerce has enabled Spain to mitigate the harmful effects of droughts.

During droughts and regular years, commerce has indeed aided the Spanish in expanding their consumption options. However, it is unclear if Spain conserves water in the way that the authors propose. Water resources are likely completely allocated and utilized to generate a variety of agricultural and animal goods in dry areas. Although trade expands production and consumption options, it does not always decrease demand for scarce inputs. Many authors strive to impose a perspective that is too narrowly focused to accommodate the inherent complexity of international markets and optimal trading strategies, and as a result, inaccurate interpretations of the implications of international trade appear frequently in the virtual-water literature.

In recent study, many writers have argued that international commerce of commodities grown in rain-fed circumstances is superior to trade of crops grown using surface water or groundwater. 'Trading green virtual water is generally more efficient than trading blue virtual water, keeping other variables constant,' says the virtual water literature. Such comments reflect the widely held belief in the virtual water literature that the opportunity cost of soil moisture (green water) is usually lower than that of surface or groundwater (blue water), owing to soil moisture's lower transferability. Leaving aside the issue of whether or not such impression is correct, one may wonder whether focusing only on the source of water is adequate for policy consideration. Changes in water distribution and usage may need equal or greater attention to the possible consequences for livelihoods[9].

### **3. CONCLUSION:**

The virtual water viewpoint was first proposed to explain how certain dry Middle Eastern nations meet their national food consumption needs by importing agricultural goods from other countries. Politicians could guarantee a food-secure future despite the region's severe water shortages if they could depend on food imports. In that setting, discussing virtual water improved awareness of the political consequences of international commerce in dry areas. Many writers have extended the scope of virtual water analysis throughout time to include the global flow of commodities and services. The computation of water needs in manufacturing, processing, and consuming processes accounts for a large portion of that study. Non-water inputs, opportunity costs of water usage, and livelihood consequences of water consumption in industrialized and poor nations are virtually never considered.

As a consequence, most empirical estimates of virtual water and water footprints lack the substance and validity needed to assist policymakers in making the best policy choices. Empirical estimates of national and worldwide water savings enabled by exporting commodities and services should be severely disregarded, since they do not take into account national land and water endowments or the probability that nations would be able to utilize the predicted water savings. The idea of water losses to exporting nations as a result of international commerce is

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especially troubling, considering that most countries see trade as a way to boost economic activity while also increasing consumer options.

Irrigated agriculture has been developed using national water resources and a significant amount of money. The virtual water viewpoint on water savings and losses via international commerce is faulty and deceptive from the start. From a historical or policy standpoint, attributing responsibility for water problems in one nation to customers in another is not useful. Because national agricultural policy encouraged the cultivation of low-valued cereals and other commodities in the area, and there were no restrictions on groundwater withdrawals, groundwater in the Ogallala Aquifer in the United States was drained faster than it should have been[10].

## REFERENCES:

1. I. M. Voskamp and F. H. M. Van de Ven, "Planning support system for climate adaptation: Composing effective sets of blue-green measures to reduce urban vulnerability to extreme weather events," *Build. Environ.*, 2015.
2. L. Menzel and A. Matovelle, "Current state and future development of blue water availability and blue water demand: A view at seven case studies," *J. Hydrol.*, 2010.
3. G. Sayyad, L. Vassel, A. A. Besalatpour, B. Gharabaghi, and G. Golmohammadi, "Modeling Blue and Green Water Resources Availability in an Iranian Data Scarce Watershed Using SWAT," *J. Water Manag. Model.*, 2015.
4. L. Jurík, T. Kaletová, and P. Halaj, "Water Management for Sustainable Growth Strategies," *Visegr. J. Bioeconomy Sustain. Dev.*, 2016.
5. X. Tian *et al.*, "Evolution of China's water footprint and virtual water trade: A global trade assessment," *Environ. Int.*, 2018.
6. M. M. Mekonnen and A. Y. Hoekstra, "Sustainability: Four billion people facing severe water scarcity," *Sci. Adv.*, 2016.
7. P. Quinteiro, A. C. Dias, M. Silva, B. G. Ridoutt, and L. Arroja, "A contribution to the environmental impact assessment of green water flows," *J. Clean. Prod.*, 2015.
8. A. Y. Hoekstra, M. M. Mekonnen, A. K. Chapagain, R. E. Mathews, and B. D. Richter, "Global monthly water scarcity: Blue water footprints versus blue water availability," *PLoS One*, 2012.
9. S. Tamea, J. A. Carr, F. Laio, and L. Ridolfi, "Drivers of the virtual water trade," *Water Resour. Res.*, 2014.
10. J. Schuol, K. C. Abbaspour, H. Yang, R. Srinivasan, and A. J. B. Zehnder, "Modeling blue and green water availability in Africa," *Water Resour. Res.*, 2008.

## AN OVERVIEW ON EMPLOYEE MOTIVATION

Vipin Jain\*

\*Professor,  
Department of Finance & Marketing,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id-vipin555@rediffmail.com

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### ABSTRACT

*Many businesses are facing new difficulties as a consequence of globalization, such as staff inefficiencies and high turnover rates, which cause the whole company to break apart. Employee motivation is one of the most significant elements in determining how productive they are at work. As a result, learning how to inspire employees is becoming more essential. This essay focuses on the significance of motivating employees. Based on the literature study and associated theory, make a contribution to the business on how to inspire employees and come up with improved suggestions, as well as provide some critical feedback to support some advice to certain organizations. The study analyzes employee motivation and its effect on performance in Ghanaian mining companies, using the work satisfaction model to measure performance. The connection between employee work motivation, workplace performance, and company productivity is investigated in this study article. It looks at the most popular and important motivation theories, as well as various methods to motivating workers. The primary goal is to discover a link between employee work motivation and performance, as well as the impact of performance on company productivity.*

**KEYWORDS:** *Challenges Development. Employee Motivation.*

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### 1. INTRODUCTION

Motivation plays an essential part in an organization, which has a variety of styles, methods, and theories that lead individuals, groups, and organizations to achieve high levels of performance and efficiency. In today's culture, an increasing number of individuals work in various types of organizations, and despite increased competition, the majority of people still have a strong desire to work in high-pressure, high-tension work environments. Those who labor hard, on the other hand, may be so tired that they put their health at risk and sacrifice themselves. So the primary reason is that they will continue to work hard and are unconcerned about their physical and mental development. In this post, I'll go through some of the previous articles and come to a conclusion regarding motivation. First, I'll look up the definition and primarily describe the introduction to motivation, which includes why motivation is so important in organizations;

second, I'll review relevant articles about motivation and summarize the main points, compare them, and come to a conclusion about the differences between them. Finally, in order to better appreciate the significance of motivation, I presented various motivation theories. Finally, I draw a conclusion for those who are motivated and provide my critical analysis on how to increase staff productivity. By reading these motivation articles, I was able to get a better understanding of the process and significance of motivation, as well as the best method to inspire employees in a company. And I'll have a fresh perspective on motivation, which will be more important for my future studies[1].

Various study fields have different definitions of motivation. The origin, direction, intensity, and continuation of behavior are all regarded to be part of psychology. Motivation mostly refers to the psychological process of boosting people's motivation in organizational conduct. People may generate an internal driving force and progress towards the intended objective by stimulating and motivating them. It is power that motivates individuals to take action. And the incentive is to encourage individuals to participate in certain activities by channeling internal strength in one way. The reason is the activity used to accomplish a certain goal. Individual conduct is motivated by an internal process, and behavior is the execution of that process. Motivation is caused by internal circumstances, such as a need, and motivation is produced by external situations, such as external forces driving organism incentive. People's behaviors, interests, and wants are all motivated by something. Motivation is also what drives a person's conduct, or what makes them desire to repeat a behavior. A motivation is what motivates a person to behave in a particular manner, or at the very least to acquire a preference for certain behaviors. "Motivation is a term that is part of the public culture like few other psychological notions," Ruth Confer. Writes. All definitions of motivation related to psychological processes such as desire, action, and wants, as well as how they influenced people's conduct. Since a result, motivation is important, as it may influence human behavior due to internal factors[2].

## **1.2. Importance Of Motivation:**

Motivation serves three purposes in human behavior. The first is an activating function, which directs people's actions and leads to a certain action. The leader, particularly in a group or organization, plays an essential role in guiding employees to have great enthusiasm and work hard. The second function is strengthening; motivation may sustain and modify this activity; for example, if an employee is under a lot of stress or is frustrated at work, the management can take steps to ensure that the person maintains their motivation for work. The last function is the pointing function, which directs an activity toward a certain goal under the effect of motivation. As a result, motivation may increase employee activity and improve their motivation at work. Motivation is very important during the whole job process. Stefania Platea claims that. First and foremost, motivation is a critical component of the whole management process as well as the integrating component of performance management. Some theories provide managers with additional information about people's motivation. Some managers focus on identifying suitable ways to encourage employees based on these suggestions. When we have these methods for encouraging employees, and this scenario also applies to educational institutions that play a vital part in community development, second, educational institutions are very important to nations. Furthermore, research on the connection between education and development reveal that education plays an essential part in a country's growth. Employee motivation has been linked to education. As a result, those who keep employees motivated may offer excellent and efficient

service to these organizations, establishing solid foundations for future educational growth. Furthermore, education administrators at all levels, from the Minister of Education to school principals, play an essential role. They expected to recognize various aspects of educational organization workers, identify their needs, determine their motivation conditions, and provide these conditions based on domestic and international scientific research, the most important of which is that they provide the condition of promote motivation in order to play a positive role in education. Education is an essential element of life in every nation, whether for people, groups, or organizations, so concentrate on the growth of education and understand the circumstances of motivation, which is excellent for job quality[3].

### **1.3. Maslow s Hierarchy of Needs:**

Maslow's hierarchy of needs is a psychological theory presented by Abraham Maslow in his. Psychological Review article. A Theory of Human Motivation. Maslow utilized words like transcendence to define the overall pattern of human drives. Maslow's Theory aims to reach the sixth stage of development: self-transcendence needs. The development of Maslow's hierarchy of needs, in my opinion, coincides with the majority of people's needs, because the first needs for most people are to meet their physiological needs, which are basic needs when people have nothing. When people have nothing, they desire to have enough food, water, and sleep, and then they have the basic ability to survive. The second element is safety, belonging, and love esteem. When individuals have a decent quality of life, they will pursue greater wants. However, Maslow's theory characterized human behavior as a whole, but individual people have distinct personalities. For example, children are simple to care for and like delicious food, different types of water, and sleeping. Young adults had the greatest degree of self-actualization, the teenage group had the highest level of esteem need, and the elderly had high levels of security since they are elderly and ill. As a result, it is dependent on the age of the individual. On the other side, for those who are wealthy and knowledgeable, money is unimportant since they have a wonderful family who provides them with a great quality of life as well as the finest education; they do not need to provide for their family and children with money in order to make them happy. When they work in a business, they continue to work hard and efficiently, as opposed to those who want to work to satisfy their physiological requirements. The most significant reason is that they want to maximize their worth and get the company's approval in order to live a meaningful life. So it relies not only on their age, but also on whether or not they come from a decent family. Some children have a good education, a good life, and a strong family background, so it is not necessary for them to work to live. They want to feel like they belong, and they have even greater love needs. On the other hand, individuals of various economic levels have varied requirements. As I previously said, impoverished families must work hard to maintain their families and children, therefore the first thing they want to pursue is physiological needs, followed by psychological needs, and so on. Intrinsic Theories: Intrinsic and Extrinsic[4].

### **1.4. Motivation:**

Intrinsic motivation is the drive to learn new things and take on new tasks, to assess one's capabilities, and to watch and learn. It is motivated by a personal interest or pleasure in the work at hand, rather than by external demands or a need for attention. Intrinsic motivation is a kind of natural motivation that is important for cognitive, social, and physical growth. Extrinsic motivation is the antithesis of intrinsic motivation, and it relates to doing something for the sake



of achieving a goal. Extrinsic motivation is derived from factors outside of the individual's control. The tougher issue to address in extrinsic motivation is where individuals acquire the drive to carry out and keep pushing with perseverance. Extrinsic motivation is often utilized to achieve results that would not be achieved via intrinsic motivation. When compared to extrinsic motivation, intrinsic motivation pays greater attention to the intrinsic activities themselves. Students learning, for example, refers to the students' learning activities, which provide emotional pleasure and a feeling of accomplishment to the students. Intrinsic motivation is the ability of nature to encourage learning and growth without the need for external incentive or pressure. Platea, Stefania. When an individual wants to do something as a result of their own personal assessment of a specific activity or love interest, they assess whether they want to do it. Individuals like to be influenced by reward or punishment for extrinsic motivation. To be more precise, when a person receives a reward, penalty, or language that encourages them to work, they will be highly motivated to do so. Extrinsic incentives include being rewarded for displaying the appropriate behavior and the fear of punishment if misbehavior occurs, according to Dominica Delia[5].

### **1.5.Push and Pull Motivation:**

People use push incentives to accomplish their objectives or acquire something, such as the desire for escape, leisure and relaxation, status, health and fitness, adventure, and social engagement. Push motivation is the polar opposite of pull motivation. Some of the variables that arise as a consequence of the attractiveness of the destination as viewed by people with a proclivity to travel are those that emerge as a result of the attractiveness of the destination as perceived by those with a proclivity to travel. They consist of both physical and intangible resources. Pull motivation may be defined as a strong desire to accomplish a goal to the point that the objective seems to be dragging us toward it. As a result, pull motivation outperforms push motivation. It's simpler to be attracted to something than to force oneself to pursue what you want. Tahir Labara, Melted Caber. Pull motivation, in my view, is more successful than push motivation. Because internal variables have a greater impact on motivation than external ones, pull motivation refers to certain objectives that are appealing to a person to accomplish[6].

### **1.6. Expectancy Motivation:**

Victor Vroom developed the expectation theory in. The behavior process in which a person chooses one behavior choice over another, and why/how this decision is made in connection to their objective, is explained by expectancy theory. This theory also has an equation, which is as follows.  $M$  is the degree to which a person is motivated by the situation or environment in which they find themselves. As a result of the equation, which is based on the following, is a person's belief that work will lead to success. In other words, it is the individual's judgment of how well and what kind of effort will lead to improved performance. The idea that one's performance will be rewarded or penalized is known as instrumentality. The perceived amount of the reward or punishment that will come from the performance is called. Barron, Kenneth Elton be more precise, those who have a high objective and accomplish it at a high pace have greater drive and excitement. It is important to encourage employees with the expectation theory while working as a leader or manager.

### **1.7. Critical Analysis:**



Various theories on motivation have different points of view. The earliest ideas assumed that if individuals are properly compensated, they would be motivated. Contemporary ideas, on the other hand, claim that individuals labor not just for money, but also to be happy in their jobs. Various individuals, in my view, have different requirements; some people labor for money, while others work for worth. As a result, the first component is dependent on various socioeconomic levels. That is to say, in contemporary society, everyone has their own economic level; those who have a decent economic level do not need to work for money since they have enough money to live and enjoy life; thus, higher wants such as belonging, love, esteem, and self-actualization are the most desired. However, for those with a low socioeconomic status, food and clothing are the primary priorities. As a result, individual motivation varies depending on one's socioeconomic status. As a result, motivational methods vary depending on economic status. They will attempt to adapt their best attitude to accept life with an open mind. Furthermore, incentive entices them to continue. On the other hand, those with less knowledge are more likely to get frustrated and lose motivation, implying that they lack goal motivation and pull motivation to motivate them to work hard [7]. In general, everyone has their own wants, which are influenced by a variety of circumstances. As a result, economic status, familial environment, and educational attainment all play a role. In an essay on motivation, Ramona Todericiua defined it as "an inner state influencing an individual's behavior in such a manner as to achieve a certain objective. When it comes to work, motivation may be described as an individual's willingness to work hard and persistently in order to achieve organizational goals, with the expectation that the effort put in will lead to the achievement of certain personal goals. Individual goals, which are ultimately driven by the individual's wants, are genuine motivators for him to act and function in organizations. Those that are motivated will have a strong desire to complete their tasks; their motivation stems from their inner needs[8].

## 2. DISCUSSION

To better comprehend this topic, the article chooses the most influential publications and summarizes research progress based on this question. It also alluded to the macro-level trends in motivation research, such as the fundamental theories of work motivation, analyze important micro-regulatory mechanisms involved in goal choices and goal pursuit, and look forward to ending with a discussion of potential future research paths. Organizational Behavior and Human Performance was founded by Jim Naylor and George Briggs in with the goal of publishing important research that adds to our fundamental understanding of human performance. The journal has published important studies on the drivers, processes, and consequences of motivation in decision-making and performance in work and achievement contexts during the last. Janzen's Theory of Planned Behavior. Deci's Cognitive Evaluation Theory. Hackman and Oldham's Job Characteristics Model. And Locke's Goal Model are examples of alternative theories. Other articles provide insightful criticisms and reviews. As the twentieth century came to a conclusion, motivation research promoted a wide rearrangement of results, with motivation as an umbrella word that includes both the purpose and reasons behind decision-making and goal selection. They want to feel like they belong, and they have even greater love needs. On the other hand, individuals from various economic levels have varied requirements. As I previously said, impoverished families must work hard to maintain their families and children, so what they wish to pursue is limited. The physiological requirements come first, followed by the other needs one by one[9]. However, intrinsic and extrinsic motivation are not the same, and their effects on

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workers differ: extrinsic motivation is more essential for commitment and employee retention, while intrinsic motivation is more vital for inspiration and employee engagement[10].

### 3. CONCLUSION

Thirst, hunger, drowsiness, and the desire to reproduce are all biological drives that cause us to seek out and participate in particular activities. Drives are said to come from inside a person and may not need external stimuli to motivate them to act. Motivation will aid him in achieving his own objectives. If a person is motivated, he will be satisfied with his work. Individual self-development will be aided by motivation. Working with a dynamic team is usually beneficial to an individual. Passion isn't created by extrinsic incentive. Someone who does not like their work will just perform the absolute minimum to get their reward. Extrinsic motivators aren't sustainable without passion. Work ennui ultimately leads to the extrinsic motivator not providing adequate motivation.

### REFERENCES:

1. A. P. Sari, H. Mulyadi, and E. Tarmedi, "GAMBARAN GAYA KEPEMIMPINAN, MOTIVASI KERJA SERTA KINERJA KARYAWAN CIPANAS INDAH HOTEL DI GARUT," *J. Bus. Manag. Educ.*, 2018.
2. E. Demerouti and A. B. Bakker, "The Job Demands?Resources model: Challenges for future research," *SA Journal of Industrial Psychology*. 2011.
3. I. Sotirofski, "A theoretical framework of employee motivation and leadership relationship," *Eur. J. Econ. Law Soc. Sci.*, 2018.
4. L. Fallon-Byrne and B. Harney, "Microfoundations of dynamic capabilities for innovation: a review and research agenda," *Irish J. Manag.*, 2017.
5. V. Platonova and S. Bērziša, "Gamification in Software Development Projects," *Inf. Technol. Manag. Sci.*, 2018.
6. A. Rahim, S. Syech, And M. Z. Ms, "Pengaruh Lingkungan Kerja Dan Kompetensi Terhadap Motivasi Kerja Serta Dampaknya Terhadap Kinerja Pegawai Pada Dinas Pendidikan Kabupaten Tanjung Jabung Timur," *J-Mas (Jurnal Manaj. Dan Sains)*, 2017.
7. W. Parimita, L. A. A. Wahda, And A. W. Handaru, "Pengaruh Pengembangan Karir Dan Motivasi Terhadap Kepuasan Kerja Karyawan Pt Pos Indonesia (Persero) Bekasi," *Jrmsi - J. Ris. Manaj. Sains Indones.*, 2015.
8. B. Lebek, J. Uffen, M. Neumann, B. Hohler, And M. H. Breitner, "Information Security Awareness And Behavior: A Theory-Based Literature Review," *Manag. Res. Rev.*, 2014.
9. A. Suryani And R. Linda, "Pengaruh Pelatihan Dan Penempatan Terhadap Motivasi Serta Dampaknya Terhadap Kinerja Pegawai Perusahaan Daerah Air Minum (Pdam) Tirta Batang Hari Jambi," *J-Mas (Jurnal Manaj. Dan Sains)*, 2017.
10. A. Zeps and L. Ribickis, "Strategy Development and Implementation – Process and Factors Influencing the Result: Case Study of Latvian Organizations," *Procedia - Soc. Behav. Sci.*, 2015.

## SOME ASPECTS OF THE METHOD

**Ganiev Ilhom Muzaffarovich\***

\*Doctor of Philology,  
Department of Uzbek Literary Studies,  
Laureate of the International Yassavi Prize,  
TerSU, UZBEKISTAN

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### ABSTRACT

*This article is devoted to the study of the poetry of the nationalist poet Shavkat Rahmon, a talented representative of the Turkic world of the twentieth century, and the poet. If we look at the depths of Shavkat Rahmon's poems, in addition to the influence of European poetry, there is a fiery nationalist spirit in the poems of Fitrat and Cholpon, consistency, concentricity, gradualness in Abdulla Aripov's lyrics and Rauf Parfi's style. We can see that it is extremely finely synthesized with content. All this occurs at the syntactic level typical of Shavkat Rahmon.*

**KEYWORDS:** *Style, Ideological and Aesthetic Content, Metaphor, Lyrical Experience, Lyrical Plot, Rhyme, Poetic Image, Metaphor, Weight, Rhetoric.*

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### INTRODUCTION

If we look at the depths of Shavkat Rahmon's poems [1], in addition to the influence of European poetry, there is a fiery nationalist spirit in the poems of Fitrat and Cholpon, consistency, concentricity, gradualness in Abdulla Aripov's lyrics and Rauf Parfi's [4] style. We can see that it is extremely finely synthesized with content. All this occurs at the syntactic level typical of Shavkat Rahmon. This view of artistic synthesis, which does not remain at the lowest level of imitation, is a specific feature of the art of speech and does not overshadow the originality of a particular creative style, even a particle. On the contrary, it shows the continuity of the development of national poetry, the next stage and its renewal on the basis of traditions. Neither Shavkat Rahmon's look nor his voice repeats that of other poets. He perceives reality on his own, re-embodies art in a unique way. After all, just as new twigs and leaves grow from an old branch, the development of literature is always reflected in the renewal of old voices.

In the above analysis, we have clarified the ideological and aesthetic content of the poet's work. This content:

- The glorious and tragic past of Turkestan;
  - The historical destiny of the Turks, the recent past and present;
  - National limitations, fragmentation and the need to get rid of them;
  - Longing for a bright future;
  - Contradictory national mentality (greatness and inability to recognize one's rights);
  - Humanity and inhumanity;
-

- Delicate feelings of the soul;
- is characterized by the integrity of man and nature.

The poet reveals this broad and deep content, first of all, in the consistent development of a concentric lyrical plot. The concentricity of the lyrical plot in Shavkat Rahmon's poems is that the total structural parts that make up the system of poetry revolve around a single center. The consistent sequence is that in Shavkat Rahmon's poems a certain lyrical experience is seen in a vertical sequence, not in a horizontal expansion. In other words, Shavkat Rahmon's style is not characterized by the discovery of something written from different angles. That is, it does not depict a single emotion in different images, in different linguistic movements, but shows a particular lyrical experience in the beginning, the sequence, and the solution. In Shavkat Rahmon, horizontal expansion takes place within the same gradual and beginning-to-end plot. Shavkat Rahmon's poems are, to put it mildly, lyrical.

In this context, let us consider any poem of the poet, for example, "Fertilizer":

When you look straight into the eyes of a coward,  
without saying a word  
look further,  
let your eyes tremble  
to the souls of hundreds of ancestors.

Etsin,  
resurrect your ancestors,  
be resurrected, then die again,  
of your ancestors in your eyes  
let the sharp eyes be summed up.  
If you need a coward, you can take a step,  
will be your best friend or man,  
look at the coward -  
to humanity  
this will be your most needed help.  
Cowardly months, years,  
even a lifetime  
thousands of different images,  
the thinnest - the weakest part of the eyes,  
and your weak spot is your shovels.  
I dream of this light world,

how many geniuses screaming from your blood.

Do not show your cowardly shovels,

look straight into his eyes,

stand up straight .. [1; 82]

- The beginning of the thesis of the first line "Look straight into the eyes of a coward, always look away without saying a word",

"I dream of this light of the world, how many geniuses shout from your blood." Do not point your shovel at the coward, look straight into his eyes, always look straight "lines solution,

-The part between them is the development of the lyrical plot, including the culmination.

At the beginning, the poet recites his teachings of a thesis nature.

In the course of the plot, the action of "looking straight into the eye", which formed the content of the motto:

-Level (from the trembling eyes to the lives of hundreds of ancestors),

-Effect (resurrection, death of ancestors of fear),

- Scale (let the sharp eyes of your ancestors be summed up in your eyes),

-Object (step, friend or person),

-Importance (helping humanity),

-The reason (the coward's desire for the most delicate place) is expressed in the artistic plan.

The solution is repeated in an expanded form, indicating the cause of the onset (fertilization). I have an artistic idea hidden in me. That is, the poet wants the survival of the creative force (genius), not the destructive power (cowardice) in the nature of mankind, and the destruction of cowardice, which is a manifestation of evil. The poet speaks in a way that is difficult to understand that neither good nor evil is embodied in man, but in himself - in a gesture, in a distant state. For example, while genius floats in our blood (end of poem), cowardice is also our step, our friend, or our closest person (the middle of the poem). Since this analysis has a beginning and a solution, it cannot be continued.

Due to the fact that it has such a beginning and end, in the works of Shavkat Rahmon there are almost no positive rhyming verses (for example, bbba vvva ggga ... or bbbba vvvva gggga ...). This is because positive rhyming verses are more convenient to convey in different interpretations the reality (lyrical emotion is also reality) placed at the center of the artistic image. Depending on how many forms of interpretation of a reality, how many different rhymes can be expressed, how many rhyming poems can be continued, such a possibility can be infinite according to the poet's imagination. [2; 41] Due to the horizontal nature of such poems, it is difficult to express the vertically growing artistic content in Shavkat Rahmon's poems in a positive way. Another feature of Shavkat Rahmon's poems is that their rhetoric is very strong. This exaggeration is manifested not only as a stylistic method (art), but also in the selection of words that are at the top and bottom of a particular meaning paradigm, words that have a strong artistic coloring. More precisely, in the work of Shavkat Rahmon, this form of exaggeration is

thicker. For example, in addition to abstract expressions of the plural, such as "infinite", "incomparable", "innumerable", the poet chooses a million, a billion, a trillion if he wants to show this plural in numbers:

- Who are you - a million kisses of beauty ("Communication with Waters");
- Suddenly a million lightning flashes ("The Legend of the Sun and Sunshine");
- The open eyes of a million soldiers ("Eyes left open"), as if my heels were crushed;
- Now millions of slaves who will growl only from the depths of poison ("Like a rose after the rain ...");
- Mourning for one and a half million Afghans who were killed by a huge provocation ("Picture of an Afghan boy in the market");
- Millions of deaf people of time ("Sad Poem");
- Millions of idols in this terrible place will be saved from the fire for a lifetime ("Burning");
- You are a strong man who raised a million Georgians on his head like a Georgian ("Georgian mosaic");

- There are a million Anger, a million bleeding stones in their hands ("Flower Cry");

- a giant blue scorpion with billions of spines ("Like a rose after the rain ...");

- "Manovi black stone - a night trillion times smaller in the palms of time" ("Blooming stone");

Words such as "huge", "great", "great", "high" are also often used in these poems. For Shavkat Rahmon, things and events can be good and bad, big and small, but there is no middle ground:

- The great river ("banks of the Amudarya");

- Great pain ("About raw materials");

- The great stranger ("Broken walls");

- Great stature, great spirit, great oppression ("Sharhi hol");

- The great chief ("Turks");

- A huge head, a huge corpse ("Mood Landscape");

- A great name, a sadoki - a glorious, grave; great people ("Baburis");

-The great memory of a nation ("What I thought at the foot of Mount Solomon");

-Earth - a huge eye ("Eyes");

-The great judge, the great memory ("Statue of Ibn Sina in Afshana");

-The body of a maple tree - a huge elephant, a giant, a great destiny, a great way ("Maple views");

-The land - a giant dried leaf, a bottomless world, a town of small muscles ("Autumn landscape");



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-Giant leaves; the flowers of this land are great; the roar of huge waters; great period; dwarf geniuses ("What I thought when I visited Osh");

- The greatest human worries ("Time");

- my harmony is great, my tears are great; a great cry, a great death, a great ocean ("Longing for Broadness");

- The Great Turan ("Old Poem");

- A huge corpse ("Explosion statement");

- A great cry, a great cry ("The cry left in my ear");

- Huge dust ("A legend from the past about the Kokand wind");

- The way of great lovers ("If I were three ...");

- A huge lake ("Nights when the stars fall");

In addition, in the work of Shavkat Rahmon, as in all poets, there is an expression that is valued as an artistic art, which is a natural companion of poetry. Shavkat Rahmon's eloquence is also distinguished by the fact that the poet is unique.

Like a girl's star

I saw your eyes,

I saw your hands like flowers in the sky,

at the speed of light if I fly for years

I saw unattainable thoughts.

("Humanoids.")

The speed of human thought is not measured in units of measurement in our world. At the same time, so far, humanity has not even had the opportunity to read anyone else's dreams. The poet expresses this impossibility by exaggerating the concept of physical velocity that we understand. [3; 21]

Another peculiarity that is common in the style of Shavkat Rahmon is related to the perception of modern events as spatial, spatial events as modern events. According to this method, abstract contemporary concepts acquire materiality and remain visible. Or space is expressed by time attributes. Such an exchange takes place in the form of various artistic means (simile, allegory, exaggeration):

"Where are you going? Where are you going after wasting days and years?" ("Humanoids");

- You killed time today ("Humanoids");

- Maziy - black house ("Conversation under the White Wall");

- Black stone - ... reduced night ("Blooming stone");

- Hand of opportunity ("Eyes left open");

- Hand of opportunity ("Eyes left open");

- Depth of night ("Explosion statement");
- Torn shadows of the night ("Laughter").

We read again in The Explosive Movement Statement: In this text, "evening" is a modern concept. It is possible to escape from a certain space, but is it possible to escape from time? So, "evening" is a spatial reality, a metaphor. The poet expresses the gossip, intrigue and conversations of the lowly people through the metaphor of "moonless evening".

In the poem "Time", time is felt as a spatial phenomenon (material integrity that occupies a certain place in space) as a living being from beginning to end. In it, time is slaughtered like a lamb, put on a stake or hanged and buried alive, time looks at humanity with hope, speaks, time has a graveyard of time, time is crushed between the iron bars of a tyrant, time is humiliated, time is forced, cut, the social content of the poem is that the past and present inhuman actions and losses of all mankind are expressed through the concept of time, and in the whole spirit of the poem this social content is highlighted - in the foreground. The main goal of the poet is to spend time properly, to cherish life, to promote mutual love, to organize the life of society, to use the opportunities given to him by nature. But if we come from the whole spirit of the poem, if we understand it philosophically, then it is felt that man is helpless before Time, that he cannot submit to his own judgment. This is most clearly seen in the conclusion of the poem:

Uh-oh,  
how long  
if activated  
how many hands lived forever free  
or in ordinary hands  
a more beautiful single universe.

After all, even when man discovers his total potential, he will not be able to build a new universe. He can reveal the secrets of an existing being, use it to his advantage, change it, destroy it, but he cannot create a new one. This conclusion in the poem is conditional and is understood as a promotion of the proper use of time. In general, this conclusion is also a form of exaggeration. The confession in another poem, "But even if I worked for a thousand years, I could not make a living bee" ("Nature is a flower craftsman") supports our opinion. In another poem, the same point of view sounds different:

If there are no limits, human opportunity,  
If nature gives man a wing  
Will anyone stay on the ground,  
The abode of eternal calamities - on earth?

Sometimes, however, the distance of time and space does not matter for a particular behavior. In a poem he said:

Did I give my hand from the depths of the maze  
to countless helpless hands,

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that is to say, both spatial and temporal differences remain insignificant. The past and the present, the noreal world and the real world are perceived in the capacity of a time, a space.

In Shavkat Rahmon's poetry, words and forms in simple speech live side by side with the norms of literary language, with high artistic vocabulary. "Cars of oppression", "Where did he hide in the grave" ("Sad poem"), "When did we kneel down" ("Hirgoyi"), "From the urine of a yellow horse ...", "Crazy horseman" ("Brass rider") "Durru pays for a jewel", "Which grave is the land of vallamat" ("Like a rose after the rain ..."), "You raised your hand and said oh my god" ("The impression of a picture"), "About raw materials", "in this case the grandchildren will suffocate" ("Turks"), "where will the cruel grandchildren of time separate us?" ("Sad Poem"), "Once upon a time, my dears, we used to go through Moscow to the neighboring Afghan" ("There is nothing wrong with dreaming"), "On the day of the show I saw an old salad" ("The day of the show ..."); "Heads ready in any direction, if you want, go to Germany, to Paris" ("Unexpected gifts"). The poet uses these words and forms:

-To avoid monotony, to achieve diversity;

-To show how many opportunities there are at the dialect level of the national language and to preserve them;

- dialects as a part of the national language are deliberately used not only in live speech - in informal circles, but also in formal communication in the form of literary texts, claiming that it is expedient.

These words and forms are consciously aimed at showing and emphasizing that the people themselves are suffering in the language of Shavkat Rahmon, that the poet is the voice of the people. Because in all of the above cases there is a variety of opportunities to adapt the content to the weight and rhyme without deviating from the norms of literary language. In Shavkat Rahmon's poems, the artistic text appears as a treasure of the national language, while at the same time appearing as a manifestation of the unity of the people and the poet.

Another peculiarity of Shavkat Rahmon's poems in terms of language level is that the poet has, so to speak, words and sentences that he has chosen from the dictionary, which he has a special attitude to, and therefore uses over and over again. For example, the word "potirladi". In fact, the word "potirlamak" refers to the movement of a hand-held animal, such as a bird or a fish. Using this meaning of the word, the poet uses it as a nomadic adjective:

When you wake up, it's special

your mornings blazing,

in ninety-two veins

your blood is shed.

(Book of Myths.)

I caught my breath,

The strings of my body trembled for a long time

in my palms like a bird

of the ancient world

live snow ....

(Communication with Waters.)

In both cases there is a complete digestive tract. If we take into account that the fluid moves at an unlimited level, that it cannot stop in one place, it becomes clear how delicately the poet perceives the word. In verses such as "My heart is trapped like a bird" ("Flying man"), "I have a soul stuck like a bird" ("Look at the Buddha"), "popping" is used as a result of imagining the soul and heart trapped in the body as a bird in a cage.

The word "ancient":

-On the banks of the Ganges, Indian girls sing a song from time immemorial, staring into the frozen mountains ("Song");

-Ancient peace in my soul ("Thought");

-Singer-songwriter has been scraping the stones of the world since ancient times ("Passenger");

-Ancient peaceful night ("Qiyas");

-The most ancient revenge ("Why the word happiness ...");

-I shouted for my blood, for my ancient blood, let's go to the maze ("Nights when the stars fell");

- It is as great as ancient melodies ("What I thought when I visited Osh");

When the poet gives the quality of a certain thing-event "ancient (-gi, -iy)", it means such things as perfection, optimism, purity. To him, these qualities always seem to be stuck in the path of humanity. He wants to see man as pure and simple as in ancient times, not as hostile to each other, but as united and co-operative, as in the days when they destroyed the mammoth together.

The combination "Pushtirang Parda" is also one of the unique discoveries of Shavkat Rahmon. In the poem "Oath":

While on a great journey,

from thousands of windows with pink curtains

beautiful words sitting on the floor

I'll leave it to everyone now.

In this poem, "the words that are hidden from the pink curtain" have a slightly satirical meaning and are aimed at expressing superficial beauty, vulgarity and false "art". Because the poet goes on to use the adjective "playful with a rose neck" in relation to the same words, and sharply declares that "these words are not mine." Because the poet, who defined the essence of his work as "Homeland, People's Courage, Struggle and Freedom", needs only words as sharp as a bread, as sharp as a sword, as brave as a poison.

In the poem "Aravan views" the "pink curtain" is used for landscape painting and has a completely different meaning:

Aravon

in the embrace of a broken morning

shakes the bubbling gardens,

sometimes blue,

sometimes in pink curtains

it wakes up like the sun and sinks like the moon.

In this poem, the "pink curtain" is paralleled with the "blue curtain" and represents the colorful landscapes at different times of the day.

Whether a person is an ordinary person, far from the art of words, or a poet, he can experience four seasons in an instant, fly imaginatively, and his heart is like a river. But the difference between a poet and an ordinary person is that he can verbally express these colorful experiences. At the same time, this phenomenon is not the same in all artists, depending on whether it is complete or partial, clear or abstract, the level of imagery. Only those who are able to express the boundless charms of the spiritual world in a unique and vivid and wide-ranging way, combining them with rational content, will rise to the level of a true artist. In their works, external and internal reality is realized using the most intensive means of a particular language. Shavkat Rahmon was such an artist of words.

**REFERENCES:**

1. Rahmon Sh. Selection. A flowering stone. T .: Young Guard, 1985. 126 p.
2. G'aniev I, Afoqova N, G'anieva A. Merciful world T; "Akademnashr" 2013. 142p.
3. Afokova N. The divine judge in the heart. "Tafakkur", 2014, issue 4. Pp.29-34.
4. G'aniev I. Rauf Parfi Öztürk world. Tashkent, Editor, 2021, 732 p.

## REVIEW OF TANDOOR MURDER CASE

**Sourabh Batar\***

\*Assistant Professor,  
Department of Law,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [battarsourabh@gmail.com](mailto:battarsourabh@gmail.com)

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### ABSTRACT

*The paper is an investigation of the situation. The case of State v. Sushil Sharma is often referred to as the "Tandoor Murder Case." The business plan would discuss the chain of events (reality) that led to such a situation, which would undoubtedly involve Tandoor. The assassination of Naina Sahni is one of the most intriguing instances in the criminal court system. The discovery of a woman's burned corpse cut into pieces at a tandoor restaurant in Delhi shocked the country's morale to unprecedented heights. This scenario has clearly shown the repulsion of the human mind when confused and enraged. The paper would be a point of view on how the conviction was based only on circumstantial evidence and why it wasn't fair not to sentence the prisoner to death. This heinous act rocked the whole country, and the verdict affected everyone to an unprecedented degree.*

**KEYWORDS:** *Crime, Evidence, Murder, Report, and Tandoor.*

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### INTRODUCTION

What happens if you discover your beloved spouse engaged in a long telephone discussion with a person of the other sex? You decide to shoot your spouse in a fit of rage, slice the corpse into pieces, and then burn the whole body in a "Tandoor" to dispose of the evidence. In the instance of Sushil Sharma and Naina Sahni, this is exactly what occurred. The assassination of Naina Sahni is one of the most intriguing instances in the criminal court system. The discovery of a woman's burned corpse cut into pieces at a tandoor restaurant in Delhi shocked the country's morale to unprecedented heights.

The mystery is not so much the case as it is the length of time it took to reach a decision. This study discusses a number of factors other than the facts of the case, which made the ultimate decision in this case a bit too difficult to comprehend[1].

### LITERATURE REVIEW

1. Criminal Major Act-Section 34 of the Indian Penal Code states that when a criminal act is committed by many people, each with a similar purpose, each bears the same level of responsibility as if it were committed by one person alone. Also according to Section 37,



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which states that any type of assistance given with the purpose of committing a crime is punished as a crime. Criminal Conspiracy is discussed in Chapter VA, and section 120B highlights the penalty for the conspiracy, which is either imprisonment or a fine, or both. The crime of Keshav Kumar was interpreted under Section 201, which deals with destroying evidence or providing false information to conceal the perpetrator.

2. Indian Evidence Act, 1872-Section 30 of the Indian Evidence Act states that when two or more people are prosecuted together for the same crime and one of them makes a confession that is proven, the court may accept the confession against both of them.

## **DISCUSSION**

### **Facts of the Case**

Starting with the deceased's and appellant's backgrounds, Sushil Sharma was the President of the Delhi Youth Congress at the time of the incident (1992), and a commerce graduate of Delhi University.

Naina Sahni was a Delhi University alumna as well. She served as the General Secretary of the Delhi Youth Congress Girls Wing for many years. Sushil Sharma, the accused, bought an apartment on Mandir Marg in 1992, where Naina Sahni used to come on a daily basis and occasionally stayed late at night. After that, Sushil and Naina married in their apartment, according to their own rites and traditions, implying that they had a secret marriage concealed from the public. Naina continued to live in the same house after that, claiming to be Sushil's wife, until she was killed. Because Sushil Sharma was a political figure, he sought to keep their marriage a secret from Naina Sahni, and he also questioned his wife's integrity, limiting her freedom as a result.

Sushil and Naina's marital life became a weary one as the couple's tensions grew, and the wife attempted to leave the husband and go to Australia with the aid of her friend Matloob Karim.

### **Day of Incident**

Sushil Sharma arrived at his Mandir Marg apartment on July 2, 1995, after three years of secret and exhausting marriage, to find Naina deep in discussion with someone on the phone. Naina became frightened when she saw Sharma and hung up the phone. Sharma double-checked the number and discovered it was Matloob Karim, Naina's roommate. Mr. Karim was revealed to be in a relationship with Sushil Sharma's wife. Sushil Sharma, enraged, pulled out his pistol and fired three shots at Naina Sahni, the first two striking her head and neck and the third hitting the air conditioner. Naina died instantly. Sushil then transported her corpse in the trunk of his Maruti vehicle to the restaurant he owns, wrapped in black plastic. He dismembered the corpse and tossed it into the Tandoor of his restaurant. The Tandoor burning was carried out with the assistance of another co-accused, restaurant employee Keshav Kumar.

Meanwhile, when the body was placed in the barbecue tandoor, it caused a huge quantity of smoke to fill the restaurant, drawing the attention of both pedestrians and diners. A police constable reports an unusual fire and smoke to the location where police arrived at the eatery. Meanwhile, Sushil Sharma fled the site of the crime as the police investigated the cause of the fire at the restaurant[2]. The authorities discovered a human corpse in the charcoal, namely a

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lady whose limbs had torn apart and her guts were pouring out. The cops discovered black polythene near the Tandoor with bloodstains on it. Bloodstains on Keshav's clothing were later discovered, and the fact that he assisted the criminal in fleeing the murder scene and assisting Sushil in disposing of the corpse made him a co-accused[3].

The following are the facts that have been verified and agreed upon without a shadow of a doubt:-

1. The appellant Sushil Sharma was the proprietor of Bagia Bar-be-Que, a restaurant in the Ashok Yatri Niwas complex in New Delhi, and his co-accused Keshav Kumar was a restaurant employee.
2. On the night of July 2, 1995, the appellant and his employee Keshav Kumar burned a female body on the tandoor of the Bagia Bar-be-Que.
3. During the autopsy of that unfortunate woman's burned corpse, bullets were discovered lodged in the head and neck area, and the ballistic expert determined that those rounds were fired from the 32 Arminius revolver that the appellant allegedly had at the time.
4. Appellant Sushil Sharma was residing with Naina Sahni in an apartment on Mandir Marg in New Delhi, and both of them were seen together in the said home on the evening of July 2, 1995, and no one has seen Naina Sahni alive since that day.
5. Sushil Sharma had doubts that Naina Sahni was in a relationship with someone else, and Naina Sahni had been pressuring Sushil Sharma to officially announce their marriage, which Sushil did not want to do, thus he had a solid reason to murder her.
6. On July 4, 1995, five fired .32 magazines and one .32 lead bullet, as well as several blood-stained items, were discovered in the apartment, and the ballistic expert determined that the magazines and lead bullet were shot from the licensed Arminius.
  - 1) Sushil Sharma's 32 revolver was discovered to have the same blood on various items as the blood on the black plastic.
7. Naina Sahni's burned corpse was discovered in the tandoor of Bagia Bar-be-Que on the night of July 2nd/3rd, 1995.

#### **Issues of Law and Statute**

- 1) The crime was motivated by Sushil's suspicions about his wife's character. The case was built on the basis of circumstantial evidence (DNA) and a second autopsy, according to the legal problem discussed here.
- 2) According to Section 34 of the Indian Penal Code, when a criminal conduct is committed by a group of people with a common purpose, each of them is responsible for the crime as if it were committed by themselves.
- 3) The penalty for criminal conspiracy is discussed under Section 120 B of the IPC. Keshav Kumar's conduct of assisting Sushil to burn the body parts in the Tandoor symbolizes his aid in the murder and subsequent aid in his escape from the crime scene, making him responsible for punishment.

- 4) Keshav Kumar (the co-accused), who assisted Sushil in escaping from the restaurant and also assisted him in burning the body, was charged under Section 201 of the IPC because he destroyed evidence in order to protect Sushil from legal action and also lied about the burning, claiming that it was old Congress posters, thus providing false information to the police.
- 5) With the assistance of Keshav Kumar, Sushil Sharma was able to quickly flee the restaurant, in violation of Section 212, which states that anybody who assists an offender in avoiding legal penalty would be punished as specified in the section.
- 6) According to Section 302 of the Indian Penal Code, anybody who commits murder is punishable by death or life imprisonment, as well as a fine.

### **Analyze the Situation**

This was a clear instance of homicide in which a woman was brutally killed by her husband in a fit of rage after he questioned her about having extramarital affairs. In any case, the case was kept under wraps for more than ten years in order to get the greatest possible verdict. The question that arises in people's minds as a result is: why would such a situation take such a lengthy time to choose? The proper answer is self-evident. In this system, political influence is always important. When the accused is the President of the Delhi Youth Congress, it is self-evident that his influence can be utilized to change the situation[4].

Sushil Sharma has never disputed murdering his wife; what he disputes is that he cut her into pieces and then burned her in a Tandoor. The poor connection between the accused and the dead was often mentioned, and this became a major factor in the final verdict.

The reason for the couple's tensions was that Sushil was reluctant to officially announce their marriage and recognize her as his wife, claiming that doing so would have harmed his political career, which is notoriously difficult to enter. Marriage, in any case, can hardly destroy anyone's political prospects. In any event, the murder was the result of a well-thought-out plan.

While media reports and headlines suggest that Sushil Sharma sliced his wife, the Supreme Court motion examines medical evidence that the body was not severed. There is also no evidence of any weapon, such as a chopper, being recovered, which might indicate that Sushil Sharma chopped the corpse.

The assassination was the consequence of a tense personal connection. Sushil says that the impact of heat, not the allegations that he sliced her torso, caused her limbs to break apart[5].

It is very difficult to accept that the penalty was changed from a death sentence to a life term. In a fit of rage, Sushil not only murdered his wife, but also cut it to pieces and burned it in the Tandoor. While one might argue that there is no proof of his cleaving the corpse since no such weapon was discovered during the investigation, there was black polythene with bloodstains of the dead found at the murder site (circumstantial evidence), making it plausible and legitimate.

While everyone debates the validity and legality of Life Imprisonment, no one seems to understand why such a decision is made in the first place. When it comes to Sushil Sharma, the method by which he planned to dispose of his corpse is fierce and striking. What could be more "rare of the rare" than this? What could be more ruthless and unusual than cutting a corpse into pieces and burning it in a Tandoor?

Without a doubt, the crime is severe, but the mercilessness alone would not warrant a death sentence for this scenario," the Supreme Court said in overturning the lower court's decision. Sharma's appeal to the Supreme Court against his death sentence raises the horrifying question of just how cruel and terrible a crime must be later on to qualify as the "rarest of rare"[6].

### **Suggestions & Judgment**

Sharma was sentenced to death by a district court in 2003. He filed a similar petition in the Delhi High Court, where he found no benevolence, and the court's decision in 2007 stated: The confirmation of the appealing party is so mocking and distressing that if the death penalty isn't granted to him, it would be a joke of considerable worth, ethics, and the inner voice of the entire population would be stunned. This is a case that comes under the 'rarest of rare' interpretation, in which various restrictions near to the death sentence are maintained.

The next step is the Supreme Court's decision, which said in 2014: "The crime is merciless and there is no question about it, but simply ruthlessness would not justify the death sentence in this instance."

Isn't this Equity's Judgement a farce? Doesn't this strike fear into the hearts of the general public? To this end, the Supreme Court established a set of criteria based on which a death sentence would be granted only if the offense meets certain criteria.

- When the manslaughter is committed in an extremely coldblooded, strange, hazardous, startling, or hostile manner in order to elicit unprecedented and over-the-top dissatisfaction from the framework.
- When the manslaughter is committed for a point that demonstrates solid debasement and unpleasant.

The Supreme Court further concluded that Sushil Sharma killed Naina because he "loved" her and was a possessive spouse; the murder was the "product of a strained individual relationship," according to the court. When he was brutally cutting his wife's corpse into pieces, what happened to his "love" for her? When his better half wife planned to relocate to Australia with the help of a coworker, where was the possessive husband? There are numerous questions, but the verdict provides no solutions.

The death penalty was imposed for a variety of reasons. Sushil Sharma had no "criminal history," according to the Bench, and his sentence was likely to be renewed. In any event, Sharma's repeated efforts at domestic cruelty (limitations, abuse, etc.) against Naina Sahni do not take "criminal antecedents" into account. Domestic violence incidents were confirmed in court by domestic assistance, establishing the validity of this claim[7].

On the night of July 2, 1995, had the police and the house gatekeeper not been alerted? Sharma would have gotten away with the legal trial and penalty, as shown by the manner he tried to get rid of the body (evidence of murder). The crime had every political ramification one could imagine. According to me, the legislator's concern should be to describe the concept as "rarest of the rare," given the abundance of mitigating circumstances in such high-profile cases, but its legitimacy remains debatable[8].

## CONCLUSION

Perhaps it's a pattern or habit, but a death sentence is handed down by a lower court, upheld by the High Court, and then reduced to life imprisonment by the Supreme Court. The judicial branch has always performed to the best of its abilities, but what happens when the Court of Law includes certain criteria and arrangements that cause one to doubt the unchanging quality of the judgment, and people begin to underestimate crimes?

The judgment in the Tandoor Murder Case is still remembered today. The conclusion is as follows: Apparently, the appellant was very attached to the dead. The appellant (Sushil) doubted her constancy, and the murder was the result of this possessiveness, not a societal offense<sup>8</sup>. What is the meaning of love that goes so far as to take away a person's life? Who makes the decision to limit possessiveness? Isn't restricting one's freedom a crime in and of itself? Will talking with someone of the other gender enrage someone to the point of shooting them? Such a question will not be addressed, and society's moral sense will be stabbed.

Perhaps Sushil Sharma's crime isn't gruesome enough to be recognized for the rarest of the rare kinds of crimes. We may have developed a resistance to crime as a result of being surrounded by so much of it. Maybe we've become so accustomed to killing and murdering that life and death no longer matter. It is recommended that the next time you visit a restaurant with a Tandoor, you carefully inspect the material. You never know when a happy dinner time may turn into abhorrence.

## REFERENCES

1. PTI, "Cope who led probe on tandoor murder case," *The Hindu*, 2007.
2. N. E. D. Hawass, "An association between 'desert lung' and cataract - A new syndrome," *Br. J. Ophthalmol.*, 1987.
3. T. H. Editorial, "Rarest of Rare opportunities," *The Hindu*, 2013.
4. T. C. M. Act, *Chapter IX*.
5. AIR, *Bacchan Singh vs. State of Punjab*, vol. 684. 1980.
6. D. H. Court, *Sushil Sharma vs. The State of N.C.T Delhi*. 2007.
7. D. Pal, "What Tandoor murder verdict ignores: 'Women like us' are beaten up too," *India News*, 2013.
8. SC, *Sushil Sharma vs. The State of N.C.T Delhi*, vol. 925. 2013.

## CONCEPT OF INSANITY UNDER LAW OF CONTRACT

**B. R. Maurya\***

\*Assistant Professor,  
Department of Business Law,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- brmourya.mourya321@gmail.com

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### ABSTRACT

*The right to contract, which is basically the capacity to acquire and dispose of goods and services, change legal relationships, and act with some assurance as to future responsibilities and rights, is seldom considered by most individuals. It is only when one is confronted with the possibility of losing a right that the worth of that right becomes evident. This research study compares and contrasts the use of insanity as a defence in Indian and American contract law. India is far behind the times in terms of mental disease identification, and it also does not provide adequate liberty to those who are judged incompetent. Several psychologists and human rights advocates have spoken out against mentally ill people being as helpless as children, warning of the risks that come with surrendering all of their rights to a guardian. This research will also assess several criteria for detecting mental incapacity and propose reforms to both the Indian Contract Act of 1872 and the Mental Healthcare Act of 2017.*

**KEYWORDS:** *Contract, Defence, Insanity, Legal, Mental, Right.*

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### INTRODUCTION

Insanity, often known as lunacy, is a legal defence that a person was of unsound mind or lacked the mental ability to comprehend the implications of their actions at the time of the act. This is a defence in contract law that one may use to show that they were not competent to form a contract. This allows the person deemed crazy at the time of entering into the contract the opportunity to set aside the deal, i.e. it is a voidable contract, if adequately proved[1].

By contrasting Indian laws and precedents with those of the United States of America, this research examines the present scope and use of the defence of insanity in contract law. This research is significant because mental incapacity is a broad word that needs clarification in order to adapt to the changing dynamics of recognizing mental disorders. It is pertinent in the current situation, as the world is becoming more aware of mental diseases and problems.

Scientists are learning more and more about these diseases and their consequences in daily life. This research will be useful in providing an overview of the current state of insanity legislation, as well as serving as a guide for judges seeking a better grasp of the word "insanity" and how to both restrict and broaden its scope.

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The goal of this research is to delve deeper into the concept of 'insanity' as it relates to contract law, and to determine whether the current applications of this concept in India are truly sufficient to protect those who suffer from mental illnesses, by comparing the situation to that of the United States of America, which is considered to be more progressive on mental health issues[2].

## LITERATURE REVIEW

It was held in *Kruse v. Coos Head Timber Co.* that a person must have the mental capacity to comprehend the nature of the transaction in which he is engaged, as well as its quality and consequences, in order to have the mental capacity to contract. The United States of America in the State of Oregon is the subject of this decision, which is a frequently cited case in American Contract Law.

In India, the case of *Sharda v. Dharmpal*, which was heard by the Supreme Court of India and decided in 2003, is a frequently cited decision in which a High Court ordered the woman to undergo a medical examination after her husband requested it in his divorce petition on the grounds of mental instability. In the case of *Amrit Bhushan Gupta v. Union of India (UOI) and Ors.*, it was held that insanity must be such that it prevents an accused person from knowing the nature of the act he is committing at the time of the act. Gowthaman's Assessment on the Mental Healthcare Act of 2017 Ranganathan examines the Mental Healthcare Act of 2017 by comparing it to the UNCRPD model to see whether India's legal acknowledgment of mental infirmity meets international norms in areas like contract law.

Clinton Luth examines the historical background of insanity as a defence in contract law, as well as the various tests used to determine it, in his book *The Color of Competency: The Differential Race Impact of Mental Health Assessment in Voidable Contracts*. There is a paucity of literature that compares the Indian scenario of insanity as a contract law defence to international trends, such as US law.

## DISCUSSION

### *Contract Freedom as a "Fundamental" Right*

To be clear, this article is not advocating a return to Lochnerian jurisprudence, which was based on a laissez-faire approach to the market, in which wage and hour regulations, child labor laws, and other restrictions on "freedom of contract" were rejected[1].

Rather, the fundamental right of a person to engage into agreements that acquire or lose assets, services, or otherwise change legal relationships is argued for. Contractual duty "springs from a higher source: from those fundamental principles of universal law, which are obligatory on societies of men as well as on individuals," as Justice Thompson observed in 1827.

In sectors as varied as real property, personal property, labor, and legal status, the jurisprudential development of the right of contract over the last three centuries has gradually moved the emphasis of common law rights from property to contract. Along with that development, governments have had to deal with ongoing conflict between businesses and the government over worker protections and pay standards, particularly in the area of labor rights. This tension resulted in many worker protection laws concerning hours, wages, and actions coexisting with the judicial pronouncement that [p]ublic policy requires that men of full age and competent

understanding have the greatest liberty of contracting, and that their contracts... shall be held sacred[3].

This conflict, as well as the possible misinterpretation of contract freedom, has perplexed legal academics, philosophers, and economists alike. At times, such as during the abolitionist movement, freedom of contract has meant both the ability of the empowered class to economically advantage themselves through the strength of their superior bargaining position and the economic insecurities of the working class; at other times, such as during the abolitionist movement, freedom of contract has meant the basic right of humans to contract and receive benefits for a specific purpose.

*An overview of the use of insanity as a defence*

With the colonial authority in India, insanity became a legal defence. The Indian Lunatic Asylums Act, 1858, Indian Lunacy Act, 1912, and later, the Mental Health Act, 1987, and lastly, the Mental Healthcare Act, 2017 were all regressive in character. The notion of legal capacity is based on the definitions in these laws in both civil and criminal settings. In the past, insanity or madness was thought to be a flaw or aberration that needed to be isolated[2].

They were denied any kind of legal ability, and their mental impairments were solely understood in a medical sense, rather than in terms of psychosocial actions and effects. Furthermore, the previous understanding of mental disorders was pessimistic in its outlook. That is to say, people with impairments were seen as being devoid of all legal ability, and as a result, they were barred from making decisions or entering into contracts. This, however, has evolved into a more positive notion.

People with disabilities are now seen as people who have the will to make decisions and have certain choices in mind, regardless of the consequences, and who require some form of support and assistance in understanding their decisions and the consequences, as well as ensuring that their will is carried out. However, there has been a broad range of criteria used to determine whether a person has the mental legal ability to contract, which have evolved throughout time in various courts, such as in the US decision of *Norah v. Evans*[4].

*Mental incapacity categories are evolving.*

Because the realm of mental illnesses was still a mystery to medical practitioners at the time, mental incapacity was initially referred to as "insanity." It was later dubbed "mental illnesses," but there was still a lack of medical study to comprehend the different kinds of mental problems that may lead to legal incapacity. Because of society's insensitive attitude toward mental health, even though it was recognized that there were more than one kind of mental illness, the sole acceptable defence of insanity was "cognitive incompetence." The phrase "cognitive incompetence" refers to a party's lack of understanding of the nature of the repercussions of an act, or even the contract as a whole, at the time of entering into such a contractual relationship[5].

Soon after, the court established a distinction between two kinds of mental incompetence: "cognitive incompetence" and "volitional incompetence." The phrase "volitional incompetence" refers to a party's state of mind in which they were unable to provide what is deemed the legal definition of consent and had no control over their actions. However, in today's categorization of defences, this has been given its own defence, namely "involuntary intoxication."

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However, at the time, both were deemed to be cases of "mental incompetence." It took a long time for the courts to recognize volitional incompetence as a viable defence in contractual law, and today the recognized definition of mental incapacity is a hybrid of the two kinds of mental incompetencies. In India, there are two kinds of mental incapacity that are recognized by the courts. The first kind occurs when the party is unsound most of the time but rarely, if at all, of sound mind, whereas the second occurs when the party is sound most of the time but occasionally, if at all, of unsound mind[6].

The general accepted rule is that in contract law, determining whether a party was of sound mind at the time of entering into the contract or not, regardless of their demeanor or mental state at other times, is the best way to determine whether mental incapacity or unsoundness of mind can be used as a defence. In the case of *Smalley v. Baker*, another distinction was made in the United States: total mental incompetence was defined as Section 38 of the California Civil Code, partial mental incompetence was defined as Section 39 of the California Civil Code, and undue influence was defined as a type of mental incompetence as Subdivision 2 of Section 1575. Undue influence is separated from insanity as a distinct kind of defence in India[7].

*Is it true that the burden of evidence is a lie?*

The presumption is always in favor of sanity at first, but the existence or absence of it at the moment of contracting is always a matter of fact. It makes little difference whether the individual was crazy before or after the contract was formed, save that it is likely to raise suspicion of mental illness at the time of contract formation, *M'Adam v. Walker* ((1813) 1 Dow 148 (HL)). In the case of *Mahomed Yakub v. Abdul Quddus*, the party alleging insanity has the burden of proof (AIR 1923 Pat 18717).

It was ruled in *Lakshmi v. Ajay Kumar* (AIR 2006 P&H 77) that the point of insanity had to be shown at the time the contract was formed. In *Mohanlal Madangopal Marwadi v. Sadasheo Sonak* (AIR 1941 Nag 251), it was ruled that the burden of demonstrating that a person was of sound mind at the time rests on the one who confirms it. In the event of a person who is normally in a sound state of mind, the burden of showing that he was not in a sound state of mind falls on the person who disputes the contract's legality.

However, in cases of intoxication or other causes, the onus is on the party who claims the disability to prove that it existed at the time of the contract, and that the party was so inebriated that he was unable to comprehend the meaning and effects of the agreement, as well as that the other party was aware of his condition under English law[8].

In India, the current scope of "mental incapacity" is as follows:

Mental incapacity is defined in India as "unsoundness of mind" as defined by Section 12 of the Indian Contract Act, 1872. When it comes to determining insanity, there is a presumption of sane. A person must have a healthy mentality to be able to contract. A person with an unsound psyche is someone who has a temporary or permanent mental disorder. There is a widespread assumption that something is rationally sound. Mental soundness refers to an individual's ability to understand and make rational decisions about his or her own benefits. Section 12 of the Indian Contract Act defines what constitutes a sound mind for contracting[9].

Capacity sufficiency is a necessary prerequisite for contracting ability. This provision establishes that when a person's mental capacity is impaired, he is not permitted to enter into a contract.

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Such inadequacy may arise from illness, foolishness, or being unprepared for the contract; his illness does not have to be so unbelievable as to negate his explanation, nor does it have to amount to the whole requirement for justification. Whatever the case may be, it must be more than a minor lack of insight, regardless of whether he is a bonehead, a dolt, or suffering from some form of insanity; his mental state must, for example, render him incapable of comprehending the subject of the agreement, its temperament, and its plausible outcomes.

*In the United States of America, the current scope of "mental incapacity" is as follows:*

In Texas instances involving testamentary limit, the crazy hallucinations test has been used to prolong the traditional mental limit trial to some extent. A crazed dream is self-assurance in the face of a set of imagined facts that no normal person would embrace. This test may just be another kind of subjective exam in which the hallucination impairs the ability to understand. It is possible that the standard test will develop if it is based on the hypothesis that the insane hallucination pushes one to do a demonstration that he would not undertake in any situation, even if he understands and comprehends his action.

That is, a person's wild fancy may prevent them from acting on their own free will. The inclusion of a component of volition is not a new addition to the law[10]. Courts have always seen external causes for a failure to exercise one's will as safeguards against legally binding danger. Extortion, coercion, and undue influence are examples of such outside forces. Any agreement that is impacted by one or more of these authorities is voidable. Despite the fact that the extension of volition to include meanings of mental limit has received only modest acceptance, an expanded mental limit definition has gained some acceptance.

Tests that integrate both volition and insight, for example, have begun to replace the traditional M'Naghten' criminal limit trial. M'Naghten required that a responder not understand the nature and character of his demonstration or know he was giving a false answer to establish protection of insanity. In such instances, especially in cases where the respondent's mental capacity was insufficient "to adapt his lead to the requirements of the law," more recent tests accommodate an insanity barrier. This evolution of the insanity defence is reflected in the new Texas Penal Code. This use of a larger criminal mental limit trial seems to reflect a growing awareness that a lack of ability to regulate actions may be a symptom of mental illness.

## CONCLUSION

Under terms of determining consent in commercial law, India should broaden the scope of mental disability categories. India should also strive to keep up with worldwide mental health trends. Furthermore, the judicial system and the mental system should be better linked. Doctors and psychiatrists should be more engaged in the process of establishing an individual's unsoundness, as well as ensuring that this defence is not used to discriminate against women and people of lower socioeconomic status.

## REFERENCES

1. "Health Insurance Portability and Accountability Act (HIPAA) Privacy Rule and the National Instant Criminal Background Check System (NICS). Final rule," *Fed. Regist.*, 2016.
2. C. Neirinck and M. Bruggeman, "Les aménagements consensuels que les couples appliquent à leur rupture sont-ils d'essence contractuelle ?," *Les Cah. droit*, 2009.

3. K. S. Rajah, "Medical jurisprudence in the local context.," *Ann. Acad. Med. Singapore*, 1987.
4. E. Zar Rokh, "Marriage and Divorce Under Iranian Family Law," *SSRN Electron. J.*, 2012.
5. L. H. Gold and D. Vanderpool, "Legal regulation of restoration of firearms rights after mental health prohibition," *J. Am. Acad. Psychiatry Law*, 2018.
6. J. Peay, "Mental incapacity and criminal liability: Redrawing the fault lines?," *Int. J. Law Psychiatry*, 2015.
7. "Lunacy and Breach of Promise," *J. Ment. Sci.*, 1896.
8. W. McDougall, "Ideas in national life.," in *The group mind: A sketch of the principles of collective psychology with some attempt to apply them to the interpretation of national life and character (2nd ed., rev.)*, 2006.
9. G. Hallevy, "The Shadows of Normality: Legal Insanity Under Modern Criminal Law," *SSRN Electron. J.*, 2015.
10. S. M. Chlebowski and C. Leonard, "The forensic and legal implications of water, wet, or fry," *J. Am. Acad. Psychiatry Law*, 2012.

## A REVIEW OF THE SPACE FRAME STRUCTURE SYSTEM

**Pradeep Kumar Verma\***

\*Assistant Professor,  
Department of Electrical Engineering,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- pradeep.engineering@tmu.ac.in

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### ABSTRACT

*In recent decades, the building industry has begun to grow. Humans continue to try to cram as much structural space as possible into their bodies. Modern techniques are required to establish a broad and transparent economic period. These days, space frame systems are becoming more common. A 3D structural structure is a space frame that provides a constant power distribution by having well-organized linear axial components. The primary goal of these plans is to offer a broad range of coverage while maintaining a basic layout. The space frames are very light and simple to carry to the work site. The goal of this paper is to provide a comprehensive definition of spatial frame systems and their implementations. Furthermore, a study of the literature looks at a number of variables that affect the structural behavior of the space frames system.*

**KEYWORDS:** -3D Structure, Lightweight, Long Span Structures, Space Frame Systems.

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### 1. INTRODUCTION

The development of space frame systems has piqued the public's curiosity throughout the world. The primary goal of architecture and design is to create a wide open area with all of the necessary amenities and safety. Because the spaceframe is the best option for meeting these criteria for modern design methods, materials, and processes. Many researchers have offered ideas, techniques, and experimental findings aimed at improving the framework of spatial structures[1]. Because of its appealing appearance and ability to cover a wide area without any intermediate hindrance, the device is becoming more essential[2].

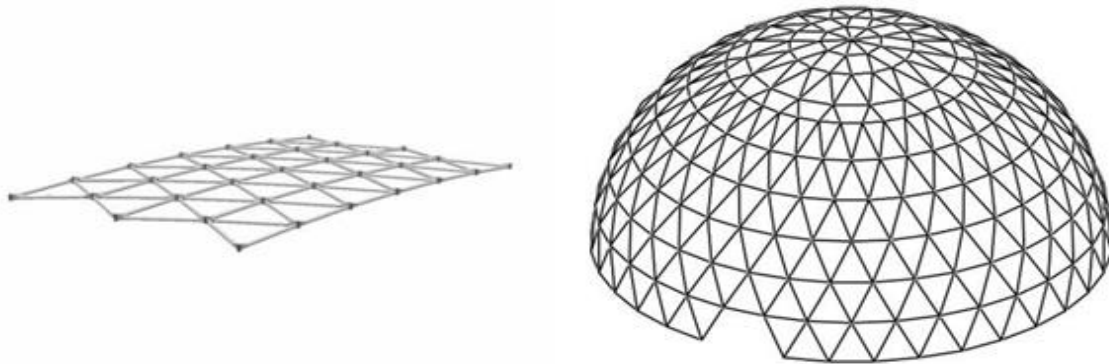
In architecture and structural engineering, a space frame or space structure (3D truss) is a rigid, lightweight, truss-like structure constructed from interlocking struts in a geometric pattern. Space frames can be used to span large areas with few interior supports. Like the truss, a space frame is strong because of the inherent rigidity of the triangle; flexing loads (bending moments) are transmitted as tension and compression loads along the length of each strut. Space frames are typically designed using a rigidity matrix. The special characteristic of the stiffness matrix in an architectural space frame is the independence of the angular factors. If the joints are sufficiently rigid, the angular deflections can be neglected, simplifying the calculations.



The simplest form of space frame is a horizontal slab of interlocking square pyramids and tetrahedra built from aluminium or tubular steel struts. In many ways this looks like the horizontal jib of a tower crane repeated many times to make it wider. A stronger form is composed of interlocking tetrahedra in which all the struts have unit length. More technically this is referred to as an isotropic vector matrix or in a single unit width an octet truss. More complex variations change the lengths of the struts to curve the overall structure or may incorporate other geometrical shapes.

The design of a Space Frame (figure 1) may be described as a truss-like rigid and lightweight structure. It is made up of geometrically designed interconnected struts. The space frames may be used to fill vast areas effectively and with little internal support. The intrinsic stiffness of the triangle and the bending loads distributed as stress and compression loads across each strut are due to the robustness of the spatial system[3].

When building space frames, a stiffness matrix is often utilized. The angular variables of the architectural frame are independent, which is a unique feature of the rigidity matrix. The angular deflections may be disregarded if the joint is sufficiently stable, simplifying equations [4]. A horizontal plate of square pyramids and tetrahedrons made of Aluminum and tubular stainless steel is the most basic form of the room frame. The horizontal jib of a turret has been replicated to make it longer. Interconnecting tetrahedral with unit lengths, with all struts the same length, creates a more strong structure[5].



**Figure 1: Space frame structure[6]**

In technical terms, this is known as an isotropic vector matrix or a byte truss with a single unit width. The length of the streams is determined by the structure's complexity or other geometric forms. Space frames are a typical element in contemporary constructions, and they're often used in large sections of the roofs of modernist commercial and industrial complexes.

The low weight of a space frame structure is one of its most important advantages. The key factor is that the material is arranged spatially in such a manner that axial voltage or compression is the primary load transmission mechanism. As a consequence, any material may be used in any element completely. Furthermore, most space frames are now made of steel or aluminum, reducing their weight significantly.

The low weight of a space frame construction is one of its most significant benefits. The load transmission method is largely axial-tension or compression since the material is dispersed

spatially in this manner. As a result, every piece of material in each part is fully used. In addition, most space frames are now made of steel or aluminum, reducing their weight significantly. This is particularly true for long-span roofs, which have resulted in a number of noteworthy uses.

Space frame modules are often mass-produced in factories to maximize the benefits of an industrialized building method. Simple prefabricated pieces, usually of uniform size and shape, may be used to construct space frames. Semi-skilled workers can readily move such pieces and quickly assemble them on-site. As a result, space frames are less expensive to construct. Even though it is light, a space frame is typically sturdy enough. This is owing to the fact that it is three-dimensional and that all of its component parts are fully engaged. Engineers value space frames' intrinsic rigidity and stiffness, as well as their remarkable ability to withstand asymmetrical or high concentrated loads. The space frames provide for more freedom in the arrangement and placement of columns due to their increased stiffness.

Space frames may create different flat space grids, latticed shells, or even free-form forms with the use of a common module. Lines in space frames are appreciated by architects for their aesthetic attractiveness and remarkable simplicity. The structural elements are being left visible as part of the architectural statement, which is becoming more popular. The need for openness, both in terms of aesthetic impact and the flexibility to meet varying space requirements, always leads to space frames being the best option.

The arrangement of Space Frame Structure components is used to classify them.

### *1.1 Single-layer grid:*

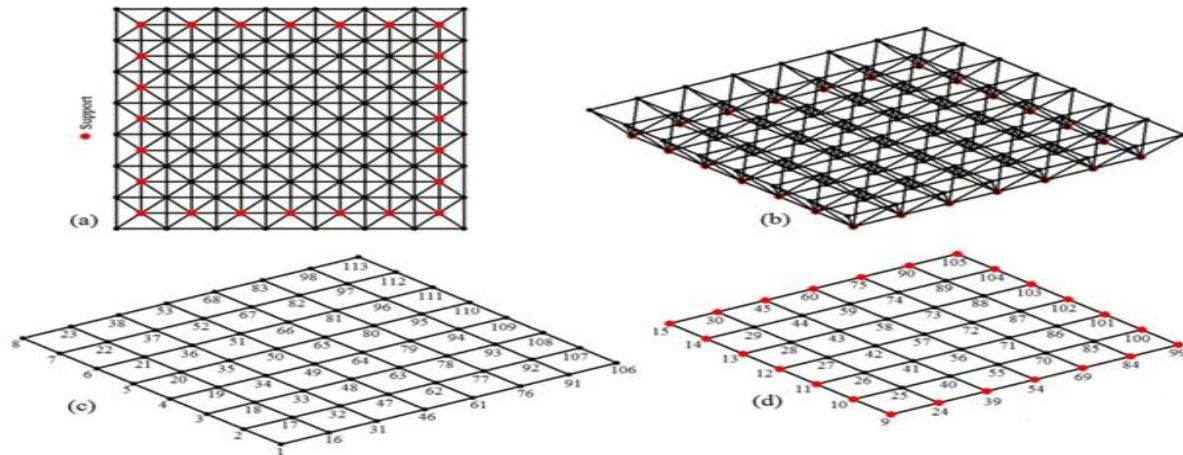
All components are placed on the estimated surface Figure 2 shows the different types of space frame structures.

### *1.2 Two-layer grid:*

Elements are arranged in two levels that are parallel to each other and separated by a specific distance. Each layer creates a lattice of triangles, squares, or hexagons in which the nodes' projections may overlap or be shifted relative to one another. Diagonal bars go in opposite directions in space, connecting the nodes of both levels. The elements in this mesh type are divided into three groups: upper cordon, cordon, and cordon lower diagonal.

### *1.3 Three-layer grid:*

Elements are arranged in three levels that are connected by diagonals. Almost all of them are flat. Cover that hangs Pleated metallic structures, hanging covers, and pneumatic structures are all examples of space frames.



**Figure 2: Different Types of Space Frame Structures**

This is particularly true in the case of long-term roofing, which has seen far too many noteworthy implementations. In order to fully use an industrialized structural infrastructure, spatial frame units are often mass-produced in factories. Prefabricated components of basic, usually consistent size and shape may be utilized to build space frames. These units can be moved and erected rapidly on site thanks to semi-skilled practice. As a consequence, space frames will be produced at a reduced cost[7].

## 2. DISCUSSION

Despite its low weight, a space structure is adequately stiff. This is owing to the fact that it is three-dimensional and contains all of the component parts. Space frames come in a range of shapes and sizes, and may be used to make flat space grids, tapestries, and even free-form modules. Architects appreciate the beauty of vision and the remarkable simplicity of space frame lines.

The structural elements are nevertheless subjected to a pattern, which is seen in the architectural expression. The necessity for visual clarity as well as the flexibility to fulfill a range of spatial requirements often requires the most advantageous approach to spatial frames [8]. Space structure arrangements are becoming more stable and inflexible, and markets will soon catch up. It's a great choice because of its beauty and architectural vistas. In addition to the reasons stated above, the next paper will discuss several other characteristics and benefits of a Spatial Frame Structure.

### 1.1 Space Frame Structure Implementations

- Business and industrial structures
- Auditory environments
- Lightning
- Canopies
- Outstanding stances
- Exhibition Halls
- Athletics stadiums are number seven.

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## 1.2 Space Frame Layout Curvature Classification

**1.2.1 Capacity Of the Space Plane:** such space structures consist of planar substructures. Its action is identical to that of a plate where the floor extends across the horizontal bars and the diagonal protects the shear forces.

**1.2.2 Vaults of A Barrel:** This kind of vaults has a simple arch cross section. Normally, tetrahedral modules or pyramids do not need to be used as part of this kind of spatial frame.

Tetrahedral modules or pyramids and additional support from the skin are typically required for spherical domes and other compound curves.

This is referred to as an isotropic vector matrix or a byte truss with a single unit width in technical terms. The length of the streams varies depending on the complexity of the structure or other geometric forms. Space frames are a common feature in modern architecture; they are often utilized in vast portions of roofs in modernist commercial and industrial structures [9].

The space frame designs are light in weight and may be molded into a variety of shapes to give the building a pleasing visual appearance [10].

## 3. CONCLUSION

The researchers came to the conclusion that spatial systems are most suited to long-term structures and can be used to extend large areas without introducing mid-impedance. The loads are distributed evenly to guarantee that these systems have the following characteristics: rigidity and power gain.

- The space frame designs are light in weight and may be molded into various shapes to give the building a pleasing visual appearance.
- Various Finite Element programs, such as STADDPro, SAP 2000, ANSYS, and ABAQUS, are helpful for comprehensive analysis and design of spatial structures.
- To improve structural performance, various techniques such as composed spatial systems and over-reinforced top chord elements are employed.
- To reduce compression pressures in the top chord, a composite roof is more effective than a non-composite roof.
- Members. - Individuals. By lowering the compression powers, the buckling loss of top chord members was also prevented. Space's composite construction enhances structural performance.

## REFERENCES:

1. D. Koller and A. Pfeffer, "Probabilistic frame-based systems," 1998.
2. E. R. B. Cutler, J. Gothe, and A. Crosby, "Design Microprotests," *M/C J.*, 2018, doi: 10.5204/mcj.1421.
3. J. D. Anderson, "Contradictions across space-time and language ideologies in northern arapaho language shift," in *Native American Language Ideologies*, 2009.
4. P. F. MacNeilage, "The frame/content theory of evolution of speech production," *Behavioral and Brain Sciences*. 1998, doi: 10.1017/S0140525X98001265.
5. R. Brockington and N. Cicmil, "Brutalist Architecture: An Autoethnographic Examination of

Structure and Corporeality,” *M/C J.*, 2016, doi: 10.5204/mcj.1060.

6. “Space Frame Structure; an analysis of its benefit.” .
7. R. Lawrence, “Locate, Combine, Contradict, Iterate: Serial Strategies for PostInternet Art,” *M/C J.*, 2018, doi: 10.5204/mcj.1374.
8. “X-TENUATOR™ REDIRECTIVE ATTENUATOR.” .
9. C. Facilitator, “Space Frame Structure; an analysis of its benefit.” .
10. S. A. Ashtul and S. N. Patil, “Review on Study of Space Frame Structure System,” pp. 667–672, 2020.

## AUTOMATIC SCREW JACK TO REDUCE MAN EFFORT

**Dr. Pavan kumar Singh\***

\*Assistant Professor,  
Department of Applied Science (Physics),  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- pavan.engineering@tmu.ac.in

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### ABSTRACT

*We're going to show you how to use a motorized screw jack. When a person's ability to raise weight reaches a particular limit, a jack is required. It gets more convenient when it is motorized. In order to put this concept into action, we've invented and constructed a mechanism called a motorized jack that operates by a switch, allowing us to effortlessly lift it. Using the on/off switch, you may adjust the volume up and down. This helps to lighten the worker's load. The major motivation for making a motorized screw jack is to save time. Human weariness should be avoided during load lifting. The project is less expensive and more efficient to run. The motorized screw jack was created to meet the needs of small and medium-sized vehicle garages, which are typically man-powered and employ only a few trained workers. In the majority of garages, the screw jacks are used to elevate cars.*

**KEYWORDS:** Dc Motor, Garages, Lead Screw, Lifting, Screw Jacked.

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### 1. INTRODUCTION

A screw jack is a portable device[1] that raises or lowers a load using a screw mechanism. The screw jack operates on a similar concept to that of an inclined plane. Hydraulic and mechanical jacks are the two most common types. A hydraulic jack[2] is made up of two parts: a cylinder and a piston mechanism. The piston rod's movement is utilized to raise or lower the load. Hand-operated or power-driven mechanical jacks[3] are available. Jacks are regularly used to raise vehicles so that a tyre may be replaced. A screw jack is often associated with automobiles, although it can also be found in industrial machinery and even aeroplanes. Depending on the amount of strain they will be under and the space they must fit into, they can be short, tall, fat, or thin.

The jack is composed of a variety of metals, although the screw is almost always made of lead. While screw jacks are meant to raise and lower loads, they are not suitable for side loads. However, depending on the diameter and size of the lifting screw, some can resist side loads. Shock load[4] should also be reduced or avoided as much as possible. Anti-backlash is integrated into some screw jacks. The anti-backlash mechanism[5] keeps axial backlash in the lift screw and nut arrangement under control. The screw jack generates a lot of heat, and long lifts can lead to catastrophic overheating. The screws jack must be used at room temperatures to maintain its



efficiency; otherwise, lubricants must be used. Oil lubricants are used to improve the equipment's performance.

Aside from regular maintenance, it is critical to utilise a screw jack according to its design and manufacturer's instructions to maximise its capacity and usefulness. Make sure you follow the application's speed, load capacity, temperature recommendations, and other pertinent criteria. It is necessary to elevate a car in order to repair and maintain it. Various jacks have been produced as a result of this. Standard jacks, pneumatic jacks, and hydraulic jacks are the three types. The lead screw was used to lift the ordinary jack. The goal of the project is to reduce the amount of human effort required to operate the jack. The screw jack is powered by a motor[6] has been designed to meet the needs of small garages with limited skill sets, as well as those who are unable to do so these kinds of works Screw jacks in garages are often operated by hand, which necessitates a significant amount of human effort and expert labour[7].

## **MOTORIZED SCREW JACK:**

Our investigation into the matter in a number of automobile garages found that the majority of difficult procedures were used in lifting[8] the vehicles for reconditioning. Now that the research work has primarily focused on this issue, a suitable gadget has been devised to lift the car from the floor land without the need of any impact force. Its fabrication element has been evaluated with almost case for its simplicity and economy, to the point where it can be accommodated as one of the basic tools in automotive garages.

The motorized screw jack was created to meet the needs of small and medium-sized vehicle garages, which are typically man-powered and employ only a few trained workers. In the majority of garages, vehicles are lifted with a screw jack. This will necessitate a large amount of manpower and expert labour. To avoid all of these drawbacks, the motorized jack[9] was created in such a way that it can be utilized to elevate the vehicle very smoothly and without causing any impact force. The procedure is designed to be easy enough for even unskilled labour to operate. The screw jack is connected to the D.C. motor via a gear arrangement.

The rotation of the screw jack shaft is determined by the rotation of the D.C motor. This is a really straightforward automation project. This is an era of automation, which is defined as the replacement of manual labour with mechanical power at various levels of automation. Although increasing demands on physical input have increased the degree of mechanization, the operation remains an important aspect of the system.

## **Working Principal:**

The screw rod of the jack is attached to the drive shaft[10], and the engine is powered by the power source. The on/off switching controls are connected to the power appliances controller. Whenever we push the ON & OFF switch, we link the dc motor to the modelling tool for downward movement. It will send power to the motor to rotate in the correct direction and in the opposite way. We can readily access load lifting with this equipment for a variety of purposes. The jack can readily raise huge loads by alternating the motors with increasing torque.

## **2. LITERATURE VIEW:**

For World War II jeeps and trucks, screw type mechanical jacks were particularly widespread. For example, the "Jack, Automobile, Screw type, Capacity 1 or 1/2 tonne," Ordnance item

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number 41-J-66, was delivered to World War II jeeps. The ratchet operation of this jack, as well as comparable jacks for trucks, was triggered by utilising the lug wrench as a handle. The 41-J-66 jack was kept in the toolbox of the jeep. Screw type jacks have remained in use for minor capacity applications due to their inexpensive cost of production. The direction of movement is determined by the position of a control tab, which is designated up/down and requires almost no maintenance. Archimedes proved the benefits of employing a screw as a machine, which is effectively an inclined plane wound around a cylinder, with his system for pumping water around 200BC.

Although evidence of the usage of screws may be found in the Ancient Roman era, it was the great Leonardo da Vinci who demonstrated the use of a screw jack for lifting objects in the late 1400s. The threaded worm gear of Leonardo's design, which was supported on bearings and rotated by the turning of a worm shaft to drive a lifting screw to transfer the load, is readily identifiable as the idea we use today in most of the company. There was definitely a market for this technology, and only ten years later, in 1940, Duff-Norton introduced the first worm gear screw jack, which is still widely used today, for altering the heights of truck loading platforms and mill tables.

The initial model had a lifting capability of 10 tonnes with raises of 2" or 4" and could be used independently or mechanically combined. It could be propelled by air, electric motors, or even manually. Since then, the device has evolved to be capable of pushing, pulling, lifting, lowering, and positioning masses ranging from a few kilos to hundreds of tonnes. A special Power Jacks E-Series unit rated for 350 tonnes – even in seismic circumstances for the nuclear industry – is one of the largest single screw jacks built to date. Recent advancements have focused on increasing efficiency and durability, resulting in improvements to screw jack lead screw and gearbox design possibilities.

### 3. DISCUSSION

A screw jack with an integrated motor is now known as a linear actuator, but it is still essentially a screw jack. Screw jacks can now be linked mechanically or electronically, allowing loads to be positioned to within microns thanks to developments in motion control. Screw jacks provide a true alternative to hydraulics in terms of duty cycles and speed, thanks to advancements in gear technology and the addition of precision ball screws and roller screws at a time when industry wants cleaner, quieter, and more reliable solutions. The application of screws is used to raise cars or things. The screw jack's operation is such that it has a handle for manually driving a bolt element (Lead Screw) to alter the height of the Jack to elevate a vehicle.

The manual operation of the jacks makes it difficult with most females and the elderly to operate since it takes a lot of effort to drive the screw jack, resulting in a low linear speed and a long duration. To operate these presently offered jacks, the operator must also remain in a lengthy bent or squat position. Working for long periods of time in a bent or squatting position is not ergonomic for the human body. It will eventually cause a backache problem. Assume that automobile jacks are simple to use by ladies or anyone who has a problem with their tyres on the road. The goal of this article is to improve the present car jack design by inserting an electric motor into the existing screw jack. This will make the operation easier, safer, faster, and more reliable.[7]

- **Lead Screw:**

The lead screw[11] is a machine coupling that converts rotational motion into linear motion. The size and shape of a lead screw (short, tall, fat, and thin) is determined by the load they must support and the area they must occupy. The lead screw's sliding contact generates a significant quantity of heat. To overcome such an issue and boost productivity, work should be done in a natural environment. Alternatively, lubrication must be used.

- **DC Motor:**

It's a device that transforms electrical energy into mechanical energy. It operates on the theory of electromagnetic induction, which states that a current carrying conductor in a magnetic field experiences a magnetic force whose direction is determined by the Fleming's right-hand rule. The fundamental advantage of a DC motor is that the polarity of the motor may be altered to vary the direction of rotation.

- **Control Switch:**

This is the switch that controls the DC motor, which controls the complete operation of the jack. Toggle Switches are the most frequent type of switch. A mechanical lever is used to manually activate this switch. The architecture of these switches allows them to control numerous sets of electrical connections.

- **Control Cable:**

These cables are used to provide electrical connection to a various part of the system with the battery.

- **Base And Frame**

It is a rigid construction on which all the parts are assembled.

- **Universal Joint:**

A universal joint is a positive, mechanical connection between rotating shafts, which are usually not parallel, but intersecting. They are used to transmit motion, power, or both. The simplest and most common type is called the Cardan joint or Hooke joint. It is shown in It consists of two yokes, one on each shaft, connected by a cross-shaped intermediate member called the spider. The angle between the two shafts is called the operating angle. It is generally, but not necessarily, constant during operation. Good design practice calls for low operating angles, often less than 25°, depending on the application. Independent of this guideline ne, mechanical interference in the construction of Cardan joints limits the operating angle to a maximum (often about 37½°), depending on its proportions. Typical applications of universal joints include aircraft, appliances, control mechanisms, electronics, Instrumentation, medical and optical devices, ordnance, radio, sewing machines, textile machinery and tool drives. Universal joints are available in steel or in thermoplastic body members. Universal joints made of steel have maximum load-carrying capacity for a given size. Universal joints with thermoplastic body members are used in light industrial applications in which their self-lubricating feature, light weight, negligible backlash, corrosion resistance and capability for high-speed operation are significant advantages.

Process involved

Fabrication and assembly motorized screw jack of is given below as follows:

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**i. Making Of Coupling:**

We have cut the blank of mild steel rod having diameter 60 mm and length 70mm by using power hacksaw machine from the given rod. Turning operation of MS rod has done on lathe machine which reduces the diameter up to 50 mm. Machining operation has done on CNC milling machine for making slot. Drilling operation has done on drilling machine for making hole of 10mm diameter for fixing bolt and nut. Surface finishing operation has done by grinding machine and filing.

**ii. Supporting Component:**

Supporting component has used for fixing the D.C. motor. It has cut from the channel by using power hacksaw machine in required size. Drilling operation has done on drilling machine for fixing bolt. Finishing operation has done on bench vice using file.

**iii. Base Plate:**

Base plate is made from mild steel plate. It has used for fixing all components of motorized lifting jack. Base plate has cut from mild steel plate of bigger size in to required size of 120mmx100mm. By using gas cutter machine.

**4. CONCLUSION**

In the world of automobiles and motor workshops, the project we completed was impressive. Working in an automobile workshop or a service station is extremely beneficial to employees. The cost of the concern has also been decreased as a result of this endeavour. The project was created to complete the entire needed task that was also provided. The screw jack is the most effective instrument for lifting heavy loads. The jack must be portable, simple to use, and capable of being operated by any untrained worker. It is preferable that it be stable and that it can be operated rapidly from inside the car from a safety standpoint. All of the above parameters are covered by our project. The screw jack is the best device lift the heavy load. It is necessary that the jack is portable, easy to use, operate by any unskilled worker. It is desirable that it should be stable and can be operated by switch quickly from inside the vehicle by safety point of view.

**REFERENCES:**

1. Anon, "JACKS.," *ANSI Stand*, 1974, doi: 10.2307/j.ctvthhdc3.26.
2. R. Sharavanan, "Design of built-in hydraulic jack for light motor vehicles," *Int. J. Mech. Eng. Technol.*, 2017.
3. K. Sainath, "Design of Mechanical Hydraulic Jack," *IOSR J. Eng.*, 2014, doi: 10.9790/3021-04711528.
4. Y. Ding, H. Feng, D. Shen, N. Li, M. Wang, and Y. Zhou, "The effect of organic shock loads on the stability of anaerobic granular sludge," *Environ. Technol. (United Kingdom)*, 2017, doi: 10.1080/09593330.2017.1286388.
5. A. D. Zalucky, "ANTI-BACKLASH RACK AND PINION DRIVE.," *IBM Tech. Discl. Bull.*, 1985.
6. L. Miková, M. Kelemen, V. Maxim, and J. Jezný, "Design of control of DC motor," *Appl. Mech. Mater.*, 2014, doi: 10.4028/www.scientific.net/AMM.611.325.

7. C. S and R. K. D, "Development of Motorized Car Jack," *J. Appl. Mech. Eng.*, 2016, doi: 10.4172/2168-9873.1000216.
8. "Lifting Jack," *Sci. Am.*, 1886, doi: 10.1038/scientificamerican09111886-168a.
9. M. Y. S. A. Y. S. Iqbal, "Motorized Screw Jack," *Int. J. Sci. Res.*, 2017.
10. M. B. P. M, "Design and Analysis of Composite Drive Shaft," *Int. J. Res. Appl. Sci. Eng. Technol.*, 2018, doi: 10.22214/ijraset.2018.5254.
11. A. Zhao, W. Wu, J. Jiang, L. Zhu, K. Lu, and F. Blaabjerg, "Design and experiment of a magnetic lead screw for the point-absorbing wave energy conversion system," *IET Electr. Power Appl.*, 2020, doi: 10.1049/iet-epa.2019.0486.

## A REVIEW ON STUDY OF AN AIR COMPRESSOR

**Mahir Hussain\***

\*Assistant Professor,  
Department of Mechanical Engineering,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [mahir.engineering@tmu.ac.in](mailto:mahir.engineering@tmu.ac.in)

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### ABSTRACT

*A device that converts mechanical energy into pneumatic energy is known as an air compressor. There are many distinct types of compressors, each with its own set of functioning principles and operating conditions. All have the same purpose: to extract air from the atmosphere and produce greater pressure air for various applications. The current paper provides a brief overview of an air compressor and its applications, as well as overhauling, condition monitoring, and maintenance programs for two-stage reciprocating air compressors, as well as a brief overview of recent developments in compressed-air vehicles, compressed-air engine and power source development, and the effect of temperature on moisture separation in air compressors. In the development of the industry, air separation is particularly significant. And there's the air compressor, which produces not only the necessary air but also the necessary pressure. Refrigeration and cooling equipment require high-pressure air. Plant, as well as the raw materials needed for separation a major device in an air separation plant is the plant. A case study was conducted on a locomotive compressor to improve performance and the development of a two-stage reciprocating air compressor.*

**KEYWORDS:** *Air Compressor, Compressed Air, Vehicle, Overhauling, Moisture Separation.*

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### 1. INTRODUCTION

It is a mechanical component (machine)[1] that compresses and raises the pressure of the air. The air compressor draws air from the environment, compresses it, and then transfers it to a storage vessel at a high pressure. It may be transmitted from the storage tank to a location where compressed air is required via a channel (pipeline). After then, air compression necessitates some work, which necessitates the use of a compressor that is powered by a prime mover. An air compressor[2] is a device that compresses and transports air. It is an essential apparatus in the air-separate equipment, as it not only provides compressed air at the source, but also provides compressed air at the source. For cooling, a regulated pressure is required. Refrigeration and equipment (such as the throttle) Not only does it convey technology (such as the expander), but it also transports people.raw air must be sent to the separation equipment. When air consumption is constantly changing, air supply pressure fluctuates wildly and becomes unstable. As a result, it



has a negative impact. The pneumatic components' functioning procedure and Product quality suffers as a result, and waste items emerge.

**1.1.Application of Air Compressor:**

The main uses of high-pressure (compressed) air are:

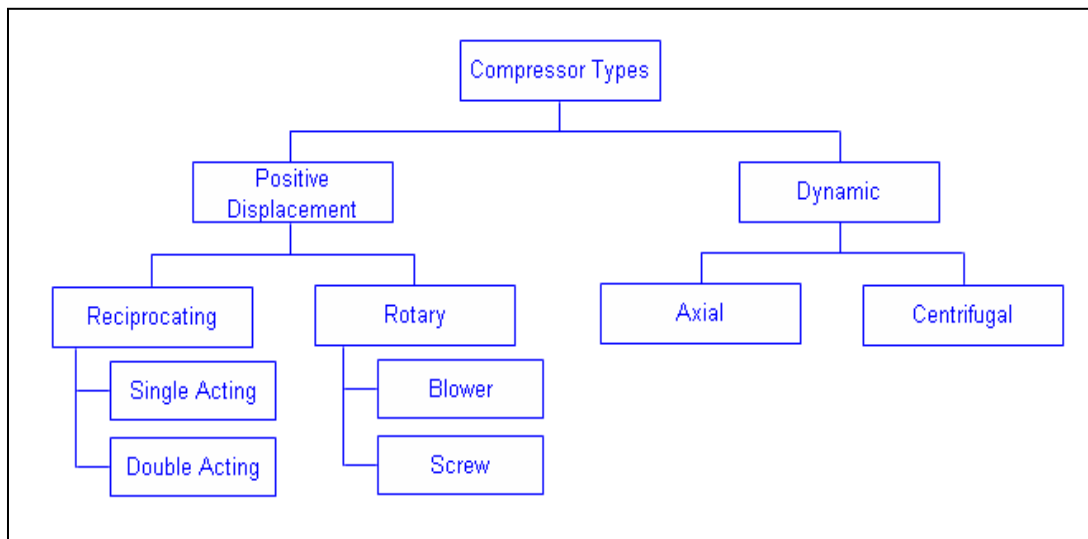
- To drive compressed air engines (air motors) used in coal mines,
- To inject or spray fuel into the cylinder of a Diesel engine (air injection Diesel engine),
- To operate drills, hammers, air brakes for locomotives and railway carnages, water Pumps and paint sprays,
- To start large (heavy) Diesel engines,
- For cleaning workshop machines, generators, automobile vehicles, etc.,
- To operate blast furnaces, gas turbine plants, Bessemer convertors used in steel plants, etc,
- To cool large buildings and air craft's, and to supercharge I.E. engines.

**1.2.Classification of Air Compressors:**

Compressors are mainly classified as:

- Positive displacement compressor and
- Dynamic compressor.

Positive displacement compressors reduce the volume of the gas while increasing the pressure. Reciprocal and rotary compressors are two types of positive displacement compressors. The air velocity is raised by dynamic compressors, which is then transferred to higher pressure at the exit. Dynamic compressors are centrifugal compressors that can be divided into two types: radial and axial flow. The flow and pressure requirements of a given application determine the suitability of a particular type of compressor.



**Figure 1: Compressor Types Based On Operating Principles**

**1.2.1. Positive-Displacement Compressor:**

Positive displacement compressors deliver a set volume of air at high pressures and are typically separated into two types: rotary and reciprocating. A certain inlet volume of gas is confined in a

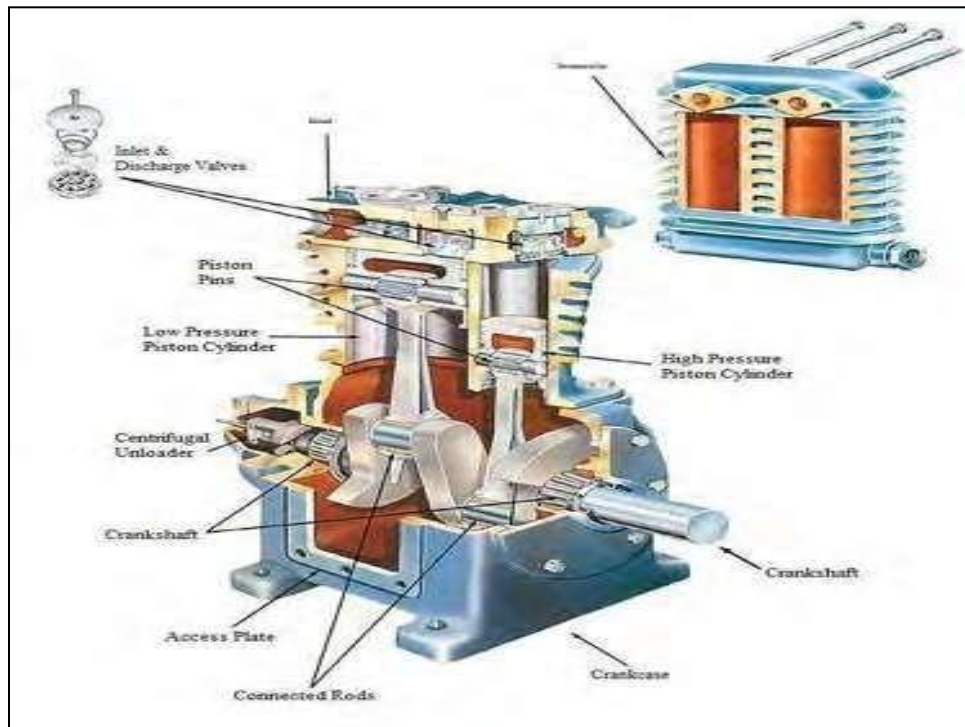
given space in all positive displacement machines, and then compressed by diminishing this confined area or volume. The gas is then discharged into the discharge piping or vessel system at this high pressure.

### 1.2.2. Reciprocating Compressors:

The reciprocating, or piston, compressor[3] is a positive displacement compressor that moves gas from one pressure level to a higher pressure level by moving a piston within a cylinder. Single-acting reciprocating compressors compress by utilising only one side of the piston; double-acting reciprocating compressors compress by using both sides of the piston. They're mostly used when a high-pressure head is needed at a modest flow rate[4]. The maximum compression ratio is usually determined by the maximum permissible discharge-gas temperature. Single-stage and multistage reciprocating compressors are both available. The entire compression is achieved using a single cylinder or a group of cylinders in tandem in a single stage system.

On multistage machines, intercoolers are provided between stages. These heat exchangers[5] remove the heat of compression from the gas and cool it down to around the same temperature as the compressor intake. The volume of gas travelling to the high-pressure cylinders is reduced, the power required for compression is reduced, and the temperature is kept within safe operating limits. Because the piston goes downward, a vacuum is formed inside the cylinder, and the intake gas enters the suction manifold into the cylinder.

When the piston reaches its lowest point, it begins to rise. When the intake valve closes, the gas inside the cylinder is trapped. The gas fluid is compressed as the piston moves upward, raising the pressure. The piston is pushed downward by the cylinder's high pressure.



**Figure 2: Compressor Reciprocating Two-stage, Two Cylinder.**

### 1.2.3. Rotary Compressors:

A rotary compressor[6] is a type of positive displacement machine with a rotating rotor in the centre and a number of vanes. A spinning component gives this device its pressurizing capabilities. The devices are small, affordable, and require very little attention and maintenance to operate. The pressure of a gas is increased in a rotary compressor by trapping it between vanes that lower its volume while the impeller revolves around an axis that is eccentric to the casing. In Fig.1.4, you can see how it works.

Only by adjusting the speed or bypassing or wasting some of the machine's capacity can the volume be changed. The discharge pressure will vary depending on the discharge side of the system's resistance. Screw compressors, vane type compressors, lobe and scroll compressors[7] are the four types of rotary compressors.

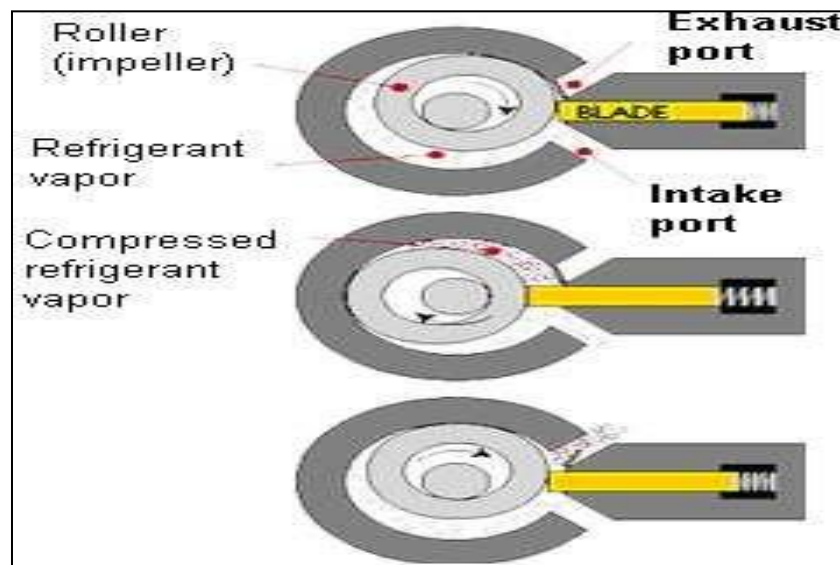


Figure 3: Rotary Compressor

### 1.2.4. Dynamic Compressor:

A dynamic compressor, which comprises centrifugal and axial flow compressors, is a continuous-flow compressor. It is frequently utilized for certain services in the chemical and petroleum refinery industries. They're also employed in other industries like the iron and steel industry, pipeline boosters, and reinjection compressors on offshore platforms. The rotating impeller[8] of a dynamic compressor adds velocity and pressure to the fluid. Dynamic compressors are substantially smaller and cause far less vibration than positive displacement compressors.

### 1.2.5. Centrifugal Compressor:

The centrifugal compressor is a dynamic machine[9] that compresses gas by using rotating impellers to impart inertial forces (acceleration, deceleration, and turning). It is made up of one or more stages, each of which has an impeller as the spinning element and a diffuser as the stationary element. Vane less diffusers and vanes diffusers are the two types of diffusers. The vane less diffuser is commonly used in applications with a wide working range, whereas the vane less diffuser is utilized in applications that need a high pressure ratio or high efficiency.

## 1.2.6. Axial Flow Compressor:

Axial flow compressors are mostly employed in gas turbine compressors. They're employed as blast furnace blowers[10] in the steel industry and as huge nitric acid facilities in the chemical sector. In comparison to other types of compressors, axial flow compressors are mostly employed in applications where a low head is required and a large intake volume of flow is required. An axial flow compressor has a higher efficiency than a centrifugal compressor. They come in a variety of sizes that can produce pressures of over 100 psi at intake volumes ranging from 23,500 to 588,500 acfm.

At the compressor inlet, an extra row of fixed blades (inlet guiding vanes) is usually utilized to guarantee that air enters the first stage rotors at the proper angle. Another diffuser, known as exit guide vanes, may be installed near the compressor's outlet to further spread the fluid and control its velocity.

## 1.3.Important Definitions:

- *Inlet pressure:* It is the absolute pressure of air at the inlet of a compressor.
- *Discharge pressure:* It is the absolute pressure of air at the outlet of a compressor.
- *Compression ratio (or pressure ratio):* It is the ratio of discharge pressure to the inlet pressure. Since the discharge pressure is always more than the inlet pressure, therefore the value of compression ratio is more than unity.
- *Compressor capacity:* It is the volume of air delivered by the compressor, and is expressed in m<sup>3</sup>/min or m<sup>3</sup>/s.
- *Free air delivery:* It is the actual volume delivered by a compressor when reduced to the normal temperature and pressure condition. The capacity of a compressor is generally given in terms of free air delivery.
- *Swept volume:* It is the volume of air sucked by the compressor during its suction stroke.

## 2. DISCUSSION

They prepare a two stage reciprocating compressor[11] that includes a casing; a first compressing unit disposed in the casing and including a first piston and a first cylinder, the first compressing unit being driven by a reciprocating motor to linearly reciprocate the first piston in the first cylinder to suck in and compress gas; and a second compressing unit disposed in the casing and including a second piston and a second cylinder, the second compressing unit being driven by a reciprocating. a second compressing unit disposed in the casing and comprising a second piston and a second cylinder, the second compressing unit being driven by the first compressing unit's vibration to linearly reciprocate the second piston in the second cylinder to suck in and compress gas; and a vibration transfer member that transfers vibration from the first compressing unit to the second compressing unit.

The first compressing unit and the second compressing unit of their compressor may be arranged so that the first compressing unit's first piston and the second compressing unit's second piston travel in opposing directions. The sucked gas flowing directions of the first and second compressing units may be in different directions. It is possible to align the first piston of the first

compressing unit with the second piston of the second compressing unit. The second compressing unit's second piston may be fixedly attached to the vibration transmission member, and the second cylinder may be coupled to a support frame.

### **2.1.Maintenance Procedures**

Although monitoring of reciprocating compressors is not as simple and definitive as monitoring other rotating equipment, there are some things that can be and should be monitored. The first step in the program is to decide what is to be monitored. An effective predictive maintenance program should include the following:

- Daily Operating Reports and Logs,
- Maintenance Records and Wear Measurements,
- Infrared Thermography,
- Lubricating Oil Monitoring,
- Vibration Monitoring,

### **2.2.Application of Air Compressor in Locomotive:**

Compressed air is utilised in locomotives for secondary air conditioning, air brakes, exhausters, train horns, and wind shield wipers, among other things. A typical compressed air supply configuration for a locomotive is shown in Figure shows A compressor, cooling pipes, an air drier, a storage reservoir, and controls are the primary pieces of equipment.

### **2.3.Overhauling Procedure of Reciprocating Air Compressor:**

An audit of the reciprocating compressor was planned as part of the maintenance programme to determine the reason of failure. Vibration measurements and foundation visual inspections are performed during these times. In addition, the maintenance plans and technical data for the use of wearable parts are examined. These detailed compressor schedules enable us to map out the current state of the compressor and provide viable remedies. The timetable revealed that the reciprocating compressor needed to be overhauled to prevent wear of moving parts and auxiliaries from causing an unanticipated shutdown. It was also suggested that the compressor foundation be renewed. Scheduled maintenance is required to ensure the system's continued functionality.

- Overhauling Compressor
- Determine the compressor's suitability for the job.
- Use the Volumetric Efficiency Test to determine the compressor's efficiency.
- Connect the compressor to the Testing Panel for Compressors.
- Determine the compressor's efficiency for overhauling.
- Make the decision to get the compressor overhauled.
- Parts are replaced based on dimensional correctness and precession.
- Evaluate the cost of repair and replacement based on the economic analysis.

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## 2.4. Tests on Overhauled Compressor

Following tests are conducted on overhauled compressor

- Temperature rise test
- Leak back test
- Vacuum test
- Sub merge test
- Volumetric efficiency test.

## 3. CONCLUSION

Various applications and potential sectors for an air compressor have been reported in the literature. The performance of the variable speed air compressor simulation model is satisfactory. A proper reciprocating compressor maintenance schedule improves the machine's reliability, availability, and reduces downtime and maintenance costs. An appropriate overhauling approach decreases the risk of failure and additional maintenance costs.

## REFERENCES

1. L. Y. Xie, W. X. Qian, and N. X. Wu, "Reliability model for complex mechanical component design," 2013, doi: 10.4028/www.scientific.net/AMM.365-366.28.
2. S. Sivaprasad *et al.*, "Investigation on the failure of air compressor," *Eng. Fail. Anal.*, 2010, doi: 10.1016/j.engfailanal.2009.04.016.
3. P. Loukopoulos *et al.*, "Reciprocating compressor prognostics," 2018, doi: 10.1007/978-3-319-66697-6\_31.
4. S. Pityana, R. M. Mahamood, E. T. Akinlabi, and M. Shukla, "Gas flow rate and powder flow rate effect on properties of laser metal deposited Ti6Al4V," 2013.
5. M. Rauch and A. Galovic, "Energy analysis of heat exchanger in a heat exchanger network," *Therm. Sci.*, 2018, doi: 10.2298/TSCI171231216R.
6. H. Sakamaki, S. Sugishita, and Y. Horikoshi, "Rotary air-compressor.," 1984.
7. D. Krähenbühl, C. Zwysig, H. Weser, and J. W. Kolar, "A miniature, 500 000 rpm, electrically driven turbocompressor," 2009, doi: 10.1109/ECCE.2009.5316472.
8. J. Park, B. Lee, W. Shin, S. Jo, and H. Jun, "Application of a rotating impeller anode in a bioelectrochemical anaerobic digestion reactor for methane production from high-strength food waste," *Bioresour. Technol.*, 2018, doi: 10.1016/j.biortech.2018.02.091.
9. H. P. Bloch, "Dynamic Compressors," in *Petrochemical Machinery Insights*, 2017.
10. A. Amaral *et al.*, "Towards advanced aeration modelling: From blower to bubbles to bulk," *Water Sci. Technol.*, 2017, doi: 10.2166/wst.2016.365.



11. F. M. Tello Oquendo, E. Navarro Peris, J. González Macía, and J. M. Corberán, “Performance of a scroll compressor with vapor-injection and two-stage reciprocating compressor operating under extreme conditions,” *Int. J. Refrig.*, 2016, doi: 10.1016/j.ijrefrig.2015.10.035.

## AN OVERVIEW ON HUMAN-COMPUTER INTERACTION

**Namit Gupta\***

\*Assistant Professor,  
Department of Computer Science,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- namit.computers@tmu.ac.in

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### ABSTRACT

*Human-Computer Interaction (HCI) is a multidisciplinary area of research that focuses on computer technology design and, in particular, the interaction between people (users) and computers. The use of computers had always raised the issue of interfacing. The methods by which humans interact with computers have progressed significantly. HCI began with computers and has now grown to include virtually all aspects of information technology design. This paper's goal is to provide a broad overview of the field of Human-Computer Interaction. The fundamental concepts and terminology are covered, as well as a review of current technologies and recent developments in the area, typical architectures used in the design of HCI systems, including unimodal and multimodal configurations, and HCI applications. In addition, this paper provides a complete list of references for each HCI idea, technique, and application.*

**KEYWORDS:** *Human-Computer, Interaction, Interfaces, Multimodal Hci, Ubiquitous Computing.*

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### 1. INTRODUCTION

The field of Human-Computer Interaction (HCI) has grown not only in terms of quality of interaction, but also in terms of branching throughout its history. Instead of designing standard interfaces, different research branches have focused on concepts such as multimodality versus unimodality, intelligent adaptive interfaces versus command/action based interfaces, and finally active versus passive interfaces. The journey continues, with new designs of technologies and systems appearing every day, and research in this area has grown at a breakneck pace in recent decades.

This paper aims to give an overview of the current state of HCI systems and to cover the major branches mentioned above. Basic HCI definitions and terminology are provided in the following section. The following section provides an overview of current technologies as well as recent advancements in the field. Following that, a description of the various architectures of HCI designs is provided. The final sections cover some of the applications of HCI as well as the field's future directions [1]–[3].

## **1.1. Terminology and Definition of Human-Computer Interaction:**

The concept of Human-Computer Interaction/Interfacing (HCI), also known as Man-Machine Interaction or Interfacing, was automatically represented with the advent of the computer, or more broadly machine. In fact, the reason is obvious: most sophisticated machines are useless unless they can be used correctly by men. This basic argument simply lays out the two most important terms to consider when designing HCI: functionality and usability.

What a system can do, i.e. how the functions of a system can assist in the achievement of the system's purpose, is ultimately what defines why it is designed. The collection of activities or services that a system offers to its users defines its functionality. The value of functionality, on the other hand, is only apparent when it can be used effectively by the user. The range and degree to which a system with a certain feature may be utilized effectively and sufficiently to achieve specific objectives for specific people is referred to as usability. When the functionality and usability of a system are properly balanced, the system's true efficacy is realized.

With these concepts in mind, and keeping in mind that the terms computer, machine, and system are frequently used interchangeably in this context, HCI is a design that aims to achieve a fit between the user, the machine, and the required services in order to achieve a certain level of quality and optimality in the services. It's largely subjective and context-dependent to determine what constitutes a successful HCI design. An aviation component designing tool, for example, should offer great accuracy in the perspective and design of the parts, while graphics editing software may not. The available technology may also influence how various kinds of HCI for the same goal are developed. Using instructions, menus, graphical user interfaces (GUIs), or virtual reality to access computer functions is one example. The next part provides a more comprehensive review of current techniques and technologies for interacting with computers, as well as recent developments in the area [4]–[6].

## **1.2. HCI Overview:**

The advancements in human-computer interaction (HCI) over the past decade have made it almost difficult to distinguish between what is fiction and what is and can be real. The continuous twists in marketing and the push of research enable the new technology to become accessible to everyone in no time. However, not all current technologies are available to the general public and/or are cheap. The first portion of this section provides an overview of the technology that is more or less accessible to and utilized by the general population. The second section provides an overview of the direction in which HCI research is headed.

## **1.3. Existing HCI Technologies**

HCI design should take into account a wide range of human behaviors and be practical. When compared to the simplicity of the interaction technique itself, the degree of human participation in interacting with a computer is often unnoticeable. The complexity of current interfaces varies depending on the degree of functionality/usability as well as the financial and commercial aspects of the machine on the market. An electrical kettle, for example, does not need a complex user interface since its only purpose is to heat water, and it would be impractical to have anything more than a thermostatic on/off button. A basic website, on the other hand, with limited functionality, should have a sophisticated enough usability to attract and retain consumers.

As a result, while designing HCI, the amount of interaction a user has with a machine should be carefully considered. There are three levels of user activity: physical, cognitive, and emotional. The physical aspect defines the mechanics of human-computer interaction, while the cognitive component addresses how users can comprehend and engage with the system. The emotional component is a more contemporary problem that aims to not only make the interaction a pleasant experience for the user, but also to impact the user in a manner that encourages them to continue to use the machine by altering their attitudes and feelings about it.

The primary focus of this paper is on advances in the physical aspects of interaction, with the goal of demonstrating how different methods of interaction can be combined (Multi-Modal Interaction) and how each method can be improved in performance (Intelligent Interaction) to provide a better and easier user interface. The current physical technologies for HCI may essentially be classified based on the device's intended human sense. Vision, audition, and touch are the three human senses that these technologies depend on.

The most prevalent kind of input device is one that relies on vision and is either a switch or a pointing device. Any kind of interface that utilizes buttons and switches, such as a keyboard, is referred to as a switch-based device. Mice, joysticks, touch screen panels, graphic tablets, trackballs, and pen-based input are examples of pointing devices. Joysticks are controllers that may be used for both switching and pointing. Any kind of visual display or printing equipment may be used as an output device.

Auditory devices are more advanced gadgets that typically need some kind of voice recognition. These gadgets are considerably more challenging to develop since they seek to make interaction as simple as possible. The creation of output auditory devices, on the other hand, is much simpler. Machines now generate a wide range of non-speech and speech signals and messages as output signals. Simple examples include beeps, alerts, and turn-by-turn navigation instructions from a GPS gadget.

Haptic devices are the most complex and expensive to create. "Through touch, weight, and relative stiffness, these interfaces create feelings in the skin and muscles." Virtual reality and disability assistance apps are the most common uses for haptic devices.

Recent HCI techniques and technologies are attempting to integrate traditional ways of interaction with newer technology like as networking and animation. Wearable gadgets, wireless devices, and virtual devices are the three categories of new innovations. Technology is progressing at such a rapid pace that the distinctions between these new technologies are blurring and merging. GPS navigation systems, military super-soldier enhancing devices (e.g. thermal vision, tracking other soldiers' movements using GPS, and environmental scanning), radio frequency identification (RFID) products, personal digital assistants (PDAs), and virtual tours for real estate businesses are just a few examples of these devices.

Some of the new gadgets improved and merged earlier interface techniques. As an example, there is a keyboarding option provided by Compaq's iPAQ called Canesta keyboard. This is a virtual keyboard that uses a red light to display a QWERTY-like layout onto a solid surface. The gadget then uses a motion sensor to monitor the user's finger movement while typing on the surface and sends the keystrokes back to the device [7]–[10].

#### **1.4.Recent Advances in Human-Computer Interaction:**

Recent research directions and achievements in HCI, particularly intelligent and adaptable interfaces and ubiquitous computing, are described in the sections that follow. Physical, cognitive, and affectional activity are all involved in these interactions.

##### **1.4.1. Intelligent and Adaptive Human-Computer Interaction:**

Although the bulk of the public's gadgets are still simple command/action setups using less complex physical equipment, the flow of research is focused on the development of intelligent and adaptable interfaces. The precise theoretical meaning of intelligence or being clever is unknown or, at the very least, not publicly acceptable. However, the apparent development and improvement in functionality and usefulness of new gadgets on the market may be used to describe these notions.

As previously said, it is economically and technologically critical to create HCI designs that make users' lives simpler, more pleasant, and fulfilling. Every day, the interfaces are becoming more natural to use in order to achieve this objective. A excellent illustration is the evolution of note-taking tool interfaces. There were typewriters, then keyboards, and now touch screen tablet PCs where you may write with your own handwriting and have it recognized and converted to text, as well as tools that automatically transcribe anything you say so you don't have to write at all.

Differentiating between utilizing intelligence in the creation of the interface (Intelligent HCI) and the way the interface interacts with users is an essential element in the next generation of interfaces (Adaptive HCI). Intelligent HCI designs are user interfaces that integrate intelligence in their perception and/or reaction to users. Speech-enabled interfaces that engage with users using natural language and gadgets that visually monitor the user's motions or gaze and react appropriately are two examples.

Adaptive HCI designs, on the other hand, may not utilize intelligence in the interface design but do so in the way they interact with users in the future. An example of adaptable HCI is a website that sells different goods using a standard GUI. This website would be adaptable -to a degree- if it could identify the user and remember his searches and purchases, as well as intelligently search, locate, and recommend items on sale that it believes the user may require. The majority of these adaptations are concerned with cognitive and emotional levels of user engagement.

Another example of an intelligent and adaptable interface is a PDA or tablet PC with handwriting recognition capability that can adjust to the logged-in user's handwriting to enhance performance by remembering the user's changes to the detected text.

Finally, when it comes to intelligent interfaces, it's important to remember that most non-intelligent HCI designs are passive in nature, meaning they only react when the user invokes them, while ultimate intelligent and adaptable interfaces are active interfaces. Smart billboards or advertising, for example, display themselves based on the preferences of people. In the next part, we'll look at how combining various HCI techniques may aid in the creation of intelligent adaptable natural interfaces.

## 2. DISCUSSION

The “Put That There” demonstration system is a famous example of a multimodal system. By saying "place it there" while pointing to the object and then pointing to the intended destination on a map on the screen, one may transfer an object to a new spot on the map. Map-based simulations, such as the aforementioned system; information kiosks, such as AT&T's MATCHKiosk; and biometric identification systems have all benefited from multimodal interfaces.

In comparison to conventional interfaces, multimodal interfaces may provide a variety of benefits. They may, for example, provide a more natural and user-friendly experience. For example, with the Real Hunter real-estate system, one may point with a finger to a home of interest and speak to ask questions about it. Multimodal interfaces provide users with a natural experience by allowing them to choose an item with a pointing motion and then ask questions about it using voice. Multimodal interfaces' ability to offer redundancy to suit various individuals and situations is another important feature. MATCHKiosk, for example, enables users to define the kind of company to search for on a map using voice or pen. In a loud environment, one may give input by scribbling rather than speaking. Here are a few more examples of multimodal system applications:

- Intelligent Video Conferencing
- Intelligent Offices/Houses
- Driver Observation
- Games with Intelligence
- E-Commerce
- Assisting Persons with Disabilities

The following sections go through some of the most significant uses of multimodal systems in more depth.

### 2.1. Multimodal Systems for People with Disabilities:

Multimodal systems may be used to address and help handicapped individuals (such as those with hand impairments), who need different types of interfaces than regular people. Disabled people may communicate with the machine via speech and head motions with such systems, allowing them to do work on the computer.

Speech and head motions are then utilized as modalities. Both modalities are always active. The cursor's current coordinates on the screen are shown by the head position. Speech, on the other hand, offers the necessary information about the meaning of the action that must be carried out with the cursor chosen item.

The cursor location is calculated at the start of speech detection to ensure synchronization between the two modalities. This is primarily due to the fact that the cursor location can be moved during the process of pronouncing the complete sentence by moving the head, and the cursor can then point to another graphical object; additionally, the command that must be fulfilled appears in the brain of a human in a short time before the beginning of phrase input.

### 2.2. Multimodal Emotion Recognition Systems:



As we get closer to a future where computers are more widely used, it will become more important for machines to recognize and understand the implicit and explicit signals we provide them about our intentions. A genuine human-computer connection cannot be exclusively dependent on instructions that are clearly expressed. Computers will have to identify a variety of behavioural cues in order to determine an individual's emotional state. This is a critical piece of the jigsaw that must be assembled in order to correctly anticipate one's intentions and future behavior.

People can anticipate an individual's emotional condition based on their observations of their face, body, and speech. According to studies, if only one of these modalities was available, the face modality would provide the greatest results. When human judges are provided access to both face and body modalities at the same time, their accuracy improves by 35%. This indicates that multimodal fusion methods may significantly improve impact recognition, which has traditionally relied on facial expressions.

Facial characteristics and body posture features are integrated to create an indication of one's annoyance in one of the few studies that has tried to integrate more than one modality for affect detection. Another study that combined face and body modalities found that, like humans, machine emotion categorization is better when based on both face and body data rather than either modality alone. For emotion recognition, the authors tried to combine face and speech data. When facial and voice data were combined, computer categorization of emotion as neutral, sad, furious, or joyful was most accurate, staying consistent with human assessors.

### **2.3.Multimodal Map-Based Applications:**

Different input modalities are appropriate for conveying various messages. For example, voice offers a simple and natural way to ask a question about a certain item or to request that the object do a specific action. Speech, on the other hand, may not be suitable for activities like selecting a specific area on the screen or establishing a specific route. Hand or pen motions are more appropriate for these kinds of activities. Making inquiries about a specific area and choosing that region, on the other hand, are common activities that should be supported by a map-based interface. As a result, it stands to reason that map-based interfaces may significantly enhance the user experience by allowing various forms of input, particularly voice and gestures.

### **3. CONCLUSIONS**

Human-Computer Interaction (HCI) is a crucial component of system design. The way a system is displayed and utilized by users determines its quality. As a result, improved HCI designs have received a great deal of attention. The current study approach aims to use intelligent, adaptive, multimodal, natural techniques to replace conventional regular methods of contact. The Third Wave, also known as ambient intelligence or ubiquitous computing, aims to integrate technology into the environment in order to make it more natural and undetectable. Virtual reality is an emerging area of HCI that has the potential to become the common interface of the future. Through a thorough reference list, this article aimed to offer an overview of these problems as well as a review of current research.

### **REFERENCES:**

1. A. Dix, "Human-computer interaction, foundations and new paradigms," *J. Vis. Lang. Comput.*, 2017.

2. A. Jaimes and N. Sebe, "Multimodal human-computer interaction: A survey," *Comput. Vis. Image Underst.*, 2007.
3. S. S. Rautaray and A. Agrawal, "Vision based hand gesture recognition for human computer interaction: a survey," *Artif. Intell. Rev.*, 2015.
4. H. Limerick, D. Coyle, and J. W. Moore, "The experience of agency in human-computer interactions: A review," *Frontiers in Human Neuroscience*. 2014.
5. D. Bachmann, F. Weichert, and G. Rinkenauer, "Review of three-dimensional human-computer interaction with focus on the leap motion controller," *Sensors (Switzerland)*. 2018.
6. K. Li, A. Tiwari, J. Alcock, and P. Bermell-Garcia, "Categorisation of visualisation methods to support the design of Human-Computer Interaction Systems," *Appl. Ergon.*, 2016.
7. A. Haria, A. Subramanian, N. Asokkumar, S. Poddar, and J. S. Nayak, "Hand Gesture Recognition for Human Computer Interaction," in *Procedia Computer Science*, 2017.
8. H. Bansal and R. Khan, "A Review Paper on Human Computer Interaction," *Int. J. Adv. Res. Comput. Sci. Softw. Eng.*, 2018.
9. A. Henderson, "Interaction design: beyond human-computer interaction," *Ubiquity*, 2002.
10. M. J. Smith, F. T. Conway, and B. T. Karsh, "Occupational stress in human computer interaction," *Industrial Health*. 1999.

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## AN OVERVIEW OF THE CONCEPTS OF PASSIVE AND ACTIVE MIXING IN MICRO MIXERS

**Sakshi Singh\***

\*Assistant Professor,  
Department of Electronics & Communication Engineering,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- sakshi.engineering@tmu.ac.in

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### ABSTRACT

*This paper provides an overview of micro structured mixer devices and their mixing principles for miscible liquids (and gases). The explanation of common mixing element designs, mixing characterization techniques, and application areas are all included. The mixing principles used may be split into two categories: passive and active mixing, which depend on either pumping energy or the supply of additional external energy to accomplish mixing. Devices and methods such as Y- and T-type flow-mixers, multi-laminating-, split-and-recombine-, chaotic-, jet colliding-, recirculation flow-mixers, and others are addressed in terms of passive mixing. Time-pulsing flow caused by a periodic shift in pumping energy or electrical fields, acoustic fluid shaking, ultrasound, electro wetting-based droplet shaking, micro stirrers, and other methods may all be used to achieve active mixing.*

**KEYWORDS:** *Active Mixing, Inter-Digital, Micro-Mixer, Micro Reactors, Passive Mixing.*

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### 1. INTRODUCTION

Microchannel-based mixers' application areas often include both contemporary, specialized problems like sample preparation for chemical analysis and classic, widely applicable mixing activities like reaction, gas absorption, emulsification, foaming, and blending. Micro-mixer components are usually included in credit-card-sized fluidic chips as part of the integrated system in the first instance[1]. At the laboratory size, chip-like micro-mixer components, or micro-mixer s, are used for more traditional chemical and chemical engineering applications. Glass inter-digital micro-mixer s the size of a cheque-book are an example of this kind of technology. Much larger components, usually containing microstructures in a huge housing, are used at pilot- or even production-scales for the same mixing duties, and are therefore referred to as micro structured mixers.

Arrays of tens to hundreds of stacked star-shaped platelets are placed into fist-type and bigger equipment with liquid throughputs in the m<sup>3</sup>/h range[2]. Micro-mixer elements, micro-mixer s, and micro structured mixers generally have flow rates of sub-ml/h, ml/h–l/h, and 10–10,000 l/h, respectively, spanning the whole flow range up to traditional static mixers while also being

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suitable to analysis and chemical synthesis. The diffusive flow of a substance, such as a solute, is equal to the diffusion coefficient multiplied by the interfacial surface area multiplied by the species concentration gradient. As a result, maximization of the comprising components may be used to improve diffusive mixing[3].

Leaving away the increase of the diffusion coefficient, such as via an adequate temperature rise, one is left with the maximisation of the diffusion coefficient. Essentially, 'the art of macromixing is maximizing the interfacial surface area and concentration gradient as efficiently as possible. In mixing devices, convective diffusion enhancement is most frequently used[4]. Effective mixing methods include secondary-flow patterns superimposed on the primary flow or recirculation patterns inside liquid plugs of segmented liquid/liquid flows. However, viscous dissipation is linked to the greatest feasible interfacial area generation. As a result, effective mixing and viscous dissipation, or energy consumption, are inextricably connected.

The reaction, in which iodine is produced through an acid catalyzed redox reaction between iodide and iodate, is a commonly used competitive method for characterizing micro-mixer devices[5]. Measurement of optical characteristics on- or in-line, usually not for the whole volume but along lines such as the planned channel cross-section. In a flow-through mixing channel, measuring multiple cross-sectional profiles at different distances provides the time development of the mixing with precise spatial information. Photometric or fluorescence measurements may be used to determine concentrations. Electrode-based concentration detection, which is often used for impeller-in-tank mixing characterization, may also be utilized, but there are few reports at this time[6].

This job may be performed in-line by particularly miniaturized electrochemical sensors, which are currently available for other purposes. For assuming a laminar flow and disregarding features of the flow field, such as entry flow effects, vibrational analyses such as IR and Raman may be employed. The mixing length in these channels can be estimated by  $Pe$ , where  $Pe$  is the Peclet number and  $w$  is the channel width. Despite the concept's simplicity, the Y-type structure's features have a significant effect on mixing efficiency. This was shown in a CFD simulation of gaseous oxygen and methanol mixing, with respective mass fractions along the channel route. A laminated feed stream enters an inverse bifurcation structure and then a folded delay-loop channel, where mixing occurs.

Fluorescence flow visualization verified the multi-lamination pattern. Fluorescence quenching experiments were used to obtain quantitative data on the process of mixing at various sites. Liquid solution mixing took less than 100 milliseconds; 95 percent mixing took approximately 40 milliseconds. Cross-sectional concentration profiles with precise geographical information were recently assessed in relation to the latter. The presence of extremely regular, periodical multi-lamination patterns for liquid flows, both before and after focusing, could be verified, among other fluid dynamics facts. Furthermore, it was shown that if the focusing angle is made too great, liquid lamellae may tilt and, at high Reynolds numbers, spirally wind and create recirculations. In the instance of gas mixing in a micro structured inter-digital mixer[7].

At a particular axial distance along the mixing chamber, anomalously high mixing efficiencies were discovered at high velocities of the gas streams. Additional turbulent mixing was explained by the collision of gas streams due to the slanted injection through the inter-digital feed, which resulted in quicker mixing. The mixing energy of these micro structured mixers, normalized by

volume for a particular mixing job, was shown to be lower than that of a jet mixer used in industry. Semi analytical computations were used to optimize a unique liquid focusing inter-digital mixer with parallel feed flows called Super Focus, which was initially realized as a glass version[8].

Both methods produce liquid lamellae that are quite thin. While the glass mixer has a focusing ratio of 40, the steel mixer has a ratio of 200 because of its higher throughput and lower fouling sensitivity[9]. The number of lamellae and therefore the throughput for the steel mixer increased significantly since the ultimate lamellae width was set. Photometric measurement for the Super Focus mixer verified a mixing time (for 95 percent completion of mixing) of 4 ms, omitting the time required to pass through the focusing chamber, equivalent to some cm mixing length at most feasible throughputs. A design optimization research on the dimensions of the triangle focusing chamber was recently completed in order to decrease the residence time inside this flow channel and shorten the total mixing time. Photometric study revealed that the mixing efficiency of the stirred vessel and traditional mixing tees is better. Furthermore, the analytical technique allowed for comprehensive findings on the effect of minor design modifications, as well as a comparison of various micro structured mixers with throughput or energy problems[10].

## 2. DISCUSSION

A secondary mixing mechanism based on jet mixing generating eddies in the surrounding liquid affected the mixing effectiveness of previous versions. The flow in this outflow area is no longer completely laminar. As a consequence, findings for determining mixing efficiency (as well as executing chemical reactions) may be heavily affected by flow behavior outside the micro structured area, potentially leading to misunderstanding of experimental results. FTIR monitoring of the reacting flows was accomplished for an unfocused parallel-flow inter-digital mixer, providing a high number of interferograms and, as a result, comprehensive information on the mixing and reaction process. Their fluid input is similar to an alternating (inter-digital) flow injection in general. The flow regime, however, is turbulent due to the wide internal aperture and usually applied high volume flows, resulting in a pre-layered flow being sequentially mixed by eddy generation.

Due to the cheap cost of the plates and the ability to stack a large number of plates, such as several hundreds, very high throughputs may be obtained even for devices with tiny exterior volumes. The performance of T-shaped, inclined, oblique, and wavy structures in mixing gaseous methanol and oxygen was simulated. Despite the fact that the geometry had an effect, the various designs had relatively comparable mixing durations for mixing completion. A maximum-type curve of mixing efficiency is obtained by establishing a relationship between mixing performance and the periodicity of the functional components. The shortest mixing length discovered in a basic T-junction was approximately one-third of that found in a basic T-junction. In this case, the key characteristic of chaotic advection is the exponential increase of the interfacial area, which is followed by a decrease in striation thickness. A mathematical framework is required for a correct definition of chaotic flows, which is outside the scope of this study. A detailed mathematical explanation. Two-dimensional unstable velocity fields or three-dimensional velocity fields with or without time dependence may cause chaotic advection.

Many active mixing concepts belong to the first category. The simplest example is the so-called "Blinking Vortex Model," which is a mathematically analyzed alternating agitation vortex. Flow

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circulations are created as a result of this, resulting in an exponential rise in the specific interface and, as a result, rapid mixing. Circulating fluids having extensive interfaces, as well as quiet zones with less enhanced mixing, are typical of such chaotic flows. Similar micro channels with no internal features or just straight ridges are inferior to the SHM mixing.

The basic T-mixer needs mixing lengths of approximately 1 and 1.5 cm, respectively, while the mixer accomplishes the same job in just 1 and 1.5 cm. The relationship between mixing efficiency and the Pe number is also discussed. The diagonal mixer creates a single helical flow, while the herringbone mixer creates a double helical flow with big and tiny vortices. The presence of a modest degree of convective mixing in the diagonal mixer is verified by particle tracking. As a result, the herringbone mixer produces excellent mixing results. In addition, the variance of the tracer dispersion and stretching were calculated. Later, a far simpler channel architecture was suggested, based only on alternatively curved micro channels.

The improvement in mixing at high Re numbers is attributable not just to the reduction in lamellae width as a consequence of the flow's decreased extension into the triangles, but also to the effect of recirculation, according to a thorough research. It was also shown that having a zig-zag layout with a high periodicity is not advantageous since it mimics the straight channel situation. When charting the mixing efficiency across the periodicity, a maximum is reached; as a result, the disparity between the zig-zag and straight channel performances is also at its highest. This is typically accomplished using a ground electrode and a linear electrode array that serves as a route for the flowing droplets. Furthermore, the size of the droplet is selected such that it may be agitated, which a kind of active is mixing (see below). Fluorescent and non-fluorescent droplets were mixed in a passive mixing experiment. It was discovered that this did not result in efficient mixing, but rather in the formation of a vertically stratified structure inside the droplet. Because these layers are solely mixed by diffusion, they will take 1–2 minutes to complete. Because of the layered structure, a vertical ('from the side') as well as a horizontal ('from the top') microscope examination is required. The pictures, on the other hand, imply mingling, which is not the case. In this manner, the mixer may be thought of as a particular implementation of the SAR method based on recycle-flows. Capillary forces are used in a self-filling micro-mixer device to enter and retain liquids in different chambers that are linked by a tiny gap. This idea may be expanded to the injection of numerous, pulsating flows into a single micro-channel; such devices are currently speculative and would almost likely need a sophisticated control mechanism. The development of chaotic regions that are not uniformly distributed within the bulk fluid comes from increasing the amplitude from there at a given frequency. The so-called Kolmogorov–Arnold–Moser (KAM) curves, which are positioned at the interfaces between chaotic and quasi-periodic regions, break up into islands with even greater amplitude. Outer and inner chaotic regions are discovered as a unique characteristic. The optimum operating parameters were determined by graphing the exponent against the amplitude and angle frequency. By applying an electric field perpendicular to the solid–liquid contact, the potential may be controlled both spatially and temporally. In practice, the production of such typical electric. Fixed points are discovered around by closed orbits (tori) of different periods. Chaotic behavior emerges over longer periods, the hyperbolic fixed point is disturbed, and the tori are agitated. With homo clinic tangle and the creation of additional hyperbolic and elliptic points, a chaotic area emerges. The intricacy of the flow gets more apparent when the time is increased. The particles first roam about the pattern that has been placed on top of them. The particles then



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deviate from the "regular route" and sample the majority of the cell's surface area. Advection has become chaotic.

As anticipated, employing four embedded electrodes results in even more complicated flow fields that are comparable in sections to those produced by switching with two electrodes. Bubble vibration caused by a sound field causes friction forces at the air/liquid interface, causing cavitation micro-streaming or acoustic micro-streaming, which is a bulk fluid flow around the air bubble. Circulatory fluxes cause global convection flows with a "tornado" pattern, which accelerate mixing. The intonation frequency must match the resonance frequency for pulsation, which is, of course, heavily influenced by the bubble radius. The bubble must then be secured to a solid border. Without the utilization of air bubbles, sonic irradiation produces very little fluid motion. In turn, sonic irradiation with air bubbles led a colored solution to have a lot of gross fluid motion.

Mixing is stimulated throughout the micro chamber, not only in one section, due to the equal distribution of air pockets. A colored solution was used in a dilution-type experiment for one-bubble micro-streaming mixing. The dye fills the drum-shaped micro chamber entirely. The mixing process was quantified using ensemble-averaged probability density functions and power spectra of instantaneous spatial intensity profiles, complete the information provided by direct imaging. A high-resolution CCD camera's integration of fluorescence intensity across measurement volumes (voxels) gives a measure of the degree to which two streams are mixed inside each voxel volume.

The picture power spectrum is characterized by a frequency band somewhat extended in the vertical direction in the initial unmixed condition with no AC field. Advective flux emerges during mixing development, resulting in high-spatial frequency gradients in the power spectra. Within the flow, new interfacial area is constantly being created. These high-frequency bands are damped in the final blended state. As a result, the isotropic power spectra of the matching well-stirred power spectra. The merged droplets stratified, segregated structure, on the other hand, does not allow for rapid mixing. As a result, active mixing through electro wetting was created, resulting in the combined droplet being shaken. When utilizing multi-electrode arrays, this proved to be very successful. Complex patterns of fluid motion were discovered for a four-electrode array (600 m electrode spacing; 8 Hz, 1.32 l droplet volume; 50V), resulting in much shorter mixing durations than passive mixing. As fluorescence imaging shows, shaking the droplets with two- or three-electrode arrays causes flow reversibility, with the consequence that newly formed interfaces disappear and the old pattern is restored.

### 3. CONCLUSION

Meanwhile, there is a sufficient selection of micro and micro structured mixers; commercial catalogue items are also accessible for manufacturing purposes. Devices are available for a wide flow range of ml/h to m<sup>3</sup>/h, and various mixing methods, such as varying energy input and fouling sensitivity, may be used. New designs and principles are certainly welcome, but they are not the most important responsibilities for future improvements. Micro structured mixers should become standard pilot-scale and production equipment in the chemical industry in the next years. Additional features, such as heating and sensing, must be added to existing mixing devices. Still, more strong and professional designs are required, as are field experiments to assess the potential in an industrial setting.

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Aside from technological advancements, market development must be actively started and promoted. In order to bring their goods to market, developing new businesses offering such gadgets in the sector need help during the start-up phase. The wide range of micro-mixers available, especially those that actively mix, necessitates benchmarking and segmentation into more scientific and more field-tested methods. Until yet, only test solutions have been used to characterize mixing; in the future, the advances should be put into practice, mixing real-world solutions. Because they are often components of an integrated TAS device, their commercialization is inextricably connected to the introduction of these miniaturized analytical instruments to the market.

**REFERENCES:**

1. J. Aubin, D. F. Fletcher, J. Bertrand, and C. Xuereb, "Characterization of the mixing quality in micro-mixers," *Chem. Eng. Technol.*, 2003.
2. S. Wiggins and J. M. Ottino, "Foundations of chaotic mixing," *Philos. Trans. R. Soc. A Math. Phys. Eng. Sci.*, 2004.
3. J. P. Silva, A. dos Santos, and V. Semiao, "Experimental characterization of pulsed Newtonian fluid flows inside T-shaped micro-mixers with variable inlet widths," *Exp. Therm. Fluid Sci.*, 2017.
4. S. Kirchner, S. Teychené, M. Boualleg, A. Dandeu, C. Frances, and B. Biscans, "Effect of precipitation process parameters on boehmite properties: In situ optical monitoring," *Chem. Eng. J.*, 2015.
5. S. Dreher, N. Kockmann, and P. Woias, "Characterization of laminar transient flow regimes and mixing in t-shaped micro-mixers," in *Heat Transfer Engineering*, 2009.
6. K. S. Novoselov *et al.*, "Electric Field Effect in Atomically Thin Carbon Films Supplementary," *Science (80-. )*, 2004.
7. N. Kockmann, S. Dreher, M. Engler, and P. Woias, "Simulation and characterization of microreactors for aerosol generation," in *Proceedings of the 4th International Conference on Nanochannels, Microchannels and Minichannels, ICNMM2006*, 2006.
8. M. N. Kashid *et al.*, "Peracetic Acid (CAS No. 79-21-0) and its Equilibrium Solutions," *Chem. Eng. Sci.*, 2011.
9. J. Ramsden, *Micro-mixers - Fundamentals, Design and Fabrication*. 2008.
10. T. Bayer, K. Himmler, and V. Hessel, "Don't be baffled by static mixers," *Chemical Engineering*. 2003.

## THE BRIEF REVIEW ON THE PAPER RECYCLING TECHNIQUES

Harish Kumar\*

\*Lecturer,  
Department of Mechanical Engineering,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- harish.engineering@tmu.ac.in

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### ABSTRACT

*Paper processing necessitates a range of chemicals, which are employed either in the manufacture of paper and pulp or in the conversion operations that follow (i.e. printing and gluing). Paper recycling continues to rise as a result of economic and environmental policy. Recycling in Europe has increased by almost 20% in the past decade, reaching nearly 72 percent in 2012. Increased recycling rates may include paper fractions of lower quality. This may potentially lead to the agglomeration or unintentional dispersion of chemical compounds in paper, for as via the recycling of chemicals from waste paper. This study examines possibly paper-borne chemicals and proposes a progressive hazard screening methodology based on the compounds' intrinsic hazards, physicochemical properties, and biodegradability. According to the results, 51 substances (chosen mineral oils, phthalates, phenols, parabens, and other chemical groups) are potentially significant for paper recycling. It is suggested that these compounds in waste paper be given greater attention.*

**KEYWORDS:** *Chemicals, Paper, Recycling, Waste Management.*

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### 1. INTRODUCTION

Paper recycling is one of the most well-established waste material recycling programs presently in use. With an annual recycling usage of about 72 percent in Europe in 2012, recycled paper is an essential component of the paper and pulp manufacturing process. In addition to being a vital raw resource for the paper industry, numerous studies have demonstrated that paper recycling may provide significant environmental advantages throughout the course of its life cycle. Paper recycling is beneficial from both a resource and an environmental standpoint, and it should be promoted as much as possible [1].

Paper is one of the most often used materials in our civilization. It's a fantastic material with a wide range of applications. Although recycling paper seems to be a straightforward procedure, various kinds of paper provide unique challenges in the recycling process. In 2011, the United States recycled 66.8% of their paper use. More paper is collected for recycling than plastic, metal, and glass combined, and every ton of paper recycled saves more than 3.3 cubic yards of

landfill space. Because 87 percent of us have access to curbside or drop-off recycling for paper, it's a material we're accustomed to recycling. Figure 1 shows the [paper recycling process link](#).

The recycling of paper may be broken down into a few basic steps:

- Paper from the bin is collected and placed in a big recycling container alongside paper from other recycling bins.
- The paper is transported to a recycling facility and classified into different kinds and grades.
- To remove inks, plastic film, staples, and glue, the separated paper is rinsed in soapy water. The paper is placed in a big holder and combined with water to form a slurry.
- Various paper products, including as cardboard, newsprints, and office paper, may be made by adding different ingredients to the slurry.
- Huge rollers are used to distribute the slurry into large, thin sheets.
- After drying, the paper is rolled up and ready to be cut and returned to the stores.

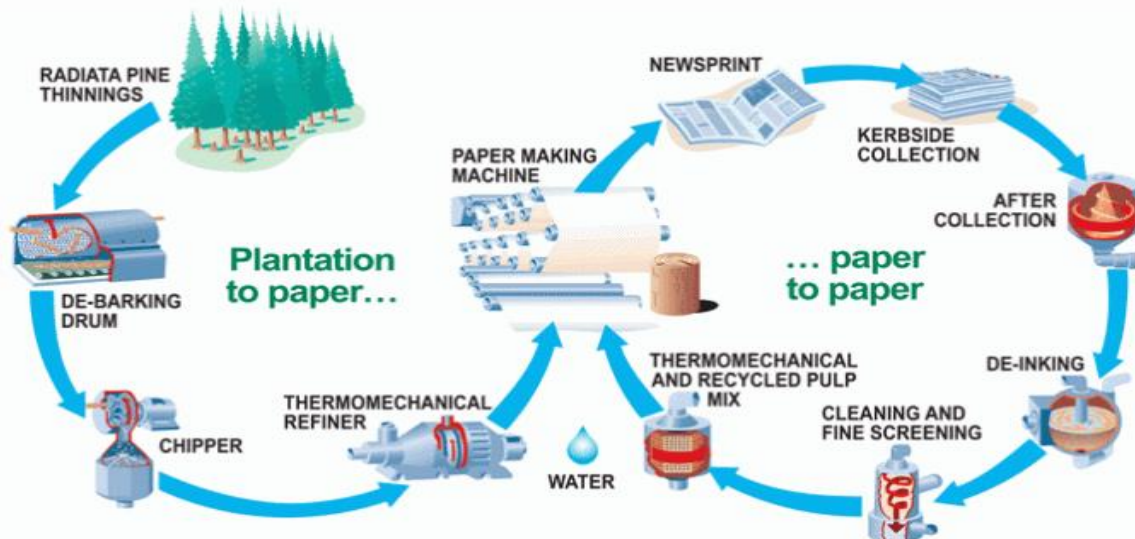


Figure 1: Paper Recycling Process Link

Although there is little doubt that Europe's paper recycling rates will continue to grow, the quality of waste paper will deteriorate as more "marginal" paper fractions are acquired for recycling and the amount of hazardous chemicals in paper rises [2] In order to offer a framework for future evaluation of the nature of waste paper as a resource and, ultimately, to maintain market awareness of recycled paper in general, a thorough study of the chemical compounds possibly contained in waste paper for recycling is also needed. The Following Are Some Paper Grades Facts:

According to the Environmental Protection Agency (EPA), there are five main paper grade classifications. While these phrases are primarily helpful to paper mills seeking to process certain types of paper, you may hear them from time to time and need to know how to differentiate between them.

- Containers made of corrugated cardboard – This is also known as "corrugated cardboard." Boxes and product packaging are the most common places to find it.
- Mixed Paper - This is a wide term for mail, catalogs, phone books, and periodicals, among other things.
- Newspapers from the past — this one is self-explanatory. To produce more newsprint, tissue, and other goods, mills utilize newspapers, a lower-grade paper.
- High Grade Deinked Paper — this high-quality paper includes envelopes, copy paper, and letterhead that have had the ink removed during the printing process.
- Pulp Substitutes — this paper is typically mill waste, and you won't have to worry about coming across it, but it may make its way into goods you purchase.

The following are the two stages of most paper processing and manufacturing processes: I paper and pulp production by the paper industry (i.e. different grades of paper quality) and ii paper product manufacturing by distinct industries (e.g. periodicals, packaging materials, books, etc.). Chemicals in waste paper may originate from a number of places, including additives, inks, pigments, glues, and so on. They can also arise through reactions and/or biodegradation, or they might be introduced during the paper-making process or during the waste management phase (e.g. cross-contamination from other waste materials during collection).

## 1.1 Paper Making And Recycling

Wood pulp or non-wood fibers may be used to make paper [3]. Many industrialized nations don't have enough wood to make pulp for papermaking, therefore they utilize raw non-wood content from agricultural waste instead. Wheat straw, rice straw, and bagasse are examples of non-wood raw materials. Caustic pulping is a method of dissolving a non-cellulose organic component, such as lignin, from non-wood raw materials and leaving a fibrous residue as a pulp for papermaking. Shredding the rice straw content and washing it with water are the first stages in the rice straw pulping method. The shredded fibers are then boiled in a rotary digester to dissolve the lignin while leaving the cellulose fibers intact [4]. The fibres from the cooking liquor are next extracted using vacuum filters. Centrifuges thicken the fibers, which are subsequently bleached by chlorination to produce pulp that may be used to make paper.

### 1.2 Advantages of Recycling

**1.2.1** Recycling is good for the environment. Recycled paper is used to make new paper, which reduces the amount of trees chopped down and conserves natural resources. Each ton of recovered fiber saves an average of 17 trees and the pulping resources they need. Recycling systems are sometimes less expensive than disposal services. Recycled paper helps to reduce trash and the amount of pollutants produced by incineration. Starting and maintaining a paper recycling program can help businesses maintain a positive corporate and community image. By demonstrating the advantages of paper recycling to their children, parents will promote a healthier planet and a safer lifestyle for their children[5].

**1.2.2** Recycling problems are reduced by utilizing discarded paper to produce new paper. For every tonne of paper recycled, at least 30,000 gallons of water, 3000–4000 kW h of energy, and 95% of air pollutants are saved. Even 3 cubic yards of landfill area are saved. In many cases, recycling paper saves communities money that would otherwise be spent on waste disposal[6].



**1.2.3** When compared to virgin paper, recycled paper uses between 28 and 70 percent less energy to manufacture. Less water is often utilized. This is because pulping, the process of turning wood into paper, consumes a significant amount of energy.

**1.2.4** Recycled paper contributes to reduced pollution of the air and water. Recycled paper isn't often re-bleached, and when it is, oxygen rather than chlorine is typically utilized. As a result of chlorine bleaching procedures, the quantity of dioxins emitted into the atmosphere is reduced[7].

**1.2.5** High-quality paper may be recycled several times, resulting in significant environmental advantages each time.

**1.2.6** In reality, recycled paper manufacturing emits between 20% and 50% less carbon dioxide than virgin fiber paper manufacture.

**1.2.7** The processing of used paper reduces transportation and carbon dioxide emissions since used paper is usually acquired relatively near to recycling facilities.

**1.2.8** By processing and managing discarded paper, recycling paper helps to reduce waste while also supporting the local economy.

Paper processing necessitates a range of chemicals, which are employed either in the manufacture of paper and pulp or in the conversion operations that follow (i.e. printing and gluing). Paper recycling continues to rise as a result of economic and environmental policy. Recycling in Europe has increased by almost 20% in the past decade, reaching nearly 72 percent in 2012 [8]. In their research article, Jobien Laurijssen et al. state that paper recycling has a beneficial effect on energy intensity and CO<sub>2</sub> emissions throughout the whole life cycle[9].

## 2. DISCUSSION

Various LCA and waste management studies that cover recycling trade and other end-of-life alternatives for old paper have been published. While this study did not include different waste management options, the findings are similar with many of previous studies. Over the life cycle of an item, recycling is beneficial in terms of CO<sub>2</sub> pollution and (feedstock) energy usage. Furthermore, we discover that the device boundary choice has a considerable impact on the results. Particularly in terms of the inclusion or removal of excess biomass made accessible by increasing recycling. This study sheds fresh light on the country's pulp and paper production, as well as the relative importance of different paper grades. We were also able to differentiate not just between different paper grades, but also between the outcomes of recycling different paper grades and a mixture of paper grades. It's essential to note that, despite the fact that we compared the environmental impacts of three distinct kinds of pulp, we don't want to imply that one type of pulp is better than the others.

Recent research has shown that paper and paper products may include a large number of chemical compounds, many of which can be linked to the printing industry, which uses over 7,000 chemicals in food-packaging ink production alone. However, there is a scarcity of detailed data on the existence of such chemicals in paper and paper waste products. The majority of current research focus on a specific group of chemicals or paper products, and classifying any single chemical in paper has proved challenging.

Paper may be made from wood pulp or non-wood fibers [3]. Because many industrialized countries do not have enough wood to produce pulp for papermaking, they instead use raw non-



wood material from agricultural waste. Non-wood raw materials include wheat straw, rice straw, and bagasse. Caustic pulping is a technique of removing a fibrous residue from non-wood raw materials after dissolving a non-cellulose organic component, such as lignin. The rice straw pulping process begins with shredding the rice straw material and washing it with water. After that, the shredded fibers are cooked in a rotary digester to dissolve the lignin while leaving the cellulose fibers alone [4]. Vacuum filters are then used to remove the fibers from the cooking liquid. Centrifuges thicken the fibers, which are then bleached by chlorination to create pulp for paper production.

### 3. CONCLUSION

Paper is one of the most often used materials in our civilization. It's a fantastic material with a wide range of applications. Although recycling paper seems to be a straightforward procedure, various kinds of paper provide unique challenges in the recycling process. In 2011, the United States recycled 66.8% of their paper use. More paper is collected for recycling than plastic, metal, and glass combined, and every ton of paper recycled saves more than 3.3 cubic yards of landfill space. Because 87 percent of us have access to curbside or drop-off recycling for paper, it's a material we're accustomed to recycling. Paper recycling, according to this research, has a beneficial effect on energy intensity and CO<sub>2</sub> emissions throughout the life cycle. Paper recycling is a vital raw resource for the paper industry, and numerous studies have shown that it may provide significant environmental advantages over the course of its life cycle. Paper recycling is beneficial from both a resource and an environmental standpoint, and it should be promoted as much as possible.

### REFERENCES

1. H. Grossmann, T. Handke, and T. Brenner, "Paper Recycling," in *Handbook of Recycling: State-of-the-art for Practitioners, Analysts, and Scientists*, 2014.
2. R. K. Pati, P. Vrat, and P. Kumar, "A goal programming model for paper recycling system," *Omega*, 2008, doi: 10.1016/j.omega.2006.04.014.
3. A. Villanueva and H. Wenzel, "Paper waste - Recycling, incineration or landfilling? A review of existing life cycle assessments," *Waste Manag.*, 2007, doi: 10.1016/j.wasman.2007.02.019.
4. S. Byström and L. Lönnstedt, "Paper recycling: Environmental and economic impact," *Resour. Conserv. Recycl.*, 1997, doi: 10.1016/S0921-3449(97)00031-1.
5. S. M. Al-Salem, P. Lettieri, and J. Baeyens, "Recycling and recovery routes of plastic solid waste (PSW): A review," *Waste Management*. 2009, doi: 10.1016/j.wasman.2009.06.004.
6. R. Miranda and A. Blanco, "Environmental awareness and paper recycling," *Cellul. Chem. Technol.*, 2010.
7. R. Jain, "recycled paper," *science direct*. <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/recycled-paper>.
8. K. Pivnenko, E. Eriksson, and T. F. Astrup, "Waste paper for recycling: Overview and

identification of potentially critical substances,” *Waste Manag.*, 2014, doi: 10.1016/j.wasman.2015.02.028.

9. J. Laurijssen, M. Marsidi, A. Westenbroek, E. Worrell, and A. Faaij, “Paper and biomass for energy? The impact of paper recycling on energy and CO2 emissions,” *Resour. Conserv. Recycl.*, 2010, doi: 10.1016/j.resconrec.2010.03.016.

## EXPERIENTIAL LEARNING PRACTICES IN THE SECONDARY EDUCATION OF NEPAL

**Bhattarai Prakash\***

\* Master's in Major English (TU, Nepal),  
Master's in Education (University of Applied Research and Development, UK)),  
Kathmandu, 44600, NEPAL

Email id: Prakash.bhattarai223@gmail.com

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### ABSTRACT

*This paper starts with the introduction of experiential learning in general, as seen in all fields of research and practice, before concentrating on experiential learning and its effects on education of children. This document provides examples and advocates for the use of experience learning in Nepalese schools and throughout the world in the current situation.*

*Teachers and students may use a variety of strategies to expand the learning portion that takes place in the classroom. This investigation focuses on the effects of experiential learning in Nepalese school. This pedagogy is often used, contested and studied in academia and is widely used, discussed and studied in different teaching styles. It is intended to present literature for the use of experiential education in schools, with the aim of encouraging educators from all academia who are often forced to take part in red learning as a new way of learning. This document provides examples and advocates for the use of experience learning in Nepalese schools and throughout the world in the current.*

**KEYWORDS:** *Experiential, Personalized, Inquiry.*

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### INTRODUCTION

As a teacher, one of the most difficult aspects of our profession is ensuring that our kids are engaged in the learning process. Traditional school teaching methods, on the other hand, have never met the demands of students. As a result, this research has described the impact of experiential learning in Nepalese schools and throughout the world. As we all know, the term "experiential learning" is broadly applied, discussed, and investigated in a wide range of educational approaches as well as in academia. This study presents a variety of examples from Nepal and other various countries to advocate for the use of experiential learning in Nepalese and international schools. Though numerous researchers have defined experiential learning in many ways over time, they have always come to the same conclusion: experiential learning is a child-centered process of learning by doing. Experiential learning is defined as "the process of learning by experience" and "learning through reflection on doing." (Baek, 2012, [1]). This type of learning is focused on the students' experiences and the learning outcomes that arise from those experiences. In the classroom, experiential learning opportunities may help both students and teachers to become more productive and efficient.

David Kolb defines experiential learning theory as "the process through which a person learns something new from a learner's past experience." Knowledge is created as a result of the transformation of experience. Kolb believes that "knowledge is the result of grasping and changing experience." (Kolb, 1984, p.41) [9]. Children communicate more effectively when they can feel, touch, sense, and see a situation or topic, as Kolb pointed out. In our school, we have been pursuing experiential learning through a variety of curriculum-related activities. At the same time, our school has a program called 'Beyond Textbook Department', in which children are given various opportunities to participate in diverse activities both inside and outside of the classroom, resulting in more meaningful and child-centered learning. As a result, it is revealed that students are prepared for life rather than for a test. These types of activities have boosted up students' confidence, responsibility, independence and mental, physical, and spiritual health. In order to become responsible and competent members of society, students ask deep responses about their behaviors, ideas, emotions, and educational achievement during the process of learning through experiences. The focus of this research is on the overall impact of experiential learning. Despite the fact that there are varieties of pedagogies for school education and children's learning, the issue of experiential learning has received a lot of attention in recent years.

## 1.1 Experiential Learning in Nepal and Around the World

Experiential education is valued by students, educators, and companies because it has the ability to bring new skills, information and innovations into the classroom and workplace through reciprocal collaborations.

As a result, experiential learning is being included into the teaching techniques of educational institutions all around the world. Scholars including John Dewey, Kurt Lewin, Jean Piaget, William James, Carl Jung, Paulo Freire, and Carl Rogers established a multilinear model of early adulthood and a holistic model of experiential learning in the twentieth century (Kolb, 1984) [9].

According to research, experiential learning provides students with the time and space to engage in the learning process by placing them in real-world situations. Students can incorporate new experiences with previous ones through hands-on activities and reflection. Experiential learning is an efficient way to prepare students to become smart individuals who are ready to join and lead the workforce, as well as face numerous obstacles. The entire world is adjusting its teaching and learning processes to be more experiential or child-centered due to a variety of variables. Learning by doing has been shown to be a successful method for engaging learners and promoting deeper learning. It also allows students to gain valuable practical experience in a real-world setting. In contrast, traditional classrooms are one-way, teacher-led situations in which students are passive consumers of knowledge. Experiential learning techniques are being used in several Nepalese schools, providing students with numerous opportunities for field excursions, community service, presentations, and research projects, to name a few. RatoBangala School, Kathmandu World School, Sanskriti International School, NisargaBatika-Experiential School, Apex Life School, and Premier, among others, encourage experiential learning. Field trips, National and International Day celebrations, gardening, cooking, waste management, community service initiatives, and other thematic activities are all emphasized at our school. However, most public and private schools, on the contrary, fail to include experiential learning due to lack of trained human resources and solid government policies. Even Nepalese university graduates are having difficulties finding work that matches their academic skills and certifications.

Thousands of graduates suffer during their careers as a result of a lack of up-to-date curriculum that meets international standards. Hence, the Nepalese educational system must be reformed in this instance. In this regard, Nepal has to shift its curriculum from a theoretical to a practical one. A life-skills-based strategy that focuses on preparing pupils for real-life situations rather than short-lived exam cramming. Due to a lack of learning materials and competent teachers, students in rural regions are unable to get exposure to the basics of 21st-century education. However, there are many possibilities for change in the educational system. The Nepalese government has now modified the curriculum for classes one, two, three, and six, and has plans to do likewise for more classes in the future. This recently revised curriculum focuses on activities-based learning, which covers the majority of the content in terms of life skills.

## **1.2 Prospects of Experiential Learning:**

### **I. Real-Life Interconnectedness:**

Experiential learning integrates facts and concepts to hands-on tasks, resulting in real-world results. The knowledge becomes more real to the students as they interact with it. Of course, each student's learning experience will be led by their unique perspective, and as a result, everyone will interact with the information and the task in unique ways—and may produce various outcomes. The experiential classroom thereby simulates “real” society.

### **II. Expression of creativity:**

In today's world, various problems have multiple solutions. Experiential learning allows students to use their creative minds to come up with their own unique solution to a problem or assignment. The range of results created by this creative problem-solving enhances the classroom as a whole.

### **III. Provides a space for reflection:**

Experiential learning theory includes reflective observation as a key component. Students activate more areas of their brains and develop personal connections with the curriculum by combining concrete experiences with abstract concepts and reflecting on the results. They consider how their activities influenced the outcome and how it differed from that of other students. This evaluation allows them to see how the concepts they've learnt can be applied to different situations.

**IV. Making errors and learning from them is part of the process:** Experiential learning entails making mistakes and learning from them. Students discover that some ways work better than others as they work on hands-on assignments. They throw out the approaches that don't work, yet the act of attempting something and then discarding it is an important part of the learning process. Students learn not to be afraid of making mistakes, but to learn from them and remember them.

### **V. Learning is accelerated:**

The act of honing a skill increases neuronal connections in the brain, effectively making us “smarter.” Practice, problem-solving, and decision-making are all required in hands-on activities. Learning accelerates and retention improves when student engagement rises through these processes.

### **VI. Inspires students to think about the future:**

Because they are grounded in real-world activity, many experiential learning initiatives are career-focused. Students begin to identify and develop their abilities, aptitudes, and passions as a

result of these activities. This self-discovery leads to a clearer picture of what they want to do after high school, such as college and careers.

***VII. Students gain collaborative skills through education:***

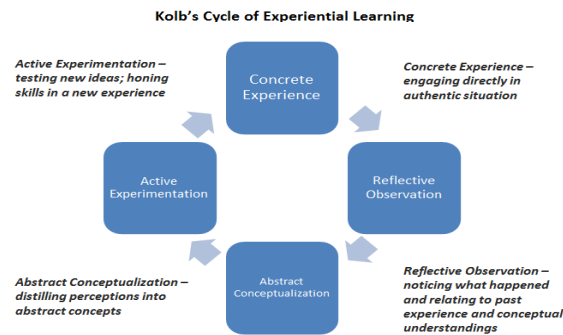
The majority of experiential learning activities are group-based, with students working in groups. Students learn to operate more effectively as a team, formulating a plan of action and utilizing each team member's individual abilities through these team projects. As a result, the students gain leadership skills, critical thinking skills, and the ability to adjust to changing situations.

The notion of experiential learning has been around for a long time. Since the beginning of the twentieth century, there have been ideas about the significance of integrating education to community needs. Early proponents of educational reform and experiential learning, such as John Dewey, thought that democratic engagement was critical to resolving community issues (**Dewey, 1916**) [4]. He claimed that it was education's role to promote such engagement. Furthermore, Dewey believed that recognizing community problems and working toward solutions could lead to the creation of a democratic society. Learners from a very early age should be provided with the opportunities to explore the actual needs of the society, and learning should be an integral part of the community. This method could lay the groundwork for a culturally literate society and, more importantly, ensure that such a society exists in the future (**Dewey, 1916**) [4]. William Kilpatrick, as Dewey's successor, is credited with being one of the first proponents of school-based community service. He advocated for a project-based approach in which education is tailored to meet the requirements of the community (**Conrad & Hedin, 1991**) [3]. In the 1950s, the Citizenship Education Project at Columbia University reflected this approach to instruction, emphasizing education paired with engagement and direct community involvement (**Conrad & Hedin, 1991**) [3]. The 1960s saw a renewed dedication to service in the United States. By including young people in the creation of change, the civil rights movement, the Peace Corps, and Volunteers in Service to America (VISTA) created chances for activist education. The early pioneers of the service-learning movement emerged during this time period, attempting to link 'service' and 'learning' in a direct and compelling way (**National Service-Learning Clearinghouse, 2008**) [5].

Students' strategic, active participation in opportunities to learn by doing and reflecting on those activities, allowing them to apply theoretical knowledge to practical endeavours in a variety of situations both inside and beyond the classroom.

Many diverse theories have contributed to this field, including **John Dewey (1971)** [6] and, more recently, **David Kolb (1984)** [9].





**Figure 1: first picture**

David Kolb developed an experiential learning style model in 1984 with a four stage cycle i.e. concrete experiences, reflection, abstract conceptualization, and active experimentation which basically focuses on learners' cognitive process. However, deep learning occurs when a learner can execute all four stages of the model. In the same way, my educational institution also basically focuses on the activities of observation, conceptualization, experience and experiment etc.

In contrast to direct presentation of facts and concepts, Problem-Based Understanding (PBL) is a teaching style in which challenging real-world issues are used as the vehicle to promote student learning of concepts and principles. PBL can help students acquire critical thinking skills, problem-solving talents, and communication skills in addition to course content. It can also facilitate collaborative work, the discovery and evaluation of research resources, and lifelong learning.

### VIII. Problem-based learning:

- Case-based learning,
- Project-based learning,
- Inquiry-based learning, and
- Cooperative (work- or community-based) learning are all examples of problem-based learning. (Duch et al., 2001 [12]).

However, critics such as **Kirschner, Sweller, and Clark (2006) [11]** believe that experiential learning instruction is frequently "unguided," citing several "meta-analyses" of the effectiveness of problem-based learning that found no difference PBL is more expensive, with inferior problem-solving ability, lower basic science exam scores, longer study hours, and longer study hours. They reach this conclusion: When it comes to novice to intermediate learners, there is almost universal support for direct, strong instructional guidance rather than constructivist-based limited assistance based on evidence from controlled studies. Even with students who have a lot of prior knowledge, powerful learning assistance is typically found to be just as successful as unguided alternatives.

Experiential learning approaches will likely demand significant restructuring of teaching and a great deal of precise planning if the curriculum is to be completely covered. It usually entails

considerable teacher retraining as well as meticulous student orientation and preparedness. I agree with Kirschner et al. that just providing learners real-world tasks to complete without direction and support is unlikely to be helpful.

Experiential learning, on the other hand, is based on **C. Rogers' (1969) [10]** notion of "learning to do," and it refers to the utilization of students' knowledge and experience in the educational process, where they gain life skills and form a positive attitude toward life. Experiential learning is a type of active learning that allows students to use and process their previous experiences while learning. In experiential learning, children are at the centre of the learning process, and the efficiency of learning is determined by "how to learn" and "how to think."

The majority of Nepalese instructors come from a conventional education culture, parents are test and mark oriented, and the curriculum is primarily theoretical based. So. This type of teaching and learning dynamism doesn't allow holistic development of a child and every human is born with a particular quality of potential, and experiential learning is critical in bringing that talent.

## 1. **Key Problems, Issues, and Challenges**

Though Nepal has a long history of formal and informal education, from the Gurukul to today's schools, colleges, and universities, it lacks an experiential learning tradition. Traditional educational techniques are often used in schools from generation to generation. Although the government has begun to upgrade the curriculum, Nepal's whole education system has not been upgraded in a long time.

Perhaps, there are very few private schools in Nepal, truly focus on the learning process of hands-on activities that the students are benefited in creating and constructing effective learning experiences rather than being passive recipients of modular building content delivered through one-way lectures. These schools were established with the intention of providing learning opportunities both inside and outside the classroom that are aligned with the curriculum's goals and objectives.

Similarly, I began my teaching career in a private school and later had the opportunity to volunteer at a public school. However, after a very long span of time I became much more aware of teaching and learning methodologies and pedagogies after I participated in various international training, and my med course from UARD (University of Applied Research and Development). I participated in "Entrepreneurship in School Education" in Israel, "Leadership for Education in Thailand", and as an ISA (International School Award Head) visiting the United Kingdom organized by the British Council. I used to believe in mass education since I didn't know much about tailored or child-centric learning, in which each child learns through experiences. These International trainings really helped me to establish "Beyond TextBook Activities," a department in my working school, where students are expected to take an active role, investigating, experimenting, problem-solving, assuming responsibilities, and many more. This department focuses on hands-on learning to help our Students develop vital skills for their further life and career. I am so much motivated with the theory of Kolb who offers a four-part circular model. Reflective Observation can be motivated by concrete experiences. Abstract Conceptualization can be based on these observations. However, when applied to relevant scenarios in Active Experimentation, these three areas have the most benefit. Activities that generate such concrete experiences can range from highly structured (with prescribed roles that tell participants what they should do and occasionally how they should act) to more emergent,

unstructured events. Cohen (1976) claims that simulation exercises are unnecessary when teaching management and organizational behavior since "the classroom is an organization." Leadership and membership, power and influence, norms and formal regulations, collaboration and competitiveness, and other issues are all linked. As a result, there are a plethora of tangible experiences that could be used. If there has been an unsuccessful attempt by students to influence the instructor, a debate of "how subordinates give away their power" becomes real. Experiential activities benefit both the educator and the students. How discouraging it is to have gone through a concept in depth in lectures only to discover that the message on the exam was missed by a huge portion of the class. Experiential approaches can be very appealing to educators that place a high value on their teaching. In fact, it can be so alluring that professors overlook the possibility for unintended consequences that raise ethical concerns when utilizing this type of instruction. Lectures and discussions may yield significantly less profit, but they also pose far fewer risks. In over 50 years of employing experiential approaches, the following summarizes what I have observed and experienced. Experiential learning practice can influence the student more deeply and intimately than other teaching styles." Students can withdraw in ways that are not possible with experiential activities in lectures, seminars, or case analysis.

Whether the activity is highly structured or emergent, there are eight areas where experiential learning raises ethical concerns:

- **Weak (informed) student selection**
- **There is a bias in what is covered**
- **Insufficient debriefing,**
- **Individual exposure in class and in the community**
- **Issues of deception**
- **The personalization of role-behavior**

(By self and others), the negative effects of feedback (both planned and unplanned), and the degree to which experiential activities are "bounded."

The Power Game (**Bolman & Deal, 1979 [2]**), in which students are separated into high-, medium-, and low-power groups and attempt to influence one another, is described in the course outline. But can any explanation really portray the sense of powerlessness experienced by members of the low-power group? What choice is there in a mandated course, even with a more thorough explanation?

## 2. **State of The Art**

### **I. The present state of experiential learning**

In the last decade, experiential learning has risen from the periphery of school to the foreground. Experiential learning is no longer considered an add-on to content acquisition; it is now regarded as a requirement for meaningful learning. What is the reason for this shift in perspective? To begin with, our perceptions of learning have evolved considerably. We've progressed from the behaviorist perspective of teachers as knowledge suppliers and pupils as passive users. Current cognitive, humanistic, social, and constructivist learning paradigms emphasize the role of meaning formation. As a result, in order to promote current and future learning, excellent practice

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models in adult education must take advantage of learners' prior experiences. Second, in recent decades, there has been a massive increase in the number of adult students enrolled in higher education. Adult learners bring a lot of prior knowledge to the learning environment and are eager to apply their background and previous learning in the classroom. Responsive teachers can use their students' prior learning experiences as a springboard for future learning. Third, in today's fast-paced workplace, there is a greater need for flexibility and the ability to use existing knowledge and experience in novel ways. Educators are being held responsible for what students know and can do. Due to the need for accountability, educators have developed competency-based learning measurements and experiential strategies for evaluating learner outcomes. The corporate sector has also sought for more accountability to justify the vast quantities of money spent on education and training, claiming that assessing the transfer of training to the work has been challenging. Experiential learning methods appear to be more effective in building abilities that employer's value, such as communication, teamwork, and workplace literacy (**Lewis & Williams, 1994, [7]**).

## II. Nepal's Educational System (Public and Private Schools)

Many public schools in Nepal's rural villages lack basic amenities such as school buildings, classroom infrastructure, and bathrooms. According to a government survey released last year, nearly 72 percent of Grade V students in public schools performed poorly in mathematics. The reason for this low performance was that students were never given the opportunity to engage in real Mathematical learning, instead focusing on memorizing formulas. According to recent data from public schools, approximately 32% of learners were only taught 5% of the whole course in a given academic year. According to a government survey issued in May, nearly 21% of students in public schools drop out by the 8th Grade, and the percentage more than doubles by the 9th grade. By adopting the "Student Learning Facilitation Guideline-2020," the government has decided to enable private schools to enrol students for the coming academic year and run online classes. The government has denied about 70 percent of the eight million children in public schools who do not have access to computers, smartphones, or the internet a viable alternative. This occurred as a result of instructors' inability to provide tools that would be useful in online classes. According to educationist BidhyaNathKoirala, "the government should design a uniform way to train kids according to their geographical location." (**The Himalayan Times, 2020**) [8]. Nepal's educational system is dualistic, with state and private institutions coexisting. Education in a private school is costly, and only the wealthy can afford it. Most private schools employ English as their primary language of instruction, and many of them incorporate computers into their curriculum. There were 3,077 private elementary schools, 2,417 private middle schools, 1,370 private secondary schools, 332 private higher secondary schools, and 132 private tertiary colleges in 1995. The numbers were proportional to the public schools at the lower secondary and secondary levels. Yet, only a few private schools have been successful in implementing experiential or child-centered learning. These educational institutions place a greater emphasis on curriculum-related activities than on course texts. The activities are designed to meet the needs of the learners. In many private schools, Curriculum-related activities are valued more than course books. The activities are customized to the children's needs. In addition to their own curriculum, private schools from urban areas have introduced 3DI and IPC (International Primary Curriculum). Through different teacher professional development programs and other means, the British Council assists private and public schools in improving experiential learning (ISA- International

School Award). In the same way, if we talk about global context, experiential learning has become more popular in recent years. Experiential learning has a long history in the United States, but it is relatively new in Nepal. Teachers in Nepal must be up-to-date on the most up-to-current teaching/learning pedagogy that truly fulfils the demands of 21st-century students. Nepali students are entitled to more than memorization from books. They need to get out into their neighbourhoods and learn about their surroundings and the country's ecosystem. Students must be knowledgeable about their communities and country. They require better education and access to well-maintained libraries. They require knowledge beyond what is given in school. Art, painting, woodworking, and pottery, to mention a few, would be beneficial to students. This research revealed that there are various benefits and impact of experiential learning in students' life. Students may have difficulty grasping concepts that aren't related to the "real world." Experiential learning allows students to use data and concepts in a real-world context in which they are also active participants. The knowledge becomes more real to the learner as they interact with it. Students will discover that some ways perform better than others as they work on hands-on assignments. They dismiss the ineffective ways, yet the act of attempting something and then discarding it – normally regarded as an "error" – becomes an important element of the learning process. Students learn to value mistakes rather than fear them. Though this method of learning offers several advantages for 21st-century learners, there are certain problems associated with the experiential learning approach.

### ***III. Experiential Learning's Challenges:***

A decentralized approach may appear less organized, and an authoritarian-style teacher may consider it less comfortable. It demands additional preparation on the behalf of the leader/teacher, as well as additional processing time the instructor / facilitator needs patience and guidance. Often no "appropriate" answer can be found. To maximize the value of any experience, whether field-based, simulated, or on the job, it must be analyzed through reflection and debriefing. Experiential learning research is likewise in desperate need of improvement. Most publications on experiential learning that have been published are descriptive reports. Few studies show that students truly learn certain abilities. Effective and respected programs will have defined objectives, excellent facilitation, and credible evaluation. The business sector will only invest in expensive experiential learning programs if instructors can demonstrate significant learning. Those programs that have been using experiential learning successfully for several years must be highlighted as outstanding examples. A fresh method to experiential learning, such as the one presented in this book, can serve as a model for others to follow.

### **3. The Increasing Importance of Experiential Learning in the Secondary Schools of Nepal**

The Increasing Importance of experiential learning in the secondary education of Nepalese schools represent Nepal's future because, as research shows, it accounts for a sizable portion of the Nepalese population. This study has found that significant steps need to be taken to address problems inherent in Experiential Learning or millennial teachers engaging students in a high school context. Due to varying experiences of technology due to life experiences, we can see that there are different approaches, experiences, and expectations. This study has made five key suggestions that can be implemented by teachers to address this issue and advocates the use of field research based learning, interpersonal learning, community-based activities, real-life experiences and bite sized learning.



#### **4. Application**

The findings of this research can be used by Nepal's teaching community, particularly in Secondary School education, to better understand learning patterns and their impact. This learning could also be applied to course design and delivery.

#### **5. Lack of Research**

The Lack of Research Beyond a few articles, there is little empirical research focusing on the practices of Nepal's experiential learning expectations and instructional strategies for motivating the school education. This created limitations for this study as their specific experiences could not be directly related to the global context and generalizations had to be made. Further empirical research can be conducted to investigate Experiential Learning in Nepal, providing insights into their characteristics, and learning preferences. Educators in Nepal can also implement the strategies outlined in this research and evaluate their effectiveness in the context of Nepal.

This study is also considered adding to the literature by drawing the attention of students' teachers, encouraging them, enhancing their transferable skills, and preparing them for the next stages of learning.

In a nutshell, Nepalese education policy needs to be updated and improved in order to meet a child's educational needs and prepare him or her for the twenty-first century. From one political epoch to the next, it has also supported a range of realities and been the subject of experiments.

#### **REFERENCES**

1. Baek Y. Practices and outcomes in Virtual Worlds and Environment (Vol. 20). IGI GLOBAL, Publisher of Timely Knowledge. 2012. DOI: 10.4018/978-1-60960-762-3.ch038
2. Bolman LG, Deal TE. (1979). A simple-but powerful-power simulation. Exchange: The Organizational Behavior Teaching Journal, 1979;4:38-42.
3. Conrad, D., & Hedin, D. School based community service: What we know from research and theory. Phi Delta Kappan, 1991;72:743-749.
4. Dewey, J. (1916). Democracy and Education. New York: MacMillan.
5. National Service-Learning Clearinghouse (2008). History of service-learning in higher education. Retrieved May 1, 2009, from:
6. Dewey J. Experience and Education. New York: Collier Books, 1971. (Originally published 1938.)
7. Lewis LH, Williams CJ. Experiential learning: Past and present. Wiley Online Library, 1994;(62): 5-16. <https://doi.org/10.1002/ace.36719946203>
8. The Himalayan Times. (2020, September 25). Students of public schools deprived of education.
9. Kolb DA. (1984). Experiential learning: Experience as the source of learning and Development. New Jersey: Prentice-Hall.
10. Rogers CR. Freedom to Learn: A View of What Education Might Become, 1st ed.; Charles,



E., Ed.; Merrill Publishing Company: Columbus, OH, USA, 1969.

11. Kirshner P, Sweller J, Clark R. Why Minimal Guidance During Instruction Does Not Work: An Analysis of the Failure of Constructivist, Discovery, Problem-Based, Experiential, and Inquiry-Based Teaching. *Educational Psychologist*, 2006;41(2): 75-86.
12. Duch BJ, Groh SE, Allen DE. The power of problem-based learning. Sterling, VA: Stylus. 2001.

## AN OVERVIEW ON LABOR WELFARE SCHEME IN INDIA

**Avinash Raj Kumar\***

\*Assistant Professor,  
Department of Marketing & HR,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- avinashmimt1982@gmail.com

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### ABSTRACT

*Anything done for the comfort and betterment of workers that is given in addition to pay is referred to as welfare. Intra-mural welfare, extra-mural welfare, social security programs, and work environment are examples of welfare initiatives. The aim of implementing labor welfare measures is to ensure that workers have a pleasant working environment. Labor welfare is a technique that may be utilized to enhance work performance. This is a research that aims to determine the effect of welfare measures on the job performance of workers working for a company that manufactures food items. The various welfare amenities offered by the organization were also examined. Employee perceptions of labor welfare initiatives were also investigated. The answers of two hundred workers were collected and evaluated utilizing percentage analysis, descriptive statistics, and chi square analysis in this descriptive research. The welfare amenities were judged to be satisfactory by the respondents. As this company in Tiruchengodu, Tamil Nadu, India, has discovered, welfare initiatives have an effect on work performance.*

**KEYWORDS:** *Construction, Economic, Social Security, Welfare, Workers.*

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### 1. INTRODUCTION

The enormous disparities between the wealthy and the poor, as well as between unorganized and organized employees, have prompted efforts in many nations to provide social and economic security to the impoverished and unorganized sectors. The advent of modern manufacturing methods and the expansion of capitalist production relations in Kerala has significant consequences for traditional crafts and craftspeople. One of the consequences has been the disintegration of the traditional social security system. In Kerala, craftsmen belonged to one of two caste groups: Kamala or Viswakarma. Craftsmen's social security systems were deeply rooted in craft and caste traditions and practices. In the processes of transformation that changed caste-based occupational traditions and the social structure itself, the customs and practices of the craft as well as caste groupings were undermined. It took a long time to find new institutions to fill the void left by social change. The creation of Welfare Fund Boards was a significant step

forward in this direction. Labor welfare law and the institutions established under it seem to have had a significant effect on the state's informal labor markets. They are also said to have given Kerala's social security system a new dimension. Nonetheless, it seems that many problems related to providing social security to employees in our informal lab markets have not gotten the attention they need. The current research on construction workers is an effort to investigate the issue Centered on the Welfare Fund established for them, its effect on the lives of construction workers, and the Fund's long-term financial viability[1].

## **1.1. Scope of the Study:**

The condition of the Welfare Fund's revenues and disbursements is critical to its long-term viability. The Construction Workers Welfare Fund is unlikely to face a significant financial problem in the foreseeable future, according to evidence. The fund management may be proud of the substantial quantity of deposits they have amassed over time. However, a careful examination of the statistics on disbursements, particularly the trends, reveals some concerning patterns. Disbursements seem to be increasing at a faster rate than revenues. These patterns need a thorough assessment of both the source of income and the items of spending. It would be fascinating to create predictions of the Fund's incomings and outgoings to see how and if they would balance out over time. In addition, several of the sources of revenue, such as donations from contractors, seem to have room for improvement. The potential for controlling the outflow of disbursements and administrative expenses seems to be substantial. The research would also try to analyze the Fund's operations from the perspective of its employees. A comparison of members' living circumstances to those of non-members would help us comprehend the Fund's accomplishments as well as its limitations[2].

The effectiveness of this is assessed using data gathered from secondary sources such as the Welfare Fund's yearly reports. The actuarial technique is used to assess the Fund's long-term solvency. For this reason. Entries from pensioners in six different areas throughout the state were gathered. A main survey was performed using semi-structured pre-tested and interview delivered questions to investigate the effect of welfare programs on construction workers and their families. The survey was complemented by in-depth key informant interviews and worker focus groups. It would be impossible to conduct a census of all members of the. Given the limited time and resources available for the research, As a result, an area-specific research was undertaken centered on Mazhuvannur Panchayat in Kunnathunadu taluk in Ernakulum district. The Welfare Fund's operations were discovered to be extensive. Workers were selected from both urban and rural regions. The employees in the sample were split into three categories. Members of this group. On-members, as well as. Pensioners who are above the age of 65. Construction workers were discovered with the assistance of informed locals and people's representatives using the taluk's census data. Fifty homes were chosen at random from each of the three groups.

## **1.2. Scheme Of The Study:**

Receipts sources, disbursements, promises, and future prospects the second component is the Welfare Fund's effect, particularly on worker welfare and the societal implications of the welfare fund concept of social security. The research is broken down into eight parts. In the second part, we examine development plans and the current state of our welfare programs in the unorganized sector. The Welfare Fund model of social security systems is briefly explored in the third part. In the fourth part, an assessment of the operation of Kerala's Labor Welfare Funds is carried out.

The final part examines the Kerala Building and Construction Workers Welfare Fund, including its operations and financial stability. The solvency and existence of the is evaluated using the actuarial approach in the sixth part. The socioeconomic situation of construction employees is discussed in the seventh part. The study's results are summarized in the last part, along with some suggestions[3].

### **1.3. Concept Of Lab Our Welfare:**

The word welfare, in its broadest sense, refers to a person's or a group's condition of being in a desirable connection with their surroundings. Environmental, economic, and societal factors all have a role. Labor welfare is a component of social welfare, which is strongly connected to the idea and function of the state, both conceptually and practically. In its most basic form, the notion of social welfare has been linked with economic wellbeing. Pigou described it as "that aspect of general wellbeing that may be brought into direct or indirect contact with the monetary measuring rod." "Those officially structured and socially supported organizations, agencies, and programs that serve to sustain or enhance the economic circumstances, health, or interpersonal competency of certain sections or all of a popular- tic's population," according to Gilinsky and Ladeaux. Individuals may not always be able to achieve these objectives on their own, therefore the government stepped in and eventually started to assume responsibility for the population's free and complete development of human personality.

### **1.4. Social Responsibility Of Industry:**

This idea is founded on a social view of industry and its function in society, namely, that the state's social duty is expressed via industry. Labor welfare is seen to be a representation of industry's responsibility to its workers. The duty of the industry to pursue such policies, make those choices, and follow those courses of action that are beneficial in terms of the society's present goals and values is known as social responsibility. The Indian community's ideals are entrenched in the country's constitution. Labor welfare is a manifestation of industry's acceptance of responsibility for its workers, rather than an embellishment of capitalism or the outward adornment of an exploitative management. Industry is required to gain employees' cooperation by providing them with job stability, a fair pay, and equitable opportunities for personal development and progress, as well as providing them with social services[4].

### **1.5. Democratic Values:**

The principle of democratic labor welfare values acknowledges that workers may have certain unmet needs through no fault of their own, that industry has an obligation to assist them in satiating those needs, and that workers have the right to determine how these needs can be met as well as participate in the administration of the need gratification mechanism. The worker is assumed to be a competent and reasonable person who is capable of making choices for himself or herself under this method.

### **1.6. Efficiency:**

The fourth labor welfare principle emphasizes the axiom that "to nurture welfare is to promote efficiency." Even those who reject that industry has any social duty agree that a business must implement all labor welfare policies that enhance efficiency. Workers' education and training, housing, and nutrition have all been regarded as the three most essential elements of labor welfare, which always emphasize labor efficiency[5].

### **1.7. Re-personalization:**

Because industrial organization is impersonal and inflexible, the aim of industrial welfare is to enhance and develop human individuality. By recognizing man as an individual with his unique wants and ambitions, the labor welfare movement aims to infuse joy, comfort, and warmth into human relationships. The consequences of monotony, boredom, and cheerlessness may be mitigated by social and cultural programs, leisure, and other measures that are planned with the employees' interests in mind[6].

### **1.8. Social Security And Unorganized Labor:**

The protection that society provides for its members against the economic and social distress that would otherwise be caused by the cessation or substantial reduction in earnings due to sickness, maternity, employment injury, unemployment, invalidity, old age, and death; provision of medical care, and the provision of subsidies for fa The organized sector was the first to implement a social security system. However, as a result of the pressures that the unorganized sector is putting on the state and society, concern is rising and emphasis is being paid to extending legal and social security protections for the unorganized sector. Economic security, encompassing employment, income, and assets, should be connected to social security systems. There should be a confluence of approaches to achieving both sustainability and increased coverage. A decentralized participatory social security system can meet the increasing needs of the unorganized working force and their efforts to organize themselves. It will free up people's creative energy and result in a fast expansion of social security for the organized sector. For the following reasons, expanding social security to the unorganized sector is not simply a question of extending current organized sector programs to additional groups[7].

### **1.9. Medical Care:**

According to the advice. Medical care should be given either via a social service medical care service with additional social assistance services to address the needs of individuals who are not covered by social insurance, or through a public medical service. It necessitates the availability of comprehensive preventative and curative treatment, as well as care that is structured and integrated with general health services. Medical care in India is mostly supplied by the government, private physicians and hospitals, and to a lesser degree, social insurance programs, welfare funds, and volunteer health organizations. The Employees State Insurance Scheme is based on providing the service directly under an integrated arrangement in which the financing and medical services vest with the same organization, whereas some Welfare Funds in Kerala have adopted reimbursement of the cost of medical care at standard rates or actuals. On the other hand, some government agencies offer services indirectly via agreements with physicians, diagnostic institutes, and hospitals. Sickness benefit: Sickness benefit is paid when an insured individual is unable to work owing to a medical condition, and this inability to work generally results in a decrease or cessation of wages. The cash benefit is intended to replace all or part of the lost wages. The Employees State Insurance Scheme in India provides for the payment of illness benefits. Employees of the federal and state governments, as well as certain public and private sector organizations, are eligible to half-pay medical leave[8].

### **1.10. Maternity Benefit:**

One of the first norms that was accepted by The Maternity Protection Convention was ratified. The goal of this Convention was to guarantee that a woman worker could support herself and her child throughout the time leading up to and after her confinement. Maternity benefits, like medical care and sickness benefits, are typically given via a social insurance system. Maternity benefits are given in India under the Maternity Benefit Act. The Employees State Insurance Act is a law that covers all employees in the state. The Beed and Cigar Act, the Beed and Cigar Labor Welfare Fund Act, and other state-run social aid programs. Maternity payments are also paid in a single amount under the National Social Assistance Program[9].

### **1.11. Employment Injury Benefit:**

Employment Injury Benefit, commonly known as workmen's compensation, is the most frequently used component of social security. According to ILO Recommendation No. 67 on income security, the contingency for which compensation for employment injury should be paid is traumatic injury or disease in the course of employment, rather than injury caused intentionally or by serious and willful misconduct of the victim, resulting in temporary or permanent disability or death. This is a monetary reward that is often linked to medical treatment. The Workmen's Compensation Act and the Employees State Insurance Act offer benefits for work-related injuries in India. While the earlier Act covers certain unorganized sector jobs, such as those in the construction industry, the later Act is mostly for employees in the organized sector.

## **2. DISCUSSION**

Labor Welfare Schemes Presented By Ramakrishna Rajput. Organizations provide **welfare facilities** to their employees to keep their motivation levels high. The labor welfare schemes can be classified into two categories viz. statutory and non-statutory welfare schemes. The principal Act to provide for various labor welfare measures in India is the Factories Act. The Act applies to all establishments employing 10 or more workers where power is used and/or more workers where power is not used, and where a manufacturing process is being carried on. India has numerous labor laws such as those **prohibiting discrimination and Child labor**, those that aim to guarantee fair and humane conditions of work, those that provide social security, minimum wage, right to organize, form trade unions and enforce collective bargaining.

## **3. CONCLUSION**

The structure of a welfare state rests on its social security fabric. Labor welfare is welfare accorded to lab ours. Welfare Funds are raised by levying chess on production, sale or export of specified goods, or by collecting contributions from various sources including employers and employees, as well as the Government, and are used for meeting expenditures on the welfare of workers. The Government, employers, and trade unions in Kerala generally agree that Labor Welfare Funds have gone a long way in ameliorating the conditions of life of lab our outside their work premises and in the society at large. But the multiplicity of Boards has resulted in heavy expenditure or overheads, thus draining the amounts available for benefit spending. Further, each Board covers only specific groups of workers, neglecting many of the needy. It is therefore essential to co-ordinate the activities of the various Welfare Boards, or to amalgamate them into a common administrative set-up for the sake of economy and efficiency of welfare activities. In spite of several limitations, Welfare Boards, as they function today, provide one of the most



important ways of reaching workers in the unorganized sector. Labor in the unorganized/informal sector accounts for about. Percent of the working population in Kerala. Welfare Funds of social security for workers in the unorganized sector have a history of more than three decades in Kerala. Social security benefits are given mainly in the form of provident funds, paid to workers on superannuation, monthly pensions, and gratuity. Social insurance is given in the form of ex gratia payment in the event of disability or death; a modest payment is made in the event of treatment for ill-health. Welfare assistance consists of financial assistance for housing, education of children, and marriage of daughters[10].

**REFERENCES:**

1. S. Nagpal, "Expanding health coverage for vulnerable groups in India," *World Bank's Univers. Heal. Cover. Stud. Ser.*, 2013.
2. R. Dwivedi, "Migration: An Overview and Relevant Issues," *Manag. Insight J. Incl. Anal.*, 2012.
3. Y. M. Chan, "SELF-DIRECTED LEARNING READINESS AND ONLINE VIDEO USE AMONG DIGITAL ANIMATION STUDENTS," 2018.
4. T. Swanson, "Consensus-as-a-service: a brief report on the emergence of permissioned, distributed ledger systems. Work," *World Agric.*, 2015.
5. J. A. Laub, "Assessing the servant organization; Development of the Organizational Leadership Assessment (OLA) model. Dissertation Abstracts International," *Procedia - Soc. Behav. Sci.*, 1999.
6. M. Z. Lubis, "Tingkat Kesukaan dan Daya Terima Makanan serta hubungannya ddengan Kecukupan Energi dan Zat Gizi pada Santri Putri MTs Darul Muttaqien Bogor," *World Agric.*, 2015.
7. A. D. H. Randi Putra1), "RANCANG BANGUN APLIKASI PENGINGAT JADWAL DAN TUGAS KULIAH BERBASIS ANDROID," *World Agric.*, 2015.
8. N. I. Nusantari, N. F. Nuzula, and A. Darono, "Pengaruh Agrevitax Pajak Terhadap Pengungkapan Corporate Social Responsibility (CSR) (Studi pada Perusahaan yang Terdaftar dalam Indeks SRI KEHATI Tahun 2011-2013)," *J. Adm. Bisnis - Perpajak.*, 2015.
9. D. Erawati, "Hubungan Lama Pemakaian Kontrasepsi Suntik Dengan Peningkatan Berat Badan Pada Akseptor Suntik Depo Medroksi Progesteron Asetat Di Bidan Praktik Mandiri (Bpm) Sugiyati Kajoran Magelang," *Naskah Publ. Stikes Aisyiyah Yogyakarta*, 2015.
10. A. M. Duad, "Karakteristik Fisisk Daging Sapi Bali Pascarigor Yang Dimarinasi Theobromin Pada Level Dan Lama Marinasi Yang Berbeda," *World Agric.*, 2015.

## ASSESSMENT OF DECISION-MAKING METHOD

**Puneet Sethi\***

\*Associate Professor,  
Department of Management,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id-puneet.management@tmu.ac.in

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### ABSTRACT

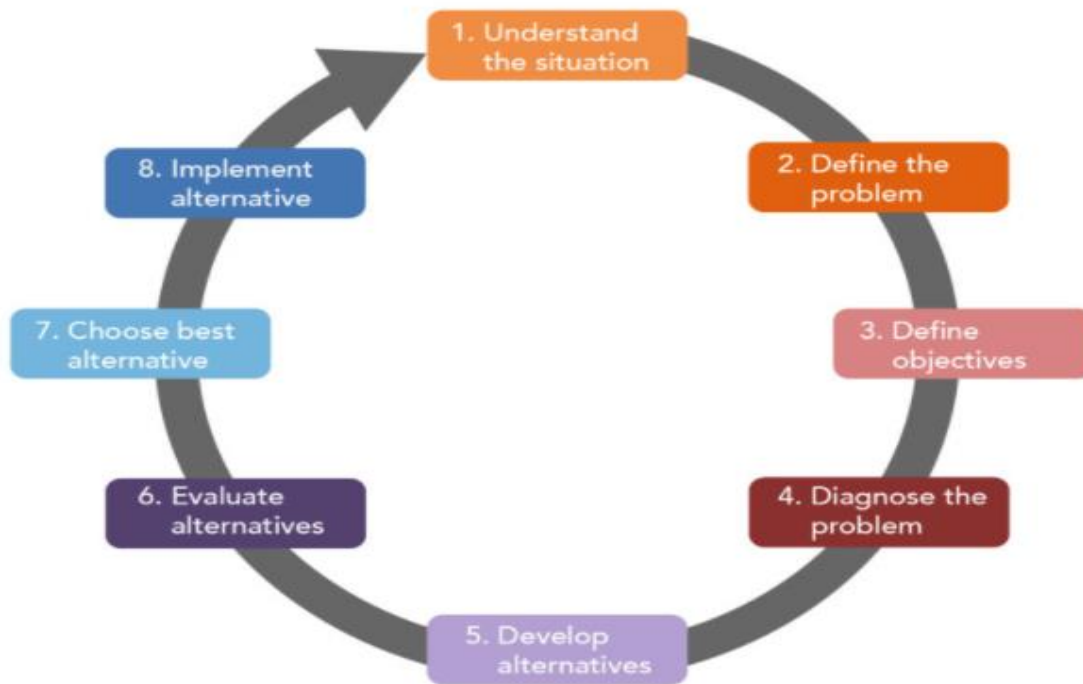
*The method presented in Multi Criteria Decision Aiding (MCDA) focuses on the formulation of choice and is expressed by decision-making law "if...then...." Basic premise facts as well as the quest for clear rules to encourage its judgements. This approach has a significant benefit in handling contradictions as a consequence of hesitations. The method suggested is based on the fundamental, natural and logical concept of dominance. It states something else in a particular family, and then it in general, according to all requirements. The gathering of judgements based on preferred facts using an information discovery method adapted to reflect the dominance principle. In order to demonstrate how Dominance Rough Set Approach (DRSA) may be used clearly in various MCDA situations, the authors' Dominances-based Rough Set Methodius acts as a mathematical basis for the MCDA decision-making approach, along with teaching examples.*

**KEYWORDS:** *Choice Ranking, Decision Rules, Dominance, Multiple Criteria, Rough Sets.*

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### 1. INTRODUCTION

Supporting multi-criteria decision attempts to include the right actions (option) or giving groups (classification, commonly referred to as sorting) recommendations to the Decision-Maker (DM); (ranking). No such ideas are formed until the DM offers agreeable to the expected model of choice. The two main options structures used to date for multi-criteria decision analysis are the Multi-Attribute Utility Theory (MAUT) and the outranking method shown in Fig.1.



**Fig. 1: The Rational Decision Making Process.**

These models need a reference explicitly linked to their parameters [1] to conduct pairwise comparisons of behaviour such that [2] or the significance [3] can be calculated.

This kind of favoured information looks like the normal logic of the DM. It is usually simpler to execute her actions than it appears to be less natural to explain the translation of these facts, on the other hand. According to Slovic, individuals decide by seeking law that offers obvious explanations why their choices should be constructed properly after getting preference for exceptional options. Some examples of these rules are below [4]:

- If a car's peak speed is 174.9 km/h as well as its price is at most \$11,999, it is deemed to be medium,
- If car is marginally superior to car in terms of acceleration and car's price is only marginally higher than car's.

The preference of DM is built on rules based on example choices that allow it to comprehend the reasons for its choice. Approval by the DM of the Guidelines justifies their adoption in accordance with the concept of March. The DM system expands to a variety of possible behaviour in order to generate unique options. The modification of these connections may offer an appropriate recommendation to assist the DM in the evaluation problem. As a consequence it is feasible to use either representation or suggestion for the choice model in the form of judgement rules produced from instances. Indicating rules from instances is a popular artificial intelligence technique. This demonstrates our enthusiasm with rough set theory, which has proven to be an effective method of understanding confusing choice descriptions [5].

The aim of a rough set analysis is to explain the connection between the values of certain characteristics that serve as 'dependent variables' and those of other attributes of condition that

are 'independent variables.' Information on the presence of such diseases is provided in a medical context while evidence of these symptoms is offered in decision characteristics. The raw approach provides the advantage of dealing with partly contradictory instances such as items that cannot be distinguished by state judgement. In addition, it provides a useful placement of specific qualities and subsets, as well as the foundation for a concealed linking value of condition attributes [6].

The rough set technique and data mining approaches were, however, not taken into account in a restricted selection order of assessments. Medical diagnostics are in this regard a clear and excellent example of this kind of issue. It's sufficient to think of it as a result. However, sometimes it's not enough to manage all the related data. Consider two businesses assessed for risk of bankruptcy using a parameter package with a low debt ratio that is then distinct (discernible) in connection to the feature investigated, according to the established theory (debt ratio) [7].

However, as respects the analysis of options and, for example, the risk assessment of bankruptcy. The traditional raw set method and data mining approaches are supported by the following indiscernibility theorem.

According to this concept, it is related to illness X whether there is no disagreement and we should conclude, while symptom B is linked to disease Y. The theorem of indiscernibility is inadequate in the examination of many criteria for conveying all important semantics. Consider two above-mentioned companies: one has a low ratio of debt and the other a large ratio of debt. Assume that these businesses' evaluations are similar (profitability indices, efficiency of the management and industry). In addition, suppose the business is given a higher risk with a DM [8].

Concept of indiscernibility, thus linked with significant danger and may be detected. That's incongruous, of course. The rationale is that in multiple criteria decision analysis, the notion of indiscernibility must be replaced with the principle of supremacy.

Implementing the theory of superiority on debt and the probability of bankruptcy shows a contradiction that leads to a larger paradoxical deduction. As a consequence, a dominance-based extension of rough set theory was suggested that would enable them to handle MCDA samples. This invention is focused mainly on replacing the relationship of insight with a dominance connection in approximate approximation of decision groups. As a result, the choice model may be constructed from example choices in terms of judgement rules which are the logical statements of the kind "if..., then..." Various decision-making criteria are used to separate certain unclear information about the interests of the DM from instances that do not follow the rule of dominance [9].

The latter are important because they show situations in which DM's wishful thinking is reluctant. In other words, a choice of method may be formed by the inference of sample judgments. The characteristics of a model of this type are strange: It is stated with no formal theoretical definitions in a natural language; its meaning may also be based on circumstances which are suggestive of genuine choice. The model of rule choice is a novel MCDA technique that differs significantly with MAUT and other approaches. Starting with numerous categorization difficulties, we present which progresses by confusing choice, partially missing information, and ultimately many optional problems [10].

## 2. LITERATURE REVIEW

R. L. Keeney in his work undoubtedly appreciates the significant contribution to the practical philosophy and application of decision analysis science and instruction. Its main contributions are the development of a prescriptive technique for assessing decisions-makers' expectations of uncertainty based on particular behavioural assumptions and the convergence of extensive theoretical findings previously published primarily in journal literature. The book is essential for the individuals who consider the significance of the decision-maker, who considers hard and fully on his/her choice and also an examination of the degrading method for benefit compromises and attitudes to risk in the priority assessment process [2].

B. Roy explained that the above difficulties are related to the distribution of numerical values needed to define strong preference models, it should be noted. This kind of problem is not confined to multicriteria aggregation procedures in the ELECTRE (ELimination Et Choix Traduisant la REalité). In all modelling types problems of the same kind may be observed any way or another. We assume that all options are involved. It is important that the path we travel not shadows, but accentuates, these difficulties. Robustness analysis may be of vital significance in the development of a medication independent of the modelling method used. The benefits of ELECTRE methods include the relatively simple assessment of robustness [3].

## 3. USING THE DOMINO BASE METHOD ROUGH COLLECTION METHOD

For the purpose of a didactic presentation, we integrate the key DRSA concepts in a very simple image. Assume that the success of students at a technical institution in Algebra, Physics and Literature is the foundation for evaluation. Let us suppose that you are looking for some broad criteria for a systematic assessment of ideas, such as comprehensive academic reviews.

The table row corresponds to the particular item. An intervention study may also be included. In this example, the objects (actions) represent an attribute, or a particular knowledge category. The features of our scenario are: math, physics, literature and a comprehensive assessment. A qualitative or quantitative assessment is given by using the characteristic in the appropriate column. In the preceding example, an evaluation is a graduation of a student in a specific topic (math, science, and art) or in an overall assessment. This formal description of the information table as the four-fold characteristics is a complete function known as the knowledge function.

So is a minimal set of criteria guaranteeing that  $S_3$  is consistently evaluated? It should be mentioned that this rule of judgement was created because of a quest for a line between continuity and incompatibility of the dominance theory, which may be useful as part of an elective model. This search for the continuity as well as inconsequence line is understood to be the choice model as well as all the DRSA decision analysis.

P-dominant and belong to the lower class of the impoverished pupils. An object of  $c$  is controlled by  $P$ , i.e. (Take add besides remove). Where a particular collection of parameters varies from the prevailing principle, uncertainty is created. There is thus no debate as to whether or not the concept of supremacy belongs to, and there is no conflict. This is all things that are P-dominant, i.e. convincing in view of the  $P =$  mathematical parameters, science).

## 4. DISCUSSION

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The concept of dominance is strictly applied to the ideas of a small number of negative occurrences, particularly for large data tables, where there are not imprecise artefacts to be described. The constancy of variable Model DRSA is an enhanced DRSA version (VC-DRSA). It is nonetheless clear in the following section that we conclude that at the consistency stage it belongs to without ambiguity.

The level is called the level of consistency since it affects the degree of continuity uncertainty. Provided that any items that conform to a theoretically unknown coherence criteria are regarded as a list. Similarly, all items pertaining to a potentially ambiguous criterion for consistency could be evaluated. On the stage of consistency, the stated one is the following: the vector consistency paradigm of the dominance based rough set technique allows certain flexibility artefacts to be easily proving decision class unions.

DRSA's final result was the basic "if..., then..." rule characteristics contained in the information table measured.

1. Decree 1): If the student is provided a medium both in science and in art at least it is a media in general.
2. Decree 2): When a student has a high degree in science and his degree at most is poor, he gets a full degree which extends beyond the medium
3. Decree 3): The first and second phrases are the pupils who, due to uncertainty in their comprehension, are at least as poor or as medium in science, and at worst in art.

Let us assume that as stated in Decree 5, the student may be above average, because it is not completely obvious that the student is outstanding, it is possible thus that the students cannot be. Decree 5 may alternatively be translated as Worse, in which case it is an approximation of the law, with meaning to which it might say: When it is the case of Decree 3 which may be over-average and weak, then it belongs to We may have and, on the left-hand side of the phrase, it belongs for the same: Decree 5: If both requirements fall on one which does not contain the other, the types 1 and 3) rules represent information obtained from the data table, while the types 2), 4) and 5) rules indicate possible and doubtful knowledge. Furthermore, the two criteria are not concerned with the other.

As ambiguous circumstances call into question certain judgement criteria, in large data tables ambiguity prevails, prohibiting the identification of any specific patterns. This fundamental pattern may be mirrored in probabilistic judgement processes which accept a limited number of counterexamples. We create a minimal rule, which utilizes a portion of its fundamental needs and/or weaker basic criteria). Consider the following criteria of judgement, both applicable in when the student gets a score that is at least high in mathematics and more than the average in literature, he receives a grade of excellent overall.

## 5. CONCLUSION

Certain contrasts may be helpful to properly understand the process of judgement rule: A collection that is comparable to multi-criterion problems of sorting and which only has a particular grammar when the utility function follows certain formulations. Sugo integral is more wide than DRSA decisions, with most generic max-min ordinal aggregates; in practise with equal evaluations of circumstances and outcomes, such as Suggestion integral. If the entire



assessment surpasses average if and then the complete assessment is excellent, a rule of decision is multi-degree.

He contends that the interests of the DM can't represent if they are specified in law reflected in the integrated Sugeno. The ELECTRE family of outranking methods that suggested specific models priority. The major characteristics of DRSA are as follows: The DM is asked for preferential information to handle a problem of multicriteria evaluation and a rough collection of preferential information provides a number of precise information awareness elements concerning the situation of the decision; there are: the importance of attributes and/or criteria, facts regarding their relationship (the consistency of approximation and core).

The model of choice based on desired information must be provided in a clear and understandable way, if... then... Although traditional MCDA methods take only objective ordered evaluations into consideration, and have certain changes, the judgement decree is comparable to all the existing joint calculation frameworks because it can handle inconsistent preferences. DRSA can process judgement laws and heterogeneous data. The approach proposed is built upon the basic principles and mathematical procedures (binary relations, sets and specified operations), the main theory is fairly natural and, without the algebraic or theoretical constructs, the core definition is objective too. There was no doubt that the adoption of a model of judgment and the ability of DRSA to cope with unexpected favourites revealed a fascinating MCDA study area, which moved it closer to artificial intelligence and expertise.

## REFERENCES

1. B. Roy, "Decision science or decision aid science?," *Eur. J. Oper. Res.*, 1993, doi: 10.1016/0377-2217(93)90312-B.
2. R. L. Keeney, "Decision with Multiple Objectives - Preferences and value Tradeoffs," 1976.
3. B. Roy, "The outranking approach and the foundation of ELECTRE methods," 1991.
4. J. Błaszczyński, S. Greco, and R. Słowiński, "Multi-criteria classification - A new scheme for application of dominance-based decision rules," *Eur. J. Oper. Res.*, vol. 181, no. 3, pp. 1030–1044, 2007, doi: 10.1016/j.ejor.2006.03.004.
5. D. Bouyssou and M. Pirlot, "Nontransitive decomposable conjoint measurement," *Journal of Mathematical Psychology*, vol. 46, no. 6. pp. 677–703, 2002, doi: 10.1006/jmps.2002.1419.
6. G. Choquet, "Theory of capacities," *Ann. l'institut Fourier*, vol. 5, pp. 131–295, 1954, doi: 10.5802/aif.53.
7. K. Dembczyński, S. Greco, and R. Słowiński, "Methodology of rough-set-based classification and sorting with hierarchical structure of attributes and criteria," in *Control and Cybernetics*, 2002, vol. 31, no. 4, pp. 891–920.
8. P. C. Fishburn, "Methods of Estimating Additive Utilities," *Manage. Sci.*, vol. 13, no. 7, pp. 435–453, 1967, doi: 10.1287/mnsc.13.7.435.
9. J. Fodor and M. Roubens, *Fuzzy Preference Modelling and Multicriteria Decision Support*. 1994.

10. S. Giove, S. Greco, B. Matarazzo, and R. S Ł Owiński, “Variable consistency monotonic decision trees,” in *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 2002, vol. 2475, pp. 247–254, doi: 10.1007/3-540-45813-1\_32.

## AGRICULTURAL BASED BLOCKCHAIN AND FOOD CHAIN NETWORK

M. P. Singh\*

\*Professor,  
Department of Education,  
Faculty of Agriculture Science,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [studentswelfare@tmu.ac.in](mailto:studentswelfare@tmu.ac.in)

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### ABSTRACT

*Blockchain is a developing digital technology that allows distributors to interact financially across all components without such middlemen as banks. This article analyzes and summarizes current research and efforts on blockchain-based agriculture and food supply chain implications, problems and potential. The research indicates that blockchain is a viable choice for a transparent supply chain with a great lot of work on foodstuffs and food issues. This research showed that a number of companies and efforts are establishing a dependable food supply chain with the involvement of key stakeholders within the distribution chain using blockchain technology. However, there are still certain obstacles and problems which hinder farms and systems from becoming more attractive. The difficulties include technological, educational, policy and regulatory frameworks. In the near future, study will demonstrate, in order to provide a secure, trustworthy and transparent approach, how government and trade activities should guarantee food security and integrity, as well as address such problems.*

**KEYWORDS:** *Blockchain Technology, Farmers, Food Supply, Information Security, Supply Chain.*

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### 1. INTRODUCTION

The pseudonymous writer Nakamoto authored Bitcoin: A Peer-to-Peer Electronic Cash System for 10 years. The article offers the foundation for Bitcoin, the first cryptocurrency that enables trusted central authority such as banks and financial organizations to perform private financial transactions. By developing blockchain technology, Bitcoin has solved the twofold problem (i.e. the digital tokens flaw as computer files can be simply duplicated or falsified). A blockchain is a digital record of transactions, which is backed by many computers by a trusted Third Party. In order to handle personally identifiable data transaction files, software solutions allow for data transmission, translation, storage and presentation in readable form (blocks). Each block contains a header with a time stamp, transaction data and a link to the preceding block with the basic Bitcoin configuration. A hash is produced on the basis of each block and is listed in the

following header of the block. The modification of a specific block thus leads to erroneous risks for the following blocks [1].

Researchers examined the problem of consensus carefully in past years, but lately it was energized and motivated to be used in blockchain applications and led to new blockchain design ideas. The most frequently utilized work proof in Bitcoin needs computer nodes nicknamed minerals to be redeemed before verifying transactions. The first miner to solve this problem is a checked chain block, which gets a modest transaction fee for transactions and cash [2].

Proof of Work (PoW) is frequently criticized for the computer energy sector, which leads to increased price of hardware and energy and the consequent centralization problems and a significant environmental effect. The alternative method is termed the Proof of Stake (PoS), such that organizations holding system coins may choose to be stakeholders in the process of approval of the transaction. Thus, PoS has the same effect as mining without requiring significant energy and computing resources (distributed consensus) [3].

Accordingly, several hundred digital tokens sought to address various flaws in major cryptocurrencies or targeted certain sectors such as health, gambling, insurance, agriculture and many more. The conventional banking system also analyzes Blockchain, which approximately 15 percent of banks utilize in IBM transactions and sometimes accept them [4].

Blockchain has increasingly used cryptocurrency and financial transactions since 2014, exploring several new applications, including handling and storing records and the authentication of digital signatures, intellectual and patent proprietary and patent rights, smart contracts and tracking of patent rights. Such advancements have already changed many areas of industry, government and society as a whole. But equally new and expected strands may be generated [5].

## 2. LITERATURE SURVEY

J. Becker et al. demonstrated in the paper that there is an all-encompassing danger of infringements of information security. Recent privacy information from big companies, such as Sony or Lockheed Martin has been acquired and handled. For certain reasons, asset safety is also endangered by targeted bottlenecks, viruses and malware, computers lost or stolen and mobile devices or by misuse of IT personnel. They invest in security measures to prevent or at least reduce the likelihood and severity of information security breaches in the aim of safeguarding companies from threats to information security. As information security expenditures are limited and the quantity of assets to be protected is enormous, information security investments must be carefully evaluated. Literature offers various techniques for evaluating investments in the security of information. This page is intended to identify, compare and analyze such methods using examples of the policy and security management tool. This solution is intended to decrease management expenses and enhance the trust of the companies by utilizing organizational norms and security frameworks. For the economic viability assessment, for example, the policy and security configuration management system employed cannot apply any of the methods examined without exception. Authors see significant possibilities for new methods in evaluating information security investment in the combination of various components of current techniques [6].

T. Lang et al. showed in the paper that Brexit may have significant food effects. This judgment is valid, regardless of whether Brexit is hard or soft. The UK food system is completely

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Europeanized to the tastes and pricing of consumers. This cannot be decreased or lowered by March 2019 without significant consequences. The food system in the UK is seriously faced with issues of food safety. Food across 16 key sectors, Brexit could harm UK food resilience and safety: What are the objectives of any post-food future EU? Will they handle the urgent issue of environmental, social and public health sustainability? Will this be a transfer of EU law, with the Secretary of State sitting on his 'delete' button? British domestic manufacturing has progressively decreased. The resilience of the UK food system should be enhanced. That is not the case. That's not the case. It is like a lad in the news who have no objectives, no leadership and no major Sourcing Ministries. Britain gets lots of fruit and vegetables from inside the EU which is important for health. The pound's value has dropped. Food price inflation has increased. Clarify what British consumers indicate they want to do, then connect to the pre-March 2019 discussions. The proponents of Brexit have disregarded Britain's integrated reliance on pan-European institutions and make it appropriate for food to be consumed in the UK, contributing to a broad variety of scientific infrastructure. Customers were not informed from Brexit campaigners that US agri-commerce offers lower-standard products or that the EU and US standards are weaker in foreign foodstuffs. The CAP and the CFP are the European Union's basic and old policies. A lot, sometimes with good reason, has been attacked in the UK. Brexit is a political construction. It's not a recipe for food insecurity. The report provides detailed suggestions in each area on how to improve food safety in the UK [7].

The CAP and the CFP are vulnerable to a severe policy vacuum. The new Secretary of State even rejected the CFP precursor by proclaiming the London Fisheries Convention of 1964! No notion of policy except the premise that farming and export drives are adequate and that the Coalition and successive Conservative Governments had guaranteed that the exclusion of 200 miles will address the unsustainable supply of seaweed. What is farming and fishing? How many environmental services be combined with food? These are major climate problems and ecological pressures.

### **3. BLOCKCHAIN IN AGRICULTURE AND FOOD SUPPLY CHAIN**

While Blockchain's technology has been effective in several cryptocurrencies, various agencies and others attempt to make advantage of the openness and default tolerance they provide in order to solve issues that are confronted with the distribution of resources by many untrusted parties. Agriculture and the food supply chain are two major and very essential sectors. The agricultural and food supply chains are closely linked since in many sectors farm product is virtually always utilized as input in some scattered supply networks where consumers usually are the final client. Agri Digital carried out its first sales of 23.46 tons of grain in December 2016 on a global, successful blockchain. Since then, the cloud-based system has handled more than 1,300 customers and over 1.6 million tons of grain, with manufacturers paying USD 360 million. According on Agri Digital's success, this technology could be utilized throughout the agricultural supply chain. Agri Digital is already building trustworthy and efficient blockchain supply networks for agriculture

The food chain is built and dispersed throughout the globe with many participants, including farmers, transportation firms, dealers and food suppliers. Currently this technique is useless and unreliable. For example, if individuals purchase products locally, the origin or the environmental effect of the manufacturing is unclear. Various efforts have been created to address the real issues in the agriculture supply chain using blockchain technology. The four major areas of these

efforts are: (a) food safety, (b) food safety, (c) food integration, and (d) assistance for small farmers.

The FOA defines food safety as a requirement for everyone to always have access to sufficient, safe and nutritious meals which satisfy their nutritional needs as well as their preference to healthy living, says the Food and Agricultural Organization. In the midst of humanitarian catastrophes linked with environmental, violent political and ethnic conflicts, and so on, it was very difficult to accomplish this goal. Blockchain is seen as a possibility for open international assistance to disrupt delivery systems, to authenticate and access documents and assets and maybe to react more quickly and efficiently to humanitarian emergencies. On Jordan's camp, for instance, digital food vouchers were given to Palestinian refugees using a set of coupons accessible in the Ethereum blockchain. The project is currently helping 100,000 refugees [8].

Food safety is needed in order to prevent illnesses in people for sanitary food preparation, manipulation and storage. According to the CDC, 48 million Americans are poisoned by food each year while 3,000 die. In 2016, Oceana conducted a study that showed that 20 percent of seafood had not been tagged correctly. Lee et al. have observed a decline in trust and significant complexity in supply networks and huge shipping distances. With increasing demand for better food traceability in terms of its safety and transparency, Blockchain could offer an efficient solution [9].

The first businesses to utilize technology in their supply chains are example of Walmart and Kroger that investigated technology for China's pork and Mexico mangoes.

The current concept to integrate Blockchain into the Internet of Things is for physical data to be monitored in real time and the HACCP system to be tracked. This is very essential in order to preserve the cold chain of spoilable food items. For example, Zeto Chain provides environmental monitoring on the basis of IoT devices at each link in the cold chain. Problems are identified in real time and fast action is immediately communicated to the parties involved. Intelligent contracts are used to enhance sales and security of supply. Customers may utilize mobile apps to scan Zeto product labels to monitor the product history [10].

The initial aim is to utilize blockchain to track cargill Agricultural conglomerates from the shop on to their fields. In a recent blockchain experiment, turkeys and animal welfare are addressed. In the sugar cane industry, Coca-Cola attempted to deprive blockchains of forced labor. Carrefour European Food Company utilizes Blockchain to monitor and trace the origins of the food in different types that include meat, fish, fruits, vegetables and dairy products.

Throughout addition, the research project Paddock to Plates focuses at monitoring beef in the production chain and promoting Australia's reputation for its excellent quality. JD.com's e-commerce platform monitors beef produced and distributed throughout the nation in Inner Mongolia. Details on nutrition, murder and packaging dates and the results of food safety tests may be scanned through the QR codes. Gog chicken utilizes a knee bracelet to display the free chickens of the client, which makes it available online. Securing free customer spectrum. The company's goal is to create trust by documenting the origins of food.

The Grass Roots Farmers' Cooperative offers a blockchain technology meat subscription package to give customers with private information about their dogs. In April 2017, Intel also demonstrated the potential of Saw-tooth, the hyper leader, to improve the traceability of the



seafood supply chain, as a production and management platform for blockchains. The research utilized sensor devices to gather information on fish location and storage conditions. The World Wildlife Foundation (WWF) claimed in January 2018 that block shelling of the traceability of the supply chain blockchain may eliminate illicit tuna fishing. In addition, the Balfegó project focuses on the traceability of tuna.

Furthermore, Rip.io has developed the Food blockchain, the quality food network that controls food transfers from production to the platform. The Origin Trail also enables customers to understand the true worth of the chicken company, the components in the soup, etc. The Blockchain Project for Agri-food has provided proof of the concept-based application of blockchain on table grapes in South Africa. Finally, a greenhouse farming framework based on blockchain technology, with enhanced security.

A significant approach towards increasing competitiveness in developing countries is to promote small farmers' cooperatives that help farmers get a greater share of the value of goods they produce. AgriLedger uses distributed crypto-driven devices to build trust in local cooperative businesses in Africa. The aim of FarmShare is to establish new forms of property ownership, cooperation between the community and an independent local economy. OlivaCoin is a B2B trading platform for lowering total financial cost, increasing transparency and making global markets simpler to access. Several startup companies, including Provenance, Arc-Net, Bart.Digital and Bext360, allow smallholder farmers to discover product traceability solutions. Accreditation is a test technique by the Soil Association, for instance with Provence which verifies bio-food routes.

Experts note that the past measures could help even medium-sized farms, since they clearly vary from big businesses. Cooperatives may, however, comprise, and become quite substantial, of small or medium-sized farmers. But they are an excellent foundation for the blockchain, because their transparency may assist to settle inconsistencies and conflicts between farmers more simply and equitably.

Summarizing, scholars offer the examples provided by blockchain technology/goods and/or product enterprises. For each instance, the final column specifies the objectives in blockchain. Financial problems connect in commercial initiatives to food traceability.

#### **4. DISCUSSION**

Blockchain technology offers many benefits, because it may be protected and distributed across multiple reputable parties. This is a key component of the food supply chain, which includes a vast number of players from the raw ingredients to the retailer. A decentralized directory may be linked with other programs by different rules (policies) and/or improve traceability in value chains with varied uses, inputs, suppliers, producers, buyers and regulatory bodies. The potential of Blockchain is to monitor social and environmental responsibility, expand sources of information, enable mobile payments, finance and credit, reduce transaction costs and allow the real-time, secure and reliable management of the supply chain.

As shown in the previous section, Blockchain is especially well suited for applications to assist small farmers in the developing nations. Other possibilities may include rural farmers' financing and insurance and transactions ease in underdeveloped nations. Whereas farmers produce over 80 percent of goods in underdeveloped nations, services like banking and insurance are not

usually provided. With regard to the industrialized world, smallholdings have always been limited by current issues, such as unexpected pricing and the environmental and economic effect of bigger businesses. Blockchain can support the entire value chain at a fairer price. Finally, future blockchain transparency could help to build renowned trading platforms. The reputation of many other business platforms (e.g. eBay and Alibaba) improves the conduct, responsibilities and commitment of the parties engaged.

There are many obstacles and challenges with future use of blockchain technology. Small businesses do not have the size, scale or expertise required for investing in the blockchain in the case study in the Netherlands. Furthermore, owing to considerable uncertainty, solid business reasons are still missing. There is a general lack of knowledge about training on the blockchain, and there are no training platforms. Farms must understand it properly before they embrace blockchain. As farmers are often ignorant of state of the art technology when they wish to collaborate internationally on agriculture. The regulation is also a significant impediment. Previous cryptocurrencies, based on existing experience and values, are exposed to speculators on a regular basis. Therefore, cryptocurrencies are not reliable for usage in food supply chains without a kind of regulation as a full answer.

It is not apparent how blockchain technology and monetary transactions still exist between policy makers and developers. In addition, there are many design choices for the existing or growing block chain. For example, unlimited, open (that is, everyone may join), or systems should be allowed to (i.e. members trust), shutdown, etc. Existing block chains face severe scalability difficulties, since the present transaction processing is restricted by characteristics such as sizes and intervals of the transaction blocks. Although blockchain increases safety, there is only a severe danger of mishaps involving the loss of private keys by the account owner. Finally, the world of developed and developed skills and access to blockchain technology seem to be in a divide. Many materials originate from industrialized countries with a rich and well-structured primary sector (i.e. the USA, Australia, the Netherlands, etc). In the usage of big data in agriculture, too, this digital divide has been found. In advanced areas, such as the USA and Europe, the most ongoing trials tend to take place. The potential benefits and challenges of blockchain agriculture are addressed.

## 5. CONCLUSION

In this paper, a range of organizations and initiatives utilize blockchain technology to create a proven and trustworthy food supply chain, including the involvement of stakeholders in the distribution chain. There are still numerous difficulties and impediments to overcome, not only at the technical level. It is essential to simplify Blockchain. Different businesses have developed solutions that make it simpler for farmers to utilize blockchain technology, such as 1000 Eco Farms that have combined all major food, agricultural and farm blockchain operations which use Food Coin as the suggested ecosystem. In order to realize the potential benefits of the technology, government financing, education and formation are increasingly focused on research and innovation to decrease barriers to usage. Gupta emphasizes the trend towards blockchain amongst governments, stressing the necessity to monitor and identify the exact "pain spots" and manage them correctly. A series of policy measures may be taken, e.g. supporting growth in agri-food chain blockchain-minded ecosystems, technology support under the general competition improvement objectives and sustainable exploitation of the agri-food supply chain, and developing a clear regulatory framework for blockchain implementation. Blockchain is in

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brief a promising technology for a transparent food supply chain, but there are still numerous hurdles and problems that impede the broader call of farmers and food systems. It will soon be shown whether and how government and industry efforts can overcome these difficulties in order to provide a secure, dependable and transparent approach to food safety and integrity.

## REFERENCES

1. F. Tschorsch and B. Scheuermann, "Bitcoin and beyond: A technical survey on decentralized digital currencies," *IEEE Commun. Surv. Tutorials*, 2016, doi: 10.1109/COMST.2016.2535718.
2. I. Bentov, A. Gabizon, and A. Mizrahi, "Cryptocurrencies without proof of work," 2016, doi: 10.1007/978-3-662-53357-4\_10.
3. J. Becker, D. Breuker, T. Heide, J. Holler, H. P. Rauer, and R. Böhme, "Can we afford integrity by proof-of-work? scenarios inspired by the bitcoin currency," in *The Economics of Information Security and Privacy*, 2013.
4. J. B. Keith, D. Nick, K. Peter, P. Veena, W. Likhit, and Wallis, "Leading the pack in blockchain banking," *IBM Res.*, 2016.
5. Tayeb & Lago, "Blockchain technology : Between high hopes and challenging implications," *Mena Bus. Law Rev.*, 2018.
6. J. Becker, D. Breuker, T. Heide, J. Holler, H. P. Rauer, and R. Böhme, "The Economics of Information Security and Privacy - CanWe Afford Integrity by Proof-of-Work? Scenarios Inspired by the Bitcoin Currency," *Work. Econ. Inf. Secur. 2012*, 2013.
7. T. Lang, E. Millstone, and T. Marsden, "A Food Brexit: time to get real – A Brexit Briefing.," *Univ. Sussex Sci. Policy Res. Unit*, 2017.
8. K. Warner, W. Timme, B. Lowell, and M. Hirshfield, "Oceana study reveals seafood fraud nationwide," *Oceana*, 2013.
9. H. L. Lee, H. Mendelson, S. Rammohan, and A. Srivastava, "Technology in Agribusiness: Opportunities to Drive Value," *Stanford Grad. Sch. Bus.*, 2017.
10. F. Tian, "A supply chain traceability system for food safety based on HACCP, blockchain & Internet of things," 2017, doi: 10.1109/ICSSSM.2017.7996119.

## A REVIEW ON SOCIAL MEDIA AND IMPLICATIONS FOR THE SALES PROCESS

Ankit Kumar\*

\*Associate Professor,  
Department of Management,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- ankit.management@tmu.ac.in

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### ABSTRACT

*Innovation research has a long, historic history in the sales discipline. Starting with the role of desktops to tablets, continuing to the impact of the Internet, forward to customer relationship management and marketing force automation programs, and now to the function of social media, sales research is being shuttled into a new technology paradigm. The aim of this article is to examine the function of social networking in the sales team and the sales process. We begin the article by giving definitions of social media and examining the function and significance of social media in business. An analogy between the growth of Internet use in the sales force and the emergence of social media is shown and explored. Next, we examine the difficulties of social media in the sales and marketing interface and analyze four distinct business methods to identify who “owns” social media inside a company. We continue with a review of the various phases in the sales process and provide ways in which social media affects each individual step, thus identifying future study possibilities.*

**KEYWORDS:** Social Media, Marketing, Systematic Review, CRM, Advertising.

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### 1. INTRODUCTION

With the introduction of social media, consumers are quickly embracing social networking sites, participating in micro-blogging, and downloading mobile apps and computer tablets to improve their social life and encourage sharing and contact with friends and family. Beyond just utilizing social media technology for uploading photos and publishing status updates, consumers and members of society in general have discovered that social media apps may really empower them when contemplating the flow of information. This is substantively significant given that it has been calculated that a week's worth of reading the New York Times includes more knowledge than a person was likely to come across in a lifetime in the 1800s. At the organizational level, however, businesses have been slower to embrace new technologies but are rapidly recognizing the potential benefit in their usage. Witnessing the strength of social media apps at the consumer level, many marketers have embraced the potential of these platforms to disseminate their

message. For example, Ford Motor Company recently used social media to advertise the introduction of their new model Ford Focus[1].

“We chose 40 Social Networking professionals and gave them each a Focus to test at a test track in Spain,” said Paul Venn, senior vice president of Team Detroit, Ford’s advertising agency. The videos were then disseminated through Facebook, Twitter, and other social media sites. The response from this marketing strategy “is good, considering the amount of views and the tone of comments from videos recorded during the test drive”. Correspondingly, Financial Times recently reported that “Procter & Gamble said it would lay off 1,600 staffers, including marketers, as part of a cost-cutting exercise” in which executive chairman officer (CEO) Robert McDonald planned “to ‘moderate’ his ad budget even though Companies like Google can be ‘more efficient’ than the conventional media that usually eats the lion’s share of P&G’s ad budget. Among the functional areas of companies that have seen the potential effect of social media, the sales function has the potential to be one of the most drastically altered by these technological advances.

Virtually all elements of personal selling and sales administration may be fundamentally impacted by these technologies. Importantly, social media is not confined to technologies accessible for mass consumption (e.g., Facebook, LinkedIn, Myspace, Twitter, Spotify, Google+, and Pinterest) but also integrated screening social media and network capabilities being provided by businesses such as Salesforce.com[2]. Yet, too far, there has been little study on the impact of social media and its effect on salesperson behavior, the sales procedure, or sales management techniques.

With the foregoing in mind, the aim of this article is to give a background of social media and its role in a management structure. Specifically, with respect to the marketing– sales interface, we examine whether social media should be located in the marketing or sales department or sales business unit and the relative benefits and disadvantages associated with each location. Our views on where a company’s social media unction should be kept come from the various methods a firm may adopt. From here, we examine various phases in the sales process and how social media may affect the actions of a boundary spanner/salesperson or client at that step. We end with recommendations for sales managers and salespeople on how to promote social media adoption in order to achieve a competitive edge. Throughout this article, we draw parallels to the beginnings of the Digital revolution for theoretical base[3].

## **1.1 Background of Internet Evolution:**

To investigate social media, one must first create an acceptable definition. In the early days of the Internet, businesses wrangled with the same problem as they tried to establish precisely exactly what was meant by an Internet presence. Both businesses and academics went through several phases of a yet-to-be-defined Internet adoption life cycle. There were various plans and methods as each business tried to identify not just how the Internet might and would alter their relationship with consumers, but how they intended it to revolutionize their sales operations. Early adopters frequently blazed a path, but consumers would eventually decide where the information super highway would go, not executives or consultants living on the business side of the customer–company continuum. Companies who spent significantly to be first fell prey to the slogan of “the new way of doing business” and frequently either disregarded their main constituents (customers), or the wisdom of applying good business principles with a careful eye



on the balance sheet. At initially, there were “information only” Web sites with the goal of pushing business to established sales channels. Companies thought that establishing an Internet presence was a passive effort. Other businesses recognized the promise of the Internet and sought to supplement their current sales channels by utilizing the Internet to connect with their consumers, maybe even enabling orders, and subsequently collecting payments[4]. This was the beginning of the “bricks-and-clicks” revolution. Still some businesses totally abandoned the conventional sales channels and went “all in” on an e-commerce strategy, putting newly minted Ivy League MBAs over experienced CEOs in a rushed effort to slough off any link to the old way of doing business. This occurred throughout every business and area of the economy, and winners and losers soon emerged in each of the aforementioned methods. The one fundamental factor that connects every one of the methods at its heart, however, is that the client, whether it another company or a consumer, determined which strategy would succeed and which would fail. In the same manner, businesses today are grappling with how to integrate social media into their business models and strategy[5].

## **1. 2 Shifting Paradigms:**

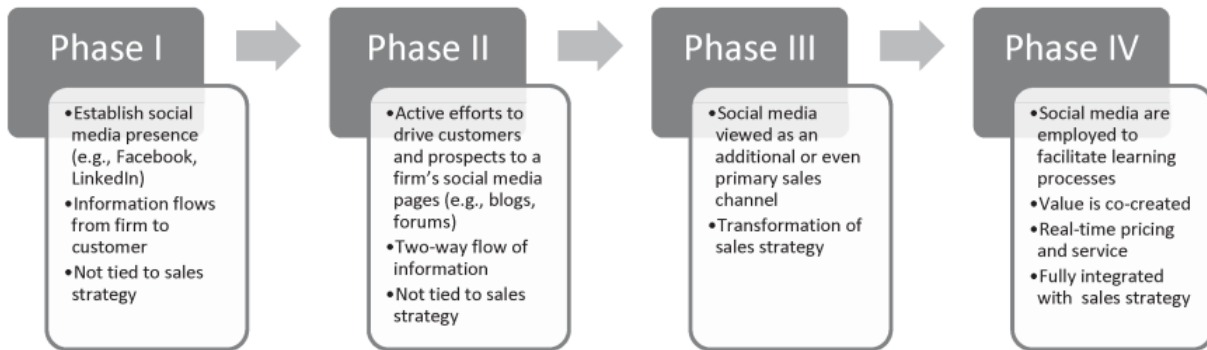
The only thing that is constant is change. It is clear that Myspace produced superstars and changed the entertainment industry, from music to film. However, it was not until Facebook replaced Myspace and started connecting tens of millions of individuals across the globe that most businesses realized the possibility for a more personal connection with consumers was (possibly) only a few mouse clicks away. The same queries about passive vs visible involvement faced by companies a decade ago are surfacing again as companies understand the importance that Facebook, Twitter, and Chatter, to name just a few, might play heading forward as customers wanted almost instant gratification in their friendships and contact with those with whom they choose to do business. With rising consumer expectations, customers demand a venue to express issues[6]. They also want a system to be rewarded for their devotion to a brand or company, and want unique deals not accessible to the general public or the shop down the street. Customers also want to be informed on the goods and services that are provided, as well as when, why, and how they may be changing. With the development of social media, it would appear that the technology has the ability to significantly impact a company or perhaps an industry like technology did in the Internet age. It is not simply enough to charge a marketing or sales person with the duty of building a Facebook profile, tweeting on behalf of the business, or starting a forum on Salesforce.com. Social networks should not be viewed of as just another channel, another method by which to engage with the consumer, or another instrument by which to manage brand and company reputation but, rather, all of those things (and possibly many more) concurrently[5].

## **1.3 Internet Based social Media Comparisons:**

If we do cannot learn from the past, we are compelled to repeat it. It is not difficult to draw parallels between the birth of the Internet and the confluence of today’s drive for social media adoption by large and small company alike. What is markedly unclear, however, is whether the Y2K-age clamor by business to establish any Online footprint, with the resultant product lifecycle adoption from bricks-and-mortar to concrete blocks, begins or simply ends with such a nascent Facebook and Twitter presence as employers ask fans to “like” or follow people, or with a transcendent strategy that impacts business-to-consumer (B2C) and business - to - business (B2B) commerce at its core. With this in mind, this paper aims to advance the collective



knowledge base from a collection of fragmented practitioner techniques and guidelines, to instead propose a strategy for social media adoption at every stage of the sales process, and to officially recommend who in the business[7].



**Figure 1: Process Evolution of Social Media in Sales.**

Properly “owns” social media and its related deployment across all platforms. We propose that utilizing contemporary social media apps must be regarded as a live, dynamic activity in the business[8]. It is a plan that will need significant commitment and constant monitoring. In reality, similarities to the adoption of the Internet by businesses little over a decade ago may readily be made. Much in the same way that businesses began the Internet era with a basic, one-way (and sometimes simply one page) Internet presence years ago, they must now understand that social media is a tool, strategy, or method of doing business that will develop through its own life cycle that has yet to be defined. An individual would be hard-pressed to discover a business that still utilizes the same Internet page or sticks to the same Internet or e-commerce strategy it chose around 2000. Although Darwin was able to offer merely a theory of evolution, it is basically established reality when it comes to e-commerce, and acceptance of the Internet, that there is a life cycle through which companies, large and little, will all ultimately traverse. , president of 1-800-Flowers.com, has claimed that “social commerce” is in fact the fourth wave of business, the natural next stage in the development of online and Internet company. We think this similar process of development is also true within the framework of social media itself.

The first Web sites, as stated above, were mainly informative. They offered minimal possibility for two-way communication, maybe at most giving a postal address, e-mail, or phone number for any future interaction that might be needed. They existed because prevalent thinking at the time advised businesses they must “be on the Internet,” even though the commercial case as to why had yet to be completely established. In the same manner, some businesses today may determine that social media means establishing a YouTube channel, or even a LinkedIn or Facebook page solely for the sake of “having a social media presence.” This basic approach may please certain consumers, but it will do nothing to improve a firm’s value offer[9]. It will be, basically, the equivalent of being listed in the white page portion of the Yellow Pages. Customers can discover you, but for answers to queries or for more substantial information they will ultimately want more.

As Internet usage grew, businesses quickly started to replace informative, single-page Web sites with ones that could take orders, and ultimately even money. The comparable social media

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experience will likely include businesses creating blogs or offering up comment sections and forums to their consumers and the public. The approach will further develop as businesses try to attract consumers and potential customers to their social media sites, even if they do not yet have a strong plan for what they want people to do once they get there. The consumers will gradually and finally define and demand more from the experiences, and the next stage in the development will be fast to follow[10].

In the Internet era, brick-and-mortar businesses became bricks and-clicks, while still many more migrated completely to (or were supplanted by) Internet-only e-commerce models. Much in the same manner, social media will see a similar transition as some businesses will consider social media sites as an extra sales channel, while others will strive to market them as the main channel. This may or may not be possible (only time and consumer demand will tell), but social networking will be the backbone strategy that guides how customer and business cooperate to co-create worth in the sales process. Finally, contemporary e-commerce is truly an incredible thing except that it has at the last advanced to a state where clients not only transact internet, but Web sites learn about customer 's buying habits to suggest both these goods or services (e.g., Amazon.com), something that was at one moment unimaginable and certainly not feasible in terms of tactics.

## 2. DISCUSSION

**Marketing and Sales Interface with Social Media** The hundreds of accessible practitioner writings on social media may have yet to establish consensus on optimal practice, but they do agree on many things. First, it is vital. Second, "the balance of power has shifted, inexorably and permanently, from the business to the consumer. And, last but not least, it needs dedication, resources, and seamless integration with not only the sales organization and its plan, but with all aspects of the company and its entire strategy. Social media is not simply about picking a handful of techniques that everyone else seems to be doing, or is talking about adopting. Rather, social media, while cheap to deploy, needs study up front to determine which methods make sense for the industry, company, and line of business, and the commitment to connect the human resources required to support the installation and ongoing social media effort There is no one size fits all, or turn the switch and forget about it, method to which a CEO can simply allocate money. Social media, at its core, requires cooperation within and outside the business, which implies that partnership between sales and marketing is essential. Considering that sales and marketing are regarded as two profit centers within an organizational structure. Before a company can join the social media arena, it must establish the proper objectives connected with the social media implementation.

It has to discover and comprehend the value offer for the customer, not simply the business. Again, social media is about interaction and cooperation. The advantages cannot be unidirectional or one-sided. Customers need to get, or at the very least perceive, value from the social media endeavor. This will vary by industry, business, and even consumer. That being said, a smart sales or marketing organization will likely have some understanding of what present and potential consumers want and will expect from their interactions in the future. If businesses do not understand what consumers want, they will need to obtain this knowledge, possibly via what some practitioners would term a "social audit" t is this information that will drive, in part, the first selection of which kinds of social media (and particular platforms) to pursue. Are consumers just searching for a forum to better understand a product or service? Do they wish to connect

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with experienced consumers to assuage their own concerns before making a financial investment? Or, are they may be seeking for loyalty incentives for preferring to maintain business with one firm over another? These are just a few examples of the kinds of questions a business must utilize to design its first approach to social media. Some businesses may need to consider a basic blog, while others may require a Facebook or Twitter presence. Still others may find the greatest value in instructional films uploaded on YouTube or comparable file-sharing sites such as Flickr.

### 3. CONCLUSION

The aim of this article was to provide a comprehensive review of social media and its function in the sales process. Because this subject is very new, there are many ways to continue with future study. Our aim was to highlight what we consider to be the most significant and powerful aspects of social media. With this debate, we think there are several important take-aways. Companies would be smart to listen to their consumers, and even rivals, and to begin investigating what a social media presence can and will mean to their sector. It is about involvement. It is about developing the brand. And it is about adopting a new, more nimble style of conducting business. It does not have to be detrimental to corporate culture; it may be introduced and made to be enjoyable or interesting as this new channel develops. It will most definitely be transformational in the years to come, but the key point is that the social media narrative has yet to be told.

The future of social media in marketing and sales relies on both the consumer and the business, and where it will go both will change with time and further advancements in technology. One topic of study not explicitly addressed in this debate might possibly include the typologies of social media, or the variations in their uses in business-to-business (B2B) vs business-to-consumer (B2C) settings. As there are clearly variations across kinds of social media and the functions that they play in various marketing contexts, it was beyond the scope of this study to discover such problems. There are many particular types of social media apps, all of which may have different or unique capabilities that may impact the sales process in diverse ways. Coupling these categories with the specific requirements in B2B and B2C sales scenarios offers considerable potential for further study and research. There are also many topics for further study that were discovered in producing this article, including the influence of technology, crisis management, security/privacy concerns, company culture and silo problems, and price, just to mention a few. As the body of educational work in the area slowly tries to replace the physician bits in the way a field manual culls the industry standards learned on a field of battle, social media will become a significant source for future research that has the potential to shape, craft, and reshape not only sales and marketing strategy, and yet business strategy for years to come. We believe that our study opens the door for future, informative studies on the role of social media in the world of sales and marketing

### REFERENCES

1. M. Rodriguez, H. Ajjan, and R. M. Peterson, "Social Media in Large Sales Forces: An Empirical Study of the Impact of Sales Process Capability and Relationship Performance," *J. Mark. Theory Pract.*, 2016, doi: 10.1080/10696679.2016.1170538.
2. M. Rodriguez, R. M. Peterson, and H. Ajjan, "Crm/Social Media Technology: Impact on Customer Orientation Process and Organizational Sales Performance," 2015.

3. K. E. Niedermeier, E. Wang, and X. Zhang, "The use of social media among business-to-business sales professionals in China," *J. Res. Interact. Mark.*, 2016, doi: 10.1108/jrim-08-2015-0054.
4. J. N. Moore, M. A. Raymond, and C. D. Hopkins, "Social Selling: A Comparison of Social Media Usage Across Process Stage, Markets, and Sales Job Functions," *J. Mark. Theory Pract.*, 2015, doi: 10.1080/10696679.2015.980163.
5. S. Fraccastoro and M. Gabrielsson, "Effects of social media usage on the speed of international growth of an international new venture," 2018, doi: 10.24251/hicss.2018.543.
6. J. Andzulis, N. G. Panagopoulos, and A. Rapp, "A review of social media and implications for the sales process," *Journal of Personal Selling and Sales Management*, vol. 32, no. 3. pp. 305–316, 2012, doi: 10.2753/PSS0885-3134320302.
7. C. Lorenzo-Romero, E. Constantinides, and M. D. C. Alarcón-Del-Amo, "Social media as marketing strategy: An explorative study on adoption and use by retailers," *Adv. Ser. Manag.*, 2013, doi: 10.1108/S1877-6361(2013)0000011014.
8. Y. Y. Wang, T. Wang, and R. Calantone, "Momentum in social media and offline car sales after automobile recalls," 2016.
9. K. K. Kapoor, K. Tamilmani, N. P. Rana, P. Patil, Y. K. Dwivedi, and S. Nerur, "Advances in Social Media Research: Past, Present and Future," *Inf. Syst. Front.*, 2018, doi: 10.1007/s10796-017-9810-y.
10. R. Felix, P. A. Rauschnabel, and C. Hinsch, "Elements of strategic social media marketing: A holistic framework," *J. Bus. Res.*, 2017, doi: 10.1016/j.jbusres.2016.05.001.

## AN OVERVIEW ON CYBER CRIME

**Sourabh Batar\***

\*Assistant Professor,  
Department of Corporate Law,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id-battarsourabh@gmail.com

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### ABSTRACT

*The body of data is now processed online, making it susceptible to cyber-attacks. There are a large variety of cyber dangers, and whose behavior is hard to predict early on, making it tough to prevent cyber assaults in their early stages. Computer assaults may have a purpose or may be handled without the user's knowledge. Attacks that are carried out intentionally are classified as cybercrime, and they have serious ramifications for society in the form of economic disruption, psychological disturbance, and a danger to national security, among other things. Cybercrime prevention needs a detailed examination of criminal conduct as well as an awareness of their implications at different levels of society. As a result, the present paper offers a knowledge of cybercrime and its social effects, as well as future cybercrime trends.*

**KEYWORDS:** *Cyber Attacks, Cyber Crimes, Potential Economic Impact, Consumer Trust, National Security.*

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### 1. INTRODUCTION

The current era is too fast to take use of the time element to enhance performance. It is only feasible because the Internet's usage. The Internet is a collection comprising millions of devices connected by a network of electrical connections. The internet is linked to millions of computers. Everyone enjoys the usage of the Internet, but there is still a flip side to the coin: cyber-criminal action via the use of the Internet. A cybercrime is an act done or omitted in violation of a law forbidding or commanding it, for which a penalty is imposed upon conviction. In other terms, cybercrime is defined as "criminal activity directly linked to the use of computers, specifically illegal intrusion into another's computer system or database, manipulation or theft of stored or on-line data, or equipment and data sabotage. The Internet, also known as cyberspace, is rapidly expanding, as are cybercrime. Some of the many forms of cyber are mentioned here[1].

#### 1.1.Hackers:

These people examine other folk's computer systems for the purpose of education, curiosity, or rivalry with their peers. They may be attempting to gain access to a more powerful system, gain

respect from other hackers, create a reputation, or gain acceptance as an expert without successfully completing formal education[2].

## **1.2.Career Criminals:**

Illegals, addicts, and irrational and incompetent people: Troublemakers, addicts, and illogical and incompetent people: "These individuals range from the mentally ill to anyone who does not commit crimes on a regular basis. Some people are working for a while, earn a little money, and then move to another job to repeat the process. They may cooperate with others or work for organized gangs such as the Mafia. Russia, Italy, and Asia pose the greatest danger from organized crime." According the FBI, there were more little Russian gangs operating in the United States in.Many of these nefarious alliances, according to the FBI, rely on advanced information technology and encrypted communication[3].

## **1.3.Salami Attackers:**

These attacks are carried out in order to conduct financial crimes. The goal is to make the change so little that it would go completely unnoticed in a single instance, such as when a bank employee installs a software into the bank's servers which deducts a tiny sum from each customer's account. In principle, cybercrime may be divided into the following[4].

## **1.4.Data Interception:**

In order to collect information, an attacker monitors data streams to or from a target. This attack may be carried out to collect data in preparation for a future attack, or the data collected could be the attack's ultimate objective. This attack usually entails sniffing network traffic, but it may also include observing other data streams, such as radio. The attacker is usually passive and just monitors basic speech, but in certain versions, the attacker may try to start the creation of a stream of data or alter the type of the data sent. The attacker is not the intended receiver of the data stream in all versions of this attack, which distinguishes it from other data collection methods. Unlike some other data leakage attacks, the attacker is watching and reading specific data channels. This is in contrast to assaults that gather more qualitative data, such as communications volume, which is not clearly communicated through a data stream.

## **1.5.Data Modification:**

To ensure that data cannot be changed or seen while in transit, communications must be considered secret. Data may be tampered with as it travels between locations in a distributed environment, allowing a hostile third party to commit a computer crime [4]. An unauthorized entity on the network intercepts data in transit and changes portions of it before retransmitting it in a data modification attack. Changing the monetary amount of a financial transaction from is an example of this. A complete set of valid data is repeatedly inserted into the network in a replay attack. Account bank transfer transaction, for example, may be performed[5].

## **1.6.Potential Economic Impact:**

In over million people in the United States were victims of cybercrime, according the Norton Cybercrime Report. These illegal actions resulted in direct financial losses of billion. Further investigation into this growing problem revealed that percent of people who are online had been victims of cybercrime, with million victims each day. Many individuals believe that cybercrime is an inevitable part of doing business online. Because today's consumer is so reliant on



computers, networks, and the information they store and maintain, the danger of becoming a victim of cyber-crime is quite high. Per some previous studies, as much as of the companies questioned admitted financial losses as a result of computer intrusions. The entire quantity affected was estimated to be. Almost ten percent of respondents said they had been the victims of financial fraud.

Every week, we learn of new cyber-attacks against computer systems' confidentiality, integrity, and availability. Theft of personally identifiable information to denial-of-service attacks are all possibilities. As the economy is becoming more reliant on the internet, it becomes much more vulnerable to cyber-criminals' threats. Stocks are exchanged over the internet, bank transactions are completed over the internet, and credit card purchases are done over the internet. All instances of fraud in such transactions have a negative effect on the financial condition of the affected company and, as a result, the economy. One of the major consequences may be the disruption of worldwide financial markets, which is a significant worry. The contemporary economy is multi-national and multi-time zone. Because the interconnectedness of the global economic system, a disruption in one part of the globe will have repercussions in other parts. As a result, any disruption of these systems would have consequences outside of the market, which is the root of the issue[6].

## **1.7.Impact on Market Value:**

Firms deciding where to invest their information security budget, as well as insurance companies offering cyber-risk policies, are interested in the economic effect of security breaches. For instance, a decision in favor of Ingram Micro held that "physical damage" does not only mean "physical destruction or injury to computer hardware," but also "loss of use and functionality. As many businesses depend on information technology in general, and the Internet in particular, this new and evolving perspective of harm becomes even more essential. Many insurance companies may be forced to compensate businesses for damages caused by hacker attacks and other security breaches as a consequence of this precedent. Companies constantly evaluate their IS environment for risks as the features of security breaches evolve. In the past, CIOs have used FUD.to convince top management to invest in IS security.

Some insurance firms have recently developed actuarial formulas that they think can be used to calculate damages from computer outages and hacker assaults. However, these estimates are suspect, owing to a scarcity of past data. Per some industry insiders, the prices for such programs are mostly determined by guesswork. These insurance products are so new, the: Are we charging the appropriate premium for the exposure? Says. Industry experts point to the need for better return on security investment. Studies, which could be used by insurance companies to create "hacking insurance" with adjustable rates based on the level of security employed in the organization.as well as by the organization to justify investments in security prevention strategies. A comprehensive assessment of every element of the IS environment may be too expensive and impractical depending on the size of the company. IS risk assessment is a method for identifying security risks and assessing their severity. Risk assessment is the process of deciding which controls to use based on the likelihood of loss. Risk assessment in information security addresses the issues of what the effect of an information security breach will be and how much it will cost the company. Assessing the financial loss from a possible IS security breach, on the other hand, is a difficult step in the risk assessment process for several reasons[7].

### **1.8. Impact On Consumer Trust:**

Because cyber-attackers intrude into other folk's space and attempt to disrupt the logic of the website, the end user who visits the page in question will be dissatisfied and discouraged from using the site in the long run. The site in issue has been labeled as fake, but the criminal masterminding the hidden attack has gone unnoticed. This causes the consumer to lose faith in the website in general, as well as in the internet and its abilities. Over of online shoppers identified security as a top concern when conducting business over the Internet, according to studies sponsored by the Better Business Bureau Online. When prompted for their credit card details, over of online shoppers abandon the purchase. The idea that the Internet is riddled with credit card theft and security risks is gathering steam. This has been a significant issue for e-commerce. To make the matter worse, consumer perceptions of fraud make the situation seem to be worse than it is. Consumer impression is just as potent - and just as harmful - as reality. As a result, many online consumers are hesitant to conduct business due to worries about fraud. A shopper is reluctant to conduct business because they are concerned about an e-reputation enterprises in terms of being dangerous or cluttered. Even the tiniest hint of a security issue or sloppy business practices jeopardizes potential revenue.

### **1.9. Areas Ripe for Exploitation: National Security:**

The majority of countries' modern militaries rely heavily on sophisticated computers. Information warfare, or IW, which includes network assault, exploitation, and defense, isn't a new national security threat, but it has taken on more importance after. IW is attractive because it may be low-cost, highly effective, and give the attacker with denial. It also has the ability to quickly spread malware, causing networks to collapse and spreading false information. Because the focus is on non-information warfare, information warfare is ripe for study. The Internet has garbage and effective security systems. When attackers come across systems that are simple to get into, they just hack them. Terrorists and criminals plan and carry out their criminal activities using information technology. The rise of crime and terrorism has been helped by increased international contact and widespread use of information systems. People no longer need to be in the same country to organize such crime thanks to improved communication technology. As a result, terrorists and criminals may exploit security flaws in the system and operate from odd locations rather than their home nation. The bulk of these crimes have been committed in poor nations. These security hacks are fueled by the widespread corruption in these nations. The internet has aided in the funding of such crimes via fraudulent money transfers, money transfers, and other methods. These criminal operations are being helped by advances in encryption technology.

### **1.10. Future Trends:**

One of the most urgent worries is what would happen if key systems in government, businesses, and financial firms were hacked. This may result in malware infecting key systems, resulting in data loss, abuse, or even the death of the systems. Due to the ease in which criminal groups may communicate through the internet, they may merge and collaborate much more than they do now. It is thought that increased mobility would make it easier for money and individuals to move around. Money laundering is becoming increasingly common on the internet. The possibilities for money laundering via over-invoicing and under-invoicing are expected to increase as the Internet becomes the medium through where more and more international

commerce takes place. Online auctions provide comparable possibilities to transfer money by making apparently legal purchases for much more than the items are worth. Online gambling also allows for the transfer of funds, particularly to offshore financial hubs.

It will be simpler to join criminal groups through the internet than it was before. Secret messages may easily be sent to a big group of people via the internet without being noticed. Because many information technology firms are privately held, the emphasis would be on providing customer satisfaction instead of worrying about international crime. Furthermore, valid civil freedoms may be used to argue that information technology should not be monitored. All of these factors make dealing with cybercrime more challenging. The following text highlights some of the future trends anticipated by Stephen Northcutt & Friends. Social Engineering has been improved. The coming age will be marked by attacks. Attackers will increasingly employ social engineering approaches to get beyond technical security measures, fine-tuning their methods to take full advantage of inherent human tendencies.

Because social engineering allows foreign attackers to rapidly acquire an inside vantage despite conventional perimeter security measures, we will be closer to blurring the boundary between internally and externally threat agents. Cyber criminals will use social media as a platform. More businesses will make social media a central part of their marketing plan. They will struggle to strike a balance between the necessity to be engaged in online social communities and the compliance and legal risks that such activities entail. Similarly, businesses will struggle to manage its users' online social networking activities. Attackers will continue to scam individuals and organizations by taking advantage of a still knowledge of online social safety measures. Security providers will promote their solutions as addressing all of these issues; some will stand out by allowing organizations to manage and monitor on-line social networking activity at a granular level while being aware of users' privacy expectations[8].

## 2. DISCUSSION

Cybercrime is defined as criminal activity using a digital, a network node, or a device on the network. Most, but not all, cybercrime is perpetrated by profit-driven cybercriminals or hackers. Individuals or groups can commit cybercrime. File a report with the Cyber Crimes View Of customer at [www.ic3.gov](http://www.ic3.gov) if you have been a victim of online crime. The Federal Bureau of Investigation, as well as the National White Collar Crime Center have teamed up to form IC3. Report fraud, waste, or abuse to the Social Security System at <http://oig.ssa.gov/report-fraud-waste-or-abuse>. Apps should be downloaded from reputable sources. Maintain the most recent system updates for your applications and operating system. To avoid potential attacks on outdated software, turn on automatic upgrades. Back up all of your critical information on a daily basis and save it elsewhere. Cybercrime is a more complex world. There are far too many cyber-attacks and enough law enforcement resources to keep up with the crime. There are jurisdictional borders that prohibit offenders from being prosecuted, which further confuses the situation. Who are they, exactly? Individuals or small groups commit the majority of cybercrime. Large organized crime groups, on the other side, use the Internet. These "professional" criminals invent new methods to perpetrate old crimes, considering cybercrime as a business and forming international criminal networks[9].

## 3. CONCLUSION

This manuscript focuses not only on the understanding of cybercrime, but also on the consequences at all levels of society. This will assist the community in protecting any online information vital organizations that are vulnerable to cybercrime. Understanding the behavior of cyber criminals and the effects of cybercrime on society will aid in deciding the proper methods to address the issue. The methods for combating these crimes may be divided into three categories: cyberlaws, education, and policymaking. In many nations, all of the above methods for coping with cybercrime are either inefficient or quasi. This lack of effort necessitates either improving current work or establishing paradigms for preventing cyber[10].

## REFERENCES:

1. V. K. Gandhi, "An overview study on Cyber Crimes in Internet," *J. Inf. Eng. Appl.*, 2012.
2. A. Bendovschi, "Cyber-Attacks – Trends, Patterns and Security Countermeasures," *Procedia Econ. Financ.*, 2015, doi: 10.1016/s2212-5671(15)01077-1.
3. N. Jain and V. Srivastava, "Cyber Crime Changing Everything – an Empirical Study," *Int. J. Comput. Appl.*, 2014.
4. R. Etges and E. Sutcliffe, "An overview of transnational organized cyber crime," *Curr. Issues Lang. Plan.*, 2010, doi: 10.1080/15567281.2010.536731.
5. R. Etges and E. Sutcliffe, "An overview of transnational organized cyber crime," *Inf. Secur. J.*, 2008, doi: 10.1080/19393550802036631.
6. "Cyber Crime: Critical View," *Int. J. Sci. Res.*, 2016, doi: 10.21275/v5i1.nov152579.
7. J. Raiyn, "A survey of cyber attack detection strategies," *Int. J. Secur. its Appl.*, 2014, doi: 10.14257/ijasia.2014.8.1.23.
8. M. Tubake, "Cyber Crimes : An Overview," *Online Int. Interdiscip. Res. J.*, 2013.
9. I. Frank and E. Odunayo, "Approach to cyber security issues in nigeria: Challenges and solution," *Int. J. Cogn. Res. Sci. Eng. Educ.*, 2013.
10. Y. A. Makeri, "Cyber Security Issues in Nigeria and Challenges," *Int. J. Adv. Res. Comput. Sci. Softw. Eng.*, 2017, doi: 10.23956/ijarcsse/v6i12/01204.

## A REVIEW OF HUMAN RIGHT EVALUATION

**Dal Chandra\***

\*Assistant Professor,  
Department of Law & Legal Studies,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- dcgautambahjoi@yahoo.co.in

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### ABSTRACT

*In 1945, a new global order emerged from the ashes of World War II, with the United Nations' main goals being respect for human rights, as well as peace, security, and development. The 1948 Un Convention on The Rights established a foundation for a number of international human rights treaties. Currently, these conventions have an impact on virtually all national law. Human Rights and Fundamental Freedoms are generally acknowledged as a birthright of every human being. The study's primary goal is to look at the evolution of Human Rights throughout history and to examine philosophical thought. As a qualitative paper, data was gathered from various articles, books, and related materials about Human Rights in order to perform this research. Human rights are a collection of rules that regulate how governments and non-state entities treat people and groups based on ethical ideas about what society deems essential to a decent existence. These standards are integrated into national and international legal systems, which include methods and procedures for holding duty-bearers responsible and providing remedy to accused human rights violators.*

**KEYWORDS:** *Ethical Concerns, Fundamental Rights, Global War, Human Rights.*

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### 1. INTRODUCTION

As the Second Global War seemed to be coming to an end, world leaders began making plans to end war and establish a lasting peace. One of the methods for achieving this goal was to promote universal respect for and observance of human rights and basic freedoms for all people without regard to race, sex, language, or religion. The Universal Declaration of Human Rights was approved and proclaimed by the United Nations General Assembly on December 10, 1948. For the first time, the Declaration established a universal standard of human rights that applied to all peoples and countries without distinction.

Human Rights are primarily inherent and natural rights, and enforcing, maintaining, or enjoying them is simply impossible. It is also true that human progress is impossible without respect for human rights. Every country adheres to the International Covenant on Civil and Political Rights in this respect. In this regard, Bangladesh created a National Human Rights Commission in 2009 to safeguard its people' human rights.

### 1.1. Human Rights Concepts:

People want or desire rights in order to further their own development. People cannot live with dignity unless they have some fundamental rights. "Rights are what we may expect from others, and others from us, and all real rights are social welfare conditions," Hobbhouse argues. While translating the French Declaration of Man and Citizen from French to English, Thomas Paine, a Frenchman, coined the phrase "Human Rights." Unfortunately, he was arrested. Human Rights are the fundamental principles without which no one may live in dignity. The right to life and liberty, freedom of opinion and expression, and equality before the law are among the fundamental rights and freedoms to which all people are entitled. Treating someone as though she or he were not a human being is to violate their human right. These are a small number of inherent rights that cannot be refused but are not protected by statute. The state has a responsibility to promote and defend human rights.

The Lexicon of the Future The phrase "Human Rights" is defined as "the right to be free from Governmental breaches of the integrity of people" by Webster's Dictionary of the English language. "Human Rights" are defined as "a person's right to life, liberty, equality, and dignity as guaranteed by the People's Republic of Bangladesh's constitution and other Human Rights documents ratified by the People's Republic of Bangladesh and enforceable by Bangladesh's existing laws" (National Human Rights Commission Act, 2009 Section 2) [1], [2].

Human rights are a collection of interconnected, comprehensive, and diverse rights. The following categorization is based on the 1948 Universal Declaration of Human Rights:

1. Civil and political rights; also known as fundamental rights; guaranteed by Bangladesh Constitution Article (27-44) section (III).
2. Part (II) Article (8-25) of the Bangladesh constitution does not guarantee economic, social, or cultural rights.
3. Rights to solidarity, i.e. the right to develop and the second is the right to self-determination.

There are a total of 27 human rights, 25 of which are defined by the Universal Declaration of Human Rights, 1948, and the other two by the Declaration on the Granting of Independence to Colonial Countries and Peoples (DGICCP) and the Declaration on the Right to Development, respectively (DRD)[3], [4].

Human Rights are distinguished from other rights by their obvious features. The following are the distinguishing characteristics:

1. **Inherent:** One of the most distinguishing features of Human Rights is that they are inherent and natural. Nobody gets it because of a unique quality of reputation. It is neither a person's nor a societal system's generosity. These are rights that every man is born with.
2. **Non-Transferable:** Human rights cannot be given, traded, or transferred. It is excessive for everyone. It couldn't be given away or stolen, and it couldn't be taken away by grabbing.
3. **Universality:** The fundamental value of human rights is universality. All of the rights and freedoms outlined in this Declaration are guaranteed to everyone.



4. **Equal Opportunity:** Human rights relate to everyone having equal access to opportunities and resources. Human Rights is based on the principles of justice, the rule of law, and nondiscrimination.
5. **Feasibility:** One of Human Rights' most significant qualities is its feasibility or efficacy. As a result, Human Rights must never be considered a theoretical or abstract notion. Social values, customs, culture, and institutions all influence it.

## **1.2. Differences between Human and Fundamental Rights:**

### **1.2.1. Issues of Definition**

Human Rights are the fundamental principles without which individuals cannot live in dignity. Individuals have intrinsic human rights. Fundamental Rights: The rights or human rights protected by the constitution are known as fundamental rights. Human Rights are all basic rights, however not all human rights are fundamental rights. Human rights are concerned with all people throughout the globe, while basic rights are concerned with the relationship between a state and its inhabitants[5], [6].

### **1.2.2. The Total Number of Human and Fundamental Rights:**

There are 25 human rights listed in the 1948 Universal Declaration of Human Rights (Civil and Political Rights-19 and Economic, Social and Cultural Rights-06). There are also two types of Human Rights called Solidarity Rights. One right, according to DGICCP, is self-determination, while another, according to DRD, is self-development. As a result, there are a total of 27 Human Rights. Fundamental rights, on the other hand, do not have a fixed number. It differs from one nation to the next. It is dependent on a state's political and economic situation.

### **1.3 Human Rights as Ethical Concerns:**

Human rights share an ethics issue for fair treatment, which is based on compassion or selflessness in human conduct and philosophical notions of justice. Amartya Sen, a philosopher and economist, believes that "Human rights may be viewed as essentially ethical obligations. There is an implicit assumption in making declarations on human rights, as with other ethical assertions that require acceptance, that the fundamental ethical arguments will withstand open and knowledgeable scrutiny." Although in law, a "right" refers to any privilege guaranteed by the constitution, the moral validity or morality of which may be distinct from its legal position as an entitlement, the phrase "human rights" is frequently used interchangeably with the broader notion of "rights" in moral reasoning. Natural law, legal framework, justice as fairness, consequentialism, and other theories of justice may all be used to support the moral foundation of a right. A right is regarded as an entitlement of people in all of these philosophical traditions, whether by virtue of being human or because they are members of a political society (citizens). However, in law, a right is any legally protected interest, regardless of the social impact of the right's enforcement on the well-being of anyone other than the right-holder (e.g., the property right of a landlord to evict a tenant, the right of a business to earn profits).

To avoid misunderstanding, the term "human right" or its equivalent ("fundamental right," "basic freedom," "constitutional right") should be used to refer to a higher order right that is authoritatively defined and carries the expectation that it has a preemptory character and thus prevails over other (ordinary) rights and reflects the fundamental values of the society adopting

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it. What one is prepared to accept as a legitimate human right is determined by ethical and religious principles. Like principles are often cited in discussions over contemporary problems such as abortion, same-sex marriage, the death penalty, and migration, just as they were in the past when it came to slavery and inequalities based on class, gender, or race. The importance of the person was inferred by Enlightenment thinkers from their ideas of the condition of nature. Social contractarians, particularly Jean-Jacques Rousseau, based the state's power on its ability to maximize the enjoyment of natural rights, or rights that are inherent in every person regardless of birth or position. "It is clearly opposed to the rule of nature," he said in *Essay on the Origin of Inequality Among Men*. [7]

#### **1.4 Universal Declaration of Human Rights, 1948:**

The United Nations General Assembly established the Universal Declaration of Human Rights (UDHR) in 1948, largely in reaction to the savagery of World War II. The UDHR encourages member countries to pursue a variety of human, civil, economic, and social rights, claiming that these rights form the "basis of global freedom, justice, and peace." Members of the Human Rights Commission, chaired by Eleanor Roosevelt, started discussing an International Bill of Rights in 1947, and the UDHR was born. The members of the Commission couldn't agree on what such a bill of rights should look like or how it could be implemented right away. The Commission went on to draft the UDHR and related accords, but the UDHR rapidly rose to the top of the priority list. John Humphrey, a Canadian legal professor, and Rene Cassin, a French lawyer, were in charge of most of the cross-national research and the document's structure, respectively, where the declaration's articles were interpretive of the preamble's basic concept. Cassin organized the document so that the first two articles contained the basic principles of dignity, liberty, equality, and brotherhood, followed by articles on individual rights, individual rights in relation to one another, and group rights, spiritual, public, and political rights, and economic, social, and cultural rights. According to Cassin, the last three articles put rights in the context of limitations, responsibilities, and the social and political order in which they are to be fulfilled. As stated in the third clause of the preamble, Humphrey and Cassin intended for the UDHR's rights to be legally enforceable in some way [8], [9].

A group of international human rights specialists, comprising members from all continents and all major faiths, studied and wrote parts of the UDHR, relying on consultations with luminaries such as Mahatma Gandhi. The idea that fundamental human rights are indivisible and that the many kinds of rights mentioned are intrinsically connected led to the inclusion of both civil and political rights as well as economic, social, and cultural rights. Despite the fact that no member state objected to this concept at the time of adoption (the declaration was approved unanimously, with the exception of the Soviet bloc, Apartheid South Africa, and Saudi Arabia), it was subsequently challenged.

A preamble and 30 articles make up the Universal Declaration of Human Rights, which lays forth fundamental human rights without discrimination. The Declaration included broad definitions for the following two kinds of rights:

1. Civil and Political Rights, as defined in Articles 3 to 21, include the right to life, freedom, nationality, property ownership, freedom of speech, thinking, conscience, and religion, and the right to participate in government.

2. Articles 22 to 28 recognize economic, social, and cultural rights. Some of them include the right to social security, education, participation in communal cultural life, enjoyment of the arts, and participation in scientific progress and its advantages, among others.

It's noteworthy that the UDHR is not a convention nor a treaty, but rather a statement with no legal effect. Despite this, after 1948, this statement had a significant impact on the adoption of numerous international and regional treaties, covenants, constitutions, and legislation. As a result, the International Bill of Human Rights is a watershed moment in human rights history, a genuine Magna Carta signaling humanity's arrival at a critical turning point: the conscious acquisition of human dignity[10], [11].

## 2. DISCUSSION

Human rights are essential rights that are necessary for a person's growth and without which he or she cannot live a dignified existence. The Indian Constitution safeguards people's basic rights, often known as human rights. Provisions for this are established not only in the Articles of the Constitution, but also in the Preamble, which mentions essential freedoms and the preservation of individual dignity. The Indian judiciary has even loosened the rule of locality when it comes to human rights protection, paving the door for the creation of the idea of Public Interest Litigation. Various instances of human rights violations have been brought before the courts via public interest litigation. Women's, worker's, children's, and prisoner's rights were all protected by the courts. As a result, the court serves as a rescuer of people's human rights, allowing each person to live in dignity. Protection of human rights is a major concern throughout the globe. Various international instruments have been enacted to safeguard human rights, and national efforts have been undertaken based on the terms of the international instruments, such as the enactment of the Protection of Human Rights Act 1993. The Act provides for the creation of the National Human Rights Commission as well as State Human Rights Commissions in different States, as well as the construction of Human Rights Courts at the district level, so that victims of human rights violations may get justice at all levels. The Indian Constitution offers protections for the preservation of human rights; nevertheless, the government of India has passed the 'Protection of Human Rights Act, 1993', which provides for the effective execution of human rights. The National Human Rights Commission and the State Human Rights Commission were established.

Human Rights Commissions in different states, as well as district Human Rights Courts, The Indian judiciary is likewise striving to safeguard the people of India's human rights. as well as providing prompt redress to victims of human rights violations. Despite this,

Due to the government's efforts, the desired outcomes have yet to be realized for the following reasons:

1. The Indian Constitution enumerates several rights, but there are many more. A large number of individuals who are unaware of the rights provided by the constitution due to their precarious living circumstances and daily fight for existence, they have a constitution. These are the individuals who are most often the victims of human rights violations, yet they are also the most vulnerable. They are too preoccupied with their daily salaries to consider going to court. Instead of safeguarding their fundamental human rights.

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2. Despite the fact that the State's responsibilities are entrenched in Part IV of the Constitution, i.e. Principles of State Policy for enacting laws and working for the people's welfare while certain directive principles are not enforced by India in many areas Courts, and one cannot go to court if the government does not execute the law.

The establishment of a state human rights tribunal and human rights courts is not required by the state government. "A State Government may establish a body to be known as (name of the State) Human Rights Commission to exercise the powers bestowed on, and to execute the duties assigned to, the State Commission under this chapter," according to Sections 21. "For the purpose of providing speedy trial of offences arising out of violations of human rights, the State Government may, with the concurrence of the Chief Justice of the High Court, specify for each district a Court of Session to be a Human Rights Court to try the said offences, by notification," according to Section 30.

### 3. CONCLUSION

The preceding discussion gives an impression that natural Human Rights had to pass a long way to obtain the legal and international recognition. Universal Declaration of Human Rights created the stream of worldwide efforts and international co-operations for assuring human rights. Though Human Rights have a universal figure, it's scope and periphery differ because of different socio-economic and political structure of various countries. In a well-developed social system of Europe or America, right to freedom of thought or freedom of opinion can be regarded as the most important human rights whereas relief from poverty or ignorance is the standard of rights in a poor, developing country of the Third world. However, Bangladesh has recognized UDHR and the components of basic human rights have been enshrined in the constitution. But the widespread poverty, illiteracy, malnutrition, want of social security and abuse of rights simply point out the fact that issues on human rights are confined still in the holy pages of the Constitution. The scenario in the arena of Human rights in other developing or underdeveloped countries is more or less identical to that of Bangladesh. It is therefore implied that the political leaders, thinkers, economists, scientists, social workers and philanthropist must do something meaningful to ensure human rights around the globe and in case of failure in this regard the world will never be a happy abode for human beings.

### REFERENCES:

1. A. M. Eyng, T. Pacievtch, M. D. L. D. P. K. D'Almeida, and M. L. Gisi, "Evaluation and human rights educational policies: Contradictions between regulation and emancipation in basic education in Brazil," *Ensaio*, 2016, doi: 10.1590/S0104-40362016000300007.
2. M. Kamruzzaman and S. K. Das, "The Evaluation of Human Rights: An Overview in Historical Perspective," *Am. J. Serv. Sci. Manag.*, 2016.
3. I. A. N. Gorvin, "Producing the Evidence that human rights advocacy works: First steps towards systematized evaluation at human rights watch," *Journal of Human Rights Practice*. 2009, doi: 10.1093/jhuman/hup022.
4. J. Činčera, J. Skalík, and B. Binka, "One world in schools: an evaluation of the human rights education programme in the Republic of Georgia," *Cambridge J. Educ.*, 2018, doi: 10.1080/0305764X.2018.1427216.

5. E. Eryazıcıoğlu, "An Evaluation Model For A Human Rights-Based Cultural Heritage System," *MEGARON / Yıldız Tech. Univ. Fac. Archit. E-Journal*, 2018, doi: 10.5505/megaron.2018.57441.
6. C. C. Barber, "Tackling the evaluation challenge in human rights: Assessing the impact of strategic litigation organisations," *Int. J. Hum. Rights*, 2012, doi: 10.1080/13642987.2011.566723.
7. L. Guendel, "Evaluation, public policies, and human rights," *New Dir. Eval.*, 2012, doi: 10.1002/ev.20016.
8. I. McLean, "Human Rights," in *What's Wrong with the British Constitution?*, 2010.
9. A. Buchanan, "Human Rights," in *The Oxford Handbook of Political Philosophy*, 2012.
10. C. A. Florencio, "Human rights in nutrition and nutrition in human rights," *Food Policy*. 1996, doi: 10.1016/0306-9192(95)00054-2.
11. G. De Beco, "Human Rights Indicators for Assessing State Compliance with International Human Rights," *Nord. J. Int. Law*, 2008, doi: 10.1163/090273508X290681.

## A REVIEW PAPER ON AEROBIC AND ANAEROBIC BIODEGRADATION

**Navneet Kumar\***

\*Professor,  
Department of Medical Lab Technology,  
Faculty of Medical Allied Sciences,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- navneetbiochem@yahoo.co.in

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### **ABSTRACT**

*Biodegradation, whether aerobic or anaerobic, is a method for cleaving large molecules from a mosaic of chemicals and materials in a series of steps, with some of the smaller molecules being valorized as a pollution abatement strategy and a source of energy through biogas generation. Biogas may be made from virtually any kind of biomass, including main agricultural sectors and different organic waste streams, which can be used as a sustainable energy source. Animal dung that has not been properly handled or managed is a significant cause of pollution in the air and water. Some of the most serious concerns include nutrient leakage, particularly of nitrogen and phosphorus, as well as ammonia evaporation and microbial contamination. The animal manufacturing is responsible for 18 percent of total CO<sub>2</sub> equivalent emissions and 37 percent of atmospheric methane, which has 23 times the global temperature potential of CO<sub>2</sub>. Furthermore, the global animal production sector is responsible for 65 percent of human activity nitrous oxide and 64 percent of anthropogenic ammonia emissions.*

**KEYWORDS:** *Aerobic, Anaerobic, Biodegradation, Biogas, Chemical.*

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### **1. INTRODUCTION**

#### **1.1. Biodegradation In Aerobic Conditions:**

Many bacteria thrive in aerobic environments. Aerobes use oxygen to oxidize substrates like carbohydrates and fats to generate energy, which is referred to as the cellular respiration process (CSP). Glucose molecules are digested into smaller molecules in the cell of the aerobes prior to the start of CSP. The smaller molecules are subsequently transported to a mitochondrion, which is where aerobic respiration occurs. Small entities are broken down into water and carbon dioxide with the release of energy using oxygen. Unlike anaerobic degradation, aerobic degradation does not generate unpleasant gases. In most instances, the aerobic process results in a more thorough digestion of solid waste, which reduces build-up by more than 50%. Oxidation and reduction catalyzed by oxygenases and peroxidases are the most important enzyme processes in aerobic biodegradation. Oxygenases are oxido-reductases that incorporate oxygen into the substrate. Oxygen is required by degradative organisms at two metabolic sites: the first assault



on the substrate and the end of the respiratory chain. Higher fungi have a unique oxidative mechanism based on injectable ligninolytic superoxide dismutase and laccases for lignin breakdown. The co-metabolic breakdown of persistent organic pollutants relies on this enzymatic system. The bacteria that dominate contaminated soils come from a variety of genera and species[1]–[4].

Mineral oil components and halogenated petrochemicals are the two most significant groups of organic contaminants in the environment, and aerobic microorganisms' biodegradation capabilities are critical. Petroleum hydrocarbons, chlorinated aliphatics, benzene, toluene, phenol, naphthalene, fluorine, pyrene, chloroanilines, pentachlorophenol, and dichlorobenzenes are among the contaminants that degrade most quickly and completely under aerobic circumstances. Many bacteria cultures can thrive on these compounds and produce enzymes that breakdown them into non-toxic forms. Metalobic reactions are among the most important characteristics of aerobic bacteria that degrade organic contaminants. The chemicals must be available to the organisms that are degrading them. Hydrocarbons, for example, are immiscible in water and need the formation of microbes in order to be biodegraded effectively[5]–[7]. Because the first intracellular assault of organic contaminants is an oxidative process, the primary enzymatic reaction mediated by oxygenases and peroxidases is the activation and incorporation of oxygen. Organic pollutants are converted into intermediates of central glycolytic pathway, such as the tricarboxylic acid cycle, via peripheral degradation mechanisms. Cell biomass must be biosynthesised from the key precursor metabolites (acetyl-CoA, succinate, and pyruvate). Gluconeogenesis produces the sugars required for different biosynthetic processes and growth. Chemo-organotropic organisms that can utilize a wide range of natural and xenobiotic chemicals as carbon sources and electron donors for energy production are the most common degraders of organo-pollutants in the oxic zone of polluted regions. Despite the fact that numerous bacteria can metabolize organic pollutants, no one bacterium has the enzymatic capacity to digest all or even most of the environmental contaminants in a heterogeneous mixture coming from specific sectors. Mixed microbial communities, therefore, have the greatest biodegradative potential. To create a system that might be utilized on an industrial scale to breakdown the complex combinations of organic chemicals found in polluted regions, genetic information from many organisms is required. The pace and degree of deterioration are governed by genetic potential and certain environmental variables like as temperature, pH, and available nitrogen and phosphorus sources[8].

## **1.2. Biodegradation In Anaerobic Conditions:**

Due to the significant energy recovery associated with the process and its low environmental impact, anaerobic digestion is often the most cost-effective biological treatment. When anaerobic bacteria outnumber aerobic microbes, anaerobic biodegradation takes place. The ultimate electron acceptor or reactant in this case is not oxygen. Electrons derived from the oxidation of organic molecules decrease manganese and iron ions, as well as chemicals such as sulfur, sulfate, nitrate, carbon dioxide, certain organic intermediates, and contaminants. The biodegradable trash in landfills is a typical example of anaerobic processes. Over extended periods of time, paper and other materials deteriorate more slowly. Biogas produced by anaerobic digestion is mostly methane, which may be collected effectively and utilized for environmentally beneficial power production, as shown on a larger scale. Anaerobic digestion is commonly utilized to treat wastewater sludge and biodegradable garbage as part of an integrated waste management system

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since it reduces the volume and bulk of the input material. It lowers landfill gas emissions into the environment. Anaerobic digestion is a sustainable energy source since it generates methane and CO<sub>2</sub>-rich biogas that may be used to generate electricity, reducing the need for fossil fuels. Also, following digestion, the nutrient-rich solids may be utilized as fertilizer[9].

Hydrolysis, acidogenesis, acetogenesis, and methanogenesis are the four main biological and chemical stages of anaerobic digestion. The process starts with bacterial hydrolysis of organic materials, which breaks down insoluble organic polymers like carbohydrates, making them accessible to other bacteria. Sugars and amino acids are converted to carbon dioxide, hydrogen, ammonia, and organic acid by acetogenic bacteria. These compounds are subsequently converted to methane and carbon dioxide by methanogens[10].

### **1.3. Technological Advancements In Anaerobic Digestion:**

Anaerobic digestion's capability has been shown by thermophilic anaerobic digestion of manure and evaluation of biodegradability of macro pollutants. Anaerobic digestion is currently a common technique for stabilizing municipal wastewater treatment residuals. Staged anaerobic digestion, also known as phased or staged anaerobic digestion, is a relatively new technology for digestion facilities that includes four different reactor configurations: staged mesophilic digestion, temperature-phased digestion, acid/gas phased digestion, and staged thermophilic digestion. Multiple reactor digesting systems are known as phased or staged setups. A digestive system with two or more tanks, each with its own operating conditions, supports distinct biomass populations, which may be acid-forming, methane-forming, thermophilic, or mesophilic organism populations. Operational factors such as solids retention time (SRT) and temperature are used to ensure effective digestion. During each research phase, the temperature phased digestion system is shown to be superior to the other systems, with more volatile solids reduction (VSR), higher methane output, and lower residual biological activity.

Anaerobic digestion of solid waste is considered an established technique on an industrial scale. Around 60% of plants in Europe are said to operate in the mesophilic range (40 percent thermophilic), with capacity steadily increasing in most European nations over time. The amount of bio methane produced is highly dependent on the operating circumstances and the kind of substrate utilized. Industry is interested in the digestion of grey wastes or leftover refuse after source separation, and land filling and incineration are two options being explored. Anaerobic digestion, on the other hand, is a superior choice since it offers a number of benefits, including more flexibility, the potential of extra material recovery (up to 25%), and a more efficient and environmentally friendly energy recovery. The low-calorific organic fraction is digested, the high-calorific fraction is thermally treated, and the non-energy fractions are recovered and reused in this instance. This remaining waste is expected to be handled by anaerobic digestion.

Anaerobic digestion of the organic component of municipal solid waste is anticipated to have a very high development potential (OFMSW). Around 50 percent of MSW is land filled, with an organic component of around 30 percent (without considering paper and cardboard). This technology's growth potential is critical for reducing greenhouse gas emissions, as discussed at the Kyoto Summit. Furthermore, since the digested waste may be regarded fairly stable organic matter with a very slow turnover of many decades given appropriate soil conditions, anaerobic digestion should become a mainstream technique for the OFMSW. As a result, the natural CO<sub>2</sub> imbalance may be corrected by repairing or producing organically rich soil. An additional

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advantage is the elimination of CO<sub>2</sub>, which makes anaerobic digestion one of the most important technologies in this area. The breakdown of chlorinated chemicals requires more investigation, since anaerobic treatment holds considerable promise in this field.

Several novel nuclear power stations with greater flow rates, such as fluidized bed reactors, spread granular sludge bed (EGSB) reactors, and membrane bioreactors, have been used in various configurations, in which hydraulic retention times (HRT) are uncoupled from solids retention times (SRT), making anaerobic technology an affordable alternative to conventional wastewater treatment systems. Most often used are upflow anaerobic sludge blanket (UASB) reactors and/or similar systems, in which anaerobic organisms spontaneously form granular conglomerates, resulting in anaerobic sludge with an exceptionally low sludge volume index and excellent settling characteristics. Moreover, many large-scale biogas facilities have been constructed, which mix waste from agriculture, industry, and homes to create biogas as well as a liquid fertilizer that is re-circulated back onto agricultural land. The optimization of procedures for the combined removal of organic matter, sulphur, and nutrients has resulted from combining biogas with other biological or physico-chemical processes. Other methods for removing nitrogen and phosphorus (with oxic phase) are employed in combination with anaerobic digestion, which removes mostly carbon. These processes primarily utilize microorganisms and also physico-chemical processes. The ANANOX method uses sulphate reduction to sulphide to provide an electron donor for the denitrification process for the treatment of municipal wastewater. The use of the ANAMMOX method, which uses certain microorganisms that can oxidize ammonium to N<sub>2</sub> gas using nitrite as an electron acceptor, may improve the nitrogen cycle integration in anaerobic digestion.

#### **1.4. Industrial Organic Pollutants Biodegradation:**

Because many industrial chemicals are hazardous, resistant, and bioaccumulative in organisms, understanding the destiny of chemicals released in the environment, life cycle analyses, and the processes by which they degrade is critical for developing biodegradation systems.

##### **1.4.1. Volatile Organic Compounds (VOCs):**

VOCs fall into two categories, each of which is responsible for a significant amount of land and groundwater contamination:

- Petroleum hydrocarbons (PHCs) such as gasoline, diesel, and jet fuel.
- chlorinated hydrocarbon (CHC) solvents such as tetrachloroethylene, perchloroethylene (PCE), and degreasing solvents like trichloroethylene (TCE), 1,1,1-trichloroethane (TCA), and PCE.

PHCs decay quickly in an aerobic environment, while CHCs degrade considerably more slowly and in anaerobic circumstances. Aerobic biodegradation can typically restrict the concentration and subsurface movement of petroleum vapours in unsaturated soils because PHC biodegradation is particularly quick when oxygen is available. Furthermore, hazardous compounds like as dichloroethylene and vinyl chloride may be produced during CHC biodegradation, while petroleum breakdown typically generates carbon dioxide, water, and sometimes methane or other simple hydrocarbons. The density of the contaminant is the second major difference. PHC liquids are immiscible and lighter than water. PHCs may float on the groundwater surface (water table), while chlorinated solvents, which are heavier than water, sink

down to the aquifer's bottom. Because of the significant variations in biodegradability and density, the subsurface behavior is frequently quite different, reducing the risk of human exposure.

#### **1.4.1.1. Hydrocarbons from Petroleum (PHCs):**

Microorganisms capable of aerobically decomposing PHCs have been found in almost every subsurface soil environment. Effective aerobic biodegradation of PHCs requires sufficient oxygen and water in the soil to support sufficient populations of active microorganisms. These organisms will usually utilize accessible PHCs if oxygen is present. Furthermore, aerobic biodegradation of petroleum compounds may take place very rapidly, with half-lives as short as hours or days in certain cases. Some petroleum compounds may biodegrade under anaerobic circumstances; however, this process is minor and typically considerably slower than aerobic biodegradation above the water table, where oxygen is normally present in the soil zone. Aerobic biodegradation depletes oxygen while producing carbon dioxide and water. This results in a distinctive vertical concentration profile in the unsaturated zone, in which oxygen concentrations drop with depth while VOCs, such as PHCs and methane from anaerobic biodegradation, and carbon dioxide concentrations rise.

#### **1.4.1.2. Solvents Containing Chlorinated Hydrocarbons (CHC):**

During their manufacture and use as solvents in a variety of cleaning processes or as vehicles for solid slurries, chlorinated solvents such as tetrachloroethylene (TCE), 1,1,2,2-tetrachloroethane, carbon tetrachloride, and chloroform are released as waste products by spills, land-filling, and sewer discharge. TCE is a significant industrial contaminant. Under anaerobic circumstances, it is biodegraded via hydrogenolysis, which generates isomers of 1,2-dichloroethylene (1,2-DCE), vinyl chloride (VC), and ethylene. Ethane, methane, and carbon dioxide have also been reported as breakdown products by certain laboratories.

TCE and other chlorinated VOCs may be sensitive to co-metabolic oxidation by aerobic bacteria with wide substrate specificity oxygenases, in addition to anaerobic breakdown via reductive dechlorination (hydrogenolysis). Methanotrophs are aerobic bacteria that use methane monooxygenase (MMO) enzymes to mainly oxidize methane for energy and growth and convert TCE via co-metabolic oxidation. In contrast to reductive dechlorination, where the rate of degradation slows as the degree of chlorination of the aliphatic hydrocarbon decreases, less-chlorinated VOCs like 1,2-DCE and VC degrade more easily and quickly through aerobic oxidation reactions than higher chlorinated compounds like TCE. TCE is converted to its epoxide by methane-oxidizing bacteria, which subsequently breaks down in water to produce dichloroacetic acid, glyoxylic acid, or one-carbon molecules like formate or CO. The two carbon acids build in the aqueous phase, whereas methanotrophic bacteria oxidize formate and CO to CO<sub>2</sub>. As a result, combining anaerobic and aerobic degradation processes for chlorinated VOCs like TCE has been suggested as the best feasible bioremediation approach.

## **2. DISCUSSION**

The author has discussed about the aerobic and anaerobic biodegradation, the cellular respiration mechanism is how aerobes produce energy by oxidizing substrates like carbs and lipids with oxygen (CSP). Prior to the commencement of CSP, glucose molecules are digested into smaller molecules in the cell of the aerobes. After that, the smaller molecules are transferred to a

mitochondrion, which is where aerobic respiration takes place. With the release of energy from oxygen, little entities are broken down into water and carbon dioxide. Anaerobic biodegradation occurs when anaerobic bacteria outweigh aerobic microorganisms. In this instance, the final electron acceptor or reactant is not oxygen. Manganese and iron ions, as well as substances like sulfur, sulfate, nitrate, carbon dioxide, some organic intermediates, and pollutants, are all reduced by electrons generated from the oxidation of organic molecules. Anaerobic reactions are often seen in landfills with biodegradable waste. Paper and other materials degrade more slowly over time than other materials.

### 3. CONCLUSION

The author has discussed about the aerobic and anaerobic biodegradation, the most significant enzyme activities in aerobic biodegradation are oxidation and reduction catalyzed by oxygenases and peroxidases. Oxygenases are oxido-reductases that take oxygen from the environment and integrate it into the substrate. Degradative organisms need oxygen at two points in their metabolism: the initial attack on the substrate and the end of the respiratory chain. Higher fungi have a unique oxidative mechanism for lignin degradation based on injectable ligninolytic superoxide dismutase and laccases. Despite the fact that many bacteria can metabolize organic pollutants, no one bacterium has the enzymatic ability to digest all or even the majority of environmental toxins in a heterogeneous mixture originating from many industries. As a result, mixed microbial communities have the highest biodegradation potential. Genetic information from a variety of species is needed to develop a system that may be used on an industrial scale to break down the complex combinations of organic compounds present in contaminated areas.

### REFERENCES

1. D. G. Karpouzas and I. O. Giannakou, "Biodegradation and enhanced biodegradation: A reason for reduced biological efficacy of nematicides," *Russ. J. Nematol.*, 2002.
2. C. F. Han, A. F. Zheng, and D. P. Li, "Study on biodegradation of polyacrylamide," *Huanjing Kexue/Environmental Sci.*, 2006.
3. J. P. Eubeler, M. Bernhard, and T. P. Knepper, "Environmental biodegradation of synthetic polymers II. Biodegradation of different polymer groups," *TrAC - Trends in Analytical Chemistry*. 2010, doi: 10.1016/j.trac.2009.09.005.
4. C. I. Nair, K. Jayachandran, and S. Shashidhar, "Biodegradation of phenol," *African Journal of Biotechnology*. 2008, doi: 10.4018/978-1-5225-8903-7.ch045.
5. R. J. West and S. J. Gonsior, "Biodegradation of triethanolamine," in *Environmental Toxicology and Chemistry*, 1996, doi: 10.1897/1551-5028(1996)015<0472:BOT>2.3.CO;2.
6. N. Dai, F. J. Zhang, J. Chen, G. Li, Y. F. Deng, and S. Li, "Biodegradation of [omim][PF6]," *Huanjing Kexue/Environmental Sci.*, 2009.
7. C. A. Staples, C. G. Naylor, J. B. Williams, and W. E. Gledhill, "Ultimate biodegradation of alkylphenol ethoxylate surfactants and their biodegradation intermediates," *Environ. Toxicol. Chem.*, 2001, doi: 10.1002/etc.5620201108.
8. A. Zgoła-Grzeškowiak, T. Grzeškowiak, and A. Szymański, "Biodegradation of nonylphenol monopropoxyethoxylates," *J. Surfactants Deterg.*, 2015, doi: 10.1007/s11743-014-1652-8.

9. E. Jurado, M. Fernández-Serrano, J. Núñez-Olea, and M. Lechuga, "Aerobic biodegradation of a nonylphenol polyethoxylate and toxicity of the biodegradation metabolites," *Bull. Environ. Contam. Toxicol.*, 2009, doi: 10.1007/s00128-009-9716-6.
10. J. Yang, Y. L. Song, and X. Y. Qin, "Biodegradation of polyethylene," *Huanjing Kexue/Environmental Sci.*, 2007, doi: 10.1016/0306-3747(95)90387-9.



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## A REVIEW STUDY ON WHEY PROTEIN & ITS HEALTH BENEFITS

Upasana\*

\*Assistant Professor,  
Department of Agriculture Science,  
Faculty of Agriculture Science,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- upasana35954@gmail.com

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### ABSTRACT

*Whey, a component of milk, is co-product of cheese-making and casein production in the dairy industry. Nowadays, whey is regarded as a value-added component in many food items. Whey and whey components are regarded as value-added ingredients in baby formulae, sports nutrition meals and drinks, and other food items. Recognition of whey as a source of different biologically active chemicals with distinct physiological and functional characteristics offers possibilities for the food industry to create functional meals or foods that have potential health advantages. Whey-derived bioactive components have antimicrobial and antiviral properties, and enhance immune defense and bone health, and improve antioxidant activity, and help protect against cancer and cardiovascular disease, and enhance the performance of physically active individuals, among other benefits. The current review is an effort to address scientific elements of whey proteins' health advantages and criticize some of the major research results connected with them to date.*

**KEYWORDS:** Health, Milk, Nutrition, Health Benefit, Protein.

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### 1. INTRODUCTION

Drinking milk is a tradition that goes back to the domestication of animals in ancient times, and has taken advantage of the vast nutritional benefits of that natural product. However, one important component of milk-whey, has historically not been given as much attention as occurred with source milk, possibly because it is a by-product of cheese production, regarded for a long time as of little value. Interestingly, Hippocrates already applauded the health properties of whey in Ancient Greece; and during the Middle Age, whey was considered not only as a medicine, but also even as an aphrodisiac and a skin balm: it was in fact a regular component of salves and potions to soothe burns, to inspire vitality and to cure various illnesses. Moreover, whey protein, a great protein, is selected by people of all ages who appreciate the importance of a balanced diet in helping to maintain and enhance their health. Indeed, there are allusions to different health advantages of whey in Italian Literature going back to early 17th century[1]–[3].

Now we detail at whey protein system, we can see that whey protein, 20 percent of total milk protein, consists of several different proteins, including  $\beta$ -lactoglobulin ( $\beta$ -LG),  $\alpha$ -lactalbumin

( $\alpha$ -LA), the heavy-and light-chain immunoglobulins (Igs), bovine serum albumin (BSA), lactoferrin (LF), lacto peroxidase, and glycomacropeptide (GMP) (GMP). Whey may also contain the protease-peptone components and low-molecular weight compounds produced by the enzymatic breakdown of the caseins during the cheese manufacturing process. Whey protein includes all 20 amino acids and all nine essential amino acids, and it is a strong and balanced supply of the Sulphur amino acids that play a vital function as antioxidants as precursors to the powerful intracellular antioxidant glutathione and in one-carbon metabolism. It has three to four times more accessible cysteine than other proteins. Cysteine is essential for the production of glutathione, a tripeptide having antioxidant, anticarcinogen, and immuno stimulatory effects. It also plays a crucial function in the control of whole body protein metabolism, which results in changes in body composition. Leucine is a very essential component in tissue development and repair. Leucine, isoleucine, and valine are believed to have a function as metabolic regulators in protein and glucose homoeostasis and lipid metabolism, and play a role in weight regulation[4]–[7].

Currently, the biological activity of some of the small whey proteins and peptides that can be separated is being researched. Current evidence supporting the potential of whey proteins and peptides to provide health advantages beyond basic nutrition, that is to serve as functional foods/food components, comes from a variety of sources. Emerging research results mainly from in vitro, experimental animals and few human investigations indicate a variety of positive bioactivities of whey and whey components. Whey protein supplementation has numerous recognized advantages. Now, this review may allowed us to explain health advantages of whey proteins and it will concentrate on the most current study breakthroughs related to the biological characteristics of whey proteins to date[8]–[11].

### **1.1. Antimicrobial and Antiviral Activities:**

Milk proteins include numerous physiologically active proteins. Protein and peptides, in milk, particularly whey, show potential as antibacterial and antiviral modifiers. Whey includes many components which may defend against toxins, germs, and viruses. These components include Igs, LF and its peptide derivative, lactoferricin, lacto peroxidase, GMP and sphingolipids. Furthermore, antimicrobial peptides may be produced from whey protein by proteolysis during gastrointestinal transit. LF,  $\alpha$ -LA and  $\beta$ -LG have been tested for inhibitory action against human immunodeficiency virus type-1 (HIV-1) [18]. In particular,  $\beta$ -LG may be potential agents for inhibiting transmission of genital herpesvirus infections as well as the spread of HIV. LF and lactoferricin inhibit a wide variety of microorganisms including gram-negative bacteria, gram-positive bacteria, yeast, fungus and parasitic protozoa. It has been proven to prevent the development of certain dangerous foodborne pathogens such as E. coli and Listeria monocytogenes. LF also exhibits strong antiviral action against human immunodeficiency virus, human cytomegalovirus (HCMV), herpes viruses, human papillomavirus (HPV), alphavirus and hepatitis C, B and G viruses, among others. In addition, LF is effective against many non-enveloped viruses including rotavirus, enterovirus, poliovirus (PV), adenovirus and feline calicivirus (FCV) (FCV). It may increase the antibacterial activity of lysozyme. The antibacterial activity of LF is of particular relevance to intestinal function and in the prevention of gastroenteric disorders via regulation of intestinal microbiota.

While LF shows bactericidal action against pathogens such as coliforms, it also offers probiotic support for beneficial microorganisms such as Bifidobacteria and Helicobacter pylori is

recognized as the causal culprit in the majority of duodenal ulcers. It is thought to be responsible for 50 percent -60 percent of all stomach carcinomas. A number of studies have shown that daily treatment of LF favorably reduces intestinal colonization of *Helicobacter pylori* in infected individuals. Whey protein stimulates immune cell and/or inhibits infection. Whey protein shows potential to help fight rotavirus diarrhea, which is a prevalent illness that results in the death of over 500,000 children yearly. Recent research have revealed that whey protein ( $\alpha$ -LA) fed babies had no diarrhea. The natural antibacterial activity of lactoperoxidase is being utilized in a variety of oral healthcare products and is finding use in such items aimed at the prevention and treatment of xerostomia (dry mouth) (dry mouth). The lactoperoxidase containing products have been scientifically shown to suppress dangerous bacteria linked with gingivitis and oral irritation, to accelerate the healing of bleeding gums and decrease inflammation, and fight both the causes and consequences of halitosis (foul breath) (bad breath). In vitro, results have suggested that the whey-derived sphingolipids, sphingosine and lysosphingomyelin, have antibacterial action. Glutathione protects the cells against free radical damage during exercise. Also, it may possibly reduce infection in HIV affected youngsters. Whey protein may increase glutathione production. Oral whey protein supplementation improves glutathione levels in HIV affected youngsters. Whey protein concentrate supplementation may potentially reduce the incidence of related co-infections.

### **1.2.Immune Modulating Activity:**

Milk proteins include numerous physiologically active proteins. Protein and peptides, in milk, particularly whey, show potential as antibacterial and antiviral modifiers. Whey includes many components which may defend against toxins, germs, and viruses. These components include Igs, LF and its peptide derivative, lactoferrin, lacto peroxidase, GMP and sphingolipids. Furthermore, antimicrobial peptides may be produced from whey protein by proteolysis during gastrointestinal transit. LF,  $\alpha$ -LA and  $\beta$ -LG have been tested for inhibitory action against human immunodeficiency virus type-1 (HIV-1) [18]. In particular,  $\beta$ -LG may be potential agents for inhibiting transmission of genital herpesvirus infections as well as the spread of HIV. LF and lactoferrin inhibit a wide variety of microorganisms including gram-negative bacteria, gram-positive bacteria, yeast, fungus and parasitic protozoa [20]. It has been proven to prevent the development of certain dangerous foodborne pathogens such as *E. coli* and *Listeria monocytogenes*. LF also exhibits strong antiviral action against human immunodeficiency virus, human cytomegalovirus (HCMV), herpes viruses, human papillomavirus (HPV), alphavirus and hepatitis C, B and G viruses, among others. In addition, LF is effective against many non-enveloped viruses including rotavirus, enterovirus, poliovirus (PV), adenovirus and feline calicivirus (FCV) (FCV). It may increase the antibacterial activity of lysozyme.

The antibacterial activity of LF is of particular relevance to intestinal function and in the prevention of gastroenteric disorders via regulation of intestinal microbiota. While LF shows bactericidal action against pathogens such as coliforms, it also offers probiotic support for beneficial microorganisms such as *Bifidobacteria* and *Helicobacter pylori* is recognized as the causal culprit in the majority of duodenal ulcers. It is thought to be responsible for 50 percent -60 percent of all stomach carcinomas. A number of studies have shown that daily treatment of LF favorably reduces intestinal colonization of *Helicobacter pylori* in infected individuals. Whey protein stimulates immune cell and/or inhibits infection. Whey protein shows potential to help fight rotavirus diarrhea, which is a prevalent illness that results in the death of over 500,000

children yearly. Recent research have revealed that whey protein ( $\alpha$ -LA) fed babies had no diarrhea. The natural antibacterial activity of lactoperoxidase is being utilized in a variety of oral healthcare products and is finding use in such items aimed at the prevention and treatment of xerostomia (dry mouth) (dry mouth). The lactoperoxidase containing products have been scientifically shown to suppress dangerous bacteria linked with gingivitis and oral irritation, to accelerate the healing of bleeding gums and decrease inflammation, and fight both the causes and consequences of halitosis (foul breath) (bad breath). In vitro, results have suggested that the whey-derived sphingolipids, sphingosine and lysosphingomyelin, have antibacterial action. Glutathione protects the cells against free radical damage during exercise. Also, it may possibly reduce infection in HIV affected youngsters. Whey protein may increase glutathione production. Oral whey protein supplementation improves glutathione levels in HIV affected youngsters. Whey protein concentrate supplementation may potentially reduce the incidence of related co-infections.

Caseinophosphopeptides and GMP suppress growth of cariogenic bacteria. Glycomacropeptide inhibits streptococcus mutans. One research showed that the addition of certain immunoglobulins in a food product may prolong the shelf life of the product while it also helps in the prevention of dental caries and oral infections.

### **1.3.Cardiovascular Health:**

Whey proteins may enhance cardiovascular health. Milk peptides can reduce high blood pressure. Fermented milk with whey protein concentrate reduces triglyceride levels in the blood. Also, whey protein improves blood pressure and vascular function in overweight and obese people. Furthermore, LF was found to substantially prevent the formation of cellular cholesterol esters in macrophages by acting as a scavenger in a vitro investigation. Hydrolyzed whey protein isolate decreased blood pressure and cholesterol. Whey peptides have been demonstrated to decrease the action of ACE. ACE transforms the dormant angiotensin I hormone into angiotensin II which constricts vascular smooth muscle thus, raising blood pressure. Inhibition of ACE decreases blood pressure. 20 g dosage of hydrolyzed whey protein isolate lowers blood pressure and it raises white blood cell count. It also lowers low-density lipoprotein (LDL) cholesterol. Whey protein has anti-hypertensive properties.  $\beta$ -lactosin B from a commercial whey product is a novel anti-hypertensive peptide. They said that whey protein supplementation has the potential to be utilized as an additional component in dietary programs and in functional meals targeted in the treatment of the metabolic syndrome risk factors.

### **1.4.Physical Performance:**

Whey and whey components provide numerous advantages for people with physically active lives according to a study. Whey protein is a rich source of branched chain amino acids (BCAAs), having the highest known amounts of any natural dietary source. BCAAs are vital for athletes because unlike the other necessary amino acids, they are processed straight into muscle tissue and they are the first ones utilized during times of activity and resistance training. Whey protein supplies the body with BCAAs to replace reduced levels and start repairing and rebuilding lean muscle tissue. Essential amino acids and whey protein are equally efficient in boosting muscle protein synthesis in older people. These amino acids offer an energy supply during endurance exercise which enables athletes to train more intensely for longer periods of time. Moreover, whey protein is a great supplier of the important amino acid, leucine. Leucine is

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essential for athletes since it plays a critical function in increasing muscle protein synthesis and muscular development. Research has revealed that people who exercise benefit from diets rich in leucine and have more lean muscle tissue and less body fat compared to persons whose diet includes lower amounts of leucine. Whey protein is simple to digest protein and is effectively absorbed into the body. It is frequently referred to as a “fast” protein for its capacity to rapidly deliver nutrition to muscles. Indeed, its intake has been demonstrated to result in quicker muscle protein synthesis as compared to other proteins. This makes whey protein more efficient than other proteins for mending exercise-related muscle damage and developing larger, stronger muscles. Its intake leads in a greater peak amino acid concentration in the blood than other proteins. Whey proteins are rich in the amino acids, arginine and lysine, which may stimulate the production of growth hormone, a stimulator of muscle development. Whey protein cans creatine demonstrating an increase in lean muscle fiber adaptations.

### **1.5.Weight Management:**

Studies indicate that attaining and maintaining a healthy weight may add years to your life and help avoid weight related problems, including diabetes, cancer and heart disease. Diet plays a vital part in any weight control program and adding whey protein frequently helps make a favorable impact. Whey protein is an excellent option for diabetics who need to carefully control food consumption. It has promise as an additional component in dietary programs and in functional foods targeted at control of hunger and body weight and in the management of the metabolic effects of excess body fat. It shows promise as physiologically useful dietary component for people with obesity and associated co-morbidities (hypertension, type II diabetes, hyper-and dislipidemia) (hypertension, type II diabetes, hyper-and dislipidemia). It is the best protein for fat reduction under calorie restricted diets, when coupled with exercise. It enhances body composition and lowers waist circumference. The researchers discovered that people who ingested whey protein weighed less, had less body fat. Whey protein is the greatest protein for fat reduction during energy restricted diets. It impacts on appetite and hunger regulating hormones. A high-protein diet lowers calorie intake and adiposity and that whey protein is more effective than red meat in decreasing body weight gain and improving insulin sensitivity. In addition, whey protein helps regulate blood glucose levels and has been proven to be helpful for weight management, both of which are frequently a problem for type-II diabetes. The breakfast with  $\alpha$ -lactalbumin maintains lipid oxidation and quickly supplies amino acids for usage during exercise increased the effectiveness of exercise training to reduce adiposity.

### **1.6.Bone Health:**

Milk includes many components helpful for bone health. Milk basic protein stimulates bone growth and inhibits bone resorption in healthy adult males. Milk basic protein is in the whey protein fraction. 300 mg of milk basic protein raises blood osteocalcin concentrations. Milk basic protein stimulates bone growth and inhibits bone resorption. The milk basic protein of whey is the active protein that activates osteoblast. The active component in the whey protein plays an essential function in bone production by stimulating osteoblasts. LF is a strong modulator of bone cell activity and promotes bone growth in vivo. It promotes osteoblast differentiation and creates new bone production. It also reduces bone breakdown. It has strong anabolic, differentiating and anti-apoptotic actions on osteoblasts, and suppresses osteoclastogenesis. It is a possible therapeutic target in bone diseases such as osteoporosis and potentially an essential physiological regulator of bone development. Glycomacropeptide has demonstrated inhibitory



action to enamel demineralization and supports dental enamel remineralization. Some whey components (e.g., proteose-peptones) may protect against tooth tissue demineralization, while other whey components, because of their immunostimulatory properties, may have beneficial effects on dental plaque.

## 2. DISCUSSION

An imbalance in brain serotonin levels is a potential cause exhibiting the detrimental consequences of prolonged stress, tiredness, and delirium.  $\alpha$ -LA, a whey protein in cow's milk with a high concentration of tryptophan (a precursor of serotonin) enhances cognitive function (i.e. memory scanning) in stress-vulnerable people.  $\alpha$ -LA rich whey protein enhances serotonin activity. Stressed people were less stressed when were fed  $\alpha$ -LA. It decreases drowsiness and enhances attention processing. Infant formula based on predigested (hydrolyzed) whey protein is slightly less allergenic than normal child formula and may reduce the chance that the infant will later acquire allergies. Whey protein is typically the favored option for high protein products advised by doctors after surgery or burn treatment. Whey protein has many of the same components present in human breast milk and for this reason, it is a major ingredient in a broad range of baby formulae, particularly those for preterm babies. In addition, whey protein is a great protein option for the pregnant woman who requires higher quantities of protein. Whey protein concentration protects stomach mucosa from ethanol injury. The protective effects are attributed to sulfhydryl compounds, stimulators of glutathione production. Whey protein is digested rapidly and causes a quick increase in plasma amino acids.

## 3. CONCLUSION

The following overview highlights the findings of research conducted to date. In certain instances, the advantages of the active peptides were proven in human and animal studies. The health advantages of whey protein and whey proteins have been a topic of increasing commercial interest in the context of health-promoting functional foods. Whey components, particularly the proteins and peptides, will increasingly be chosen as ingredients for functional meals and nutraceuticals as active medicinal agents. They drew upon the strong consumer trends for health and wellness, and ongoing discovery and confirmation of the biological functionality of whey components. As a consequence, we are likely witness significant advances by the food and healthcare industries in the broad use of whey proteins and their related peptides as functional food components, nutraceuticals, and dietary supplements.

## REFERENCES:

1. C. Akal, "Benefits of whey proteins on human health," in *Dairy in Human Health and Disease across the Lifespan*, 2017.
2. F. Alimoradi, E. Hojaji, H. Jooyandeh, S. A. H. Z. Moghadam, and J. Moludi, "Whey Protein : Health Benefit and Food Applications Whey Protein," *J. Int. Res. Med. Pharm. Sci.*, 2016.
3. F. Alimoradi, E. Hojaji, H. Jooyandeh, S. A. Hossein, Z. Moghadam, and J. Moludi, "Whey Proteins : Health Benefits and Food Applications," *J. Int. Res. Med. Pharm. Sci.*, 2016.
4. A. S. Gad and A. F. Sayed, "Evaluation the degree of whey protein concentrate 80 hydrolysis on the health benefits amino acids content need of the human body," *Int. J. Dairy Sci.*, 2009,



doi: 10.3923/ijds.2009.91.99.

5. S. Patel, "Emerging trends in nutraceutical applications of whey protein and its derivatives," *Journal of Food Science and Technology*. 2015, doi: 10.1007/s13197-015-1894-0.
6. S. Pal, S. Radavelli-Bagatini, S. Ho, J. L. McKay, M. Hagger, and M. Jane, "Dairy Whey Proteins and Obesity," in *Nutrition in the Prevention and Treatment of Abdominal Obesity*, 2014.
7. S. Pal and S. Radavelli-Bagatini, "The effects of whey protein on cardiometabolic risk factors," *Obes. Rev.*, 2013, doi: 10.1111/obr.12005.
8. K. Marshall, "Whey Protein Review Permission," 1996.
9. jared johnston, "Therapeutic applications of whey protein," *Altern. Med. Rev.* ♦, 2004.
10. C. H. Onwulata and P. Huth, "Whey Processing, Functionality and Health Benefits Chapter 4. Whey and Lactose Processing . Zadow. W. G," *Verlag, Springer.*, 2009.
11. K. Marshall, "Therapeutic applications of whey protein," *Alternative Medicine Review*. 2004.

## A REVIEW ON WIRELESS SENSOR TECHNOLOGIES

**Raghvendra Singh\***

\*Assistant Professor,  
Department of Electrical Engineering, Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- raghvendra.engineering@tmu.ac.in

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### ABSTRACT

*Wireless Sensor Technologies (WST) are entering a new phase. Recent advancements provide enormous possibilities for study and development. This is the result of the lowering costs of ownership, the creation of ever compact sensing devices and the advances in radio frequency technology and digital circuitry. The objective of the current article is to examine the technical and scientific state of the art of wireless sensor technologies and standards for wireless communications in the AgriFood industry. WST in agricultural and food business and to categorize them in suitable categories. These technologies are extremely promising in many areas such as environmental monitoring, precision agriculture, cold chain control or traceability. The article focuses on WSN (Wireless Sensor Networks) and RFID (Radio Frequency Identification), covering the various systems available, current advancements and examples of applications, including ZigBee based WSN and passive, semi-passive and active RFID. Future developments of wireless communications in agricultural and food sector are also addressed.*

**KEYWORDS:** Agriculture, Bluetooth, Food, Radio, Wireless.

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### 1. INTRODUCTION

WST refers to Wireless Sensor Networks (WSN) and radio frequency identification (RFID) based sensor devices. WSN is one of the most important technologies in the 21st century. RFID was created for identifying reasons, but increasing interest in the many other potential uses has led to the creation of a new variety of wireless sensor devices based on RFID. The primary distinction between a WSN and an RFID system is that RFID devices have no cooperative possibilities, whereas WSN enable various network topologies and multichip communication[1]–[4].

These technologies have been drawing numerous research efforts over the last few years, led by the growing maturity and acceptance of standards, such as Bluetooth and ZigBee for WSN, and other ISO (International Organization for Standards) (International Organization for Standards). Currently, they are extremely promising in many areas such as environmental monitoring, irrigation, livestock, greenhouse, cold chain management or traceability. The systems are typically comprised of a few sinks and huge number of tiny sensing nodes. Normally, these

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sensor nodes comprise of three components: sensing, processing and communicating. Each wireless sensor node communicates with a gateway unit which can communicate with other computers via other networks, such as a Local Area Networks (LAN), Wireless Local Area Networks (WLAN), Internet, Controller Area Network (CAN) or Wireless Wide Area Network (WWAN) using standard protocols like GSM (Global System for Mobile communication) or GPRS (General Packet Radio Service) (General Packet Radio Service)[5]–[7].

In this article, we examine the standards and the many applications that use WST in agricultural and food business and to categorize them in suitable categories. The study of their features and contributions may be helpful for recognizing novel applications or relevant research possibilities.

### **1.1.Wired vs. Wireless:**

WSN can function in a broad variety of settings and offer benefits in cost, size, power, flexibility and distributed intelligence, compared to wired ones. In a network, when a node cannot directly reach the base station, the message may be routed across several hops. By auto configuration set up, the network may continue to function when nodes are relocated, added or deleted. Monitoring applications have been created in health, agriculture, environment, military, machine/building, toys, motion tracking and many more areas. Architectures for sensor networks have been evolving significantly over the past 50 years, from the analogue 4-20 mA designs to the bus and network architecture of today. Bus designs minimize wiring and needed communication bandwidth. Wireless sensors significantly reduce wire requirements, offering new possibilities for distributed intelligence systems.

For fieldbus architecture, the danger of severing the bus that links all the sensors remains. WSN removes all the issues originating from wires in the system. This is the most significant benefit of employing such technology for monitoring. Wireless sensor technology enables Micro-Electro-Mechanical Systems Sensors (MEMS) to be combined with signal conditioning and radio units to create “motes” – all for a cheap cost, a compact size, and with low power needs. Available MEMS include inertial, pressure, temperature, humidity, strain-gage, and various piezo and capacitive transducers for proximity, position, velocity, and acceleration and vibration measurements; and according to several research works, connecting wires to these devices can be more problematic than doing it by means of wireless designs[8]–[10].

Motes may establish networks and co-operate according to different concepts and designs. They came with tiny sensors attached, that enable, in a small area ( $2.5 \times 5 \times 5$ cm), the collection of data not only about temperature, but also relative humidity, acceleration, shock and light. Another benefit for wireless sensor devices is the possibility of placement in locations where cabling is difficult, such as huge concrete buildings or buried inside the cargo, which puts their readings closer to the actual in situ characteristics of perishable goods. Wired networks are highly dependable and robust communication methods for instruments and controllers. However, wireless technology offers cheaper installation costs than wired gadgets, since necessary cabling architecture is extremely expensive.

### **1.2.Wireless Sensor Networks :**

A WSN is a system consisting of radio frequency (RF) transceivers, sensors, microcontrollers and power sources. Recent developments in wireless sensor networking technology have led to the creation of low cost, low power, multipurpose sensor nodes. Sensor nodes allow environment

sensing along with data processing. Instrumented with a range of sensors, such as temperature, humidity and volatile chemical detection, enable monitoring of various conditions. They are able to network with other sensor systems and share data with other users.

Sensor networks are used for a number of applications, including wireless data collection, machine monitoring and maintenance, smart buildings and roads, environmental monitoring, site security, automated on-site tracking of costly goods, safety management, and in many more fields. A general WSN protocol comprises of the application layer, transport layer, network layer, data link layer, physical layer, power management plane, mobility management plane and the task management plane.

Currently two there standard technologies are available for WSN: ZigBee and Bluetooth. Both operate inside the Industrial Scientific and Medical (ISM) band of 2.4 GHz, which offers license free operations, large spectrum allotment and global interoperability. In general, as frequency rises, bandwidth increases allowing for greater data rates but power needs are generally higher and transmission distance is much shorter. Multi-hop communication over the ISM band may possibly be feasible in WSN because it uses less power than conventional single hop communication. It is also feasible to construct a WSN utilizing Wi-Fi (IEEE 802.11), although this protocol is typically used in PC-based systems since it was designed to extend or replace for a wired LAN. Its power consumption is quite significant, and the limited autonomy of a battery power source still remains a major drawback.

### **1.2.1. Bluetooth:**

Bluetooth was designed as a wireless protocol for short-range communication in wireless personal area networks (PAN) as a cable substitute for mobile devices. It utilizes the 868 and 915 MHz and the 2.4 GHz radio bands to communicate at 1 Mb per second between up to seven devices. Bluetooth is primarily intended to optimize ad hoc networking capabilities. Some of its typical functions include passing and syncing data, e.g. between a PDA (personal digital assistant) and a computer, wireless access to LANs, and connectivity to the internet. It utilizes frequency-hopping spread-spectrum (FHSS) transmission, which sends data across various frequencies at varying time intervals. Bluetooth utilizes a master-slave-based MAC (medium access control) protocol.

### **1.2.2. ZigBee:**

The ZigBee standard is built on top of the IEEE 802.15.4 standard. The IEEE 802.15.4 standard specifies the physical and MAC (Medium Access Control) layers for low-rate wireless personal area networks. The physical layer supports three frequency bands with varying gross data rates: 2,450 MHz (250 kbs-1), 915 MHz (40 kbs-1) and 868 MHz (20 kbs-1) (20 kbs-1). It also provides features for channel selection, connection quality estimate, energy measurement and clear channel evaluation. ZigBee standardizes both the network and the application layer. The network layer is in charge of arranging and providing routing across a multi-hop network, defining various network topologies: star, tree, peer-to-peer and mesh. The application layer offers a platform for distributed application development and communication.

Aside from the agricultural and food sector, it is extensively utilized in residential building control, automation, security, consumer electronics, personal computer peripherals, medical monitoring and toys. These applications need a technology that provides extended battery life,

dependability, automated or semiautomatic installation, the ability to quickly add or remove network nodes, signals that can flow through walls and ceilings and a cheap system cost.

### **1.2.3. Bluetooth vs. ZigBee:**

For situations where greater data rates are essential, Bluetooth obviously has the edge because it can handle a broader variety of traffic kinds than ZigBee. However, the power consumption in a sensor network is of main significance and it should be very low. Bluetooth is arguably the closest equivalent to WSNs, although their power consumption has been of secondary concern in its design. Bluetooth is thus not appropriate for applications that need ultra-low power consumption; turning on and off costs a significant lot of energy. In contrast, the ZigBee protocol puts main emphasis on power management; it was designed for low power consumption and years of battery life. Bluetooth devices have shorter battery life compared to ZigBee, as a consequence of the processing and protocol management overhead which is needed for ad hoc networking. Also, ZigBee offers greater network flexibility than Bluetooth, enabling various topologies. ZigBee supports a higher number of nodes – more than 65,000 – according to standard. Thus, the appropriateness of ZigBee for monitoring in agricultural and food sector has been suggested by different writers.

### **1.3.Environmental Monitoring:**

WSN became a significant problem in environmental monitoring. The comparatively cheap cost of the devices enable the installation of a dense population of nodes that may effectively reflect the diversity inherent in the environment. They may offer risk assessment information, like for example warning farmers at the beginning of frost damage and giving improved microclimate awareness.

### **1.4.Climate Monitoring:**

The automation of the monitoring process may be utilized in various kinds of climates and circumstances. Johnson and Margalho observed agroclimate in the Amazon, studying WSN short range transmission. They observed that more distant nodes experienced a performance drop, whereas nodes closest to the drain maintained their throughput levels. Another example of climate supervision is flood prediction by use of wireless sensors, which can monitor rainfall, water level and meteorological conditions. The sensors provide information to a centralized database system. Pierce and Elliot expanded the implementation to a regional and on-farm sensor networks at 900 MHz that enable remote, real-time monitoring and control of farming activities in two agricultural applications, a weather monitoring network and an on-farm frost monitoring network.

### **1.5.Fire Detection:**

Current surveillance systems utilize a camera, an infrared sensor system and a satellite system. These systems cannot enable real-time surveillance, monitoring and automated alarm. A wireless sensor network can identify and predict forest fire more quickly than the conventional satellite-based detection method. WSN based fire monitoring systems was developed and deployed. WSN monitor temperature and humidity, and detect smoke.

### **1.6.Precision Agriculture:**

The development of WST applications in precision agriculture makes feasible to improve efficiency, productivity and profitability while avoiding unexpected effects on wildlife and the environment, in various agricultural production systems. The real time information from the fields will offer a strong foundation for farmers to change tactics at any moment. Instead of taking choices based on some hypothetical average state, which may not exist anyplace in the reality, a precision farming method detects variances and changes management activities appropriately.

## **1.7. Pest Control:**

Baggio installed a WSN for combating phytophthora in a potato crop. Phytophthora is a fungal disease which relies on the climatological circumstances. 868/916 MHz motes were utilized for monitoring humidity and temperature. The goal of the technology is to disclose when the crop is at danger and allow the farmer treat the plants only when is truly required.

## **1.8. Precision Irrigation:**

Efficient water management is a significant issue in many agricultural systems. WST offer a great potential for reflecting the natural soil variability found in fields with more precision than the existing methods available. Thus, the advantage for the producers is a better decision support system that enables to optimize their output while conserving water. Also, WST removes problems to connect sensor stations throughout the field and lowers maintenance expense. Since installation of WST is simpler than current wired systems, sensors may be more densely distributed to give local comprehensive data. Instead of irrigating a whole field in response to broad sensor data, each portion may be triggered depending on local sensors.

## **2. DISCUSSION**

The major benefits of WSN for monitoring are its greater reading range than RFID, the flexibility and various network topologies that may be built, the diversity of sensors that are currently deployed and their low power consumption. Battery life, reliability of measurements and performance in actual settings are important problems that must be addressed. One issue could be that these monitoring systems generate large quantities of data that are difficult to handle, creating a substantial rise in the daily volume of data in a business information technology system. This rise affects the hardware cost needed for installing monitoring systems. Neither manual assessment nor transmission via mobile networks is possible owing to restricted capacity and costly use charges. The answer consists in establishing a decentralized data management system. Data must be pre-processed near to their place of origin by intelligent systems, which may be sited at the level of RFID, motes or the sink. There is a need to know the long-term behaviour of the systems. Most of the applications described in this article involve short experimental durations (days or weeks) (days or weeks). Longer testing and experimentation is required for validating some of applications provided.

## **3. CONCLUSIONS**

As it was demonstrated, the applications of WSN and RFID are numerous and varied. The usage of WST in agricultural and food sector offers new characteristics that have the potential to be an economically feasible alternative to wired networks. The value of technology may be most realized when combined with agronomic expertise, utilizing the information collected in the development of decision support systems. Also enhancing operations by giving early warning of



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equipment failure and a predictive maintenance tool, improving energy management, providing automated record-keeping for regulatory compliance, lowering staff training expenses or decreasing insurance costs. The cooperation and synergy of sensing, processing, communication and actuation is the next step to harness the potential of these technologies.

From 2004 to 2008 the development of RFID technology has been developed extremely rapidly, bringing new capabilities to conventional automated identification and data collection applications. However, a substantial percentage of RFID installations remain experimental. Semi-passive tags may be used to monitor environmental factors, such as the temperature, to detect trouble regions and to trigger alerts. RFID loggers are excellent instruments that are accessible in large numbers and are cost-effective. However, they need human handling due of their limited reading range.

Another significant advantage of the systems is the visibility that it may provide throughout the food chain. Measurements collected are consistent and offer important information on the circumstances faced throughout the life cycle of the goods. It is possible to address, at regular time increments, what is occurring with the product, whether it is temperature, humidity, acceleration, etc. Another benefit is offering excellent assistance in legal circumstances as well as safety checks. The combination of WSN with RFID appears to be a smart concept, taking use of the complimentary characteristics of both technologies. For this aim, several theoretical methods have been proposed, but a lot more work needs to be done.

#### REFERENCES:

1. J. Molka-Danielsen, P. Engelseth, and H. Wang, "Large scale integration of wireless sensor network technologies for air quality monitoring at a logistics shipping base," *J. Ind. Inf. Integr.*, 2018, doi: 10.1016/j.jii.2018.02.001.
2. "Overview of Wireless Sensor Network Security Technology," 2018, doi: 10.25236/iceecs.2018.096.
3. C. Buratti, A. Conti, D. Dardari, and R. Verdone, "An overview on wireless sensor networks technology and evolution," *Sensors*. 2009, doi: 10.3390/s90906869.
4. L. Ruiz-Garcia, L. Lunadei, P. Barreiro, and J. I. Robla, "A review of wireless sensor technologies and applications in agriculture and food industry: State of the art and current trends," *Sensors (Switzerland)*. 2009, doi: 10.3390/s90604728.
5. E. Delbreil and G. Zvobgo, "Wireless sensor technology in dementia care: Caregiver perceptions, technology take-up and business model innovation," *EuroMed J. Bus.*, 2013, doi: 10.1108/EMJB-05-2013-0019.
6. Z. Yang and C. Yang, "Research on the application of intelligent calibration device for nuclear power plants based on wireless sensor technology," *Int. J. Online Eng.*, 2016, doi: 10.3991/ijoe.v12i05.5731.
7. S. S. O. Burgess, M. L. Kranz, N. E. Turner, R. Cardell-Oliver, and T. E. Dawson, "Harnessing wireless sensor technologies to advance forest ecology and agricultural research," *Agric. For. Meteorol.*, 2010, doi: 10.1016/j.agrformet.2009.08.002.
8. A. L. Cheng, C. Georgoulas, and T. Bock, "Fall Detection and Intervention based on

Wireless Sensor Network Technologies,” *Autom. Constr.*, 2016, doi: 10.1016/j.autcon.2016.03.004.

9. V. Ostasevicius *et al.*, “Monitoring the condition of the cutting tool using self-powering wireless sensor technologies,” *Int. J. Adv. Manuf. Technol.*, 2017, doi: 10.1007/s00170-016-8939-z.
10. I. Khemapech, I. Duncan, and a Miller, “A survey of wireless sensor networks technology,” *6th Annu. Postgrad. Symp. Converg. Telecommun. Netw. Broadcast.*, 2005.

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## COVID 19 AND MIGRATION

**Ms. Anupama Sharma\***

\*Assistant Professor,  
Department of Public Administration,  
Sri Guru Gobind Singh College, Sector-26, Chandigarh,  
C-99, Block C, Panjab University Campus, Sector-14,  
Chandigarh, INDIA

Email id: anupama.researchwing@gmail.com

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### ABSTRACT

*Migration is a term used for the movement of people from one place to another. Some of the individuals migrate out of choice many others migrate out of necessity. In Asia, most of the people migrate to work abroad. They are attracted towards better job opportunities or a better income. The highly skilled migrant is always welcomed by a destination country. On the other hand the unskilled migrant often finds it difficult. People migrate more to Delhi and Maharashtra states because these states are highly urbanised and modern state which offers better standard of living. Migration is also related to increased urbanisation. Rapid urbanization and our interference with the nature for raising our standards of living, has created a disorder in the nature. The recent example is of Corona Virus or COVID19. Due to the lockdown imposed to contain the virus, thousands of migrant workers had to march back to their native places. They were left with the choice between live and livelihood. Many of them unfortunately even died before they could complete their journey and be able to reach their native place. The magnitude of this sudden reverse migration in the country was such that, even the best of the efforts of the Government of India, could not match the crisis. Migrant Workers are the ones who are responsible for doing most of our job. But before this pandemic we have never thought like this. Such plight of migrant's workers is there because they have no voting rights in states where they work, no health benefits, no employment benefit of MGNREGA in the cities, no right or protection against employers. Lack of data monitoring portal of migrant workers has resulted in mismanagement during this time of crisis.*

**KEYWORDS:** Migration, Migrant Workers, Covid19, Urbanisation, Pandemic.

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### INTRODUCTION

#### SECTION I

Migration is a term used for the movement of people from one place to another. Since ancient civilizations people are continuously migrating. Some of the individuals migrate out of choice many others migrate out of necessity (Tumbe, 2018) [19]. There are various factors behind migration. These can be classified under two major headings i.e. pull factors and push factors.

Pull factors refers to those factors which are related with the choice of the individuals like good economic opportunities, re-joining of family or migrating for higher studies. Push factors refers to those factors which arises out of necessity like to escape conflict persecution, food shortage, terrorism or human rights violations (**McLeman, 2014**) [11]. Population Division of the United Nations Department of Economic and Social Affairs in 2019 released International Migrant Stock report. According to the report India has emerged as the top source of international migrants constituting 6.4% (17.5 million) of world's total migrant population (**Nations, 2019**) [13]. Globalisation, Urbanisation and the search for better livelihood, standard of living, better economic opportunities has led to an increase of migrant labourers. Migrants can be regarded as the collarless workers (**Ratnoo, 2016**) [15].

In Asia, most of the people migrate to work abroad. They are attracted towards better job opportunities or a better income. The highly skilled migrant is always welcomed by a destination country. On the other hand the unskilled migrant often finds it difficult. They had to negotiate with the employer, remain aloof, and accept low-wage work. Regional and internal migrants also face a different set of challenges. Internal migrants though provide with less remittances but they are not required to negotiate with the borders (**Migration, 2021**) [12]. The Sustainable Development Goals (SDGs) 2030 Agenda has for the first time acknowledged the contribution of migration to sustainable development as the motto of SDGs is "leave no one behind" not even migrants. 11 out of the 17 SDGs contain targets and indicators that directly relates with migration or mobility. The Sustainable Development Goal number 10 "Reduced Inequalities" includes target 10.7 that specifically focus on orderly, safe, regular and responsible migration and mobility of people, This will require implementation of planned and well-managed migration policies (**Society, 2021**) [17]. There are some other targets that relates with migration like trafficking, remittances, international student mobility and more. Under the goal 11 of SDGs i.e. sustainable cities and communities' one of the target provides us with the information that accessibility of adequate housing may be challenging for many migrants, especially irregular migrants as they travel a lot. So, if we achieve success in managing the migration orderly then we can achieve the sustainable development goals related to migration to some extent (**Development, 2021**) [4].

This article is divided into five sections. Section I deals with the introduction in which the term migration has been explained and the role of migration in achieving sustainable development goals, Section II discusses about the remittances which is the one of the source of economic stability especially for that village, community and country which receives it, gender and migration, how increasing urbanisation has led to the migration, how rapid urbanisation and interference with the nature has led to the spread of Covid19 pandemic and this section also discusses the situation of migrant workers during the pandemic and lockdown, Section III deals with the migrant laws and labour reforms, Section IV focusses on One Nation One Ration Card scheme, PM GaribKalyanYojana, AtmaNirbhar Bharat being launched by Government of India, and various measures being taken by the central and state governments for job creation for the migrants for example diluting of labour laws by the Uttar Pradesh and Madhya Pradesh Government, there is a need for skill mapping of the migrant workers and the last section i.e. Section V concludes the paper by discussing an urgent need for a sound migration policy. It also includes the references.

## SECTION II

In 2019, India approximately received \$83.1 billion remittances from people working abroad. Half of remittances came from six Gulf countries: Qatar, Bahrain, Oman, UAE, Kuwait, and Saudi Arabia and others from countries like USA, Canada, Singapore, Indonesia etc. Remittances is a source of economic stability especially for the country which receives it. They are the economic transfers that follow in a direction from the migrated person to his or her household, community, and country from where they belong. Remittances are a vital source of income especially for those households that lack local opportunities. They also help the migrated person who send it by raising his standard of living and providing him better prospects of employment opportunities. The households that receive remittances coming from abroad are able to come out of poverty easily. International remittances help them to increase their per capita income and raise their standard of living. These remittances becomes the source of welfare for the household of migrants in their native place. If they do not send remittances back to their homes then there will be no positive impact of their migration on their households back in their village or community or country. But there is another view also family members of the migrated person tend to work less as they start depending on the remittances only. So, in that case the overall effect of remittances sent by the migrated person on remaining members becomes small. India is one of amongst those countries that comes under the list of biggest recipients of remittances (**Greenway-McGrevy & Hood, 2016**) [6]. These remittances not only strengthen the country's foreign exchange reserves but also helps in balancing current account deficient. Due to Covid19 pandemic and the subsequent lockdown which was aimed at curbing the disease, the World Bank revealed that remittances to South Asia will drop by 22% this year.

According to the 2011 census India has 45.36 crore migrants within the country i.e. 37% of country's population consists of migrants. Out of this 37% i.e. a significant chunk of workers are interstate migrants. They come from poor, traditionally disadvantaged castes and classes. They work outside their villages or country to avoid economic distress.

Textile and garment industry, construction industries, brick kilns are the key industries that employs largest number of migrants. The sub-sectors like fishers, seafood processing, footwear, ceramics and leather work are the other sectors where the migrants are employed. India's some of the capitalist states like Maharashtra and Delhi heavily depend on migrant workforce. They are the ones who circulates between underdeveloped regions and the urban informal sector, manufacturing zones and middle-class homes. According to the data presented in census 2011, Maharashtra and Delhi were among those states which experiences the maximum number of flow of migrants from the states of Uttar Pradesh, Bihar, Rajasthan, Odisha, West Bengal, Madhya Pradesh, Assam and Punjab (**Bhagat, 2008**) [2].

In some parts of India, migration takes place in 3 out of 4 households and two Indians out of ten are internal migrants. Migrant population not only include greater number of males but it also contains a significant number of females also. According to the Census of 2001 around 70.7 percent were women migrant out of the total internal migrants, one of the major reason for this significant number is marriage in both the rural and urban areas. Census figures shows the increasing trend in female migration for employment and business also. It has improved from around 41 lakh in 2001 to 85 lakh in 2011, increasing the share of female migrants from 12% to 16%. Census data also reveals that there is a major shift in the pattern of female labour migration

from largely rural destinations to a distinguishing inclination towards urban destinations. The percentage of women migrating for work or for business to urban areas has increased from 47% in 2001 to 58% in 2011.

People migrate more to Delhi and Maharashtra states because these states are highly urbanised and modern state which offers better standard of living. Migration in India not only relates to better employment opportunities but it is also related to increased urbanisation. People migrating to these states also starts living in the sub-urbs areas which slowly converts into an urban area. As per World Bank, India along with China, Indonesia will lead the world's urban population surge by 2050.

Rapid urbanization and our interference with the nature for raising our standards of living, has created a disorder in the nature. This has resulted in increasing the possibility of new interface between humans and wildlife. Excessive involvement of humans in trying to mould every situation according to his need has led to the creation of various kinds of diseases. The recent example is of Corona Virus or COVID19. To contain the Corona Virus lockdown was considered as a necessary measure **(Panwar & Mishra, 2020) [14]**. It has severely affected various sectors such as tourism, entertainment, restaurants, and the travel industry. Ultimately, this led to reducing of economic opportunities and increased uncertainty regarding future among the persons. They have to face the problem of financial crunch. So as a result thousands of deprived people and manual worker started to march back to their native places and home states. They were left with the choice between live and livelihood. They were very well aware about the fact that they are at the forefront where they are more vulnerable to the SARS-CoV-2 infection and can eventually become the reservoirs from where the disease can spread easily leading to community transfer. But they had no option. Temporary shutdown of various industries, construction activities and other economic activities has left the migrant workers without salary or jobs **(Khanna, 2020) [9]**. They had to make a difficult choice of staying without pay, support and food or walk back to their villages. Migrant exodus caused due to the sudden lockdown driven by the novel coronavirus disease (COVID-19) pandemic and loss of livelihood is similar to the great migration during partition. According to one of the report of World Bank, around 40 million internal migrants have been affected due to COVID-19 and around 50,000–60,000 individuals migrated from urban to rural areas i.e. they have migrated back to their native places within a period of few days. Since there was no transport facility available during lockdown, so as a result the panic stricken migrant workers with their families including small children, pregnant women and the elderly walked hundreds or thousands of kilometres on their foot without any source of food and money to reach their native places. Many of these migrants found themselves in a situation where they had to face hunger and misery. Many of them unfortunately even died before they could complete their journey and be able to reach their native place **(Chaudhary, Sodani, & Das, 2020) [3]**. As there was a question of live v/s livelihood in front of them so they decided that if they have to face starvation then it would be better to starve at their native place. For example there was one couple Rajan and Sanju Yadav. They came to Mumbai 10 years ago with their two children. They had the dream of a brighter future. Two years ago, their hard work was paid and with their savings and a bank loan they bought a tuk-tuk. This vehicle brought more money and happiness in their family. But then came coronavirus. They used their all savings in paying off the rent, repaying bank loan and buying groceries and other essential items in the month of March and April. They were in the hope that may be the lockdown will not extend further. But the lockdown was extended. Out of money and all other



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options of survival, they decided to go back to their native village in Jaunpur district of Uttar Pradesh state. As they had applied for the tickets for shramik special train which was been run for the migrants so they were in hope that they will get the tickets. But unfortunately they had no luck for a week. Losing all the hope they finally decided to undertake the 1,500-km long journey in their tuk-tuk. They started their journey on 9 May. They ate whatever dry food they had packed and slept on roadways. But on 12 May - just 200km from their village - a truck hit the tuk-tuk from behind. Sanju and her daughter died on the spot. Rajan and his son escaped with minor injuries. Rajan says. "We were so close to our village. We were so excited." But he has nothing left now - just a big void. He says he can't help but keep thinking about the train tickets that never came. He wished he had gotten the tickets. He wish he had never started the journey... he wished he was not poor (**Varshney, Kumar, Mishra, Rashid, & Joshi, 2021**) [20].

### SECTION III

Not all migrant workers are skilled so they engage in the low-paying jobs in various rural and urban industries, they are not able to enter into some formal contracts so they are outside the scope of the law. The sole labour law available in India for internal migrants is Inter-state Migrant Workmen (Regulation of Employment and Conditions of Service) Act, (ISMWA) 1979 which addresses the contractor-mobilised migration, under which advances are paid for recruitment as a norm. The intrastate migrants are debarred from its scope. Also, this act is not applied to the anguished migrant workers who have travelled from their homes on their own in risky situations. Migrant labourers being both labourers and migrants, face additional difficulties and limitations (**Ashok & Thomas, 2014**) [1]. This law is befitting to every establishment that employs migrant workmen from other states, at least five or more. It is also applicable to contractors whose number of employees of inter-state workmen is similar. This act anticipates a system of registration of such establishments. It is forbidden for the principle employer to employ interstate workmen without a certificate of registration from the relevant authority. It is also a provision of the law that every contractor should obtain a licence to recruit workmen from one state for deployment in another state (**Sharma & Upadhyay, 2020**) [16]. A system of accountability is created by the registration of establishments which acts as the first layer of formalising the utilisation of their labour. It aids the government in keeping a track of the number of workers employed and makes a legal basis for regulating their conditions of service. The terms and conditions have to be provided by the Contractor to the workers on the basis of which they are recruiting such as the remuneration payable, hours of work, fixation of wages and other essential amenities in respect of the interstate migrant workmen. If the nature of work of an inter-state migrant workmen is similar to those extended to other workmen in the same establishment, then the wage rates, holidays, hours of work and other conditions of service shall be the same. The appropriate government would apply it as prescribed in other cases also. The wages in any case shall not be lower than what is prescribed under the Minimum Wages Act. But their rights are being ignored due to a lack of serious implementation. This act, is however being immensely ignored in practice by the state governments. The ideal working conditions for interstate migrants are expressed, but provisions for enforcement are lacking. In practice, it has not been used to create a better policy environment (**Harsh, 2021**) [7]. Labour laws for the protection of migrant workers have been mere words on paper. In the case of the 1979 Act, licences have been taken by a few contractors and very few enterprises employing interstate migrant workers have registered under the Act. There has been a weak record of prosecutions and dispute settlement. Pass books, as directed by law, are not possessed by migrant workers

which forms the basic record of their identity and their transactions with the contractor and employers. Following the recommendations of the Second National Commission of Labour 2002, a draft law (The Unorganised Sector Workers Bill, 2003) has been raised by the central government so as to identify workers employed in the unorganised sector and also to supply them with basic social security. The experience of tri-partite welfare funds already existing for a few industries in some states has been a mode of reliance for the bill (**Hirway, 2006**) [8].

Recently the Government of India has brought the 4 labour codes i.e. Wage Code, Industrial Relations Code, Social Security Code and Occupational Safety, Health and Working Conditions Code. The code contains likewise provisions as the Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979. Payment of the displacement allowance and a journey allowance to interstate migrants has been envisaged both by the old Act and the proposed code. Despite the code looking to preserve many of the protections and rights given to the inter-state migrant workers, it is felt by the trade unions to have a separate enactment. The Corona Virus lockdown has subjected the migrant workers to face unprecedented distress and misery. A beneficial legislation dedicated to their welfare has been drawn to attention. As per the ILO (2020) reports, it is estimated that with a share of almost 90 per cent of people working in the informal economy in India, about 400 million workers in the informal economy are facing a risk of dropping to extreme poverty during the crisis. Small businesses have been put in dilemma leading to mass departure of migrants (**Mathew & Jain, 2020**) [10].

#### SECTION IV

The magnitude of this sudden reverse migration in the country was such that, even the best of the efforts of the Government of India, could not match the crisis. The government are trying their best to cope up with the situation by providing free food under one nation and one ration card scheme and developing shelters and quarantine houses for the disadvantaged migrants.

The scheme of One Nation One Ration Card allows accessibility of food security benefits to poor migrant workers as they will be allowed to buy rice and wheat on a subsidised rate from any ration shop in the country, as long as their ration cards are linked to Aadhaar card. In India One Nation One Ration Card is a kind of an official document that is issued only to those households which are eligible for purchasing subsidized food grain from the Public Distribution System (under the National Food Security Act). This card is issued by the state governments. As we know that there is trend of movement of the people from one place to another in search of better job opportunities and higher standards of living, so this scheme allows the flexibility to the migrant workers in obtaining subsidized food. The scheme has been launched keeping in mind the internal migration of our country. As a pilot project the scheme was implemented in Telangana and Andhra Pradesh and it was found that the utilisation of the scheme was very low. For example there was 800 workers on an average in a month who took ration on subsidized rate but during lockdown it came down to 200. There is need for continuation updation of the record of the migrant workers (**Sunitha & Sudha, 2020**) [18].

Prime Minister beside One Nation One Ration card scheme also launched the PM GaribKalyanYojana, where an economic package worth of Rs 1.7 Lakh Crore was announced to help various sections of the society. This yojana will benefit the migrant workers, labourers, poor and agricultural workers. It has been announced with an aim of dealing with the impact of corona virus outbreak and the nationwide lockdown. The scheme will provide relief to around 80 crore people by providing them free of cost 5kg rice or wheat. The state governments and U.T

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administrators has been allowed to utilise their state disaster response fund (SDRF). Center government has allocated Rs 29000 Cr for the next financial year for providing food and shelter to migrant workers who have been hit by the 21-day lockdown (**Varshney, Kumar, Mishra, Rashid, & Joshi, 2021**) [20].

Since the migrant workers were returning to their native place so it now becomes the responsibility of the government to provide jobs to them. Government has increased the amount to be given in the MGNREGA scheme to provide support to the returning migrants. As compared to May month in the last year there has been a sudden jump of around 40-50% in the enrolment ratio. Various drives have been undertaken by the government to enrol almost all the returning migrants. Center government has advised various States/UTs to provide work to migrant workers as per the provisions of the Act. The government has announced that they are planning to continue MGNREGA works in the monsoon season as well. They will be provided jobs of plantations, horticulture, and livestock related sheds.

One of the key focuses of Central government's AtmaNirbharAbhiyan is creating short-term job opportunities for migrants based on their skills. Being a part of the programme, 116 districts with over 25,000 migrant workers have been selected by the Centre and these have been named as 'AtmaNirbhar districts' which covers almost six states (**Dubey & Sahu, 2020**) [5].

An ordinance has been cleared by Uttar Pradesh Government which has diluted most of the labour laws (Minimum Wages Act, Maternity Benefit Act, Equal Remuneration Act, Trade Unions Act, Industrial Employment Act, Industrial Disputes Act and Factories Act) for the coming three years excluding Bonded Labour System (Abolition) Act 1976, Employee Compensation Act 1923, Building and Other Construction Workers Act 1996 and Section 5 of the Payment Wages Act 1936. The statute includes all the current enterprises and assembling units and the new ones that are coming up in a couple of years. Also, flexibility is to be provided to those businesses and industries which provide employment to workers who have migrated back to the state. Some of the labour laws have been kept intact so workers will continue to be protected. It will aid in re-skilling and mapping the workers who have been displaced and to re-employ them according to the needs of the industry. Experts are of the opinion that these laws, "while well intentioned, have had terrible unintended consequences of creating a monstrous unorganised sector" Indian regulations make labour "most costly". So either firms opt for capital, or don't hire labour (**Hirway, 2006**) [8]. Else, 'contract out' using middle some to provide workers barring any formal contracts. This is to avoid paying above market wages and also to avoid compliance costs. Legal protections were not with 90% of India's labourers. There are various argument that are against this action also like according to the size of the population, formal sector comprises of several lakh workers, who will be affected by the ordinance, If states wish to protect the unorganised workers, there is a legislation -The Unorganised Workers' Social Security Act in 2008 (**Harsh, 2021**) [7]. But till date, no implementation has been done by any state. The ordinance could terminate the services of all permanent employees and they would be replaced with contract workers. It has arbitrarily and absolutely unfairly discarded very basic rights covered by labour laws. Labour laws have also been suspended by the Madhya Pradesh Government for the next 1000 days.

Skill mapping of the migrant workers is also needed so that they can be provided with the jobs related to their skills. There is also need to revamp the skills of those who have some traditional

knowledge of their family and provide them with opportunities to help them sustain their traditional knowledge (Hirway, 2006) [8].

## SECTION V

Migrant workers are worst hit by this pandemic as their livelihood was dependent on only moving. Now it has also stopped completely. They are the ones who were to be seen everywhere whether in hotels, small industries, construction, metro stations etc. They are the ones who are responsible for doing most of our job. But before this pandemic we have never thought like this. We didn't even recognised their work. We failed in imagining migrant workers as a group present in an adequate number that may have the potential to protest or to be taken seriously. We knew the fact that they are existing, in some cases just to our next door but never recognised their importance. Though remaining on the margins, they provide critical labour that withstands India's economy. Most of migrants do not have smartphones so they cannot get the latest guidelines being provided by the government (covid19). There is a communication and education gap. Such plight of migrant's workers is there because they have no voting rights in states where they work, no health benefits, no employment benefit of MGNREGA in the cities, no right or protection against employers. Lack of data monitoring portal of migrant workers has resulted in mismanagement during this time of crisis. We miscalculated their capability to unite or organise as we ignored the fact that they are the ones who are real heroes and are risk takers. We have totally undervalued the role of migrant workers which they play in the economy of our country. We have failed to acknowledge their contribution. In some of the cities migrant workers constitute some 30%-40% of the economy. We cannot think of running our economy without them. We can again open the industries, but how will they function without them. Scarcity of the migrant workers has now already been seen in Kerala. The impact of the reverse migration will certainly hit the economy of the country as well. During the lockdown most of the migrants had to face the worse situation of their life. They have lost their faith in the cities and many of them have promised not to return. As they have decided why should they travel to faraway places and starve there it would be better to live in their own village and starve there than to starve in a big city where there will be no one to look after them. Post-Covid-19, the normal migration flow is likely to change. People will avoid long distance travelling for example somebody coming from the northeast to Kerala in the south may not come anymore.

The challenges faced by the migrant labourers are more complex. An analysis of this migrating pattern makes it clear that though the migrant labourers contribute more to India's economy, they are not in a caring and well-off zone. The Central and State Governments have to provide adequate measures to safeguard the interests of the migrant labourers, and derive context-specific solutions. There is an urgent need for an intensive national policy on migration to assist and stimulate the wellbeing of the migrant workers. There is a need for a system that will ensure access of the entitlements and basic work conditions of these migrant workers. For the migrants who have reverted back to their native place there is a need to do skill mapping and provide them with jobs that suits their skills. The government can also encourage the workers to revamp their traditional skills of their family, if they have any and then the government can help them in providing various opportunities through which they can sustain their livelihood.

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**REFERENCES**

1. Ashok S, Thomas N. A study on issues of inter - state migrant labourers in India. *International Journal of Scientific & Engineering Research*, 2014;5(7):91–94.
2. Bhagat RB. Assessing the Measurement of Internal Migration in India. *Asian and Pacific Migration Journal*. 2008;17 (1):91-102.
3. Chaudhary M, Sodani P, Das S. Effect of COVID-19 on Economy in India: Some Reflections for Policy and Programme. *Journal of Health Management*. 2020;22(2):169-180.
4. Development Of. Migration - OECD. 2021. Retrieved from <https://www.oecd.org/migration/>.
5. Dubey DP, Sahu KK. MSMEs in COVID-19 crisis and India's economic relief package: a critical review. *The International Journal of Indian Psychology*, 2020;8(4):1651-1656.
6. Greenway-McGrevy R & Hood KK. Worker migration or job creation? Persistent shocks and regional recoveries. *Journal of Urban Economics*, 2016;96:1-16.
7. Harsh K. Constitutional Validity Of Minimum Wages Act, 1948. SSRN. 2021.
8. Hirway I. Unorganised Sector Workers' Social Security Bill, 2005: Let Us Not Go Backwards! *Economic & Political Weekly*, 2006;41(5):379-382.
9. Khanna A. Impact of Migration of Labour Force due to Global COVID-19 Pandemic with Reference to India. *Journal of Health Management*. 2020;22(2):181-191.
10. Mathew B, Jain C. Labour Code on Industrial Relations Bill 2015 - A Review. SSRN. 2020.
11. McLeman RA. *Climate and Human Migration: Past Experiences, Future Challenges*. Cambridge University Press. 2014.
12. Migration IO. International Organisation for Migration | IOM, UN Migration. 2021. Retrieved from <https://www.iom.int/>.
13. Nations U. Migration | United Nations. 2019. Retrieved from <https://www.un.org/>.
14. Panwar NS, Mishra AK. COVID-19 crisis and urbanization, migration and inclusive city policies in India: A new theoretical framework. *Journal of Public Affairs*, 2020;20(4): e2249.
15. Ratnoo HS. *Migration of Labour in India The Squatter Settlements of Delhi*. Taylor & Francis. 2016.
16. Sharma A, Upadhyay VK. Implementation of Inter-State Migrant Worker Act During Covid19 : A Ruminantion. *Shodh Sanchar Bulletin*, 2020;10(39):157-162.
17. Society NG. Introduction to Human Migration | National Geographic Society. 2021. Retrieved from <https://www.nationalgeographic.org/>.
18. Sunitha S, Sudha S. India's Initiative: One Nation One Ration. *Dogo Rangsang Research Journal*, 2020;10(7):148-152.
19. Tumbe C. *India Moving A HHistory of Migration*. Penguin Random House India Private Limited. 2018.
20. Varshney D, Kumar A, Mishra AK, Rashid S, Joshi PK. India's COVID-19 social assistance package and its impact on the agriculture sector. *Agricultural Systems*, 2021; 189(1):103049.



## IRRIGATED CORN AND NON-IRRIGATED WHEAT CARBON AND WATER FOOTPRINTS IN NORTHEAST SPAIN

Anil Kumar Chaudhary\*; Akanchha Singh\*\*

\*Assistant Professor,  
Department of Genetics Plant Breeding,  
Agri Extension, Faculty of Agriculture Science,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- anilsingh2929@gmail.com

\*\*Assistant Professor,  
Department of Genetics Plant Breeding,  
Agri Extension, Faculty of Agriculture Science,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA

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### ABSTRACT

*Irrigation improves yields and enables the production of many crops in areas where it would otherwise be difficult owing to a lack of rainfall. Irrigation, on the other hand, may have a number of negative environmental consequences, which must be well understood before mitigation measures can be implemented. The life cycle assessment methodology was used to compare the main irrigated and no irrigated crops in Northeast Spain (corn and wheat, respectively), identifying the processes that have the greatest impact on environmental impacts (carbon and water footprint categories), and providing scientifically sound information to aid government decisions. Because of worries about climate change and water shortage, the IPCC 2013 GWP (carbon footprint) and the water scarcity indicator were chosen as the methodologies for assessing environmental effects (water footprint). The study region, a 7.38-km<sup>2</sup> basin, was observed for 12 years, including before, during, and after irrigation was implemented. The cultivation of 1 ha over the course of a year was the functional unit with which all material and energy flows were linked. Irrigated corn has a greater total carbon footprint, however when factoring the increased productivity obtained with irrigation, the emissions per kilogram of maize drop, favoring this irrigated crop. When it came to the water footprint, the amounts of irrigation water used were so large that production could not compensate for the negative effects of water consumption in corn. Considering productivities and gross revenues, however, puts the findings closer together. The major contributions to the negative effects discovered were fertilizer usage (carbon footprint) and irrigation water (water footprint).*

**KEYWORDS:** Contaminants, Environmental Impact, Fertilization, Irrigation, Rained Farming.



## 1. INTRODUCTION

Irrigated agriculture's significance in today's globe is undeniable. Irrigation allows for increased agricultural output and a greater range of crops to be grown in regions where rainfall is scarce. Because irrigation may have a number of severe environmental consequences, it's crucial to fully understand these consequences before implementing mitigation measures. With the global growth of irrigated land, it is as essential, if not more important, to address the environmental effects of converting an area to irrigated land. This need grows in tandem with environmental awareness and the obvious limits of our natural resources. In this context, life cycle assessment (LCA) uses comprehensive methods to assess the environmental impacts of products and activities, quantifying environmental loads while also meeting the requirements to become a design tool for more sustainable products and activities[1].

In their LCA evaluation of four distinct options for the use of by-products and wastes of sugar production in Cuba, took irrigation into account. Payraudeau and van der Werf looked at the major techniques for assessing environmental effect in an agricultural area, including LCA. Due to the complexity of agricultural activities, these authors noted that LCA took into consideration long-term impacts of pollutant emissions and allowed a comprehensive approach to environmental evaluation, obvious benefits. presented a method for including water source information into LCA inventories and assessing the effect on environmental impact assessments[2].

The authors then used their findings in a life cycle assessment of irrigated lettuce production. To evaluate efficiency in 94 soybean fields in Iran used LCA and data envelopment analysis. The authors found that irrigation was the second largest contributor to greenhouse gas emissions and the largest contribution to overall global warming potential decrease, indicating that there is a lot of room for increasing irrigation system efficiency to reduce global warming potential. LCA to examine three cropping systems based on water management methods in a northeastern Thailand basin: wet-season rainfed rice, wet-season irrigated rice, and dry-season irrigated rice.

Their findings revealed the poor technological, economic, and environmental performance of dry-season irrigated systems. Through LCA, these studies contributed to a better understanding of the environmental effects of irrigation. None of these studies, however, utilized data collected from a monitored region before, during, and after irrigation was implemented. The LCA technique was used to compare irrigated and non-irrigated agriculture, with findings expressed in kilogram CO<sub>2</sub>-equivalent per hectare per year and cubic meter of water per hectare per year. The study region was observed for 12 years, and data was made accessible for the periods before, during, and after irrigation was implemented, allowing researchers to identify and understand the processes that contributed the most to negative environmental effects.

Farmers in the zone have been transitioning from non-irrigated to irrigated agriculture over time. The aim of this research was to quantify and explain the environmental effects in two time periods: before and after the study area was converted to an irrigated region (primary crop: non-irrigated wheat) vs. today the research region was the Lerma basin (7.38 km<sup>2</sup>), which is situated in northeastern Spain. This basin is part of the Ebro river basin, a large region of irrigated farmland that has been growing in recent years due to the transformation of parts that were allocated decades before but had never been irrigated[3].

The Lerma basin is one of the newer transformation regions, with work on structure and adjustment beginning in the irrigation system network and other infrastructure projects were completed till, when 31% of the land was watered. It covered 100 percent of the space set aside for this purpose (3.54 km<sup>2</sup>) between 2009 and 2013. Since before the alteration of the region, the authors have conducted hydrological, geological, climatic, and agricultural research in the study area these studies yielded information on the dynamics of the Lerma basin's transition to irrigated land, irrigation systems implemented, established crops, irrigation volumes applied, seed types and quantities, fertilizers and pesticides used, and standard irrigation system materials, among other things. To compare the environmental burdens generated in the study region without and with irrigation, the LCA approach was used. LCA is the study and evaluation of the environmental consequences of a specific process, product, or activity. The goal of LCA is to quantify these effects by creating a complete spectrum of environmental and social harm, allowing for comparison of competing goods, and ultimately selecting the one with the least environmental impact. Guinea provides further information about LCA. The cultivation of 1 ha throughout the course of a year is the functional unit of this research, to which all material and energy fluxes are related. Wheat and corn were evaluated as the major non-irrigated crop and the main irrigated crop in the region, respectively, with differing auxiliary material and energy use. The functional unit, which ultimately represented [4].

Findings in kg CO<sub>2</sub>-equivalent/ha year and cubic meter of water year, allowed the two models to be compared. There are many techniques for assessing environmental effects in LCA, each of which employs a distinct set of environmental criteria to assess and analyze various environmental factors. The conversion factors provided by the IPCC are used in the first characterization technique selected for this research. Analyzes the direct global warming potential of gaseous emissions by combining emissions using a standard measure. CO<sub>2</sub> is selected as the reference substance, with GWP 100 indicating the substance's potential contribution to global [5].

This indicator has a worldwide reach. The water scarcity indicator (WSI), developed by, and was selected as the second characterization technique. The WSI is a water footprint technique that calculates the percentage of used against available water. The emphasis was on the shortage of blue water, which includes water from rivers, lakes, reservoirs, and groundwater. The indicator was solely used to evaluate consumptive water consumption and was applied to the amount of water drank. Water needed to absorb contaminants entering water bodies and scarcity of direct precipitation was not taken into account. It was able to construct inventories to compare the condition of the region with and without irrigation thanks to the many studies conducted in the Lerma basin before, during, and after its transition into an irrigated area. Collaboration with the irrigation district administration and the 55 farmers who were in charge of the plots in the research area was crucial. Wheat was selected as the reference crop for the scenario without irrigation since it was the primary rainfed crop in the basin prior to transformation. Maize was chosen to symbolize the basin's irrigation condition since corn is the area's primary irrigated crop. The sprinkler system was the primary irrigation system used. An inventory was created to keep track of the goods and equipment that were actually utilized in the basin [4].

This process begins with 1 kWh of energy supplied into the high-voltage transmission (distribution) network and concludes with 1 kWh of low-voltage electricity transported via

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cables and aerial lines in the transmission network. This dataset contains electrical inputs generated in Spain, as well as imports and conversions to other currencies.

## 2. DISCUSSION

And combine harvester, as well as grain transport from the field to the regional processing center and drying. In addition, direct field emissions are taken into account. Seeds are processed (pre-cleaning, cleaning, drying, and chemical treatment in the processing center. Storing it and transporting it to a regional storage facility centre. The receipt of precursors is part of the glyphosate manufacturing process. Decarbonizes water, acetic anhydride, ammonia, chlorine, formaldehyde, phosphorous chloride, sodium hydroxide near the factory's entrance The input materials are included in the dataset. Energy consumption, infrastructure, and pollution are all factors to consider. The information in the dataset is accurate. emulsifiers and additives are not included. Discussion of the findings When carbon footprints were compared, it was discovered that they were quite similar.

The two scenarios have similar negative environmental consequences. The resultant emissions for wheat without irrigation were 1340 kilogram CO<sub>2</sub>-equivalent/ha year, while the corresponding emissions for irrigated corn were 1340 kg CO<sub>2</sub>-equivalent/ha year. In these illustrations, the thickness of the lines is shown. The intensity of the connecting lines is proportional to the intensity of the intensity of the intensity of the intensity of the intensity of the effect on the environment Fertilization was the most important factor in wheat production. Urea contributes about 5% of the carbon footprint Compound fertilizers have a 9 percent effect on these consequences. The sum total contribution of fertilizers to wheat-related effects In the study basin, output without irrigation was 87 percent. Seeds accounted for 13% of the total, indicating that they play a major role. Impacts from an input that isn't usually taken into account environmental research Herbicides made up just 0.13 percent of the total. negative consequences The low value was attained as a result of the low value. Manufacturer-recommended application rates were followed. Farmers are to blame. Fertilizers were also a major contribution to irrigated corn production. liquid fertilizers contribute to the carbon footprint, accounting for Compound fertilizers are responsible for 18% of the unfavorable effects and 69 percent of the negative consequences. Herbicides provided 3%, whereas seeds contributed 3%. Only 1% of the population was involved. Considering the Spanish, the electrical 7 percent of the effects were due to the national electricity mix. As most power is generated, this is a rather high value. The consumption refers to the area's usage of hydraulic pumps. Irrigation in the Lerma basin needs forced pressure. The last component included in the evaluation of irrigated corn contributed an unexpectedly low amount to the total. Effect on the environment Irrigation is a term used to describe a component.

The typical materials that make up the system Sprinkler irrigation system for Lerma corn basin. Only 1% of the total negative was due to this factor. 17 kg CO<sub>2</sub>-equivalent/ha year is a measure of the effect. The The evaluation took into account the hydrants' whole life lifetime, 35 For each acre examined, sprinklers and 800 meters of piping were installed. The materials' 30-year lifespan, on the other hand, guaranteed that the comparable emissions were dispersed (diluted) across a large area. As a consequence, the yearly numbers given here are low. Fertilization was the primary cause of the unfavorable effects seen in both instances. The natural world the effects of fertilization in the Lerma basin on local wildlife other evaluations have previously looked at water resources.

These researchers have identified the seasons and regions of the basin during which the amounts of nitrate in water and the amount of nitrogenous pollutants exported were both higher. Impaction the research region, nitrogen application rates, particularly urea in the case of wheat, and liquid fertilizer application rates should be prioritized. In the case of irrigated corn, fertilizers are used. In a study of 94 soybean varieties, found that Fertilization was also identified as a source of pollution in Iranian fields. Among the field practices, it has the greatest CO<sub>2</sub>-equivalent. The creators indicated that switching to other fertilizer sources might be beneficial. A means of lowering emissions Different LCA indicators were used to rainfed and irrigated rice by They discovered that fertilizer manufacture and application for the bulk of overall energy use, as well as a significant portion of it Acidification, eutrophication, and global warming all contribute to ozone depletion, freshwater aquatic ecotoxicity, and a little amount to acidification, eutrophication, and global warming. Warming potential, according to the current climate. At the field level, there are direct emissions.

Through nitrogen fertilizers; the greatest significant contribution to GWP100 was made. In conventional production scenarios, the largest negative effects were mainly produced by fertilizers, while in organic production, the primary negative impacts were caused by pesticides. Machinery and irrigation energy use resulted in responsible emissions. Furthermore, both scenarios have undesirable consequences. The results of the current research may be interpreted in a variety of ways. A variety of ways, depending on how much emphasis is placed on the value gained as determined by the LCA When the two scenarios were compared in terms of farmed area, it was shown that irrigated corn represented a significant advantage [6].

However, taking into account each crop's average output and, in particular, gross revenue per acre, hectare, it is clear that the revenue is almost 10 times greater. Instead of a little decrease in carbon footprint it's essential to note that the expenses of irrigated corn are not the same as the costs of non-irrigated maize. Are greater, and the disparity in net earnings would inevitably widen. Recruiting new farmers to the research region and surrounding areas, as well as current farmers to irrigated agriculture. Irrigated corn is generally the farmers' favored choice [7].

This obviously encourages the development of additional irrigated land territories in the northeastern part of Spain Because the Lerma basin is emblematic of the modern irrigated agriculture, the findings may be extended to other parts of Northeast Spain. The findings revealed that non-irrigated wheat was to blame. Irrigated corn produced 1340 kg CO<sub>2</sub>-equivalent per hectare per year, while non-irrigated corn produced 1700 kg CO<sub>2</sub>-equivalent per hectare per year. It's worth noting that, although total corn emissions were lower [8].

When these effects are divided by the number of productions, the result is greater. It was discovered that 0.893 kg CO<sub>2</sub>-equivalent/kg of wheat grown was generated. Irrigated corn produced 0.121 kilogram CO<sub>2</sub>-equivalent/kg CO<sub>2</sub> acquired. Analysis of the carbon footprint flowchart showed that the usage of fertilizers, which is widespread in agriculture, contributed the most to environmental effects. Both crops were investigated. Other fertilizer sources may be used. Be a viable alternative for reducing emissions; nevertheless, farmers' reluctance to shift has been highlighted as a potential roadblock. their customary/customary procedures The significance of the connection between the findings and long-term sustainability The giving of a fresh perspective into fertilizer use and application in both irrigated and non-irrigated agriculture is a development in the irrigated and non-irrigated agricultural setting [9].

Irrigation and fertilization methods have an effect on agricultural operations' environmental impact. There are a number of things that may be done to alter or enhance the current condition. Additional research into the use of sludge from effluent treatment plants in businesses or even the use of sewage sludge because pig farming is a widespread activity in the region, there is a lot of pig excrement. Using the WSI, it was discovered that irrigated maize had much more negative environmental effects. For a blue, these outcomes were somewhat anticipated. 7500 m<sup>3</sup> of water footprint/ha of irrigation water per year. In the region, it was used to grow maize. As previously stated by The affect disparities between the two, according to if green water was taken into account, crops would not be so far away. Nonetheless, and the WSI remains a reliable predictor of blue water. Rainfed crops and improving water use efficiency in the research region, demonstrating the significance of rewarding rainfed crops and boosting water use efficiency in basins with a scarcity of water. The WSI per output is divided, 0.097 m<sup>3</sup> per kilogram of 0.728 m<sup>3</sup> of wheat was produced. Produced per kilogram of irrigated corn [10].

### 3. CONCLUSION

Due to rising worries about the environmental effects of contemporary society's expectations, life cycle assessment is being used more often to identify the most ecologically unfriendly activities and to evaluate impact reduction methods in a variety of industries, including agriculture. In Northeast Spain, this paper used the LCA technique to assess the carbon and blue water footprints of irrigated and non-irrigated agriculture. Concerns about climate change and water usage led to the selection of these categories. Environmental data was gathered over a 12-year period from live monitoring of a 7.38-km<sup>2</sup> basin, which included the time before, during, and after irrigation. This study's main data richness is a significant addition. The functional unit was the cultivation of one hectare over the course of one year. Non-irrigated wheat (which included production and transportation chains for seeds, fertilizers, and herbicides) and irrigated corn (which included production and transportation chains for seeds, fertilizers, herbicides, irrigation water, and electricity, as well as irrigation infrastructure such as pipes, hydrants, and sprinklers); results were expressed in kg CO<sub>2</sub>-e. The carbon and water footprints of producing 1 kg of non-irrigated wheat in the Lerma basin were 0.893 kg CO<sub>2</sub>-equivalent and 0.097 m<sup>3</sup>, respectively. The carbon and water footprints for 1 kg of irrigated corn production were 0.121 kg CO<sub>2</sub>-equivalent and 0.728 m<sup>3</sup>, respectively.

The total carbon footprint connected with material and energy flows was greater for irrigated corn, but when considering the increased productivity obtained with irrigation, the emissions per kilogram of corn drop, favoring this irrigated crop. When considering just the water footprint, however, the quantities of irrigation water used are so large that productivity cannot compensate for the negative effects of water usage in the case of corn; no irrigated wheat has the least negative impacts before and after considering productivity. This raises concerns about the development of irrigated regions in Northeast Spain's long-term viability. However, from the viewpoint of the farmers, the economic advantages show the opposite: when the average output of each crop was combined with gross revenue per hectare, irrigated corn produced almost 10 times more money. In the instance of carbon foot printing, this may be much more appealing to the farmer than a little decrease in environmental effects.

Farmers' buy-in is critical for any global warming mitigation strategy involving changes in fertilization and water use to succeed. However, any additional investment will compete with other options that may prove to be more economically appealing, which could be another barrier



to cleaner production. Special regulations or standards may play a significant role in reducing agricultural carbon and water footprints. Future research will involve the use of other environmental impact assessment techniques to see whether the proportions of effects are maintained when looking at broader viewpoints, such as environmental and human health harm.

## REFERENCE:

1. A. Acquaye ., “Measuring the environmental sustainability performance of global supply chains: A multi-regional input-output analysis for carbon, sulphur oxide and water footprints,” *J. Environ. Manage.*, 2017.
2. J. E. Box and G. W. Langdale, “The effects of in-row subsoil tillage and soil water on corn yields in the southeastern coastal plain of the United States,” *Soil Tillage Res.*, 1984.
3. R. O. Amoroso ., “Bottom trawl fishing footprints on the world’s continental shelves,” *Proc. Natl. Acad. Sci. U. S. A.*, 2018.
4. I. Cazcarro, R. Duarte, M. Martín-Retortillo, V. Pinilla, and A. Serrano, “How sustainable is the increase in the water footprint of the Spanish agricultural sector? A provincial analysis between 1955 and 2005-2010,” *Sustain.*, 2015.
5. Z. Lü, W. Pan, X. Zhang, X. Li, and J. Zhang, “The effect of cropping landscapes on the population dynamics of the cotton bollworm *helicoverpa armigera* (lepidoptera, noctuidae) in the northern Xinjiang,” *Shengtai Xuebao/ Acta Ecol. Sin.*, 2012.
6. G. V. Johnson and W. R. Raun, “Nitrogen response index as a guide to fertilizer management,” *J. Plant Nutr.*, 2003.
7. X. Li, C. Hu, J. A. Delgado, Y. Zhang, and Z. Ouyang, “Increased nitrogen use efficiencies as a key mitigation alternative to reduce nitrate leaching in north china plain,” *Agric. Water Manag.*, 2007.
8. R. Abrahão, M. Carvalho, and J. Causapé, “Carbon and water footprints of irrigated corn and non-irrigated wheat in Northeast Spain,” *Environ. Sci. Pollut. Res.*, 2017.
9. E. Fathelrahman, A. Davies, S. Davies, and J. Pritchett, “Assessing climate change impacts on water resources and Colorado agriculture using an equilibrium displacement mathematical programming model,” *Water (Switzerland)*, 2014.
10. B. D. Wardlow and S. L. Egbert, “Large-area crop mapping using time-series MODIS 250 m NDVI data: An assessment for the U.S. Central Great Plains,” *Remote Sens. Environ.*, 2008.



## A REVIEW ON THE EXPERIENCE OF AGENCY IN HUMAN-COMPUTER INTERACTIONS

**Alok Singh Sengar\***

\*Assistant Professor,  
Department of Computer Engineering,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [aloks.computers@tmu.ac.in](mailto:aloks.computers@tmu.ac.in)

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### ABSTRACT

*The feeling of being able to influence both one's body and the external world is known as agency. Although the feeling of agency has been widely researched, there are few studies in "real-life" circumstances. Human-computer interaction (HCI) seems to be a very important applied topic, since technology is being used in our daily agentive interactions. Indeed, the sense of control has long been acknowledged in HCI as a crucial element in how humans engage with technology. The goal of this study is to summarize and investigate the potential connections between feeling of agency and control understanding in HCI. For computer input modalities and system feedback, computer help, and collaborative activities between people and computers, we investigate the overlap between HCI and feeling of agency. How agency research may inform HCI and vice versa is an important concern. Finally, amid an ever-increasing society of technology users and intelligent machine interfaces, we explore the possible ethical implications of human responsibility.*

**KEYWORDS:** Agency, Computer Assistance, Joint Action, Human Computer Interaction, Technology.

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### 1. INTRODUCTION

The feeling of being able to influence both one's body and the external world is known as agency. Due to the understanding that a distorted sense of agency is essential to diseases like schizophrenia, this experience has gotten a lot of attention in the area of cognitive neuroscience. A basic element of self-awareness is the feeling of agency, which is an essential part of human consciousness in general. We'll concentrate on the feeling of agency for controlling the external environment in this assessment. This is due to the fact that it is most relevant to the human-computer-interaction (HCI) problems we are discussing.

The feeling of agency is an important factor to examine when evaluating how humans interact with technology, which is a major emphasis of HCI research. Designers should aim to develop computer interfaces that "enable an internal center of control," according to the sixth of Shneiderman's Rules of Interface Design. Users "particularly want the feeling that they are in

control of the system and that the system reacts to their activities," according to the study. The fact that an increasing number of our daily agentive encounters include technology makes our knowledge of agency in HCI all the more important. The basic process of generating an action to produce a desired result is endowed with a wide host of potential factors that may significantly change the agentive experience during interactions with technology. As a result, both cognitive neuroscience and human-computer interaction (HCI) are interested in learning more about how people perceive agency and control over action execution. The goal of this review is to look at the connections between sense of agency and HCI in cognitive neuroscience and to suggest some new research paths [1]–[3].

We argue that investigating the feeling of agency via an interdisciplinary mix of HCI research and cognitive neuroscience may offer a rich and promising new study topic with the potential to influence both disciplines in innovative ways. The novel interaction approaches quickly being created in the area of HCI, such as gestural input, physiological or intelligent interfaces, and support methods, will enhance research into the feeling of agency. As a result, new methods of generating activities may be included in such study. Furthermore, putting agency to the test in more "real-world" situations may provide fresh insights on the nature and limits of agentive experiences in daily interactions. HCI research may also benefit from the relative maturity of neurocognitive research and the development of trustworthy measures for the experience of volitional control. Incorporating such measures in future study will inspire HCI researchers to examine the feeling of agency as a measurable experience. Understanding the neurocognitive processes and mechanisms that underpin this experience also serves as a valuable source of evidence and a guide for interface design. The theoretical and methodological basis of research on the feeling of agency is briefly discussed in the first part of this article [4]–[7]. The implications and areas of overlap of these theories and techniques for three particular areas of HCI study are then discussed:

- (1) Input modalities and feedback from the system;
- (2) Computer support; and
- (3) Agency attribution and collaboration.

## **2. INPUT MODALITIES AND SYSTEM FEEDBACK**

The significance of input modalities is the first point of contact between the feeling of agency and HCI that we want to discuss. The sensors or devices that the computer uses to accept input from humans, such as a keyboard or mouse, are known as input modalities. The input modality is crucial to the process of creating actions in order to achieve the user's intended state changes in the computer, and therefore to the feeling of control over the action. The goal of HCI research is to figure out how to best convert psychological states (such as intentions) into computer state changes. One of the difficulties of HCI is to bridge the gap between the user's intentions and the system's state in terms of form and content. The Gulf of Execution is the name given to this split. The system's input modality is crucial for crossing the Gulf of Execution.

“To do anything, whether it's simply to say something or to complete a complicated motor sequence, is to execute an action. The kind of input devices used on the system determines what physical activities are needed, and this may have a significant impact on the system's usefulness.

Because certain physical acts are more difficult than others, the input devices used may influence the actions chosen, and therefore the system's ability to match intentions.”

Control is made easier using a computer interface. It offers a collection of methods via which a human may influence a system's belief in a user's intentions towards a desired state over time. Control necessitates both user display and user input; computers provide state feedback to a user, who then adjusts his or her actions to achieve the desired change of state.”

HCI researchers have created a variety of novel interaction methods and gadgets in recent years, such as voice and gesture control. These are quickly becoming commonplace, with daily gadgets like as smart phones (Apple's Siri), TVs (Samsung's Smart TV), PCs (Leap Motion), and gaming consoles all having the ability to be controlled via such interaction (Microsoft Kinect). HCI researchers face new difficulties with each new way of managing technology. Various methods of “bridging the Gulf of Execution” are available with new input modalities, including different action initiation criteria, feedback systems, and device capabilities [8]–[10].

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## **2.1. Modalities of Input:**

An experiment is performed using intentional binding as an implicit measure of users' feeling of agency for two different input methods to begin addressing the effect of input modalities on sense of agency. Participants in one condition pushed a key on a keyboard to produce an outcome (a beep). Participants in the second condition wore a skin-based input device and tapped their arm to make it beep. The results indicate that purposeful binding was considerably higher for skin-based input than for keyboard input, suggesting that skin-based input provides a better feeling of agency. This is intriguing from the standpoint of input design since it suggests that skin-based input is seen as much more responsive than button-based input. It also showed how deliberate binding might be used to measure this difference. This approach may be used to evaluate and quantify differences for a broader variety of interaction methods in the future, including subtler alterations than those examined here. For example, we might compare the sense of agency while using a pen vs. using a direct finger to engage with a touch screen, or compare interactions that use haptic, embodied, or physiological input. When additional variables of the interactions vary, such as system feedback, reliability, or latency, we may also compare the various interaction experiences for a particular input method. These options are given further thought in the sections following.

The discovery that skin-based input leads to increased purposeful binding raises intriguing concerns about the cognitive mechanisms that underpin the feeling of agency. One potential explanation for the greater feeling of implicit agency assessed in skin-based input is that there is a higher degree of congruence between the internally anticipated sensory output of the action and the actual sensory output of the action when performing a self-directed, skin-based action. When a person is more sensorially aware of their actions, intentional binding may be enhanced.

Another interpretation, which is consistent with the cue integration theory for agency, is that in the skin-input situations, participants get extra sensory agency signals from the passive limb, which serves as the input modality. This may help to boost a person's feeling of control. A final theory is related to the discovery that acts directed towards oneself are associated with greater motor system activity. Given how strongly sensorimotor processes are linked to feelings of agency, greater activity in this system may boost feelings of agency. All of these are things that we are looking at right now. Regardless of the reason, this research demonstrates how the novel forms of interaction being created in HCI may open up new lines of inquiry for the neurological understanding of agency.

## **2.2. Reliability:**

Because the interaction needs the computer's sensors to detect and then categorize the user's intention, which is not always obvious and frequently noisy, many input methods suffer from different degrees of dependability. Consider a voice interface and the many potential accents that the user could have. A speech system that can handle a wide range of accents is likely to result in more misclassifications of people's words. Initial training periods or giving the system additional time to identify utterances may improve the reliability of speech systems. However, this decreases the voice input system's responsiveness. A gesture recognition device, such as the Microsoft Kinect, is needed to detect a broad variety of mid-air motions in a comparable way. Even with basic motions, various individuals will perform the gesture in different ways. A system that allows for greater flexibility in action execution will be more versatile, but it may also lead to more misclassifications of people's activities. As a result, designers of such systems must make trade-offs between limitations like precision and flexibility, both of which have an impact on system dependability.

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## **2.3. Feedback from the System:**

Controlling a computer system needs feedback in addition to input to notify the user of the system's present state, the actions needed to alter the system's state in accordance with their goals, and the success of those actions. The user may then utilize this information to alter their subsequent actions in order to achieve the next desired result. The method of feedback and the information provided by the interface about the system's status are both significant considerations in HCI. Norman defines the Gulf of Evaluation as a counterpart to the Gulf of

Execution, referring to a mismatch between the system's input on its current status and how the user perceives it in terms of their expectations and intentions. Depending on the interface, context, needs, and user expectations, the Gulf of Evaluation will be different. A mobile phone interface and an automated flight deck, for example, will have vastly different Gulfs of Evaluation, necessitating the presentation of various types of feedback to the user.

When consumers engage with technology, they usually perform an action and then get sensory input on that activity. Several research in cognitive neuroscience have looked at the consistency between anticipated and actual sensory input during action execution. Surprisingly, empirical data suggests that participants' sense of agency is flexible, and that feedback may be skewed, causing them to misattribute their own acts to another actor or vice versa. When an action's result differs from the participants' expected sensory outcome, agency may be ascribed to an external source.

## **2.4. Latency:**

The delay imposed between the action and its subsequent consequence is another element to consider when evaluating input modalities and the feeling of agency. Due to technical limitations inside the system, latency is often highlighted as a problem in HCI.

Perceptual limitations such as attention span and memory load may be harmed as a result. As a result, another important issue in HCI research is how to effectively overcome delay in a manner that is compatible with the user's perceptual abilities. Roto and Oulasvirta's (2005) early work on web surfing on a mobile phone is an example. The speed of the network connection, the phone's processing capabilities, and the user's visual attention span were all recognized as temporal limitations. They discovered that after 4–8 seconds, a user's attention moves away from a screen. Page download times for mobile web surfing were above 5 seconds at the time of their study. Multimodal feedback, according to Roto and Oulasvirta, is one option, with tactile input (vibration) helping to minimize the requirement for visual focus beyond what is normal.

Neurocognitive experimental methods, like the web-browsing example, offer the ability to verify design choices about latencies in a variety of situations. For a simple button-pressing activity, empirical data suggests that the intentional binding phenomena breaks down after 650 milliseconds. However, for a dispute resolution task, there is evidence that purposeful binding is still intact after 2250 ms. Understanding how the feeling of agency operates and is modified across time-scales is critical for effectively overcoming the impact of delay on control. In many instances, latency choices will also entail trade-offs with system feedback and dependability. For example, an input classification system may be made more reliable by giving it more time to classify people's activities accurately, but this would raise the system's latency.

## **3. DISCUSSION**

This study has uncovered a new field of applicability for agency research: human-computer interaction (HCI). This study has concentrated on a few possibilities to explore the feeling of agency in HCI contexts; however, this is by no means a comprehensive list. Techniques for interacting with others are rapidly developing. Neurocognitive experimental methods and implicit metrics such as intentional binding have the potential to influence the design of a broad variety of new technologies once their validity and advantages are proven in HCI contexts. They



will also provide designers important information into how people engage with technology, allowing them to better customize interaction experiences.

Human-computer interaction (HCI) is focused with creating new or enhancing existing interfaces between people and computers. As a result, this article suggests that while designing new interfaces or enhancing current ones, the user's sense of agency should be taken into account. While explicit metrics like as verbal reports are now used in HCI to evaluate agencies, implicit measures are much less common. This paper reviews the limited number of previous studies that cross over between HCI and sense of agency research. Intentional binding has been the main measure of implicit feeling of agency in the research examined. For tasks that demand actions and outcomes on a sensorimotor (e.g., sub-second) timeframe, intentional binding has been successfully reproduced. As a result, it's an excellent way to evaluate feeling of agency in the numerous HCI activities that need agentic interactions on this timeframe. However, we acknowledge that certain HCI activities must take place across longer timeframes, and thus deliberate binding may be less helpful for these tasks. Consider a computer game or robotic surgery, both of which integrate discrete efforts to accomplish a longer-term objective. The user experience will be influenced by the user's immediate sense of agency in specific acts as well as their power over the longer-term objective. Alternative measures, both implicit and explicit, will be investigated further to see whether they are more suited to HCI study on these types of situations.

#### 4. CONCLUSION

Finally, there is a personal responsibility component to researching feeling of agency and HCI in an ever-increasing society of technology users and intelligent machine interfaces. When the line between computer-controlled and human-controlled activities blurs during computer help or collaborative action, significant legal and social issues about agency and accountability arise. This is especially true in life-or-death situations. Take self-driving vehicles, for example, which automate the driving process. One problem in HCI is to find the best methods to display the interface such that humans may maintain their distal sense of control while leaving the proximal sensorimotor control to the machine. However, a balance must be found such that the human "driver" maintains enough feeling of responsibility to guarantee the car's safe functioning. Understanding how the feeling of agency changes over time while engaging with a semi-automated system will be useful in determining how much time should be spent on such interfaces. There are many instances of the repercussions of bad interface design in safety critical circumstances in the HCI literature, the most notable of which being the partial nuclear meltdown at Three Mile Island. Conflicting information from a control panel that operators had grown to trust and depend on led to early operator inactivity and delayed reaction to the developing situation. While the effects would seldom be as severe, the possibility of a decrease in human accountability as a result of increasing contact with intelligent interfaces is an interesting topic for future research. HCI and agency research will be crucial in influencing and informing choices in this area.

#### REFERENCES:

1. K. Li, A. Tiwari, J. Alcock, and P. Bermell-Garcia, "Categorisation of visualisation methods to support the design of Human-Computer Interaction Systems," *Appl. Ergon.*, 2016, doi: 10.1016/j.apergo.2016.01.009.



2. H. Limerick, D. Coyle, and J. W. Moore, "The experience of agency in human-computer interactions: A review," *Frontiers in Human Neuroscience*. 2014, doi: 10.3389/fnhum.2014.00643.
3. A. Jaimes and N. Sebe, "Multimodal human-computer interaction: A survey," *Comput. Vis. Image Underst.*, 2007, doi: 10.1016/j.cviu.2006.10.019.
4. A. Dix, "Human-computer interaction, foundations and new paradigms," *J. Vis. Lang. Comput.*, 2017, doi: 10.1016/j.jvlc.2016.04.001.
5. S. S. Rautaray and A. Agrawal, "Vision based hand gesture recognition for human computer interaction: a survey," *Artif. Intell. Rev.*, 2015, doi: 10.1007/s10462-012-9356-9.
6. A. Henderson, "Interaction design: beyond human-computer interaction," *Ubiquity*, 2002, doi: 10.1145/512526.512528.
7. D. Bachmann, F. Weichert, and G. Rinckenauer, "Review of three-dimensional human-computer interaction with focus on the leap motion controller," *Sensors (Switzerland)*. 2018, doi: 10.3390/s18072194.
8. H. Bansal and R. Khan, "A Review Paper on Human Computer Interaction," *Int. J. Adv. Res. Comput. Sci. Softw. Eng.*, 2018, doi: 10.23956/ijarcsse.v8i4.630.
9. A. Haria, A. Subramanian, N. Asokkumar, S. Poddar, and J. S. Nayak, "Hand Gesture Recognition for Human Computer Interaction," 2017, doi: 10.1016/j.procs.2017.09.092.
10. M. J. Smith, F. T. Conway, and B. T. Karsh, "Occupational stress in human computer interaction," *Industrial Health*. 1999, doi: 10.2486/indhealth.37.157.

## INDIANS IN CANADA: LAYING FOUNDATIONS OF A COMMUNITY, 1905-08

Dr Archana Verma\*

\*Associate Professor,  
Department of History, Hindu College,  
University of Delhi, Delhi, INDIA  
Email id: [arbverma@yahoo.co.in](mailto:arbverma@yahoo.co.in)

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### ABSTRACT

*The Indian immigration to Canada is a twentieth century phenomenon, beginning about 1904-05 and reaching increased numbers by 1908 and then abruptly declining within the next year essentially because Canadian exclusionary policies barred immigration from India in 1908 through manipulative policies. The Indians were shovelled out of Canada as opposition to their entry acquired a virulent form. The Canadian labour, backed by the press, politicians, provincial and federal governments, and the citizenry in general, demanded exclusion of Indians from Canada. This happened because at the time racial homogeneity was a widely shared value among white Canadians and exclusion of people, belonging to non – white races, was accepted as something given. Before the arrival of Indians, Canadians had already identified Chinese and Japanese as the unwanted and it did not take them long to slot Indians in the same category. After 1908 Indian immigration to Canada remained closed for almost half a century till it resumed in 1960s. The paper concentrates on the early phase of Indian immigration to Canada and argues that despite virulent racism directed against them, the Indians managed to lay the foundations of their community at a time when Canada and India were British colonies.*

**KEYWORDS:** *Canada, Canadian Immigration, Indian Emigration, Indian Immigrants, British Columbia, Vancouver, Punjab, Punjabis, Sikh Immigrants, Indian Diaspora.*

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### INTRODUCTION

The saga of Indian immigration to Canada in the early years of the twentieth century reflects two opposites – one of anguish and trauma and the other of change and adjustment. Indians were not the desirable immigrants that Canada sought at the time. Yet Indians ready to take risks to better their lives were able to set themselves up as a community, though a very small one, in the land of their destination. During the early phase of their arrival in Canada almost all Indian immigrants were single men falling in the age range 14-44 years, with most belonging to the age group of 20 to 29 years.[1] They had entered Canada as sojourners and were not accompanied by their families, wives or children. This feature easily separated Indians from other immigrants, the Europeans in particular who were entering Canada in hundreds and thousands accompanied by their families, intending to settle down and make Canada their home.

However, what differentiated Indians from other Europeans was that they had ventured out of a British colony. Their colonial status as British subjects meant that they had entered the perfect world i.e. Canada with the queen of England as head of the country just like India. What made their condition even more significant was that they had entered Canada with hopes of making good fortunes and return home. Even though they faced difficulties in adjustments to the new destination they had arrived in, they hoped for a congenial treatment at the hands of other colonials. This feature also fundamentally differentiated Indians from other Asian immigrants in Canada like Chinese and Japanese. Yet immigrants from the colony of British India were perceived as undesirables by other Canadians. It was their very colonial status as British subject races that became the thorn to make Canada, a Dominion country at the time, to devise difficult situations for Indians, so much so that Canada ended up conniving with British colonial authorities to stop Indian immigration by 1908.

The arrival of first Indians in Canada is documented to 1904 – 05 when Canadian immigration recorded 45 entrants from India. By the year 1905 -06 this number became 387, perhaps not of much concern. But when the Canadian immigration reported these numbers to have risen to 2124 in 1906 – 07 and then to 2,623 in 1907 - 08, with the news of many more Indians on the way, Canadians not only took note of it they actually became alarmed to the extent of becoming anxious. By 1908 they halted the movement completely through an order -- in – council after which the number of Indian arrivals faced a steep fall, with the figure being recorded as just 6 entrants in 1909. [2] Following this, Indians were not allowed entry in Canada for the next forty years. Although a new law was promulgated in 2018 but that limited legal entry to only wives and children of the immigrants already present in Canada. Other than this, legal entry of Indians remained closed at least till the mid – twentieth century. Those who chose to remain in Canada in 1908 could be counted on fingertips.

Indians had entered Canada as voluntary immigrants. This meant that Indian immigration to Canada was not regulated by any outside agency, nor did any potential Canadian employer induce Indians through a job contract. In most cases the immigration developed in the form of a chain migration. The few who entered in 1904 – 05 became the medium to spread the news back home through letters that labouring jobs were aplenty in Canada with prospects to earn good money. By early 1906 some returning Indians carried the news home about Canada, thus helping generate interest in others to follow. This did not mean that all emigrants returned home wealthy, there were some who returned empty handed too. [3] But their numbers remained small with the result that many felt enticed to try their fortunes believing in the prospects of good pay and bettering their lives overseas.

What facilitated the departure of emigrants from India was the role of Canadian shipping agents that had offices opened in Calcutta such as Messrs. Gillanders and Arbuthnot Company or Messrs. Thomas Cook and Sons. These agents were in regular touch with their counterparts in the Vancouver city located on Canada's west coast province of British Columbia like the Canadian Pacific Railway or the Canadian Pacific Steam Navigation Company which appeared willing to carry Indian passengers on their steamers. It is stated that in the year 1907 alone, Messrs. Gillanders Arbuthnot had sold somewhere around 1200 tickets to Indians although not promising anything about job prospects in Canada. [4] The shipping agents could not recruit immigrants as contract labour for Canada under the British colonial law in force in India at the time. The agencies were also barred from advertising such types of news in the local newspapers

nor were they allowed to circulate any notice advertising Canada in India. They could not take any immigrant at personal level as well. [5]

This meant that emigrants moved to Canada on their own risk, though shipping agents did inform the emigrants about essential requirements regarding debarking at their destination. When left on their own the shipping agents encouraged those who could show their medical fitness certificates or those who could certify that they carried fixed amount of money that was meant to be declared before the Canadian immigration officials so that the immigrant was not presumed to be a beggar. It is to be noted that most shipping agencies active at Calcutta looked after departing ships going to many overseas countries, but not to Canada as at the time a direct shipping line between India and Canada did not exist. There were two embarkation points for onward journey to Canada, one at Calcutta and the other at Hong Kong. [6] This meant that intending Indian emigrants had to break their journey from Calcutta at Hongkong and board another ship that carried them to the Pacific coast of Canada where immigrants disembarked in British Columbia.

The batch of 45 in the vanguard of Indian influx to Canada had selected the Canadian Pacific Steamship steamer line *Empress of India*. It is said that their arrival went unnoticed. But the next batch that reached by the same steamship steamer line seemed large enough to warrant official attention. In 1905 – 06 the Canadian Year book listed Indian numbers as 387. [7] However, the census returns of the period are not very helpful in ascertaining the background of Indian immigrants. By the time small trickles turned into large clusters, the Canadian census enumerators were describing Indians as Hindus and Sikhs. Sometimes these categories overlapped, at other times the listing clubbed all Indians as Hindus, at times they were listed under separate religious categories. Be it the district wise distribution of Indians or their patterns of settlements in British Columbia's major cities like Victoria or Vancouver, the Canadian census are not of much help to find details about Indian immigrants. At best these offer information about their numbers. [8]

In any case, it would not have been possible for an ordinary Canadian to distinguish Hindus from Sikhs had it not been for the dress they wore. Nearly 90% of the Indian arrivals were estimated to be of Sikh background, the rest were Hindus, along with a scattering of Muslims. Ethnically, Indian immigrants appeared as a homogenous lot as described in Canadian newspaper headlines, "... wearing light coloured European style clothes, bearded and turbaned". [9] Among the Sikhs, their largest numbers came from the Punjab region of India with most declaring their places of origin as the local districts of Hoshiarpur and Jalandhar. Some Sikhs were also listed from the districts of Ferozepur, Ludhiana and Amritsar. A few had arrived from Ambala, Patiala or Lahore. [10] Given the geographical and regional scale, these districts were part of the central and submontane Punjab. Geographical proximity in the areas of immigrants' origin as well as regional sense as 'Punjabis' accorded solidarity ties to majority Indian immigrants. However, within the community there were distinctions between Nanak Panthis and Khalsa Panthis, also dialects in the language varied. [11] Nevertheless, the fact was that majority hailed from the Punjab in India.

It is informed that most Indian immigrants to Canada came from the farmer class. [12] They were in search of greener pastures wanting to escape the life of drudgery under the British colonial rule in India. The Punjabi farmer immigrants had left behind a world where they were deep in debt, facing economic hardships because of small and fragmented land holdings created due to rising population pressure. From 1890s, the situation of majority farmers in the Punjab

was considered precarious as they were susceptible to the vagaries of nature. Recurring famines, crop failures, short harvests, scarcity of fodder, cattle mortality, rising food prices were primary contributors to make life difficult for farmers in the Punjab. On top of this wheat exports began to fall and the farmers found themselves bound to the trappings of the money lenders from which the colonial government offered no respite. Rather the government's revenue department used coercive measures to issue warrants and writs to farmers in order to continue collecting land revenues, that too at enhanced rates. [13] These factors served as the necessary 'push' motivating Indian farmers particularly from the Punjab to look for greener pastures away from their own moorings. Under the British colonial rule, emigration out of Punjab appeared to lot of farmers as the most preferred resort in order to become able to provide necessities of life.

Moving overseas was perhaps an easy option for the emigrants from the Punjab, familiar as they were to long distance migratory trends even before the dawn of the twentieth century. Much before they came to know of Canada, Punjabi Indians had been working as carpenters and electricians in East Africa. Many had found their niche in the hardware business in Bangkok. In Malaya they were found employed as car drivers, dairymen and also as mine - labourers. They were found working as policemen, watchmen and caretakers in Singapore and also at Hongkong. [14] It was from Hongkong that majority Indian immigrants having large number of Sikhs among them ventured out to Canada using the facility provided by the Trans Pacific Passenger Service in operation since 1891.

How Indians came to know about Canada may never be known but, the legend goes that in 1897 Indian troops sent by colonial Britain to represent India in the celebration of Queen Victoria's Diamond Jubilee in London had passed by the Pacific west coast of Canada. The Indian troops had covered their journey by the *Empress of Japan* and had even disembarked very briefly at Vancouver. During their very short stay the city's newspaper coverage gave them positive coverage – "Turbaned Men Excite Interest" -- indicating that the Indian contingent consisted mainly of Sikhs though Muslims were also part of it as the contingent was led by Sardar Major Kadir Khan Bahadur. The contingent had returned to Hongkong on the steamer *Empress of China*. [15] This short journey for Indian troops was impressionistic and, when they returned home, they narrated glowing accounts of what they saw in Canada. They wrote letters to their families about what they perceived as economic freedom and available opportunities in far off lands and thus made information about Vancouver accessible to others. By 1903 it is reported that at least five Indian men had landed in Vancouver and five others in the city of Victoria located in the province of British Columbia. [16]

It was during the plague epidemic of 1902 that Indians from the Punjab became aware of the importance of going to Canada. Their interest was initiated as some returnees to villages in the Punjab carried information that certain steamships had put up notices in their Calcutta offices advertising the voyage to Canada. The headlines of one of the notices read as follows – "For Hindoos Going to Canada", the full message stated "...Hindus who desired to go to Canada can have full information from the company's agents for the Canadian Pacific Railway Royal Mail Steamship Line, No. 8 Clive Street, Calcutta...Every steerage passenger must have with him at least Rupees 50/- (dollars 16.69), coins of India to show to the Immigration Officer so that he can satisfy himself that the immigrant is not a beggar." [17] The Indians responded, with many intending emigrants travelling by train from Jalandhar railway station in the Punjab to embark upon a ship from Calcutta's Takhta Ghat for their onward journey to Hongkong. From



Hongkong different batches of Indian emigrants boarded the vessels of Canadian Pacific Line and travelled by a number of ships including the *Empress of India* or *RMS Tartar* or the *Empress of Japan*. These ships carried Indians in the steerage class or third class where they slept in the ships' bunker sections.

The earliest experiences of Indian immigrants were quite trying after they landed on Canada's western most province of British Columbia. As poor farmers from rural backgrounds Punjabi Indians faced difficulties in adjusting to the glittering city lights, to tall buildings, even to smartly dressed women and children, as they compared their own backwardness and poverty - stricken roots with the affluence in the living conditions of the people in their new destination – “they have electric lamps, we have not even oil lamps”. [18] The difficulty of adjustment was compounded as no officials helped them. The immigrants were on their own, hunting for jobs or looking for favourable employers in a largely unknown land. However, it did not take them long to regard Canada with favour and approbation. The Indians soon discovered that British Columbia had tremendous opportunities to absorb them as labourers. The province was on the threshold of an economic boom with its major sectors of economy rapidly expanding – lumbering, mining, fishing, along with railway construction. British Columbia was participating in an economic boom that spread across Canada with the entry of millions of European immigrants. The situation in British Columbia's lumber industry was unprecedented as it was progressing rapidly in response to demand from the rest of Canada and also from foreign countries. [19] Soon Indian immigrants found a foothold in British Columbia's employment sector as they found jobs in lumber mills, logging camps and railway yards around the city of Vancouver and on the Vancouver Island. They also succeeded in finding their own settlements around the centres of their employment. Port Moody on the east coast of the Vancouver Island became famous among the immigrants as the first Punjabi Indian settlement in Canada. Soon other Indian settlements came up in the lumber mills at Arrowhead, Rossland and Robson. [20]

Once the process started, it did not take long for Indians to attain a reputation of respect as deserving workers. Belonging to farmer's background, they were accustomed to arduous and seasonal work and believed in patience and resiliency. It is informed that lot of Canadian employers seemed keen on keeping Indians as labourers because they were found to be worthy workers, reliable, industrious and law abiding. An officer attached to the Geological Survey of Canada, N. D. Daru, observed how quickly a part of 30 Indian labourers found employment – 24 worked with the Canadian Pacific Railway and 6 went to a fruit ranch. The Canadian Pacific Road Master under whom 24 Indians worked told Daru that they gave him more satisfaction than any other European labourers. [21] C. S. Gonnason of the Gonnason Company in Victoria found Indian workmen “more energetic with a keen desire to learn more”. [22] Other employers like Columbia Lumber Company at Golden too found Indians employed in their lumber yards and saw mills as favourable workers. They were found acceptable in Nelson's Yale Columbia Lumber Company and Johnson Lumber Company at Cranbrook. The coal chutes of the Canadian Pacific Railway Yards too found Indians as popular employees. Indians were found to be competent not only in railways or lumber mills, even the fruit orchards in Western found Indian labour dedicated and of course they adapted well to farm work, especially looking after cattle. [23] N. D. Daru had made further observations, “so many employers asked me to enable them to get these men that if I had a few hundred more, I could easily have placed them”. [24]



It is stated that most Indians preferred to work in groups which Canadians referred to as gangs, under one employer. Initially quite a few of them worked on 'piece' basis, but they preferred to work on contract basis as it allowed them greater freedom to distribute their labouring time or better organise the division of labour. More importantly it gave them freedom regarding number of working hours and also to manage their own time of attendance. Contract labour was preferred also because it provided financial security to immigrants as under it all payments were made at definite periods. [25] In any case the time and mode of payment varied, for piece work it involved intensive labour for producing single items on the basis of which payment was made whereas in contract work payments were made fortnightly. Piece work was not a stable mode of payment.

The rates of wages that Indians earned too varied from dollars 1.50 to 2.50 per day depending on the nature of work performed. In the railway construction work and the saw mills, the payment was made on hourly basis ranging from 15 to 20 cents per hour of work. However, the wages were higher in seasonal work, in picking fruits in the orchards for example the Indian wages ranged from 3 to 4 dollars. These figures when compared to their homeland were equivalent to Rupees 9 and 12 in Indian currency, amounting to more than a month's salary for a soldier in the colonial Indian army. This seemed to serve the primary purpose for which Indians immigrated to Canada. And to save enough, an Indian labourer lived frugally. It is stated that in British Columbia an Indian could comfortably manage within dollars 12 and 14 a month. Colonel Swayne, the Governor of British Honduras where Canada would make efforts to transfer Indians, had estimated, "...there are over 1000 Sikhs...whose savings [may reach] a total of about dollars 35000 a month". [26]

Indians had entered into new roles as hired labourers in Canada's urban setting but, essentially, they remained rooted in the simplicity of Punjab's rural village life. Their new status did not cause disturbances at social level with their earning capacity being secured. Though there were some Sikh immigrants who tried to adjust to the life ways of the majority white Canadians after their arrival in Canada, however efforts to contain such 'deviance' were quickly made as majority Indians, particularly from Sikh background, tried to preserve and maintain their socio – cultural values with which they entered Canada. The *Punjabiyyat* and the notions of *Bir* and *Prah* [brothers] remained alive among them so that ties of solidarity remained strong, and in fact these got reinforced because Indian immigrants gave too much importance to ties of kinship based on village connections or *pind bhaichara* in a new setting. [27] Such feelings, sentiments and values allowed Indian immigrants to preserve and retain their distinct identity.

Religion was integral to the growth pattern of the community. Sikhism became the solidifying force for the community as it was transplanted almost unaltered in the new setting in matters of doctrines, teachings and values. As a first step in 1908 Indian immigrants financed the construction of a Gurdwara from their savings that was constructed at Port Moody. It was popularly known as the Vancouver Gurdwara within the immigrant community. The Gurdwara was meant to fulfil the same functions as a village Gurdwara in the Punjab, imparting Guru's teachings, giving *marg darshan*, guidance, to those who deviated from the *panth*, religion. *Granthis*, ceremonial readers of the Sikh holy book, were provided like Bhai Bhag Singh and Bhai Balwant Singh who through their efforts tried to arrest "corrupting influences" of the novel environment in Canada and resolved to conduct evangelical work, the *gurumat prachar*, within the community. A Gurdwara Committee was also formed, a precursor to the later Khalsa Diwan

Society, to look after the functioning of the Gurdwara. [28] With the emergence of a place of worship, a pattern developed within the community that was reflective of the evolution of community consciousness among Indians.

Majority Indian immigrants remained in the company of their countrymen at work, in logging camps or in bunk houses provided by their employers and they preferred their ethnic food while retaining their eating habits and continued to respect tradition in matters of religious symbols like the turban. All this resulted in the creation of a sub – community culture of Indians overseas in Canada. A concrete example of this orientation was the construction of a *Hindu Ghar* in the form of a community shelter. The *Hindu Ghar* was meant to accommodate new arrivals from India, to provide them temporary shelter, given for such time till the community members successfully settled down or found work. *Langars*, communal meals, were provided in the *Hindu Ghar* by the better off in the nascent community. [29] The Indians therefore worked through mutual understandings. There was, however, nothing to ensure that the community would be left by itself to allow its ethnic characteristics to grow. This was because Canadians were becoming very restive with continuous arrivals of immigrants from Asia.

When Indians were laying the foundations of their community, the Chinese and Japanese immigration influx had resumed in Canada and their numbers began to rise in the period 1901 and 1908. Canadians appeared very constrained about this, with almost every section of white society in British Columbia opposing their entry into Canada. White public opinion put very strong pressure on their governments, provincial and federal, to achieve complete restriction on the Chinese and the Japanese immigration. As the white British Columbian society became highly polarised on racist grounds, Indian immigrants too were placed in most difficult of the situations. An increase in their numbers meant rise of white prejudice against them. This indicated that Indians too would face the racial brunt of white Canadians.

The city of Vancouver was very conscious about preventing what they perceived as the “invasion” of British Columbia by “Asian hordes”. When Indians were arriving at the rate of just 3 and 4 the city clerk Thomas McGuigan had despatched an angry letter expressing his personal opinion to the federal government. His letter charged that shipping companies were luring Indians to come to Canada on promises of finding them jobs with Canadian employers. However, the same letter also made McGuigan’s official position clear --- “Indians were not wanted in Canada!” [30] Although the Vancouver clerk’s letter was full of inaccuracies, it was clear on one point that “Indians were a non – European racial group”. Such beliefs became widespread as a force to unleash racial hatred against Indian immigrants and gradually gave rise to vociferous drive to exclude all Indians from Canada. The white Canadian leaders, politicians, labour councils took the lead in this and their racial hatred got reflected in the form of riots against Asians in Vancouver, including Indian immigrants.

Concerted opposition against Indians began to take place from 1906 when Vancouver and Victoria’s Trades and Labour Councils communicated their resolutions, passed in general body meetings, condemning Indian immigration specifically. [31] A crisis like situation appeared in the fall of 1906 when the Vancouver city government raised sharp objections at the arrival of almost 270 Indians in a single ship. The government was joined by local federal immigration officials unsympathetic towards Indians and they even ‘deported’ few immigrants taking the plea to send back Indians on medical grounds. What contributed towards opposition becoming public was the response of two of Vancouver’s local MPs as they approached the Prime Minister

Wilfred Laurier to demand ---“Hindoos Be Shut Out”. [32] By the end of 1906 when almost 1300 Indians arrived, Vancouver’s Mayor Buscomb brought the context centre stage at the level of national and world politics. Buscomb had contacted a number of British government officials on the issue. [33] With this British colonial government in India too became a participant in restricting Indian immigration to Canada.

In 1906 however the opposition to Indian immigration did not yet represent what was to follow. There was a section of white population that was still kind, pleasant and friendly towards Indians. Owners of lumber and logging mills were eager to have Indian labour particularly on the jobs where white man could not even exist but the “Asiatic hordes thrived”. The railroad construction yards, ranch owners, orchard owners, where labour was the demand of the hour, continued to hire and employ Hindoos. It was this class of people who actually wanted “more” Hindoos admitted. But white labour continued to be restive. When a notice appeared in *The Canadian Daily* on 30<sup>th</sup> July 1906, “...owing to the success attending the employment of 300 Sikhs, mostly reservists, in British Columbia arrangements are being made to import 2000 more of those workers from India”, it was inevitable that white labour interests would seize the opportunity. [34] Much of the prejudice and hostile feelings towards Indians were based on the complaints of white workers that emphasised Indians lowering the standard of living in British Columbia. The wages they earned became a contentious issue because the minimum wage structure for the Asians including Indians, Chinese and Japanese, was much lower than what the white labourers earned. Although wage rates for Indian immigrants were higher among Asians, their wages were not comparable in any way with white labourers. It was an established policy in some of the mills to pay lower wages to all Orientals and Asians in comparison with whites. [35] The arguments were forwarded that while a Sikh or a Hindoo could live and thrive on dollars 12 or 14 a month, a white man could not even exist on that amount. More the employers favoured Indians, more the white labour and their political bodies became hostile towards them. By August 1906 the white labour unions were up in arms against importing “all” alien labour and they seemed to have become organised with Vancouver and Victoria’s Trade and Labour Councils officially placing their emphatic protests against attempts to flood the country with cheap Asiatic labour. [36]

It’s notable that Indian immigrants had not followed the Chinese into such employments like domestic service, laundries and hotels or working as cooks, kitchen help or in market gardening. [37] Based on such choices made by Indians, the whites created the impression that what they could or would do was limited. Majority Indians from farmers’ background preferred arduous and rough work outdoors, of course it also paid well from their perspective. They were often made targets of generalisations as claiming the position of equality with white workers hence not wanting peace at any price!

The white labour opposition was supported by press campaigns in local newspapers promoting stereotypes. *Victoria Daily Colonist* described Indian immigrants as a community of “an unwholesome group of starved decrepit humanity” making attempts to “foist upon this [white] community aged, infirm and impecunious persons”. The local newspapers portrayed India as the “hotbed of the most virulent and loathsome diseases such as bubonic plague, small pox, Asiatic cholera and the worst form of venereal diseases”. [38] As the press campaign of vituperation and calumny continued, the white politicians eagerly tried to make political capital from such opposition, white labour being an important class of voters in the province. The sense of job

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competition that white labour felt Vis – a – Vis Asian immigrants was bound to have political repercussions. Soon, British Columbian politicians joined the press campaign and contributed further to engineer hostile feelings. A deputation of two local MPs was sent to meet the Prime Minister Wilfred Laurier in Ottawa, even as the local Municipality attempted to forcibly prevent the landing of Hindoos at Victoria port with the help of city's police force. [39] The politicians in the province began to demand complete exclusion of Indians when reports poured in by late 1906 and early 1907 about the arrival of about 2000 more Indians. The development was viewed as a welcoming sign by the conservative leadership in the province keeping in mind the pending elections. The federal politicians in Ottawa too took a note of it. The reports of the Department of Interior bear ample testimony to this as these note that “Yankee bosses are playing a crucial role in controlling the labour market” and that “opposition to outside labour is largely political and very corrupt”. [40] The British Columbians showed profound interest towards the impact of Asian immigration on the quality of permanent settlers that Canada was seeking at the turn of the twentieth century. Their hostility was rooted in widely shared beliefs and desires for racial exclusiveness as whites. Besides the government, even the most ordinary citizen was for the whites. Nothing reflected this more clearly than the premier Richard McBride's declaration, “British Columbia must be kept white...we have a right to say that our own kind and our own colour should enjoy the fruits of our labour”. [41] A popular doggerel of the time reflected such ideas and attitudes personifying white dominance in Canada

“We welcome as brothers

All white men still,

But the shifty yellow race,

Whose world in vain,

Who oppress the weak?

Must find another place.”[42]

It was at this time when cries of “White Canada Forever” were commonplace that Indian immigrants incurred the odium of the white population.

They were considered an inferior race, ignorant of the Canadian culture. Stories abounded, whipping up racial prejudice against Indians that they were caste – minded and polygamous. Indignation was expressed over “their mannerisms, their talking loudly on the side - walks, their unkempt behaviour, their habit of spitting, loudly clearing throats, their unclean habits riddled with disease”. [43] Indians continued to be projected as the impoverished, the unwanted boat people. Their traditional attire, particularly the turban worn by the Sikhs as a mark of their religion, became what a red rag is to an infuriated bull. Whites treated the Sikh turban as the most conspicuous emblem to justify that the immigrants had no desire to be assimilated with the majority. This generated lot of excitement among the white population. Strong propaganda in many other ways continued to be directed against Indians. Charges of begging were placed against them as whites failed to understand their ethnic language. T. R. E. McInnis for example, the secret agent planted by the federal government's Department of Interior in the community, exaggerated in his report, “...I notice many idle groups of them about all the streets and know that they beg from house – to – house in the Westend for such foods as they will eat”. [44] McInnis was not knowledgeable about Indian languages and most Indians were handicapped in

English. Later this shortcoming prompted Colonel Swayne to suggest the appointment of an officer knowledgeable in Indian languages, a task that saw W. C. Hopkinson's appointment among Indians. He was a military officer called especially from Calcutta. [45]

Indian Immigrants, however, were not without sympathisers, even in political circles. Henry H. Gladstone, nephew of the famous British prime minister wrote, "...Sikhs were unscrupulously clean and I regard them as a very fine race of men". [46] Dr. S. H. Lawson, surgeon – in – charge on the Canadian Pacific Railway steamers *Monteagle* and *Tartar* that carried Indian immigrants to Canadian shores, shared Gladstone's view. It was his duty to make thorough physical examination at Hong Kong of all travelling passengers, "...at first I was strongly prejudiced against them...thousands of them had passed through my hands and I had compared them with white steerage passengers I had seen on the Atlantic. I refer in particular to the Sikhs, and I am not exaggerating. They were hundred percent cleaner in their habits and freer from disease than the European passengers I had come in contact with". [47] Such views, however, represented minority opinion and were of no consequence.

Relations between Indians and whites worsened when rumours spread about riots in the city of Vancouver in November 1906. This made the civic authorities of south Vancouver act on the complaints of few citizens and they threw out a number of Indians from their lodgings or bunkhouses in cold weather, refusing food and fuel to them on another occasion that too on instructions of the city Mayor. [48] The government officials also tried to force the Canadian Pacific Railway to return Indian immigrants to Hong Kong. By that time the federal government declared the Indians liable to be "public charges". [49] Hundreds of Indian immigrants were forced to spend the night outdoors in the winter of 1906 - 07, while moves to restrict their immigration continued apace. The local public hysteria mounted as Canadians realised that Indian immigrants being British subjects were eligible to vote in Canada. This hardened the resolve of the government and the Minister of Interior sent instructions to the local immigration officer in Vancouver to deport any Indian not able to support himself. [50]

As the British Columbian economy slumped in 1907, throwing thousands of whites out of work in Vancouver alone, Indians were also affected. Many Indian immigrants lost their jobs and, in most cases, they simply walked back to Vancouver from other parts of the province. Their return coincided with the arrival of thousands of new immigrants from India via Hong Kong. [51] As their numbers augmented, it became clear that white hostility would influence government policy. Politically, the provincial legislature took steps to place restrictions on Indians already in Canada. In March 1907 British Columbia's premier Bowser initiated the process to disenfranchise the Indians "not of Anglo – Saxon parents". The legislature unanimously approved the bill introduced by the premier. [52] By April 1907 changes were made in the Municipality Incorporation Act denying to Indians in Canada the right to federal vote.[53] Simultaneously a host of other rights were withdrawn. This action of British Columbia's government highlighted that as British subjects Indians were not equal members in the Empire having the same rights, same privileges, and same responsibilities as the whites. The belief in equality of the British subjects was just a fiction.

The political disabilities imposed on Indian immigrants remained in force till the next forty years, in 1907 in British Columbia the action of the government was followed by the formation of the Asiatic Exclusion League. On September 7, 1907 its meeting was chaired by the city Mayor who gave directions to the League members in a manner that touched off serious race



riots in Vancouver. [54] The Vancouver League members rioted against the Chinese and the Japanese but the Indian immigrants escaped the wrath of white mobs because they lived away from the riot sites. However, quite a few Indian immigrants fearing the danger of its recurrence left for the United States, though situation there wasn't any better. Evidently, the "Hindoo question" had become an acute one in the winter of 1907. By then it is stated that the Prime Minister Wilfred Laurier had made the decision to terminate immigration from India.

The Prime Minister Laurier had written to Canada's Governor General Lord Earl Grey informing that the situation of Hindoos was far more serious. He then made a revealing statement that the movement of Indians to Canada be settled 'quietly' in India itself. He justified this opinion by arguing that the immigrants were decoyed by unscrupulous agents in India and were shipped to British Columbia under misrepresentation about the state of Canadian labour market. [55] Laurier's communication to the Governor General indicated that governmental action to restrict Indian immigration would soon follow. The hostility towards Indians increased in 1907 as British Columbia's economic conditions deteriorated coinciding with the arrival of *SS Monteagle* transporting hundreds of more Indians even as province's officials made projections that some 1500 Hindoos and a large number of white labourers would lose employment. [56] Meanwhile, the *Monteagle* passengers disembarked at Victoria where they had to spend the nights either at cattle pens or in government's city jail, while many laid off Indians reached Vancouver where they spent the nights at Stanley Park or simply slept on the streets. [57] Seeing the situation, the city's Mayor Bethune sent furious telegrams to Laurier to urgently contain the situation. [58]

The Prime Minister acted by sending urgent communications to the British government following which the colonial government in India undertook some steps to curtail the movement at the source of origin. The colonial government in India issued 'serious' warnings to emigrating Indians. [59] The move however failed to make an impact, as a result thousands of Indians continued to reach the western shores of Canada. The government of India expressed its inability to "openly" support the Canadian government in the matter and did not initiate any legislation against emigrating Indians. Despairing to find solutions by itself the Canadian government looked for other alternatives, even if it meant transporting Indian immigrants physically out of Canada to either Fiji, Mauritius or British Honduras. The Canadian government thought it necessary that Indians should be made to move out for the maintenance of public order.

The Canadian government decided to shift Indian population to British Honduras located on the Caribbean Coast of Central America. The decision was taken in the middle of the economic slump but it was worked upon in 1908. The case was strongly presented by Ottawa – "West Indies proposal looks good because it gets the Hindoo out of a country where there is little but hardship and misery in store for him...and places him in a country where climate and conditions are favourable." [60] The Canadian government thus adopted the attitude of a benefactor for Indian immigrants but, internally the government's view was that "in matters that so vitally affect our own welfare Canada is the best judge of the course to be adopted". [61] Deportation of Indians from Canada, however, was open to court reviews and more importantly the whole idea was rejected by the Indians. The community guarded its interests by forming something like a labour union of its own through which its leaders like Nagar Singh and Sham Singh visited British Honduras to investigate the conditions there and reported unfavourably about the entire deportation scheme. By then the economic depression had waned with the conditions improving



for the immigrants, even the Governor of British Honduras admitted, “all indignant Hindoos in Vancouver had been provided for by the Hindoo community”. [62]

In 1908 unemployment lessened in British Columbia for both, whites and the Indians, as lumber mills and logging yards resumed work. The better off among Indians showed willingness to support their countrymen who remained unemployed. By now some Indian immigrants had shifted to other sectors of economy for example some had taken to farming by purchasing private land. However, politically Indian immigrants remained powerless as Canadians continued to harness the general feelings of white dominance, though some whites did further the argument that Indian immigration should be restricted on the grounds that white labour would continue to ill treat them. [63] The Canadian government considered the question of restricting Indian immigration a tricky one because it involved Indians as British subjects from a British colony while Canada too remained tied to the British crown. Moreover, Canada was aware that the British colonial government visualised its position in India as sensitive, Punjab being the core area for the recruitment of Sikh soldiers in the British army. More importantly, the colonial government in India did not want to stop Indian immigration on racial lines, forwarding such arguments as to prevent Canada from becoming the breeding ground for Indian “seditionists” and “revolutionaries” who might seize the opportunity to act against the British colonial government. [64] The government of India thus stayed away from taking any legislative action against emigrants and informed the Canadian government to devise a mechanism without mentioning race or ethnic origins of Indian immigrants.

Canada appointed the Deputy Minister of Labour, W. L. Mackenzie King, to investigate the matter and make recommendations. King quietly negotiated with India’s colonial and the British governments and found them in concurrence with Canada’s wishes to terminate Indian immigration. [65] The British officials wanted Canada to introduce such methods of restriction that did not create political problems for the Britain in India. It was then that the provision of “continuous journey” was worked out by the Canadian government. This saw amendment of the Canadian Immigration Act which empowered the Governor General to prohibit the landing in Canada of any immigrant who did not reach directly from his country of origin. After this a sub – clause was added that made it compulsory for the tickets also to be purchased in the country of origin. The provision was given effect through an order – in – council dated 27<sup>th</sup> May 1908. The immigrants from India could no longer travel to Canada as there was no direct shipping service running between Canada and India at the time. The Canadian government by a further order – in -- Council of June 3<sup>rd</sup> 1908 ensured to stop the “unwanted” immigration more fully. Under this all immigrants were required to possess dollars 200 at the time of embarkation on continuous journey. [66] This had the desired effect as in 1909 the number of Indian arrivals in Canada reduced to just 6.

The Canadian government put its act together and began to pressure the Canadian Pacific Railway not to accept Indians as passengers from Hong Kong and also not to issue through tickets from Calcutta as the orders – in – council had made the shipping companies liable and responsible to return the unwanted passengers from Canada. After Canada had restricted Indian immigration, the colonial government in India chose to amend its Emigration Act, 1883 by making it illegal for the natives of India to proceed to Canada under an agreement to work for hire. With these promulgations, the Canadian and colonial Indian governments achieved their

objective. Afterwards Canada wrote the continuous journey provision into an Act which remained operative for the next forty years.

Thus, the community of Indian immigrants that remained in Canada after their immigration was stopped, could not be treated as a 'real' community with the absence of women and children. In the next few decades Indians continued to face Canadian ethnocentrism magnified with such racial stereotypes about them as – inferior, lazy, untruthful, immoral, litigious, and violent. The community, however, remained resilient and battled the racial constraints. Most of the times they chose to ignore the white community. Over the years some individuals in the community gained more from the profits earned and worked hard to redefine their status rankings in the Canadian society.

**ENDNOTES:**

1. Aparna Basu and Archana Bhatnagar, 'Sikh Emigration to Canada: The First Phase, 1905 – 1908', *The Tropical Maple Leaf: Indian Perspectives in Canadian Literature*, John L. Hill, Uttam, Bhoite (eds), New Delhi, Manohar, 1989.
2. Canada Year Book, Ottawa, The Kings Most Excellent Majesty, 1905 –08; Rajni Kant Das, *Hindustani Workers on the Pacific Coast*, Berlin, Walter de Gruyter, 1923; Hugh Johnston, 'Patterns of Sikh Migration to Canada 1900 – 1960', Joseph T. O' Connell, Milton Israel and Willard G. Oxtoby, (eds) *Sikh History and Religion in the Twentieth Century*, Toronto, Centre for South Asian Studies, University of Toronto, 1988; Norman Buchignani, Doreen M. Indra with Ram Srivastava, *Continuous Journey: A Social History of South Asians in Canada*, Ontario, McClelland and Stewart Limited, 1985.
3. Department of Commerce and Industry, Branch: Emigration, May 1907, 7 – 29 A, National Archives of India, New Delhi, India (Hereafter Commerce and Industry, Emigration).
4. Commerce and Industry, Emigration, May 1907, 7 – 29 A; Commerce and Industry, Emigration, September 1907, 13 – 14 A.
5. Commerce and Industry, Emigration, May 1908, 13 – 15 A; Commerce and Industry, September 1907, 13 – 14 A; Karnail Singh Sandhu, *Indians in Malaya: Some Aspect of their Immigration and Settlement, 1786 – 1951*, Cambridge, Cambridge University Press, 1968.
6. Commerce and Industry, Emigration, September 13 – 14 A; Commerce and Industry, June 1908, 7 – 9 B; Hugh Johnston, *The East Indians in Canada*, New Brunswick, Canadian Historical Association, 1984.
7. Johnston, *East Indians*, p 6. Buchignani et al, *Continuous Journey*, p
8. See Canada Census, 1911.
9. Das, *Hindustani Workers*, p 4.
10. Archana B. Verma, *The Making of Little Punjab in Canada: Patterns of Immigration*, New Delhi, Sage Publications, 2002, p 105; See also Das, *Hindustani Workers*; Johnston, *East Indians*, Buchignani et al, *Continuous Journey*.
11. See Verma, *Making of Little Punjab*.
12. Basu & Bhatnagar, *Sikh Emigration*, p 104; See also Verma, *Making of Little Punjab*.

13. See Malcolm Lyall Darling, *Punjab Peasant in Prosperity and Debt*, London, Oxford University Press, 2<sup>nd</sup> ed. 1928; P. H. M. Van Den Dungen, *The Punjab Tradition: Influence and Authority in Nineteenth Century India*, London, George Allen and Unwin, 1972; Neeladri Bhattacharya, *Agrarian Change in Punjab, 1880 – 1940*, Ph.D Thesis, Centre for Historical Studies, Jawaharlal Nehru University, 1985.
14. See Johnston, *East Indians*; Sandhu, *Indians in Malaya*.
15. Buchignani et al, *Continuous Journey*, pp 6 – 7.
16. Buchignani et al, *Continuous Journey*, p 7.
17. Commerce and Industry, Emigration, July 1908, 6 – A.
18. N. G. Barrier, *Sikhs and their Literature: A Note on Sikh Proscribed Material*, Delhi, Manohar, 1970, p 114.
19. Jean Barman, *The West Beyond the West: A History of British Columbia*, Toronto, University of Toronto Press, 1991.
20. Verma, *Making of Little Punjab*, p 109; Harish K. Puri, *Ghadar Movement, Ideology, Organisation and Strategy*, India, Guru Nanak dev University Press, 1983, p 21.
21. Commerce and Industry, Emigration, May 1907, 7 – 29 A.
22. Das, *Hindustani Worker*, p 44.
23. Basu & Bhatnagar, *Sikh Emigration*, p 105.
24. Commerce and Industry, Emigration, May 1907, 7 – 29 A.
25. Verma, *Making of Little Punjab*, pp 111 – 112; Das, *Hindustani Workers*, p 54.
26. Das, *Hindustani Worker*, p 54; Puri, *Ghadar Movement*, p 23; Commerce and Industry, Emigration, September 1907, 13 – 14 A; Commerce and Industry, Emigration, May 1909, 13 A.
27. Basu & Bhatnagar, *Sikh Emigration*, p 106.
28. Harish K. Puri, 'Ghadar: An Experiment in New Patterns of Socialisation', *Journal of Regional History*, vol.1, 1981, pp 122 -128.
29. Commerce and Industry, Emigration, May 1907, 7 – 29 A.
30. Buchignani et al, *Continuous Journey*, pp 7 – 8.
31. Buchignani et al, *Continuous Journey*, p 18.
32. Johnston, *East Indians*, p 6.
33. Buchignani et al, *Continuous Journey*, pp 18 – 19.
34. Commerce and Industry, Emigration, May 1907, 7 – 29 A.
35. Das, *Hindustani Worker*, p 58.
36. Buchignani et al, *Continuous Journey*, p 18.
37. Johnston, *East Indians*, p. 8.

38. Verma, *Making of Little Punjab*, p. 112.
39. Buchignani et al, *Continuous Journey*, p. 19.
40. Commerce and Industry, Emigration, May 1907, 7 – 29 A.
41. Patricia E. Roy, *White Man's Province*, Vancouver, University of British Columbia Press, 1989; Peter W. Ward, *White Canada Forever: Popular Attitudes and Public Policy Toward Orientals in British Columbia*, Montreal, McGill – Queen's University Press, 1990; Johnston, *East Indians*; Buchignani et al., *Continuous Journey*.
42. *Ibid*; Khushwant Singh, *The History of Sikhs*, vol. 2, Delhi: Oxford University Press, 1987, pp 168-169.
43. Basu & Bhatnagar, *Sikh Emigration*, p 109; Commerce and Industry, Emigration, July 1908, 15 – 19 A.
44. Commerce and Industry, Emigration, July 1908, 6 A.
45. Hugh Johnston, 'Surveillance of Indian Nationalists in North America 1906 – 1988', *BC Studies*, 1988.
46. Singh, *History of Sikhs*, p. 169.
47. *Ibid*.
48. Johnston, *East Indians*, p 3; Commerce and Industry, Emigration, May 1907, 7 – 29 A.
49. Basu & Bhatnagar, *Sikh Emigration*, p 110.
50. Buchignani et al, *Continuous Journey*, p 19.
51. Buchignani et al, *Continuous Journey*, p 19.
52. Buchignani et al, *Continuous Journey*, p 21.
53. *Ibid*.
54. Buchignani et al, *Continuous Journey*, p 22.
55. Commerce and Industry, Emigration, May 1907, 7 – 29 A; Buchignani, p 23.
56. Commerce and Industry, Emigration, May 1907, 7 – 29 A.
57. Buchignani et al, *Continuous Journey*, p 22.
58. *Ibid*.
59. Commerce and Industry, Emigration, May 1907, 7 – 29 A; Commerce and Industry, Emigration, September 1907, 13 – 14 A.
60. Commerce and Industry, Emigration, May 1909, 13 A.
61. Commerce and Industry, Emigration, May 1907, 7 – 29 A.
62. Commerce and Industry, Emigration, May 1909, 13 A.
63. Basu & Bhatnagar, *Sikh Emigration*, p 113.
64. Buchignani et al, *Continuous Journey*, p 23.

65. Commerce and Industry, Emigration, July 1908, 15 – 19 A.

66. See Johnston, *East Indians*; Buchignani et al, *Continuous Journey*; Johnston, Hugh, *The Voyage of the Komagata Maru: The Sikh Challenge to Canada's Colour Bar*, Delhi, Oxford University Press, 1979.

### **Bibliography**

#### **Primary Sources**

##### **Unpublished**

- Department of Commerce and Industry, Branch Emigration, A Proceedings, National Archives of India, New Delhi, India.

##### **Published**

- *Canada Year Book*, 1905-08, Ottawa, The Kings Most Excellent Majesty.
- *Census of Canada, 1911*, Ottawa, Printed by C. H. Parmelee.

#### **Secondary Sources**

##### **Books & Articles**

- Banerjee, Himadri, *Agrarian Society of the Punjab*, New Delhi, Manohar, 1982.
- Barman, Jean, *The West Beyond the West: A History of British Columbia*, Toronto, University of Toronto Press, 1991.
- Barrier, N. G, *Sikhs and their Literature: A Note on Sikh Proscribed Material*, Delhi, Manohar, 1970.
- Barrier, N. G. and Verne A. Dusenbery (eds), *The Sikh Diaspora: Migration and the Experience Beyond Punjab*, New Delhi, Chanakya Publications, 1989.
- Basu, Aparna and Bhatnagar, Archana, 'Sikh Emigration to Canada: The First Phase, 1905-1908', *The Tropical Maple Leaf: Indian Perspectives in Canadian Literature*, John L. Hill, Uttam, Bhoite (eds), New Delhi, Manohar, 1989.
- Bhattacharya, Neeladri, *Agrarian Change in Punjab, 1880 – 1940*, Ph.D Dissertation, Centre for Historical Studies, Jawaharlal Nehru University, 1985.
- Bose, Arun Coomer, *Indian Revolutionaries Abroad, 1905 – 1922*, Patna, Bharti Bhawan, 1971.
- Broad, Isabella Ross, *An Appeal for Fair Play for the Sikhs in Canada*, Victoria, Victoria Society of Friends of the Hindus, 1913.
- Buchignani, Norman, 'Contemporary Research on People of Indian Origin in Canada', *Sociological Bulletin*, vol. 38 No 1, March 1989, pp 71 -93.
- Buchignani, Norman, Indra, Doreen M. with Srivastava, Ram, *Continuous Journey: A Social History of South Asians in Canada*, Ontario, McClelland and Stewart Limited, 1985.

- Darling, Malcolm Lyall, *The Punjab Peasantry in Prosperity and Debt*, London, Oxford University Press, 2<sup>nd</sup> ed. 1928.
- Das, Rajni Kant, *Hindustani Workers on the Pacific Coast*, Berlin, Walter de Gruyter, 1923.
- Grace, Elizabeth Ross, 'East Indian Immigration', *Westminster Hall Magazine*, vol. 3 No. 3, 1908.
- Jacob, George C. (ed), *Encounter and Identity: Perspectives on Indo – Canadian Studies*, New Delhi, Prestige Books, 2001.
- Johnston, Hugh, 'Patterns of Sikh Migration to Canada 1900 – 1960', Joseph T. O' Connell, Milton Israel and Willard G. Oxtoby, (eds) *Sikh History and Religion in the Twentieth Century*, Toronto, Centre for South Asian Studies, University of Toronto, 1988.
- Johnston, Hugh, 'Surveillance of Indian Nationalists in North America 1906 – 1988', *BC Studies*, 1988.
- Johnston, Hugh, *The East Indians in Canada*, New Brunswick, Canadian Historical Association, 1984.
- Johnston, Hugh, *The Voyage of the Komagata Maru: The Sikh Challenge to Canada's Colour Bar*, Delhi, Oxford University Press, 1979.
- Lockley, Fred, 'The Hindu Invasion', *Pacific Monthly*, 1907, pp 584 – 595.
- Neogi, Prabir and Nand Tandan, *A History of Indo-Canadians in Ottawa: A Journey Across Generations*, Canada, CreateSpace Independent Publishing Platform, 2018.
- Puri, Harish K, *Ghadar Movement, Ideology, Organisation and Strategy*, India, Guru Nanak Dev University Press.
- Puri, Harish K., 'Ghadar: An Experiment in New Patterns of Socialisation', *Journal of Regional History*, vol.1, 1981, pp 122 -128.
- Roy, Patricia E, 'British Columbia's Fear of Asians', Peter Ward and Robert A. J. McDonald (eds), *British Columbia: Historical Readings*, Vancouver, Douglas and McIntyre, 1981.
- Roy, Patricia E, *White Man's Province*, Vancouver, University of British Columbia Press, 1989.
- Sandhu, Karnail Singh, *Indians in Malaya: Some Aspect of their Immigration and Settlement, 1786 – 1951*, Cambridge, Cambridge University Press, 1968.
- Singh, Khushwant, *The History of Sikhs*, vol. 2, Delhi, Oxford University Press, 1987.
- Van Den Dungen, P.H.M., *The Punjab Tradition: Influence and Authority in Nineteenth Century India*, London, George Allen and Unwin, 1972.



- Verma, Archana B, *The Making of Little Punjab in Canada: Patterns of Immigration*, New Delhi, Sage Publications, 2002.

Ward, William Peter, *White Canada Forever: Popular Attitudes and Public Policy Toward Orientals in British Columbia*, Montreal, McGill – Queen’s University Press, 1990.

## AN OVERVIEW OF ENVIRONMENT IMPACT ON WIND ENERGY ON WIND TURBINE

**Dr. Varun Kumar Singh\***

\*Associate Professor,  
Department of Applied Science (Chemistry),  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- drvarun.engineering@tmu.ac.in

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### ABSTRACT

*Energy consumption has grown at a far faster rate than the global population since the dawn of civilization. It is well recognized that energy consumption is astonishingly high, and that fossil-based resources may not be able to supply energy for the whole globe in the near future, since these resources will be depleted. As a result, renewable energy is anticipated to play a significant role in meeting the need for energy while also preventing pollution. Before any wind farm is built or a decision is taken, the environmental effects of wind energy must be investigated. Despite the fact that many nations are demonstrating a strong interest in renewable or green energy production, a bad image of wind energy is growing, which may hinder wind energy installations in certain countries. This study collected the most recent research on the environmental effects of wind energy in the form of wind turbine, journal paper, conference proceedings, reports, books, and online resources. This article also contains a comparative analysis of wind energy, as well as issues, answers, and recommendations as a consequence of wind turbine installation. Wind energy's positive and negative effects have also been thoroughly discussed. This form of energy has been discovered to decrease pollution and water consumption in the environment. However, it causes noise pollution, sight interference, and animal harm.*

**KEYWORDS:** *Environment, Energy Consumption, Wind Energy, Wind Turbine, Quadrillion Btu.*

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### 1. INTRODUCTION

Energy consumption is growing substantially across the globe as a result of economic and technical advancements[1]. Over the last 30 years, the global economy has grown at a rate of 3.3 percent each year. Demand for energy rose by 3.6 percent. The output of energy throughout the world was in 2004, the globe used 17,450 TWh, and it is predicted that by 2030, the world would consume about 31,657 TWh. According to international organizations, in 2009, the world's energy consumption is expected to rise from 472 quadrillion Btu in 2006, 552 quadrillion Btu in 2015, and 678 quadrillion Btu in 2016. Quadrillion Btu in 2030 a 44 percent increase above the anticipated amount. The period 2006–2030. Several industries and the machines/appliances used

in many energy-intensive industries. Industries are polluting the environment by emitting polluted gases[2]. Changes in the globe as a result of global warming climate patterns have long been recognized as the most serious. In the twenty-first century, there is a danger to mankind. There is a rising sense of apprehension about the future. Environmental contamination and global energy demand to lessen[3].

To some degree, global communities are attempting to address these issues. Identify and execute various energy-saving techniques, technologies, and methods. Considering alternate energy sources for many industries that depend on fossil fuels energy derived from many sources In this respect, wind energy is beneficial[4]. To satisfy future energy needs, growth will be critical. To some degree, demand may be met while also reducing pollution. For the United States has surpassed Germany in wind energy development. China has surpassed the United States as the global leader in wind power installations. For the fourth year in a row, overall capacity has doubled. global total In 2008, there were more over 27,000 MW of installed capacity, with the United States leading the way[5]. Europe, North America, and Asia are the three major marketplaces. The wind across the world Last year, energy capacity increased by 28.8%, faster than the average over the previous decade, to reach a total worldwide installation of over approximately by the end of 2008, than 120.8 GW Based on publicly accessible data from WWEA reported 5374 MW new installed capacity in the first quarter of 2009, indicating a 23 percent growth over the previous quarter and representing over 80% of the global market. Year after year, in the same countries. The total installed capacity. At the end of 2009, there were 152,000 MW globally. Unlike thermal power facilities, wind energy does not contaminate the air that depend on fossil fuel burning, such as coal or natural gas wind turbines do not emit harmful pollutants into the atmosphere. Greenhouse gases or acid rain (GHGs). Wind turbines may be constructed on farms or ranches, thus helping rural economies. There you'll find the majority of the finest wind locations. Because of this, wind energy is regarded as a green power technique. It has very minimal negative environmental consequences. The vitality spent in the production and transportation of the materials used in construction[6].

A wind power plant produces the same amount of fresh energy as a nuclear power station after a few months of starting out. Garrett Gross is a physicist. "The effect made on the environment," says a researcher from UMKC in Kansas City, Missouri. When compared to what is achieved, the environmental cost is negligible." Potential dangers from wind turbines are only a few of the worries. Radar and telecommunications infrastructure are being interfered with. as well as wind generators, like all other electric power plants, generate electricity magnetic and electric fields Although wind power facilities have a lower environmental effect than fossil fuel plants, they nevertheless have an impact. Concerns have been made about the noise generated by power plants by rotor blades, visual effects, and bird and bat fatalities that ricochet off the rotors[7]. Wind, on the other hand, may have a role. Programs to reduce carbon dioxide emissions at the regional level, such as New England and California, new technologies are being created. When compared to biomass and PV, wind energy has a minimal carbon impact as well as marine. There are a lot of works on the wind that should be highlighted. Design, performance, economics, and policy are all aspects of energy development. However, no thorough environmental work has been done. Wind energy development has an effect. This work is anticipated to be published. may be able to bridge the gap[8].

## 1.1 Positive Impact Of Wind Turbine:

Wind turbines, unlike other sources of electricity (such as coal, gas, and petroleum-based fuel), do not emit pollutants[9]. By replacing existing sources of conventional energy with wind energy, it may be possible to decrease air pollution. As a consequence, carbon dioxide, nitrogen oxide, and sulfur dioxide emissions, in particular, may be decreased. According to the literature, the release of these gases produces acid rain and global warming, which results in greenhouse gas impact, sea-level rise, and changing weather conditions. Wind energy is a limitless source of energy that may be collected on land or in the sea. A 2.5 kW system is expected to save 1–2 tonnes of CO<sub>2</sub>, whereas a 6 kW system saves 2.5–5 tonnes. Wind turbines are a comparatively low-cost form of micro-renewable energy production in the right location. They can provide greater power supply security to non-grid connected areas while also providing some protection against rising electricity prices. By producing energy, you may earn Renewable Obligations Certificates (ROCs). These may then be sold to power producers to help them achieve their goals of supplying a certain percentage of their customers' electricity from renewable energy sources. A customer who qualifies for the Climate Change Levy exemption may profit from onsite electricity production. It is also possible to get compensated for any excess energy that is supplied to the grid. According to the Intergovernmental Panel on Climate Change's (IPCC) fourth assessment report, human activities are to blame for the earth's warming during the last half-century. The greenhouse gases produced by the combustion of fossil fuels, particularly carbon dioxide, are the primary causes (CO<sub>2</sub>). Wind energy may supply electricity while lowering CO<sub>2</sub> emissions. The World Energy Commission estimates that using one million kWh of wind power may avoid 600 tonnes of CO<sub>2</sub>. As a result, widespread usage of wind power will aid in the mitigation of climate change. Wind energy may also help to prevent regional environmental issues caused by coal burning[10].

- **Water Usage Reduction:**

Water consumption is critical in an increasingly water-stressed globe, and it is a major issue, particularly in places like Singapore, where clean water is very precious and rare. It's worth noting that the condensing phase of the thermodynamic cycle in traditional power plants uses a lot of water. Water is also utilized to clean and treat coal in power plants. The amount of water utilized each day may be in the millions of liters. Water may be conserved and utilized for other purposes by decreasing water consumption. The quantity of water used by conventional power facilities as assessed by the California Energy Commission. For the year 2007, the average quantity of water used by conventional power plants in Malaysia was 1.48 l/kWh, whereas wind energy-powered power plants used just 0.004 l/kWh.

- **Carbon Dioxide Emission Reduction:**

Wind energy, in general, produces no direct air pollution. During the building and maintenance stages of wind energy, a tiny quantity of CO<sub>2</sub> is emitted. This quantity of CO<sub>2</sub> is, however, much lower than that produced by other fossil-fuel-based power plants. The quantity of CO<sub>2</sub> generated may be absorbed by the tree via the photosynthesis process. Every unit (KWh) of energy generated by the wind displaces a unit of electricity that would have been generated by a power plant using fossil fuels. As opposed to fossil fuel power sources, it does not emit carbon dioxide, sulfur dioxide, mercury, particulates, or any other form of air pollution.

## 1.2 Negative Impact Of Wind Turbine:

Aside from the beneficial effects, it is important to investigate the negative effects of wind turbine technology. The worst case scenario must be identified and anticipated before any choice can be taken. This will minimize the harm to a bare minimum. Wildlife, noise, and aesthetic impacts are the most important negative impacts of wind turbine technology, which will be addressed in the following sections. Other effects include radar or television reception being disrupted by magnetic forces produced by the wind turbine, as well as an increased risk of being hit by lightning.

- **Wildlife Effects:** Many studies have discovered that wind energy is one of the healthiest and most environmentally friendly energy sources accessible today. Wind energy is the most environmentally friendly energy source on the planet for both animals and humans. However, a few studies have found minimal wildlife effects. Wildlife effects may be divided into two types: direct and indirect. The direct effect is death due to collisions with wind turbines, whereas indirect effects include avoidance, habitat disturbance, and relocation. However, as compared to other energy sources, the effects are minor. Furthermore, academics and industry are working to discover ways to mitigate and avoid the negative effects of wind energy on animals. Many studies and evidence-based conclusions have been reached that the proper placement of wind turbines does not result in a substantial decrease in bird death. Climate change poses a much greater danger to animals, according to studies.
- **Noise Pollution:** The noise pollution caused by wind turbines is the most serious environmental effect. Noise pollution has the ability to reduce property values within a certain radius of the building site. As a consequence, turbines should be placed back from homes and property boundaries to protect participants and neighbors from noise and safety issues. Engineers must be acquainted with the many kinds of noise that a wind turbine produces before they can construct one. Mechanical and aerodynamic noise are two kinds of noise produced by wind turbines. Moving components such as the gearbox, electrical generator, and bearings create mechanical noise. Normal wear and tear, faulty component designs, and a lack of preventive maintenance are all possible causes of mechanical noise. The passage of air over and past the blades of a turbine produces aerodynamic noise. The rotor's speed tends to raise the noise level. When it comes to blade noise, a lower blade tip speed means less noise. The interaction of wind turbine blades with air turbulence, which produces a distinctive "whooshing" sound, is of special importance. Mechanical noise may be reduced by utilizing side toothed gear wheels in the design stage, or by adding acoustic insulation on the interior of the turbine housing. Acoustic insulating curtains and anti-vibration support footings may help decrease mechanical noise during operation. Aerodynamic noise may be minimized by manufacturers carefully designing blades to minimize this kind of noise.
- **Wind Turbine Color and Contrast:** When wind turbines are painted white (or any grey tone), according to Bernd, this will be a small problem since brightness will tend to outweigh color variations. Wind turbine blades are often painted in a light grey hue to resemble a skyline. In addition, to decrease contrast levels, the color of the turbine is created green at the base and gradually changes to grey at the top. As a result, the visual effect will be reduced. There is a concern that blending the turbine with the skyline hue would result in more bird deaths. Because the impact on wildlife is less noticeable than the aesthetic impact, it is advised to select a turbine color that blends in with the skyline. The effect degree of contrast

produced by wind turbines rises with the increase in contrast with the surroundings, according to a study published by Ian and David. The contrast level decreases with distance, according to the authors. At the turbine's borders, the designer would almost certainly mix the turbine pixels with the backdrop pixels. Problems caused by shadow flickering because the turbines are tiny and therefore do not cast lengthy shadows, the problem of shadows produced by wind turbines is not a significant one. As the turbine's hub height rises, the effect of their shadows rises with it. This causes considerable visual pollution, which people in the area must be safeguarded against. This moving shadow, which has a frequency three times that of the rotor speeds (in the case of a three-bladed turbine), may cause pulsing light levels, particularly in naturally lighted spaces.

- **Solution to Avoid Shadow Flickering:** In order to expand the usage of wind energy in the future, it is necessary to reduce shadow flickering. If the shadow cast on a certain location exceeds the allowed limit, the wind turbine should be turned off. This may be accomplished by using a module created specifically for this purpose. This kind of simple module switches their turbines according to a computed shadow calendar, without considering whether shadows are really feasible during the theoretical periods of shadow. Modules that utilize a light sensor, on the other hand, would enable a wind turbine that can automatically create shadow to remain in operation on overcast days, but only for 8 hours per year. Turbines may also be modified to run in a low-noise mode, and a specific mechanism can be installed to turn the machine off for a brief time if shadow flickering occurs.
- **Wind Turbine Blades, Moving or Stationary:** As mentioned by Jaskelevicius and Uzpelkiene, the visual effect of a wind turbine is affected by its movement or when it is stationary. It was discovered that a turbine would have a greater visual effect than a stationary situation. The negative visual impact during the moving condition is smaller than when the blades are stationary, according to the authors. It should be noted that the blades of the turbine may be difficult to detect while it is moving.

## 2. DISCUSSION

A wind turbine is a machine that transforms the kinetic energy of the wind into electricity. Wind turbines come in a variety of sizes and have either horizontal or vertical axes. Hundreds of thousands of huge turbines in wind farms produce over 650 gigawatts of electricity, with 60 gigawatts added each year, according to estimates. They are becoming a more significant source of intermittent renewable energy in many nations as a way to decrease energy prices and dependence on fossil fuels. In comparison to photovoltaic, hydro, geothermal, coal, and gas, one research stated that wind had the "lowest relative greenhouse gas emissions, the least water consumption needs, and... the most favorable social effects" as of 2009. Smaller wind turbines are used for battery charging, supplemental power for boats and caravans, and traffic warning signs, among other things. Larger turbines may contribute to a home power supply while also selling unused electricity back to the utility through the electrical grid.

## 3. CONCLUSION

Wind energy has been discovered to be clean, environmentally beneficial, and less expensive than other renewable energy. As a result, this form of energy will safeguard the planet from pollution in the atmosphere. It was also discovered that when wind energy is used instead of petroleum-based power plants to generate electricity, water consumption is decreased. It was also



discovered that, when compared to other energy sources, wind energy had the least negative effect on the environment. Wind turbine energy, on the other hand, is not without its drawbacks. The collision of wind turbines with animals has been shown to harm wildlife in numerous instances. This type of energy also produces noise, which is bothersome to those who live near a wind turbine installation project. The wind turbine additionally obstructs visual performance. Many of these negative effects may be reduced if wind turbines are properly built and planned.

## REFERENCES

1. S. Degraer, R. Brabant, and B. Rumes, "Environmental impacts of offshore wind farms in the Belgian part of the North Sea: Learning from the past to optimise future monitoring programmes," *Rep. by R. Belgian Inst. Nat. Sci.*, 2013.
2. L. Riefole *et al.*, "Offshore wind turbines: An overview of the effects on the marine environment," 2016.
3. A. B. Gill, I. Gloyne-Philips, J. Kimber, and P. Sigray, "Marine Renewable Energy, Electromagnetic (EM) Fields and EM-Sensitive Animals," 2014.
4. A. B. Suma, R. M. Ferraro, B. Dano, and S. P. G. Moonen, "Integrated roof wind energy system," 2012, doi: 10.1051/epjconf/20123303002.
5. A. W. Bates, "Key challenges of offshore wind power: Three essays addressing public acceptance, stakeholder conflict, and wildlife impacts," 2016.
6. D. Coates, J. Vanaverbeke, and M. Vincx, "Enrichment of the soft sediment macrobenthos around a gravity based foundation on the Thorntonbank," in *Offshore wind farms in the Belgian part of the North Sea: Heading for an understanding of environmental impacts*, 2012.
7. B. Gohla-Neudecker, P. Wimmer, M. Huber, and T. Hamacher, "Energy Economic Assessment of Range Extension Technologies for BEVs in 2020," *Conf. Futur. Automot. Technol. Focus Electromobility*, 2013.
8. R. K. Brook, M. Cattet, C. T. Darimont, P. C. Paquet, and G. Proulx, "Maintaining ethical standards during conservation crises," *Can. Wildl. Biol. Manag.*, 2015.
9. Petra Kaczensky *et al.*, "Status , management and distribution of large carnivores – bear , lynx , wolf & wolverine – in Europe 2," *Eur. Comm.*, 2012.
10. T. Uhl, W. M. (Wiesław M. . Ostachowicz, and J. Holnicki-Szulc, *Structural health monitoring 2008 : proceedings of the fourth European workshop*. 2010.

## REVIEW PAPER ON WOMEN SAFETY SYSTEM

Vipin Jain\*

\*Professor,  
Department of Finance & Marketing,  
Faculty of Commerce, Management & Law,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- vipin555@rediffmail.com

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### ABSTRACT

*In recent years, incidents of physical assault and violence against women are increasing. With development of female employees in industries and other sectors of the commercial market, it is now becoming a necessity for females to travel at late hours and visit remote and lonely places as a part of their job. Defense isn't the sole measure that can be adequate against this increasing misuse. A security system that creates a method of safety among ladies has to be developed. Thus, there is need so simpler safety solution that may be triggered as simply as by pressing a button and can immediately send out alerts to the near ones of the sufferer. So, this project focuses on a safety system that is created exclusively to serve the goal of providing security and protection to women so that they never feel helpless while confronting such societal problems.*

**KEYWORDS:** Internet, Protection, Raspberry Pi, Safety System, Women.

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### 1. INTRODUCTION

The position of women in India has undergone numerous extraordinary modifications in the course of the past couple of centuries. In contemporary India, women continue to endure social challenges and are frequently victims of abuse and violent crimes. According to a global survey performed by Thomson Reuters, India is the “fourth most hazardous nation” within the globe for ladies and therefore the worst place for women within the G20 countries. The safety of women is a distress of growing necessity in India and other nations. The primary problem in the handling of these instances by the police lies \sin limitations prohibiting them from responding promptly to calls of distress. These limitations include not knowing the location of the incident, and not knowing the crime is occurring sat all at the victim's end, contacting the police definitely and discreetly is a problem.

This job focuses around a security framework that is planned solely to successfully offer security and wellness to ladies so they never feel defenseless when facing such social difficulties. The Delhi “Nirbhaya” case that shocked the entire country was the biggest inspiration for our endeavor. It was high time we ladies needed a change. To assist in the removal of these limitations, in this method we are going to created IoT based women safety gadget.

The \embedded- IoT platform comprises of Raspberry pi as a controller, GSM for sending the message and call, GPS to locate the woman, camera for video streaming and mic for recording sounds. The user may simply and discreetly trigger panic button supplied on the gadget. If the panic button pressed once, it will send the message indicating the geographical position of the user to the pre-selected list of emergency contacts. Also, the camera and Mic starts to stream the video and record the voice respectively[1]–[4].

In this literature emphasis is on establishing a safety system that brings about a solution that guarantees both defense and creation of a smooth route to starting legal procedures, if any; have to be taken by the victim. We aim to develop a partial wearable that can offer a full security solution and become a utility that eases the apprehension among women and their family members. The aim of this literary study is to develop a safety system in the form of a portable safety gadget for women that perform the following tasks:

1. Alerts family and police and provides location coordinates of the lady being assaulted.
2. Incorporates a defensive mechanism by delivering a small shock.

More accidents occur for women, children and elderly people who always think that they require the help to go around.

With the assistance of current technology individuals may make use of a simple gadget which can be used whenever they are \sin unforeseen circumstances to establish connection between police and family The gadget created is a portable one which can be activated as per the requirement of the individual which will locate the victim using GPS and with the help of GSM emergency messages can be sent to the respective locations asper the design. The gadget provides a alarm system[5]–[7].

The device can be activated by just merely pressing the emergency button once. This device gets activated and sends instant location with a distress message to the police pre-set numbers through a GSM module<sup>3</sup>. Shows the triggering button and how the device looks like and when the emergency button is double clicked, the device sends both the distress message with instant location and records the audio of the incident. When the same button is long pressed it activated call to the police and sends message to the police instant location. The location is located using GPS (UBLOX). The audi io is recorded using audio recorder and call is made from GSM modem respectively. This GSM Modem (sim 900) can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. The plus point of using modem will be that you can use its RS232 port to communicate and develop embedded applications. It can be used to send and receive SMS<sup>4</sup> or make/receive voice calls. The hidden camera detector can be used anytime to find whether there is any hidden camera in the surrounding.

This article offers a fresh viewpoint to utilize technology to protect women. The device resembles a regular belt which when triggered, monitors the position of the victim using GPS via communication module (Global Positioning System) and sends emergency messages via GSM (Global System for Mobile communication), to three emergency contacts and the police control center.

It is an all-in-one system. Hence no need to carry multiple devices.

1. GPS tracking feature tracks the user lively when you are the move after triggering the emergency button.
2. It records audio, which can be used for further investigations.
3. When the battery is running low, it automatically sends the location the pre-stored contacts.
4. The second distinct feature is; it also detects the hidden cameras which help in our privacy.
5. This device works without internet connectivity.

Our primary goal of this project is to ensure every woman in our society to feel safe and secured. According to the survey in India 53% of working women are not feeling safe - Women is working in night shift (Bangalore-56%, Chennai-28%, Hyderabad-35%, Mumbai-26%). In Overall 86% of working women in India, women facing hurdles are high in Delhi, Mumbai, Hyderabad, Kolkata and Pune comparatively to other places.

FEMME can play a major role by providing women a safe environment in all situations for example (detecting hidden camera, physical threatened, harassed, robbery, stalked). Implementing real time application and a device, we can solve the problems to an extent. With further research and innovation, this project is used as a small wearable device like watch. It not only make them safe but their parents, kids or husbands will also feel stress free as they are virtually in touch during complete journey Ladies' security is a basic issue in this day and age and it's especially required for each person to be acting over such an issue. This paper depicts a "GPS, GSM and Zapper Circuit based ladies' security framework" that gives the mix of GPS gadget particular to track the area and in addition give alarms and messages a crisis catch trigger. It additionally contains stun instrument to create non-deadly electric stun in crisis circumstance.

Our try behind this paper is to outline and create a device which is so conservative in itself that give favourable position of disguise. The fundamental point of interest of this framework is that the client does not require a Smartphone dissimilar to different applications that have been created before. This system it detects the fall detection accelerometer, temperature, acid gas detection and heart beat in both normal and abnormal conditions of the patients. In mobile screen both normal and abnormal values are displayed. Adriano microcontroller compares the maximum and minimum values and if the patient is in abnormal condition then abnormal values are detected and the buzzer indicate a beep sound and the data are sent through the gsm/gps module always the mobile receives the data.

The doctor / relatives receives the data and if the patient is in critical condition by their turn can send an ambulance to the patient location. Discussion was made about the scenario of how updating technology makes data more vulnerable and how it helps to make the safety of women & child through its application point of view. Some sensing parts mentioned in the system which helps to generate data at high and future risk of such situations got reduce using various embedded devices. Many crimes against women has increased to a greater extent and due to which harassment takes place at working place, shopping, evening walk, eve teasing and many more. This technology helps to generate the simulation. To stay ahead in the competition, the manufacturers of the IoT devices are often in a rush to launch their products in the market at the lowest prices. And, while doing that, they don't pay enough attention to provide security updates

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and patches. This poses a serious threat to the security of their IoT devices in the long run. To overcome this challenge, the manufacturers of the IoT devices should avoid launching their products without proper planning for the long-term support for the security of their IoT devices and applications[8]–[11].

## 2. DISCUSSION

This study effort plays an essential part towards providing the quickest method of safety for women. The proposed design will deal with hazardous problems encountered by women in the recent past and will help to address them by using safety measures. This study will concentrate on creating a smart \slow-cost gadget to assist women, feel them safer and prevent the occurrence of rape, harassment and other dangerous situations. The initiative would assist in improving the protection and security of all depressed and badgered mothers and children.

The method helps to preserve gender equality by giving a safe atmosphere to women in the community and enables them to work until late evenings. Anyone before committing any crime against the women will be warn and it helps to decrease the crime rate against the ladies. Basically, there are three IoT architecture layers:

1. The client side (IoT Device Layer)
2. Operators on the server side (IoT Getaway Layer).

A pathway for connecting clients and operators (IoT Platform Layer).

## 3. CONCLUSION

It is suggested to develop and deploy smart system for women safety utilizing internet of things (IoT). As illustrated in the gadget intended to operate as follows. If a \woman is subjected to assault by an opponent, then a panic button needs to be pushed manually, by her. This switch will trigger the controller. Global Positioning System (GPS) will obtain the area co-ordinates of the woman exposed to assault and will transmit them to the pre-chosen mobile phone numbers (ordinarily the family and the friends) through GSM module. Also with this it is going to record the image/video and audio of the attacker and transmit it through an RF module to another section where it will be viewed. Hence more accuracy in this system was achieved with the use of updating technology which helps to reduce the risk factors among women and even though children. Discussion was made about the scenario of how updating technology makes data more vulnerable and how it helps to make the safety of women & child through its application point of view. Some sensing parts mentioned in the system which helps to generate data at high and future risk of such situations got reduce using various embedded devices. Many crimes against women has increased to a greater extent and due to which harassment takes place at working place, shopping, evening walk, eve teasing and many more. This technology helps to generate the simulation with respect to panic situation by considering various body measures and help in the case of emergency.

## REFERENCES:

1. M. F. Elledge *et al.*, “Menstrual hygiene management and waste disposal in low and middle income countries—a review of the literature,” *International Journal of Environmental Research and Public Health*. 2018, doi: 10.3390/ijerph15112562.

2. M. C. Signorelli, S. Hillel, D. C. De Oliveira, B. P. Ayala Quintanilla, K. Hegarty, and A. Taft, "Voices from low-income and middle-income countries: A systematic review protocol of primary healthcare interventions within public health systems addressing intimate partner violence against women," *BMJ Open*. 2018, doi: 10.1136/bmjopen-2017-019266.
3. A. Iudici, L. Bertoli, and E. Faccio, "The 'invisible' needs of women with disabilities in transportation systems," *Crime Prev. Community Saf.*, 2017, doi: 10.1057/s41300-017-0031-6.
4. O. de Bari, T. Y. Wang, M. Liu, C. N. Paik, P. Portincasa, and D. Q. H. Wang, "Cholesterol cholelithiasis in pregnant women: Pathogenesis, prevention and treatment," *Ann. Hepatol.*, 2014, doi: 10.1016/s1665-2681(19)30975-5.
5. W. M. Kanadys, B. Leszczyńska-Gorzela, and J. Oleszczuk, "Efficacy and safety of Black cohosh (*Actaea/Cimicifuga racemosa*) in the treatment of vasomotor symptoms - Review of clinical trials," *Ginekol. Pol.*, 2008.
6. J. Henderson, J. J. Kurinczuk, and M. Knight, "Resident consultant obstetrician presence on the labour ward versus other models of consultant cover: a systematic review of intrapartum outcomes," *BJOG: An International Journal of Obstetrics and Gynaecology*. 2017, doi: 10.1111/1471-0528.14527.
7. Anonymous., "Abstracts of Papers and Posters to be Presented at the 63rd Annual Clinical and Scientific Meeting of the American College of Obstetricians and Gynecologists," *Obstetrics and Gynecology*. 2015.
8. C. K. Baker, K. A. Billhardt, J. Warren, C. Rollins, and N. E. Glass, "Domestic violence, housing instability, and homelessness: A review of housing policies and program practices for meeting the needs of survivors," *Aggression and Violent Behavior*. 2010, doi: 10.1016/j.avb.2010.07.005.
9. R. Rich, T. D'Hont, J. Linton, K. E. Murphy, J. Veillard, and S. Chatwood, "Performance indicators for maternity care in a circumpolar context: A scoping review," *International Journal of Circumpolar Health*. 2016, doi: 10.3402/ijch.v75.31470.
10. Anonymous., "Abstracts Presented at the 17th Symposium of the International Society of Oncology Pharmacy Practitioners," *J. Oncol. Pharm. Pract.*, 2018.
11. R. Dickinson, S. Hall, J. E. Sinclair, C. Bond, and P. Murchie, "Using technology to deliver cancer follow-up: A systematic review," *BMC Cancer*, 2014, doi: 10.1186/1471-2407-14-311.



## AN OVERVIEW ON FREELANCER

**Garima Rawat\***

\*Assistant Professor,  
Department of Marketing & HR,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [grawat436@gmail.com](mailto:grawat436@gmail.com)

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### ABSTRACT

*This article examines the idea of a freelancer in depth, including its history, jobs, wages, top hiring, freelancer nations, and prominent websites that act as a middleman between employers and freelancers. The research also clarifies the distinctions between an entrepreneur and a freelancer. A non-systematic descriptive assessment of the available literature backed the study with empirical data. Facts regarding freelancers were revealed in a study. To begin with, it was discovered that existing organizational structure is evolving to accommodate labor market and technology developments, indicating that independent freelancers, now known to as freelancers, are seeing sustained growth. Second, a study of the literature reveals that freelancing dates back to the 1970s and has been steadily increasing since the 1980s. Finally, the research determined that an entrepreneur is an individual who uses someone else's service or product to start a company, while a freelancer is a person who uses his or her own talents to serve numerous customers for various work kinds. Finally, empirical data suggests that freelancing is still seen as a novel and distinct field, which academics and policymakers should investigate more.*

**KEYWORDS:** *Entrepreneur, Freelancer, Contractor, Boundary-Less Worker, Portfolio-Worker.*

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### 1. INTRODUCTION

In recent decades, he's access of labor has been aided by privatization, technology advancements, organizational reorganization, and market regulation reforms. To gain numerical sustainability and cost savings, companies are increasingly trying to match labor inputs more accurately to commercial needs; employing freelancers is one way to accomplish this flexibility. Changes in organizational structure are also addressed in this paper's section on altering organizational structure. Freelancers were first referred to as "Internationalizing Workers" at the Massachusetts Institute of Technology in the 1970s, according to history of freelancing development. This name was chosen since freelancers have no restrictions when it comes to finding work; their clients may be from anywhere in the globe. For the majority of online occupations, one computer with a camera and a high-speed internet connection is sufficient.

Although it is necessary to have a checking account in order to receive money. Freelancers only offer their professional expertise and abilities Leadership, organizing, and administrative abilities, which are required for running a business, are of little use to the typical freelancer. Organizations are increasingly reorganizing their workforce and outsourcing tasks to independent contractors. This saves them money while also providing them with highly skilled employees[1]. Organizational changes, technology advancements, entrepreneurship, and new labor qualities all provide opportunities for new study.

## **1.1 Changing Organizational Structure:**

Many tasks formerly done by workers have been transferred to freelancers, many of whom are ex-employees, and commercial contractors have overtaken employment agreements in many instances. This kind of freelancer works as a consultancy for their former employers as well as for other businesses. There is some indication that the utilization of temporary employment for elevated freelancers is becoming more common. Independent professionals are thought to provide approximately 60% of the overall output of the UK media business. Large employing organizations, such as television companies, have eliminated long-term employees and replaced them with freelance labor throughout the media business, signaling a change in the media market where the majority of workers have become independent experts in less than a decade[2]. According to estimates, there were approximately 10.3 million contract employees in the United States in 2005, accounting for 7.4% of the workforce. Since 1995, when contract workers made up 6.7 percent of the workforce, there has been a 24 percent increase. Since the past decade, we've been dealing with a new generation of computer-savvy individuals. They want new labor agreements. Why travel to the workplace when you can do it from the comfort of your own home? Individual Professionals are hired by a huge number of businesses to do highly technical tasks. Recently, it was shown that the collapse of the conventional career model does not reflect current employment tenure statistics in a number of nations. In comparison to permanent employees, who are recruited on an annual contract basis, it is easier to continue or terminate an employment contract with a freelancer. A freelance contract only covers one work; further assignments may be given based on mutual desire[3]. Both the customer and the freelancer benefit from this flexibility.

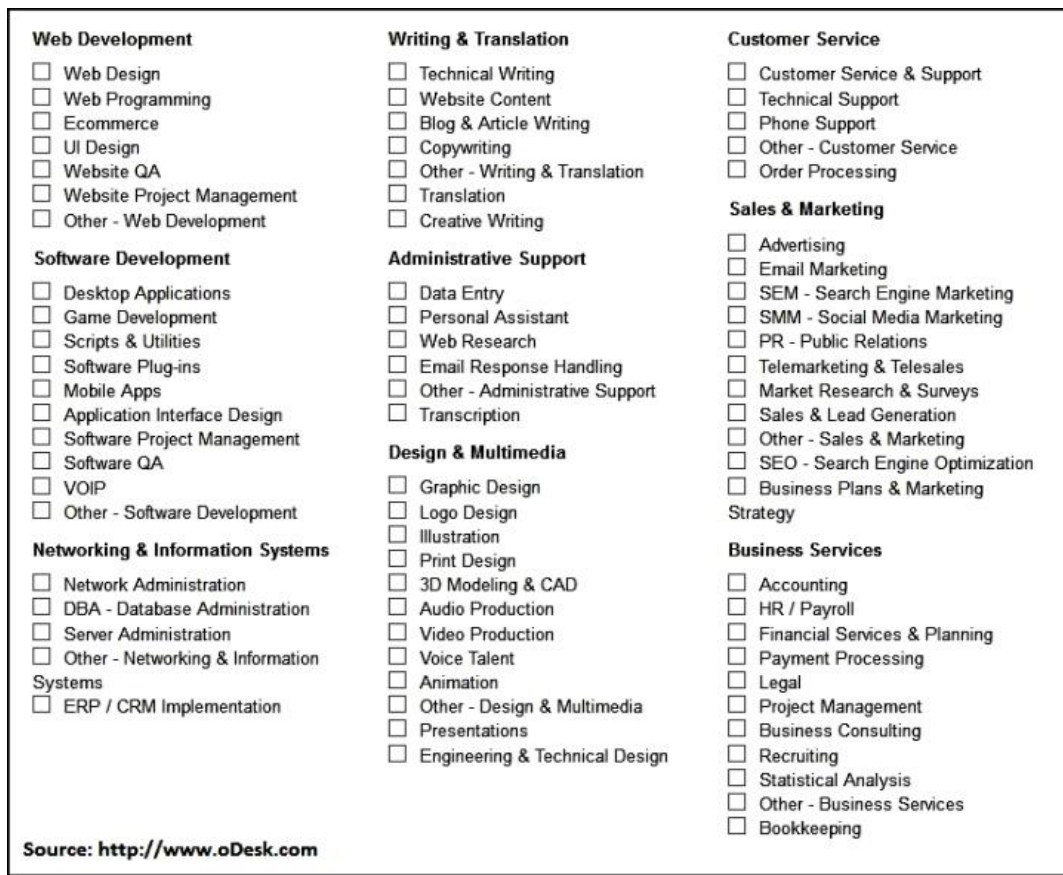
## **1.2 The History of Freelance Growth:**

The intelligent enterprise necessitates intelligent careers, which are based on the boundary less career idea. A new kind of contingent worker is emerging: the boundary less temporary worker. The desire for temporary employment, as well as their high degree of competence and experience, set these boundary less temps apart from conventional temps. Perhaps the most severe or pure manifestation of the contemporary boundary less job is the portfolio career[4]. A portfolio career has no fixed boundaries and is linked with a strong desire for mobility. Any organizational career management initiatives, such as mentorship and training programs or other kinds of organizational assistance, have no effect on an individual's career path. Individual choices and market possibilities influence one's professional path and success in this "free" society. These personnel are dubbed portfolio workers by Charles Handy because they build a portfolio of work for themselves. Individuals who work as freelance workers, often known as independent contractors, do not have a long-term contractual commitment to any one company. A freelance employee often provides services or completes work tasks under short term contracts with a number of employers or customers, who have the right to manage only the end product of

the employee's job, rather than the exact methods used to complete the job. Independent contractors work in a variety of roles, from physicians to computer programmers to cleaners and agricultural laborers. Individuals who work as freelancers may benefit from a variety of benefits, including flexible work arrangements, freedom, diversity, and tax deductions. However, there are also drawbacks, such as taking on risk in business transactions, paying self-employment taxes, and accepting personal responsibility for the health, disability, and retirement coverage[5].

**1.3 Job Opportunities for Freelancers:**

oDesk is a well-known online site and platform that connects freelancers and employers. Figure 1 List of Freelancer Jobs from oDesk illustrates the jobs that a freelancer does[6].



**Figure 1: List of jobs of freelancer.**

**1.4 Freelance Workers Earn:**

According to Fabio Rosati, CEO of Elance-oDesk, companies in the United States would spend \$500 million on remote freelance employees in 2014. “The increase is a clear indication of a shift in work to the internet,” Business Insider Malaysia, 7 June 2014. Elance-oDesk, which acts as a middleman between businesses in need of talents and freelancers ready to fill them, sees 2.7 million freelance tasks offered each year. Over the last five years, the overall earnings of freelancers have increased by 50% compounded yearly, according to the firm. According to Rosati, many companies hire these employees because they need work done on demand, usually

for a short period of time. In such situations, a marketplace like Elance-oDesk functions similarly to Amazon Prime for employment. It benefits both the business, who may hire on an as-needed basis, and the worker, who has scheduling and geographical flexibility. Furthermore, if the highest-paying freelancing jobs are any indication, freelancers with the appropriate abilities may make a good income from the comfort of their own homes. The salary figures in Figure 2 are derived from the merged databases of Elance.com and oDesk.com, and cover the period from January 1 to May 31, 2014[7].

TOP 20 HIGHEST-PAYING FREELANCE SKILLS BY THE HOUR					
	SKILL	HOURLY RATE		SKILL	HOURLY RATE
1.	Patent Law	\$112.20	11.	Database Development	\$47.60
2.	Voice Acting	\$72.70	12.	Python Programming	\$45.80
3.	Ruby Programming	\$61.00	13.	Django Framework Development	\$45.70
4.	Startup Consulting	\$54.00	14.	User Experience Design	\$43.68
5.	Google Website Optimizer	\$53.80	15.	Internet Security	\$41.60
6.	Investment Research	\$53.20	16.	Salesforce App Development	\$41.20
7.	Network Administration	\$51.10	17.	Label and Package Design	\$40.90
8.	Statistical analysis	\$49.60	18.	Animation	\$35.90
9.	Amazon Web Services	\$49.40	19.	Search Engine Marketing	\$34.90
10.	Legal Writing	\$49.20	20.	Mobile App Testing	\$32.90

Figure 2: Top 20 highest-paying skills the hour

### 1.5 Countries with the Most Hiring and Freelance Opportunities:

Elance is yet another website that serves as a platform for hiring freelancers. Elance published its 2013 Global Online Employment Survey in January 2014, showing a record-breaking year for development in the freelancing economy. Almost 1 million freelancers and 410,000 companies joined the Elance network in only one year, resulting in a roughly 50% boost in freelancer income year over year. Figure 3 shows the world's top employing and freelancing nations.



Figure 3: Top hiring countries, and top freelance countries.

**1.6 Freelance Workers Get Job Opportunities:**

Freelancing is an excellent method to earn a living. You can work from anywhere, and you can pick how much and when you want to work. You don't need to worry about getting up early or taking a lengthy vacation. You are in charge of your own destiny. Hundreds of websites offering freelance services have been established as the freelancing culture has grown in popularity over the years. I did some research on the internet and discovered several freelance internet sites that are very excellent and have already established themselves as major providers of freelancing and outsourcing[8].

- **E lance:**

It is the oldest and most reputable freelancing website. It was founded in 1999 and has completed about half a billion dollars in freelancing transactions since then. With a big number of freelancers in many areas such as web design and development, graphics design, content writing, and so on, and about 50,000 tasks posted each month, there is always a large opportunity to find new work here. On Elance, there are five main employment categories: programmers, mobile developers, designers, writers, and marketers the commission is greater than the average. For projects that don't go as planned, they provide escrow payment and dispute settlement[9].

- **Fiverr:**

It is the biggest marketplace for small services in the world. The most intriguing aspect is that you may generate jobs for as little as \$5. Even if you don't know anything about coding or design, it may be a money-making method for you. Simply look at the jobs that others are generating and see if you can do the same. If you can accomplish something extremely common that people are ready to pay \$5 for, you can earn a lot of money here[10].

**2. DISCUSSION**



Many freelancers consider themselves to be entrepreneurs. Freelancers are individuals who are truly in company on their own account, working alone or with founder partners or co-directors, and are responsible for producing their own work and revenue but do not hire others. Freelancers may work as self-employed single proprietors or partners in unincorporated enterprises, or as directors of their own limited corporations. Task, work, compensation, and other commission components are set out on a project-specific basis in a contract for work and services, or a service contract, in the context of cooperation between businesses and freelancers. Expertise is a highly sought-after talent, with a track record of achievement and years of expertise, A self-starter who likes working on his or her own, A self-marketer who loves promoting and selling his or her services and has a solid marketing vision and plan. Capability to wear many hats, including clerical, billing, and accounting processes Capable of dealing with high risk situations, such as a lack of job stability, no company-provided benefits, and no consistent income, A substantial network of personal and professional connections, Excellent oral and written communication abilities, Problem-solver who is creative and inventive. A freelancer is someone who sells his or her own expertise, skills, and talents. This distinguishes freelancers from most other businessmen, such as retail store owners, who are also self-employed and may operate independently from employers or workers, but these self-employed people offer products or services other than their own expertise. Although we utilize the above description, it is sometimes extremely unclear, which is why further study on Freelancing is needed.

### 3. CONCLUSION

A freelancer is a rising workforce that does highly skilled and professional tasks using modern technologies. They prefer to work from a tiny office or from home, hate monotonous tasks and needless meetings, prefer to operate on a project basis with many customers, and do not believe in stable and long-term employment. Many small companies do not have the means to recruit permanent staff to help with short-term projects or to offer knowledge in highly specialized areas, therefore they rely on the services of independent contractors. In these situations, it is in both the small company owner's and the independent contractor's best interests to lay out the specifics of the employment arrangement in a contract. The small company owner should also exercise caution when hiring freelancers to ensure that they portray themselves as being in business to earn a profit. As a result, the Human Resources department must grasp their nature, as well as how to choose freelancers, allocate jobs, complete jobs, and terminate contracts. Third, we discover that the entrepreneur and freelancer are two distinct individuals. An entrepreneur is an individual who recruits someone else's service or product to set up a business, uses its business intelligence, hires services or skills from others expert, and goods from market, then sells them for financial gain to market segment, this is a type of small business owner; a freelance writer uses own-skills to establish a business.

### REFERENCES

1. J. Jang, "THE EMERGENCE OF FREELANCER COOPERATIVES IN SOUTH KOREA," *Ann. Public Coop. Econ.*, 2017, doi: 10.1111/apce.12143.
2. L. Tutov, "IS A FREELANCER THE MAN OF THE FUTURE OF WORK?," 2018, doi: 10.5593/sgemsocial2018/1.4/s04.059.
3. S. Dorsey, *The Global Freelancer*. 2016.



4. T. Nian, L. Ye, W. Yuhan, G. Tao, and C. JiaHui, "Research and Realization of the Background of Freelancer System," *Int. J. Adv. Pervasive Ubiquitous Comput.*, 2017, doi: 10.4018/ijapuc.2016100101.
5. "Kapitel 14. Freelancer," in *Praxishandbuch Flexible Einsatzformen von Arbeitnehmern*, 2013.
6. B. Rashid, "The Rise Of The Freelancer Economy," *Forbes*, 2016.
7. T. McKeown and P. Leighton, "Working as a self-employed professional, freelancer, contractor, consultant issues, questions and solutions?," *Journal of Management and Organization*. 2016, doi: 10.1017/jmo.2016.45.
8. E. M. Akhmetshin, K. E. Kovalenko, J. E. Mueller, A. K. Khakimov, A. V. Yumashev, and A. D. Khairullina, "Freelancing as a type of entrepreneurship: Advantages, disadvantages and development prospects," *J. Entrep. Educ.*, 2018.
9. S. Süß and S. Sayah, "Work-life balance of freelancers between reality and ideal conception - an explorative approach," *Zeitschrift für Pers.*, 2011, doi: 10.1688/1862-0000\_ZfP\_2011\_03\_Suess.
10. M. Den Besten and W. A. Nakara, "Freelancers and innovation in France," *Int. J. Entrep. Small Bus.*, 2016, doi: 10.1504/IJESB.2016.078054.

## SEARCH ENGINE OPTIMIZATION: A REVIEW

**Alok Singh Sengar\***

\*Assistant Professor,  
Department of Computer Engineering, Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [aloks.computers@tmu.ac.in](mailto:aloks.computers@tmu.ac.in)

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### ABSTRACT

*Because of the large amount of websites available, search engines such as Google utilize the Page Ranking Algorithm to rank web pages based on their content and presence on the internet. SEO may be defined as a technique for enhancing a website with the aim of achieving a high ranking, i.e., a top result. The authors provide the most popular search engine optimization (Google, Bing, MSN, Yahoo, etc.) and compare the performance of the search engine optimization in this article. The writers also discuss the advantages, limitations, difficulties, and commercial applications of search engine optimization. It is essential to have a solid strategic plan in place before diving in. Ranking for keywords is important, but it's much more important to guarantee that you meet your consumers at every stage of the buying process.*

**KEYWORDS:** *Page Ranking Algorithm, Search Engine, Techniques, Websites.*

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### 1. INTRODUCTION

The process by which a website or web page is modified to optimize the frequency and amount of organic traffic from search engines is known as search engine optimization. A web page with effective SEO is more likely to appear higher on a search engine's results page (SERP). Although Google is the most popular search engine, other search engines (such as Bing, Yahoo, and DuckDuckGo) have their own unique web page crawling algorithms that provide the most relevant search results. SEO is the process of assisting in the improvement of your website's ranking on Google and other search engines, allowing you to reach a larger audience, develop your business, and become an industry leader.

It's critical to understand that SEO isn't something you should do half-heartedly; you need a solid strategic plan in place before you get started. It's great to rank for keywords, but you also need to make sure you're meeting your consumers at every stage of the buying process. Google Search Console and other SEO monitoring tools make it simple to gain fast insights into the results of page-specific or site-wide search engines. If you have a particular date in mind, the process by which a website or web page is enhanced in order to optimize the frequency and amount of organic traffic from search engines is known as search engine optimization. A website with good SEO will appear higher on a search engine's results page (SERP). Although Google is the most popular search engine, other search engines (such as Bing, Yahoo, and DuckDuckGo) have their own web page crawling algorithms that provide the most relevant search results. SEO

is the process of assisting in the improvement of your website's ranking on Google and other search engines, allowing you to reach a larger audience, expand your business, and become a leader in your field. It's important to have a solid strategic plan in place before you dig in[1–3].

Ranking for keywords is important, but seeing your consumers at each stage of the buying process is much more important. It's critical to understand that SEO isn't something you should do half-heartedly; you'll need a solid strategic plan in place before you begin. It's great to rank for keywords, but you should also make sure you're meeting your consumers at every stage of the buying process. Google Search Console, for example, makes it simple to obtain fast insights into the results of page-specific or site-wide search engines using SEO monitoring tools. If you're looking for something particular on a certain day. Users may discover information about which searches generate the most traffic, as well as where a website ranks for certain keywords. Although a page's search ranking may be the greatest indicator of SEO effectiveness, there are many additional success measures to consider when evaluating SEO. Google Analytics, another website monitoring tool, provides context for additional factors that may directly or indirectly affect a blog's SERP ranking. Page length, pages per visit, mobile traffic, bounce rate, and visits returned are examples of such measures[4–6].

When it comes to search engines, there is still the age-old debate over who is the best and why. From Google and Bing to Yahoo and DuckDuckGo, the internet is accessible via a variety of engines, some of which are arguably worse than others. The aesthetic appeal (how the results are structured and presented) and the repercussions of the search engine are the two major aspects of its nature and duty. By focusing on performance characteristics, rather than architecture, which is mainly a secondary usability function (though still essential), it compares the two major search engines, Google and Bing.

According to Michael Basilyan, a senior program manager at Bing, one of the main priorities of the search engine's page ranking phase is "content quality." Bing considers three factors for determining a website's rating: the website's contextual significance, meaning, and consistency of material. If an internet page is related to the query, topical significance asks, "Does it answer the inquiry?" Contextual and historical users are analyzed, and particular questions are asked, such as if the inquiry is about a frequent current problem, the user's physical location, the user's search history, and so on. Finally, and most importantly, the content standard investigates three key questions: "Can we trust this material?" "Is the information useful and comprehensive?" and "Is the material simple to locate and properly presented?" are two questions to consider.

While these aren't the only factors considered by Bing in its page ranking algorithm, they are the ones that it considers the most significant. On the other hand, it's difficult for Google to depend only on a few important rating factors. With over 200 ranking variables, Google SEO experts may identify the most important factors in the algorithm, such as keyword usage, site structure, site speed, time spent on site, number of inbound links, and inbound connection quality. Clearly, Google and Bing utilize many of the same page rating factors, but the differences in how they use them are what distinguishes the two competitors. While there isn't much of a difference between Bing and Google, there are a few differences worth noting. While Google's search algorithm excels in matching synonyms and related phrases to queries and data, Bing's search algorithm requires more specific keyword matching to get precise search results. Furthermore, Bing continues to give priority in page ranking to sites related to current events[7–9]

For example, when searching for it on Google and Bing, the first link is the official Indian tourist website, while Bing displays news items initially, which precedes the ranking of the official tourism website. If a website has Flash content, however, Bing outperforms Google in a substantial way; it is far more likely to rank higher on Bing than Google. When it comes to search engines, there is still the age-old debate over who is the best and why. From Google and Bing to Yahoo and DuckDuckGo, the internet is accessible via a variety of engines, some of which are arguably worse than others. The aesthetic appeal (how the results are structured and presented) and the repercussions of the search engine are the two major aspects of its nature and duty. By focusing on performance characteristics, rather than architecture, which is mainly a secondary usability function (though still essential), it compares the two major search engines, Google and Bing.

When Bing was created as a replacement to Microsoft's MSN Search, Windows Live Search, and subsequently Live Search in 2009, Larry Page and Sergey Brin founded Google in 1998. Google has a 73.02 percent share of all desktop search engine users, whereas Bing has just a 9.26 percent stake.

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For example, when searching for it on Google and Bing, the first link is the official Indian tourist website, while Bing displays news items initially, which precedes the ranking of the official tourism website. If a website has Flash content, however, Bing outperforms Google in a substantial way; it is far more likely to rank higher on Bing than Google. To a single effort, since it prevents verification via the trace and slip method, continuous review, and periodic improvement of the output standard in order to keep the site's rank.

As a result, companies often outsource this responsibility to firms or people who are experts in this field. The search engine is expected to include 500 billion posts, according to estimates. As a result, a company's particular website may need to compete fiercely for a high position. The

demand for optimization has risen as a result of a productive level of promotions and customer drawing capacity, which is made feasible by upgrading the company's websites. From the above, it can be seen that search engine optimization is a method of boosting the popularity of the company's websites. The search engine optimization would employ a certain axiom or key limitation for specific websites so that the company's website would appear when the attacker enters a specific term. However, the utility of the words protected by the website would have a big impact on trafficking. For this reason, it's critical to keep the content on the web up to date. In most cases, businesses lend out for the purpose of upgrading to other partnerships[10].

## 2. DISCUSSION

Furthermore, gaining access to various stakeholders particularly in more marginalized groups is a significant challenge, and in order to mitigate the severity of such situations, it is critical to recognize antagonistic interests as well as understand which opinions are visible in the debate and which are not. With the potential exception of tools that address the requirement to identify participants, current support tools seem to lack this ambition when it comes to methods for more representative involvement in collaborative governments. In an online community, your online performance defines your identity. Identity is not a problem for basic and well defined task-oriented activities like data transcription, but as tasks grow more complicated, legally recognized identity becomes more essential. As a result, further critical study in this area is required. It's also important to talk about why problems like representation and digital difference aren't addressed at all in these fields of study. Similarly, it is critical to inquire into the reality and reasons why political science academics have not discussed open government in their own discipline/publications. This examination of the open government paradigm reveals that the idea of open government has become increasingly politicized, focusing on innovation and efficiency rather than debate and democracy in political discourse. Transparency and open data are tools for not just accountability but also control. As a result, a more critical debate about who owns data, how it is generated, and by whom is required.

## 3. CONCLUSION

The open government idea advocated in the study papers is a strong meme since it refers to change, transformation, and even a revolution in the way government works. It's also tough to argue against this belief system's promises of accountability, creativity, and a sharing culture, all of which will be realized provided we all adhere to the same standards. Despite the obvious democratic issues with ICT, such as rising disparities and access to the means to engage in society being more complicated than ever, most study has concentrated on the less problematic areas of open government, ignoring the challenges of digital difference. From a radical democratic standpoint, both participation, in which people supply government with information, and collaboration, in which information is produced via discussion, may be challenged. In this view, the "public" is made up of numerous individuals who are distinct from one another. Because of competing interests inside and across parties, it is difficult to reach agreement in a deliberative process in such a situation. ICT has exacerbated the disparity between various groups' capacity to engage in terms of required literacy and social capital, according to studies on digital differentiation. It matters who is debating and making choices. Feminist academics stress the significance of "placed knowledge", which means that knowledge is always situated in a person's prior understanding of the information. People not only have diverse and often conflicting interests, but they also generate and perceive information differently, which is why

the result of information collecting is also influenced by who is in the “crowd.” As a result, there is a need for greater debate and action research in this area in order to find ways to promote a more deliberative democratic process.

## REFERENCES:

1. Shih, B.Y., Chen, C.Y., and Chen, Z.S., “An empirical study of an internet marketing strategy for search engine optimization,” *Hum. Factors Ergon. Manuf.*, 2013, doi:10.1002/hfm.20348.
2. Gudivada, V.N., Rao, D., and Paris, J., “Understanding Search-Engine Optimization,” *Computer (Long. Beach. Calif)*. 48(10):43–52, 2015, doi:10.1109/MC.2015.297.
3. Shahzad, A., Nawari, N.M., Sutoyo, E., Naeem, M., Ullah, A., Naqeeb, S., and Aamir, M., “Search engine optimization techniques for Malaysian University websites: A comparative analysis on google and bing search engine,” *Int. J. Adv. Sci. Eng. Inf. Technol.*, 2018, doi:10.18517/ijaseit.8.4.5032.
4. Palanisamy, R. and Liu, Y., “User search satisfaction in search engine optimization: An empirical analysis,” *J. Serv. Res.*, 2018.
5. Shahzad, A., Nawari, N.M., Hamid, N.A., Khan, S.N., Aamir, M., Ullah, A., and Abdullah, S., “The impact of search engine optimization on the visibility of research paper and citations,” *Int. J. Informatics Vis.*, 2017, doi:10.30630/joiv.1.4-2.77.
6. Killoran, J.B., “How to use search engine optimization techniques to increase website visibility,” *IEEE Trans. Prof. Commun.*, 2013, doi:10.1109/TPC.2012.2237255.
7. Search engine optimization with Google, *Int. J. Comput. Sci. Issues*, 2012.
8. Hayaty, M. and Meylasari, D., “Implementasi Website Berbasis Search Engine Optimization (SEO) Sebagai Media Promosi,” *J. Inform.*, 2018, doi:10.31311/ji.v5i2.4027.
9. Ahmed, I., Shahzad, R.K., Kashif-ur-Rehman, and Shabbir, J., “Search engine optimisation: Evidence from Pakistan,” *Asian Acad. Manag. J.*, 2013.
10. Shahzad, A., Jacob, D.W., Nawari, N.M., Mahdin, H., and Saputri, M.E., “The new trend for search engine optimization, tools and techniques,” *Indones. J. Electr. Eng. Comput. Sci.* 18(3):1568–1583, 2020, doi:10.11591/ijeecs.v18.i3.pp1568-1583.



## A REVIEW ON VALUES AND ETHICS IN HUMAN-COMPUTER INTERACTION

**Arpit Jain\***

\*Associate Professor,  
Department of Computer Science, Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- arpit.computers@tmu.ac.in

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### ABSTRACT

*An important public discussion is underway on the values and ethics of digital technologies as designers work to prevent misinformation campaigns, online harassment, exclusionary tools, and biased algorithms. This monograph reviews 30 years of research on theories and methods for surfacing values and ethics in technology design. It maps the history of values research, beginning with critique of design from related disciplines and responses in Human-Computer Interaction (HCI) research. The review then explores ongoing controversies in values-oriented design, including disagreements around terms, expressions and indicators of values and ethics, and whose values to consider. Next, the monograph describes frameworks that attempt to move values-oriented design into everyday design settings. These frameworks suggest open challenges and opportunities for the next 30 years of values in HCI research.*

**KEYWORDS:** *Computer, Evaluation, Interdisciplinary Influence, Privacy, Social Implication.*

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### 1. INTRODUCTION

Recent events have pushed concerns regarding the aims and politics of human-designed technologies, as well as whether the social interactions of such devices are good, fair, or just, to the forefront of public discussion. Reporters, for example, have uncovered the involvement of social media platforms like Facebook in the 2016 US election. Designers have spoken out about how phone applications employ psychological techniques to keep users' interest. The New York Times bestseller *Weapons of Math Destruction*, which examines prejudice in mathematical modeling, was long-listed for the National Book Award. *Technically Wrong: Sexist Apps, Biased Algorithms, and Other Toxic Tech Threats* charged that "an isolated industry" was responsible for alienating and damaging technology. Ethics courses are in more demand in prestigious university computer programs.

For more than 30 years, the question of how to avoid biased practices and instead undertake ethical, just design has been a source of research and discussion in the field of human-computer interaction (HCI). It's encouraging to see news and industry sources focusing on prejudice and injustice in the intricate network of designers, technological systems, users, and indirect stakeholders that make up our sociotechnical environment. This complicated sociotechnical

network, on the other hand, explains why this debate has lasted so long and is so difficult. When people and systems are deeply intertwined, avoiding prejudice and injustice is a terrible issue. People may have unpredictable responses to technologies, and users may have unexpected reactions to technologies. It's impossible to count the number of direct and indirect technology stakeholders. Our design methods may have an effect on individuals other than our users, whether via the gathering and use of personal information throughout the design process, unexpected consequences, or the natural resources our technologies use [1], [2].

HCI would have long ago shown how to prevent biased design if there were explicit standards to follow. Instead, we have lively debates about what constitutes a “value” or a “ethic,” ontological quandaries about where such entities or actions might reside in people, technology, or their interactions, questions of agency and intention in design, and reflective, almost artisanal design practices aimed at bringing all of these issues to the forefront of development.

The good news is that more individuals are addressing the vexing issue of design principles and ethics. For example, the number of publications referencing "human values" in the ACM Digital Library increased dramatically from 20 in 2000 to 113 in 2010. By this metric, interest has only grown: by 2017, the number of articles referencing “human values” had almost quadrupled (to over 210). 1 When you add “ethics” to the search and limit it to abstracts, the number jumps to almost 4,000, with the majority of those articles published after 2000. The "Denver Manifesto" was written by workshop participants at CHI 2017 to "unambiguously declare that values play a crucial role in the design, development, and deployment of technologies, and that there is a need for debate and action on the subject." “An ‘ethical shift’ is happening in the design fields,” according to the preface of an edited anthology on design and ethics. Van den Hoven defines both a "value turn in engineering design" and a "design shift in thinking about values" in the same way [3]–[6].

## **1. Critique Methods:**

Philosophers, critical theorists, anthropologists, and sociologists have long studied the meanings, effects, and interconnections of people and technologies, and have created critique-based approaches to values and ethics in technology. Scholars in STS, information studies, and information systems have offered complementary criticisms based on empirical research, while computer ethics has published critiques influenced by philosophical traditions. All of these fields have generated significant criticisms of technology from explicitly intersectional perspectives, including feminist, critical race, and postcolonial academics. The criticism traditions, taken collectively, have established a basis for understanding design principles and ethics that is echoed across HCI research.

### **1.1. The Ethics Of Computers:**

The computer and information ethics area of philosophy of technology employs conventional ethical theory, primarily Western ethical theory, with exceptions for computer and information network issues. Norbert Wiener, a professor of Mathematics and Engineering at MIT and the Founder of Cybernetics, is credited with establishing computer ethics, according to the Stanford Encyclopedia of Philosophy. Wiener's book *The Human Use of Human Beings*, published in 1950, looked at the ethical and societal problems that arose as a result of the development of computerized automation. However, it was not until the 1980s that computer ethics were more widely discussed in philosophy, with the publication of an important monograph outlining a

theory of computer ethics and the first edition of an influential textbook outlining debates and difficulties in the field [7]–[10].

The article "What is Computer Ethics?" by Moor highlighted a fundamental issue that still reverberates throughout the HCI community. Computers' capacity to do new things with information, according to Moor, leads to policy vacuums, or circumstances in which there is little official or informal ethical or legal guidance. For example, confusion among researchers and regulators regarding the ethics of conducting revealing and possibly identifiable studies using online public datasets is a contemporary policy vacuum. Traditionally, research utilizing publicly accessible data has been excused from scrutiny by research authorities such as Institutional Review Boards (IRBs). However, in an age of online posting and social media, both social computing researchers and IRB staff members express confusion regarding whether data counts as "public."

Computer ethics has a long and rich history of criticism, building on the fundamental work of academics like Wiener, Moor, and Johnson. Privacy and surveillance, justice and accountability, and responsible innovation have all benefited from conferences like Computer Ethics Philosophical Enquiry (CEPE) and ETHICOMP, as well as publications like Ethics & Information Technology. Disclosive computer ethics is probably the most closely linked to HCI traditions of addressing values during design within this discipline. Disclosive computer ethics is concerned with the "moral decoding" of values encoded in technology. The method is anticipatory: it looks for ethical problems during the development of a technology rather than during its usage. Disclosive computer ethics, like most (but not all) HCI values research, focuses on technologies and their moral characteristics rather than the behaviors of actors utilizing technology. Interdisciplinary is required for revealing computer ethics, since philosophical competence must be coupled with technological skill and social science understanding of human-computer interaction.

## **1.2 Sociotechnical Methodologies:**

While computer ethics focuses on philosophical criticisms of developing information technology, social scientists have examined the politics, morals, and ethics of information technologies as well. Scholars that utilize sociotechnical methods such as social construction of technology, social shaping of technology, and social informatics focus on how people and social connections influence the ethics of technology design and usage.

What sort of world are we creating while we 'make things work?' This implies that, as part of any major technological development, we should pay attention not just to the creation of physical instruments and processes, while that is still essential, but also to the creation of psychological, social, and political circumstances. Are we going to create and construct environments that expand human freedom, sociability, intellect, creativity, and self-government opportunities?

Winner first addressed these issues in his book "Do Artifacts Have Politics?" published in 1980, in which he outlined arguments that are still often referenced concerning how technologies "embody particular kinds of power and authority." Winner proposes that we consider the "regimes of instrumentality" in which we live, and that these considerations should inform design:

To the extent that the capabilities of a particular technology permit, the item should be built in both its physical and social components to conform to a carefully defined, widely accepted idea of a society worthy of our care and devotion.

Winner connects the origins of these concepts to 1960s academics like Lewis Mumford, who claimed that industrialization technologies might be viewed as authoritarian (e.g., nuclear power) or democratic (e.g., solar energy), as well as the 1960s and 1970s "appropriate technology" movements. Appropriate technology enthusiasts, first in the global South and later in the global North, attempted to fit technologies to the needs and ideals of communities.

### **1.3 Feminist, Intersectional, And Postcolonial Technological Critiques:**

Feminist, anti-racist, and postcolonial scholarship has criticized the manner in which technology reflect dominant ideals while failing to promote disadvantaged groups' values. Feminist technology academics have been important in highlighting the many ways in which women are excluded from technical narratives and, as a consequence, from design opportunities.

The common concept of "technology" in both popular discourse and technology studies excludes technologies connected with women (such as baby bottles or knitting patterns). The ways in which prejudices against women's bodies have been incorporated into technology like aircraft cockpits. How gendered family norms are reflected in household technology. Standard technical principles like efficiency were overlooked in household technology such as the vacuum cleaner, washing machine, electric ranges, and microwave ovens since women's domestic work was often assumed to be free or even done for pleasure. Gender expressions that are more flexible are often ignored by technological design. Consider how social media rules and affordances disregard flexible and diverse gender identities.

The ways racism and prejudice interact with design are also criticized by race and intersectionality scholars. Criticizes the early internet boom's "race less" myths, showing how internet firms used racial othering in their advertising to assuage white fears about the digital future. The role of a racist and sexualized nerd culture as a barrier to technical competence.

## **2. Putting Design Into Practice:**

Design researchers actively dealing with ethical practice have been inspired by philosophical and social science criticism traditions. HCI, participatory design (PD), and computer-supported cooperative work have long included discussions of values and politics in design (CSCW). Since the 1990s, investigations into algorithm bias have also been a hot subject in HCI. From its inception, the CSCW scholarship has explicitly emphasized the importance of collaboration in working groups and teams, as well as principles such as empowerment and privacy. In its early studies, participatory design scholarship grappled with ethical problems including cultural norms and legitimate involvement.

Friedman integrated ideas from philosophy of technology and STS with computer science in a 1997 edited book, concretely linking the continuing debate about values, ethics, and politics of technologies to design. With the shift from technology criticism to building for values, complicated new issues arose about what, and whose, values to design for, as well as how to make building for values possible in computer environments.

### **2.1 Value-Aware Design:**

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Batya Friedman's work on value sensitive design (VSD) has been important in bringing together the worlds of computer ethics and design methodologies, and breaking new ground for generative approaches to values in design. Her technique, which she created with collaborators, offered theoretical and methodological scaffolding for academics attempting to conceive and operationalize difficult values such as privacy and equality for design.

Friedman's early work was motivated by a succession of negative outcomes caused by computer viruses, medical software failures, and mistakes in computer-guided weapons technology. This early research focused on human autonomy while interacting with computers, and it advocated for the use of philosophical analysis with social scientific techniques to better understand users and their agency in a sociotechnical setting. Friedman started to tackle the problem of how to develop responsible computer systems over time. VSD developed a three-part method in which theory, empirical research, and design are all intertwined.

Theoretical studies aim to get a philosophical understanding of a proposed technology, using moral lenses such as utilitarian or deontological methods. Friedman and Kahn propose a set of values that "have a unique claim on resources in the design process," based mainly on moral philosophy. These values are proposed as a starting point for system philosophical study. Is a proposed technology harmful to people's physical, material, or psychological well-being? Do preexisting or emergent biases exist in a system? Is a system based on the idea of trust?

## **2.2 Involved Values:**

The Values at Play (VAP) framework describes methods to assist in the creation of games for certain values, although it has a limited design scope than VSD. Character selection, graphic characteristics, point of view, and accessible actions are all high-value game components. The writers were inspired by VSD, but they believe that designing digital games is more difficult since they combine play, art, and technology. VAP is described as a "rough guide for game designers who want to influence the social, ethical, and political principles inherent in their games." The VAP method starts with value discovery, in which designers identify their personal values, as well as the values of their team and work environment, as well as those expressed in project or mission statements. It then moves on to translation, when designers operationalize and implement their values into game objects, as well as resolve value conflicts as they occur. Finally, via critical reflection, user surveys, and pre- and post-tests, verification techniques allow designers to see whether their intended values have been operationalized.

## **2. DISCUSSION**

Discussions of design principles often pose difficult ethical relativism issues. Is there a set of values that should be included in global technologies? Or do technologies have to constantly respect the values of a certain location? My interviews with internet architects revealed how tough it may be to answer these concerns. My informants and I looked at the principles that the proposed NDN protocols promote, such as free speech and anonymity. These ideals, on the other hand, would face opposition from governments, companies, and people on a global internet. What is the best way for the team to approach values-oriented design for a global internet?

Typologies, heuristics, or lists of values deemed essential within design have often driven values-oriented design. Value sensitive design publications, for example, have suggested short groups of values (usually 8–13) as design heuristics: non-comprehensive lists of values problems



that are often invoked throughout design. Cheng and Fleischmann's work has built on this study, as well as social psychology research, to build even bigger, empirically supported inventory of design ideals.

Values typologies or heuristics in design, on the other hand, have been subjected to a slew of criticisms. These criticisms usually go one of two ways. On the one hand, some HCI researchers believe that such criteria are excessively rigid, causing researchers to be biased and failing to consider local circumstances. Philosophical academics, on the other hand, have contended that the heuristics employed in values-oriented design are insufficiently philosophically reasoned.

Values-oriented design typologies have been criticized by HCI researchers inspired by participatory design traditions for emphasizing researcher competence above stakeholder norms and values. The importance of values lists, but researchers should make the culture and views utilized to create them (as well as the possible biases of such lists) extremely clear. Because of the top-down character of value inventories or typologies, researchers are encouraged to create their own context-appropriate values based on local design contexts.

Despite the fact that value-sensitive design has no overarching moral framework, this definition of virtue ethics may be used to read some of the practice's required abilities. Vallor's suggested techno moral virtues are also aligned with value-driven design activities. Vallor is a taxonomy of techno moral qualities that includes honesty, self-control, humility, justice, bravery, empathy, care, civility, adaptability, perspective, and magnanimity. It is based on both Eastern and Western virtue ethics traditions. These offer a set of guiding principles for virtuous design practice, as well as echoing and expanding on the basic ideas of value sensitive design. Simultaneously, ethical knowledge provides the flexibility to recognize that these virtues aren't the only or best virtues for every design scenario. Finally, arguments over values heuristics or ethical frameworks vs grounded methods represent two distinct ways of knowing. Computer ethics scholarship inspired VSD's values heuristics, and values heuristics use deductive reasoning based on generalized ethical concepts as well. Contextual values methods, on the other hand, rely on action research, user-centered design, and participatory design traditions, in which the main source of values advice is design for a community. These phenomenological and inductive traditions culminate in a values-oriented design approach from the ground up.

### 3. CONCLUSION

It's essential to note that values-based design isn't a cure for "toxic tech" or, more generally, the problematic standards of an industry that depends on user attention and advertising income. Policy, leadership reform, and educational reform all play important roles. 153 values-oriented methods, on the other hand, encourage the sorts of introspection and socio-technical discussions that are critical for the future of HCI. We have never been more equipped as a field to lead this shift in practice. For values reflection, we offer a well-developed collection of techniques and toolkits. We now have a wider set of frameworks for doing critical inquiry into human-computer interaction design as a field of creation and a kind of knowledge. We have observational evidence of times that are conducive to using these techniques into design work. And the IT sector is increasingly being held responsible for its design ethics by the press. Now is the time to alter design practice in order to enhance design ethics.



**REFERENCES:**

1. K. Shilton, "Values and Ethics in Interaction," *Found. Trends® Human-Computer Interact.*, 2018.
2. K. Shilton, *Values and Ethics in Human-Computer Interaction*. 2018.
3. C. Frauenberger, M. Rauhala, and G. Fitzpatrick, "In-action ethics," *Interact. Comput.*, 2017, doi: 10.1093/iwc/iww024.
4. J. Davis and L. P. Nathan, "Value sensitive design: Applications, adaptations, and critiques," in *Handbook of Ethics, Values, and Technological Design: Sources, Theory, Values and Application Domains*, 2015.
5. D. Boyd, E. F. Keller, and B. Tijerina, "Supporting Ethical Data Research: An Exploratory Study of Emerging Issues in Big Data and Technical Research," *Data Soc.*, 2016.
6. M. Taddeo and L. Floridi, "What is Data Ethics? Subject Areas: Author for correspondence :," *Philos. Trans. Ser. A*, 2016.
7. J. Iqbal and B. M. Beigh, "Computer Ethics: Job of Computer Scientist," *Int. J. Adv. Res. Comput. Sci. Softw. Eng.*, 2017, doi: 10.23956/ijarcsse/v7i6/0135.
8. D. Coric, "Introduction to computer ethics," *Zb. Rad. Pravnog Fak. Novi Sad*, 2015, doi: 10.5937/zrpfns49-10031.
9. S. Jones, "Doing the right thing: computer ethics pedagogy revisited," *J. Information, Commun. Ethics Soc.*, 2016, doi: 10.1108/JICES-07-2014-0033.
10. R. Volkman, "Computer ethics beyond mere compliance," *J. Information, Commun. Ethics Soc.*, 2015, doi: 10.1108/JICES-10-2014-0043.

## A REVIEW ON WATER PURIFICATION USING MAGNETIC SERVICE

Dr. S. R. Ali\*

\*Professor,

Department of Civil Engineering, Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- drsrli.engineering@tmu.ac.in

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### ABSTRACT

*On our world, water is a vital resource for existence. As a result, its preservation is a top concern. With rise in demand, the supply must satisfy certain criteria. To fulfill the requirements, many purifying methods have been used. Magnetic separation is a purification method which has been adopted from the mineral mining industry to anti-scale pipe line treatment and magnetic flocculent seeding. In recent years, there have been no evaluations of the water purification method that uses magnetic aid. The current article covers various features of magnetism and magnetic fluids for water purification and provides a great deal of information on this water purification method.*

**KEYWORDS:** *Environmental Applications, Flocculent, Magnetic Separation, Nanomaterials, Waste Water Purification.*

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### 1. INTRODUCTION

Ground water, lakes and reservoirs, canals, atmospheric water production, rainwater harvesting, fog collecting, and sea water are all significant drinking water sources. Depending just on pollutant source, they may be contaminated differently. Water management may be split into three categories depending on source of water: natural source water management, household waste water management, and industrial waste water management. Every scheme requires a unique plan of action for re-use or disposal, depending on the quality of the water. Biological, chemical, and physical techniques are widely used in water remediation. The biological treatment refers to the breaking down of organic molecules and the bio-assisted transformation of inorganic chemicals. Coagulation, oxidation, electron beam irradiation, radio colloid therapy, and sorption on organic/inorganic substrates are some of the biochemical treatment techniques. Wind and incineration are two physical therapy techniques.[1]

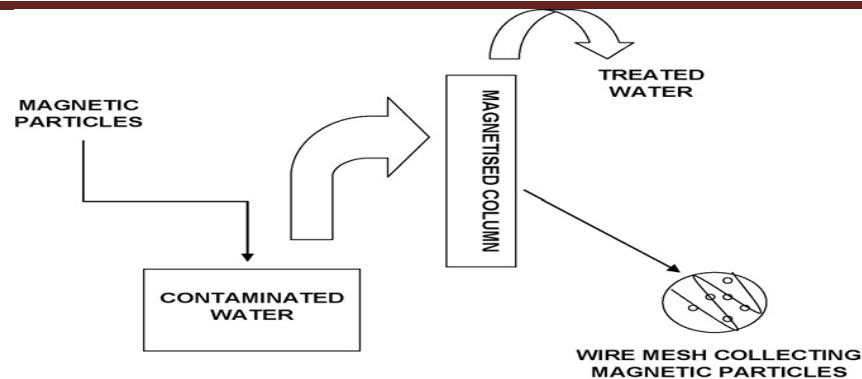
#### 1.1 Water Purification Techniques May Be Divided Into Six Categories:

Biotechnology, adsorption, Catalytic processes, membrane processes, ionizing radiation processes, and magnetically assisted processes are all examples of processes. Furthermore, nano materials-based technologies are gaining traction as viable alternatives to existing water treatment methods. The adsorption method is the most widely researched and used technology in industry. The most often used adsorption is activated carbon, which comes from a variety of

sources including coconut coir, jute sticks, rice husk, and so on. Adsorption techniques utilizing particular ion exchangers or extractants, as well as a combination of desorption with catalytic treatment methods, redox processes, and magnetic processes, are all used to treat water. The use of carbon nanotube clusters has recently been described as a novel adsorption method. This cluster's distinguishing feature is its ability to remove germs from water via an adsorption technique. Plants as sorbents and microorganisms for pollutant elimination or transformation are extensively researched in the field of biotechnology. Simpson described a bioactive carbon biofilm ability to degrade a significant fraction of encapsulated water-borne nutrients and dissolved organic adsorbed on granular activated carbon (GAC) surfaces, as well as other contaminants, minerals, and microorganisms enclosed in source water when it came to water purification for the degradation of organic pollutants.[2]

Soil Biotechnology, or SBT, is another technique for water purification that utilizes a designed soil environment in which natural processes such as respiration, mineral weathering, and photosynthesis bring about the bioconversion. The system comprises of a mineral-rich media, a local micro flora culture, the geophagus worm *Pheretima elongata*, and bio-indicator plants. Both organic and inorganic contaminants are often oxidized or reduced using catalytic methods. Catalytic applications to water purification include solar-assisted oxidation, photo-assisted oxidation, heterogeneous catalytic ozonation, electro catalysis, electro-Fenton techniques, photo-electro-catalysis process, and photo-electro-Fenton process applications. Seawater desalination, brackish water desalination, and groundwater desalination are all applications for high-pressure membrane water purification. Figure 1 A typical facility for high-gradient magnetic separation. Softening, surface water treatment and municipal water reclamation are all examples of municipal water reclamation. Membrane bioreactors and RO are used in water purification for micro- and ultra-filtration. Phelps et al. showed the use of metallic membranes with holes smaller than a micron in size to solve fouling issues with organic membranes.[3]

Macedonio mentions the use of membrane distillation in improving process efficiency in another paper. The use of ionizing radiation sources for water purification is a new area in waste water treatment. This method is also useful for sterilizing sewage waste sources. Yavuz et al. recently evaluated the use of magnetic separations in a variety of sectors, including clay decolorization, steel factories and power plants, ore enrichment-mineral beneficiation, food processing, water treatment, and metal removal. Only advancements in the field of magnetic separations are mentioned in this article. So far, there hasn't been any research done on the use of magnetism in water filtration. The purpose of this article is to describe the many features of magnetism and magnetic fluids for water purification.[4]



**Figure 1: High Gradient magnetic separation[5]**

## 2. DISCUSSION

### 1. Water Purification Via Magnetic Separation:

Magnetism is a unique physical characteristic that aids in water purification by affecting the physical properties of pollutants in water. Furthermore, by combining it with other procedures, an improvised efficient purification technique may be created. Before addressing the subject's technical development, we may look at Appendix A, which defines a few magnetism words and measures for frequently used magnetic separator variables. In magnetic separations, the phrase "high-gradient magnetic separation" (HGMS) is frequently used.[3]

As illustrated in Fig. 1, an HGMS device consists of a bed of magnetically sensitive wires placed within a magnet. The wires de homogenize the magnetic field in the column whenever a magnetic field is applied across it, resulting in significant field gradient around the wire that draw magnetic particles to their surfaces and trap them here. The formation of these huge magnetic field differences, as well as particle size and magnetic characteristics, have a big impact on particle collection. The magnetic force pulling particles towards to the wires must outweigh the fluid drag, gravitational, centrifugal, and diffusion factors as the particle suspension passes through the separating for HGMS to capture magnetic particles successfully.[6]

#### 1.1 Types Of Magnets:

Variation in magnet type may increase the strength of magnetisation in a separator. Permanent magnet-based separators, electromagnet-based separators, and superconducting magnet-based separators are indeed the three types of magnet-based separators. Permanent magnets have been made from ferromagnetic compounds based on iron, nickel, cobalt, or rare earth elements. Permanent magnets have traditionally been thought of as low-intensity magnetic forces that produce fields of less than 1 T, but with advances in material research and knowledge of shape design factors, high-intensity magnetic field strength may now be achieved. Multi pole magnets have a strong benefit in this respect since they can produce fields higher than 2 T per unit length. Because no energy is used to generate the magnetic field, advancements in this area assist to lower operating costs compared to other kinds of magnets. In electromagnets, a solenoid of electrical conducting wires generates a magnetic field inside its chamber when an electric current passes through it. Depending on the application, solenoid space has been created for linear, annular, and other form designs. A maximum field of 2.4 T is generated by the electromagnets.[7]

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**1.2 Industrial Advancement:**

The use of magnetic water treatment in industry dates back more than just a century. Porter was the first to suggest non-chemical water purification equipment as a method of scale control. Electricity was utilized by Faunce and Cabell to avoid boiler incrustation. To treat boiler water, they developed an electromagnetic device. Hay obtained the first US patent for a magnetic field-based water treatment system in 1873. The phases of development, according to Friedman et al, have ranged from industrial water purification through improvements in materials research and equipment for the collection of weakly magnetic particles. Separator applications of magnetic particle carriers were later developed for pollution separation.

**1.3 Economy Considerations:**

A few employees have successfully assessed the separation technology's economic effectiveness. Yano et al., for example, used HGMS to the filtration of steel mill waste water streams in a research. They discovered that although the HGMS and sand filter are almost identical in terms of installation, the HGMS outperforms the sand filter in terms of running expenses and space needs. The necessary flow rate through to the sand filter for a 150 mg/L solid waste was  $8 \times 10^{-3}$  m/s, compared to  $6 \times 10^{-2}$  m/s for HGMS. The feed time for the HGMS was 20 minutes vs 8 hours for the sand filter. The area needed was 4.5 m<sup>2</sup> compared to 8 m<sup>2</sup> for a sand filter. In comparison to a sand filter, the HGMS has a 0.7:1 relative running cost, whereas the sand filter has a 1.1:1 installation cost. In another case, Vedavyasan calculated the cost of using RO in conjunction with the magnetic separator method. Colloidal solids and biological fouling devices are the enemies of RO plants. Fouling is minimized and efficiency is improved by integrating turbulence producing flow regulators and an EMF device. According to the estimates, the capital cost of RO plants with EMF is 13% more than that of standard RO plants. However, because of the savings in membrane washing, the time is reduced by 30%, and the trans-membrane pressure loss is decreased by 20% overall. A higher feed water quality was achieved thanks to a combination of cost reductions and improved technology. The examples shown indicate that magnetically assisted methods for water purification offer significant benefits in terms of time and cost reductions.[8]

**1.4 Direct Purification:**

There is no carrier magnetic component in the direct purification technique. Instead, the purifying process is based on the fundamental characteristics of ions or solids in reaction to a magnetic field. The use of a magnetic field helps to induce crystallization, and when a magnetic filter is used before water delivery, the filter collects all salts and prevents salt ions from passing through the distribution pipes. Scaling caused by deposits on pipes is avoided in this way. Anti-scaling is the most frequent approach used in direct purification. In the case of boilers, heat exchangers, and pipelines, salt deposition causes equipment damage over time. CaCO<sub>3</sub>, CaSO<sub>4</sub>•2H<sub>2</sub>O, and silica are the most frequent scale components, although additional scaling species include BaSO<sub>4</sub>, SrSO<sub>4</sub>, Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>, and ferric and aluminum hydroxides. The anti-scale effect is caused by changes in crystallization behavior that cause bulk solution precipitation rather than adherent scale development.[9]

The magnetic effect seems to be increased when the process water is supersaturated and has a high ionic load. The salt concentration, the presence of an anion in the salt, the pipe's building supplies, the physicochemical characteristics of water, the strength of the magnetic field, and the

length of the field application are only a few of the variables that influence the de-scaling process. For this application, several equipment combinations such as permanent magnets and electromagnets, as well as multimode and re-circulatory mode, have been used. Magnetic devices are also classified for applications based on magnetic field direction, which may be parallel to fluid flow directions. The designers describe each arrangement as commercially viable. The architects of single-pass mode attribute better de-scaling to flow rate control, while the designers of re-circulatory mode attribute de-scaling to turbulent factor. The superiority of one method of operation over another is difficult to anticipate due to many factors involved for de-scaling.

### **1.5 Seeding And Separation Of Magnetic Flocculant Using High-Gradient Magnetic Separation:**

The HGMS seeding technique, like the direct purification method, is one of the oldest methods for water purification, with evaluations dating back to the early 1900s. A coagulant cation, such as Fe(III), produces an insoluble compound with positive susceptibility when exposed to a magnetic field under the right chemical circumstances. On a magnetic filtering assembly, this characteristic is used to trap the coagulant with the pollutant. It is an efficient method for reducing both oil and suspended particles in water discharge streams, such as those from the paper and steel industries. The creation of a continuous low magnetic field filtration system with seeding and flocculating phytoplankton for lake water purification is one example of a typical application. Algae, biochemical oxygen demand (BOD), total nitrogen (TN), and total phosphorous were all removed at the same time. Using a super magnetic filter, almost 93 percent of phytoplankton could be flocculated out of lake water at 400 m<sup>3</sup>/day flow rates.

### **1.6 Magnetic Sorbents:**

There are rivers in waste water that are difficult to coagulate. Polyhydroxy complexes, also known as nitroso-hydroxy, hydroxy-carbonato, or halogenohydroxo-carbonato complexes, are formed when several ionic species polymerize. These do not precipitate with the ferric floc after being seeded with ferric ions. Monovalent ions, on the other hand, do not agglomerate well with ferric ions. For such waste streams, HGMS separations are ineffective. The use of adsorbents, ion exchangers, or solvent extract ants as an alternative to removing such ions is possible. These sorbents are often used in column, membrane, or concentration separations. In the practical time span permitted for separation, these techniques suffer from a loss of theoretical exchange value.

The addition of a magnetic element to these sorbents allows for efficient solid-liquid separation, particularly for low-concentration solutes with quicker exchange kinetics. Magnetic ion exchange resins (MIEX) were developed in 1995 as an alternative to coagulation methods for removing natural organic matter (NOM) from atmospheric raw water. The term MIEX originates from "Magnetic Ion Exchange," which refers to the fact that the ion exchange resin beads include a magnetic component inside their structure, allowing them to function as separate magnets. Because of the magnetic component, the particles form agglomerates that settle quickly or fluidize when subjected to high hydraulic loading rates. The tiny resin bead size offers a large surface area, allowing for fast ion exchange kinetics. Humic acid, low to moderate organic concentrations across a broad range of alkalinities, and bromide concentration was all treated with it.

## **2. Water Purification Methods Based On Nano Materials:**



Nanoscale magnetic separations have advanced in application and model development because when magnetic materials are scaled down to the nanoscale, they exhibit a distinct magnetization behavior than large magnetic materials. The magnetic separation properties would be altered as a result of this. If shrinking the size results in the formation of hard magnetic material, magnetic filter renewal will be problematic. Magnetic separation uses favor soft magnets with small magnetic remanence and super paramagnetic materials with zero magnetic remanence. Because the ease of orientation of magnetisation varies depending on the arranging of atoms in the magnetic structure, magnetic nanoparticles may be differentiated based on their nanostructures. Given the impact of hydrodynamic drag forces on nanoscale materials, magnetic nanocarrier characteristics may be changed by tailoring materials to specific applications. Magnetic nanoparticles are appealing for controlling transport and segregation of attached material that may vary in size from molecules to cells because of their inherent interactions with applied magnetic field gradients.

As a consequence, magnetic nanoparticles have gotten a lot of interest in recent years as researchers try to figure out how to regulate their size, magnetic behavior, and chemical reactivity synthetically. Preparation of multifunctional magnetic nanoparticles that are unique to contaminant type is possible by simultaneously adjusting surface chemical and physical characteristics. The removal of fluoride and arsenate was assisted by nano-adsorbents of gamma ferric oxy hydroxide and nano oxides of magnetite integrated on charcoal. The removal of metallic ions such as Cr(VI), Cu(II), Co(II), Cd(II), As(V), As(III), and Hg(II) from water was studied using a variety of magnetic nano-adsorbents, and it was shown that particles are more efficient in most instances. Iron oxide as a nano-adsorbent is 5–10 times more effective in removing arsenic than its micron-sized equivalents. The highest absorption of nanoscale  $\text{-Fe}_2\text{O}_3$  with a surface area of  $200 \text{ m}^2/\text{g}$  at  $\text{pH} = 3$  was  $50 \text{ mg/g}$ , whereas it was 3 percent lower at  $\text{pH} 9$ . Surface area, surface charge ( $\text{pH}$ ), and the applied background magnetic field all influenced the removal effectiveness.[10]

Dong et al. investigated the characteristics of a new functional composite for environmental remediation that included a device ( $\text{Fe}_3\text{O}_4$ ), a molecular sieve matrix (zeolite), and silver nanoparticles. These may be used for a variety of purposes, including adsorption, redox modification, and improved separation efficiency with magnetic aid.[11]

### 3. CONCLUSION

Magnetic separation is a widely used technique for water purification. That may be used to remove everything from oil to inorganic ions to organic contaminants to microorganisms. Has shown that adding a magnetic component to any separation method, whether it is adsorption, catalytic processes, or membrane processes, improves separation efficiency. Except for the function of carbon nano clusters in pollutant removal, all other areas may be covered by iron or iron-based compounds. Meso structured iron oxides may be used to capture or remove microorganisms. Nanoscale iron used for pollutant degradation in a magnetic field may be transformed to magnetic oxide wastes, which can be successfully separated utilizing magnetic aid. Magnetic separation system designs need to be at the forefront of research in the field of nano materials for water purification. Nanoscale iron-based catalysts and magnetic assistance-based separations would offer long-term advantages from the environmental management perspective of managing the least hazardous material and due to high saturate magnetisation of iron.

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**REFERENCES**

1. S. Chaurasia and A. K. Tiwari, "A review on traditional water purification methods used in Rural Area," *Indian J. Environ. Prot.*, 2016.
2. K. Ravindhranath and M. Ramamoorthy, "Nickel based nano particles as adsorbents in water purification methods - A review," *Orient. J. Chem.*, 2017, doi: 10.13005/ojc/330403.
3. S. Zaman, A. Begum, K. S. Rabbani, and L. Bari, "Low cost and sustainable surface water purification methods using Moringa seeds and scallop powder followed by bio-sand filtration," *Water Sci. Technol. Water Supply*, 2017, doi: 10.2166/ws.2016.111.
4. T. Ahmed, S. Imdad, K. Yaldram, N. M. Butt, and A. Pervez, "Emerging nanotechnology-based methods for water purification: A review," *Desalination and Water Treatment*. 2014, doi: 10.1080/19443994.2013.801789.
5. A. Sharan and S. Sharan, "Cost Analysis of Water Purification Methods in India," *Glob. Environ. Eng.*, 2016, doi: 10.15377/2410-3624.2015.02.02.1.
6. B. M. Smirnov *et al.*, "The bubble method of water purification," *EPL*, 2018, doi: 10.1209/0295-5075/121/48007.
7. Z. F. Li, Y. Y. Jia, R. D. Liu, Y. H. Xu, G. H. Wang, and X. Bin Xia, "Irradiation effect of Sm<sub>2</sub>Co<sub>17</sub> type permanent magnets," *Wuli Xuebao/Acta Phys. Sin.*, 2017, doi: 10.7498/aps.66.226101.
8. M. Zhang, X. Xie, M. Tang, C. S. Criddle, Y. Cui, and S. X. Wang, "Magnetically ultrasensitive nanoscavengers for next-generation water purification systems," *Nat. Commun.*, 2013, doi: 10.1038/ncomms2892.
9. R. Nisticò *et al.*, "From biowaste to magnet-responsive materials for water remediation from polycyclic aromatic hydrocarbons," *Chemosphere*, 2018, doi: 10.1016/j.chemosphere.2018.03.153.
10. J. L. Tang and Z. R. Ouyang, "Analysis on the cooling water system operation under the first time test of 40 Tesla hybrid magnet," *Case Stud. Therm. Eng.*, 2017, doi: 10.1016/j.csite.2017.05.004.
11. J. Sohaili, H. S. Shi, Lavania-Baloo, N. H. Zardari, N. Ahmad, and S. K. Muniyandi, "Removal of scale deposition on pipe walls by using magnetic field treatment and the effects of magnetic strength," *J. Clean. Prod.*, 2016, doi: 10.1016/j.jclepro.2016.09.028.

## LINGUIPHILOSOPHICAL ATTITUDE ON THE PROCESS OF NOMINATION

**Rahimov Abror Ahmadovich\***

\*PhD,

Samarkand State Institute of Foreign Languages,  
UZBEKISTAN

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### ABSTRACT

*The article deals with the problem of nomination, its functioning in the language. The author tries to describe the importance of the human factor in analyzing the language and its nominative units. The focus of the work is directed to language, phenomenon and the human. The author analyzes the works of famous philosophers as, Aristotle, Plato, Al-Farabi, and Avicenna on the field of nomination process in human cognition.*

**KEYWORDS:** *Linguocognitive Skill, Human, Name, the Materialists, the Realists, Language, Thought, Al-Farabi, Avicenna.*

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### INTRODUCTION

Humans gain linguo-cognitive skills as a result of the cooperation between mind and language. Therefore, relying on this skill we comprehend the objects and phenomenon, identify the interrelation between them, analyze the chain of mutual relations, and by this we interchange generality with specificity, exactness with abstractness, and on the basis of aforesaid we form the system of notions (concepts) and their linguistic expression – the name [6].

In this perspective, the name gains scientific value as a product which reflects primary and then systematic usage, and also involves linguo-cognitive ability which embodies the cooperation of two great powers: language and thought. Consequently, on the one hand, the name expresses the heritage of ancestors who could comprehend the objects and phenomenon of the universe and made the mechanism of linguistic denotation of them, on the other hand, it expresses linguo-cognitive means witnessing linguistic proficiency of descendants who inherit this intellectual heritage, the practice of ancestors and keep their mother tongue during the centuries from oppression and affects, progressing the language due to requires of time and using the linguistic means cleverly.

Due to reasons mentioned above, the names besides being a source of observing linguistic combinations of all layers of the language system, should also be considered as a mean of bringing into complex of knowledge which embodies the potential of frames, concepts and categories that gives an opportunity of knowing, analyzing and remembering the objects of universe. Also, the knowledge formed under notion - name is the fundament which serves for synthesis of thought and for the future of knowing, and it gives a chance to mark practical and theoretical progress of knowledge. The formation of secondary nominative units on the basis of the primaries is a brilliant example of it.

Then, secondary nominative units and the means forming them have a significant role in the process of imagining linguo-cognitive gradualness about the past, the present and the future of nominative activity of the humanity. An extensive study of nominative activity will, first of all, help to mark interlayer relationship that is in integral connection with the structure and the system of the language, secondly it will make an opportunity of deep entry into the analysis of such points as the place of the need and purpose of communication of humans, their linguo-cognitive abilities and the extent of the mastery of scientific work among that interlayer relationships.

The wish of gaining reliable information about knowledge and the process of learning which appears due to interrelation of the name and the object is one of the main problems of the researchers since the first stages of scientific activity [7].

It is known that the discussion about interrelation of the object and the name dates back to the debates between antic philosophers about the correlation of human thought, phenomenon of objective reality and language [4]. Although the problem that was under hot discussions in the debates between the realists and the materialists and at present it is analyzed by the materialistic and idealistic points of view, one can not admit that all dark spots of the interrelation of object and name are completely lighted.

Of course, it does not mean that hot debates held by the supporters of these opposite points of view in history were inefficient. Because, until now there were done impressive researches in the fields of analyzing, marking out the scale, assorting the nominative units of languages and learning the linguistic base, structure-semantic, stylistic features, linguo-semiotics and gnoseology aspects and derivational graduality of them. But the experience gained through them is not enough to understand and make clear all problematic points of nominative units, e.g. why the object "bread" should be named "bread". These points still need to be solved by the subjects pertaining to the humanities.

By reminding those problematic points we do not dare to declare that the "universal solution" is found, the main purpose is to underline that "a new look" at the object of investigation periodically appears [9].

In past decades one of the reasons of appearing impossibility of making investigation except inventory of the language units during the system-structure analysis of the language system consisting of the set of the phenomenon, the human, and the language, is due to ignoring of the human factor in description of language. In order to overcome the imperfections mentioned above, a new linguo-cognitive paradigm was forwarded to agenda of scientific researchers. On this basis the anthropocentric tendency revived, and gained its importance also by the review of initial philosophic world outlooks which put in the center of researches the interrelation of the phenomenon, the human, and the language.

Every subject being a hierarchical system that reflects continuous progress of knowledge about objective regularities of the nature, the society and the thought, demands to be enriched with new opinions. By turn each new opinion is formed on the basis of the developing previous achievements. Thus, one of the main ways of reasoning the initial basis and developing latest linguistic ideas about exploring nominative act on the ground of cognitive demands is reanalyzing existing graduality of the ideas of ancient scientific world coming out of the purpose of the research. That is the reason of making special focus on discussion of linguo-epistemological world-outlook of naming and nomination process in history below.

This is no accident that an early stage of formation of the first philosophical interpretation of the language and theoretical world outlook itself, generally, began from treatment of the interrelationship between the name and the object. Consequently, being the only animate creature with the thought, the human has always tried to learn the environment better and use the

knowledge to make his life comfortable. The key of this aspiration are language and thought — two great powers given only to human being. The point of intersection of those great powers is reflected in interrelation of the name and the object. That is why ancient philosophers tried to acquire the key of the secret hidden under the interrelation of name and object.

According to Aristotle's empiric interpretation, the initial phase of human intellect and act of learning is sense, and by means of it the human gains memory, achieves experience and knowledge. By-turn, emotional learning is a spiritual gift given to the human, this gift is developed by initiative and desire for the knowledge of human [3].

According to Plato's rational interpretation, interrelation between the human and environment is based on acceleration of natural ability in his mind. Plato describes the universe as consisting of two parts which are ideal and emotional (material) ones, and the period of connection of these parts forms the human life. The main mean of connection human to the universe of ideas is the spirit. The human is born naturally with the spirit of the ideas. Thereat expressing emotional experience by means of language and making knowledge is reviving innate ideas [4. P. 97].

The rational and empiric tendencies advanced by Aristotle and Plato influenced upon the formation of Eastern and Western scientific thought in the middle Ages. Particularly, the translation of ancient Greek philosophers' works into the Arabic during Arabic caliphate (VII-VIII centuries), served as fundament in the process of spreading their ideas into Eastern countries as well as into the Middle Asia. On one hand this case lead to conflict between Islamic representation of the world based upon the sacred book of the Muslims – the Koran and the ideas of "foreign subjects", on another hand it served for the development of the Greek philosophical ideas about the human mind, his gift of knowledge and act of understanding. It also contributed to the development of logical thinking in harmony with Islamic philosophy. Historic significance of those acts (the translations of the Greek works) was pointed out by the authors of "The History of Philosophy" as followed: "they saved Hellenistic culture from disappearing and serving as a base for revolutionary changes in the European subjects of XVI-XVII centuries"[5].

Such evidences concerning an incomparable contribution of Muslim philosophers (many of them were born in Central Asia) in preserving and developing of Hellenistic scientific and particularly gnoseological heritage, as well as in contribution to improvement of universal knowledge are recognized by many researchers [2].

One of the world famous scientists of his period was Abu Nasr Farabi (873-950). He was the first scientist to learn deeply the ancient philosophy and to establish its coherence with Islamic philosophy. As Farabi notes, "potential being" needs a cause to exist. "Real being" that is necessary being is the first cause of appearing real and abstract things (potential being). By-turn, "real being" is a symbol of active intellect. The human is an owner of acquired intellect and at the same time possesses the objectified form of active intellect which is also universal intellect. In other words, human is the representative of The God's wisdom. Thanks to this divine commencement human is born with the spirit of learning and understanding that is why those abilities are innate [11].

In his work "About intellect and science" devoted to the issue of the gradual progress of innate intellect, Al-Farabi emphasizes followings: "Innate intellect is a type of intellect which gives human the opportunity of forming initial knowledge by means of sense. The second type of the intellect is a part of soul that gives the opportunity to gain empiric knowledge and reliable



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scientific notions on the object through continuous repeating and reflection over it during a certain time period in order to decide whether to approach or to avoid it “[3].

It becomes clear from this idea that Al Farabi does not follow the ideas of Aristotle about senses as the direct basis of process of cognition. As Al-Farabi interprets, the senses serve as the primary base, power of innate intellect. When the human is born, the powers of intellect, imagination, desire, and different senses appear sequentially [1. P. 30]. "Different sensory experiences appear as a result of being under influence of external world; different types appear by means of five senses and they get connected to each other. The sense experiences appear as a model of thought in the domain of imagination. By this way they will stay in memory even after sensitive feelings disappear. The power of imagination coming out of the feature of uniting and separating the senses has a great number of variations of positioning them" [1. P. 40].

Thus, the senses form the stage of rational (intellectual) learning by granting sensitive image of outer world influence to the mind. Sensitive learning is based on cooperation of powers such as sense, intellect and imagination. In this process senses make a chance of taking information about peculiar features of objects and phenomenon. And intellect serves for making combined image of features revealed by senses, round them off as a system of signs. Imagination helps to embody, incarnate intellectual image formed on basis of current object, in state of not having that object in eyesight.

Peculiar feature of this interpretation is visible in description of interrelation of divine basis that is actual and human mind. Because, as Farabi notes, the actual mind is not a power that dominates on human but it is a primary basis denoting beginning of intellectual action of the human. This point of view was so widely spread in philosophy, that it was even reflected in famous Bahauddin Naqshbandi’s thesis: "The heart - with the God, hands at work". As far, this quote lays the responsibility upon the human to keep in mind the God and to develop His gift of thinking [7].

As A. Nurmonov notes, Farabi means “inner (intuitive) mind” which is formed by sensitive learning while describes innate mind as “primary knowledge that is formed by means of senses”. And while he writes: “Names and objects are products of our sensitive organs. They are inherited through generations. That’s why it is not innate, but acquired knowledge”, he means “outer (formed)” mind (the stage of intellectual learning) [8. P. 8].

So, we can summarize that names and objects are products of senses and they can be transferred through generations. On this basis, we may conclude that, firstly, the human is able to abstract the features and characteristics of notions and by this way get access to the linguistic creativity, secondly, the human, using these notions and his memory, has the ability to save them and activate where necessary which means the opportunity to transfer them to the future.

#### REFERENCES:

1. Forobij AN. The Ideal City. 2nd ed. Tashkent, 2012, 160 p.
2. Abduhalimov BA. Scientific activity of Central Asian scientists in Baghdad. Tashkent, 2010, 246 p.
3. Skirbekk G. History of philosophy. Tashkent, 2002, pp.235-240.
4. Sina I. Selected philosophical works. Moscow, 1980, pp.215-217.



5. Kubryakova ES. Nominative aspect of speech act. Moscow, "Librokom ", 2010, 160p.
6. Nazarov K. Gnoseology. Tashkent, 2005, 348 p.
7. Nurmonov A. History of Uzbek linguistics. Tashkent, 2002, pp.8-10.
8. Safarov Sh. Cognitive linguistics. Jizzakh "Sangzor", 2006, 87 p.
9. Sagadeev AV. Avicenna. Moscow "Mysl", 1980, 34 p.
10. Sirozhiddinov Sh. The philosophical sources of Uzbek classical literatures. Tashkent, 2011, 200 p.

## THE ART OF WRITING LITERATURE REVIEW

**Mohit Rastogi\***

\*Assistant Professor,  
Department of Marketing,  
Faculty of Commerce, Management & Law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- mohit.management@tmu.ac.in

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### ABSTRACT

*A literature review paper offers a thorough survey of the literature on a certain theme/theory/method and summarize previous research to improve the basis of knowledge. In the expanding area of Global Business (IB) research, review articles are very valuable; yet, there are few reviews published that describe how researchers may design and produce classic review articles. We offer recommendations for creating the most informative and helpful review articles by describing the goal, technique, and format of a comprehensive study. We provide an overview of various kinds of review papers and explain how future scholars may find them helpful by defining procedures and thumb rules to bear in mind. Furthermore, we provide nine papers that were ultimately chosen for this special edition of systematic literature back to look ahead International Business research in the days ahead.*

**KEYWORDS:** *Literature Review, Research, Publish, Journal, Business.*

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### 1. INTRODUCTION

When previous research are rationally integrated based on the results of prior studies, a topic progresses. As a research technique, literature reviews contribute substantially to the intellectual, methodological, and thematic growth of many areas. "Review articles are critical assessments of previously published studies." They include, for example, systematic literature review and meta-analytical reviews that investigate quantifiable impacts. Review papers meticulously locate and synthesize relevant literature in order to evaluate and contrast the results of previous research in a topic. Thus, review papers offer viewers with a current knowledge of the study subject, assist in identifying research gaps, and indicate prospective research possibilities. To put it another way, systematic reviews, in particular, offer a lot of critical debates on a specific research topic by integrating existing literature, summarizing previous studies, finding knowledge gaps, and creating new theoretical frameworks. In many different fields, systematic reviews, in particular, have become an officially acknowledged type of write-up research. There are other specialized publications that publish review papers, such as the International Journal of Management Reviews (IJMR), the Journal of Economic Literature (JEL), and the Academy of Management

Review. Hundreds of study articles have been produced utilizing the same old ideas, measurements, and techniques.

One of the most essential objectives of a review article is to identify significant research gaps based on what constructs, theories, and techniques are commonly used in various settings and in what contexts (industry and nation) studies have been conducted. As a result, the writers of a classic review article offer future study directions based on fresh and innovative ideas, theories, measurements, techniques, and research questions. As a result, a review paper may serve as a foundation for future study. They established the aim of discouraging scholars from recycling and repurposing outdated ideas and techniques. A well-written literature review article has the potential to serve as a foundation/platform/lens/springboard for future research because it expressly synthesizes existing understanding, recognizes research gaps, and suggests exciting new directions for future research in a given field of study, with references to Methodology, Structures, Theory, and Situations. Similarly, theoretical approaches created as part of literature review investigations may be utilized as typologies/bases/lenses in research studies utilizing quantitative or qualitative techniques and/or practice by both researchers and practitioners [1]. As a result, if released, they would be a very welcome and valuable contribution to the literature.

## **1.1 Review Article Methodology And Structure:**

Domain-based, theory-based, and method-based systematic literature papers are the three types of systematic literature review articles. Meta analytical reviews are becoming increasingly common in a variety of academic areas, in addition to these types of systematic literature reviews. There are domain-based evaluations available in practically every subject area, both business-related (management, marketing, finance and accounting, entrepreneurship, and so on) and non-business-related. However, few well-written theory- and method-based reviews have been published in reputable publications [2].

### **1.1.1 Domain-Based Assessment:**

Domain-based review articles can be categorized into several groups. Specifically, a structured review that focuses on commonly used methodologies, theories, and notions. Bibliometric review based on a framework Hybrid-Narrative with a framework for determining future research priorities and a review aimed at developing a model or framework. The following are some examples of classifications.

### **1.1.2 Review Of The Structure:**

Readers gain insightful knowledge from big data given and content when a domain-based review article is structured scientifically and explicitly based on commonly accepted methods, ideas, and constructions in the form of tables and figures. In traditional structured review papers, such data is usually provided in well-designed tables. This aids junior researchers in understanding what methodologies have already been employed, as well as what theories and structures have already been applied. Based on the gathered data, researchers might identify study gaps using techniques, theories, and constructs. This category includes some of the most well-known review papers in the literature [3]. Typically, domain review papers include 5–10 relevant tables in a systematic fashion.

### **1.1.3 A Framework-Based Review:**

If the authors produce a domain-based review article utilizing a framework such as ADO (Antecedents, Decisions, and Outcomes), as seen in Paul & Benito's (2018) review article, or the 6 W Framework developed by Callahan, it is referred to as a Framework-based review (2014). Thematic reviews with a framework have been found to be more acceptable since they are more likely to demonstrate a more solid structure. As a result, authors of framework-based evaluations must either create their own framework or utilize it to structure their review, or they must accept an already existing framework, such as ADO, and acknowledge who they are taking it from if it was created by others [4].

#### **1.1.4 Analysis Of Bibliometric Data:**

Bibliometric reviews use statistical tools to analyze a large amount of published research in order to determine trends and citations and/or co-citations of a certain theme, broken down by year, nation, author, journal, method, theory, and research challenge. A graphical bibliometric review can be created utilizing presently offered Viewer computer software, such as VoS (Visualization of Similarities), which would be commonly used to do such bibliometric reviews in a variety of subject areas, including International Business. Many bibliometric analyses have the problem of a very small number of articles accounting for a significant portion of the total citations in the analysis. However, some academics are skeptical about the overall impact of bibliometric studies when compared to other forms of reviews [5].

#### **1.1.5 An Examination Of A Hybrid:**

Hybrid reviews can be created in a variety of methods, at least two of which are listed below: i) A hybrid type review is one in which researchers use a framework to propose ideas for future research in a more narrative-oriented style of literature review. In their narrative type review on exporting challenges for small enterprises, Paul, Parthasarathy, and Gupta (2017) employed the Theory, Context, and Methods (TCM) framework to suggest study directions. ii) By combining the ideas of both bibliometric and structured reviews, a second manner of a hybrid kind of review might be produced. In this special issue, Bahoo, Alon, and Paltrinieri, for example, have taken a similar approach in their review of international commercial corruption. They combined the principles of bibliometric review with the principles of organized review [6].

#### **1.1.6 The Purpose Of This Review Is To Advance Theory:**

This category includes a large number of review papers published in prestigious business publications such as the Academy of Management Review or the Academy of Marketing Science Review. In theory-building review articles, authors often establish theoretical models and/or testable hypotheses or statements. They don't always go on to test those models and/or theoretical propositions in the same piece, though [7].

#### **1.1.7 Theory-Based Review:**

Senior and novice researchers can benefit from systematic reviews that examine the role of a given theory in a subject area or field. Theory-based review is the name given to such a review article. Review articles of this type synthesize and contribute to the advancement of a body of literature that employs and/or empirically applies a specified underlying theory. Further advancements in this area could include, for example, a systematic review of Agency Theory in Franchising, or the Theory of Planned Behaviour in Global Business/Marketing or Entrepreneurship, among other things [8].

### **1.1.8 Methodology Review:**

Method-based review articles synthesize and expand on a body of work that employs a technique (either quantitative or qualitative). For instance, have a look at the publication titled "Event Study Methodology in the Marketing Literature: An Overview." Similarly, the study "Discriminant Accuracy Testing in Marketing: An Analysis, Causes for Concern, and Proposed Remedies" examines existing methodologies for measuring discriminant validity in marketing contexts using Monte Carlo simulation to identify which tests are the most effective. However, the number of method-based evaluations available in various topic areas of the business administration or International Business/Entrepreneurship is limited (some notable exceptions in the field of International Entrepreneurship include, for example, or, more recently, ). As a result, there are still plenty of opportunities to write method-based review articles. Review articles focused on Smart PLS implementations in global strategy research or Structural Equation Modelling (SEM) in a specialized field of empirical literature in World Business/Marketing, for example, can be published.

### **1.2 Guidelines And Tips For Writing An Effective Review Article:**

We present some potentially valuable tips and suggestions for generating more insightful and effective research papers in future studies, based on our own information and expertise as editors, guest editors, and writers of multiple review articles, and partially complimenting other similar efforts.

#### **1.2.1 Selecting A Subject :**

Not surprise, well-written review articles have a strong impact. However, authors should avoid reviewing a topic that is frequently discussed when there are already outstanding reviews on the same topic (especially recent ones) published in reputable publications. Unless authors demonstrate a very novel review and evaluation donation by providing a completely new set of research agenda, editors and reviewers may be hesitant to consider very traditional themes reviews when there are many thorough ones already available somewhere else related to a given theme/topic. Before settling on a broader versus specialized topic for review, it's vital to check this thematic uniqueness on key co - citation databases like Google Scholar, Web of Science (WoS), or Scopus [9].

#### **1.2.2 Criteria For Selecting Journals, Identifying Streams, And Determining Coverage Time:**

Typically, many researchers and academics use Web of Science (WoS)/Social Science Citation Indexes (SSCI)/Journal Citation Report, which lists academic journals having an Impact Factor (IF), to locate suitable sources for review. When thousands of papers on a hot topic have already been published and need to be evaluated, one can rely on JCR-indexed journals with an IF above a certain threshold (i.e. 1.0 plus following, for example). In addition, many authors have published review articles based on studies from Scopus-indexed journals, which lists a larger number of journals than WoS. As a result, relying solely on Scopus to undertake a systematic literature review may result in a lengthy list of references that may surpass many publications' word limits. On the other hand, we've come across some published review articles that justify their collection of 5–10 journals with a minimal level rank of 3 star and/or above in the Association of Professional Schools (ABS) Journal Quality List (JQL) or journals with an A or A

star rating in the Australian Business Deans Council (ABDC) list. However, it was startling to discover that some of the most often rejected submissions for this special issue lacked explicit journal selection criteria, and that the majority of them featured references from less-than-trustworthy academic sources.

### **1.2.3 Keyword Search And Inclusion Criteria For Articles:**

40–50 to 500 or more relevant publications can be used to create a systematic review article. Finding relevant articles, on the other hand, can be difficult. Authors will have to make several decisions based on their knowledge, skill, and expertise in order to establish unambiguous selection criteria (i.e., exclusion/inclusion) for articles in their sample. There are two popular ways for determining very convenient inclusion criteria, among other things: i) Keywords chosen by the writers of a possible article to be reviewed can usually be found immediately in the title, abstract, or keyword list. ii) In addition to the title and abstract, keywords can be located in the full text of the paper. As a result, if just the first requirement is rigidly applied, the sample size of a review article will tend to be limited. Authors should be mindful, however, that if they employ a second criteria that includes keywords in the whole text, they may end up with hundreds of publications in their sample. In that situation, extensive content reading, debate, deliberation, and consensus among the review paper's author(s) are frequently required in order to select the most acceptable final sample [10].

### **1.2.4 Choose Appropriate TITLES:**

In order to write an integrative literature review, you must use both previous and current research to investigate the future. As a result, it's critical to emphasize that, in addition to covering previous and current research lines, an excellent review paper should also provide clear and specific directions for future study. As a result, this goal should ideally be stated clearly and/or incorporated in the title of the article. If the researcher's goal is to focus not only on compare data research in the field but also on providing useful suggestions for future work with regard to (new) theory, methods, and constructs, a relatively short title showcasing both a comprehensive review effort (looking back) and continuing to develop a future research agenda (looking forward) is more appealing.

## **2. DISCUSSION**

Research gaps and the necessity of future research directions: In a good review article, authors must identify major research gaps based on a thorough examination of existing research. Therefore, At least 20%–25% of the review paper should be devoted to developing a thorough future research agenda based on theory, methodology, constructs, and/or context. In this specific but crucial area of a review article, authors must mention and anticipate underexplored ideas, key constructs, and potentially unique approaches that can be applied in future research. Review papers are designed to synthesize a relevant and essential research area completely. Authors frequently come up with interesting and timely ideas. They do not, however, show which broad or more specialized ideas, frameworks, and approaches are the most extensively employed and investigated. Unfortunately, many writers do not make sufficient attempts to combine the data of previous studies in the most effective manner possible. Prior study findings should ideally be summarized in a table/chart format, with comparable or conflicting findings classified. Authors



of review articles must also meticulously supplement text and tables with information on the most commonly utilized methods, theories, variables, and well researched industry contexts, countries, and so on. Reviews that are constructed both scientifically and logically, and that offer readers extremely beneficial outcomes, are undoubtedly more rigorous, relevant, and effective.

### 3. CONCLUSION

A review article's major goal is to critically examine the existing literature in a certain research area, theme, or field, identifying pertinent theories, key constructs, empirical methodologies, settings, and remaining research gaps in order to develop a future research agenda based on those gaps. We've shared our knowledge in the form of ideas and instructions on how to write scientifically acceptable and actually significant literature review articles based on our own experiences. It is critical to take these guidelines into account, at least in part, in order to prevent rejection of this type of research publication in prestigious business journals. These observations are based on our experience as review article editors as well as the suggestions and feedback provided by a small number of anonymous reviewers. Developing a classic systematic review or a meta-analytical contribution, in our opinion, is a "art." Although a single author of a highly original contribution was included in this Unique Review Issue, it appears that developing such influential reviews requires a team of two or three academics to exchange ideas and benefit from the exposure and experience of those with a track record and more knowledge base. We hope readers love the finished product as much as we enjoyed the process of developing it as guest co-editors.

### REFERENCES

1. A. S. Denney and R. Tewksbury, "How to Write a Literature Review," *J. Crim. Justice Educ.*, 2013, doi: 10.1080/10511253.2012.730617.
2. R. Ferrari, "Writing narrative style literature reviews," *Med. Writ.*, 2015, doi: 10.1179/2047480615z.000000000329.
3. B. Steward, "Writing a literature review," *British Journal of Occupational Therapy*. 2004, doi: 10.1177/030802260406701105.
4. M. B. Moldwin *et al.*, "Why and How to Write a High-Impact Review Paper: Lessons From Eight Years of Editorial Board Service to Reviews of Geophysics," *Reviews of Geophysics*. 2017, doi: 10.1002/2017RG000587.
5. A. S. Denney and R. Tewksbury, "How to Write a Literature Review Paper (Journal Guide)," *J. Crim. Justice Educ.*, 2013.
6. W. Ashton *et al.*, "Writing a literature review : A guide for MCom ( HRM/IP ) students," *Ultrasound Q.*, 2006, doi: 10.1017/CBO9781107415324.004.
7. C. L. Winchester and M. Salji, "Writing a literature review," *J. Clin. Urol.*, 2016, doi: 10.1177/2051415816650133.

8. J. J. Randolph, "A guide to writing the dissertation literature review," *Pract. Assessment, Res. Eval.*, 2009.
9. J. L. Callahan, "Writing Literature Reviews: A Reprise and Update," *Human Resource Development Review*. 2014, doi: 10.1177/1534484314536705.
10. G. Dinah, "Writing literature reviews," *Nurse Res.*, 1994, doi: 10.7748/nr.2.1.13.s3.

## AN OVERVIEW OF THE RISKS AND BENEFITS OF COFFEE CONSUMPTION

**Piyush Khajuria\***

\*Assistant Professor,  
Department of General Medicine, Faculty of Medicine,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [khajuriapiyush@gmail.com](mailto:khajuriapiyush@gmail.com)

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### ABSTRACT

*The evidence on both the health advantages and the possible harms of coffee drinking has been mixed. However, most scientists agree that moderate, frequent coffee use by healthy people is either basically harmless or slightly helpful. A variety of variables confound the results and generalizations, including age, gender, health condition, style of coffee preparation, serving size, and coffee supplier. Coffee may offer possible health advantages and hazards, but causation for either cannot be proven based on the existing study, which is mainly observational data. The goal of this study was to provide a thorough assessment of the hazards and benefits of coffee intake on health outcomes. Using the electronic databases "OVID," "CINAHL," and "Web of Knowledge," a systematic search of the literature yielded 12405 results. Duplicates were removed, studies were screened (based on inclusion/exclusion criteria), and the remaining eligible studies were used to compile an exhaustive list of the potential health benefits and risks of coffee consumption, which were grouped and discussed in terms of major diseases/conditions (mortality, cardiovascular disease, cancer, and metabolic/liver/neurological disorders). The majority of health outcomes examined in this qualitative evaluation indicate that the health benefits (or null effects) of moderate coffee drinking in adult consumers definitely exceed the dangers. The findings of this study may help with more qualitative and quantitative deterministic risk-benefit analyses of coffee intake.*

**KEYWORDS:** Benefit, Coffee, Health, Human, Risk.

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### 1. INTRODUCTION

Coffee is a widely consumed beverage around the world, and extensive scientific research has been carried out to investigate the link between coffee consumption and a variety of chronic diseases and health outcomes, including total mortality, many cancers, cardiometabolic risk, liver disorders, and neurological conditions. Many different bioactive constituents of coffee have been linked to these effects, including caffeine (methylxanthine), chlorogenic acids (polyphenol), diterpenes, and other phenolics, some of which may have additive or synergistic effects.

Despite the fact that research on the potential health benefits and risks of coffee consumption has been published in the past, the general consensus is that moderate, regular coffee consumption by healthy people is either essentially benign or mildly beneficial. To date, the majority of findings have come from observational data, albeit from large prospective cohort studies, case-control studies, and cross-sectional data. The existing literature, however, has limitations due to heterogeneity in study populations and designs, as well as a lack of control for many other confounding factors. Furthermore, most studies or meta-analyses to date have focused on single disease outcomes or endpoints, with few (if any) weighing the benefits and risks associated with multiple health outcomes [1]–[3].

As a result, the goal of this study was to give a comprehensive overview of the risks and benefits of coffee consumption in terms of health outcomes.

## **1.1. Cancer:**

Coffee consumption has been linked to cancer risk or incidence in nearly every tissue type in the body, with colorectal, bladder/urinary tract, pancreatic, and female-specific and breast cancers being the most commonly reported subsites. A total of 352 studies (27.6%) have found a link between coffee consumption and cancer, the majority of which are observational. An intervention study design is used to test only the more mechanistic studies.

With the exception of bladder/urinary tract cancers, where the risks of coffee consumption are more commonly reported, observational findings have consistently reported a beneficial or null effect of coffee consumption on cancer. However, an increased risk of bladder/urinary cancer was typically reported only in males, not females, and nonsmokers versus smokers. Negative effects of alcohol were also observed, as well as the impact of certain genetic polymorphisms. Furthermore, other studies have only found an increased risk of urinary system cancer in Turkish coffee drinkers, high coffee drinkers, or have failed to show a dose-response relationship, implying that such associations are not causal [4]–[7].

Other kinds of cancer have similar risk factors, according to observational data. Coffee use seems to raise the risk of stomach and colorectal cancer in males but not in women, but the authors wonder whether the former is a coincidence. Smokers and non-drinkers seem to have a greater risk of pancreatic cancer, whereas genetic polymorphisms (CYP1A2 and GSTM1/GSTT1) may alter the connection between coffee intake and the risk of breast, ovarian, and skin cancer. Only caffeinated coffee seems to be protective as compared to decaffeinated coffee in certain studies (for example, in skin, endometrial, and some stomach cancers), while the reverse is true in others (for example, for ovarian, rectal and lung cancers). Comparisons of other types of coffee preparations, such as boiled (not filtered) versus filtered coffee or hot versus iced coffee, produce equivocal results in the literature, and risks are typically associated with heavy coffee consumption or coffee abuse compared to light/moderate coffee consumption. Finally, for some cancers, risks appear to be greater in younger adults, with a null or beneficial (inverse) effect of coffee consumption on cancer risk becoming apparent only in older adults after more than 35 years of coffee consumption, or in postmenopausal females compared to premenopausal females after more than 35 years of coffee consumption.

More consistently, favorable or beneficial correlations between coffee intake and cancer risk are apparent in the mechanistic investigations, and as referred to above, this data more frequently than not comes from intervention studies. Coffee intake has been shown to have a protective or

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positive impact on antioxidant status, oxidative DNA damage urine mutagenicity, and DNA strand breaks/integrity in studies. Overall, the findings from intervention trials indicate that coffee may have a role in lowering the incidence of some malignancies.

### **1.2. Cardiovascular Disease (CVD):**

A total of 273 (21.4%) research has shown a connection between coffee intake and cardiovascular disease (CVD), the majority of which are observational, but there is some evidence from intervention trials, especially for hyperlipidemias, hypercholesterolemia, and blood pressure. Various outcomes or disease endpoints have been reported in such research, ranging from mechanistic studies focused on specific risk factors (or causes of such) to those reporting adverse events like myocardial infarction, heart failure, or stroke.

The bulk of research in CVD has shown a negative (or null) relationship between coffee intake and blood cholesterol levels (that is, an increased risk of hypercholesterolemia). In contrast to filtered coffee preparations, such inverse connections are mostly generated by the intake of cafetiere, French-press, Arabic, or boiling coffee. Another research found a 1.66 and 1.58 mg/dL rise in low density lipoprotein (LDL)-cholesterol in men and women, respectively, per day cup of coffee drank. Furthermore, abstaining from coffee for at least 6 weeks lowers cholesterol levels in the general population as well as in hypercholesterolemic patients. The higher concentrations of diterpenes (kahweol and cafestol) in boiled coffee contribute to the negative effect of coffee on cholesterol levels. Despite the fact that diterpenes have been shown to reduce lipoprotein (a) in four randomized controlled trials, the authors concluded that their well-known negative side effects on LDL cholesterol preclude their use as such. An inverse relationship between coffee consumption and triglyceride concentrations has been reported, which warrants further investigation.

The literature also shows that coffee drinkers are at risk for high blood pressure/hypertension, and this pressor effect could be caused by a coffee-induced increase in adrenaline levels. The pressor effect, on the other hand, was seen more frequently in coffee newbies, with no effect seen in regular coffee drinkers or those who have adapted to heavy coffee consumption. Furthermore, although 9 weeks of coffee abstinence was shown to lower blood pressure in normotensives, other studies found no impact on ambulatory blood pressure readings or the risk of developing hypertension over 33 years. Indeed, benefits of coffee consumption on blood pressure have been reported in human intervention studies in both normotensive and mildly hypertensive adults, as well as in coffee drinkers with the rapid \*1A/\*1A genotype, as opposed to those with the slow CYP1A2\*1F genotype, who have an increased risk [8]–[10].

Coffee drinkers seem to have a greater risk of higher homocysteine levels, which is an independent risk factor for CVD. This connection may be influenced by folic acid, especially in individuals with the TT polymorphism of the methylenetetrahydrofolate reductase (MTHFR) gene, which codes for the MTHFR enzyme, rather than the trigonelline concentration of coffee.

### **1.3. Metabolic Health:**

The overwhelming majority of data examining coffee intake and metabolic health (n = 126; 9.9% studies) consistently indicates a positive (inverse) relationship with the risk of type 2 diabetes. Reduced insulin resistance (or increased insulin sensitivity) and/or improved glucose tolerance are at least partially responsible for these relationships. Rather than working via the incretin

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hormones, the antagonistic action of chlorogenic acid (with/without caffeine) on glucose transport seems to be the source of direct effects on glucose tolerance, moving glucose absorption to more distal regions of the gut. Associations with low-grade systemic inflammation, oxidative stress, and sex-hormone binding globulin have also been proposed as mechanisms of action. The variety of body mass index categories covered in the research, as well as the usage of hormone replacement treatment, may affect the results, emphasizing these as significant confounders once again.

Coffee consumption (3 250 mL/day for 4 weeks) may reduce calorie intake by increasing satiety hormones (ghrelin and serotonin) and therefore lowering body fat levels. Others have shown that the mannooligosaccharides or polyphenols in coffee may boost or accelerate postprandial fat consumption, resulting in fat excretion in the stool. Although some studies have indicated an increased risk of metabolic syndrome, this has only been found for greater coffee intake (>3 cups/day), especially instant coffees with added sugar and powdered creamer, thus these findings should be taken with care.

#### **1.4. Neurological conditions:**

Coffee intake has been associated to benefits in (or a lower risk of) a variety of neurological diseases, with Parkinson's disease, cognitive decline/function, and mental health being the most frequently reported. Coffee intake and neurological outcomes have been linked in 94 (7.4%) research, the majority of which are observational.

Overall, coffee has been linked to a lower incidence of Parkinson's disease, with a dose–response protective association shown in females who do not take HRT. With prior diabetes and smoking, additive effects were also seen. While some studies have shown a link between specific genetic variants and environmental effects, others have found no such link. Certain alkaloid chemicals in coffee function as monoamine oxidase inhibitors, which may explain why coffee has a preventive effect against Parkinson's disease. Females may be more susceptible to coffee's protective impact on cognitive decline/function than men, and such benefits on psychomotor/cognitive performance are more likely to be attributable to caffeine intake rather than the chlorogenic acids in coffee. Furthermore, antioxidants in coffee have been linked to a decrease in the risk of Alzheimer's disease due to their ability to lower reactive oxygen species.

#### **1.5. Gastrointestinal Conditions:**

Coffee intake has long been associated with gastrointestinal (GI) problems in the literature, with null/adverse correlations most frequently documented with reflux, ulcers, heartburn, and dyspepsia. A total of 73 (5.7%) research, the bulk of which were observational studies, have shown a connection between coffee intake and GI disorders. Although negative findings suggest an increased risk of GI complaints in coffee drinkers, such negative associations are at best weak, and are only reported in univariate, not multivariate analyses for (unusually) high coffee consumption; they are perceived side effects by the consumer or patient rather than being tested/diagnosed; or they are only reported in coffee-sensitive/susceptible individuals. Furthermore, some of the negative effects come from acute feeding trials, in which coffee is either directly injected into the stomach or administered intra- or orogastrically, thus the findings aren't similar to regular coffee intake. Others have speculated that variations in bean processing, such as dark or light roasting, may produce variation in coffee-induced gastrointestinal reactions.



### **1.6. Liver Illnesses:**

A total of 72 (5.6%) research looked at the impact of coffee on liver diseases, namely liver function/enzymes in general and gallstones/gallstone disease. Coffee seems to have a liver-protective effect, according to this data, which is mostly based on observational studies. In general, coffee seems to provide protection against alcohol-induced liver damage/impairment and alcohol-induced hepatic inflammation, which is unrelated to caffeine concentration or antioxidant activity. According to several research, male smokers and smokers have greater positive benefits than female smokers and nonsmokers. However, strong cafetiere coffee (as opposed to filtered) may have the opposite effect. In a 24-week randomized-controlled intervention trial, drinking 5 to 6 cups per day had a detrimental impact on liver cell integrity. However, whether the chemicals responsible for such effects are diterpenes, such as kahweol found in coffee oil, is a subject of dispute in the literature.

### **1.7. Mortality:**

Coffee intake has been linked to a lower risk of total/all-cause and cause-specific death, especially in the case of CVD and coronary heart disease. In contrast, CHD or ischemic heart disease (IHD) mortality was shown to be negatively related to coffee intake in several previous research performed 20+ years ago. However, in these studies, the hazards were linked with the sale of coffee rather than consumption, and the daily intake or associated risks were either none/very low (0 to 1 cup) or extremely high (6 to 9+ cups), thus the findings should be taken with care. The relationship between coffee intake and mortality seems to change inconsistently by gender, HRT user's vs nonusers, and smoking status, but remains favorable in the majority of data when populations are examined as a whole.

## **2. DISCUSSION**

Poor bone health is the other most often reported ailment linked with coffee use. Despite the fact that almost half of the research included in the present analysis found no impact on bone results. A comparable percentage of people have had negative consequences. These negative effects have only been observed in lean people compared to overweight/obese persons, and in females, not males, who consume a lot of coffee on a regular basis. Others, however, have shown that the negative effects on bone mineral density may be countered by milk, which is often taken with coffee, and that they are only noticeable in those who have the fast CYP1A2 CC genotype, and may not translate into an increased fracture risk in the long run. To fully understand the impact of coffee intake on bone health, further study is definitely needed.

For pregnant women, there were additional hazards associated with coffee intake (for example, relative to pregnancy complications, birth outcomes, or the health of the infant). Although these hazards were mentioned in 26 of the 50 research, many of them were connected to increased coffee intake, and about the same number of studies (22 out of 50) showed null (no) impact on pregnancy-related adverse events. Indeed, several research found that specific pregnancy/infant health outcomes, such as the risk of preterm birth or childhood acute leukemia, had a positive (beneficial) impact. Caffeine is blamed in several of these studies for the reported side effects. However, the European Food Safety Authority (EFSA) has determined that regular caffeine intake (200 mg/d) does not pose a risk to the fetus, supporting others who have found no impacts. Finally, the literature search turned up a number of additional research (n = 45) that pointed to coffee as a possible source of unwanted/toxic components including ochratoxin A,

furan, heavy metals, and acrylamide. However, most studies found that measured/estimated consumption levels were far below projected daily tolerable intakes, or that coffee was not a significant source, making it safe. Furthermore, the positive benefits of additional “bioactive” components, such as chlorogenic acids, phenolic acids, and melanoids, contribute to the beverage's favorable impact.

### 3. CONCLUSION

Overall, the findings of this thorough analysis indicate that the health benefits (or null effects) of moderate coffee use in adult consumers significantly exceed the dangers for the majority of health outcomes studied. This conclusion is based mainly on observational data, and there were significant interactions between coffee intake and other lifestyle behaviors (such as smoking, drinking, and HRT). More randomized clinical trials are needed, especially in the areas of cardiovascular risk factors and outcomes, as well as gastrointestinal diseases. Instead of quantifying effects of caffeine intake per se, this study should differentiate impacts of coffee consumption as a beverage, accurately quantify/define coffee consumption, and account for any possible confounding variables. The kind of coffee preparation or brewing technique, any possible effects of relevant genetic polymorphisms (for example, CYP2A1), and the demographic group of interest should all be taken into account (for example, healthy individuals vs. patient groups and habitual vs. non-habitual coffee drinkers). For the most compelling advantages (for example, type 2 diabetes and neurological and/or hepatic diseases), the potential benefits for public health of drinking coffee or not drinking coffee might be estimated. Depending on the availability of population level food intake statistics, possible public health benefits may be evaluated in terms of more Quality Adjusted Life Years or fewer Disability Adjusted Life Years for nations and demographic groups of interest.

### REFERENCES

1. L. K. Pourshahidi, L. Navarini, M. Petracco, and J. J. Strain, “A Comprehensive Overview of the Risks and Benefits of Coffee Consumption,” *Comprehensive Reviews in Food Science and Food Safety*. 2016, doi: 10.1111/1541-4337.12206.
2. H. L. Wachamo, “Review on Health Benefit and Risk of Coffee Consumption,” *Med. Aromat. Plants*, 2017, doi: 10.4172/2155-9821.1000301.
3. H. L. Wachamo, “Review on Health Benefit and Risk of Coffee Consumption Medicinal & Aromatic Plants,” *Med. Aromat. Plants*, 2017.
4. M. S. Butt and M. T. Sultan, “Coffee and its consumption: Benefits and risks,” *Critical Reviews in Food Science and Nutrition*. 2011, doi: 10.1080/10408390903586412.
5. R. Poole, O. J. Kennedy, P. Roderick, J. A. Fallowfield, P. C. Hayes, and J. Parkes, “Coffee consumption and health: umbrella review of meta-analyses of multiple health outcomes,” *BMJ*, 2017, doi: 10.1136/bmj.j5024.
6. K. Nieber, “The Impact of Coffee on Health,” *Planta Medica*. 2017, doi: 10.1055/s-0043-115007.
7. M. Wadhawan and A. C. Anand, “Coffee and Liver Disease,” *Journal of Clinical and Experimental Hepatology*. 2016, doi: 10.1016/j.jceh.2016.02.003.

8. L. Han *et al.*, “Genetic variation of habitual coffee consumption and glycemic changes in response to weight-loss diet intervention: The Preventing Overweight Using Novel Dietary Strategies (POUNDS LOST) trial,” *Am. J. Clin. Nutr.*, 2017, doi: 10.3945/ajcn.117.156232.
9. S. L. Schmit, H. S. Rennert, G. Rennert, and S. B. Gruber, “Coffee consumption and the risk of colorectal cancer,” *Cancer Epidemiol. Biomarkers Prev.*, 2016, doi: 10.1158/1055-9965.EPI-15-0924.
10. S. Saab, D. Mallam, G. A. Cox, and M. J. Tong, “Impact of coffee on liver diseases: A systematic review,” *Liver International*. 2014, doi: 10.1111/liv.12304.

## A STUDY OF UTILIZATION OF MAGNETIC INDUCTION FOR UNDERWATER COMMUNICATION

Rahul Vishnoi\*

\*Assistant Professor,  
Department of Electrical Engineering, Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [rahulv.engineering@tmu.ac.in](mailto:rahulv.engineering@tmu.ac.in)

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### ABSTRACT

*The vast bulk of underwater communication research has focused on acoustic communication. High propagation delays, extremely low data rates, and very environment-dependent channel behavior are among issues that acoustic communication encounters. To solve these flaws, magnetic induction is proposed as a viable communication paradigm for underwater applications in this paper. All research obstacles in this area are described, according to this. Underwater MI communications are fundamentally distinct from traditional underwater communication paradigms, which depend on electromagnetic, acoustic, or optical waves to convey information between transmitting and receiving parties. MI-based underwater communications have a number of unique and promising characteristics, including low signal propagation delay, reliable and consistent channel behaviour, a sufficiently long communication range with high bandwidth, and the ability to operate silently and stealthily underwater. This article presents the foundations of underwater MI communications, including MI channel models, MI networking protocols design, and MI-based underwater localization, in order to fully use the promise aspects of MI-based communications under water.*

**KEYWORDS:** *Magnetic Induction, Acoustic Waves, Optical Waves, Underwater Communication.*

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### 1. INTRODUCTION

In the last decade and a half, underwater communication networks have piqued the interest of the academic community, owing to a slew of theoretical and practical problems. Large-scale networks of underwater devices (e.g., underwater static sensors, unmanned autonomous vehicles, and autonomous robots) that are capable of harvesting information from the aquatic and marine environment, performing simple processing on the extracted data, and transmitting it to remote locations are driving this growing interest. Significant advancements in this field have ushered in a flurry of civil and military applications in recent years. The undersea environment, on the other hand, offers significant challenges to dependable and real-time communications based on acoustic, electromagnetic (EM) [1], and optical waves [2].

Under water, EM waves have a significant attenuation, which drastically restricts the communication range. Large antennas are necessary for low-frequency EM transmission to improve communication range, which is not practicable for tiny underwater vehicles and robots. For a 50 MHz working frequency, the antenna size of an EM transmitter is a few of meters. Optical waves are subjected to numerous light scatterings, resulting in inter-symbol interference and a limited transmission range. Transmission of optical communications [3] needs great precision in pointing tiny laser beams at the receiver to extend transmission range, which is problematic for highly mobile underwater vehicles and robots. While acoustic waves offer long communication ranges under water, they suffer from high propagation delay, unreliable and unpredictable channel behavior, and low data rate due to complex multi-path fading, prevalent Doppler effects, and significant variations in these properties due to temperature, salinity, or pressure.

Our study on magnetic induction (MI)-based communications [4] in challenging and hostile settings, such as soil, oil reservoirs, and water pipelines, has revealed several intriguing aspects of MI-based communication during the previous decade. Recent study uses similar communication concepts as to give mathematical analysis of the MI-based communication channel in underwater applications. MI-based communication provides the following benefits over frequently utilized acoustic, optical, and electromagnetic communication:

### 1.1. Negligible propagation delay:

MI waves propagate at a speed of  $3.33 \cdot 10^7$  m/s under water, which is far faster than acoustic waves, which travel at 1500 m/s. MI waves' exceptionally fast propagation speeds can greatly enhance the delay performance of underwater communications while also making underwater networking protocols like medium access control (MAC) and routing, as well as underwater networking services, easier to develop and deploy (e.g., localization). Furthermore, due to the low latency and steady channel, physical layer synchronization among wire-free devices becomes simple and dependable.

### 1.2 Steady channel response:

Because a coil's radiation resistance is significantly lower than that of an electric dipole, only a little amount of energy is radiated to the far field by the coil. As a result, unlike acoustic communication, MI-based underwater communication does not suffer from multi-path fading. Furthermore, the frequency offsets produced by the Doppler effect [5] may be significantly reduced due to the fast propagation speed of MI waves. MI channel characteristics (e.g., data rate and packet loss rate over a given transmission range) are very consistent and predictable because they are free of multi-path fading and Doppler effect. Furthermore, unlike optical communications, MI communications do not suffer from light scattering, thus their transmission range and channel quality are unaffected by water quality issues like turbidity. Furthermore, both acoustic and optical communications must contend with significant acoustic and ambient light noises. Because high-frequency noise is absorbed by the aqueous medium, the EM noise encountered by MI channels is restricted under water.

### 1.3. Sufficiently large communication range with high data rate:

Transmission and reception in MI-based communications are performed via a pair of tiny wire coils, often known as coil antennas. Unlike the dipole antenna used in most EM wave-based

communications, the antenna does not have a minimum frequency below which it cannot function. On the one hand, no matter how tiny the coil at the MI transmitter is, a time-varying magnetic field may be created. The MI receiver, on the other hand, can capture the signal even if the frequency is as low as the Megahertz range as long as there is magnetic flux passing through the coil. Because of this characteristic, each small coil antenna may be used to generate low-frequency MI signals, allowing small underwater robots and vehicles to communicate over vast distances. Furthermore, MI coils may operate at Megahertz frequencies while maintaining predictable and consistent channel quality, resulting in significantly greater data rates than acoustic communications.

**2. DISCUSSION**

Underwater MI communications use non-audible and non-visible MI waves, which are suitable for a wide range of civilian and military applications that require stealth underwater operations. While acoustic and optical communications rely on the generation, propagation, and reception of audible sounds or visible lights, respectively, under-water MI communications use non-audible and non-visible MI waves, which are suitable for a wide range of civilian and military applications that require stealth underwater operations. The difference among the various kinds of rays used underwater is depicted in table 1.

**TABLE NO. 1: DIFFERENCE BETWEEN VARIOUS KINDS OF COMMUNICATION MEDIUM UTILIZED IN UNDERWATER**

Communication paradigm	Propagation speed	Data rates	Communication ranges	Channel dependency	Stealth operation
MI	$3.33 \times 10^7$ m/s	~ Mb/s	10–100 m	Conductivity	Yes
EM	$3.33 \times 10^7$ m/s	~ Mb/s	10 m	Conductivity, multipath	Yes
Acoustic	1500 m/s	~ kb/s	~ km	Multipath, Doppler, temperature, pressure, salinity, environmental sound noise	Audible
Optical	$3.33 \times 10^7$ m/s	~ Mb/s	10–100 m	Light scattering, line of sight communication, ambient light noise	Visible

The data information is conveyed by a time-varying magnetic field in MI transmission. The modulated sinusoid current along a MI coil antenna at the transmitter produces such a magnetic



field. The information is retrieved by demodulating the generated current along the receiving coil antenna. The transmission distance in MI communications is shorter than a wavelength. As a result of the lossy underwater medium, the communication channel undergoes reduced absorption. Furthermore, with underwater MI systems, multi-path fading is almost non-existent. The MI transceivers, as previously stated, operate in the Megahertz band, which has a wavelength of tens of meters.

Even though there are numerous pathways between the transceivers, the phase shifting of multiple paths [6] is so tiny that the coherence bandwidth is significantly greater than the system bandwidth in underwater MI systems since the communication range is within one wavelength. As a result, fading and channel distortion are minimal. In MI transmission, data is sent using a time-varying magnetic field. At the transmitter, a magnetic field is created by a modulated sinusoid current running through a MI coil antenna. The information is recovered by demodulating the produced current along the receiving coil antenna. In MI communications, the transmission distance is less than a wavelength. The communication channel's absorption is decreased as a result of the lossy underwater medium.

An analytical channel model is critical for properly characterizing the above unique underwater MI communication channel. The EM fields around the transmitter and receiver coils are initially described using Maxwell's equations in the MI channel models. The coupling between the transceiver coils is modeled using the equivalent circuit approach based on the field analysis. Finally, the MI path loss may be calculated using the operating frequency, transmission distance, coil antenna size, number of turns, relative angle between the two coils, and underwater ambient conditions, particularly water conductivity. The MI transceivers are thought to have coil antennas with a radius of 10 cm and 20 turns of AWG26 wire. The operational frequency is ten megahertz (MHz). Sea water with a conductivity of 4 S/m, lake water with a conductivity of 0.05 S/m, and drinking water with a conductivity of 0.0005 S/m are the three types of underwater environments studied.

A pocket-sized wireless device may achieve a communication range of 20 m in drinking water, more than 10 m in lake water, but less than 1 m in sea water utilizing a pocket-sized wireless device. (It's worth noting that the maximum communication range is defined as the distance at which the route loss exceeds 100 dB.) The orders of magnitude variations in medium conductivities in sea water, lake water, and drinking water cause such large disparities in communication ranges. In seawater applications [7], highly conductive saltwater produces substantial Eddy current, resulting in extremely high path loss, which is a challenge for both EM waves and MI methods.

Despite the promising features of MI underwater communications, the route loss performance of the MI channel varies depending to the uncontrolled coil orientations, according to the developed channel models, if underwater robots and vehicles utilize a single coil antenna. By using a tri-directional coil antenna at the receiver and transmitter to overcome the problem, which consists of three coils that are perpendicular to each other. The underwater robots and a vehicle with a tri-directional coil antenna create an omnidirectional receiver, with the coil orientation having no influence on communication performance. The orthogonal coils on the same wireless device do not interact with each other because the magnetic flux created by one coil becomes zero at the other two orthogonal coils due to the field distribution pattern of the coil.

The performance of systems utilizing either a unidirectional or tri-directional coil [8] in the MI communication channel to demonstrate the advantages of the tri-directional coil antenna is quantitatively analyzed. The route losses with different antenna orientations are shown in Fig. 3b when the receiver is a tri-directional coil. When the antenna deviates from its ideal orientation, the tri-directional coil antenna has considerably lower path loss [9] and more dependable performance than the unidirectional coil, according to the findings. Furthermore, because the path loss of the tri-directional coil antenna does not change significantly when the antenna's orientation changes, the tri-directional receiver may be considered omnidirectional. The cross-layer design method can improve the performance of underwater MI-communications even further. For MI-based wireless sensor networks [10], for example, a cross-layer communication architecture is developed. Because it can adaptively alter communication settings according to channel characteristics such as bandwidth and path loss under diverse conditions, this cross-layer module provides a unified solution for subterranean, soil, oil reservoir, and underwater environments.

### 3. CONCLUSION

An underwater communication paradigm, underwater magnetic-induction (MI) communication is studied, in this work. Underwater MI communications are fundamentally distinct from traditional underwater communication paradigms, which depend on electromagnetic, acoustic, or optical waves to convey information between the transmitting and receiving parties. MI-based underwater communications have a number of unique and promising characteristics, including little signal propagation delay, reliable and consistent channel response, a sufficiently long communication range with high bandwidth, and stealthy and covert underwater operations. This article presents the foundations of underwater MI communications, including MI channel models, MI network protocol design, and MI-based underwater localization, in order to fully use the promising aspects of underwater MI-based communications.

### REFERENCES

1. X. Yang, B. Wei, and W. Yin, "Analysis on the Characteristics of em Waves Propagation in the Plasma Sheath Surrounding a Hypersonic Vehicle," *IEEE Trans. Plasma Sci.*, 2017, doi: 10.1109/TPS.2017.2755723.
2. R. C. Thompson, "Optical Waves in Layered Media," *J. Mod. Opt.*, 1990, doi: 10.1080/09500349014550171.
3. Y. Ata and Y. Baykal, "Structure functions for optical wave propagation in underwater medium," *Waves in Random and Complex Media*, 2014, doi: 10.1080/17455030.2014.884735.
4. M. C. Domingo, "Magnetic induction for underwater wireless communication networks," *IEEE Trans. Antennas Propag.*, 2012, doi: 10.1109/TAP.2012.2194670.
5. S. Klinaku and V. Berisha, "The Doppler effect and similar triangles," *Results Phys.*, 2019, doi: 10.1016/j.rinp.2018.12.024.
6. R. Zhang, J. Zhou, J. Lan, B. Yang, and Z. Yu, "A High-Precision Hybrid Analog and Digital Beamforming Transceiver System for 5G Millimeter-Wave Communication," *IEEE Access*, 2019, doi: 10.1109/ACCESS.2019.2923836.

7. "The electrical properties of sea-water for alternating currents," *Proc. R. Soc. London. Ser. A, Contain. Pap. a Math. Phys. Character*, 1933, doi: 10.1098/rspa.1933.0209.
8. E. Gavoci *et al.*, "Tri-Axial Magnetic Field Exposure System for a Patch-Clamp Set-Up," *J. Environ. Prot. Ecol.*, 2013.
9. P. Saini, R. P. Singh, and A. Sinha, "Influence of undersea acoustic parameters on path loss for RF-based underwater sensor networks," *Int. J. Commun. Networks Distrib. Syst.*, 2020, doi: 10.1504/IJCNDS.2020.110520.
10. D. Kandris, C. Nakas, D. Vomvas, and G. Koulouras, "Applications of wireless sensor networks: An up-to-date survey," *Applied System Innovation*. 2020, doi: 10.3390/asi3010014.

## REVIEW ON IMPACT OF DRINKING ON CARDIOVASCULAR SYSTEM AND CARDIOVASCULAR RISK FACTORS

**Dr Mazher Maqsood\***

\*Professor,  
Department of Pulmonary Medicine, Faculty of Medicine,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- dmaqsood@gmail.com

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### ABSTRACT

*The habitual mild intake of alcohol (510 g/day) and the incidence of coronary artery disease are known to be inversely related (CAD). This link includes many physiologically plausible mechanisms, including alcohol's amount of the drug effects on HDL cholesterol, plasma fibrinogen, and platelet aggregation. However, such a preventive impact against atheroma must be weighed against known negative regulation of blood pressure and triglycerides, as well as the potential negative consequences of episodic or binge drinking on a variety of other cardiovascular final and risk factors. An alcoholic binge may worsen both silent myocardial ischaemia and angina in those who already have CAD. When people go through withdrawal after binge drinking, they experience a lot of symptoms. Blood operating pressure, together with increased platelet activation and changes in the balance of fibrinolytic factors, may explain the observed link between episodic excessive drinking and ischemic stroke. This has been observed in young men in particular, and it extends to an increase in both subarachnoid and intracerebral haemorrhage following binge drinking. Acute elevations in hypertension have been seen in males who drink mostly on weekends, compared to longer-term pressure effects in habitual daily drinkers, according to intervention studies in men. However, we have not been able to replicate the findings of unfavorable effects of binge drinking on the lipid profile that were reported in both animal and human research. Binge drinking may produce cerebrovascular spasms as well as ventricular and supraventricular arrhythmias, including atrial fibrillation. Alcohol-induced arrhythmia is thought to be the cause of alcohol-related sudden coronary mortality in those who already have CAD. As a result, future research into potential protective effects of alcohol against CAD must carefully examine the implications of drinking patterns for the connection. Co-timing of drinking with meals, cigarette smoking, and illegal drug use all have modifying effects that must be examined. Without this crucial knowledge, public health recommendations on alcohol and coronary artery disease would be restricted in breadth and possibly in effective.*

**KEYWORDS:** Alcohol, Blood Pressure, Coronary Artery Disease, Drinking Habit, Public Health Advice.

## INTRODUCTION

An adverse association has been shown in a significant group of potential and case control studies between increased frequency of alcohol intake and a reduction in the risk of coronary artery disease. A meta-analysis of 42 of these trials noticed that the majority of any coronary protection is obvious with intakes of just one standard drink (10 g) every other day, with greater rate of spending providing no further benefit of coronary protection. In fact, greater levels of consumption have been linked to either a loss of any preventive benefit or an increase in the risk of coronary artery disease mortality or morbidity in certain studies. Similarly, the research on alcohol intake and stroke strongly suggests a biphasic relationship [1]. In support to deal studies, intakes of 20-40 g/day were associated with a lower risk of thrombo-embolic stroke, while intakes of 60 g/day were associated with an enhanced danger of both thrombo-embolic and haemorrhagic stroke. In prospective studies, these cut-points seem to be somewhat lower, with a reduction in risk in the 10-20 g/day region and an elevated risk at 30 g/day or above. There is some indication that the pattern in which people were drinking may be as significant as the average amount of intake in determining such biphasic risk profiles [2]. Several studies have linked acute excessive alcohol use over short periods of time with an increased risk of both stroke and cardiovascular events.

These studies indicate that a practice of consistent daily drinking has distinct consequences on cardiac health than a pattern of alternating heavy drinking and abstention, even if overall average weekly consumption may be the same. However, the total effect of drinking habits on cardiovascular health has yet to be completely explained, and further research is needed, especially in certain Western nations where hazardous drinking habits have become more prevalent. Failure to distinguish between diverse drinking patterns may conceal potentially harmful connections between alcohol and cardiovascular disease, resulting in imbalanced public health advice that focuses only on the positive benefits. Alcoholism is diagnosed via a series of tests.

According to epidemiologic research, the National Institute on Alcohol Abuse and Alcoholism (NIAAA), a division of the Institutes of health, defines "binge" drinking as the quantity of drink linked with an elevated risk of developing alcohol dependence and abuse. This is defined as 5 or more fluid ounces per day or 15 or more beverages per week for males and 4 or more standard drinks per day or 8 or more drinks per week for women. A maladaptive pattern of alcohol use which leads to substantial morbidity and mortality, as evidenced by tolerance, cessation or having a drink to relieve withdrawals, incapability to reduce drinking, drinking more or for longer than intended, neglect of activities, time spent getting drunk or trying to recover from drinking, and sustained use of alcohol despite alcohol-related psychological. Alcoholism may or may not be accompanied with a separate condition known as alcohol abuse. Alcoholism is a problematic pattern of alcohol use that results in clinically substantial distress of social or occupational functioning, as shown by inability to meet key role responsibilities, exposure to physical dangers, legal issues, or social and interpersonal issues. 66 percent of individuals with alcohol dependency also meet the criteria for binge drinking, according to the National Epidemiologic Study on Alcohol and Related Conditions (NESARC), a national survey of more than 43,000 adults performed from 2001 to 2002. Alcoholism symptoms usually develop from misuse to poor control, tolerance, and, eventually, physiologic dependency [3].

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## DISCUSSION

### 1. Patterns Of Consumption:

The idea of such potentially beneficial benefits was first suggested when researchers discovered that the inverse association among light and moderate alcohol use and total mortality in middle-aged people was mainly attributable to a reduction in cardiovascular disease mortality. The interpretation of the connection as evidence for an alcohol-protective effect was not always apparent. The first issue is that the reference non-drinker category often includes ex-drinkers who have stopped drinking due to illness, that this so sick quittero phenomenon. Second, there is a growing recognition that non-drinkers, also when ex-drinkers are removed, exhibit a variety of socio-demographic, health, and lifestyle characteristics that indicate they are not from the same population as drinker (the unhealthy abstainero phenomenon) [4].

As a result, the negative relationship of drinking with both coronary heart disease and stroke has been reduced in certain studies when extremely occasional drinkers were included as an alternative comparison group. Finally, most research hasn't addressed the specific issue of the underlying pattern of alcohol consumption's confounding influence. Traditional exposure measurements have centered on the overall amount of beer during a period that includes both drinking and non-drinking days. This ignores the effect of the actual amount of alcohol ingested each drinking event on cardiovascular outcomes and risk variables. It's possible that within the defined groups, there are people who drink in quite diverse ways. A person classified as consuming 12 drinks per day, for example, might be represented by someone who drinks two and only two drinks every day, for a total of 14 drinks per week. Alternatively, the person might be someone who exclusively drinks on weekends and consumes a significant quantity of alcohol in a single night. As a result, average drinks per day may not properly reflect real drinking behavior, preventing a balanced assessment of alcohol-cardiovascular disease inter-relationships, patterns of light to moderate drinking, and binge drinking being inadequately defined in most research. According to a study by Knupfer, the pattern of daily light drinking that has been linked to a reduced risk of coronary artery disease is not common. According to the research, the majority of light users do not drink on a daily basis, and the majority of daily drinkers are not light drinkers; that is, they take two standard drinks each day [5].

### 1. Patterns Of Intake And Cardiovascular Disease:

#### 1.1 Coronary Artery Disease:

Better understanding of the impact of alcohol consumption patterns in predicting coronary artery disease outcomes is required. On the one side, studies like Jackson et al. from New Zealand 46 found that drinking alcohol in the preceding 24 hours was associated with a 25% reduced risk of both fatal and non-fatal coronary events in male and a 53% reduced in women, with a reduction in risk still seen at four drinks or more. A handful of research, on the other hand, it indicates that excessive drinking may lead to myocardial ischaemia or infarction. In the British Regional Heart Study, males who drank drinks per day on weekend had a 20% higher relative risk of myocardial infarction than men who drank 12 drinks per day (MI). In a recent case-control research from Newcastle, Australia, alcohol intake patterns in instances of acute myocardial infarction or coronary mortality were compared to 6077 community-based controls. On a day when they drank alcohol, participants were asked to describe how many drinks they typically consumed. Males who consumed drinks per day on 56 days per week and females who consumed 12 drinks



per day on 34 days per week had a lower risk of an acute cardiovascular event than non-drinkers. Males who drank 9 or more drinks per day on 12 days a week, on the other hand, had a 2.4-fold higher risk, while women who consumed 5 or more drinks per day had a 2.8-fold higher risk. Other studies of alcohol and cardiovascular disease have found a link between excessive drinking and an increased risk of heart disease. Even after accounting for total alcohol consumption, men who reported having a hangover at least monthly had a 2.36-fold higher risk of cardiovascular death comparison to male who had fewer hangovers, according to the Kuopio Ischaemic, heart Disease Risk Study, a finding dependable with enhanced cardiovascular death as a result of heavy acute drinking [6].

A second report from same study found an eight increase in the ratio risk of fatal myocardial infarction in male whose usual beverage dose was six or more bottles per session (72 g alcohol), though no overall connection between usual beer daily dosage and acute coronary syndrome infarction was identified. This increase in the risk of cardiac events and death associated with binge drinking is consistent with previous longitudinal studies that have shown that heavy drinkers had higher rather than lower cardiovascular mortality. Higher risk associated with binge drinking is likewise compatible with Gruchow and colleagues' angiographic findings. They looked at 526 males who had been sent for coronary angiography and compared the degree of blockage of coronary arteries to their alcohol use patterns. When individuals had irregular or sporadic patterns of alcohol consumption, the negative relationship between quantities of alcohol drank and occlusion score was reversed, according to the researchers. They used a ratio of maximal to normal quantities of alcohol ingested per drinking occasion as a measure of variability in alcohol consumption and discovered that individuals with the greatest variability ratios had a 25% increase in occlusion score. Three young people had MI hours after severe alcohol consumption, according to Moreyra and colleagues [7].

Following that, all of the patients had normal coronary angiograms with no significant occlusive disease. Silent myocardial ischaemia was induced in individuals with coronary heart disease and persistent angina pectoris after acute alcohol consumption at a dosage of 1.25 g of ethyl alcohol/kg body weight. According to these research, episodic alcohol use, especially in large quantities, may increase the risk of MI by inducing coronary artery spasm or causing myocardial ischaemia in those who already have coronary artery disease. Gender may have a role in these results [8]. When age, township of residence, calendar year, and smoking status were taken into account, a recent study from the Swedish Twin Register found that men who occasionally drank at least half a bottle of liquor or a bottle of wine on a single occasion had a 40% lower incidence of MI than non-drinkers, while women had an 80% increased incidence. However, the authors cautioned against extrapolating these findings since some uncontrolled mixing may have happened, and they lacked data for the patients to indicate whether or not excessive drinking happened around the MI.

## 1.2 Cardiac Arrhythmias:

In 1978, Ettinger and colleagues 56 reported that cardiac arrhythmia (a holiday heart syndrome) was caused by excessive previous alcohol consumption or excessive drinking, which generally resulted in hospitalization during Sunday and Tuesday or around the edge holidays. Atrial fibrillation seems to be the most frequent type of arrhythmia caused by both chronic high alcohol intake and binge drinking, according to case control studies. The most common day of start in one of these investigations was the middle of the week instead of the weekend, suggesting the

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idea that alcohol withdrawal instead of binge drinking is the underlying trigger for such arrhythmias. Thornton, on the other hand, has documented how an alcoholic binge (85200 g of alcohol in one drinking episode) caused atrial fibrillation in four different instances, even in folks who did not regularly consume high amounts of alcohol and had otherwise healthy hearts. It is believed that 15-30% of individuals with atrial Fibrillation have an alcohol-related arrhythmia, with 5-10% of all new shows of atrial fibrillation being explained by excessive alcohol consumption. Atrial utter, atrial tachycardia, junctional tachycardia, and numerous atrial premature beats are some of the other arrhythmias that have been linked to alcohol. Increased ventricular ectopic activity, including ventricular tachycardia, has been seen in people with and without cardiac disease after drinking heavily [9].

### **1.3 Sudden Cardiac Death:**

This rise in arrhythmia may explain the link between acute alcohol intake and sudden mortality among heavy drinkers, especially in those with pre-existing coronary artery disease or hypertension. A link between alcohol and unexpected coronary mortality has recently been shown in many research, indicating that heavy drinkers' non-participation in previous population studies in which only dose-response negative associations with coronary disease have been reported may have skewed the findings. A careful collect and measure of mortality data from a cohort of male residents of Göteborg, Sweden, disclosed that all those who chose not to participate in longitudinal studies had a higher incidence of both enrollment with the Temperance Board as problem drinkers and a huge increase in coronary deaths, particularly sudden coronary death [1].

### **1.4 Cerebrovascular Disease (CVD):**

The intricacy of the observed correlations was emphasized in a review of epidemiological studies that looked at the interconnections between alcohol intake and stroke risk. Overall, case control comparisons have shown mixed findings, with some indicating an increase in risk and others indicating no significant change in risk or a reduction. Some studies have shown a biphasic impact, with risk decreasing with light drinking and increasing with moderate to severe drinking. Population - based studies have also shown inconsistent results. Some researchers highlighted that mild to moderate drinking seems to protect against ischemic stroke. Whereas in others, there was no connection or a biphasic relationship comparable to that described in many case control studies. Several of these researches have shown that higher consumption leads to an increase in stroke incidence [10].

## **CONCLUSION**

The alcohol on the circulatory system and cardiovascular risk variables are complicated. The underlying pattern of alcohol use, according to this study, is likely to be one of the main contributors to such complex. If the total effect of alcohol on cardiovascular events is to be better understood, future research will need to look at the pattern of alcohol use. Without adequate disclaimers for the increased risk caused by excessive drinking for these end-points, a bland assumption that regular intake of alcohol protect against coronary heart disease and thrombo-embolic stroke would lead to imbalanced public health recommendations. When such advice is given to risks subjects, such as those with pre-existing dyslipidaemia, hypertension, diabetes, or atherosclerotic vascular disease, in which the balancing act of risks and benefits of binge

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drinking has yet to be formed adequately, the underlying trend of heavy drinking may be particularly relevant.

## REFERENCES

1. M. Krenz and R. J. Korthuis, "Moderate Ethanol Ingestion and Cardiovascular Protection," *J. Mol. Cell Cardiol.*, 2013.
2. M. Krenz and R. J. Korthuis, "Moderate ethanol ingestion and cardiovascular protection: From epidemiologic associations to cellular mechanisms," *Journal of Molecular and Cellular Cardiology*. 2012, doi: 10.1016/j.yjmcc.2011.10.011.
3. U. C. Lutz, "Alterations in homocysteine metabolism among alcohol dependent patients--clinical, pathobiochemical and genetic aspects.," *Current drug abuse reviews*. 2008, doi: 10.2174/1874473710801010047.
4. C. C. Dobson *et al.*, "The effects of alcohol exposure on fetal development," in *Fetal Development: Research on Brain and Behavior, Environmental Influences, and Emerging Technologies*, 2016.
5. J. Rehm, K. D. Shield, M. Roerecke, and G. Gmel, "Modelling the impact of alcohol consumption on cardiovascular disease mortality for comparative risk assessments: An overview," *BMC Public Health*, 2016, doi: 10.1186/s12889-016-3026-9.
6. A. Van De Wiel, A. Poppelier, W. E. Van Dalen, and D. Van De Mheen, "How much alcohol is too much and why? Comments on socially accepted but excessive alcohol drinking patterns," *Ned. Tijdschr. Geneeskd.*, 2002.
7. S. K. D., P. C., and R. J., "Chronic diseases and conditions related to alcohol use," *Alcohol Res. Curr. Rev.*, 2013.
8. C. T., "Understanding the health impact of alcohol dependence," *Am. J. Heal. Pharm.*, 2007.
9. T. Cargiulo, "Understanding the health impact of alcohol dependence," in *American Journal of Health-System Pharmacy*, 2007, doi: 10.2146/ajhp060647.
10. F. R. K and M. HE, "Alcohol consumption in the new millennium - weighing up the risks and benefits for our health.," *Nutr. Bull.*, 2006.

## AN OVERVIEW OF IMPACT OF SOCIAL MEDIA ON CONSUMER BEHAVIOUR

**Pankhuri Agarwal\***

\*Assistant Professor,  
Department of HR & Finance,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id-pankhuri.management@tmu.ac.in

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### ABSTRACT

*Consumers have a lot of options when it comes to adjusting various areas of their lives thanks to social media. Facebook, Twitter, and Instagram have all played a major part in increasing online sales. Despite the fact that Oman and other Arabian nations are having difficulty using these sites effectively, we have significant proof of their usage. The purpose of this paper is to determine which consumers are most influenced by online purchases, the reasons that tempt consumers to buy online, the types of products that are most commonly purchased using Social Media, and the types of Social Media that are most commonly used by consumers in Oman. We used two main research techniques, a questionnaire and an interview, to examine the effect of social media sites on users' shifting behavior when they want to buy anything online. According to the results, Instagram has had a major impact on customers' purchasing decisions when it comes to specific goods. This research has a wide range of theoretical and practical consequences.*

**KEYWORDS:** *Consumer Buying Behavior, Online Shopping, Influence, Social Media, Social Networking.*

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### 1. INTRODUCTION

Social media is an online communication platform that allows us to connect with one another, exchange material, and get information [1]. Social media includes social networking, forums, and social bookmarking, among other things. Social media includes Facebook, Instagram, LinkedIn, Wikipedia, Pinterest, Google+, and Twitter, and it has undoubtedly become an important part of our lives. Social media is often used in companies to raise awareness about goods and services, promote brands, retain current consumers, and discover new possibilities. In this manner, social media marketing effectively utilizes the advantages of social networking to raise brand recognition, brand value, and consumer reach [2]. The study's aim is to determine the effect of social media on consumer purchasing behavior in metropolitan regions. Without a doubt, for the first time ever, consumers and companies are more linked than ever before, thanks

to more internet connections than ever before. India has overtaken China as the world's biggest internet user. People's purchasing habits have evolved and improved dramatically during the last several decades [3]. Consumers used to shop in actual shops such as big shopping malls, and many still do.

Consumers may, however, buy over the Internet utilizing a variety of social media platforms and websites thanks to advances in information and communication technology. This kind of shopping mode is known by a variety of names, including online shopping, online buying behavior, and Internet shopping [4]. All of these terms relate to the act of acquiring and buying goods or services over the Internet through various social media platforms and websites. Web-based services known as "Social Networking Sites" relate to a network of connections and interactions between various users (groups or individuals) [5]. By accomplishing multiple tasks and facilitating the way of communication and sharing different information (comments, thoughts, videos, and images), social media such as Facebook, Instagram, and Twitter enable users to maintain strong connections among themselves as well as with others. In many areas of our life, social media is playing a major role. What's great about SM is that it helps people in a variety of fields, including business, marketing, advertising, and education. From a commercial standpoint, SM allows companies and customers to connect directly with one another, allowing them to discover the goods and services they want (Parson, 2013) [6]. Consumers are increasingly turning to technology, especially social media, to help them with their online purchasing. This procedure may be described as an electronic process that enables customers to interact with businesses and fulfill their purchasing requirements. The rapid spread of this epidemic has been aided by social media. Interacting with customers on social media may result in a higher number of prospective customers and a higher chance of converting them into actual buyers [7]. SM encourages customers to promote and share their purchase experience with their peers by providing good or negative feedback on a bought product.

According to a research, SM allows 25% of all customers to publish links to product and service information on their retail sites in order to keep other users up to date on the buying process. Miller (2010) found that social marketing has a significant influence in encouraging customers to buy online in his research. He discovered that 70% of customers utilize social media to get valuable information that 49% of them had made a purchase choice, and that 60% like to share product information with others online. Only 7% of customers, however, engage in real buying activities (Miller and Lammas, 2010) [8]. Online purchasing is becoming more popular across the board, and it has an impact on a variety of consumer groups. For example, internet purchasers are growing in India, China, Japan, and Australia, with 87 percent, 85 percent (North Asia and Europe), 83 percent (North America), 81 percent (South and Latin America), and 53 percent (Africa and Pakistan) respectively. Because of product suggestions made on various social media platforms, the entire online buying process has allowed 875 million customers to increase the proportion of other online shoppers to 40% in the last two years. For example, 41% of users purchase books, clothing, accessories, and shoes (36%), movies, DVDs, and games (24%), plane tickets (24%), and electronic equipment (23%) [9]. Despite the fact that online shopping is rapidly expanding and expanding, certain areas and nations, such as the Arab world, have a relatively low number of online shopping transactions.

Over the past 15 years, the Arab world has seen tremendous technological advancements that have resulted in many changes in corporate practices, governance practices, and the pursuit of



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higher development. In the Arab world, about 125 million people use the internet, with over 53 million of them being engaged on social media (Government, 2012). According to research, one out of every three internet users makes a monthly purchase of products and services. These active users make up 43% of those who have made several online purchases. Despite the fact that the Middle East has a large number of internet users, the proportion of these users is the lowest (3.7%) in comparison to Western nations. This study looks at the buying habits of people who shop on social media platforms. The goal of the study is to figure out why people buy things on social media, to figure out which types of people buy things on social media and how they're influenced, to figure out which products are best for social media, and to figure out which social media platforms are best for specific products and customers. This paper will be divided into several sections, beginning with a review of the literature and related studies, identifying the methodology, findings, analysis, and discussion, and finally limitations, future expectations, and a conclusion about the impact of SM on consumer purchasing behavior, all of which will be supported by theoretical and practical contributions [10].

## **1.1 Types of Products Suitable For Social Media:**

To match the findings of both the questionnaire and the interview data, a particular list of goods chosen by customers in the questionnaire was found. This study, however, does not offer detailed information on the items selected by individual customers. In order to explain this issue, interviews were performed. As previously stated, goods were divided into physical and immaterial categories. In most cases, 65 percent of respondents prefer to purchase physical fashion items through social media. For example, they like to devote a significant amount of time on purchasing accessories, cosmetics, and clothing. This is due to the fact that the majority of our samples are female. In the survey, participant 24 said, "I tend to purchase fashion goods using Instagram because I can't find my style in local stores." In the interview, he stated, "I tend to buy fashion products using Instagram because I can't find my style in local shops." Fashion goods are preferred to be purchased online since they are difficult to get in local markets and are less hazardous in terms of pricing. Similarly, prior research on this substance had similar findings. According to these research, costly goods like as luxury and cars are difficult to sell online due to a lack of or untrustworthy information about them (Miller and Lammas, 2010). In terms of other types of items, some respondents (27%) choose to purchase intangible commodities such as online publications, hotel reservations, airline tickets, trainings, and computer software. This is owing to the cheap expenses connected with these goods, such as shipping and not having to wait a long time for the product to arrive. Few (response rate = 8%) people, on the other hand, purchase both physical and immaterial goods. The rationale for purchasing both kinds of goods, according to these few participants, is due to the dependence on social media rather than conventional purchases.

## **1.2 Types Of Social Media Mostly Used By Consumers To Online Shopping :**

The findings revealed that there is an emphasis on providing more than three sites in the survey to allow respondents to pick the most appropriate one. This research, however, focuses on three popular social media sites: Instagram, Facebook, and Twitter. This is because our research revealed that these are the most popular and widely utilized sites among Omani consumers. Previous research showed an increase in Facebook use in terms of online purchasing, but Instagram has altered this trend. In contrast to earlier studies, which found that Facebook had the highest rate (respond rate = 51 percent) among western users, the survey findings revealed that



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most online shoppers (respond rate = 45 percent) use Instagram as a primary tool for online shopping (respond rate = 45 percent) . “From my past experiences, I like to use Instagram since merchants are well-known and trustworthy,” said interviewee 15 when asked why she prefers to use Instagram. They also publish feedback from other customers regarding various products.” As a result, most individuals selling goods on Instagram are well-known and trustworthy, such as acquaintances and family. Images and videos are also backed up with remarks on various items. These findings also revealed that some Omanis rely on Facebook to buy online (response rate = 12%), whereas just 3% use Twitter. Other websites such as Amazon, e-bay, and Google+, on the other hand, are used by 40% of users to shop. This high proportion is due to the fact that consumers prefer to utilize familiar websites with which they have already interacted. This study combined questionnaires and interviews in a manner that yielded a lot of information. Each of the objectives in this study has a direct impact on the others. Both the decisions of customers and the presentation of goods are influenced by social media. According to the above analysis, Instagram has a significant impact on fashion products because it allows users to display products in fashionable images and videos, attracting more young consumers, particularly females, who are influenced by informational, design, psychological, and cultural factors. Furthermore, social media (Instagram) has established a strong link between goods (fashion) and young customers. As a result of this relationship, fashion has a direct impact on the purchasing decisions of young student consumers (respond rate = 62 percent), aged 18 to 25, in such a way that the process of purchasing such fashion products is much more flexible, unique, and easier to complete effectively and efficiently. To summarize, customers think that Instagram is the finest and most appropriate platform for purchasing trendy items online. The matrix model below depicts the entire process of altering customers' purchasing behavior as a consequence of interactions between Social Media, goods, and consumer choices.

- **Facebook:** Despite its share of scandals and problems in recent years, Facebook remains the world's most popular social networking site (with over 1.7 billion members). Because of the network's size, you'll be able to reach out to more individuals, but keep in mind that Facebook isn't as popular as it once was. According to Edison Research's Infinite Dial survey from early 2019, 62 percent of 12–34-year-olds in the United States use Facebook, down from 67 percent in 2018 and 79 percent in 2017. This decline is especially noteworthy since use among the 35–54 and 55+ age groups has remained steady or even risen. Despite this, according to Business Insider, Facebook accounts for 50% of all social referrals and 64% of total social income. According to Digitas LBi Commerce, Facebook influenced more over half (52%) of customers' online and physical purchases in 2015. The business has recently attempted to repair its image by providing more control over advertising and data management.
- **Instagram:** Instagram is a fantastic platform for businesses since it allows you to showcase your goods in a variety of ways, including pictures, videos, Stories, galleries, filters, and more. It currently has a monthly active user base of over one billion people. What's wonderful about the platform is that it appeals to people of all generations and from all around the world. A business account is followed by 80% of Instagram users. 73 percent of American teenagers believe that the greatest method for businesses to contact them with new goods or promotions is via Instagram. Furthermore, the site makes purchasing easier by

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including shopping tags and checkout choices in the articles. Every month, 130 million Instagram accounts click on a shopping post to learn more about goods.

### **1.3 Factors Influence Online Insiders and Social Clickers In Purchasing Process:**

According to the survey findings, the proportion of Online Insiders (online consumers) was 48 percent, with half of them buying at least twice a month. Similarly, 52 percent of all respondents were Social Clickers (frequent internet users). The majority of them are Muscat-based young customers aged 18 to 25 years old (response rate = 84%). The reason for this is because they are more exposed to internet facilities than other areas since internet services are available in virtually every part of the country. When asked about the reasons that encouraged them to purchase online, 61 percent of those polled indicated that information elements related to the goods impacted them the most. "I believe that goods are cheaper since part of their costs at the stores come from the staff's service, taxes, shop rental, and energy supplied in the shops," said interviewee 23. Furthermore, 17 percent of Online Insiders are mentally impacted when it comes to trusting social media sites. They believe that these sites are intended to provide more security in terms of safeguarding their accounts and personal information, allowing them to feel more at ease and secure. Furthermore, the influence of culture on Online Insiders' purchasing choices was significant. This aspect influences 10% of them in terms of depending on their friends and relatives (response rate = 41% out of 10%) who give evaluations and comments based on their previous experiences. The remainder of the participants, on the other hand, agreed that they would not make a purchase via the internet. This is because they believe that websites have no security and thus do not trust the quality of the products, as one interviewee put it: "Due to security concerns, I tend not to trust putting my account information online as it may be hacked, and besides, I prefer to physically inspect the goods that I buy." Furthermore, several people said that they do not have credit cards and that they are unaware of the purchasing procedure.

## **2. DISCUSSION**

The study found that social media has a significant effect on customer purchasing behavior in the digital era. Without a question, social media has had a significant impact on both consumers and companies. Consumers are extremely picky when making purchases, according to studies. Despite the abundance of data and information available on social media, the customers' own attitudes play a significant role in product selection and purchase. The quality of social media material has a significant effect; therefore it should be consumer-relevant. When it comes to social media marketing, it's not only about raising customer awareness or selling the goods. It's more than that, since it also entails maintaining and strengthening existing relationships with prospective buyers and businesses. The customer is now the monarch, able to get all relevant information about a product or service by just conversing with one another. Since a result, businesses and marketers should be wary of negative feedback on social media, as it may harm a company's image. Many people have acknowledged that social media allows them to more efficiently express their opinions and communicate with other customers and businesses. The distance between brands and customers has certainly been closed by social media. Given this, businesses are now putting out every effort to make customers feel connected to the brand by allowing them to share their thoughts, ideas, comments, and evaluations. The business that adopts an integrated strategy approach with the goal of using social network platforms to attract, engage, influence, and retain consumers is the most successful. The tactics that lead to the customers' viewpoint, as well as the opinion of those who produce material on social media, are

all factors that may influence a customer's brand image and willingness to purchase. As a result, these methods need a high level of maintenance, and businesses that use the technique should be prepared to repair all marketing services in order to keep current clients and improve customer lifetime value.

### 3. CONCLUSION

In conclusion, the results of this study have important consequences for academic research, resulting mostly from the extraction of the connection between the study's goals. Omani customers are mostly influenced by informational and design aspects, which lead them to make the best choice when it comes to selecting the finest Social Media site (Instagram) to purchase their desired product (fashion) online. Although the aforementioned statistic is encouraging in terms of using Social Media to purchase specific goods, there is still a level of distrust among customers when it comes to the security of such sites.

### REFERENCES

1. M. Bartosik-Purgat, N. Filimon, and M. Hinner, "Determinants of social media's use in consumer behaviour: an international comparison," *Econ. Bus. Rev.*, 2017, doi: 10.18559/ebr.2017.2.5.
2. S. Y. T. Lee and C. W. D. Phang, "Leveraging social media for electronic commerce in Asia: Research areas and opportunities," *Electron. Commer. Res. Appl.*, 2015, doi: 10.1016/j.elerap.2015.02.001.
3. A. Y. S. Lau *et al.*, "The Role of Social Media for Patients and Consumer Health," *Yearb. Med. Inform.*, 2011, doi: 10.1055/s-0038-1638751.
4. A. Y. Lau *et al.*, "The role of social media for patients and consumer health. Contribution of the IMIA Consumer Health Informatics Working Group.," *Yearbook of medical informatics*. 2011, doi: 10.1055/s-0038-1638751.
5. P. Isaías, S. Pífano, and P. Miranda, "Social network sites: Modeling the new business-customer relationship," in *Social Networking and Community Behavior Modeling: Qualitative and Quantitative Measures*, 2011.
6. M. Cimbalević, "Social media marketing in tourism and hospitality," *Ann. Tour. Res.*, 2015, doi: 10.1016/j.annals.2015.05.006.
7. M. J. Dotson and E. M. Hyatt, "Major influence factors in children's consumer socialization," *J. Consum. Mark.*, 2005, doi: 10.1108/07363760510576536.
8. H. Pechlaner and D. Abfalter, *International Cultural Tourism*. 2005.
9. C. Moorman and E. Matulich, "A model of consumers' health information behaviors: The role of health motivation and health ability," *J. Consum. Res.*, 1993.
10. ICOMOS, "Managing Tourism at Places of Heritage Significance," *International Council on Mounuments and Sites*, 1999. .

## BLOCKCHAIN IN HEALTHCARE: THE CURRENT SITUATION AND CHALLENGES

Vipin Jain\*

\*Professor,  
Department of Finance & Marketing,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id-vipin555@rediffmail.com

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### ABSTRACT

*The lack of traceability of transactions and the complicated network of middlemen in healthcare cause a slew of issues. To name a few: healthcare data is scattered across multiple silos, adversely impacting research and services; about half of clinical trials are never published; the cost of drug development continues to rise; and counterfeit and inferior medications remain a major issue. Because it offers trust without middlemen, has traceability as a default feature, and promises new business models by allowing innovative incentive structures, blockchain has the potential to address these issues. Blockchain has sparked a lot of interest in the healthcare sector because of its potential. We examine key application cases of blockchain in healthcare, including patient data management, pharmaceutical research, medical supply chain management, prescription administration, billing claims management, analytics, and telemedicine, as well as associated initiatives, in this paper. We discovered that the majority of blockchain initiatives are just white papers, proof of ideas, or products with a small user base. However, we saw an increase in the number, quality, and maturity of the initiatives. We also go through the technological, regulatory, and commercial barriers to blockchain implementation in the healthcare sector.*

**KEYWORDS:** *Analytics, Blockchain, Data Management, Healthcare, Supply Chain, Traceability, Trust.*

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### 5. INTRODUCTION

The healthcare sector is one of the biggest in the world, accounting for more than 10% of the gross domestic product (GDP) of the most developed countries [1]. Simply stated, this sector is concerned with the generalization and commercialization of products and services for the treatment of patients who need curative, preventative, rehabilitative, or palliative care. Patient data is extremely fragmented, and the cost of healthcare delivery is always increasing due to inefficiencies in the system and reliance on many middlemen, since it is a complex system of linked organizations operating under strict regulatory limits. Furthermore, while being ostensibly

helpful to the patient, transparency and control over the whole process of allowing data exchange between various stakeholders is still missing from the patient's perspective. Patients have expressed worry about their data being exploited by for-profit companies. This has highlighted the need for an information technology system that can reduce costs by eliminating intermediaries while preserving trust and openness. The blockchain is a game-changing technology that can help solve healthcare's problems by establishing decentralized trust. Decentralization facilitated by blockchain technology has the potential to reduce the issue of vendor lock-in that has plagued the healthcare sector.

Patient data is dispersed among various organizations in the healthcare value chain, referred to as data silos, and data exchange is subject to a multi-level permission management procedure [2]. As a result, critical data is often unavailable and inaccessible when it is required. By acting as the foundation for a trustworthy decentralized database, blockchain may address this problem with health information exchange (HIE). It may offer a single point of access to a patient's complete medical history across all healthcare providers. Patients have control over their data thanks to an access control system based on blockchain trust; they may give permission and access privileges to external parties such as researchers to have access to all or a portion of their medical information. This characteristic is well-suited to the patient-centered healthcare paradigm, in which blockchain may serve as a catalyst for building trust. The blockchain records are immutable, meaning they can't be changed or erased. This feature of blockchain offers primitives such as data integrity and provenance, which may be utilized to develop solutions to combat medication counterfeiting and medical fraud [3]. For example, by ensuring data integrity in blockchain, false findings and data removal in clinical studies that do not match with researcher bias or funding source may be avoided. It also provides for the permanent recording of a subject's permission in a clinical study. In terms of money, blockchain may save the pharmaceutical sector hundreds of billions by establishing a chain-of-custody in the supply chain.

## **5.1. Blockchain:**

Blockchain is the technology that underpins Bitcoin, an open peer-to-peer (P2P) value transfer network that, for the first time, solves the issue of double spending [4]. Cryptocurrencies became the first use case of the blockchain with the introduction of Bitcoin. Cryptocurrencies are similar to fiat money like the USD or EUR in that they allow for the exchange of value, but they are governed by cryptographic protocols rather than relying on a central authority like banks. In recent years, there has been a growing understanding that blockchain technology has much more to offer than cryptocurrencies; blockchain technology may be an excellent tool for developing trust-based solutions.

### **5.1.1. Consensus:**

In a blockchain network, consensus is the method for agreeing on a shared version or state of the blockchain, which is regarded as the blockchain's trustworthy truth. The consensus mechanism prohibits double spending since attempting to double spend an already spent transaction conflicts with the current state, resulting in the transaction being rejected and never being added to the chain [5]. In the event of network partitions, a consensus protocol contains rules for transaction validation, admitting newly generated blocks into the chain, and selecting a fork/partition. The



need and need for consensus may vary depending on the environment and use case. Global and local consensus mechanisms are two types of consensus mechanisms.

### **5.1.2. Smart Contracts:**

A smart contract is a self-executing, self-verifying, and tamper-resistant piece of code that lives and runs on the blockchain and has programmable application logic. It formalizes the blockchain's transaction rules and relationships between entities and assets, as well as the ability to create bespoke application logic that becomes a law enforced by the blockchain itself, without the need for trusted intermediaries [6]. In the application layer, smart contracts serve as the foundation for trust.

## **5.2. Types of Blockchain:**

Depending on the permission level, blockchain may be public or private, however we categorize it into three degrees of granularity here.

### **5.2.1. Public Blockchain:**

Anyone may simply participate in and verify transactions on a public blockchain since it is permission less. The transactions are open to the public and are anonymous or pseudonymous. Because the blockchain is run by the public, it has the greatest degree of decentralized trust. The first public blockchain was Bitcoin. Public blockchains include Bitcoin, Ethereum, Waves, Dash, and Bitshares, to name a few.

### **5.2.2. Federated Blockchain:**

A federated blockchain is a permissioned blockchain that operates under the supervision of a consortium. The consensus is controlled by predefined consortium nodes. The transactions may or may not be open to the general public. R3 Corda, EWF (Energy), and B3i are among examples (Insurance).

### **5.2.3. Private Blockchain:**

A private blockchain is a permissioned blockchain that is governed by a single entity. Internally verified transactions may or may not be publicly accessible. Private blockchains often have shorter block times and can handle more transactions per second. These, however, are susceptible to security breaches. The utility of a private blockchain may be thought of as a trust transformer, in which trust is based on an algorithm rather than an authority. Private Blockchains include Monax, HyperLedger with Sawtooth, and private Ethereum.

## **6. LITERATURE REVIEW**

An examination of state-of-the-art blockchain research in the area of healthcare is performed by Marko et al. in a systematic review [7]. The goal is to showcase the technology's potential uses as well as the difficulties and future directions of blockchain research in healthcare. The paper begins with a discussion of background material, followed by an explanation of the precise technique utilized in this research. The findings are then analyzed, with a bibliometric overview, an analysis of the collected data and its characteristics, and the results of a literature quality evaluation included. Finally, there is a discussion of the analyses' findings. According to the results, blockchain technology research in healthcare is growing, and it is mostly utilized for data exchange, health record management, and access control. Other possibilities are very



uncommon. The majority of research focuses on providing new structural designs as frameworks, structures, or models. Findings also indicate that most of the examined papers do not include technical information regarding the utilized blockchain components, and that most study does not provide any prototype implementation or implementation details. Even with a prototype implementation, no information regarding blockchain components is often provided.

Zhang et al. examine the present state of blockchain technology and how it could be used to address existing healthcare system problems [8]. They looked at blockchain technology from a variety of angles when it came to healthcare data, such as privacy, security, control, and storage. They discussed existing blockchain initiatives and research in the area of healthcare records, as well as the design and building of future generations of blockchain-based healthcare systems. How to share medical data with additional stakeholders for different reasons without compromising data privacy and integrity is a challenge that healthcare record systems across the globe are grappling with. The underlying technology that keeps the Bitcoin transaction record up to date is blockchain, which operates in a consensus mode. Blockchain is gaining traction in the healthcare industry as a potential solution for transaction management. Blockchain technology offers the ability to handle patient health data securely, discreetly, and completely.

## **7. DISCUSSION**

### **7.1. Healthcare Data Management:**

The management of healthcare data, which includes data storage, access control, and exchange, is a critical component of the business. By enabling comprehensive perspectives of patients, customized therapies, and effective communication, proper data management enhances healthcare results. It is also necessary for running the healthcare sector in a cost-effective and efficient manner. However, owing to the sensitive nature of healthcare data and the resulting trust problems, maintaining it is a difficult job. It's also one of the major reasons why the healthcare system is fragmented—healthcare data and services are scattered across numerous silos in different formats [9]. This disjointed structure is to blame for a slew of healthcare inefficiencies and is a significant roadblock for medical research. Healthcare practitioners seldom have access to all of a patient's data, which makes it difficult to diagnose and treat them; and researchers struggle to locate the data they need for their studies, which slows down healthcare research.

Blockchain technology may make it possible to share healthcare data more efficiently while maintaining data integrity and preserving patient privacy. With the appropriate mix of technologies, a secure, efficient, cost-effective, and interoperable HIE may be created. Furthermore, the use of blockchain may accelerate the transition to a patient-centric healthcare paradigm in which individuals have ownership over their medical data. In both patient-centric and conventional approaches, the main barriers to data sharing are a lack of trust and incentives to contribute. By serving as a trust layer and providing incentive mechanisms such as awarding crypto tokens for sharing data, blockchain technology may address both issues. Furthermore, blockchain can serve as a link between medical device data and the healthcare internet of things; the healthcare and lifestyle data collected by wearable devices can be crucial for accurate diagnosis, but they are underutilized due to a lack of a proper way for a physician to access the data.

### **7.2. Pharmaceutical Sector:**

Clinical treatment and healthcare delivery rely heavily on pharmaceutical supply. In this part, we look at different new pharmaceutical applications and efforts, spanning the whole range from drug development and clinical trials for market introduction to solutions at the end of the chain such as counterfeit medicine detection and patient adherence to treatment [10]. Any pharmaceutical company's operations are burdened by the costs of drug development and research. With rising healthcare expenses and a desire to develop quicker on new medical treatments, it is critical that various pharmaceutical firms find a competitive way to cooperate. The technical platform of blockchain may be able to allow the transmission of trustworthy information and knowledge among numerous parties. One suitable proposal for the cooperation is the use of blockchain for strong digital verification of Intellectual Property (IP) via immutable recordings and time-stamping. Clinical and trial data may potentially be shared competitively via blockchain-based technologies. Even in non-collaborative research and drug development scenarios, blockchain may help monitor and manage different elements of clinical trials, such as data management, consent management, and medication side-effect tracking, among other things. It's also fairly unusual for a pharmaceutical research firm to outsource clinical research tasks. In this scenario, blockchain could be a viable option for ensuring data integrity and appropriate result validation.

### **7.3. Telemedicine:**

Another area of healthcare that may benefit from blockchain technology is telemedicine, which would provide a layer of trust between patients and healthcare providers. A blockchain-based telemedicine network can verify professional identity and data integrity, guarantee transparency and traceability, and encourage participants to behave ethically by using incentive measures like reputation ratings and crypto tokens. In the future, the development of such platforms may result in the creation of a global healthcare marketplace that successfully balances the global supply and demand of healthcare resources and requirements. Furthermore, provided AI models are adequately verified, controlled, and their performance is constantly measured by some proxy metrics, such a network may include software services such as Artificial Intelligence (AI).

The remote diagnostic services are expected to be at the forefront of blockchain usage in telemedicine. Diagnostic services based entirely on quantitative and qualitative interpretation of medical data in the absence of a patient are anticipated to be the first to effectively integrate blockchain technology. This expectation is backed up by a high number of startups in the region. Many of these companies are aiming for services like dermatology, where the diagnosis of a medical problem is dependent on the interpretation of patient-generated imaging data. We discovered an exceptionally high number of projects focused on skin pictures, most likely owing to its strong connection with the beauty sector, as well as the other factors stated.

### **7.4. Challenges:**

Although blockchain has enormous potential to enhance and add value to the healthcare system, and many businesses have already begun testing it for particular use cases, there are a number of obstacles to overcome before it becomes widely used. The obstacles to the widespread adoption of blockchain technology are multi-faceted. These aspects include, for example:

- Business
- Legal

- Technical
- Trust issues

The healthcare industry contains a diverse range of technology, equipment, and components, not to mention people, all of which work together to meet the space's present requirements. There are many areas in which improvements may be made, and blockchain technology has the potential to fill some of these gaps. However, blockchain technology would only be one element of the jigsaw, although a very important one. The blockchain technology must integrate effectively with current systems, and this will be a difficult task for a variety of reasons, including compatibility. It's made much more challenging by the fact that the healthcare industry includes a diverse range of equipment and device kinds. To make blockchain technology more widely used in healthcare, all relevant parties and stakeholders should work together. If blockchain cannot act as a catalyst for this collaboration among stakeholders and relevant parties, it is unlikely to have much value beyond being a simple and helpful solution for resolving certain trust problems. Regardless of the blockchain, many of the other problems around ecosystem development will persist. The training of healthcare IT professionals is also an essential element of this debate. If blockchain technology enters the healthcare sector, these employees may need to be retrained on blockchain technology.

## 8. CONCLUSION

Blockchain technology has the potential to address a number of issues that are now affecting the healthcare sector. It may allow innovative healthcare solutions as a trust mediator, and it can enable novel business models as an incentive machine, which might lead to a new dynamic among different healthcare stakeholders such as patients and providers. For example, blockchain-enabled decentralized trust and incentive systems may allow a patient-centric healthcare paradigm and a worldwide HIE. Similarly, blockchain-based decentralized networks and services in healthcare may reduce vendor lock-in issues.

In this paper, we looked at some of the most common blockchain applications, including healthcare data management, pharmaceutical supply chain management, medication adherence, billing/claims administration, analytics, and more. There were other examples of companies creating blockchain-based solutions for various use cases. The suggested applications include anything from moonshot initiatives attempting to create a fully decentralized health-care ecosystem to specialized applications like as data provenance, counterfeit medication detection, consent management, and so on. Despite the tremendous promise of blockchain technology and the enormous attention it has generated, we discovered that its effect on healthcare is minor and still in its early stages. The majority of blockchain-based healthcare solutions are currently in the form of concept whitepapers, prototypes, or a small number of functioning products with a tiny user base. However, the sector is quickly developing, and we expect blockchain to have a major beneficial effect on healthcare in the future. To enable blockchain make an impact in the healthcare sector, issues including interoperability, integration with current systems, cost uncertainty, technical and acceptance barriers, regulatory compliance, and scalability must be effectively addressed.

**REFERENCES:**

1. K. H. Abegaz and A. A. Mohammed, "Healthcare expenditure and GDP in Ethiopia from 1995 to 2014: A time-series analysis," *Agric. Food Secur.*, 2018, doi: 10.1186/s40066-018-0199-8.
2. M. Wibowo, S. Sulaiman, and S. M. Shamsuddin, "Machine learning in data lake for combining data silos," 2017, doi: 10.1007/978-3-319-61845-6\_30.
3. B. Bennett, "Blockchain HIE Overview: A Framework for Healthcare Interoperability," *Telehealth Med. Today*, 2018, doi: 10.30953/tmt.v2.14.
4. Y. He, H. Li, X. Cheng, Y. Liu, C. Yang, and L. Sun, "A Blockchain Based Truthful Incentive Mechanism for Distributed P2P Applications," *IEEE Access*, 2018, doi: 10.1109/ACCESS.2018.2821705.
5. S. Gupta, P. Lauppe, S. Ravishankar, and J. Feigenbaum, "Fedcoin - A Blockchain-Backed Central Bank Cryptocurrency," *Yale Univ.*, 2017.
6. A. M. Rozario and M. A. Vasarhelyi, "Auditing with smart contracts," *Int. J. Digit. Account. Res.*, 2018, doi: 10.4192/1577-8517-v18\_1.
7. M. Hölbl, M. Kompara, A. Kamišalić, and L. N. Zlatolas, "A systematic review of the use of blockchain in healthcare," *Symmetry (Basel)*, 2018, doi: 10.3390/sym10100470.
8. M. Zhang and Y. Ji, "Blockchain for healthcare records: A data perspective," *PeerJ*, 2018, doi: 10.7287/peerj.preprints.26942.
9. A. Dubovitskaya, Z. Xu, S. Ryu, M. Schumacher, and F. Wang, "Secure and Trustable Electronic Medical Records Sharing using Blockchain," *AMIA ... Annu. Symp. proceedings. AMIA Symp.*, 2017.
10. L. N. Chavali, N. L. Prashanti, K. Sujatha, G. Rajasheker, and P. B. Kavi Kishor, "The emergence of blockchain technology and its impact in biotechnology, pharmacy and life sciences," *Curr. Trends Biotechnol. Pharm.*, 2018.

## THE CLASSICAL APPROACH TO LEARNING A FOREIGN LANGUAGE

**Najmutdinova Gulnoza Bakhtiyarovna\***

\*Teacher,  
Department of Practical Aspects of English,  
Uzbek State World Languages University,  
Tashkent City, UZBEKISTAN  
Email id: n.scienceofworld@gmail.com

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### ABSTRACT

*In this article highlights of the classical approach to learning a foreign language. The classical approach is based on the understanding of language as a real and full-fledged means of communication, which means that all language components - oral and written speech, listening, etc. In connection with the above, the classical approach to learning a foreign language has also been somewhat transformed, but the unshakable principles of the "classics" of domestic language techniques have been preserved. Sometimes they are actively used in schools of other methodological directions. The classical course is aimed at students of different ages and most often involves learning the language "from scratch". The tasks of the teacher include traditional, but important aspects of pronunciation, the formation of a grammatical base, the elimination of psychological and language barriers that hinder communication.*

**KEYWORDS:** *Classical Approach, Foreign Language, Education, Quality, Effectiveness, English.*

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### INTRODUCTION

In connection with the above, the classical approach to learning a foreign language has also been somewhat transformed, but the unshakable principles of the "classics" of domestic language techniques have been preserved. Sometimes they are actively used in schools of other methodological directions. The classical course is aimed at students of different ages and most often involves learning the language "from scratch". The tasks of the teacher include traditional, but important aspects of pronunciation, the formation of a grammatical base, the elimination of psychological and language barriers that hinder communication. The classics have not changed the goals, but the methods due to the new approach are already different. [1]

The classical approach is based on the understanding of language as a real and full-fledged means of communication, which means that all language components - oral and written speech, listening, etc. - it is necessary to develop students systematically and harmoniously. The classical method partly turns language into an end in itself, but this cannot be considered a disadvantage. Such an integrated approach is primarily aimed at developing students' ability to understand and create speech. The methodology involves classes with Russian teachers, but this order, although not quite "fashionable", cannot be considered a minus: a teacher who is not a native speaker has the opportunity to analyze and compare two language systems, compare constructions, better

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convey information, explain grammatical rules, and prevent possible errors. The general fascination with foreign specialists is a temporary phenomenon, because the Western world has appreciated the priority of bilingualism (bilingualism). The greatest value in the modern world is represented by teachers who are able to think in the context of two cultures and convey to students the appropriate set of knowledge. [2]

The first line in the popularity rating of methods is actively held by the communicative approach, which, as its name implies, is aimed at the practice of communication. This technique works perfectly in Europe and the USA. [3]

The communicative technique, as its name already implies, is aimed precisely at the possibility of communication. Of the four "whales" that support any language training (reading, writing, speaking and listening to speech), special attention is paid to the last two. You will not hear particularly complex syntactic constructions or serious vocabulary in the classroom. The oral speech of any literate person is quite different from the written one. Try to take care of yourself during the day: have you used a lot of long sentences, constructions in the subjunctive mood? Unfortunately, the epistolary genre is a thing of the past, and if our descendants judge us only on the basis of e-mail and other "monuments" of online literature, then their opinion is unlikely to be flattering. [4]

However, it would be a mistake to think that the communicative method is intended only for light small talk. Anyone who wants to be a professional in a particular field regularly reads publications on their subject in foreign publications. Having a large vocabulary, he easily navigates the text, but it costs him enormous efforts to maintain a conversation with a foreign colleague on the same topic. The communicative method is designed primarily to remove the fear of communication. A person armed with a standard set of grammatical constructions and a vocabulary of 600-1000 words will easily find a common language in an unfamiliar country. However, there is also a flip side of the coin: cliched phrases and a poor vocabulary. Add to this a lot of grammatical errors and you will understand that the only way not to be considered, to put it mildly, an unintelligent interlocutor is increased attention to partners, knowledge of etiquette and a constant desire to improve. Those who study by the communicative method are the "light cavalry". They prance under the walls of the fortress, make swift attacks and want to tear down the flag, not noticing how beautiful the besieged citadel is. [5]

Do not lose sight of the fact that another clear gradation of methods of teaching English has the form "our - foreign". There are not so many foreign ones. If we discard American English and the TOEFL test as a kind of indicator of the results of language learning, then there are two monopolists in the field of teaching British English - Oxford and Cambridge. Both these university centers and other educational institutions work with certain publishers, therefore, for example, a textbook developed in Birmingham or Lids can be offered under one brand or another. Both publishers strive to preserve their prestige, so there is no doubt that world-class products are coming to the Russian market. Their mutual competition is the key to quality. [6]

The Oxford and Cambridge approaches to language are united by the fact that most courses are based on a communicative methodology integrated with some traditional teaching elements. It assumes maximum immersion of the student in the language process, which is achieved by minimizing the student's appeal to the native language. The main purpose of this technique is to teach the student to speak the language fluently first, and then to think in it. It is also important



that mechanical reproducing exercises are also absent - their place is taken by game situations, work with a partner, tasks for finding errors, comparisons and comparisons that connect not only memory, but also logic, the ability to think analytically and figuratively. Often textbooks contain excerpts from the English-English dictionary - it is English-English, and not English-Russian, French, Italian, etc. The whole complex of techniques helps to create an English-speaking environment in which students should "function": read, communicate, participate in role-playing games, express their thoughts, draw conclusions. Oxford and Cambridge courses are focused on the development of not only language knowledge, but also creativity and the general outlook of the student. The language is very tight is intertwined with knowledge of the cultural characteristics of the country, therefore, the courses certainly include a country-specific aspect. The British consider it necessary to give a person the opportunity to easily navigate the multicultural world, and this is easily done with the help of such a powerful unifying factor as English. We have not yet overcome isolation enough to understand the importance and inevitable necessity of this aspect. For Britain, for all its legendary traditionalism, globalization is by no means an empty phrase, but a serious problem that they are trying to find a solution to right now. [7]

If we return to the problem of course organization, then this can easily be done using the example of the textbook "Headway", which occupies one of the leading places in the ratings of our courses. This is a course (or English learning system) specially developed by London methodologists John and Liz Soars for young people and adults. Each of the five levels (Elementary, PreIntermediate, Intermediate, Upper-Intermediate) has its own methodological kit, which includes a textbook, a book for students and teachers, audio cassettes, and can be mastered within about 120 academic hours. Since Liz Soars has extensive experience as an examiner when passing "The Cambridge RSA Dip TEFL", at the end of studying any level of the course, a student can try to pass the certification exam and get a certificate. [8]

Each lesson consists of several sections. The first one is usually devoted to the development of conversational skills (for example, the fact-file of a famous person is being discussed) and the analysis of some grammatical constructions, the performance of a written task on the practice of communication, discussion of certain topics, the practice of composing dialogues based on suggested hints, listening to audio cassettes, as well as fixing and repeating the material passed in previous classes. The second one is aimed at developing language skills (skills development) - "honing" the vocabulary by performing oral and written exercises. This is followed by working with the text (the presentation typical of English textbooks is small numbered paragraphs), and reading is also diverse (scan reading, reading for gist, summary reading, etc.). Work on the text is usually preceded by classes in pairs, answers to questions, filling in tables. All this orients the student well to the perception of subsequent information, stimulates interest in reading. The lesson usually ends with an audio part, which is also preceded by various exercises that make it easier to perceive new material. A distinctive feature of the Headway course is the study of grammar at two levels: first in the context of the lesson, and then more fully in the student's workbook (self-study and revision exercises). It is also summarized at the end of the textbook in a special appendix. The kit also includes the book "Headway Pronunciation", which allows you to practice both the pronunciation of words and intonation - an equally important aspect of the language palette. [9]

So, if we summarize, or, to put it in English, make a summary, British methods have a number of distinctive features. Most of them are developed based on the integration of traditional and modern teaching methods. Differentiation by age groups and a multi-level approach make it possible to develop an individual human personality, affect its worldview, value system, self-identification, and ability to think. Simply put, the individual approach, which is now popular, is put at the forefront. All British methods, without exception, are aimed at developing four language skills: reading, writing, speaking and listening.]

At the same time, great emphasis is placed on the use of audio, video and interactive resources. Due to the variety of methodological techniques, among which language technologies occupy one of the leading places, British courses contribute to the formation of skills necessary for a person in modern business life (the ability to make a report, make presentations, conduct correspondence, etc.). The indisputable "advantages" of British developers are the preparation of a course based on authentic material, great attention to stylistics, the desire to teach "situational" and "live" English through "life" examples of semi-real characters. Some (but not all) methods are distinguished by a good systematization of the material. Perhaps British methods are the best option for those who want to study "real English" or pursue a narrowly specific goal of linguistic training.

A high degree of templating allows for an intensive pace of lyric - this language consists of 25% of cliches. By memorizing and practicing a certain range of "stable expressions", you will, in principle, be able to explain yourself and understand the interlocutor. Of course, those who choose intensive will not be able to enjoy reading Byron in the original, but the goals of this course are completely different. The intensive method is aimed at the formation of "expressive speech behavior", therefore it often has a linguistic character. In good courses, you will most likely be provided with the opportunity for unlimited communication and maximum realization of potential, and your needs will fall into the "focus" of the course. Each student will be able to feel like a person, and the teaching methods will most likely be dialogical communication and trainings.

## REFERENCES:

1. Farxodjonova, NF. Modernization of Uzbek Language and National-Spiritual Heritage in National Culture. *The American Journal of Social Science and Education Innovations*. 2021; 585-594.
2. Farxodjonova NF. Formation of National Idea through Factors of National Culture. *Problemy i perspektivy*,. 2020. Pp.3-6.
3. Farxodjonova NF. Pulatov A. Modern Methods of Increasing Student Interest in Social Sciences. *Jekonomika i socium*. 2019;(4):38-40.
4. Sodirjonov MM. Education as the Most Important Factor of Human Capital Development. *Theoretical & Applied Science*, 2020;(4):901-905.
5. Farxodjonova NF, Abdurahimov VA. Modern Technologies of Students Training In Higher Education. *Nauka i tehnika. Mirovye issledovanija*. 2020. pp. 5-7.
6. Farxodjonova NF. Relation to National Culture in the Condition Spiritual Renew of Society in the Republic of Uzbekistan. *Mirovaja nauka*, 2018;(6):14-17.

7. Numonjonov SD. Innovative methods of professional training. ISJ Theoretical & Applied Science, 2020;01 (81):747-750.
8. Farxodjonova NF. Modernization and Integration: Social-Philosophical Analysis. 2019.
9. Leontiev A. Language, Speech, Speech Activity. M.: Education, 1969. 214p.

## REAL-WORLD APPLICATIONS AND CHALLENGES OF BLOCKCHAIN

**Dr Vinay Kumar Mishra\***

\*Associate Professor,  
Department of Computer Science, Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- vinaym.computers@tmu.ac.in

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### ABSTRACT

*Blockchain is the newest technology in the realm of internet of things, social media, and cloud computing. Blockchain technology has progressed from an immutable record of cryptocurrency transactions to a programmable interactive environment for developing distributed, dependable apps. The rapid growth of blockchain, as well as its widely accepted uses, has established it as a force to be reckoned with. However, blockchain's use is not restricted to bitcoin or cryptocurrencies. This study expands on the blockchain's stipulations beyond bitcoin. Based on a literature analysis, this paper also provides insights on blockchain technology ideas, evolution, processes, and difficulties. The difficulties or obstacles in using blockchain technology in real-world applications were highlighted in this study. The main issue that has to be solved is the secure deployment of blockchain technology on small size applications. The suggested consensus method would be beneficial for securing blockchain deployment on small-scale applications or projects.*

**KEYWORDS:** *Bitcoin, Blockchain Technology, Lightning Network, Peer-To-Peer, Proof-Of-Stake, Smart Contracts.*

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### 9. INTRODUCTION

A blockchain, as the name implies, is a single linked-list of blocks, each of which includes many transactions or other types of data[1]. It offers a decentralized, unchangeable form of data that can be utilized across a network of users; it may also be used to generate assets and serve as a shared book of records for all transactions. Each piece of data is readily accessible, allowing for increased openness and confidence among all parties involved.

The goal of blockchain technology is to provide a decentralized solution that does not need the use of a third party to complete a transaction. Blockchain has proved to be a more than sufficient answer to a wide range of problems, including:

- Digital asset registration e.g., coins of bitcoin.
- Sharing of inter-organizational data.
- Integrity and identity management e.g., cryptographic information.

The blockchain protocol is a peer-to-peer (P2P) network of computers that runs on top of the internet [2]. Every user has an identical copy of the transaction ledger. Using machine consensus to enable P2P value offers us the ability to share information without the need for an intermediary. Blockchain is nothing more than a file saved on your computer that is broadcasted to other users on the network for information sharing and to provide the most recent data update. The blockchain method guarantees integrity and security since it is based on a distributed consensus system, which means that it will function if everyone agrees.

There are three major kinds of blockchain, which are as follows:

**i. Public Blockchain:**

This kind of blockchain application allows anybody to join the network, such as bitcoin and ICO networks [3]. The network is open to anybody with an internet connection. Furthermore, the user may engage in the job execution by either authorizing transactions (mining) or doing transactions as a basic user.

**ii. Private Blockchain:**

Permissions are required to use a private blockchain. A single user cannot join the network without first receiving an invitation from the network [4]. The invitation method may be implemented by a check of set of criteria to be fulfilled before a user can join under user authentication, access control, privileges. This kind of blockchain may be thought of as a medium ground for businesses interested in incorporating blockchain technology into their infrastructures. Banks, real estate companies, and file distribution networks are just a few examples. Multichain, Walmart, and FedEx are all instances of this kind of blockchain. These apps utilize a private blockchain implementation to safely distribute data throughout their network without allowing public users to meddle.

**iii. Consortium Blockchain:**

A consortium blockchain is a semi-decentralized data structure. Same as permissioned blockchain it is likewise under the control of a single entity. The nodes are dispersed across the network and may serve as a consensus mechanism for any new data or blocks that are processed [5]. The bitcoin file size surpassed 20GB in August 2014, including transaction data. Between January 2016 and January 2017, the file size was raised from 50 to 100 GB. In 2014, a new name, blockchain 2.0, was used to represent the second version of blockchain, which enabled programmable contracts and addressed numerous scalability problems.

The remainder of the paper is laid out as follows. The literature on blockchain technology and bitcoin is discussed in Section 2. Section 3 covers the blockchain technology problems that must be addressed, as well as a few solutions that may assist in addressing the main challenges of blockchain applications. Finally, section 4 brings the paper to a close.

## 10. LITERATURE REVIEW

Christodoulou et al. describe a real-world smart contract application in the logistics sector [6]. The suggested dApp, which allows users to ship and monitor goods, is a real example of how Blockchain may be used in logistics. The potential advantages of using Blockchain for Logistics are investigated using a prototype smart contract. The suggested decentralized application highlights the many architectural difficulties that programmers are expected to encounter while

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putting the app together. The suggested approach employs the usage of a specialized smart contract that was created based on a special-purpose structure to meet the use case needs. The assessment was based on evaluating the gas prices and execution time for each of the functions. The prototype design was implemented and tested on a real-world Blockchain framework, and it can be regarded a first answer for how Blockchain technology may be used in Logistics to overcome any professional obstacles.

Notheisen et al. use design science research to facilitate the deployment of a blockchain-based proof-of-concept technology demonstrator that enables the automated transaction of real-world assets like cars and provides market participants, authorities, and other third parties with a valid, transparent, and immutable record of vehicle history [7]. This study contributes to current research in three ways: First, it has a built-in method to mitigate transaction risk in blockchain-based systems due to transaction irreversibility. Second, it substitutes a centralized, trust-based, and bureaucratic register with a tamper-proof, self-contained transactional database system that includes a secure registration and transaction procedure. Third, it offers a new method for mitigating unfavorable selection effects in lemon markets by giving a full, trustworthy, and transparent history of each tradable item. Overall, the results in this paper show the promise of blockchain-based systems while also pointing out technical flaws and difficulties for commercial applications, such as scalability and privacy concerns.

## **11. DISCUSSION**

### **11.1. Blockchain Challenges:**

Smart contracts and smart property are two of the many aspects of blockchain technology [8]. Blockchain may be utilized in a wide range of organizations due to its features and decentralized nature, including private securities, insurance, internet finance, internet of things, decentralized data storage, notary papers, anti-counterfeit solutions, and so on. This study has identified the following existential difficulties in the application of blockchain technology:

#### **11.1.1. Implementation of Blockchain on Small-scale Applications:**

The security and integrity of the blocks were not an issue when it came to blockchain applications on cryptocurrencies that were deployed on a bigger scale. Because the attacker would have to equal the entire network's mining power. Furthermore, attackers must compute the hashes of all the child blocks from which the block is modified, which is thought to be very difficult. According to a recent research, bitcoin's overall mining hash rate was almost 33 million TH/sec at the time of the survey. For any attacker, that is almost difficult to catch.

According to our literature review on blockchain implementation, the researcher has discovered that blockchain technology is difficult to secure deploy on small-scale applications. When the network's hash rate is low, it's simple for an attacker to mine a malicious block since the attacker can equal the network's total mining power.

#### **11.1.2. Scalability Implications on Blockchain:**

Regarding bitcoin's blockchain problems, where the average block delay was 10 minutes. The bitcoin network could only process 7 transactions per second due to the block generation time restriction [9]. The majority of other transactions were kept in limbo until the next block was mined. Currently, the bitcoin network processes 10 million transactions each month, with the



majority of them being kept in pending status. The majority of transactions, on the other hand, may take up to half an hour or more.

Furthermore, the coin supply limit based on inflation began to pose a threat to the cryptocurrency's sustainability. As a result of Satoshi Nakamoto's initial 21-million-coin limit, there will be no more coins to be produced. This had an impact on the miners that verified the transaction in return for a reward for creating the block. Miners will only get incentive in the form of transactional payments once this limit has been reached, which will be paid by the users who are performing the transactions. This restriction was established so that the network could be held in control, similar to how banks can't produce as much money as they like, however it has had a huge effect on economics' "Demand and Supply" rule. Because of the limited amount of bitcoins accessible to the public, the value of the crypto-currency has been exaggerated; at the time of writing this paper, one bitcoin (BTC) is worth almost \$7500 USD.

## **11.2. Few Solutions:**

This part of the paper shows various approaches and techniques for dealing with the issues raised by this review in the implementation of blockchain in real-time applications, as follows:

### **11.2.1. Block Maturity Level Mechanism to Address Small-scale Projects:**

Concerning the application of blockchain technology in small-scale initiatives. Due to security concerns, using blockchain technology on a small size project may be hazardous. The security problems arise owing to the nature of the blockchain consensus process, which is that if a network has fewer nodes, it is simpler to manipulate. This paper proposes a consensus method termed block maturity level to address the stated issue (BML). The proposed BML method marks the tiny block as "pending," but the miners will approve all transactions inside it. Once 6 to 8 new blocks have been prematurely mined, the status of that block will be changed from "pending" to "approved". Once at least 6 additional blocks have been prematurely mined, the block will be put to the blockchain. The BML method operates in the same way that a transaction is kept pending until a block is mined to add it in the ledger. By simply mirroring the total network hash power, the proposed BML method would help ensure that an attacker cannot deliberately alter the blockchain. Currently, the final block on the blockchain is the most susceptible to attack and can be readily modified by attackers; all an attacker has to do is add a new block and recalculate its hash, but the proposed BML method would significantly decrease the danger of any such change. Because the attacker will have to compute all subsequent child blocks, the attacker or any hostile intruder in the network will have a difficulty. Furthermore, the BML method will guarantee that the validation of a blockchain is done with the least amount of risk possible, rather than relying only on the prior consensus algorithm. If an effort is made to nullify a blockchain that is being used in an institution, the "nonmatured" blocks may be utilized to identify data tampering or even invalidate malicious blocks that are being added by the attacker. One consequence of this approach is to utilize a high degree of maturity, since the longer blocks are kept waiting, the more passive and crowded the blockchain environment becomes.

### **11.2.2. Segwit & Lightning Network Mechanisms To Address Scalability Issues:**

Due to the blockchain's restriction of just 7 transactions per second, the bitcoin community has run into an issue with a large number of pending transactions. Tackling the problem of

blockchain scalability, which has been hanging over the blockchain community since its creation.

Based on a literature study, two novel methods have been identified as solutions to scalability issues: segregated witness (Segwit) and lightning network.

**iv. Segwit Mechanism:**

Segwit is a method for removing digital signature information from bitcoin transactions [10]. When some portions of a transaction's information are deleted, more room is available to add additional transactions to the ledger. Signatures are part of the input for a transaction block. A block's digital signature may occupy up to almost 60% of the block's total size. In contrast to the Merkle tree method, the adoption of segwit may be more advantageous since segwit removes the digital signature's hash and saves it as a witness on the blockchain. This method expands the block size and eliminates the issue of 'transaction malleability,' which is common in bitcoin blockchain implementations.

**v. Lightning Network:**

The off-chain method is also known as the lightning network. This method is used to improve the number of transactions that may be completed in a second while also reducing the burden on the main blockchain. The Lightning Network is a mechanism layer constructed on top of the blockchain that employs a payment channel method. A balance sheet is kept in the Payment channels. Both parties may utilize the balance sheet to conduct transactions depending on the balance it contains. It significantly lowers the strain on the main blockchain while significantly increasing transaction speed. Furthermore, unlike the Merkle tree, this method is more advantageous since signatures and transactions are not kept on the main blockchain. The payment channel operates alongside the main blockchain, allowing two or more parties to carry out numerous transactions without having to broadcast them to the whole network. When the payment channel is established, however, it generates a single balance sheet that includes both parties' deposited balances. This balance sheet is a digital ledger with digital signatures between two or more parties. The balance sheet is updated and signed whenever a user performs a transaction, and the payment channel may be stopped at any moment. To determine how money should be moved, the blockchain will consult the most recent copy of the balance sheet. Users may make hundreds of thousands of transactions using this technique without putting the majority of them on the main blockchain. Only two transactions will be recorded on the blockchain: one when a payment channel is established and another when it is terminated. Furthermore, it is not necessary to establish a payment channel for everyone to transact. Other payment channels may be utilized as a conduit between two parties, resulting in transactions that are quicker, cheaper, and more secure.

This paper provides a clear view on the usage of blockchain implementation in small-scale initiatives as a quick and safe data handling method. Users may build a network of safe and fast blockchains on smaller and larger network levels by combining all of the mechanisms discussed in this paper.

**12. CONCLUSION**

As a breakthrough technology, blockchain is bringing dramatic changes to our sectors, both private and public. The implications and applications of blockchain technology have been shown

in this paper in a number of situations. The characteristics apply not only to the immediate idea of cryptocurrencies and payments (Blockchain 1.0), or to contracts, property, and all financial markets (Blockchain 2.0), but also to the segments, with regard to consensus method implementation. Security and scalability problems are most likely a worry for the sectors. Government, health, research, literacy, art, and culture are all possible applications for blockchain technology. As is the case with every cutting-edge technology. However, when people's money are involved, it must be managed with great care in order to encourage growth for smarter and bigger ecosystems that may contain new technologies. The main difficulties encountered by the blockchain community in using blockchain in real-world applications have been highlighted in this paper. The scalability problem and the application of blockchain on small size projects are the two major difficulties highlighted by this study. One of the major issues raised in this paper is scalability. The scalability problem is addressed by Segwit and lightening methods. Another issue raised in this review paper is the security concerns associated with using blockchain technology in small-scale applications. The BML consensus method was addressed in this study to solve the security concerns that arise when deploying blockchain on a small size application.

Many real-world issues can be solved with blockchain technology. The supply-chain and logistics business is one of the most promising sectors. The method described in this research allows for application on both local and large scales, as well as at a higher network level. Despite the industry-wide effect that blockchain will have, most business organizations are still reluctant to integrate blockchain into their systems. With the help of the consensus method, the system's security and data management will be significantly improved. It will also provide a fresh perspective on the ramifications and use of blockchain technology in other fields.

## REFERENCES

1. H. Covington and Y. B. Choi, "Blockchain and Bitcoin," *Int. J. Cyber Res. Educ.*, 2018, doi: 10.4018/ijcre.2019010103.
2. Y. He, H. Li, X. Cheng, Y. Liu, C. Yang, and L. Sun, "A Blockchain Based Truthful Incentive Mechanism for Distributed P2P Applications," *IEEE Access*, 2018, doi: 10.1109/ACCESS.2018.2821705.
3. L. Carlozo, "What is blockchain? Here is a primer on the potentially transformative digital ledger technology," *J. Account.*, 2017.
4. Praveen Jayachandran, "The difference between public and private blockchain," *Ibm*, 2017.
5. J. Gu, B. Sun, X. Du, J. Wang, Y. Zhuang, and Z. Wang, "Consortium blockchain-based malware detection in mobile devices," *IEEE Access*, 2018, doi: 10.1109/ACCESS.2018.2805783.
6. P. Christodoulou, K. Christodoulou, and A. Andreou, "A decentralized application for logistics: Using blockchain in real-world applications," *Cyprus Rev.*, 2018.
7. B. Notheisen, J. B. Cholewa, and A. P. Shanmugam, "Trading Real-World Assets on

Blockchain,” *Bus. Inf. Syst. Eng.*, 2017, doi: 10.1007/s12599-017-0499-8.

8. A. Hahn, R. Singh, C. C. Liu, and S. Chen, “Smart contract-based campus demonstration of decentralized transactive energy auctions,” 2017, doi: 10.1109/ISGT.2017.8086092.
9. P. Yeoh, “Regulatory issues in blockchain technology,” *J. Financ. Regul. Compliance*, 2017, doi: 10.1108/JFRC-08-2016-0068.
10. Y. Ribero and D. Raissar, “Dagcoin whitepaper,” *Daft version 0.3*, 2018. .

## A NOVEL TWO-STAGE INTEGRATED MODEL FOR GREEN FRESH PRODUCT SUPPLIER SELECTION

**Anand Joshi\***

\*Assistant Professor,  
Department of Marketing & Finance,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [anandjoshi869@gmail.com](mailto:anandjoshi869@gmail.com)

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### ABSTRACT

*The selection of fresh product providers is a multi-criteria decision-making (MCDM) issue with substantial and practical implications. To demonstrate its ambiguity and uncertainty, trade-offs between several criteria are required. As a result, a new two-stage fuzzy integrated MCDM approach is used to find appropriate providers. Quality function development (QFD) constructs two collective relationship matrixes in the first stage, and relationships among customer requirements (CRs), corporate strategies (CSs), and selection criteria are examined individually in the two matrixes. The fuzzy best-worst method (BWM) is used to generate subjective criteria weights. The objective criterion weights are generated using Shannon's entropy technique in the second stage, and suppliers are ranked using fuzzy multi-objective optimization by ratio analysis plus the complete multiplicative form (MULTIMOORA). Finally, an application scenario is used to demonstrate the method's viability. These findings may aid businesses in improving their CSs and increasing their market competitiveness.*

**KEYWORDS:** *Green Supplier Selection; Trapezoidal Fuzzy Numbers (Trfns); Best-Worst Method (Bwm); Shannon Entropy; Green Product; Green Supplier.*

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### 1. INTRODUCTION

As the main focus of the supply chain (SC), the supplier's selection impacts the whole SC's cost management, reaction time, product quality, and efficiency, which in turn affects customer satisfaction and the SC's overall competitiveness. Choosing the right supplier may help you establish a long-term working relationship with them and boost client satisfaction. However, in its conventional sense, supply chain management (SCM) is primarily concerned with lowering the cost of SC. Companies can no longer disregard environmental issues if they wish to compete in the global market, as non-profit groups, governments, and individuals become more conscious of the need of environmental preservation. Sustainability 2018, 10, 2371 2 of 23 has risen to prominence and has been extensively addressed by a number of academics. GSCM is an SCM

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technique that focuses on delivering high-quality and environmentally friendly goods and services and is based on the idea of sustainable development and ecological preservation [4–7]. The foundation and precondition for creating a green SC, [1] which is an unavoidable option for attaining sustainable development, is choosing the right green supplier. Fuzzy techniques are utilized to choose suppliers because of the GSCM's uncertainty and information constraints [8]. At the same time, since there are qualitative and quantitative assessment criteria [9–11], an appropriate and highly adaptable supplier selection technique is critical.

To ensure the quality of fresh goods, the government has established a series of rules and regulations, as well as more rigorous standards for the manufacturing process of fresh product businesses. In order to fully actualize the GSCM, fresh product businesses must aggressively enhance product quality management and incorporate GSCM throughout the whole fresh product supply chain. Only a few studies have recently concentrated on supplier selection in the area of fresh food supply chains [16–21]. As a result, a new two-stage integrated fuzzy multi-criteria decision making (MCDM) approach for selecting green fresh food providers is suggested. The interrelationships between the supplier selection criteria may be taken into account using this approach. In practice, it may also assist businesses in identifying customer needs (CRs) and recognizing the benefits and drawbacks of their present stage. The suggested approach is developed in this article from a broad viewpoint. Specifically, the integrated attribute values (actual numbers and linguistic fuzzy variables coexist) are converted into trapezoidal fuzzy numbers in the first step (TrFNs). After that, quality function development transforms the CRs into business strategies (CSs) (QFD). The fuzzy best-worst approach is used to determine the weight of quantitative evaluation (BWM). The Shannon entropy technique is given in the second step to get qualitative evaluation. The complete multiplicative form (MULTIMOORA) technique is used to rank multi-objective optimization using ratio analysis. Finally, an application scenario is shown to demonstrate the method's implementation, availability, and practicality. In addition, comparative analysis and sensitivity analysis are used to verify the method's practicality and efficiency.

Scholars have recently focused their attention on supplier selection criteria and decision models, yielding a wealth of information. These studies [16,29–32] looked at many elements of supplier decision-making, with an emphasis on green themes and sustainability in SC management. A lot of study has previously been done on the trade-off between the weights of these criteria in order to find the best solution for particular issue variables and restrictions [2]. According to Dickson and Weber's [34] study on traditional supplier selection, certain factors (such as price, delivery time, manufacturing equipment, production capacity, and technical competence) are the most frequently utilized for selection. Scholars have raised several new issues in the literature on green supplier selection. According to , the environmental management system (EMS) is the most important criterion when compared to other related criteria. For assessing green suppliers, Akmanproposed a two-stage supply evaluation concept approach (economic criteria and green criteria).

Sarkis and Dhavale felt that supplier selection was critical to the success of long-term SC relationships, and developed a supplier evaluation and selection methodology based on the triple bottom line approach (TBL). From a green viewpoined the SCM and built an assessment system. A concept approach for determining how effectively sub-supplier management adheres to sustainability criteria has been suggested. Trapp and Sarkis presented a mathematical model



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that took into account problems such as supplier selection, development, and sustainability. We may infer from these research that green and sustainability criteria are being utilized more often.

In our study, we developed green supplier selection criteria based on seven factors: QA (quality adaptation), P (price), ENRC (energy and natural resource consumption), DS (delivery speed), GD (green design), RRR (reuse and recycling rate), and PP (pollution prevention) (production and planning). Suppliers were assessed using the specified criteria, as well as green supplier criteria. The suggested technique is used to assess and weight the weights of each criterion. A range of supplier selection techniques, ranging from single methods to integrated methods, have been created by a number of researchers. Because of their practicality and versatility, integrated approaches that combine two or more techniques have sparked increasing attention]. The following are the most common objective and subjective MCDM techniques of green supplier selection. The analytic hierarchy process (AHP) and analytic network process (ANP) are extensively used in research to determine the subjective significance coefficient of supplier assessment criteria. Some required pairwise comparisons should be conducted at the acceptable degree of precision for the aforementioned techniques, which involves constant user involvement and judgment.

Furthermore, to avoid compromising the consistency of human judgment, the number of suppliers criteria included in the comparison evaluation should be kept to a maximum of nine. Companies must consider CRs while setting objectives in order to successfully plan their goods and services and adapt to a market-oriented environment. QFD offers a variety of applications that may help businesses convert CRs into CSs and deliver competitive goods and services. The use of absolute priority to calculate the relative weights of CRs is, however, one of the main drawbacks of traditional QFD approaches. Sustainability 2018, 10, 2371 4 of 23 To address this flaw, the AHP and ANP have been combined with QFD to choose providers. However, a time-consuming pair comparison between components is still required. As a result, we'll explore merging QFD with fuzzy BWM to make pair wise comparisons less onerous. BWM is a subjective technique that Rezaei invented to assess the priority of a standard. BWM offers a number of important benefits. One option is to offer a structured pairwise comparison matrix, which only needs a two-vector comparison rather than a full pairwise comparison. When compared to AHP, the comparison time is substantially decreased. Second, the approach is simple to integrate with other MCDM techniques. Guo and Zhao have suggested fuzzy BWM based on triangular fuzzy integers.

## 2. DISCUSSION

This suggested approach makes it easier for decision makers (DMs) to prioritize criteria using qualitative judgment. Although subjective methods to determining criterion weights may be used, the evaluation process may be hampered by discrepancies, human mistakes, and other issues due to the DMs' differing expertise and experience. To remove false uncertainty and get more realistic findings, objective techniques such as information entropy may be utilized as the weighting method. Shannon entropy, in particular, may be utilized to assess the degree of ambiguity in system information and efficacy. Shannon's idea may be utilized as a weight calculation technique when considering the characteristics of this research indication [3].

TOPSIS (Technique for Order Preference by Similarity to an Ideal Solution), VIKOR (VIsekriterijumska Optimizacija I Kompromisno Resenje), and COPRAS (Complex Proportional

Assessment) are three commonly used alternative supplier ranking techniques. Baleentis et al. proposed a MULTIMOORA technique for supplier assessment and ranking, which differed from the conventional MCDM methods. The ratio system (RS), the maximum objective reference point (MORP), and the multiplicative form (MF) are all part of it. Because no other technique can satisfy all of MOO's robustness criteria, MULTIMOORA has been shown to be the insensitive method of multi-objective optimization (MOO) and high frequency utilized to solve MCDM issues in an unpredictable environment. As a result, MULTIMOORA has been utilized to evaluate business operations in a number of instances. Despite the fact that MULTIMOORA provides a number of effective and practical solutions for dealing with complex and real-world MCDM issues in uncertain environments, no research has been done to combine fuzzy MULTIMOORA with other fuzzy evaluation methods for a comprehensive assessment of green fresh product suppliers.

Finally, a selection model with particular functions and features may be built by combining several MCDM techniques, and this method is rapidly being utilized by academics owing to its great degree of flexibility. A two-stage selection technique comprised of QFD, fuzzy BWM, the Shannon entropy weight method, and the MULTIMOORA method was suggested to achieve appropriate supplier selection in a fuzzy environment. This study is useful in determining which fresh product suppliers to choose based on qualitative and quantitative parameters. In the first step, QFD created two collective relationship matrices, and the connection between CRs and CSs was examined individually, taking into account their distinct properties. The subjective criterion weights may be properly calculated using fuzzy BWM. Shannon entropy measurement was suggested in the second step to get objective criterion weights. During this time, fuzzy MULTIMOORA was used to rank providers based on each criteria. Taking the benefits of both techniques into consideration, the proposed two-stage integrated MCDM method may provide more reliable and complete findings. To test the given method, an application sample is built. Comparing the suggested approach against TOPSIS, VIKOR, and COPRAS, as well as doing a sensitivity analysis, may help to validate its practicality and efficacy.

A business that provides a variety of fresh products is the subject of the supplier selection study. The company's primary commercial goods include papaya, pineapple, red delicious, cherry, and other fruits. In this part, the data is utilized to compare supplier selection analyses. For each product acquisition, the goal is to conduct a supplier selection study. The business orders a particular fresh product from a vast [5] planting base, i.e. each supplier, for a specific fresh product. Following the generation of the order, the business will contact its alternative suppliers, who will be in charge of selecting, packing, and shipping the order to locations such as Japan and the United States. The producer will be a supplier and the business will be a direct client. Five fresh product vendors were discovered during the first screening procedure. The decision maker must thoroughly evaluate the requirements of all customers and determine how each provider can completely fulfill these objectives when selecting a supplier. The business is given five distinct supplier samples. Four DM1, DM2, DM3, DM4 are asked to create an expert panel to conduct the evaluation in order to get reliable results [6].

Customer requirements relate to a wide and in-depth knowledge of customers' real demands in order to assist businesses in making the best choices possible. Customers want to purchase fresh and nutritious components, and to have a product experience that has just been plucked from the orchard, therefore the size, shape, color, elasticity, and odor of fresh goods are their primary

concerns [7]. Customers are also concerned about whether the implementation criteria for the manufacture of fresh goods are stringent, if pesticide residues exist, and whether the detection of heavy metal content, bacteria, mycotoxins, and other contaminants satisfies the requirements (TSS). Any consumer is worried about pricing; they [8] all want to purchase fresh, nutritious goods at the lowest possible price, therefore there is a greater need for high-quality, low-cost products (P). Furthermore, the company's credit, prestige, and overall recognition level in the industry (CRN), as well as the ability to provide fresh product in terms of quality and quantity (CPS), and the ability to effectively manage the company's credit, prestige, and overall recognition level in the industry

According to the literature study, eight CSs and seven assessment criteria are chosen in response to CRs. The following are seven assessment criteria: QA, P, ENRC, DS, GD, RRR, and PP. The crux of the QA debate is to comprehend quality from the standpoint of consumer usage. The supplier's quote per unit of agricultural goods is denoted by the letter P [9]. The entire quantity of resources used by suppliers to deliver goods is known as ENRC. DS refers to the speed with which the supplier's cold chain transports the fresh goods to the target business. It is the distance traveled in a given amount of time. The ecological guarantee and the capacity to minimize packing materials are referred to as GD. RRR is the ratio of the quality of discarded goods that can be recycled to the quality of recovered waste products (including re-use, recycling, and energy recovery). Suppliers who can develop reasonable production plans in order to provide goods in both quality and quantity are referred to be PP. P and ENRC are criteria that should be reduced, while the others should be maximized [10].

### 3. CONCLUSION

For green fresh food businesses to obtain a competitive edge, GSCM has become a major issue. As a result, a new two-stage integrated MCDM approach is developed to thoroughly pick the best fresh product provider while also providing recommendations to businesses on how to improve their production, service, and management. The following are the advantages of this MCDM technique.

- (1) Selection criteria take into account both qualitative and quantitative factors. In the meanwhile, the criteria are assessed using fuzzy set theory.
- (2) QFD, fuzzy BWM, Shannon entropy, and fuzzy MULTIMOORA are all combined in the suggested approach. The fuzzy BWM technique is used to generate the subjective criterion weights in this suggested method. To calculate objective weights, Shannon entropy is employed. As a result, a composite selection procedure is developed to accommodate for CRs and CSs' preferences. Furthermore, both subjective and objective weights are taken into account, making the selection process more precise.
- (3) The fuzzy MULTIMOORA technique, as well as the other three ranking methods, are used to choose providers. The findings in Section 4 demonstrate that the suggested approach may be used to choose a fresh product provider. Meanwhile, the suggested approach is shown to be acceptable and resilient by varying the values of parameters.
- (4) The technique, which is demonstrated with a numerical example, may be a useful tool for improving the management of fresh food delivery businesses. As a consequence, the findings of this research might be the most compelling option. There are several limitations to this study, but

it does offer a foundation for future research. In order to meet future management requirements in the selection of fresh product suppliers, assessment criteria must be enhanced, and they must be more practical than current studies. In addition, to address MCDM issues from a new viewpoint, game theory and the Taguchi loss function may be utilized in the integrated approach.

## REFERENCES

1. F. Giudice, "Eco-packaging development: Integrated design approaches," in *Handbook of Sustainable Engineering*, 2013.
2. C. S. Jang, C. P. Liang, and S. W. Wang, "Integrating the spatial variability of water quality and quantity to probabilistically assess groundwater sustainability for use in aquaculture," *Stoch. Environ. Res. Risk Assess.*, 2013.
3. K. H. Lee and Y. Wu, "Integrating sustainability performance measurement into logistics and supply networks: A multi-methodological approach," *Br. Account. Rev.*, 2014.
4. D. Bechtsis, N. Tsolakis, D. Vlachos, and J. S. Srai, "Intelligent Autonomous Vehicles in digital supply chains: A framework for integrating innovations towards sustainable value networks," *J. Clean. Prod.*, 2018.
5. D. Khatua, G. Roymahapatra, and K. Maity, "A green supply chain production inventory model with uncertain holding cost," *Int. J. Process Manag. Benchmarking*, 2017.
6. L. Yu, T. Jiang, and Y. Zou, "Real-Time Energy Management for Cloud Data Centers in Smart Microgrids," *IEEE Access*, 2016.
7. A. Cascini, C. Mora, A. Pareschi, and E. Ferrari, "Multi-objective optimisation modelling for Green Supply Chain Management," in *Proceedings of the Summer School Francesco Turco*, 2014.
8. J. M. Deines, "Integrating Satellite Observations into Processed-based Models to Inform Agricultural Water Management," 2018.
9. Nicola Smith, "Integrating Gamification Into Mathematics Instruction: A Qualitative Exploratory Case Study On The Perceptions Of Teachers At The Fourth And Fifth Grade Level," *Photosynthetica*, 2018.
10. Daniel Silva Soto, Susheel Varma, Steven Wood, and Rod Hose, "Workflows: Principles, Tools, and Clinical Applications," in *Computational biomedicine : modelling the human body*, 2014.

## IMPLICATIONS FOR PROCESS SAFETY AND ENVIRONMENTAL PROTECTION AS A RESULT OF ADOPTING INDUSTRY 4.0

Dr. Vinod K. Singh\*

\*Professor,  
Department of General Medicine,  
Faculty of Medicine,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [deepakkr094@gmail.com](mailto:deepakkr094@gmail.com)

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### ABSTRACT

*Due of its many advantages to industrial companies, researchers and practitioners are paying close attention to Industry 4.0. The literature has looked at a number of elements of Industry 4.0. Studies on the difficulties of adopting Industry 4.0 in industrial processes, on the other hand, have garnered less attention. This research outlines a set of challenges (framework) for adopting Industry 4.0 in manufacturing sectors in order to close this gap. This framework is tested in Bangladesh's leather sector, with the use of a new multi-criteria decision-making technique known as the Best-Worst method (BWM). According to the findings of the study, the most pressing challenge that may stymie the implementation of Industry 4.0 in the Bangladeshi leather industry is a lack of technological infrastructure, while environmental side-effects are the least of the challenges that may stymie the implementation of Industry 4.0 in the Bangladeshi leather industry. This finding may aid decision makers, industrial managers, and practitioners in the Bangladeshi leather industry in recognizing the actual challenges they face when attempting to implement Industry 4.0 and focusing their attention on how to address these challenges in order to pave the way for a successful Industry 4.0 implementation.*

**KEYWORDS:** *Best Worst Method (BWM), Challenges, Environmental Protection Process, Safety, Industry 4.0 Internet of Things (Iot), Leather Industry, Smart Technology.*

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### 1. INTRODUCTION

In today's competitive business environment, many companies are focusing on incorporating smart technology into their production systems in order to increase productivity, reduce risks, and provide better quality products (Kohlberg and Zühlke, 2015; Lu, 2017; Stock and Slier, 2016; Varghese and Tender, 2014). As a result, the idea of Industry 4.0 is gaining traction among businesses owing to its benefits in industrial processes as well as environmental preservation. Industry 4.0 has had a significant impact on manufacturing firms' operations and choices (Ford, 2015; Reinhardt et al., 2016). The internet of things (IoT) and information and communication technology (ICT) are rapidly evolving. Author who communicates with you. We assist manufacturing firms in adopting new technology to automate their production processes [1]. This



trend may provide enormous possibilities for manufacturers to prevent and manage environmental effects utilizing smart technology created via ICT and IoT (Lee et al., 2015 [2]; Reinhardt et al., 2016; Schumacher et al., 2016). However, these businesses have substantial difficulties in integrating ICT and IoT-based smart technology into production processes (Chen et al., 2014; Lee and Lee, 2015; Ian and Wang, 2012). As a result, identifying and examining the difficulties that these industrial firms confront while trying to adopt Industry 4.0 is essential.

Several academics have performed a variety of studies on Industry 4.0 projects, but none have recognized and analyzed the difficulties that companies face while trying to adopt Industry 4.0. This has justified and prompted the conduct of this study. Warble et al. (2017), for example, looked into the impact of smart production systems in Industry 4.0, while Stock and Salinger (2016) looked into the possibilities of sustainable manufacturing in Industry 4.0. Thorough investigation on Industry 4.0. These are some of the most recent instances of research that are relevant to Industry 4.0, however they clearly demonstrate the paucity of studies on identifying and analyzing the difficulties of implementing Industry 4.0. This paper offers a framework to examine the difficulties of adopting Sector 4.0 in the context of the Bangladeshi leather industry in order to address this research vacuum. The difficulties of adopting Industry 4.0 are evaluated and rated in this research using the 'best-worst approach,' a new multi-criteria decision making (MCDM) methodology (BWM). For a variety of reasons, the Bangladeshi leather industry has been referred to as the case industry. To begin with, Bangladesh's leather industry is one of the most polluting in the world (Toque and Clarke, 2013). As a consequence of their many chemical operations on raw hides and skins, it is clear that the leather industry is mainly responsible for water, air, and soil contamination. Second, the Bangladeshi leather industry is one of the major industrial sectors that adds to Bangladesh's foreign currency earnings while requiring very little investment (Moktadir et al., 2017, 2018). Third, the Bangladeshi leather sector is still in its infancy, and it needs sustainable manufacturing techniques such as smart manufacturing to assist them in making strategic choices to reduce their environmental effects, thus changing the industry's bad environmental image. As a result, by addressing the following particular goals, this study adds to the state-of-the-art literature:

- (a) Determine the obstacles to adopting Sector 4.0 in Bangladesh's leather industry.
- (b) To evaluate and rank these problems using a new Best-Worst approach based on multi-criteria decision making.
- (c) To propose some of the study's practical and managerial implications for adopting Industry 4.0.

To aid in the achievement of these goals, the relevant literature is examined in order to identify some key obstacles for adopting Industry 4.0 in the leather industry. We held a series of brainstorming meetings with a group of industrial managers from Bangladesh's leather sector to identify the most pressing issues. The identified significant issues were then assessed and prioritized using BWM. The following are the reasons for choosing the BWM: In contrast to previous MCDM techniques (Marley, 2008; Rezaei, 2015a, b), it requires fewer pairwise comparison matrices, which reduces evaluation time; and ii) the obtained findings are more consistent.

## 2. DISCUSSION



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The following is the structure of the paper's reminder. The theoretical basis of Industry 4.0, technologies utilized in Industry 4.0, and obstacles to Industry 4.0 implementation are described in Section 2. Section 3 discusses research technique, which includes study design and the best-worst approach. In Section 4, the suggested challenges framework is applied to a real-world case issue in the Bangladeshi leather sector, followed by a discussion of the findings and sensitivity analysis in Section 5. Finally, Section 6 discusses the study's findings, implications for process safety and environmental protection, practical implications and limits, and suggestions for further research.

## 2.1. The Fourth Industrial Revolution (Industry 4.0)

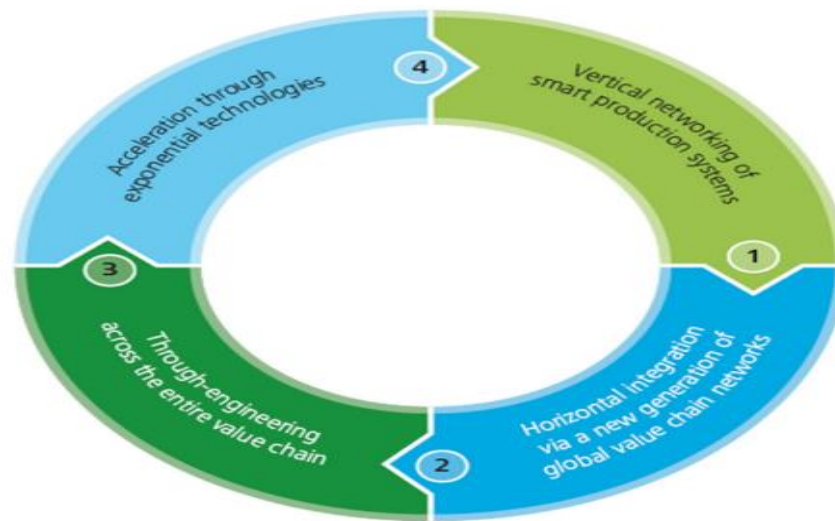
The phrase 'Industry 4.0' alludes to the fourth industrial revolution, which was inspired by a project involving computerized manufacturing. In 2011, Vaidya et al. (Vaidya et al., 2018; Tjahjono et al., 2017) predicted the future (Vaidya et al., 2018; Tjahjono et al., 2017). The German Ministry of Education and Research was in charge of this initiative. The phrase "Industry 4.0" has gained traction in Europe, particularly in Germany's industrial sector (Gilchrist, 2016; Roblek et al., 2016; Rüßmann et al., 2015a, b). The idea of Internet of services, Internet of Things, industrial internet, cyber physical systems, and artificial intelligence (Davies, 2015; Lee et al., 2015; Rüßmann et al., 2015b) lies at the heart of the phrase Industry 4.0. Four dimensions (Fig. 1) may be used to describe the fundamental features of Industry 4.0: (1) vertical integration of the whole value chain and smart production system, (2) horizontal integration of the entire value chain networks through new generation, (3) through-engineering of the complete product life cycle, and (4) smarttechnology acceleration (Deloitte, 2015).

Vertical integration across the entire value chain and smart production system refer to the digitization and intelligent integration of the manufacturing plant via cyber physical production system, which can create a dynamic production system by taking into account rapid changes in demand and stock level (Ahuett-Garza and Kurfess, 2018; Wang et al., 2016; Zezulka et al., 2016). Vertical integration is used to connect resources and goods in this system. Smart sensor technology is utilized to keep track of the whole system [3]. Horizontal integration through new generation across whole value chain networks refers to the integration of intra- and interorganizational intelligence and digitalization across a product life cycles value chain (Errol et al., 2016; Ganzarain and Errata, 2016). This technology builds optimal networks with high levels of flexibility and integrated transparency. Horizontal integration provides a dynamic manufacturing system that spans the whole process chain, from procurement to delivery. The third Industry 4.0 feature, through-engineering throughout the whole product life cycle, refers to intelligent integration and digitalization [4] across the entire product life cycle, from raw material procurement to product disposal. Data from all stages of the product life cycle may be accessible at this point, allowing for the creation of more flexible manufacturing processes. Figure 1: The characteristics of Industry 4.0 [5].

The leather industry is one of Bangladesh's most polluting industries, requiring significant chemical processes to create finished leather (Moktadir et al., 2017). Multiple chemical operations are involved in the collection of raw hides and skins of domestic animals to the finishing of raw hides and skins, resulting in the production of huge environmental pollutants (Dixit et al., 2015; Thanikaivelan et al., 2005; Xu et al., 2010), including solid waste such as fleshing, hair, lime, chrome split, shavings, and leather waste liquor containing heavy metals, some ga. As a result, the idea of Sector 4.0 may assist businesses in the leather industry in

improving their operational procedures by embracing automation and cleaner technologies in order to manage and reduce these environmental pollutions.

The paucity of literature on the difficulties of implementing Industry 4.0, as well as the leather industry's massive environmental effect, justifies and motivates this study. This research will assist decision makers and industrial managers in the leather sector in grasping the essential components of Industry 4.0 in order to help reduce pollution and preserve the environment. It will also provide them with some difficulties in adopting Industry 4.0 as well as solutions to these problems. Several academics have attempted to convey the significance of adopting smart manufacturing techniques for long-term industrial sustainability.



**Figure 1: The characteristics of Industry 4.0.**

Qin et al. (2016), for example, focused on the fundamental idea of Industry 4.0 and the status of existing manufacturing processes, while Lee et al. (2015) suggested a multi-level framework for the deployment of cyber physical production systems. Rüzmann et al. (2015a,b) performed a research to demonstrate the impact of Industry 4.0 on manufacturing productivity and growth. Trstenjak and Cosmic (2017) presented a process planning framework for adopting Industry 4.0, whereas Dilberoglu et al. (2017) examined the role of additive manufacturing in Industry 4.0. There is a lot more research in this area, but none has explicitly looked at the difficulties of implementing Sector 4.0, notably in the leather industry. Table 1 lists a few more recent research on Industry 4.0 [6]. According to the existing literature, there has yet to be a research that looks at the difficulties of adopting Industry 4.0. As a result, this research adds to the state-of-the-art literature by identifying and evaluating some of the difficulties encountered by businesses in the leather sector while trying to adopt Industry 4.0 utilizing BWM employing brainstorming. Table 2 shows a simplified overview of the identified difficulties for adopting Industry 4.0. 3.

## METHODOLOGY

Assessing the obstacles to Industry 4.0 adoption is a multi-criteria decision-making issue. The difficulties of adopting Sector 4.0 in Bangladesh's leather industry were examined in this research. Based on a mix of literature research and input from industrial managers, many

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obstacles for adopting Industry 4.0 have been identified. Experts in supply chain management, operations management, and information technology are among these executives (IT). A new BWM technique was used to assess the highlighted issues. In the next part, the suggested new BWM-based MCDM technique is briefly explained [7].

In the literature, there are many MCDM tools. The “Best Worst” MCDM tool, created by Professor Rezaei in 2015, is one of the finest (Rezaei, 2015a). When compared to other methods such as the analytical hierarchy process, this approach is more effective in solving multi-criteria decision-making problems (AHP). This technique has several distinct benefits over the other instruments. The findings obtained using this method are more consistent than those obtained using other MCDM methods, and it requires fewer pairwise comparison matrices to get better results, allowing decision makers and researchers to acquire more dependable answers in less time (Rezaei, 2015a; Rezaei et al., 2016). The aforementioned benefits were the driving force for the adoption of this MCDM tool in this study.

The literature on BWM is well-known. This technique has been utilized by a number of researchers in a variety of fields. Abouhashem Abaci et al. (2018), for example, used BWM to research the medical tourism development plan. Bari Hamada et al. (2017) utilized BWM to assess the social sustainability of supply chains, while Guo and Zhao (2017) employed fuzzy-based BWM to solve the MCDM issue. Rezaei et al. (2016) used the BWM to choose suppliers by combining conventional and environmental factors. Without [8] using a comparison matrix, the allocated decision makers select the most essential Insecure connection obstructs real-time communication among industrial firms, posing a challenge to Industry 4.0 adoption. 5 Job opportunities are dwindling (CH5) (Zhou et al., 2016; Waibel et al., 2017; Zezulka et al., 2016; Waibel et al., 2017; Zezulka et al., 2016). Due to the replacement of people by robots and the extensive use of automation in the manufacturing system, Sector 4.0 adoption in the manufacturing industry eliminates certain employment possibilities. Decision-makers decide the resultant best-to-others vector in this phase. The rating scale shows which criteria are preferred above the others. The best criteria are equally preferred to the other criterion, according to the rating scale 1. The best criteria are highly preferred above the other criterion, according to the rating scale 9. The best-to-others (BO) vector of criteria that results looks like this:

### 3. CONCLUSION

Traditional industrial operations are mainly to blame for the environment's deterioration by contaminating the air, water, and soil. Kusi-Sarpong and colleagues (Kusi-Sarong et al., 2015). The idea of Industry 4.0 is the solution to fix this problem and preserve the environment. go. There are several difficulties in adopting Industry 4.0. a lot of businesses as a result; these businesses must cope with these issues. Prior to trying to integrate a smart manufacturing system into their operations. This research looked at the Companies in Bangladesh's leather sector confront a number of difficulties. When trying to adopt Industry 4.0, there are a few things to keep in mind. These difficulties for Using brainstorming, we came up with a list of ways to adopt Industry 4.0. and evaluated in the context of one of the most polluting industries; BWM is being used in the leather sector for the first time. Several chemicals are used to treat raw hides and skins, resulting in a significant quantity of pollution. This have the potential to significantly contaminate water bodies, soil, and air quality [9]. According to the study's findings, the absence of technical infrastructure is the most serious issue facing the country. The greatest optimum weight was assigned to businesses in the Bangladeshi leather sector. This result emphasizes the

significance of growth. Supporting technical infrastructure for the execution of Industry 4.0 is the fourth industrial revolution. As a result, it is highly advised that, before to Companies should first build the enabling infrastructure to assist in the implementation of Industry 4.0 in current supply chains.the incorporation of technical advancements into the manufacturing process (Weiss and Birnbaum, 1989). This outcome may be beneficial to the industrial sector. Managers must comprehend the significance of technical infrastructure in the implementation of smart technologies in Industry 4.0. InThe environmental side-effects challenge was given the highest score in this research. The problem with the least relative weight is regarded the least urgent. as compared to other issues that have been found [10].

## REFERENCES

1. M. Y. Xu and G. Y. Zhao, "Study on environmental protection of urban transport development," in *Advanced Materials Research*, 2014.
2. N. Yang and R. Wang, "Sustainable technologies for the reclamation of greenhouse gas CO<sub>2</sub>," *J. Clean. Prod.*, 2015.
3. P. T. Anastas and T. C. Williamson, "Frontiers in green chemistry.," in *Green Chem.*, 1998.
4. J. A. Gobbo, C. M. Busso, S. C. O. Gobbo, and H. Carreño, "Making the links among environmental protection, process safety, and industry 4.0," *Process Saf. Environ. Prot.*, 2018.
5. Q. Tang, A. Tu, Z. Deng, M. Hu, and W. Zhong, "Progress in enantioselective phosphine organocatalysis," *Chinese J. Org. Chem.*, 2013.
6. C. Rangheard, C. De Julián Fernández, P. H. Phua, J. Hoorn, L. Lefort, and J. G. De Vries, "At the frontier between heterogeneous and homogeneous catalysis: Hydrogenation of olefins and alkynes with soluble iron nanoparticles," *Dalt. Trans.*, 2010.
7. Q. Li, B. Wang, H. Deng, and C. Yu, "A quantitative analysis of global environmental protection values based on the world values survey data from 1994 to 2014," *Environ. Monit. Assess.*, 2018.
8. Y. Li *et al.*, "Influence of industrialization and environmental protection on environmental pollution: A case study of Taihu Lake, China," *Int. J. Environ. Res. Public Health*, 2018.
9. S. K. Sharma, A. Chaudhary, and R. V. Singh, "Gray chemistry verses green chemistry: Challenges and opportunities," *Rasayan Journal of Chemistry*. 2008.
10. A. S. Patil, B. G. Ram, S. K. Mahajan, and S. V. Amrutkar, "Synthesis of N-(Alkyl or Aryl)-2-(1H-benzotriazol-1-Yl) -acetamides as selective COX-2 inhibitor," *J. Pharm. Sci. Res.*, 2013.

## MODERN MEDIA PLANNING

**Vibhor Jain\***

\*Associate Professor,  
Department of Marketing & HR,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email [Id- vibhor.management@tmu.ac.in](mailto:Id-vibhor.management@tmu.ac.in)

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### ABSTRACT

*The concept of IMC, as well as a variety of scientific models for media planning, have recently gained a lot of attention in the academic literature. Simultaneously, marketing academia has been chastised for being disconnected from practice. This paper begins with a survey of the current literature on IMC and media planning, followed by a description of an exploratory study done to determine the views of advertising practitioners toward both IMC and modern media planning. The most commonly utilized media planning methods, according to the findings, are still Lagged Effects of Media and Frequency Value Planning, both of which are part of a media strategy. To assure a consumer audience approach, however, models like Value Factor Distance, which has been demonstrated to be underutilized by respondents, would need to be accepted. Similarly, psychographics was only given a moderate amount of relevance, and if the move to a consumer strategy is to be realized, it will need to be given higher emphasis. Finally, the study draws parallels between theory and practice.*

**KEYWORDS:** Literature, Imc, Advertising, Media Planning.

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### 1. INTRODUCTION

Media spending accounts for the majority of all advertising expenditures, with an 82% increase in advertising costs in the UK advertising business between 1996 and 2005. (World Advertising Research Centre 2005). In addition to this expansion, changes in media planning are being driven by the emergence of new media and current techniques for media measurement, both practically and theoretically. Furthermore, in the last two decades, the theory of Integrative Marketing And communications (IMC) has become a widely acknowledged norm in marketing academia and has gotten a lot of attention from marketing academics. The IMC paradigm's integration closely links to integration in media planning and usage, hence IMC-driven changes are likely to have an impact on media planning. With potential in virtually every place, media strategy has been altered. Malls contain digital billboards that may serve relevant adverts based on facial recognition of passersby, in addition to showing television commercials. In some locations, buses are equipped with television sets that are programmed to broadcast a shop advertisement



within a block or two of the advertiser. Advertisements can be found in elevators, escalators, fortune cookies, and even on the body parts of celebrities and want to be celebrities. Marketing academic research, on the other hand, is sometimes condemned as myopic, and it actually contributes to the academic-practitioner split. This study examines recent marketing literature on media strategy and identifies several key elements. These topics then serve as the foundation for an exploratory study into practitioners' perspectives of contemporary media strategy. There is a discussion of the gaps between theory and practice [1].

## 1.1 Media Strategy:

Despite, or perhaps because of, its fast changes in such a short time, there is still some controversy about the definitions of IMC as a concept and a process. Various definitions include the motifs of one voice across all texts and media, synergy, total branding, assimilation, co-ordination of supporting communication channels (sales promotions, PR, etc.) with advertising, and the power to affect consumer behavior, according to a recent analysis of relevant literature. Increased sales growth, revenue growth, and cost savings are said to be the value of IMC, which results from a fundamental shift from a 'outside-in' approach that focuses on the needs of the customer and encourages loyalty. IMC has been found to be a driver of major changes between many ad agencies, while IMC is a new revolution and not just a management fad. They do agree, however, that transferring IMC from a concept to reality appears to be a challenge [2].

"It's a concept that's been around for a long time, but it's new in practice." This appears to be especially true in the United Kingdom, where the notion is conceptually mature but yet in its infancy in terms of implementation. As a result, determining the practical viability of IMC remains a key research subject. The structural changes that agencies must make are one of the most difficult aspects of IMC implementation. IMC's integrated strategy favors centralized decision-making to ensure message management and coordination. However, as consumer markets fracture and consumers become more active rather than passive, decentralization is required in order to bring decision-making authority closer to the customer. At the same time, as suggested, the integration of account planning with overall business solution development is expected to have an impact on media strategy. Despite the lack of study, these authors discovered that account planners require media planning integration more than any other planning area in the agency. In addition, it appears that full-service agencies lack integration of planning in the areas of media strategy, public relations, and sales promotion planning. Media strategists still use syndicated data, but they are more likely to undertake their own brand research these days. They might look at how people utilize media or how different types of media influence how people think about a brand.

A recent study found significant disparities in customers' perceptions of media for impulse vs. planned purchases. As a result, in some situations, effectiveness may entail locating media that best corresponds to impulse purchases. This line of reasoning is closer to consumer behavior theory than media theory, and it has sparked a number of studies on the function of media in the creative message. For example, if a brand's success is built on a high level of trust, would it be preferable to associate your brand's message with trustworthy media, or should you just look for the most efficient media regardless of the trust factor? The efficiency of media is a constantly changing feature of the media landscape. The media is also assessed in terms of return on investment. In fact, many brands use media as a sales channel. Stores, website sales, social media, applications, catalogs, and kiosks are all options for retailers. They may be aware of the



value of their Sunday newspaper supplement or Twitter campaign to their company. Most service and B2B companies keep track of where their leads come from, whether it's through search engine marketing, a blog, a newspaper ad, or a series of seminars. Brand marketers do in-depth evaluations to determine the amount of incremental brand sales that each medium, media vehicle, or activity generates. Because of these recent and future advances in media, marketing professionals must have a solid understanding of how media works and what part they play in the overall marketing effort. Multichannel media strategies are becoming increasingly popular as the media universe expands and ownership power consolidates.

Media businesses are learning from packaged-goods brands instead of focusing on multimedia tactics. CNN, for example, is a significant content provider with a massive footprint that includes airport television networks, radio networks, mobile apps, and a global web news portal. Media content is distributed in a variety of ways, not only through one medium. The process of designing, buying, and distributing ad material has evolved along with the media industry landscape. The advertising industry has grown and consolidated in the same way as the media sector has: Thousands of locally owned advertising, public relations, and sales promotion agencies once existed; by 2014, eight holding organizations controlled more than 75% of the business. Omnicom, WPP, and Publicist are the three most powerful worldwide holding corporations within that group; the rest is made up of either Japanese networks like Dentsu and Hakuhodo or Western-based networks like Interpublic, MDC, or Havas. The merger between Publicis and OmniCom was supposed to happen, but it didn't. Hundreds of marketing services companies, specializing in advertising, public relations, sales promotions, and even market research, are owned by these corporations. As large holding businesses purchased advertising agencies, they discovered that consolidating their expanding media planning and buying activities into firms dedicated only to that role was more efficient. Essentially, this method divides the advertising function, with one agency focusing on message strategy and creative and the other a huge media corporation focusing on media planning and purchase. Large media agencies like Starcom, Mediacom, and Media edge now control three-quarters of all advertising in the United States and more than 40% of all advertising globally [3].

Since its beginnings, the aim of media planning as part of an entire advertising effort has been on selecting the best media from a wide range of options and maximizing value for money. Discuss recent trends in the sphere of media spending and propose that the amount of money spent on advertising by FMCGs is determined by their market share. Brands with larger market shares can keep a smaller share of voice (i.e., spend less on advertising) while leveraging the brand's current power. New entrants and smaller brands, on the other hand, must spend more in order to grow. In both oligopolistic and competing market conditions, accurate projections on behalf of larger companies can lead to a fall in share of voice, lowering advertising spend to the appropriate level for favorable brand and economic consequences. Digital technology, consumer fragmentation, and the demand for greater accountability are all issues that are posing challenges to existing procedures as the sector evolves. The focus of agency compensation is shifting away from higher commission rates and toward greater accountability. Other themes have emerged as media buying strategies have progressed. Maturity has led to mergers and consolidations, as it has in any business, owing to increased buying power.

Consumer fragmentation, a growth in media options and types, technology, and an increase in the amount of data created and needed to make media planning more scientific are all major

drivers driving change. The conventional media department structure has evolved away from considering all media-related responsibilities, such as buying, planning, execution, and follow-ups, and toward media buying and planning being separated. Planning is frequently kept by agencies, while purchasing is leased to maximize efficiency. As the size of the buying centrals (a corporation that specializes in media buying) grew, the focus shifted from financial to operational efficiency. As a result, a variety of optimization models have been developed. At its most basic level, media planning should include at least two variables: media alternatives and reach options, with cost per thousand as the most common planning strategy. Multiple planning and measuring strategies that take into account reach and optimum frequency for dispersed audiences have led in more intricate models today, while computer-aided tools allow for the comparison of multiple campaign layouts [4].

Nonetheless, even with a variety of optimization models to select from, the necessity to balance art and science remains at the heart of media planning. Scientific modeling is essentially combined with artistic talent, as well as experience, product kind, target audience, budgets, and so on. Indeed, no single formula is certain to lead to success, and relying solely on formulas is likely to lead to failure. Furthermore, in the past, media planning relied significantly on judgment-based decision-making. The necessity to codify these judgments in current media contexts is a challenge that necessitates the use of both qualitative and quantitative methodologies to assess media efficiency for planning reasons [5].

An analytical processing approach for media planning that takes both qualitative and quantitative components of traditional media into account to help media planners make better decisions. Today's media planners utilize anywhere from 5 to 15 different parameters to assess the quality of various media sources. From the three major objectives of exposure, communication, and reaction production, the relative advantages and disadvantages of individual vehicles are analyzed. As a result, one of the most critical factors is the difficulty of embedding expert knowledge into computer-based systems [6]. Much academic study on media planning, on the other hand, focuses on the adoption of more sophisticated and scientific methodologies that encompass all measurable aspects while reducing traditional judgment.

The 'Media Approach' and the 'Consumer Audience Approach' were identified as the two key methods in the literature relevant to recent advancements in media planning. The former takes into account recent innovations such as frequency value planning and media lagged effects, whilst the latter focuses on product and brand consumption as well as value factor distance metrics. According to recent studies, there appears to be a shift in focus toward the customer.) The typical computer-based optimization models, which focus on demographics and cost effectiveness, do not always encompass highly engaged audiences and do not take psychographics into account. He created the Value Factor Distance model, which he claims eliminates many of the limitations of existing models because it is based on shared values between brand users and magazine readers rather than demographics [7].

Similarly, the long-held belief that advertising performance is assessed by recall is challenged, and a model based on recognition is proposed. Recall is thought to affect direct or explicit memory processes, whereas recognition is thought to affect implicit memory and cause emotional alterations. Implicit memory processing does not necessitate the consumer's attention and hence has the potential to alter emotional behavior even when attention and involvement are low. Because they can assess the emotional potency of advertising, the study switches the focus

of research on effectiveness from standard recollection to cross-analysis of recognition. Indeed, according to recent studies, media decisions should take into account the effects of a medium on a given type of message for a specific product category. The employment of media context to provide consumers with an experiential format is discussed. Who says media measurements should include the power to influence a consumer's mind in addition to reach and frequency? As a result, messages should be considered as consumer contact points rather than just convincing arguments, and media evaluation should take into account the quality of the experience through media interaction rather than just the potential for exposure [8].

Recent research has also focused on the effects of advertisements on customer behavior. In diverse situations, the placement of adverts in terms of before and post product consumption was investigated. A post experience advert and a pre experience advert can both impact the consumer experience. This situational study of consumer behavior provides crucial information about the behavioral changes that ensue, implying that effectiveness tests can be shaped by consumer psychographic research in order for media planners to adjust content or placement decisions for better results. Overall, this quick assessment of contemporary academic literature on media planning reveals a few key themes from which particular research questions have evolved. To begin with, there is still debate among academics about what IMC is, while there appears to be agreement on its worth and utility [9]. The literature also reveals that, while the concept of IMC has been around for a while, there are challenges in putting it into practice, particularly in terms of structural modifications and departmental integration. In addition to the improvements brought about by IMC, the literature implies that media planners will be held more accountable. Despite the fact that the academic literature recognizes the importance of balancing judgment and scientific instruments, it appears that the academic research focuses on scientific approaches that diminish judgment. Finally, there appears to be a significant movement in academic research toward a consumer-oriented approach, as well as acknowledgement of the importance of qualitative and psychographic data. This trend indicates a shift in the sorts of media planning tools utilized, as well as their associated effectiveness measures. The exploratory study was motivated by the discovery of these trends [10].

## **2. DISCUSSION**

In the case of IMC, comparisons between theory and beliefs and practice reveal that the literature is true in that IMC is a conceptually old notion that is regarded as much more than a passing fad by both academics and practitioners. While the sample as a whole agreed with the literature that IMC is a business process, many respondents failed to consider the perspectives of other stakeholders. Stakeholder orientation and comprehensiveness in IMC philosophy are related to communications beyond the brand and promotional level, and these findings back up the idea that businesses in the UK are still in the early phases of the process. Nonetheless, some organizations appear to be reaping the benefits of synergy and a strong brand focus, even though the customer behavior outcomes mentioned are less significant at this time. Integration of media specialists is needed for the implementation of IMC as a business process. According to the research, this need may require agencies to make necessary changes to their organizational structures, which most respondents agreed with. The disparity between actual and preferred departmental integration, on the other hand, shows that these adjustments aren't yet complete. The absence of connection with the PR function not only backs with previous studies on full integration, but it's also intriguing, considering the respondents' lack of stakeholder perspective.

This seems to imply that PR, with its traditional focus on more than just brands and consumers, still has a significant role to play in the full adoption of IMC, allowing agencies to see things from a different viewpoint. The notion that media planning involves a balance of art and science was overwhelmingly supported by respondents. Similarly, the heightened accountability that has been discussed in the literature has been revealed to be a major source of anxiety for media professionals, with expectations felt to be greater than before. However, there were discrepancies between theory and practice between the literature's advised shift from a media-centered to a more customer-centric strategy and contemporary practice. Despite this, respondents indicated that brand surveys are now used more than ad recall methods, which supports Heath's request for a change away from measurement methods that are solely focused on memory.

### 3. CONCLUSION

The goal of this study was to determine the gap between theory and practice in media strategy. The IMC concept was determined to have a high level of awareness and appreciation among responders. However, there was still considerable doubt about IMC's general corporate nature. As a result of more media options and changing consumer needs, the research revealed a shifting media planning environment. When comparing theory and practice in the areas of professional judgment and the use of new tools, it was discovered that while both are necessary, real use of the more recent tools has yet to catch up with the literature. Furthermore, public acceptance of the value of psychographic profiling in practice lags behind scholarly acknowledgement. The tiny sample size of this study is a fundamental restriction, and the findings cannot be applied to the entire UK advertising business. Academic marketing has been chastised for being out of touch with reality. The fact that more than 94 percent of practitioners contacted refused to participate in the study despite repeated, extensive, and professional attempts to encourage them to do so is perhaps the most relevant finding of this study. If the gap between academics and practitioners is to be bridged, both parties must work together. Until then, academics will continue to risk conducting research that falls short of its potential in terms of application.

### REFERENCES:

1. P. Krajcovic, "Strategies in Media Planning.," Commun. Today, 2015.
2. C. Sommer and L. Marty, "The role of media brands in media planning," J. Media Bus. Stud., 2015, doi: 10.1080/16522354.2015.1070087.
3. D. E. Schultz and M. P. Block, "A New Cross-Media Planning Tool: The Media Intensity Index.," Am. Acad. Advert. Conf. Proc., 2014.
4. C. Colapinto and D. La Torre, "Media planning and preferences: A fuzzy goal programming model," Int. J. Multicriteria Decis. Mak., 2015, doi: 10.1504/IJMCDM.2015.071246.
5. Y. Kim and S. Patel, "Teaching Advertising Media Planning in a Changing Media Landscape," J. Advert. Educ., 2012, doi: 10.1177/109804821201600203.
6. M. H. J. Webb, "Advertising Response Functions and Media Planning," OR, 1968, doi: 10.2307/3008585.
7. T. Regan, "Media Planning Toolkit: Planning for Mobile," Warc, 2015.

8. J. Lee and L. Kerbache, "Internet Media Planning: An Optimization Model," SSRN Electron. J., 2011, doi: 10.2139/ssrn.711621.
9. Y. Cheong and K. Kim, "The State of Media Planning Research: A 16-Year Assessment, 1992–2007," J. Curr. Issues Res. Advert., 2012, doi: 10.1080/10641734.2012.700796.
10. P. C. Jha, R. Aggarwal, and A. Gupta, "Optimal media planning for multi-products in segmented market," Appl. Math. Comput., 2011, doi: 10.1016/j.amc.2010.12.111.

**A REVIEW EXPLANATORY EFFECTS OF SELF & GROUP-  
ORIENTATIONS ON ACCULTURATIVE STRESS AND  
BELONGINGNESS**

**Sushil Kumar\***

\*Assistant Professor,  
Department of Education, Faculty of Education  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- sushilk.education@tmu.ac.in

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**ABSTRACT**

*The problem of being accepted in a cognitively culturally distant setting at a new institute presents difficulties for the person, both mentally and socially, with the experience of acculturation or subsequent adaptation to the new atmosphere being the most prominent. This research adds to the acculturation literature by integrating components that are important for people who are severely to moderately stressed when they meet a new institutional culture and therefore need to find a reference group to deal with the acculturative stress levels. The impact of self-verification, state self-esteem, or group-related variables like resemblance to others and reliance on others on the desire for reference group belongingness during acculturation is thoroughly investigated. The findings show that for stressed people, the desire to belong to a group is heightened as a consequence of a decrease in present self-esteem and a concurrent need to self-verify. Individuals also consider resemblance to other members of the reference group to be unimportant, while reliance on the reference group is crucial.*

**KEYWORDS:** *Acculturative Stress, Reference Group, State Self-Esteem, Self-Verification.*

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**1. INTRODUCTION**

Acculturative pressures may affect people who join new institutions or groups that they consider to be culturally different. The severity of acculturative stress varies depending on a variety of factors, including the people' socioeconomic and cultural backgrounds, their educational levels, their geographic origins, and the kind of institution they want to join. Individuals seek connections with reference groups to relieve the stress that arises as a result of the contact with a new institutional culture. Person identifies with reference groups that are comprehensive enough to minimize perceived social isolation stress to deal with the acculturation process, according to study. According to the literature, reference group connections in that setting may have a variety of antecedents, including (a) a loss of self-esteem and (b) group members' characteristics that are similar or different from the individual's [1].

Associations with a reference group have been characterized as the desire to belong, which refers to the emotional need and intrinsic drive to connect with and be accepted by members of the



reference group. These group affiliations and connections have been defined by researchers in this field as essential group belongingness requirements that people attempt to satisfy, in which they aim for good interactions with reference group members. This feature is more likely to be present when people are experiencing acculturative stress as a consequence of joining a new culturally distant institution, with the desire for belonging serving as a coping strategy to help them cope with the difficult circumstances they are facing. While some research have shown that resemblance to other members of the group is a critical component for group belongingness, other authors have discovered that dependency on group members is critical for group connections [2]. This research attempted to contribute to the acculturation-group affiliation literature by including the impact of variables that alter the connection between acculturative stress and the desire to belong to a perceptually culturally similar reference group. Our main thesis is that when people are subjected to acculturation in a new institutional setting, they experience a loss of self-esteem and therefore feel compelled to self-verify by seeking belongingness with the reference group. We were also motivated by the need to see whether, in the face of acculturative stress, resemblance with reference group members or reliance on group members affects an individual's desire to join to the reference group [3].

## **1.1 The Stress Of Acculturation And The Desire To Belong:**

Individuals who come into contact with a new institutional culture that is considered to be distinct from their own (i.e., home) culture may experience acculturation, which they must adjust to over time. Individuals desire a shift in their current motivations, identities, and attitudes to relieve the pressures generated as a consequence of acculturation. Acculturation is likely to occur when an individual enrolls in a new institution, or research has found that while this experience is exciting because it fulfills personal, familial, and career goals, the challenge lies in adapting to the perceptually dissimilar socio-cultural as well as psychological environment. Individuals face a variety of stressors as a consequence of acculturation, and since they originate from various demographic or social backgrounds and have distinct psychological makeups, they use different coping and adjustment strategies. These psychological acculturation experiences have been classified as acculturative stressors because they are important life events that are cognitively assessed by people as stress-inducing. Adaptation, aberrant behavior, and even retreat have been seen as responses to acculturative stress, all of which require readjustment regardless of cultural origins, intercultural experiences, or new cultural context.

A line of research has discovered that psychosocial adaptation motives coexist in a cross-cultural setting, but that belonging to reference groups can become a need for social inclusions. This need for reference group affiliation or inclusion has been dubbed a need to belong, and it has been described as central to individuals' need for social relationships and security. Because individuals are likely to meet a setting that is distinct from their current culture, the desire to belong in a new organizational or institutional context may become a requirement for an individual's normal life and growth. Individuals' emotions and cognitions have been shown to be influenced by their want to belong, with social ties producing good feelings rather than negative stress [4].

The context of improving one's prospects of membership in the reference group is viewed as patterns of self-presentation, interpersonal characteristics, and group conformity. Some many authors have emphasized the importance as well as implications of institutions where users understand social support and just a feeling or sense of connectedness with a perceived homogenous population in such institutions to improve their self-have found that people with

strong social (group) relationships have really been able to cope with psychological adjustment at a more able to come to grips with acculturative stress at a more able to cope with acculturative stress at a more able to cope with acculturative stress at a more As a result, it may be claimed that when a person is faced with acculturation as a result of joining a new institution, the main motivation or need would be to belonging to a perceptually culturally similar group in order to alleviate the stress of being a member of a new culture. The degree of acceptability by the members of the group that the people use as a frame of reference would enhance this feeling of belonging. We also believe that the intensity of the individual's desire to belong to the reference group is determined by the amount of acculturation stress he or she is experiencing. As a result, we predict that an individual's degree of acculturative stress and his or her desire to join to a perceptually culturally similar reference group have a significant positive connection [5].

## **1.2 Declare Your Self-Esteem:**

Self-esteem is defined as an intrinsically emotional assessment of one's own "worthiness," which correlates to particular views about one's skills and social connections. Self-acceptance, dealing with the environment, and self-improvement are often attributed to these ideas or attitudes regarding the self. According to the authors, at least a part of one's self-esteem is generated from social interactions, and changes in one's social surroundings may cause inconsistencies in one's self-worth assessment. Acculturative stress and the resulting desire to belong to a reference group may be a consequence of a person's loss of self-esteem, according to research. Acculturation research has looked at the impact of acculturative stress on self-esteem on both a trait and a state level.

The trait view believes the self to have a global as well as universal personality, while the state perspective examines the situational element of the self, or the temporal characteristics of the self, as determined by the circumstances in which one finds oneself. Individuals' state self-esteem is a result of the perceived effects of events, ideas, and culture in the social environment that they encounter throughout their lives. As a result, the motivation for inclusion or exclusion in a reference group can be seen as a threat to an individual's self-esteem when they are experiencing acculturative stress, and such individuals will strive to increase their chances of inclusion in reference groups while minimizing their chances of exclusion from groups and relationships. According to related research, belonging to a social group is important for maintaining self-esteem, which is motivated by the need to feel good about oneself in social situations [6].

Social exclusion, in particular, has been shown to have a significant negative impact on self-esteem. To reduce stress levels, the individual experiencing acculturative stress is likely to associate with the reference group as an adaptive response, in which he or she seeks consistency between the desire to express oneself and the psychological image formed as a result of belonging to the social group. High self-esteem improves dealing with difficult events, whereas low self-esteem leads to avoidance of stressful situations, according to research. Individuals who are confronted with a different cultural environment, including when joining a new organization or institution, will have their self-esteem based on their perceptions of social inclusion as well as rejection by the interpersonal others in the different learning environment, and hence their state self-esteem will be affected. If the sense of being valued by the group is positive, the individuals personal state self-esteem is likely to be high, and if the impression is negative, such individuals personal state self-esteem is likely to be low [7].

whenever an individual is trying to improve current self-esteem, which has done suffer a temporary setback as a direct consequence of acculturation, the need to belong to a comparison group is heightened. State self-esteem can also be the outcome of augmented modifications in cultural and societal roles of an individual, and can be associated with such characteristics as age, economic status, and gender. As a consequence, we propose that when a person is confronted with acculturation, the resulting impact will be a brief drop in his or her present self-esteem. To counteract this danger to self-esteem, the person will seek for social acceptability, i.e., a stronger desire to belong to a culturally comparable reference group. Because of the inherent desire to be included and accepted by members of the reference group, this will show as a tendency to develop and maintain good relationships with members of the reference group. As a result, we believe that state self-esteem will play a role in the connection between acculturation stress and the desire to belong to a culturally comparable reference group [8].

### **1.3 Self-Verification:**

Another important requirement of people who have been exposed to a new cultural context and are experiencing acculturative stress is to validate their identity via social others. Individuals seek continuity in their self-views by interacting with people who consider them to be similar to how they see themselves, according to the main concept of self-verification. This is especially essential when people are exposed to new cultural or social settings since they will want to maintain their previously formed fundamental self-concepts. Self-verification may take the form of obtaining pertinent information from social media or engaging in actions to earn approval from peer groups. Individuals with low self-esteem may seek ways to self-validate by obtaining input from the reference groups they wish to join.

Researchers have discovered a connection between the desire to belong to a reference group and the preservation of individual identities (i.e., self-verification), in which it is claimed that people seek to minimize ambiguity when they meet a new cultural context. During the acculturation process, people seek for consistency and coherence, as well as to be understood by perceptually culturally homogeneous members of the group in social interactions. People may stabilize their self-views via self-verification procedures, which offers feedback on their assimilation with the reference group. Individuals believe their worldview is more realistic when the reference group gives acceptable feedback that supports their self-perceptions.

Self-esteem will be lowered as a consequence of acculturation, prompting a strong need to seek social group integration for self-validation and to boost state self-esteem. As a result, during the coping process of a person experiencing acculturation in a new cultural milieu or at a new institution, the desire for self-verification is likely to be considerable. Because of the new society and social community, some people find the institutional entrance process unclear, and they are more likely than not to portray themselves favorably when they believe the reference group members are assessing them positively. As a result, it is anticipated that self-verification will account for a substantial portion of the connection between acculturative stress and the desire to join to a culturally similar group.

### *1.4 Compatibility with Others:*

According to research, the want to belong has two dimensions: the desire to assimilate (i.e., seek similarities with others) and the desire to affiliate. People want relationship partners who have a degree of resemblance with them, while the partners (e.g., group members) project their attitudes

and ideas onto the individuals, according to the assimilation motivation. Individuals who are looking for a relationship have an incentive to form close connections with their partners in order to maintain good emotions about themselves and boost their self-esteem. As a result, people's resemblance to others (i.e. spouses, group members, or relatives) is likely to be a major criterion, with the premise being how they perceive close other-self similarities and construct cognitive representations of these perceived similarities.

Individuals may utilize perceived commonalities with members of particular reference groups (as opposed to other groups) as sources of information when assessing their worldviews. Individuals who are similar to members of the reference group are more likely to feel in control of themselves because they believe there will be fewer unexpected encounters. Similarity to others has been studied from both cognitive and emotional viewpoints by social psychologists. From a cognitive standpoint, researchers have discovered that people from a particular demographic background seek partners as well as reference groups with similar demographic backgrounds more than that for language compatibility. They've also discovered that similarity-seeking with each other is about frequent communication, working to develop positive attitudes, fostering trust, and increasing predictability within the group.

## **1.5 Others' Interdependence:**

Aspects other than resemblance to others that may drive group belongingness demands include the degree of reliance on group members as envisioned by the person. Individuals' sense of self is likely to be entrenched in social connections such as group membership and relationships under such situations. The ability to understand one's place in the group, as well as the attachment of significance to the group's demands, becomes critical. Interpersonal or intergroup interdependence, according to research, is the process by which two parties affect one another's ideas, feelings, motivations, behavior, and experiences, with each side taking into account how much the other contributed to the collective activity.

According to Cross, Bacon, and Morris (2000), those with lower dependency requirements are less inclined to seek information or guidance from others. Individuals from various cultural origins are likely to have varying degrees of dependency requirements depending on their susceptibility to social pressure and other self-interested motives. A feeling of risk aversion, a desire to find positive attitudes in others, and a desire to conform to group behaviors may all drive such wants and motives. Individuals who are experiencing acculturative stress need psychological assistance and want to be a member of a support group. To be accepted into the group, such people may seek to form bonds with the members of the reference group and show accommodating conduct (i.e., dependency). As a result, we suggest that reliance on a reference group, with whom people desire membership, is essential for individuals under acculturative stress, when selection criteria are based on the probability of being accepted and rejections and exclusions are rare. As a result, we believe that reliance on individuals in the reference group will have a substantial impact on the connection between acculturation stress and the desire to be part of a culturally similar reference group [9][10].

## **2. DISCUSSION**

The present research investigated the degrees of acculturative stress experienced by people who were assigned to a new institution that they considered to be culturally distant, as well as the impact this had on reference group-related connections. It looked at different structures that

might explain the necessity for such connections with reference groups. Despite the fact that one of our hypotheses (that resemblance to others mediates the connection between acculturative stress and the desire to belong) was not confirmed, the findings are intriguing and may add to current acculturation and group (belongingness) literature debates. Acculturation has a variety of repercussions that may be viewed as having both bad and good impacts on a person over time. Although previous research has helped us to understand the many kinds of acculturation techniques and their outcomes. Other important antecedents that influence the process of acculturation in a new cultural context have been discovered in the present research. Furthermore, the research shows that acculturative stress levels vary by person and are based on their cultural origins, and that in order to deal with the foreign culture, individuals must belong to a reference group in order to get social support. This research was restricted to a single institution with a multicultural setting, but it may be applied to other kinds of institutions (such as a missionary or government institution) as well as corporations and businesses. Furthermore, in this age of globalization, the research may be expanded to include international corporations as well. Future research may concentrate on collecting longitudinal data for the same set of respondents to better understand the temporal nature of reference group memberships.

### 3. CONCLUSION

They argue that a concerning issue with the processes and consequences of acculturation stems from the area of cross-cultural psychology, since institutions serve as a cultural center for people from many backgrounds. Individuals sought to join to a reference group to avoid social isolation and adjust mentally and sociocultural by being included in a cultural environment that was previously unfamiliar to them, as shown by the research. The ever-increasing channels of intercultural interaction and reciprocal impact of one cultural system over another provide research possibilities in this area. Individuals may revert to various methods to reject or overcome cultural assimilation, with motivations ranging from a sense of belongingness to a reference group to demonstrating allegiance to a normative or comparison reference group. Other mediating as well as moderating variables may emerge that help to explain the desire to belong to or connect to reference groups throughout the acculturation process.

### REFERENCES

1. D. Boud *et al.*, "Curriculum development in vocational and technical education: Planning, content, and implementation," *Brooklyn, NY Workforce Strateg. Center*, 2016.
2. M. J. Gelfand, M. Erez, and Z. Aycan, "Cross-cultural organizational behavior," *Annual Review of Psychology*. 2007, doi: 10.1146/annurev.psych.58.110405.085559.
3. G. Johns, "The essential impact of context on organizational behavior," *Acad. Manag. Rev.*, 2006, doi: 10.5465/AMR.2006.20208687.
4. J. Keyton, "Communication in Organizations," *Annual Review of Organizational Psychology and Organizational Behavior*. 2017, doi: 10.1146/annurev-orgpsych-032516-113341.
5. J. Zhou and I. J. Hoever, "Research on Workplace Creativity: A Review and Redirection," *Annual Review of Organizational Psychology and Organizational Behavior*. 2014, doi: 10.1146/annurev-orgpsych-031413-091226.
6. C. L. Cooper and I. T. Robertson, *International review of industrial and organizational*

*psychology*, 2003. 2005.

7. J. Bai, "Development and validation of the Acculturative Stress Scale for Chinese College Students in the United States (ASSCS)," *Psychol. Assess.*, 2016, doi: 10.1037/pas0000198.
8. I. Ajzen, "The theory of planned behaviour: Reactions and reflections," *Psychology and Health*. 2011, doi: 10.1080/08870446.2011.613995.
9. B. Yu, M. Funk, J. Hu, Q. Wang, and L. Feijs, "Biofeedback for everyday stress management: A systematic review," *Frontiers in ICT*. 2018, doi: 10.3389/fict.2018.00023.
10. L. Martin *et al.*, "Creative arts interventions for stress management and prevention-a systematic review," *Behavioral Sciences*. 2018, doi: 10.3390/bs8020028.



## AN OVERVIEW ON INTEGRATED FARMING SYSTEM

**Arpit Huriya\***

\*Assistant Professor,  
Department of Agricultural Sciences,  
Faculty of Agriculture Science,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [arpit.agriculture@tmu.ac.in](mailto:arpit.agriculture@tmu.ac.in)

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### ABSTRACT

*In terms of geography and time, Integrated Farming Systems (IFS) and methods of thinking about them have developed. Crop and livestock outputs rose in the past two decades, bringing with them worries about their socio-economic and ecological tradeoffs. A solution to issues emerging from a primarily reductionist approach to research and a cornucopian perspective of external inputs was the application of farming systems research (FSR) to agricultural development. Modern technology was either unwelcomed or resulted in unintended negative consequences. This article examines FSR definitions and forms, as well as the necessity for change in agricultural development thought. The use of thermodynamic theory (TDT) in the study of agricultural systems has an impact on debates between cornucopians and environmentalists, as well as between reductionist and holistic research methods. There is a need to identify context (technology appropriateness), pay greater attention to relationships within systems (system dynamics), and define sustainability standards. The article connects biophysical and socioeconomic processes, provides a physical context for anthropomorphic waste ideas, and compares and contrasts objectivism and constructivism. It is claimed that FSR can only progress if all of these problems are taken into account when thinking about IFS development. Because of the complexity of reality, scientists should think more thoroughly about the best approach for lifting people out of poverty. Replicas of the well-known Bangladesh Grameen Bank micro-credit initiatives conducted throughout Asia indicate that there is ideal developments for farm families in the subcontinent to which even the impoverished aspire. Poor women invest in little animals as a result of this experience, and the household gradually rises out of poverty. Research on local resources to meet the needs of these individuals is a huge and unmet issue.*

**KEYWORDS:** Farm Research, Integrated Farming Systems, Livestock, Poverty, Recycling, Women.

## 1. INTRODUCTION

Farming methods and ways of thinking about farming are always evolving. If change is termed evolution and thinking about systems is called philosophy, these processes may be referred to as the evolution of agricultural systems and system philosophy. In terms of yield per animal or plot, as well as input usage, there has been rapid change in both temperate and tropical areas during the past two decades. During the green revolution, grain yields increased dramatically all across the globe, and individual levels of animal output followed a similar pattern. Providing food security for a rapidly increasing global population that is expected to reach 9.1 billion in 2050 and more than 10 billion by the end of the twenty-first century is a huge challenge for the current agricultural production system. The issue is exacerbated by India's shrinking average farm size and financial limitations that prevent greater agricultural investment since 80 percent of farm families fall into the small and marginal farmer category. Productivity improvement may be a crucial option for ensuring food and nutrition security for a large population. This entails the use of modern agronomic techniques and technology that promise to boost conventional agricultural systems' productivity.

Agricultural techniques such as the liberal use of inorganic pesticides and fertilizers boosted production considerably throughout the twentieth century, but unfavorable environmental deterioration and higher operating expenses prompted questions about economic viability and sustainability. Around 75% of the negatively impacted families are from rural areas in emerging countries, where agriculture and related activities provide a direct or indirect source of income. Unsustainable agriculture pollutes the environment and jeopardizes the livelihoods of millions of small farmers. In order to increase income and food and nutrition security in developing nations, agricultural production systems must be strengthened for better sustainability and higher economic returns[1]–[4].

The advent of Integrated Farming Systems (IFS) has allowed us to create a framework for an alternative development model that will enhance the viability of small farming operations in comparison to bigger ones. When compared to monoculture farming, the term "integrated farming system" (or "integrated agriculture") is a widely used term to describe a more integrated approach to farming. It may also be referred to as Integrated Biosystems, and it relates to agricultural systems that combine livestock and grain production or fish and cattle. An interconnected collection of businesses is utilized in this system such that "waste" from one component becomes an input for another portion of the system, lowering costs and increasing output and/or revenue. IFS ensure that waste from one kind of agriculture is used to benefit another. We not only reduce wastes, but we also guarantee an overall improvement in production for agricultural systems since it uses wastes as resources[5]–[7].

### 1.1 Farming Systems Approach:

The flaws in the reductionistic, command-and-control approach to agricultural research became more apparent as it became clear that the farmers' production environment was much more diverse than previously believed. Farmers in less favorable regions (as well as in the South) fought these advances and did not accept the technical packages. This made people realize that technical advances needed to be judged on more than just their immediate effectiveness. They also required being adaptable and taking into consideration the farmers' perceptions of uncertainty and security, as well as their long-term aspirations and agricultural objectives. As a

result, it was realized that the research method needed to be more integrative, systemic, and complete, taking into account various geographical and temporal dimensions. The limitations of a science-based suggestion, as well as the necessity for an actor-oriented approach to guarantee compatibility with the socioeconomic context, were also recognized. As a result, a new developmental paradigm emerged, which Korten describes as a "people-centered learning process" as opposed to the previous "technology blueprint" approach. Thus, in the late 1970s, the agricultural systems approach emerged, characterized by an interdisciplinary approach (i.e., cooperation across a broader variety of disciplines and the incorporation of socio-economic aspects) and farmer participation in the research process. Initially, the emphasis was focused on how to improve the yields of certain crops. Looking at one particular business (or portion of an enterprise) and finding changes that were consistent with the whole agricultural system was a common early farming systems strategy. Several advancements were possible as a result of this strategy:

- Technical scientists have become more aware of the complexity and unpredictability of the farming environment. They realized that this environment had both physical and socioeconomic components, and they saw the necessity to include the farmer, with his or her norms and values, as well as his or her decision-making rules, as a component of the systems they were researching.
- The farm is seen as a single system. Animal scientists, for example, offer a livestock farming system approach that views the farmer, the herd, and the resources as a single socio-technical system. The (self-) regulation characteristics of the system may theoretically and realistically be incorporated in a model, depending on interactions between its constitutive components (information flows, modifications of decision rules, biological homothetic controls at various time scales).
- Economists recognized that farmers' conduct could not be explained only in terms of profit maximization. Petit's adaptive behavior theory demonstrated how farmers change both their goals and their circumstances in real time. Long-term desires, security, lifestyle, and quality of life are all factors that farmers and farm families consider while making decisions.

## **1.2 Optimizing the Total System:**

The "Farmer First and Last Model" (FFL) is a complement to the "Transfer of Technology" (TOT) that is based on farmer perceptions and priorities rather than scientific opinions, criteria, and objectives. The starting point is scientific learning from and knowledge of resource-poor farmers' resources, needs, and challenges, with research stations and labs serving as referral and consulting centers. The use of informal survey techniques, research and development on farms and with farmers, and assessment via technology adoption define this approach. To maximize the utilization of locally "available alternative" resources, the agricultural system must be completely integrated. In Colombia and elsewhere, strategies for long-term cattle production in the tropics have been devised[8]–[10].

In many Asian civilizations, manure is a significant source of fuel. Manure is believed to be used by 8 to 12 percent of the world's population for heating and cooking. Animal excrement is also an useful fertilizer, providing additional nutrients to the soil in addition to the basic chemical nutrients of N, P, and K. Manure continues to be the connection between crop and animal

production in the developing countries as an input for crop farming methods. The greatest issue is to find better methods to increase the advantages of manure to society and the environment. Biogas generation and the cultivation of earthworms are two excellent ways to enhance manure use. Biogas is one of the cheapest renewable energy sources in poor nations' rural regions. Biogas production would not only conserve firewood, but it would also help integrated agricultural systems by turning waste into better fertilizer for crops or in ponds for fish and water plants. Other advantages of biodigestion include a decrease in manure odor, the removal of smoke while cooking, and the eradication of pathogens, all of which help to improve the farm's environment.

### **1.3 Integrative Simulation Modeling In Farming Systems Research:**

Integrative (bio-physical or socio-economical) simulation modeling is a promising tool in farming systems research, as it can help unravel the complex and dynamic interactions and feedbacks among bio-physical, socio-economic, and institutional components across scales and levels, and it can be used to make decisions that promote sustainable farming systems. The necessity for a participatory method in integrated simulation modeling to address the issue of decreasing resource availability and rivalry for resource access, as well as its market economy, is urgent. Integrated simulation models have the advantage of offering a platform for integrating research methods, information, and data in the context of multidisciplinary or transdisciplinary processes. In order to address the input-output flow of resources under the predicted climate change scenario, multi-criteria decision analysis with the integration of linear programming and simulation modeling should be undertaken at various scales to address the input-output flow of resources.

### **1.4 On-Farm Processing and Value Addition:**

Consumer preferences for graded, packaged, and processed food products for daily use in urban markets have already shifted significantly, particularly among the middle and upper classes. With the construction of additional department shops in townships and the selling of food products at competitive rates in the next years, this tendency will undoubtedly spread to rural regions as well. To unlock potential, enhance market efficiency, and stay competitive, low-cost upgraded technologies are needed. Furthermore, current trends indicate an increased usage of by-products for value addition. Sugar mills, for example, currently utilize all of the by-products of sugarcane, including bagasse for power generation, pressmud for the creation of high-value organic manure, and molasses for the manufacturing of alcohol. Similarly, in the case of rice, the husk is utilized as a highly effective source of fuel in boilers and the bran is used to produce edible oil. Following the advancement of refining technology, several formerly deemed non-edible vegetable oils are now widely utilized as edible. Farmers will, without a doubt, be able to benefit from all of these value-added technology.

Prof. Chan created the "Integrated Food and Waste Management Systems" (IF&WMS), which is one form of an IFS. This idea was first established at the Montfort Boy Farm in Fiji, a vocational school that now serves as a model for children to duplicate in local communities (A Primer on Integrated Farming Systems). There are many IF&WMS or IFS models available today. These systems integrate livestock, aquaculture, agriculture, and agro-industry into a larger symbiotic or synergistic system, in which wastes from one process are used as inputs for other processes, with or without treatment, to provide the means of production, such as energy, fertilizer, and feed, for

maximum productivity at the lowest cost. IFS principles are used by a large number of farmers all over the world.

### **1.5 Empowerment of Women through IFS:**

In home management, especially agricultural activities, women play a critical role. This is particularly true in mountainous and tribal regions. By carefully using family labor and guaranteeing numerous applications of different home resources, there is a huge opportunity to increase household profitability. Women's empowerment via location-specific trainings and essential need-based assistance makes this feasible. Women's roles in agricultural and home resource management will become more significant as their educational level improves in the coming years. As a result, feminization of agriculture is anticipated in the long term, and creating women-centric farming system models will be a major issue as males migrate to non-farm industries in rural areas.

## **2. DISCUSSION**

Animals consume agrarian by-products, and the animal's body is employed in soil cultivation and produces manure that is used as fertilizer and fuel in the Integrated Farming System (IFS). Devendra's research found three kinds of dairy systems: smallholder systems, smallholder cooperative dairy production systems, and intensive dairy production systems. In terms of increasing intensity, the first two systems were the most significant. Buffaloes were particularly prominent in South Asia, although Holstein-Friesian cross-bred cattle were mainly used in dairy production systems. The highly productive, economically lucrative, environmentally friendly, and long-term successful models of agricultural systems may open the way for youngsters from metropolitan regions with ties to the rural system to work in rural areas. This has the potential to reverse transmigration and boost agro-eco tourism.

## **3. CONCLUSION**

There is now evidence that the poorest households, especially when work is routed through women, have tremendous capacity to pull themselves out of hardcore poverty, with immediate benefit to the most vulnerable groups, such as children under five and pregnant women, with the right type of institutional, credit, and technical interventions. The development of feeding systems based on the utilization of local resources must be coordinated with socioeconomic considerations. According to the "ladder idea," the focus should be on small animals such as chickens, ducks, pigs, and goats, although variations in nations and cultures should be respected. Organic residues in the form of animal and plant wastes may assist improve soil health and therefore production over a longer period of time while posing fewer environmental risks. On-farm research is a dynamic activity.

Our biggest duty is to empower today's kids. It will be critical to provide a forum for youngsters to develop professional and business-oriented agricultural systems. In addition, highly educated and competent young will play an important role in managing knowledge-intensive agricultural systems. Capacity development of the young population via advanced trainings will further enable them to create primary and secondary agricultural input-output supply chains. The only way to keep young people in agriculture is to create micro-business models in farming, which provide a steady stream of revenue. The highly productive, economically lucrative, environmentally friendly, and long-term successful models of agricultural systems may open the

way for youngsters from metropolitan regions with ties to the rural system to work in rural areas. This has the potential to reverse transmigration and boost agro-eco tourism.

## REFERENCES:

1. M. Ahmad and G. Parmar, "Role of Integrated Farming System in Agriculture Development," *Contemp. Res. India*, 2018.
2. P. K. Nayak *et al.*, "Ecological mechanism and diversity in rice based integrated farming system," *Ecol. Indic.*, 2018, doi: 10.1016/j.ecolind.2018.04.025.
3. S. Al Mamun, F. Nasrat, and M. R. Debi, "Integrated Farming System: Prospects in Bangladesh," *J. Environ. Sci. Nat. Resour.*, 2012, doi: 10.3329/jesnr.v4i2.10161.
4. C. Morris and M. Winter, "Integrated farming systems: The third way for European agriculture?," *Land use policy*, 1999, doi: 10.1016/S0264-8377(99)00020-4.
5. M. SB, D. Shivmurthy, S. A. Satyareddi, N. MV, and B. KN, "Integrated Farming System - An Holistic Approach: A Review," *J. Agric. Allied Sci.*, 2014.
6. A. Balamatti and Shamaraj, "Participatory evaluation of choice and combination of enterprises for integrated farming system under dry-land and irrigated agro-ecosystems," *Indian J. Agron.*, 2017.
7. "Pengembangan Konsep Agroindustri Berbasis Sistem Usahatani Terpadu Di Wilayah Pasang Surut Bagian I: (Konsep Pemikiran) The Concept Development Of Agroindustry Based On Integrated Farming System At Tidal Swamp Land Areas) Chapter I: Conceptual Thinkin," *Agritech*, 2013, Doi: 10.22146/Agritech.9574.
8. H. Francakova, M. LackoBartosova, Z. Muchova, and P. Bajci, "The yields of crops and sugar beet quality in ecological and integrated farming systems," *Rostl. Vyroba*, 1996.
9. H. K. Sahoo, B. Behera, U. K. Behera, and T. K. Das, "Land productivity enhancement and soil health improvement in rainfed rice (*Oryza sativa*) farms of Odisha through integrated farming system," *Indian J. Agron.*, 2015.
10. N. P. Sukanteri, M. Narka Tenaya, and I. W. Budiasa, "Pemodelan Sistem Pertanian Terintegrasi Pendekatan: Programasi Linier Optimization Analysis of Integrated Farming Systems : Linear Programming Approach," *J. Manaj. Agribisnis*, 2013.



## THE OCCUPATION OF THE CITY OF KOKAND BY THE RUSSIAN EMPIRE AND THE ESTABLISHMENT OF A COLONIAL GOVERNMENT SYSTEM IN THE CITY OF KOKAND

Mirjalol Nazirov\*

\*Lecturer,

Department of History of Uzbekistan,

Fergana State University,

Fergana City, Uzbekistan

Email id: karimov.ulmasbek1980@gmail.com

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### ABSTRACT

*The study, scientific research and objective assessment of the history of the cities of the colonial period of Tsarist Russia play an important role in the socio-political and cultural development of the independent Republic of Uzbekistan. In this regard, the study of the history of Uzbekistan in the late XIX - early XX centuries has become part of public policy. The study of the history of cities is an important historical category in the science of history, in the emergence, formation and development of which is a whole socio-economic, economic life. However, cities have always played an important role in the history of society. The article scientifically examines the occupation of Kokand by the Russian Empire and the establishment of a colonial system of government in Kokand.*

**KEYWORDS:** *Handicrafts, Colonial System of Government, Kokand City, Khiva Khanate, Kokand Khanate.*

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### INTRODUCTION

Kokand has long been a city of handicrafts, and by this time, with the further development of handicrafts, new types of handicrafts appeared and multiplied. If in 1897 there were 3124 handicraft workshops in the city, in which 5586 craftsmen and their apprentices worked, by 1913 the number of 4521 workshops and craftsmen reached 6833.

The purpose of the study is to study the history of Kokand in the late XIX - early XX centuries, to study the history of cities in Uzbekistan to date, to fill the problem with the study of the history of Kokand, to show the weight of the city between the valley cities.

Based on this goal, it is determined to solve the following main tasks.

- Demonstrate the process of conquest of the khanate and city by the Russian Empire;
  - To study the organization of the city's administration by the colonial government within the Fergana region;
  - Demonstrate urban population, its social structure and its growth dynamics;
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- Analysis of handicraft production in the city and its place in the economic life of the city;
- Establishment of a new type of industrial enterprises in the city, revealing the purpose and essence of the resulting industrial owners;
- Determining the share of domestic and foreign trade relations in the city and the city of Kokand in trade;
- To study the traditional schools and madrasas, the methods of teaching and learning, the attitude and position of the colonial administration towards them;
- Demonstration of the importance of opening Russian schools in the city, Russian-style and new methodological schools;

It consists of solving tasks such as providing information about cultural and educational work, literary processes and other cultural institutions in the city.

### **MAIN PART**

Therefore, the following opinion of President Sh.M.Mirziyoev is also important in understanding the role and importance of the city of Kokand in the history of our country. "It is no coincidence that Kokand was chosen for the first International Crafts Festival in Uzbekistan. This ancient and beautiful city has long been known around the world as a place of skilled craftsmen, in general, as a center of folk art and applied arts, firmly established in the Fergana Valley"[1]. The history of our country in the second half of the XIX century - the beginning of the XX century, which is an important period in the history of our country, corresponds to the colonial period of Tsarist Russia. The study of the life of the people under colonial oppression, the country's economy, cultural life, the history of changes in the urban economy will greatly help to understand the importance of independence.

The study of the history of cities is an important historical category in the science of history, in the emergence, formation and development of which is a whole socio-economic, economic life. However, cities have always played an important role in the history of society. From the above considerations, it is clear that the study of our history in the late XIX and early XX centuries, and especially the history of cities in these periods, is one of the most actual issues.

Kokand, one of the oldest cities in Central Asia, is more than two thousand years old. This city was the capital of the Kokand khanate for more than a century and a half (1709-1876). But to this day its history has not been perfectly studied and written. In the words of the First President of the Independent Republic of Uzbekistan Islam Karimov: "Love for the homeland, the feelings of humanity are the eternal characteristics of our people. The issue of preserving and further improving these unique human qualities, bringing up our children as worthy sons and daughters of a free and democratic Uzbekistan should be the main direction of our work in the field of spirituality. Accordingly, a comprehensive study of the history and culture, geography and economy of the Motherland, our ancient traditions is of great importance. In the education system, from pre-school to higher education, the teaching of this science and knowledge should be seen as an important political task."[2] Many cities in the Fergana Valley have existed since ancient times. But their economic development had been very slow, sometimes stalled, as a result of devastating wars. Restoring them to their original state was like building a new city in a vacant lot. One such ancient city is Kokand, which is more than 2,000 years old. G.N. Potanin,

who came to the city in January 1830, for this reason, wrote: "There are ancient monuments in the city that have deteriorated over time"[3]. In 1849, the article "Analysis of the current state of the Kokand Khanate" («Обозрение Кокандского ханства в нынешнем его состоянии») published in the "Information of the Geographical Society of the Russian Emperor" («Записки Императорского русского географического общества») states that the ruins around Kokand testify to the fact that it was an ancient city destroyed by the invasion of northern armies [4].

According to tourists traveling to the city, in the gardens of Kokand grew trees, many of which are several centuries old [5].

About the establishment of the city, V.P. Nalivkin provides interesting information. He mentioned that in 1732, when Shahrukh's son Abu ar-Rahim became ruler, he founded the city of Kokand [6], and after his death, his brother and successor Abu al-Karimbi moved to Kokand and rebuilt it. Only then did Kokand have its own land. The locals date establishment of the city to 1153/1740 [7]. In our opinion, V.P. Nalivkin made a mistake. The existence of the city was also mentioned by Florio Beneveni, the secretary of the Oriental Commission, who was sent to Bukhara from Russia in 1718. In his memoirs we read: "There were 23 cities in the whole Bukhara region now and in the past, including east of Bukhara: Azora, Karmana, Tashkent, Kokand, Margilan, Namdan, Andijan and Kashgar ..." [8]. There is a myth that the toponym Kokand is derived from the word Hoqand (pleasant, graceful city, old city). When the need arose to build a city, experienced craftsmen — urban builders and experts in their planning — advised their governor to choose the most convenient location between the fresh water and the stream.

## RESULTS AND DISCUSSIONS

In fact, in manuscript sources in the XVIII-XIX centuries the city was called Hokand. Here are a few examples. In the "Catalog of the Archives of the Kokand Khans" written by A.L. Troitskaya, the toponym Hokand is found in more than 50 documents [9]. The following information written by Hakimkhan Tora is noteworthy: "Rahimkhan was called Sahibkiran, and after a while he left the government of Khokand to his brother Abdukarimbi and came to Khokand province, where Khokand was a new prosperity." [10]

Academician V.V. Bartold paid great attention to the origin of the word "Kokand". He wrote: "Kokand" is written in Arabic as Khuvaqand. Later Khoqand. Therefore, it was derived from the expression in the nations.

Khokand is the "city of pigs" [11]. Let's read the following: "In Babur's works, Kokand is not mentioned as a city, according to Jamal Qarshi, although the mausoleum of the Muslim saint Imam Abdullah ibn Ali is located in it, one of the brothers of Imam Muhammad al-Bakir." The name itself is written in the works of Babur in the form of Khokan district (archin): in the XVII century the city of Kokand appeared, and in Russian sources it is called Kokand. The form of Khokand, Russian Kokand was formed only in the XIX century [12] due to the literary tradition. In our opinion, Havokin or Havokent cannot be the name of the origin of Kokand, because Havokin is the plural use of 'khoqan' (governors, kings) [13]. The word Hukand is not related to the origin of the word Kokand, which is confirmed by the narrations in the manuscript "Tarikh-i Fergana". The story of Mulla Alim, the author of Tarikh-i Turkiston, the site of the city was built, is noteworthy. He wrote, for example, "It has been commanded to a number of men, both vigilant and experienced, to find a good and suitable place to build a horde and a fortress." They looked at many places and neighborhoods, and finally built a fortress and an arch in the middle

of the two streams, in the place of the blue-clad saints, on the bank of the cliff. In a short time, the city and the arch, their buildings were prepared, and on a good day and hour, all the provinces and soldiers, citizens and nobles came together and enthroned Shah Rukh Khan in the royal robe". Most importantly, the origin (etymology) of Kokand is related to the word Khokand.

In many manuscript sources and Kokand coins there is an expression "Khoqandilatif" ("Latif khokand"). According to locals, Kokand proves that the distance and location of other countries are even more accurate than in present-day Kokand.

Thus, it is safe to say that the toponym Kokand is derived from the word "Khokand", which means "Pleasant city", "Latif city" ("Khokandilatif"). However, the variants of "City at Height", "City of Hunar", "City of Hular", i.e. "City of the Hu" (Ku) Tribe (People) cannot be ruled out. It should also be noted that in ancient Chinese manuscripts, the city of Kokand (Guyshan) is represented as "Huhan". In view of the above, Kokand is one of the oldest cities in the Fergana Valley, which is more than 2,000 years old.

As the capital of the Kokand khanate, it also served as a center of culture and enlightenment. During the reign of the khanate, several dozen madrassas were built in Kokand, the highest educational institution in the Muslim world. According to some sources, by the middle of the 19th century, there were more than forty madrasas in Kokand. The madrasas taught Arabic, Persian and Turkish perfectly according to the requirements of the time. Students studied the science of the Qur'an, the laws of Shariah (fiqh), khandasa, the science of nujum, philosophy, logic, ethics, literature, history, geography, medicine. But the madrassas did not pay enough attention to the natural and secular sciences.

Kokand had more schools than other cities of the khanate. Almost every mosque has a school. There were also private schoolchildren who opened a school in their home and taught the children. It is known that there are more than 120 schools in Kokand. The Kokand literary environment had a special place in the cultural and enlightenment life of the khanate. Poems of poets and poetesses created in Kokand were spread not only in the capital of the khanate, but also in the whole khanate and beyond.

Many talented poets and poetesses have created in Kokand.

By the 19th century, Kokand, one of the largest cities in Central Asia, had become not only the capital of the khanate, but also the political, economic and cultural center of the Fergana Valley. H. Potanin gives the following information about the considerable expansion of the city during this period in 1829-30: "There are about 3,000 beautiful mosques, madrasas and other buildings in Kokand".

In the city of Kokand there were mahallas specializing in a certain branch of handicrafts, namely, paper production, tannery, coppersmithing, knife-making, blacksmithing, porcelain-making, and saddle-making.

The trade relations of the Kokand khanate with Russia are described in great detail in Russian historiography. In this field V.V.Grigorev, P.I.Nebolsin, N.I.Vaselevskiy, N.I.Nalivkin, V.V.Vilyaminov-Zernov, S.V.Zhukovskiy, A.Kun, N.Petrovskiy, A. The works of P. Fedchenko, N. Pantusov and others provide valuable information.

## CONCLUSION

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In the middle of the XIX century, during the visit of V.V. Grigorev to the Orenburg province, a collection of coins of the Kokand Khanate was created on his initiative, which studied the trade and economic relations of the Kokand Khanate with Russia. The book "Modern Coins of the Kokand Khanate" pays some attention to the political events in the Kokand Khanate in the first half of the XIX century and the khanate's relations with Russia, In Orenburg, and V.V. Grigorev was in constant contact with traders from Kokand and Tashkent, and Kokand provided information on Russian trade.

In general, we can see that the Kokand-Russia trade and economic relations are well studied in Russian historiography.

## REFERENCES

1. Mirziyoev ShM. The flowerbed of people's intelligence and values. Masterpieces of handicrafts of Uzbekistan. Book-album. T.: Uzbekistan, 2019. p4.
2. Karimov IA. Basic principles of political, social and economic prospects of Uzbekistan. T.: Uzbekistan, 1995. pp.51-52.
3. Karimov UU. Scientific And Theoretical Foundations Of The Formation Of The Social Environment In The Family. Oriental Journal Of Social Sciences, 2021;37-40.
4. Abdurakhmonova MM, UgliMirzayev MA, Karimov UU, Karimova GY. Information Culture And Ethical Education In The Globalization Century. The American Journal Of Social Science And Education Innovations, 2021;3(03):384-388.
5. Karimov UU, Karimova GY. The Importance Of Innovative Technologies In Achieving Educational Effectiveness. Журнал Естественных Наук, 2021;1(1).
6. Rayimov AA, Karimova GY. Social Aspects of the Formation of Social Activity in Youth. Oriental Journal of Social Sciences, 2021;1(2):29-32.
7. Boltaboyev M. History of Religious Confessional Politics in the Soviet Period. Theoretical & Applied Science. 2020;(6):668-671.
8. Bozarov DM, Karimova GY. Role Of The Self-Organization Model In Complex Social Systems. Oriental Journal Of Social Sciences, 2021;1-9.
9. Mukhamadqodirovich RA. The Role of Mass Media in the History of the Period of Independence. Academia: An International Multidisciplinary Research Journal. 2020;10(4):356-359.
10. Abdurakhmonova M, Karimova G, Karimova M. Role of Ethical Culture in Preventing Violence among Spupils. Интернаука, 2021;(11-2):50-51.
11. Khakimov NH, Ganiyev BS. The Role of Studying the Strategy of Action in Choosing a Professional Direction (Taking Into Account the Formation of Entrepreneurial Qualities) In Students. Scientific Bulletin Of Namangan State University, 2019;1(7):296-303.

12. Ganiyev BS. Innovative (Entrepreneurial) Activity of Women at a New Stage of Development of Our Society. Scientific Bulletin Of Namangan State University, 2019;1(11), 122-129.
13. Yuldashov I, Goynazarov G. A Need to Improve the Institutional System for Increasing the Social Activity of Young People at the Stage of Development. Интернаука, 2021;(12-3):18-19.



## A REVIEW ON PRIVATIZATION IN INDIA

Vipin Jain\*

\*Professor,  
Department of Finance & Marketing,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [vipin555@rediffmail.com](mailto:vipin555@rediffmail.com)

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### ABSTRACT

*The growth of private businesses free of functionary management is a noteworthy feature of India's economic reforms. The public sector in this country requires modernization since it contributes significantly to national investment and development. As a result, the purpose of this essay is to examine the partial privatization and restructuring of India's state-owned companies (SOEs), which need more dynamic shape. Since India switched to market-based pricing and incentives with improved contract enforcement, central government SOEs have increased their profitability, investments, and growth. SOEs outperform private businesses in terms of profitability and efficiency in the industrial sector. SOEs, on the other hand, do worse in the service sector than their competitors. Finally, the research makes policy recommendations for improving SOE performance in India. In many countries, including India, improving the efficiency and performance of public sector banks (PSBs) is a major goal of economic reforms. Private ownership is thought to assist enhance efficiency and performance. As a result, the Indian government began gradually reducing its ownership in PSBs in the early 1990s. Is it true that partially privatizing Indian banks has improved their efficiency and performance? The data on the effect of privatization across the world is varied. Despite the fact that the problem is significant in India, no research has addressed it to the author's knowledge. As a result, the current research fills a significant gap.*

**KEYWORDS:** *India, State-Owned Enterprises, Economic Reforms, Privatization.*

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### INTRODUCTION

In economics, privatization[1] is a wide term. It entails a number of activities, including the entry of private capital, the sale of government-owned assets, and the transition to a private economy[2]. As a result, there are three main characteristics of privatization: Ownership measurements, organizational measures, and operational measures are all included. The transfer of state companies' ownership to private owners is referred to as ownership measures. The restriction of governmental control in public businesses is addressed through organizational measures. These include the use of techniques for leasing and reorganizing businesses. The

method to enhance the profitability and efficiency of public businesses is via operational measures.

Nations all around the globe have their own businesses. Despite the fact that the phrase "state-owned enterprise" (SOE) [3] has a variety of connotations, it generally refers to a situation in which the government has considerable influence over the ownership of a company. Every state, in fact, has a legal obligation to have active and professional ownership in order to generate wealth. Economic value, social value, sustainability value, livelihood value, and so on are examples of such value. These SOEs are legally obligated to help the state accomplish its vision and purpose. It is also the duty of SOEs to operate in a strategic manner, as if they were a company, in order to sustain themselves, achieve continuous growth, fulfill the objective of their existence, and increase state revenue without incurring losses. SOEs must enhance their monitoring of public policy assignment performance as part of their corporate business administration.

People in every country want SOEs to conduct themselves honourably in their chosen field. Many executives claim that their companies have achieved sustainable development in the past and that they will continue to do so in the future. This, for example, has both concrete and intangible advantages, not just for the businesses but also for society. In particular, concrete advantages come from lowering the costs and hazards of doing business, while intangible benefits may boost a company's brand recognition, talent attraction, and competitiveness.

Evidence and case studies, on the other hand, indicate that many SOEs do not contribute in line with public expectations or government objectives. As a result, it is essential to evaluate the performance of SOEs, including SOEs in India. Low performance levels and regular fluctuations in performance, for example, have been highlighted as significant shortcomings of India's SOEs by study. Furthermore, labor rules virtually completely disregard the privatization of state companies, making it impossible to support the country's economic development. The purpose of this article is to identify and analyze India's reforms, which include the privatization of state-owned businesses.

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## **Historical Background of SOES in India**

India gained independence in 1947 and has faced many challenges, including widespread poverty, high levels of illiteracy and unemployment, a low GDP, and illness. India's need spurred the creation of SOEs in independent India, since necessity is said to be the mother of innovation. India's government adopted suitable industrial policies and launched SOEs in response to difficulties such as economic, social, developmental, and industrial issues, which was a significant step toward becoming a developed nation. The primary goal of India's five-year plan is to build a socialist society based on economic growth, self-reliance, social justice, poverty reduction, and the removal of all developmental obstacles. As a result, the five-year plan produced a mixed economy that gave appropriate respect and consideration to both public and private sector organizations. Nationalized industries, such as public utilities, railroads, and communications, are managed by the government because they produce income. In contrast, the nation has created state capitalist businesses from defective product and factor markets owing to high risk and poor returns, information scarcity, and apprehension on the part of a number of private firms. Hundreds of SOEs have been established by the Indian government in different industrial and service industries. Similarly, since independence, state (provincial) administrations have established hundreds of public businesses.

There are many reasons why the Indian government has been increasingly interested in SOEs since the country's independence. The previous British industrial strategy in India resulted in sluggish industrial development; it seemed that the British rulers were not serious about establishing Indian businesses and instead sought to keep India as a permanent market for British goods. As a result, the government had to step in and interfere in economic activity. The Indian National Congress at the time advocated, and its committee underlined, that the government should be involved in all aspects of the country's economic activity, including the creation of SOEs. The Burma Oil Company established the first oil refinery under British Government initiative in 1921 in Digboi, which was a notable milestone in public enterprise. Tea plantations and coal mining were also significant businesses in Assam throughout the modern era.

## **Indian SOES of Central and State Governments**

India has its own SOE model, which takes into account unity in diversity. The central government owns and oversees businesses that have received some financing from the private sector or the stock market. This arrangement pertains to the central government of India's SOEs. The state governments of India's many states all operate on the same basis. In India, both the federal and state governments own and operate fully financed and controlled businesses such as Indian Railways. The business model in these businesses includes 100 percent government decision-making, and governments generate income or profits for their exchequer. Another reality about India's SOE situation is that the words SOE, public sector, and so on are often used

interchangeably since the differences are minor. In fact, both the central and state governments of India need to increase their economic and social worth; as a result, SOEs have strategically positioned themselves in the competitive globe.

For the first decade after independence, evidence suggests that the role of SOEs in India has grown. According to the Government of India Department's source of public sector businesses [4], there are 257 profit-making central public sector companies functioning in India. There are, however, certain public-sector businesses that are losing money. Furthermore, the state governments of different Indian states own and manage public sector enterprises. According to the Government of India 20114 Public Enterprises (PE)[5] Survey, more than 80% of PSEs in India operate in five sectors: agriculture, mining, manufacturing, power, and services. The contributions of central public sector enterprises (CPSEs)[6] are received by the Central Exchequer in the form of dividend payments, interest on government loans, and tax and duty payments. Many public-sector factories are located in rural areas of the county, where essential industrial and civic infrastructure, such as power, water supply, townships, and labor, are lacking. As a result, both the federal and state governments may accomplish balanced regional development by providing these infrastructures and establishing public sector businesses.

## **Role of SOES in India's Economic Development**

To comprehend the significance of Indian SOEs, one must examine the country's industrialization policy [7] since the 1950s. Furthermore, the Commercial Policy Resolution defines the economic scope of SOEs.

Despite the fact that the Constitution protects the private sector [8] and private property, there is nevertheless a limit on investment. Indian businesses in utilities and infrastructure, such as railroads, ports, airports, and telecommunications and electricity units, were mainly in the public sector when the nation achieved independence in 1947. Existing private businesses in a variety of basic and capital goods sectors could only function with the authorization of the government. The trade goods industry, on the other hand, as well as intermediate manufacturing products such as cement, were available to the private sector.

True, Indian SOEs have aided this nation in attaining economic self-sufficiency. Building infrastructure for economic development and promoting industrialization; promoting employment and balancing regional development; creating a self-reliant economy through import substitution and developing export capacity; generating surpluses for development by earning suitable returns; and preventing the concentration of private economic power are among the main objectives of enterprises.

The government has created a number of new SOEs in core and fundamental sectors since the Second Five-Year Plan, when the Industrial Policy was implemented in 1956. It established steel, heavy engineering, fertilizer, power generating equipment, and machine tools factories, the bulk of which benefited from Russian Federation and other Eastern European nations' technical and financial assistance.

The coal industry, major commercial banks, and all insurance firms were all nationalized by the government by the 1970s. As a result, state (provincial) governments created a significant number of state-owned companies (SOEs), many of which operated in the joint sector and controlled up to 49% of the shares.

The number of CSOEs rose by 244 when the Indian government began the program on deregulation and liberalization<sup>5</sup> as part of the Seventh Five-Year Plan (excluding commercial banks and insurance companies). Because of the departure and privatization of several major CSOEs, this number had dropped to 239 by 2005–2006.

Since mature public enterprises dominated key sectors in the early 1990s, Indian SOEs developed; these had successfully expanded their production, opened up new areas of technology, and substituted imports in a variety of capital goods sectors, with technical competence, which aided India's ranking in terms of industrialization, and with a large pool of trained workers with technical knowledge.

There is a shifting situation in which SOEs (state-owned enterprises) or public-sector companies are experiencing difficulties. Poor management, resource mismanagement, lack of accountability, and frequently enormous losses are among their problems. As a result, governments all over the globe have been selling off these massive behemoths in recent decades in order to enhance the efficiency of the assets invested and to stop the massive drain on resources. India is no different. Rama (1999) stated that reducing the public sector is essential since it aids in the restructuring of SOEs in emerging nations. He said that the change may enhance economic efficiency, but that the dangers must be considered. According to Chakrabarti et al. (2017), complete privatization is very difficult to accomplish, although corporate governance changes may help SOEs improve their performance. As a result, while reforming SOEs, policymakers should carefully contemplate extensive privatization. Joshi (1999) highlighted privatization's significance in lowering social costs and dislocations. He came to the conclusion that privatization in South Asian nations does not increase trust in the private sector and results in widespread worker layoffs. As a result, on July 24, 1991, the Indian government issued a new industrial strategy, which many saw as a blueprint for the privatization of numerous industries. Disinvestment, listing SOEs on the public market, removing budgetary assistance for loss-making SOEs, greater professionalism and corporate culture, and so on were all part of the restructuring process.

SOEs play a significant role in India's economic growth. Despite the fact that the liberalized economic system and globalization have changed the role and function of SOEs, they continue to play an important part in the country's socioeconomic growth.

## 1. DISCUSSION

The following are the components of India's privatization concept[9]:

1. Delegation: The government oversees an enterprise's ownership and responsibilities. Private businesses, on the other hand, may provide the goods or services while the government is actively involved in the process. A contract, franchise, lease, or gift may all be used to delegate authority.
2. Divestment: The government sells the company's majority share to one or more private companies. As a result, the government controls partial ownership and a minority shareholder.
3. Displacement: The first stage is deregulation. This approach enables private players to join the market, and as a result, private businesses will gradually replace state enterprises.
4. Disinvestment: When the government sells a portion or the whole public business to private interests, this is known as disinvestment. In India, privatization is associated with the 1991 economic changes. Privatization, in general, refers to promoting private sector involvement in the management and ownership of public sector companies or SOEs. According to studies, there was



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a worldwide movement in the late 1980s and early 1990s to restructure loss-making public sector companies via privatization. This approach was started and used not just by developing nations like India, but also by several Western European countries. India has a mixed economy with both governmental and private sector businesses. SOEs have a 49 percent private involvement rate, which the new industrial strategy takes into consideration. Because of their poor financial and operational performance, state businesses must be privatized. The privatization of SOEs has many benefits. They include a significant decrease in government burden, increased professional competitiveness, improved public finances, infrastructure development financing, shareholder responsibility and accountability, less unwelcome intervention, and a dedicated work force, among others. The development of public sector undertakings and performance contracts in India is shown in Figure 1.

2. Between 1987 and 1991, Ahuja and Majumdar (1998) examined the variables influencing the performance of 68 Indian SOEs in the manufacturing sector. They discovered that the performance of Indian SOEs was affected by both poor performance and systematic changes in performance factors. Size has a positive correlation with efficiency, while age has a negative correlation with efficiency. Furthermore, the findings suggested that economic liberalization and reforms may help SOEs perform better. The manufacturing sector's state-owned companies, which are smaller in size, are the most likely candidates for privatization. These businesses may also be readily sold to private investors. This finding aids policymakers in developing practical policies and recommendations related to state-owned businesses and their privatization.

Another intriguing study project has provided insight into privatization. SOEs,[10], have lesser proficiency than privately held businesses. As a result, the primary goal of disinvestment<sup>6</sup> is to reduce the public sector's involvement in the country's economic activities in order to assist the private sector. Using the public share offering method, the research looked at the performance of 15 central public sector companies (CPSEs) in India's manufacturing, mining, power, and service sectors from 2003 to 2012. It used metrics to calculate the return on assets, return on equity, sales efficiency, net income efficiency, debt equity, dividend payments, real sales, and employment levels as part of a ratio study. The findings revealed that the public offering method causes performance changes in CPSEs that have been disinvested due to retail investor participation. Aside from that, the study analyzed the success and failure of privatization in India. According to Kikeri and Nellis [11], four factors must be considered when considering the privatization yield in India: commitment, competitiveness, transparency, and mitigation. In the Indian context, the elements of competitiveness and transparency get good marks, whereas commitment and mitigation receive low marks. To address privatization problems, the government should adopt partial privatization, goal streamlining, and other measures.

India's privatization of SOEs has a number of benefits and drawbacks. There is always a case to be made for and against privatization. Privatization, according to Tejvan Pettinger (2017), entails the transfer of state-owned assets to the private sector. There is a notion that the private sector can manage a company more effectively since profit maximization is emphasized more. Critics, on the other hand, have claimed that private companies may use their monopolistic position in the market at the expense of broader societal expenses. This argument is supported by the table below.

## **Advantage of Privatization**



Privatization does have certain benefits. First, private businesses always have a greater incentive than public ones. Managers and officials at private companies are generally cautious in the game since their pay is linked to the company's success, while similar incentive does not exist in public organizations. As a result, privatization increases the firm's efficiency. Second, with a public business, there is a significant degree of political influence, which prevents the company from making economically advantageous choices. Private businesses, on the other hand, seldom allow political considerations to affect their performance. Third, all of the process' objectives may be short-term, since the government often anticipates additional votes from the people and is therefore very engaged in future elections. The company's long-term objectives are often dependent on political choices. Finally, privatization may improve a firm's competitive capability in the market, which benefits customers[12].

### **Disadvantages of Privatization**

Privatization, on the other hand, has certain drawbacks. For example, although India is the world's second-largest democratic nation, this method focuses more on the profit maximization goal. When compared to SOEs, the social responsibility activities are modest. Transparency is not a priority for private sector companies, and they keep their stakeholders in the dark. Private businesses go to great lengths to achieve their aims, such as promoting corruption, using illegal methods to achieve objectives, lobbying, and so on. According to a study of the privatized status, privatization causes significant staff turnover, retrenchment, poor wages, and other issues, resulting in societal imbalance. Privatization and price inflation are inextricably linked. During and after the privatization of SOEs in India, there were many additional inconvenient, disadvantages, difficulties, setbacks, and problems[13].

### **1. CONCLUSION**

Reforms are required in every area of society, especially in Asia's emerging nations, since nothing lasts forever. Policy-making bodies, including SOEs, must debate the changing business environment and offer policy recommendations for them. Privatization of SOEs is one of the reform initiatives. For a developing country like India, privatization offers both benefits and drawbacks. The key characteristics of privatization have been discussed in this article. If public businesses operate as effectively as private-sector firms without really privatizing them, they may meet both the profit-making and social-responsibility agendas. To improve the effectiveness of SOEs in India, the reform process, which includes complete and partial privatization, must continue day by day. In order to implement changes, social fairness is an unavoidable need. Public participation as shareholders in SOEs will undoubtedly enhance their performance and accountability. Granting funding and concessions should avoid public companies that are losing money and causing problems.

Despite adopting product mix diversification, Indian manufacturing firms have poor performance, particularly in terms of financial performance, due to a lack of equipment modernization and talent upgrades. These businesses contribute to the operating margin before direct labor, although the majority of them lose money on EBITDA (profits before interest, taxes, depreciation, and amortization). Restructuring and disinvestments are two options for dealing with this problem.

To help Indian SOEs perform better, the government decided to give them more autonomy and enhance corporate governance by reorganizing boards and giving them more authority to make

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investment and strategic choices. It should also adopt the following recommendations to reform Indian SOEs: first, give SOE boards more power to make decisions after considering all relevant interests; second, improve SOE board independence; third, reduce government interference in SOE operations; and fourth, simplify SOE ownership by consolidating ownership in a single entity, such as the Stats Corporation.

**REFERENCES:**

1. R. K. Mishra and A. Lateef Syed Mohammed, "Privatization in India," *Int. J. Public Sect. Manag.*, 1994, doi: 10.1108/09513559410051345.
2. M. Harvey and A. McMeekin, "Public or private economies of knowledge: The economics of diffusion and appropriation of bioinformatics tools," *Int. J. Commons*, 2009, doi: 10.18352/ijc.144.
3. C. V. Stan, M. W. Peng, and G. D. Bruton, "Slack and the performance of state-owned enterprises," *Asia Pacific J. Manag.*, 2014, doi: 10.1007/s10490-013-9347-7.
4. Jurisch, Ika, Wolf, and Krcmar, "Key Differences of Private and Public Sector Business Process Change," *e-Service J.*, 2013, doi: 10.2979/eservicej.9.1.3.
5. "Privatization of Public Enterprises in Nigeria: Recipe for Sleaze or National Development?," *Acad. J. Econ. Stud.*, 2018.
6. S. Makkar and S. Makkar, "Privatization of central public sector enterprises in India: A performance analysis," *Polit. Econ. J. India*, 2017.
7. R. Baldwin and A. J. Venables, "Trade policy and industrialisation when backward and forward linkages matter," *Res. Econ.*, 2015, doi: 10.1016/j.rie.2015.02.008.
8. S. K. J. Ali, "Educational Rights of Minorities: A Socio-Legal Analysis," *SSRN Electron. J.*, 2013, doi: 10.2139/ssrn.2210941.
9. D. A. Aaker *et al.*, "Indian Institute of Management Indore," *PhD Propos.*, 2015.
10. P. Mandiratta and G. S. Bhalla, "Pre and Post Disinvestment Performance Evaluation of Indian CPSEs," *Manag. Labour Stud.*, 2017, doi: 10.1177/0258042X17716601.
11. J. Nellis and S. Kikeri, "Public enterprise reform: Privatization and the World Bank," *World Dev.*, 1989, doi: 10.1016/0305-750X(89)90066-1.
12. J.-C. Cosset, A. Durnev, and I. Oliveira dos Santos, "Privatization and Natural Advantage," *SSRN Electron. J.*, 2015, doi: 10.2139/ssrn.2641363.
13. K. S. Kousadikar, Anant; Trivender, "Advantages and Disadvantages of Privatisation in India," *Int. J. Adv. Syst. Soc. Eng. Res.*, 2013.

## COPPER SLAG CHARACTERISTICS AND APPLICATIONS: A REVIEW

**Navneet Kumar\***

\*Associate Professor,  
Department of Applied Science (Chemistry),  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [drashok.engineering@tmu.ac.in](mailto:drashok.engineering@tmu.ac.in)

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### ABSTRACT

*Copper slag includes elements such as iron, alumina, calcium oxide, and silica, which are generated during the pyro metallurgical manufacture of copper from copper ores. Slag is produced at a rate of 2.2 tons every tonne of metal produced. Dumping or dumping such massive amounts of slag causes environmental and space issues. Several investigators and copper-producing units across the globe have attempted to investigate the potential use of copper slag during the last two decades. Copper slag's favorable physico-mechanical properties may be used to produce products such as cement, fill, ballast, abrasive, aggregate, roofing granules, glass, and tiles, in addition to recovering precious metals via different extractive metallurgical methods. This article examines the properties of copper slag as well as different techniques for metal recovery and the manufacture of value-added products from copper slag, including pyro, hydro, and pyro-hydrometallurgical approaches.*

**KEYWORDS:** *Copper Slag, Environmental Problems, Metal., Oxides, Pyro Metallurgical.*

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### 1. INTRODUCTION

Slags, the glassy materials left behind after metals are pyro metallurgically recovered from ores, have been regarded waste since the dawn of the industrial age. Copper slag is one such substance, which is generated during the matte smelting and converting stages of copper pyro metallurgical production. Matte smelting produces two distinct liquid phases: copper-rich matte sulphide and slag oxides[1]. It is estimated that for every tonne of copper produced, 2.2 tons of slag is produced, and that global copper production generates about 24.6 million tons of slag per year. The main slag-producing areas, together with their amounts, are listed below. Copper-containing slags are either dumped as trash or marketed as goods with characteristics comparable to natural basalt crystalline or obsidian amorphous[2]. The kind of slag determines how much metal can be recovered and used. Recycling, metal recovery, value-added product manufacturing, and disposal in slag dumps or stockpiles are the current alternatives for slag management. Excellent soundness qualities, strong abrasion resistance, and good stability are among the mechanical features of processed air-cooled and granulated copper slag for aggregate usage. Granulated copper slag possesses pozzolanic characteristics due to the low concentration of CaO in copper slag.

It may show cementitious characteristics when the CaO concentration rises or when activated with NaOH, and it can be used as a partial or complete substitute for Portland cement[3]. The use of copper slag as a Portland cement substitute in concrete and/or as a cement raw material offers the dual advantage of reducing the cost of the concrete while also avoiding disposal expenses. Copper slag has certain characteristics that make it suitable for use as an aggregate in asphalt paving. The dumping or disposal of this slag results in the loss of metal values as well as environmental issues. Rather of being discarded, these slags may be utilized to their full potential by using their physico-mechanical characteristics[4]. As a result, many researchers have investigated its application, and they have used slag in a variety of ways, including the recovery of metal values, the production of value-added products such as cement, cement replacement in concrete, fill, ballast, abrasive, aggregate, glass, tiles, and so on. All of the aforementioned issues are briefly discussed in this article. Copper is recovered at high temperatures via the smelting and conversion processes. Sulphides and oxides of iron and copper are the main components of a smelting charge. Oxides such as Al<sub>2</sub>O<sub>3</sub>, CaO, MgO, and most notably SiO<sub>2</sub> are also included in the charge, and were either present in the initial concentrate or introduced as flux[5].

The chemistry and physical composition of the smelting system are mainly controlled by iron, copper, sulphur, oxygen, and their oxides. The oxidation/reduction potential of the gases used to heat and melt the charge has a significant impact as well. The initial goal of matte smelting is to guarantee that all copper in the charge is sulfidized and enters the matte phase, which is illustrated as follows. Slags are recycled into the smelting furnace, where their oxide is sulfidized to Cu<sub>2</sub>S. CuO, CuSO<sub>4</sub>, CuO/CuSO<sub>4</sub>, and CuO/Fe<sub>2</sub>O<sub>3</sub> are all examples of oxidized copper. During smelting, these compounds also react to produce Cu<sub>2</sub>S. In a nutshell, the whole quantity converts to Cu<sub>2</sub>S. Due to their high sulphur pressures, CuS and FeS<sub>2</sub> are unstable at high temperatures. Because the sulphide has little propensity to form these anion complexes, it remains a separate covalent matte phase, unlike the silicate slag. Silica is added directly to the matte for the most complete isolation of copper, which occurs when SiO<sub>2</sub> concentrations are near saturation[6]. To stabilize the slag structure, a certain quantity of lime and alumina are added. At 1000/1300 °C, the molten slag is released from the furnace. Slow cooling of liquid slag produces a dense, hard crystalline product, while rapid solidification of molten slag in water produces amorphous granulated slag. Kleen Blast and Tru-Grit are two brand names for copper slags[7].

Copper slag is often found as an impure iron silicate glass with tiny copper and copper sulphide particles. The chemical makeup of slag varies depending on the kind of furnace or treatment method used. Table 2 lists some of the physical and mechanical characteristics of copper slag. Copper slag that has been aircooled has a black color and a glassy look. The specific gravity changes depending on the amount of iron present, ranging from 2.8 to 3.8. Copper slag has a somewhat greater unit weight than ordinary aggregate. The material's absorption capability is usually extremely poor (0.13 percent). Granulated copper slag has a lower specific gravity and greater absorption capacity than air-cooled copper slag because it is more porous. The granulated copper slag is made up of angular particles that are regularly shaped and range in size from 4.75 to 0.075 mm[8]. Excellent soundness qualities, strong abrasion resistance, and good stability are among the mechanical features of air-cooled and granulated copper slag for aggregate usage. Because of its sharp angular form, it has a high friction angle. The slag, on the other hand, tends to be vitreous or 'glassy,' which has a detrimental effect on their frictional characteristics skid

resistance, which may be a concern if utilized in pavement surfaces. The majority of the copper slags are nicely crystallized, according to microscopic studies. Other oxides, such as silica, alumina, lime, and magnesia, account for 95 percent or more of the total oxides, in addition to iron oxides[9]. Quantitative Electron Microprobe studies revealed the composition of several of the slag stages. Several ways of recovering copper from copper smelter slags, with pyro metallurgical, hydrometallurgical, and combined pyro and hydrometallurgical processes receiving special consideration[10].

## 2. DISCUSSION

The next sections go through some of the techniques for recovering metals. One technique of treating copper slag is carbo thermic reduction, which includes recovering the metals as well as a portion of the iron, producing an iron-rich alloy in the end. Copper and cobalt are recovered from the alloy during processing. At the conclusion of the process, the iron that makes up the majority of the slag is typically left as a remnant ( $\text{Fe}_2\text{O}_3$ ) that has no commercial value and must be disposed of. Topkaya has previously exposed ancient copper slag from Kure, Turkey, to carbo thermic reduction to create a Fe/Co/Cu alloy (1990). It was discovered that by adding 4% coke powder to an alloy having 1.72 percent Co and 4.41 percent Cu, an alloy containing 1.72 percent Co and 4.41 percent Cu could be produced in 1 hour at 1400 8C, with Co and Cu recoveries of 97.7% and 86.7 percent, respectively.

A carbo thermal reduction method in a DC arc furnace with an open top type to treat ancient Kure copper slag. Maximum metal recovery was achieved in a 1-h reduction period at a temperature between 1430 and 1480 8C. In a closed type furnace, similar circumstances resulted in greater cobalt and copper content in the matte, as well as better recoveries. Cobalt and copper recovery in closed systems were 95.7 and 90 percent, respectively. Fluxing materials like CaO and  $\text{Al}_2\text{O}_3$  increased iron reduction, but there was no discernible effect on cobalt and copper recovery. In a 50 KVA furnace, granulated slag from Sterlite Industries India Limited was utilized to recover iron values. A charge of 10 kg granulated copper slag combined with 2.5 kg lime and 600gram graphite powder melted for 1 hour at 45 kW h yielded 85% iron recovery. The copper slag produced at Kure for pyro hydrometallurgical recovery of copper, cobalt, and manufacture of magnet grade iron oxide. In a DC arc furnace, fayalitic slag with approximately 0.8 percent Cu and 0.4 percent Co is reduced with coke/graphite, yielding a liquid alloy rich in iron with about 3.8 percent Cu, 3.3 percent Co, and 2.1 percent S. The cobalt and iron in the alloy are solubilized in hot sulphuric acid, leaving copper and other impurities in the residue. To precipitate cobalt as sulphide, the leach liquid is treated with  $\text{H}_2\text{S}$ .

To produce g- $\text{Fe}_2\text{O}_3$  for magnetic applications, the residual liquid, which contains mostly  $\text{FeSO}_4$ , goes through a processing sequence that includes goethite precipitation, dehydration, controlled reduction, and ultimately reoxidation. Metals such as nickel, cobalt, and copper from copper slag in a DC arc furnace by using a carbonaceous reducing agent. Pilot plant testing at Mintek, South Africa revealed nickel and cobalt recoveries of 98 percent and 80 percent, respectively, at power levels up to 600 kW and the maximum amount of iron oxide in the slag. Melted copper slag in a submerged electric arc furnace, partly reducing  $\text{FeO}$  to a metallic phase with copper and other metals. By passing via an air jet, the metallic phase has been converted into granules. After crushing the granules, the solution was leached with  $\text{H}_2\text{SO}_4$  and then purified with  $\text{H}_2\text{S}$  to extract  $\text{CuS}$ . From the final solution, iron was precipitated as goethite after the copper precipitation stage. Magnetic iron oxide was created by thermal breakdown of



goethite. An alternative approach is to extract copper from secondary copper slag using the flotation process. This technique may also be used to enrich Sn and Ni in small amounts. A flotation system for processing slags with Cu/Mo ores at the Almalyk copper smelter was detailed, and approaches to improve the slag flotation process were investigated. Because the quantity of metals contained in the slag is so little, many methods may not be cost-effective in recovering them. As a result, its use in the manufacture of various value-added goods such as abrasive tools, pavement, abrasive, concrete, cutting tools, tiles, glass, roofing granules, cement, asphalt concrete aggregate, and so on was investigated. Herman studied the use of granulated copper slag as a ceramic raw material, particularly as a component in ceramic binders. It was discovered that substituting copper slag for frit in the binder improved the mechanical service characteristics of ceramic abrasive tools.

Copper slag as a material that may be used in abrasive blasting or the production of abrasive tools. Some characteristics of copper slag, such as the capacity of their grains to withstand stresses or their geometry, have been shown to be similar to those of conventional abrasive materials, albeit their micro-hardness is lower. As a consequence, slag abrasive materials may be used in abrasive tools for non-ferrous metals, wood, and plastics machining. The particular machining output approaches that of tools containing silicon carbide or alundum in these circumstances, which is one of the most notable characteristics of slag-based abrasives. In the preparation of the grinding wheel, copper slag was employed as a binder. The advantages of employing slag-based binder instead of ceramics binder were shown by the service qualities of these grinding wheels, including ultimate strength, cutting characteristics, service life, and working surface condition. Lower porosity of the ground surface, better grinding efficiency, and lower energy consumption were achieved using these wheels. A comparison study on the use of grinding wheels made of copper slag against those made of polyurethane resins. The experiments were carried out on corrosion-resistant steel, 55 ordinary carbon steel in the heat-treated state, and 59 lead brass. The results are superior to those achieved with alundum grinding wheels. The greatest machining ability was discovered in heat-treated steel, whereas the lowest was reported in brass. The use of freely solidifying copper slag produced as a waste material from a high temperature copper process as an abrasive.

When decomposed, the billets produce grains that may be utilized as abrasives with a micro-hardness of approximately 7 GPa and mechanical strength comparable to electro-corundum. Slag's softening temperature of 1190 8C prevents it from being used as a ceramic bonded abrasive. The mechanical characteristics of slag and abrasive may be substantially improved by heat treatment at 800/1000 8C. The product possesses characteristics that are similar to corundum. The Transportation Research Board in Washington looked at the usage of copper slag aggregates in hot mix asphalt pavements. In California, fine copper slag was allegedly utilized in hot mix asphalt pavements, while in Georgia, granulated copper slag was reportedly included into asphalt mixtures to enhance stability. The Michigan Department of Transportation considers reverberatory copper slag to be a typical coarse and fine aggregate for hot mix asphalt pavement, despite the fact that it is seldom utilized. The copper slag from Bahia, Brazil was utilized as building materials by the American Concrete Institute. They found that the material's properties were comparable to or superior than those of conventional materials. As a result, copper slag may be a viable alternative to admixtures in concrete and mortars. The use of slag from copper smelting as fine aggregate in concrete. Ball milled slag had better strength in mortar strength



testing using a cement slag water ratio. The effects of several types of slag in mortar and concrete on alkali aggregate reaction, reinforcing steel corrosion, abrasion, workability and slump, shrinkage, and freezing thawing properties were investigated.

The mechanical properties of epoxide and epoxide-asphalt concretes filled with utilized abrasive from post-copper slag. Slag was discovered to be an excellent concrete filler. The use of slag as cement raw materials, Portland cement substitution in concrete, fill, and ballast. The addition of copper slag to the concrete mixture improved its compressive strength. Copper slag as a fine aggregate in concrete. They spoke about the strength, setting time, and durability of copper slag concrete. It was examined if copper slag might be used as a filler instead of traditional lithophone filler. Copper slag filler (0.043 kg of particle size B/150 mm) was added to a mixture of an abrasive powder (0.868 kg), powder novolak resin (0.147 kg), a liquid phenol formaldehyde resin (0.037 kg), and iron red pigment (0.013 kg) to improve the properties of grinding and cutting wheels, which was compacted and hardened for 16 hours at B/180 8C. At 3800 rpm, the resultant wheel was utilized to cut a steel rod with a diameter of 60 mm. The wheel's cutting ability was better to that of a wheel constructed with traditional lithophone filler. To make tiles, molten slag from copper smelting is cooled in the environment at approximately B/ 100 8C/h within 900/1250 8C. Reports on the use of copper smelting slags as feldspar replacing fluxes in the manufacture of ceramic face tiles are also known.

Due to the development of a liquid phase and strengthening effect during its solidification, the mechanical strength of tiles produced from kaolinitic clay and copper slags improved dramatically in the temperature range of severe sintering (1100 8C). Sintering is the mutual diffusion of atoms between contacting particles that occurs during firing. Sintering reduces the number of particles, increases their size, and eliminates pores. The interconnecting of crystals gives the burned body its strength. Fast-firing is based on the idea of promoting densification by skipping the coarsening regime with quick heating. It allows the material to acquire the mechanical properties needed for various applications as well as chemical inertia qualities. Copper slags have been utilized in the construction of granular foundation and embankment materials, aggregate replacements in hot mix asphalt, mine backfill materials, railway ballast materials, grit blast abrasives, roofing granule material, and blended cements granulated copper slags. In hot mix pavement, copper slags have been utilized as an aggregate replacement. Slags that have been aircooled may be utilized as coarse or fine aggregate, whereas slags that have been granulated can be used as fine aggregate.

### 3. CONCLUSION

Copper slag's favorable physico-mechanical and chemical properties enable it to be used to make a variety of value-added products such as cement, fill, ballast, abrasive, cutting tools, aggregate, roofing granules, glass, and tiles. These materials have been discovered to have better mechanical characteristics and may be less expensive than comparable traditional materials. The use of copper slag in this way may help to decrease disposal costs. This may also result in fewer environmental issues. It's also possible that plant economics will improve. Various pyro, hydro, and pyro-hydrometallurgical methods may be used to create metals and alloys from copper slag. As a result, it is clear that the proper use of various kinds of copper slag is critical in today's industrial waste management.

**REFERENCES:**

1. M. K. Dash, S. K. Patro, and A. K. Rath, "Sustainable use of industrial-waste as partial replacement of fine aggregate for preparation of concrete – A review," *International Journal of Sustainable Built Environment*. 2016, doi: 10.1016/j.ijse.2016.04.006.
2. P. R. Kannan Rajkumar, M. Rahul, and P. T. Ravichandran, "Characteristic study on high performance hybrid fiber reinforced concrete using copper slag fine aggregate," *Int. J. Eng. Technol.*, 2018, doi: 10.14419/ijet.v7i2.33.13848.
3. Paresh Tiwari and Anil Kumar Saxena, "A Review on Partial Substitution of Copper Slag with Sand in Concrete Material," *Int. J. Eng. Res.*, 2016, doi: 10.17577/ijertv5is120192.
4. B. S. Thomas and R. C. Gupta, "WITHDRAWN: Mechanical properties and durability characteristics of concrete containing solid waste materials," *J. Clean. Prod.*, 2013, doi: 10.1016/j.jclepro.2013.11.019.
5. R. Sharma and R. A. Khan, "Sustainable use of copper slag in self compacting concrete containing supplementary cementitious materials," *J. Clean. Prod.*, 2017, doi: 10.1016/j.jclepro.2017.03.031.
6. V. M. Illayaraja Muthaiyaa, G. Elatharasan, and A. Krishnamoorthy, "National Conference on Green Engineering and Technologies for Sustainable Future-2014 Copper Slag," *JCHPS Spec. Issue*, 2014.
7. D. K. P DrASHAK, "Utilization of Copper Slag As a Partial Replacement of Fine Aggregate in Concrete," *Int. J. Innov. Res. Adv. Eng.*, 2016.
8. D. Brindha and S. Nagan, "Utilization of copper slag as a partial replacement of fine aggregate in concrete," *Int. J. Earth Sci. Eng.*, 2010.
9. S. Anoop., K. V. Sathish, and B. S. Thomas, "Utilization of solid waste particles as aggregates in concrete," 2012, doi: 10.1016/j.proeng.2012.06.434.
10. R. Bharathi Murugan and C. Natarajan, "Investigation of the behaviour of concrete containing waste tire crumb rubber," in *Advances in Structural Engineering: Materials, Volume Three*, 2015.

## A REVIEW OF VARIOUS TECHNIQUES USED FOR SHAFT FAILURE ANALYSIS

**Shri Bhagwan\***

\*Assistant Professor,  
Department of Mechanical Engineering,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id-aksh.realworld@gmail.com

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### ABSTRACT

*This paper examines the various methodologies utilized by various writers for shafts failure research in different applications. This document compares and contrasts the numerous methodologies employed, as well as their application and limitations, as presented by various writers. The goal of this project is to investigate the various approaches for shaft failure analysis and to select the optimum methodology for shaft failure analysis in a gear box installed on an overhead crane to avoid repetitive failure. This review paper gives the insights of various analysis carried out to find shaft failure. Roller Shaft failures can be optimized by preventive mechanical maintenance techniques & using safe design with proper manufacturing processes. The various literatures has been systematically compared and reviewed to get a proper shaft failure analysis. Every method has its pros and cons and used by specific industrial segments. Shaft failure causes the unnecessary shutdowns and leads to heavy production loss. The objective of this paper is to study various shafts failure analysis and select the best method to find out the root because failure of heavy nip roller shaft used in textile industry.*

**KEYWORDS:** *Failure Analysis, Modes Fracture, Overhead Crane, Shaft Tool, Stresses Shaft.*

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### 1. INTRODUCTION

A shaft is a spinning part (solid or hollow) with a circular cross-section that is used to transmit power and rotational motion in machinery and mechanical equipment in a variety of applications[1]. It is a spinning part (solid or hollow) with a circular cross-section that is used to transmit power and rotational motion in machinery and mechanical equipment in a variety of applications. The majority of shafts are subjected to varying loads of bending and torsion with varying degrees of stress concentration. The issue with such shafts is mostly fatigue loading. Failures of such components and structures have piqued the interest of scientists and engineers, who have spent a lot of time trying to figure out what causes them and how to prevent them. A

crane is a piece of mechanical equipment that can rise, lower, and move a cargo horizontally using a hoisting mechanism[2][3].

The term driveshaft[4] refers to a revolving machine element with a circular cross section that supports and transfers energy to elements such as rollers, gears, and pulleys. The shafts have always been stepped, with the largest dimension in the middle and the smallest at the ends, which is where the Bearings are mounted. The steps give shoulders for gears, pulleys, and bearings to be positioned. The fillet radius is included to reduce stress concentration caused by abrupt cross section changes.

Axle, Spindle, Countershaft, Jackshaft, Line Shaft, and other names for shafts vary depending on the application. Ordinary transmission shafts are built of medium carbon steels with a carbon percentage of 0.15-0.40percent, such as 30C8 or 40C8, while higher carbon steels, such as 45C8 or 50C8, are utilized for increased strength. Alloy steel shafts are employed in applications where corrosion and severe wear are a concern. 16Mn5Cr4, 40Cr4Mo6 are common grades. High cost of alloy steels is compromised due to the added advantages. Commercial shafts are made of low carbon.

## 2. DISCUSSION

The procedure of collecting and analyzing data to understand the reason of a failure and how to prevent it from happening again is known as failure analysis. It is a crucial discipline in a variety of manufacturing industries. In the electronics sector, for example, it is a critical instrument for the development of new goods as well as the upgrading of existing ones. It might, however, be used to a variety of domains, including company management and military planning. The responsibilities of failure analysis and mitigation are critical in all engineering disciplines. Whether a component or products fails in service or even during particular manufacturing processes, the materials engineer[5] often takes the lead in the examination of failures. In any scenario, the reason of failure must be identified in order to avoid future failures or to improve the device, element, or structure's performance.

There are three broad goals that can be achieved by failure analysis.

1. Identifying modalities
2. The Reason for Failure
3. Determine the source of the problem.

Using procedures such as fractography, metallographic, and mechanical testing, failure mechanism can be established on-site or in the lab. Laboratory research and information of the element, its loading, and its surroundings are used to determine the reason of failure. To ascertain the cause, comparison sampling or laboratory duplicate of the failure mode may be required. The mode, the cause, and the specific process are all used to determine the root failed cause. Determining the root cause of a failure necessitates a thorough understanding of the equipment's design, operation, maintenance, history, and surroundings. Fractography, metallographic, and chemical analysis are all common failure analysis techniques. The failure analysis of an automobile's rear axle was covered in.

A product's failure signifies that it has become fully or partially unusable, or that its state has diminished to the point where it is unreliable. The failed element is checked and its condition is documented. Scales or deposit is collected if necessary, and any fracture surface features are

noted. SEMs are frequently used to inspect surface cracks for material flaws, assess fracture modes, and precisely measure fracture features and particles. When paired with traditional non-destructive examination (NDE)[6] procedures as ultrasonic testing[7], eddy current, magnetic particle testing, or liquid penetration testing, metallographic is very powerful. Fatigue failures caused by a recurring cycle, corrosion failures, stress corrosion cracking, ductile and brittle fractures, hydrogen embrittlement, liquid metal embrittlement, creep, and stress rupture are some of the most common root cause failure mechanisms. Fracture can be caused by a number of different failure mechanisms or root causes. A failure analysis can offer the data needed to pinpoint the fundamental cause of a failure. Misuse or abuse, manufacturer assembly errors, incorrect maintenance, design faults, improper material and heat treatment method for the material, and manufacturing defect such as unanticipated running costs are all major reasons of failure.

## **2.1. Causes and Analysis of Shaft Failure:**

### **2.1.1 Causes Of Failure:**

- a. Presence of cyclic over-loads
- b. Stress concentration. They may be due to production or operation causes e.g. under cuts, machining, traces, notches etc.
- c. Wrong adjustment of bearing, insufficient clearances.

### **2.1.2 Miscellaneous Non Fracture-Type Shaft Failure:**

There is a broad category of shaft failures or motor failures that does not result in the shaft breaking. The following is a list of the more common causes:

- a. Bending or deflection causing interference with stationary parts
- b. Incorrect shaft size causing interference, run out or incorrect fit
- c. Residual stress causing a change in shaft geometry
- d. Material problems
- e. Excessive corrosion and wear.

## **2.2 The Tools of Shaft Failure Analysis:**

- a) Visual inspection
- b) Optical microscope
- c) Scanning Electron Microscope
- d) Transmission electron microscope
- e) Metallurgical analysis

## **2.3 Fatigue Failure:**

Fatigue[8] is one of the most common reasons of shaft failure. Repeated cycling of the load causes metal fatigue. It is a type of progressive localized damage caused by the material's varying stresses and strains. Metal fatigue cracks begin and spread in areas where the tension is the greatest. The concept of weariness is straightforward: whenever a motion is repeatedly, the object conducting the job weakens. When a material is subjected to alternate stresses over a long stretch of time, fatigue occurs. Spring, turbine blades, aero plane wings, bridges, and bones are all examples of places where Fatigue can occur.

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- a. On a microscopic level, there are three processes to examine a material failure due to fatigue:
- i. *Crack Initiation*: This is when the first crack appears. Surface scratches created by material handling or tooling, threads (as in a screw or bolt), slip bands, or dislocations intersecting the surface as a result of earlier cyclic stress or work hardening may cause the crack.
  - ii. *Crack Propagation*: During this stage, the crack continues to expand as a result of the imposed forces.
  - iii. *Failure*: When the material that is not damaged by the crack is unable to bear the applied stress, failure occurs. This is an extremely fast-paced stage.
- b. Improvements in design are the most effective way to increase fatigue performance.
1. By streamlining the part, eliminate or lessen stress raisers.
  2. Avoid sharp surface tears caused by punching, stamping, shearing, or other procedures.
  3. Prevent surface discontinuities from forming during processing. Reduce or eliminate manufacturing-induced tensile residual stresses.
  4. Improve the fabrication and fastening operations' specifics.

Metal fatigue is a serious issue that can arise when repeated loads are applied below the static yield strength. Because most engineering materials contain discontinuities, this can result in an unexpected and catastrophic collapse in usage. Discontinuities in highly strained parts of the component cause the majority of metal fatigue cracks. Discontinuity, design, incorrect maintenance, and other factors could all contribute to the failure. A failure analysis can help you figure out why something went wrong.

## 2.4 Modes Of Fracture:

### A. Monotonic Overload:

- i. *Brittle*: Brittle fracture can occur when the yield strength is exceeded. When it comes to materials that have been subjected to impact and shock loads, they usually happen without notice. As a result of shock loading, brittle fractures are most prone to develop on large-sized components or structures.
- ii. *Ductile*: If a material is loaded above its yield point and the deformation process continues, fracture will eventually occur. To plastically deform the material at the necking zone of a ductile fracture, a significant amount of energy is required. Deep drawing, forging, and other metalworking operations rely heavily on ductile cracks.

### B. Subcritical Crack Growth:

- i. **Ductile Behavior**: Failure occurs as a result of bulk yielding, which results in undesirable permanent deformations. Noise, loss of precision, excessive vibrations, and eventual breakage can all result from these failures. Bulk yielding is a failure criterion in machinery. In static loading, little patches of yielding exhibit ductile behavior.
- ii. **Brittle Behavior**: Fracture is the cause of failure. Ceramics, grey cast iron, and extensively cold-worked parts are examples of materials (or situations) that do not allow for significant yielding.

### C. Dynamic Loading:

Materials fail due to fatigue when subjected to dynamic loading. Fatigue life is determined by subjecting the material to cyclic loading, which is a well-known phenomenon. The most



common loading is uniaxial tension, however other cycles such as torsion or bending can also be used.

Slow fracture propagation through the material causes fatigue failures.

There are four steps to the failure process.

1. Crack formation
2. Microcrack formation (with a crack length smaller than the grain size of the material) (Stage I)
3. Macro crack growth (crack lengths ranging from 0.1 to 10mm) (Stage II)
4. Failure due to a rapid fracture.

### **2.5. Tools Used For Shaft Failure Analysis:**

Non-destructive testing (NDT) is a broad category of analysis procedures used in science and industry to assess a materials, components, or system's qualities without causing damage. This method is also known by the terms nondestructive examination (NDE), nondestructive inspection (NDI), and nondestructive evaluation (NDE).

#### **A. Inspection Of Magnetic Particles:**

Magnetic Particle Inspection (MPI)[9] is a non-destructive testing (NDT) process for detecting surface and slightly subsurface discontinuities in ferromagnetic materials such as iron, nickel, cobalt, and some of their alloys. It must be carried out in accordance with international standards such as EN473 and ISO9712. A magnetic field is created in the part as a result of the process. Direct or indirect magnetization can be used to magnetize the component. When an electric current is supplied through the test object and a magnetic field is produced in the material, direct magnetization occurs. When no electric current is supplied through the test device, but a magnetic field is applied from an external source, indirect magnetization occurs

#### **b. Liquid Penetrate Testing:**

Liquid Penetrate Testing (PT)[10] is a highly successful test method for exposing surface-opening discontinuities for visual inspection. It is based on capillary action. The dyes employed are either fluorescent or visible. After removing anything that could block surface apertures or otherwise obstruct the examination, the surface is cleaned and dried. The penetrate is applied using an appropriate method, and any residual penetrate on the material surface is removed when the prescribed penetration time has passed. The developer is immediately applied. The final interpretation must be completed between 7 to 60 minutes of the developer's dwell time.

#### **C. Electromagnetic Inspection:**

The process of producing electric currents or magnetic fields, or both, inside a test object and detecting the electromagnetic response is known as electromagnetic testing (ET)[11]. A fault inside the test object produces a measurable response if the test is put up correctly. The process of producing electric currents or magnetic fields, or both, inside a test object and detecting the electromagnetic response is known as electromagnetic testing (ET). A fault inside the test object produces a measurable response if the test is put up correctly.

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### 3. CONCLUSION

In this work, the numerous shaft failures are discussed. Some shaft failures are caused by a lack of attention to repair and maintenance. When welding repairing operations, particular care should be used to relieve stress. To solve this problem, perform a failure study of the shaft in the overhead crane gear box using the techniques see. Shaft modeling based on current dimensions. Determining the different loads and stresses on the shaft. Failure analysis of the existing shaft to determine why it failed. The shaft's composition can be changed based on the analysis. The shaft needs to be redesigned.

### REFERENCES:

1. D. C. D. Hariom, Vijoy kumar, "A Review of Fundamental Shaft Failure Analysis," *Int. Res. J. Eng. Technol.*, 2016.
2. J. L. Perez-Diaz, E. Diez-Jimenez, I. Valiente-Blanco, C. Cristache, M. A. Alvarez-Valenzuela, and J. Sanchez-Garcia-Casarrubios, "Contactless mechanical components: Gears, torque limiters and bearings," *Machines*, 2014, doi: 10.3390/machines2040312.
3. J. Yazhou, "Analysis and calculation of fatigue loading of machine tool gears," *Int. J. Fatigue*, 1991, doi: 10.1016/0142-1123(91)90484-G.
4. M. Hajianmaleki and M. S. Qatu, "Transverse vibration analysis of generally laminated two-segment composite shafts with a lumped mass using generalized differential quadrature," *JVC/Journal Vib. Control*, 2013, doi: 10.1177/1077546312452903.
5. J. D. Williams, "Materials for Engineers," *Prod. Eng.*, 1976, doi: 10.1049/tpe.1976.0066.
6. S. K. Dwivedi, M. Vishwakarma, and P. A. Soni, "Advances and Researches on Non Destructive Testing: A Review," 2018, doi: 10.1016/j.matpr.2017.11.620.
7. H. Ma, L. Huang, and G. Du, "Research on ultrasonic-testing virtual instrument," *Yi Qi Yi Biao Xue Bao/Chinese J. Sci. Instrum.*, 2005.
8. M. Zamanzadeh, E. Larkin, and R. Mirshams, "Fatigue Failure Analysis Case Studies," *J. Fail. Anal. Prev.*, 2015, doi: 10.1007/s11668-015-0044-3.
9. "Magnetic particle inspection," *Adv. Mater. Process.*, 2008, doi: 10.1520/stp47862s.
10. K. FUJIOKA, "Liquid Penetrant Testing," 非破壊検査, 2000.
11. Y. Gotoh and H. Tanaka, "Analysis of electromagnetic inspection method of opposite side carburization depth in steel plate taking account of minor loop," *IEEE Trans. Magn.*, 2014, doi: 10.1109/TMAG.2013.2284275.

## AN OVERVIEW ON AYURVEDA ON AGEING

**Dr Amit Mishra\***

\*Assistant Professor,  
Department of General Medicine, Faculty of Medicine,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [dramitmishra1980@gmail.com](mailto:dramitmishra1980@gmail.com)

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### ABSTRACT

*As we get older, the incidence of disease increases while our life expectancy falls. Ayurveda has the ability to prevent illnesses via health promotion and to manage ailments that arise in old age. We cover smoking cessation, exercise, Yoga, Ramayana therapy, and proper diet as well as other lifestyle suggestions. Jarachikitsa, also known as Ramayana, is a unique therapeutic methodology for delaying aging and reducing the severity of issues that arise during this degenerative stage of life. Future aging may be slowed before old age sets in. In fact, youth is the best period to address geriatric issues. Discipline in youth helps to prevent geriatric issues later in life. The risk of no communicable chronic illness may be decreased by adopting a healthier lifestyle. The Indian government has started a nationwide effort to promote the advantages of Ayurveda and Yoga in the field of senior health care. It is essential to create an efficient holistic geriatric care protocol that includes Ramayana, Panchami, Dietetics, Ayurveda medications, lifestyle, and Yoga.*

**KEYWORDS:** Ayurveda, Geriatric, Ramayana, Spiritual, Yoga.

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### 1. INTRODUCTION

Aging is an inter process of physical, psychological, and social change. The number of old people on the planet is increasing. One-fifth of the world's population will be over 65 years old by 2050. By 2016, India would have 113 million elderly people. Ayurveda has the ability to prevent illness via health promotion and the prevention of no communicable diseases. Rasayana or Jarachikitsa is a focused branch that promotes healthy lifespan. Jarachikitsa and Ramayana were shown to decrease geriatric deterioration and delay vrudhastha[1].

#### 1.1. Psychological Problems:

Dementia is often seen in the aged. Dementia affects people worldwide, with new cases identified each year. The feeling of being ignored in the family is a common complaint among the elderly. Depression is by far the most dangerous and very well psychiatric ailment among the elderly[2].

#### 1.2. Social Issues In Elderly:

Addressing geriatric problems is not only the responsibility of the elderly. In this battle, both the family and society bear a part of the blame. When coping with elderly problems, the primary factors to examine are marital status, financial situation, work history, education, responsibilities, home environments, and accommodations. Death of a family member or siblings, retirement, relocation, and financial deterioration are all examples of key support being lost. Due to the changing phenomena in India, such as the nuclear family system and population migration to cities, rural old people suffer the most as a result of a lack of family support. Physical abuse, mental torture, neglect, and economic exploitation are all prevalent among older people, adding to their suffering. These alterations may result in a variety of issues that affect physical, social, and mental health[3].

### **1.3.Spiritual Issues In The Elderly:**

Full engagement in religious events helps continue to cope an active lifestyle and socialize, which reduces the problems associated with isolation and chronic illnesses. Interaction with individuals will raise awareness, allowing for early detection of illnesses and improved treatment compliance. Religious and spiritual people are more likely to recover from diseases faster. Attending religious events keeps elderly people motivated to quit smoking and drinking, which improves their health and social standing. Praying, reading religious literature, visiting auspicious places, participating in religious rituals, and meditation are all typical spiritual treatments. Try to keep your thoughts and demeanor as pleasant as possible. This will increase sociability, reduce loneliness, and foster a sense of belonging.

### **1.4.Diet And Nutrition:**

Malnutrition becomes increasingly common as individuals become older for a variety of reasons. Including Arochaka.Smritinas.Manoavasada.Stroke, Kampavata.and other neurological diseases, as well as delayed stomach emptying. Its diet must be tailored to the environment, season, age, and gastrointestinal capacity of the individual. When developing or advising a dietary or other lifestyle program, bear the following things in mind[4].

### **1.5.Concept Of Ramayana (Rejuvenation):**

Ramayana is a wide term that refers to data development on both a qualitative and quantitative level. Vayasthapanas are specialist Ramayana drugs that help to reverse degenerative processes and improve health.Rasayana therapy is most useful for the treatment of chronic or long-term functional and degenerative disorders. Ramayana is the sole answer in such cases from the viewpoint of efficient management in any health industry. When Ramayana is preceded by suitable Panchakarma, it becomes more fruitful and effective. The reason we find mixed outcomes in many cases when Ramayana is used is because this purification is either not done or done incorrectly. Some study that is based on evidence. Other compound formulations having a multipronged effect that are available on the market are mentioned below: Brahmi Ramayana, Ashwagandha Lenya, Mahi Tryphosa grit, Tryphosa Churn, Ashwagandha Churn, Narasimha Functionaries, Agastya Ramayana, Malaki Ramayana, Brahmi Ramayana, Ashwagandha Lenya, Mahi Tryphosa Greta, Tryphosa Churn, Ashwagandha Churn, and Ashwagandha Churn[5].

### **1.6. Exercise:**

Exercise aids in weight control, mental well-being, stress relief, blood circulation, and flexibility. Regular yoga practice starts in infancy and helps to counter the effects of aging.

### **1.7. Benefits Of The Geriatric Yoga:**

Because of the greater flexibility and core stability, yoga promotes excellent balance, blood flow, and tissue vitality. Many age-related issues may be avoided if a person joins the Elderly Yoga course on a regular basis. With Yoga's calming qualities, it is able to reload the most important brain processes. During Yoga sessions, a person gets knowledge with his own existence, body, and mental performance. He learns to be more in control of his body. He considers his emotional state with relation to his issue. He develops the capacity to deal with the symptoms he encounters. Relaxation methods decrease sympathetic activity. The calming reaction reduces pain, fatigue, sadness, and stress. The ability to remember things becomes retentive. Because of its numerous beneficial effects, yoga has found a place in geriatric and rehab centers in developed countries in Europe and the United States, and it has begun to be practiced to improve physical health, to notify, to cope with, and to support in various supportive programs; to help people with issues such as pain, fatigue, stress, nourishment, and exercise. The following yogic activities that promote longevity should only be done under the supervision of a certified Yoga therapist. Surya Namesake, Pavanamuktasana, Aroha Matsyendrasana, Bhujangasana, and Shraavana are among the asana. Nadisodhana, Kapalbhathi, Bhandari, NetIQ, Bhastrika, and Tartan are the different types of pranayama. Mudras: The Khichari mudra is being used to treat illnesses and age. Related issues. Dhahran, Dayana, Swadhyaya, and Eswaran Pranidhana are the four types of yoga[6].

### **1.8. Cutting Down Smoking And Alcohol:**

Livers, stomach problems, gout, melancholy, osteoporosis, heart disease, and hypertension are all linked to drinking. With age, sensitivity to the impact of alcohol rises.

#### **➤ Social Activities:**

Mixing with people their age, at the same stage of life, or have comparable health concerns may help people realize they are not alone. The elderly do not have to be seen as service users all of the time. They may also be useful as culture transmitters, caregivers for grandkids. Advisors for the young couple. And problem solvers and problem solvers[7].

### **1.9. Health Span:**

The term "health span" refers to a person's lifespan minus the time spent in poor health. This refers to the time in a person's life once they are usually healthy and free of severe or chronic disease. As a result, health span refers to how long a person may live a healthy, disease-free life. Biological aging, in terms of health span, is the consequence of complex structural and functional changes affecting molecules, cells, tissues, and whole bodily systems. Genomic instability, telomere attrition, epigenetic changes, loss of proteostasis, unregulated nutrition sensing, mitochondrial dysfunction, cellular senescence, stem cell fatigue, and altered intra- and intercellular communication are all variables that affect its expression. Some in the aging field believe aging to be a fatal illness since it is accompanied with impairment of normal

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physiological functioning of cells, tissue, organs, and biological systems, which raises the chance of mortality. As there are many distinct and sometimes competing theories of aging, there is no one cause or trigger for the aging phenomenon. Reduced stem cell proliferation in a variety of organs, buildup of toxic protein aggregates & free radicals, accumulation of senescent cells that cause inflammation, and impairment in mitochondrial function are all biological alterations that contribute to aging. The accumulation of mutations in DNA, as well as faulty DNA repair mechanisms and telomere shortening, are all linked to early indications of aging at the genomic level. A combination of many of these variables, per some experts, may contribute to general aging[8].

### **1.10. Factors That Promote Biological Aging:**

While aging is unavoidable, there are methods to mitigate or postpone the harmful consequences of aging. This entails investigating methods to fight aging on a cellular and/or genetic level, as well as determining if any of the aforementioned aging triggers are susceptible to pharmacological treatments. Researchers suggest at least seven interwoven processes that cause aging, laying up a framework for finding program mediators and treatment possibilities. Deciphering these variables, which are also responsible for age-related illnesses, will aid medication development attempts to slow down the aging process. One of these variables, metabolism, has sparked a lot of interest, and scientists have been attempting to figure out why calorie restriction increases the life span of mice and other animals.

## **2. DISCUSSION**

RASAYANA is the Ayurveda idea of anti-aging, which seeks to preserve good physical and mental health in senior age via a mix of nutritious food, healthy activities, and mild medicines. *Canella asiatica* is the most well-known anti-aging *vayasthapana* plant; one of its numerous functions is to boost collagen production. *Varnya*. *Varnya* is a collection of herbs that has the ability to improve the skin's radiance or bright complexion. Massage your face and neck area with a little quantity of heated olive oil. For at least 10 minutes, continue rubbing your face. Wipe with a clean towel dipped in lukewarm water. Alternatively, you may massage your face with jojoba oil, almond oil, or coconut oil. When applied to the face for 30 minutes, a combination of turmeric powder, rice powder, and tomato juice may help to minimize fine lines and wrinkles. Due to the exfoliating properties of turmeric, a paste made by combining gram flour and turmeric powder in water may help to prevent obvious symptoms of aging. *Ashwagandha*. Known as Indian ginseng, is an Ayurveda revitalizing and adaptive plant that has long been utilized as an anti-aging agent. Beta-carotene, which takes its name from the traditional food, is plentiful in carrots. This beta-carotene is converted by the body into vitamin A, which is known as retinol in carrots and is used in many anti-aging treatments.

Yes, it is correct! Ghee contains vitamins A, E, and K, which assist to repair damaged cells, stimulate hair development, and give skin a healthy shine. It aids in digestion and helps to revitalize the body from the inside out. Pure cow ghee, an age-old medicine, offers moisturizing and revitalizing qualities. Ghee provides fats to the skin, which may help increase Collagen in a variety of ways. You quickly fattens up your skin and helps it seem younger. *Ashwagandha* contains antibacterial and antimicrobial qualities, which are important in preventing new impurities from forming and are helpful in treating existing blemishes. Furthermore,



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ashwagandha has the potential to increase collagen synthesis in the skin, which helps to prevent the appearance of wrinkles[9].

### 3. CONCLUSION

Every individual want to live a long and happy life. As a result of changing lifestyles and therefore being unable to maintain dietetic rules, a variety of problems for the aged have arisen in India. The process of aging was extensively explained in detail in Ayurveda literature, and a separate medical school called as Ayurveda medicine tantric was created to discuss a range of techniques and measures to promote healthy lifespan. It is undeniably Ayurveda's strength in the context of geriatric treatment. Sander is a therapy that bestows good rasa, which in turn promotes longevity, alleviates old age and illnesses, and allows people to live to their full potential. In addition, the Indian government has started a nationwide effort to promote the advantages of Ayurveda and Yoga in senior health care. The development of an efficient holistic geriatric care protocol combining Ramayana, Panchami, Dietetics, Ayurveda medications and lifestyle, and Yoga is urgently needed[10].

### REFERENCES:

1. R. V. Rao, "Ayurveda and the science of aging," *Journal of Ayurveda and Integrative Medicine*. 2018, doi: 10.1016/j.jaim.2017.10.002.
2. G. Sasmal and S. Sipra, "Effect of Anti-Oxidant in co-relation with Rasayana therapy of Ayurveda on Ageing," *J. Ayurveda Integr. Med. Sci.*, 2017, doi: 10.21760/jaims.v2i2.7710.
3. V. C, A. V N, and . A., "ROLE OF AYURVEDA IN GRACEFUL AGEING: A REVIEW," *Int. J. Res. Ayurved Pharm.*, 2017, doi: 10.7897/2277-4343.086280.
4. B. G. Tiwari and B. N. Upadhyay, "Concept of aging in Ayurveda," *Indian J. Tradit. Knowl.*, 2009.
5. H. S. Datta and R. Paramesh, "Trends in aging and skin care: Ayurvedic concepts," *Journal of Ayurveda and Integrative Medicine*. 2010, doi: 10.4103/0975-9476.65081.
6. S. Telles, S. K. Sharma, A. Yadav, and A. Balkrishna, "Ayurveda for Healthy Aging and Health-Related Conditions," in *Complementary and Integrative Therapies for Mental Health and Aging*, 2016.
7. S. K. Mitra, H. S. Datta, R. Paramesh, and B. Patwardhan, "Theories and management of aging: Modern and ayurveda perspectives," *Evidence-based Complementary and Alternative Medicine*. 2011, doi: 10.1093/ecam/nep005.
8. S. d Chandanshive, "Review Of Rasayan Chikitsa According To The Srotas In Geriatric Disorders," *Natl. J. Res. Ayurved Sci.*, 2018, doi: 10.52482/ayurlog.v6i06.219.
9. S. S. Mane, "A REVIEW OF PREVENTING AND CONTROLLING GERIATRIC DISORDERS THROUGH AYURVEDA," *Natl. J. Res. Ayurved Sci.*, 2018, doi: 10.52482/ayurlog.v6i06.208.
10. D. Devi, R. Srivastava, and B. Dwivedi, "A critical review of concept of aging in Ayurveda," *AYU (An Int. Q. J. Res. Ayurveda)*, 2010, doi: 10.4103/0974-8520.82030.

## AN OVERVIEW ON DOMESTIC VIOLENCE

**B. R. Maurya\***

\*Assistant Professor,  
Department of Business Law,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [brmourya.mourya321@gmail.com](mailto:brmourya.mourya321@gmail.com)

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### ABSTRACT

*People of all ages, races, genders, and sexual orientations are affected by domestic violence. Domestic violence against men and same-sex domestic violence are often as less of a threat to society and the people involved, but it's important to keep in mind that male-on-female violence, female-on-male violence, and same-sex violence all have serious short- and long-term health consequences both for victim and the batterer. By comparing current published statistics on the prevalence of domestic violence in heterosexual and homosexual relationships, and analyzing results of existing studies on the short- and long-term health effects of domestic violence, this paper determines whether men or women suffer from more long-term health problems as a result of domestic violence. The findings show that, although men and women suffer many of the same injuries, women are more likely to suffer long-term health issues as a result of domestic abuse. Numerous studies have found links between intimate partner violence (IPV) and depression in women in the worldwide and national literature. This article provides a literature review on the subject. The 75 articles included in this study include both new research projects and secondary assessments of primary data sources. Quantitative and qualitative studies from Western and developing nations are included in the participant research papers published during.*

**KEYWORDS:** *Domestic Violence, Intimate Partner Violence, Sexually, Violence.*

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### 1. INTRODUCTION

Domestic violence, also referred as partner violence, is when a partner is abused emotionally, psychologically, violently, or sexually. Some refer to it as "women's violence. Women are often seen to be the only victims of domestic violence, whereas males are believed to be the offenders. Domestic violence, on the other hand, impacts people of all genders, races, ages, and sexual orientations. The traditional image of domestic violence is slowly fading as society accepts the lesbian, homosexual, bisexual, or transsexual. Population and as knowledge of abuse committed by women grows. Feminists introduced gender theories of domestic violence in the. Which explain male dominance and violence via sociological elements of a patriarchal society, and they continue to be the basis of most people's opinions on domestic violence. However, according the gender symmetry theory of domestic violence, women are equally as prone as males to be

violent. People, on the other hand, are hesitant to think that women, whether in a gay or heterosexual marriage, are capable of such violence.

In hetero or same-sex relationships, both men and women may be offenders or victims of domestic abuse; gender conceptions of domestic violence are outmoded and prejudiced. Domestic abuse may result in a variety of physical and mental health issues, both short and long term. Cuts, contusions, bite marks, concussions, broken bones, penetrative injuries such as knife wounds, miscarriages, joint damage, loss of hearing and vision, migraines, permanent disfigurement, arthritis, hypertension, heart disease, and sexually transmitted diseases such as the human papillomavirus, which can lead to cervical cancer and eventually d, and sexually transmitted infections like the human papillomavirus, that can lead to cervical cancer and eventually. Depression, alcohol or substance addiction, anxiety, personality disorders, posttraumatic stress disorder, sleeping and eating disorders, social dysfunction, and suicide are some of the mental health problems that may occur as a result of domestic violence Depression, alcohol or substance abuse, anxiety, personality disorders, posttraumatic stress disorder, sleeping and eating disorders, social dysfunction, and suicide are some of the mental health problems that can occur as a result of domestic violence[1].

## **1.1.Prevalence of Domestic Violence:**

The World Health Organization. Undertook a global study in 2006 to find out just how common domestic violence against women in. Its objectives were to determine the incidence of different kinds of violence, evaluate the health consequences of domestic abuse, identify risk and prevention variables, and record women's coping strategies. According to Garcia-Moreno ET al. surveys were conducted at 15 locations in ten countries between. A total of. Women, ranging in age from, were interviewed in clusters from each site. Each participant was given a number of questions regarding domestic violence, including if they had been physically, sexually, or psychologically assaulted by a spouse, the severity of the abuse, and when it happened. Afterwards when, a psychometric analysis was conducted, which evaluated the study's design, validity, and reliability. They discovered that. Of women had been victims of domestic abuse in most locations; the exact range was. Per cent, with physical and sexual assault being the most frequent. They discovered that domestic violence against women is widespread around the globe, that women are more likely to be harmed by a spouse than by an unknown offender, and that a significant proportion of domestic abuse is deemed serious and regular[2].

## **1.2.Domestic Violence in Same-Sex Relationships:**

A study was conducted by Owen and Burke. to determine the prevalence of domestic abuse in same-sex couples. They anticipated to discover evidence backing up previous research that suggests same-sex partnerships are more vulnerable to domestic violence than heterosexual ones. They sent out. Questionnaires to Virginia's gay and lesbian citizens. Only 68 questionnaires were returned, and were included in the study; males and females were sampled in equal numbers. They discovered that. Percent of the participants had experienced domestic violence at some point in life, with verbal abuse, physical abuse, and property damage being the most frequent types of violence. Although there was no control group, the scientists matched their findings to the National Violence towards Women Survey. Domestic violence is more dangerous for males in gay relationships than for men in heterosexual relationships, according to the research, but it is equally dangerous for lesbians and heterosexual women. Because of the low response rate, this

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study cannot be generalized, although other sources, such as the National Coalition against Domestic Abuse, estimate that domestic violence occurs in of samisen couples. Lesbian violence does not exist because women are not violent, and heterosexual abuse is more severe than same-sex domestic violence, according to two prevalent misunderstandings about same-sex domestic violence[3].

### **1.3.Health Consequences of Domestic Violence:**

Most people believe that only victims of domestic violence suffer injuries, but their batterers do as well. A study was conducted by Gerlock.to evaluate the health effects of domestic violence on victims and batterers. He was also curious in how the individuals saw their injuries in light of the violence. Domestic violence was defined in this research as a man's violent conduct against his female partner, which included both physical and psychological abuse. In a study centered on a batterers' rehabilitation program, Gerlos enlisted the help of 62 offenders and 31 victims. The batterers were questioned whether they had ever sought treatment for injuries suffered as a result of their aggression, and if they believed their health problems were linked to their actions. Victims were asked if they had ever sought treatment for injuries sustained as a result of domestic violence so if they believed their health issues were linked to the violence they had seen. They were all given an emotional health questionnaire based on their past six months of medical appointments, 63 percent of batterers had between one and twenty health-care visits in the preceding six months for physical health issues, and 90 percent for mental health issues; 29 percent felt their health issues were linked to their domestic violence. They were diagnosed with a variety of long-term health issues. Had musculoskeletal issues, had respiratory issues, had dermatological issues, had digestive upset, had cardiovascular issues, had neurological issues, had mood disorders, had anxiety, had psychosis, had psychological issues, and percent had substance abuse issues. Eight percent of the males said they were sad as a result of abuse, which they blamed on the violence. Lacerations, bruises, and fractured bones were among the short-term ailments reported by the males. In addition, according to Gerlock.percent of the victims had between one and twenty health-care visits in the previous six months for physical health issues and 29 percent for mental health issues, with 64 percent having faith their health issues were related to the domestic violence they had experienced. In addition, the ladies were diagnosed with a variety of long-term health problems, including[4].

### **1.4.Background:**

There is no generally agreed-upon definition of women's violence. Some human rights activists prefer a wide definition that includes "structural violence" such as poverty and uneven health and education access. Others have advocated for a more restricted meaning in order to preserve the term's real descriptive value. Domestic violence refers to violence perpetrated by a current or former partner in any context and in any form. "Any act of gender-based violence that results in, or is likely to result in, physical, sexual, or psychological harm or suffering to women, including threats of such acts, coercion, or arbitrary deprivation of liberty, whether occurring throughout public or private life," according the Universal Declaration on the Elimination of Discrimination Against Women. This definition suggests that "violence against women is one of the crucial social mechanisms by which women are required into a subordinate position compared to men," and that "violence against women is one of the crucial social processes by which women are forced into a subordinate position compared to men." It broadened the concept of violence to encompass both physical and psychological damage to women, as well as actions done in both

private and public life. Physical abuse, such as slapping, beating, arm twisting, stabbing, strangling, burning, choking, kicking, threats with an item or weapon, and murder, are included in certain academic definitions. Cultural methods that injure women, such as female genital cutting, are included[5].

## 1.5.Problem Statement:

Despite the very few canines and incising teeth which have grown, the United Nations General Assembly's Convention on the Elimination of All Forms of Discrimination against Women, which was adopted some 20 years ago, is still fostering teeth to bite completely in Africa. Shebang, Parker, and others details as according data from various Demographic and Health Surveys, the five countries have a high percentage of women who have been beaten by a husband or partner: Cambodia Colombia Dominican Republic, Egypt, Haiti, India, Nicaragua, Peru and Zambia. According to these polls, women who had been victims of violence did not seek assistance for a variety of reasons, included embarrassment and shame, as well as the feeling that they were alone. The sheer fact that a woman is married brings with it a societal stigma that indicates a lack of class. Instances of marital abuse were reported to DOVVSU in the first half of 2002. Women and children appear to be the most susceptible. Men are also victims of domestic violence, but their numbers are small when comparing the number of instances reported by women. Husbands are responsible for of reported cases of assault, 8 percent for boyfriends, and while women, mostly stepparents and competitors, are liable for. Women, children, the disabled, and the old make up. Percent of victims, with males contributing for just. Victims in Ghana are mostly between the ages of. The study aims to address the following issue in light of the alarming rates of women domestic violence[6].

## 2. DISCUSSION

Domestic violence is defined as atrocities inflicted by someone in the victim's close family. Partners and ex-partners, direct family members, extended relatives, and family friends are included. Physical, sexual, or psychological abuse all are examples of domestic violence. Physical assault or assault[7]. Or threats thereof; sexual abuse; controlling or overbearing; intimidation; stalking; passive/covert abuse. And economic abuse are all instances of domestic violence. Chronic pain, an increase in the risk of stroke, heart disease, lung disease, diabetes, cancer, or gynecological issues all are potential side effects. Depression, alcohol and drug abuse, and high-risk sexual practices are among behavioral health concerns. Domestic violence has a significant effect on your health and well-being, as well as the health and well-being of your children. Injuries including such bruises, cuts, fractured ribs, lost teeth and hair, miscarriage, stillbirth, and other pregnancy problems are all directly and immediately physical consequences of domestic abuse. Domestic abuse is a significant factor in women's poor health. It has a negative impact on women's emotional and physical health, as well as their women's reproductive health. Injuries, gynecological issues, temporary or permanent disabilities, depression, and suicide are just a few instances[8].

According to the Domestic Abuse Resource Center, women are the victims of domestic violence 85 percent of time. According to some statistics, women are the victims of heterosexual domestic abuse 95% of the time (Dutton; Island & Likelier; Oakley as cited in Peterson & Dixon, 2003). As according research, lesbians are just as likely as heterosexual women to be assaulted; however, homosexual men are much more likely to be victims of violence as heterosexual men.



On the basis of the available statistics, it is reasonable to conclude that women are much more likely than men to be victims of domestic abuse[9]. In a study by Gerlock, heterosexual men and women reported physical and mental health issues of domestic violence; batterers had more physical issues, but both victims and batterers experienced mental health problems. However, that study did not account for sexual injuries, which are prevalent among victims of domestic violence. It also didn't consider the impact of mental health issues on women's capacity to work. Gay males are more susceptible to psychological traumas connected to domestic abuse than heterosexual men, according to Howard ET album no study on violence-related health problems in lesbian relationships has been found. Due to a lack of research, it is difficult to say whether men and women in same-sex relationships are equally vulnerable to mental and physical damage. Domestic violence produces a variety of physical injuries to women, some of which are life-threatening, but research has shown that emotional injury to women's long-term health is more harmful. Women with mental health problems are more likely to be targeted again, which may harm their long-term health and put them at risk of suicidal behavior. Some physical health impacts, such as cervical cancer, may have long-term health effects on women. Women who have suffered domestic violence are more likely to get cervical cancer, according to study.

### 3. CONCLUSION

According to the results, domestic violence seems to cause greater long-term health problems in women than in men. The majority of domestic violence studies conclude that further research is required to properly understand the social consequences of domestic violence. Although it is the least reported and recorded crime. There are certain steps that may be taken to alleviate the existing data shortage. Because most people actually believe domestic violence exclusively affects women, many users find it difficult to believe that men can also be victims. Unfortunately, only a small percentage of abused men are willing to talk out because they are scared of ridicule, social isolation, and shame. When it comes to domestic violence training, both men and women should be taught equally. Previously, the LGBT community and law enforcement had tense relations because many cops thought homosexuality was a sin. Domestic abuse disclosure became more difficult for homosexual men due to anti-sodomy laws. Regardless of the fact that police officers are becoming more accepting of LGBT people and more aware of the same domestic abuse, many people still fail to report it. When it comes to dealing with same-sex domestic abuse, law enforcement officers need more experience and training. Working with LGBT organizations, hospitals, and shelters to develop a continuing education program for the new and seasoned law enforcement officers will help them better grasp the effects of same-sex domestic abuse and how to deal with it. Despite the fact that women are more likely than men to have long-term health issues as a result of domestic violence, it is important to comprehend the ramifications for all parties involved. It's also important to understand the reasons of domestic violence and how to avoid it. It's critical to keep researching the prevalence of domestic violence and the health problems that accompany it. Further research may aid the development of effective treatment programmes for victims, batterers, and their families, possibly reducing domestic rates of violence in the United States and throughout the world[10].

### REFERENCES:

1. H. Al-Alosi, "Cyber-violence : digital abuse in the context of domestic violence," Univ. N. S. W. Law J., 2017.



2. L. Mitchell, "Domestic violence in Australia: an overview of the issues," *Parliam. Libr.*, 2011.
3. B. Deans, D. Mancini, D. Shearer, and L. Mackenzie, "An Overview of Victims of Domestic Violence: Improving Law Enforcement Response to Domestic Violence to Prevent Revictimization," *J. Econ. Dev. Manag. IT, Financ. Mark.*, 2018.
4. J. Phillips and P. Vandenbroek, "Domestic violence in Australia: an overview of the issues," 2014.
5. S. Hamilton, "Domestic violence: an overview.," *Wis. Med. J.*, 1992, doi: 10.1007/978-1-349-13306-2\_5.
6. S. Das Dasgupta, "Charting the Course: An Overview of Domestic Violence in the South Asian Community in the United States," *Journal of Social Distress and the Homeless*. 2000, doi: 10.1023/A:1009403917198.
7. L. E. Ross, *Domestic violence and criminal justice*. 2017.
8. N. Morei, "Domestic violence in South Africa: Women and children under siege?," *Mediterr. J. Soc. Sci.*, 2014, doi: 10.5901/mjss.2014.v5n20p928.
9. K. C. Smith et al., "Overview of the children and domestic violence services study," *Child. Youth Serv. Rev.*, 2005, doi: 10.1016/j.childyouth.2005.04.007.
10. H. AL-ALOSI H.Al-Alosi@westernsydney.edu.au, "Cyber-Violence: Digital Abuse in the Context of Domestic *Violence.*," *Univ. N. S. W. Law J.*, 2017.

## MODERN METHODS OF TEACHING ENGLISH

Tursunova Feruza Tursunovna\*

\*Teacher,  
Department of Practical Aspects of English,  
Uzbek State World Languages University,  
Tashkent City, Uzbekistan  
Email id: n.scienceofworld@gmail.com

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### ABSTRACT

*The paper represents an excursus in methods in teaching English. A lot of methods in teaching languages have been developed throughout the history of mankind. The paper also considers the main of them, their advantages and disadvantages. It remains obvious that at the end of the XX century there was a "revolution" in the methods of teaching English. Previously, priorities were given to grammar, almost mechanical mastery of vocabulary, reading and literary translation. These are the principles of the "old school", which (it is worth paying tribute to it) still bore fruit, but at what cost? Language acquisition was carried out through long routine work. The tasks offered were quite monotonous: reading the text, translating, memorizing new words, retelling, and exercises on the text.*

**KEYWORDS:** *Modern Methods, Teaching, English, Education, Innovation.*

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### INTRODUCTION

Until recently, a foreign language was more of a hobby and owning it as a native language meant being an aesthete, belonging to a certain circle or (the most harmless option) being known as an oddball. But times are changing...

Recently, when the educational technology market is replete with offers for a wide variety of methods of learning English, the question is "By what method do you teach?" it is becoming more and more relevant, which indicates an increase in the culture of consumption of intellectual products. A puzzled applicant, student or businessman (however, also a student) increasingly, he freezes in front of bookshelves with linguistic literature and media manuals or thoughtfully looks through a long list of advertisements: "English in two weeks", "Communicative methods of teaching English", "Effective express method", "English at the subconscious level"... There are so many new and unknown things, and this gives rise to doubts about the results. Is it possible to trust modern technologies or give preference to well-established "brands", such as "Bonk", "Eckersley" or "Headway", gradually passing into the category of methodical classics? [1]

It remains obvious that at the end of the XX century there was a "revolution" in the methods of teaching English. Previously, priorities were given to grammar, almost mechanical mastery of vocabulary, reading and literary translation. These are the principles of the "old school", which (it is worth paying tribute to it) still bore fruit, but at what cost? Language acquisition was

carried out through long routine work. The tasks offered were quite monotonous: reading the text, translating, memorizing new words, retelling, and exercises on the text. Only sometimes, for the sake of a necessary change of activity - composition or dictation plus phonetic drill as a rest. When priorities were given to reading and working on topics, only one function of the language was implemented - informative. It is not surprising that only very purposeful and hardworking people could master it at a high level. But in terms of grammar proficiency, they could safely compete with Cambridge graduates. However, they received good compensation for their labors: the profession of a foreign language teacher or translator was considered very prestigious at that time. [2]

Now, to achieve such a high social position also requires a lot of diligence, perseverance and everyday work. But what is truly revolutionary is that the language has become accessible to the majority in one form or another and the offer is increasingly consumer-oriented. A well-known specialist in the field of linguistics and methods of teaching a foreign language, S.G.Ter-Minasova, rightly notes that recently language learning has become more functional: "Unprecedented demand demanded unprecedented supply. Unexpectedly, foreign language teachers found themselves in the center of public attention: legions of impatient specialists in various fields of science, culture, business, technology and all other fields of human activity demanded immediate training in foreign languages as a tool of production. They are not interested in either the theory or the history of the language - foreign languages, primarily English, are required for them exclusively functionally, for use in various spheres of society as a means of real communication with people from other countries". [3]

The forms of education have also become more diverse: going to the office, to the student's house, individual classes with a teacher, "weekend" groups, for the busy and not so busy, for children and pensioners... The main question remains to be solved: what is the content of the course, its structure and teaching methods? Who is the author of the proposed material, where is this material developed and tested by whom? Language teaching has acquired an applied character, whereas before it was relatively abstract and theoretical. Aristotle also brought out the famous triad of teaching ethics, which perfectly correlates with modern requirements: logos - the quality of presentation, pathos - contact with the audience, ethos - attitude to others. This rule is true for the speaker, for the actor, and for the teacher of a foreign language, whose role also involves the first two hypostases. The functions of a teacher in the educational process have changed significantly. The teacher-mentor, the teacher-dictator is not able to give students freedom of choice and provide the necessary freedom of teaching in comprehending such a subtle matter as language. Therefore, such a negative pedagogical image is gradually becoming the property of history. He was replaced by an observer teacher, a mediator teacher, a pacifier teacher and a leader. Although the personality of the teacher in this case recedes into the background, its influence on the audience, which, in turn, becomes more intimate, does not decrease, but on the contrary, increases. It is the teacher at most modern foreign courses who is the organizer of group interaction (an ideal group for learning a foreign language is currently considered to be a group of 10-15 people, since this is the number of people who can communicate with each other with maximum effect, interest and benefit). [4]

Progress and fundamental changes in language learning methods are undoubtedly associated with innovations in the field of personality and group psychology. Now there are noticeable changes in people's consciousness and the development of new thinking: the need for self-

actualization and self-realization, proclaimed by A.Maslow, appears. The fourth, psychological factor of learning foreign languages is promoted to a leading position. Authenticity of communication, balanced demands and claims, mutual benefit, respect for the freedom of other people - this is a set of unwritten rules for building constructive relationships in the teacher-student system. [5]

The fifth, but by no means the least important element of this system is choice. It appeared in a student who can attend a course that best meets his needs. In the classroom, the student is no longer limited in the choice of speech means and his own speech behavior. The teacher is also not constrained in the choice of teaching methods and techniques (from games and trainings to simultaneous translation), the organization of classes, the choice of textbooks and teaching aids (from a wide range of domestic publications to products from Oxford, Cambridge, London, New York and Sydney). The teacher can now select, create, combine, modify. [6]

Fundamental methodology is really the oldest and most traditional method. This is how the lyceum students taught Latin and Greek, while French was absorbed naturally, along with the strict suggestions of governesses and communication. The classical method, like no other, fits the description of the "fortress capture plan": a phonetic cipher, visual images of syntactic constructions, mandatory vocabulary.

The fundamental methodology is seriously relied upon in language universities. A translator is never sure of his knowledge of a foreign language - he understands the unpredictability of who perfectly-there are no similar speech situations. Studying according to the classical methodology, students not only operate with a wide variety of lexical layers, but also learn to look at the world through the eyes of a "native speaker" - a native speaker. [7]

Perhaps the most famous representative of the classical methods of teaching a foreign language is N.A.Bonk. English textbooks, written jointly with other authors, have long become classics of the genre and have withstood the competition of recent years. The classical method is otherwise called fundamental: no one promises that it will be easy, that you will not have to study at home and the teacher's experience will save you from mistakes in pronunciation and grammar. But the reward will be (developing the metaphor of the fortress) the condition of an indigenous local who knows how to "not get lost" in the maze of the subjunctive mood or the past tense.

In addition, the fundamental methodology assumes that your favorite question is "Why?" you will not be satisfied with explanations "It is necessary", but are ready to plunge into an interesting, complex and very logical world, whose name is the language system.

The extensive methodological "building" is crowned by the programs of preparation for tests and qualification exams. In order to pass the test effectively, it is best to apply to a language school or to courses that have been specializing in preparing students for certain certificates for a long time (someone cooperates with the USA using the "TOEFL" method; there are colleges that help to get an ESOL certificate from Pitman University (UK); most courses give the opportunity to get a "SAE" or "GMAT"). [8]

The tests are divided by levels, and the method of preparation depends primarily on the student's knowledge base. It should be taken into account that the test does not provide any additional knowledge, it is only a check and certification of the existing "baggage". Therefore, test methods do not serve for language learning - they help the student to better present himself at the exam, encourage him to repeat sections of grammar, vocabulary, and focus on specific forms of work.

Although today there are several variants of test scales, they do not fundamentally differ from each other. As a rule, the scale includes the following seven levels: beginner, elementary, pre-intermediate (or lower intermediate), intermediate, higher intermediate, advanced (or near native). The majority of foreign courses are built on the same level principle.

Since we have already partly adopted this productive experience, the placement test - an introductory test for the selection of a group that determines your level of language proficiency - can also be offered to you at many domestic courses. In addition, current control tests - progress tests - can be used as part of any method of teaching English. They are divided into tests that control reading comprehension, freedom of communication (Communicative Competence) and cultural knowledge. In addition, the teacher is free to offer any other test - for example, to check the vocabulary of the lesson, which is often called a quiz.

The "aerobatics" of test techniques is preparation for foreign exams. If your goal is to pass them safely, then you will need not only knowledge, but also speed, the ability to concentrate, discard unnecessary information, highlight the main thing, as well as the ability to show maximum creative abilities when writing an essay. Obtaining a diploma or certificate is a qualification and a guarantee of employment, therefore, especially serious preparation is required here.

So, there are products for every taste on the domestic methodological market. It remains only to determine the goals, means, and most importantly - the methods. Then the choice of courses and training program will not be so difficult.

## **REFERENCES:**

1. Farxodjonova NF. Modernization of Uzbek Language And National-Spiritual Heritage in National Culture. *The American Journal of Social Science and Education Innovations*. 2021; 585-594.
2. Farxodjonova NF. Formation of National Idea through Factors of National Culture. *Problemy i perspektivy*. 2020. pp.3-6.
3. Farxodjonova NF. Pulatov A. Modern Methods of Increasing Student Interest in Social Sciences. *Jekonomika i socium*. 2019;(4):38-40.
4. Isroilovich IM. et al. Philosophical ideas and views of national culture in the condition of globalization. *PalArch's Journal of Archaeology of Egypt/Egyptology*. 2020;17(4):14289-14295.

5. Farxodjonova NF, Abdurahimov VA. Modern Technologies of Students Training In Higher Education. Nauka i tehnika. Mirovye issledovanija. 2020. pp. 5-7.
6. Farxodjonova NF. Relation to National Culture in the Condition Spiritual Renew of Society in the Republic of Uzbekistan. Mirovaja nauka, 2018;(6):14-17.
7. Numonjonov SD. Innovative methods of professional training. ISJ Theoretical & Applied Science, 2020;1(81):747-750.
8. Sodirjonov MM. Education as the Most Important Factor of Human Capital Development. Theoretical & Applied Science, 2020;(4):901-905.



## COMPARATIVE STUDY OF CASTE BASED DISCRIMINATION IN INDIA AND US

**Pradip Kumar Kashyap\***

\*Lecturer,  
Department of Business Law,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- pradipprgnul@gmail.com

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### ABSTRACT

*Discrimination based on caste has an impact on the civil, political, economic, social, and cultural rights of anybody who was not born into a wealthy family. The caste system is essentially a tradition that has existed since before the Constitution was written, but in the modern day, when the constitution is being written in a rational manner to provide justice to all people, there must be no injustice. In the past, the caste was seen as a polluted member of society who might harm others just by touching them, a phenomenon known as untouchability. In India, as well as other countries such as the United States, discrimination based on caste and skin color exists, and individuals have taken part in movements to demonstrate society that the human person is the most important element of the caste system. However, the Universal Human Declaration of Human Rights provides a variety of tools that allow the lower caste to seek justice from various courts, including the CJI, but India fails to eliminate caste discrimination and ensure full enjoyment of fundamental rights and equality before the law, as guaranteed by Article 1 of the UDHR. Discrimination spreads for a variety of reasons, much like a virus. Furthermore, India is constantly confronted with issues such as caste marriage, political conspiracies, and Diasporas.*

**KEYWORDS:** *Discrimination, Discrimination, Injustice, Right To Equality, Untouchability.*

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### 1. INTRODUCTION

Caste Discrimination is a custom that has existed in human form for decades and has been spread throughout the world by representatives of salvation, which some of them still practice today, affecting the civil, political, economic, social, and cultural rights of anyone who was not born into a wealthy family, a powerful family, or a follower of another religion. The Caste System separates people into several groups, with the lowest caste being seen as "impure" or "pollute for the other caste." Caste is a hereditary system based on ancestry.

It is a trait that is determined by one's birth into a specific caste, regardless of one's religious beliefs. Caste refers to a strict social stratification system based on lineage and profession that divides people into ranking groups. Caste divides also prevail in housing, marriage, and general

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local and national political parties claiming to represent the Scheduled Castes and Tribes arose, some of which were extremely successful. Kumari Mayawati, the current Chief Minister of Uttar Pradesh, who won the state elections for the fourth time in 2007, and M. Narayanan, the President of India from 1997 to 2002, are two instances of high-ranking Dalits[3].

## **2.2 Discrimination in India and the United States:**

### **1. United States of America:**

The revival of the Dalit-Bahujan movement in India and the Black Lives Matter movement in the United States have similarities. After George Zimmerman's acquittal in the fatal shooting of Trayvon Martin, a black teenager, in Florida in 2013, the Black Lives Matter movement was formed. #BlackLivesMatter became a worldwide movement, and debates on delicate topics like racial injustice resurfaced on social media sites. When the first Black Lives Matter march was held in 2014 to protest the cold-blooded killings of two black men, Michael Brown in Ferguson, Missouri, and Eric Garner in New York, the organization gained even more traction.

The Black Lives Matter movement developed from strength to strength, frequently encountering opposition. For example, in 2016, the Toronto branch of BLM shut down the Gay Pride March for approximately half an hour, demanding that gun-toting police officers be removed from the parade. This event has generated heated discussions about intersectionality and privilege, which are still sensitive topics for many people today. However, because to the way in which the issue of inclusion was addressed, the colors black and brown were ultimately included in the 'Rainbow Flag to symbolize Black and Indigenous Peoples of Color (BIPOC).

The study, however, only provides a preliminary, impressionistic image of casteism in the United States. The avoidance of individuals previously referred to as "untouchables" at businesses, schools, personal relationships, and places of religion is a recurring issue in the results. For example, two-thirds of Dalit respondents claimed they had faced "caste discrimination" at work, which was committed by other individuals of south Asian origin[4].

Not surprisingly, just over half of Dalits said they were "passing," or concealing their caste status, as African-Americans would say. Despite the country's egalitarian credo, caste prejudice has persisted in America because immigrant groups of all sorts may and do maintain some of their ancient customs. Discrimination based on caste is not expressly prohibited under civil rights legislation. When those laws were established, it was not considered a problem in America[5].

The consequences of a "hostile environment" at work or in schools, for example, would be covered by civil rights legislation. The study also mentions physical attacks that may be classed as "hate crimes."

### **2. India**

Meanwhile, in India, Rohith Vemula's death, which the growing student movement in India called institutional murder, prompted Ambedkarites and the Left, who were starting to join together on college campuses, to establish a strategic alliance. While he was still alive, Rohith Vemula represented a synthesis of Left and Ambedkarite ideologies. In reality, it was his opposition to the death sentence in the case of Yakub Memon that enraged right-wing fanatics, who labeled him anti-national and attacked him. Following his death, dissidents from the Student

Movement, Dalit Movement, and Left felt forced to band together against the governing regime, and cries of "Jai Bhim – Lal Salaam" became even more prevalent on college campuses.

This is critical, since not only are atrocities and violence against Dalits on the rise, but the severity of the crimes is also increasing. The burning to death of two young Dalit children sleeping in their home in Faridabad, for example, made worldwide news in October 2015. According to reports, the youngsters were the victims of a feud between Dalits and members of the ruling caste. Unfortunately, this heinous act is far from uncommon. A little Dalit child died in police custody in October 2015, and police abuse is being accused. He is accused of stealing two birds from the upper classes[6].

A Dalit family with three young children was also robbed of their belongings and imprisoned for allegedly intruding on upper castes' land. These are not isolated instances of police carelessness in India, but daily stories of blatant disrespect for justice when it comes to Dalits in the country. Dalit women are often regarded as the victims of violence, since they are used to punish Dalit communities. At the same time, they are very susceptible as a result of various forms of discrimination based on caste and gender[7].

Sardar Singh Jatav went for a stroll on a humid night in early September to speak with the guys who hired his son, but they were already waiting for him on the side of the road. They, on the other hand, were not in the mood for debate. Mr. Sardar was welcomed by the higher-caste guys with a hit to the face. Then his arm was broken. They pinned him down after that. Mr. Sardar screamed for assistance. Nobody showed up. A guy from a higher caste shoved a cloth into his mouth. Another joyfully drew a razor from his pocket. He grasped Mr. Sardar's head and started lifting and cutting, lifting and cutting, almost every inch of flesh off his body.

## **2.3 India's Legal System:**

### **1. Constitution:**

To eliminate caste discrimination, the Constitution, which is regarded as the Mother of All Laws, has provided a number of articles under which any person may file a Public Interest Litigation (PIL) and the court will follow the procedures set forth by the law. However, every person in India suffers from a lack of democracy. Constitution, on the other hand, has done their bit to ensure that everything is in order. We, the people of India, have solemnly resolved to form India into an SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC and to secure to all its citizens: Justice, social, economic, and political; Liberty of thought, expression, belief, faith, and worship; Equality of status and opportunity; and to promote among them all Fraternity[8].

### **2. Penal Code of India:**

The Indian Penal Code (IPC), India's legal framework, has a number of laws aimed at preventing caste discrimination and other breaches of minority rights at both the national and state levels. The Penal Code, rather than providing a foundational rights framework for the protection of all Indian citizens, provides various Acts to prohibit specific types of behavior, such as The Bonded Labour System (Abolition) Act (1976) and The Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act (1993). The Prevention of Atrocities Act (1989), for example, lists "illegal" behavior against Scheduled Castes and Tribes (by defining atrocities such as intimidation, sexual abuse, denial of access to water et cetera). Both the Constitution and the Indian Penal Code offer an almost impenetrable bundle of individual rights for the Indian

people, and the issue of caste-based discrimination is a matter of execution rather than a lack of legal foundation.

### **3. International Obligations are Non-Existent:**

There have been a slew of violent assaults on them in various areas of the nation in recent years. For example, cow vigilantes attacked a group of Dalit men in Una, Gujarat, for simply performing what caste society regards as their caste-prescribed duty; elsewhere, the Yogi Adityanath government of Uttar Pradesh booked Dalit leader Chandrasekhar Ravan under the National Security Act – a draconian preventive detention law – despite the fact that the Allahabad high court had already declared the charges ag[9].

The United Nations Human Rights Council's (UNHRC) special rapporteur on minority affairs highlighted a substantial rise in crimes against Dalits in a report published last year. Worryingly, the study also revealed official involvement in institutionalizing manual scavenging, which continues to murder Dalit sanitation workers and is widespread in India despite laws prohibiting it. The Indian state has clearly failed to eliminate caste-based discrimination.

This offers a strong cause to consider whether India's identification of caste-based discrimination as racial discrimination, and the resulting international scrutiny, would have any impact.

#### **2.4 The Influence of Film on Society:**

While both the book and the film are successful in presenting anti-caste discrimination themes in India, the film has a greater impact. Recently, a film called Article 15, which is about the indignities supported by the caste system in modern-day India, has taken a stand. Policemen hushing up the murder and gang rape of three 15-year-old girls because they belong to a lower caste, inspired by the real-life Badaun murders — and a moving homage to Alan Parker's 1988 procedural thriller Mississippi Burning. More importantly, the film is able to reach all members of society, including the Dalit population, who has very high illiteracy rates due to a lack of available education and resources[10].

The inclusion of visual emotions, facial expressions, and location give the spectator with a deeper personal connection, making comparisons and links to the film more powerful than the book. A moment in Slumdog Millionaire (2008), for example, depicts Jamil's anguish and horror after seeing his mother being killed during a raid on the slum where he resided.

The filmmaker purposefully slowed down the frames per minute throughout the sequence to build suspense, allowing the spectator to see Jamil's mother screaming for her boys to flee moments before being struck in the head. While everything was going on, the video cut to a close-up of Jamil's face, showing him standing still, attempting to understand what was going on. The spectator develops a bond of sadness for Jamil during this short interval because they are focused on the traumatic emotion shown. Regardless matter how beautifully a book describes a scenario, nothing compares to the emotional connection that emerges when a person puts a face to the narrative[8].

### **3. CONCLUSION**

Despite efforts to eliminate it, India's caste system continues to have an impact on society. Dalits and other members of the lower castes are disproportionately susceptible to human rights abuses that impact every area of their lives. There must be a Yearly Survey Committee that operated the

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plane's timetable to expel the strange discrimination in society via the use of different embodied government entities, and the State must guarantee that all liabilities are delivered to the people and that justice is provided.

Because most reports state that only higher authority have the power to temper with the evidence, one example being the Unnao Rape case of 2017, when the Dalit Scoot died at the last breath and the Indian Judiciary was well unaware of all the facts. Caste discrimination is one of the main problems in India that has the potential to cause a negative revolution among the youth; there must be a resolution to all circumstances that have occurred in the area of case discrimination.

## REFERENCES

1. Z. Siddique, "Evidence on Caste Based Discrimination," *Labour Econ.*, 2011, doi: 10.1016/j.labeco.2011.07.002.
2. G. C. Pal, "Social Exclusion and Mental Health: The Unexplored Aftermath of Caste-based Discrimination and Violence," *Psychol. Dev. Soc. J.*, 2015, doi: 10.1177/0971333615593446.
3. L. B. Bishwakarma, "Caste-based Discrimination in Schooling: A Narrative Inquiry," *Nepal. J. Dev. Rural Stud.*, 2017, doi: 10.3126/njdrs.v14i1-2.19648.
4. T. B. Thapa, "Living with Diabetes: Lay Narratives as Idioms of Distress among the Low-Caste Dalit of Nepal," *Med. Anthropol. Cross Cult. Stud. Heal. Illn.*, 2014, doi: 10.1080/01459740.2012.699985.
5. Z. Siddique, "Caste Based Discrimination: Evidence and Policy," *SSRN Electron. J.*, 2011, doi: 10.2139/ssrn.1550883.
6. N. Axmann, K. Swanson, and V. C. Contreras, "Caste and Religion-Based Wage Discrimination in the Indian Private Sector: Evidence from the Indian Human Development Survey," *Rev. Black Polit. Econ.*, 2016, doi: 10.1007/s12114-016-9235-8.
7. H. G. Jacoby and G. Mansuri, "Crossing boundaries: How social hierarchy impedes economic mobility," *J. Econ. Behav. Organ.*, 2015, doi: 10.1016/j.jebo.2015.05.003.
8. R. K. Maurya, "In their own voices: Experiences of dalit students in higher education institutions," *Int. J. Multicult. Educ.*, 2018, doi: 10.18251/ijme.v20i3.1627.
9. D. Mosse, "Caste and development: Contemporary perspectives on a structure of discrimination and advantage," *World Development*. 2018, doi: 10.1016/j.worlddev.2018.06.003.
10. I. U. Chowdhury, "Caste Based Discrimination in South Asia: A Study of Bangladesh," *Work. Pap. Ser.*, 2009.



## ILLEGAL PRACTICE OF ABORTIONS

**Aruno Raj Singh\***

\*Assistant Professor,  
Department of Criminal & Constitutional Law,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- arunorajsingh@gmail.com

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### ABSTRACT

*Abortions that are unsafe or illegal are one of the leading causes of violations of women's and children's human rights throughout the globe. Lack of access to safe abortion procedures results in a significant number of fatalities and severe immobility. In India, it is estimated that 15.6 million pregnancies occur on a regular basis. A significant portion of them are thought to be dangerous. Unsafe fetal removal is the third leading cause of maternal death, claiming the lives of 10 women every day and leaving thousands more with morbidities. There is a need to strengthen access to abortion advantages while also preventing women's passing and inabilities. In 2002, as part of the Abortion Assessment Project, the Abortion Assessment Project led an immense focus on incited fetal removal in India. The exams, which were a significant part of this project, assessed 6.4 million preterm newborns in India each year. Even while the act of removing a fetus is not inherently immoral, the unlawful manner in which it is carried out makes it highly damaging and should be banned.*

**KEYWORDS:** *Abortion, Fetus, Illegal, Pregnancies Rights.*

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### 1. INTRODUCTION

The medicines mifepristone and misoprostol together or misoprostol alone are frequently used to induce fetus removal and to monitor fragmented fetus removal or intrauterine fetal demise (IUED). These prescriptions are becoming more widely available throughout the globe, and they are included in the WHO's List of Essential Medicines. Mifepristone is a deadly progestin that binds to progesterone receptors, inhibiting progesterone function and, as a result, interfering with the continuation of pregnancy. The underlying part of mifepristone is followed by the administration of an engineering prostaglandin sample, misoprostol, which causes cervical mellowing and expansion and enhances uterine compressions, thus assisting in the removal of the origination outcomes.

There are many laws that control and debate the ethical legality of abortion, as well as govern and regulate the practice via time and case limitations. In the lowest strata, however, there is no constraint on the safe and healthy accessibility of abortion techniques[1]. As a result, women and

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individuals who may get pregnant are more likely to use unlawful and dangerous ways to remove the baby. Furthermore, owing to a lack of knowledge and debate on the subject, many women in India turn to using at-home treatments, which are sometimes hazardous, to abort their fetuses. Due to the requirement for a medical practitioner's permission and exclusive control over the choice to abort when the mother is not present, they do not use government-provided facilities to guarantee the fetus is removed.

## **2. DISCUSSION**

### **2.1 Abortion's Ethical Conundrum**

All people who can become pregnant, including women, young women, and people of various sexual orientation personalities, and who seek clinical fetus removal care, should be given all of the necessary information to make an informed decision that will ensure their wellbeing and human rights, including sex and sexual orientation equality and no sex discrimination.

People may use this information to freely and thoughtfully select the number, dispersal, and timing of their children. It is the right of every person, regardless of marital status, to understand the benefits of logical progress and its applications. Human services providers, health administrators, strategy creators, and other partners require exceptional, evidence-based recommendations to advise clinical approaches and practices, enable improved medicinal services results, and provide precise and easy-to-understand data. The development of clinical premature birth and new considerations associated with the planning, interim, and courses of organization of clinical premature birth drugs necessitated an audit of the proof, as well as the advancement of new proposals and updates to the World Health Organization, in addition to the recommendations made in 2012[2].

The privilege of access to important proof-based wellbeing data is a standard and fundamental way to improve the execution to and nature of premature birth care, with the goal that people who can become pregnant can have command over and choose openly and mindfully on issues identified with their sexuality and propagation (counting their sexual and regenerative wellbeing) liberated. These requirements also include the provision of additional administrations for the patient's overall consideration.

### **2.2 Definition of Abortion:**

It is defined as the termination of a pregnancy that occurs after, in conjunction with, results in, or is soon followed by the death of the embryo or fetus, such as a.

- a. spontaneous ejection of a human fetus within the first 12 weeks of pregnancy— see MISCARRIAGE
- b. the forced removal of a human embryo from the womb

As a result, abortion may occur spontaneously as a preterm birth, or it can be done intentionally via the use of a drug, surgery, or other techniques. Premature birth usually refers to an induced procedure at any point during the pregnancy; medically, it is defined as an unsuccessful labor or induced end before the twenty-week mark, which is considered nonviable.

The absence of safe abortion and other rights connected to it is alluded to be a method of underdevelopment among Women as a subaltern group in 'Institutional Issues Involving Ethics

and Justices – Vol. II by K. Ravi Srinivas'. The 1994 Cairo conference is regarded as a watershed moment in altering the world's perspective on abortion and redefining reproductive health.

At the International Conference on Population and Development in 1994, Elizabeth S. Maguire, President of IPAS, a worldwide non-legislative organization dedicated to ensuring women's well-being and advancing their conception rights, stated that, while fetus removal was legal in specific situations in all but a few countries, it was frequently inaccessible, resulting in dangerous fetuses. The knowledge and ingenuity needed to eliminate hazardous pregnancies were readily available, but political will was lacking. In cases of dangerous preterm delivery, which result in about 68,000 fatalities and a large number of wounds each year, the 'Millennium Development Goal' of reducing maternal mortality by 75 percent in the next decade was abandoned. She said that it was necessary to ensure that health-care systems understood WHO guidance that suppliers were prepared, and that better advancements for started preterm delivery were made available as allowed by legislation. Those efforts required both political accountability and financial resources[3].

Furthermore, 'Human Rights in the Constitutional Law of the United States by Michael J. Perry, Emory University School of Law' discussed the central issue of the NGHR: Does "every single" individual mean everyone, including unborn persons, under the NGHR, as stated by which governments are to behave in a spirit of brotherhood toward every single person? Regardless, "every single" person in the NGHR is usually understood to imply individuals who are born fully.

The Universal Declaration of Human Rights (1948), written at the dawn of the modern era of global human rights, stated in Article 1 that "every individual is born free and equal in nobility and rights." They are endowed with reason and a still, tiny voice, and they should behave in a spirit of solidarity with one another. After forty years – long after abortion had become a highly contentious issue in the United States and elsewhere – the drafters of the Convention on the Rights of the Child, which was ratified by the United Nations General Assembly in 1989 and came into force in 1990, unmistakably stated that "every" person means people who completely brought into the world people when they specifically declined to do so.

### **2.3 Prior until 1971, (Indian Penal Code, 1860):**

Fetus removal was formerly prohibited under Section 312 of the Indian Penal Code, 1860, which defined it as intentionally "creating an abnormal birth cycle." It was a culpable crime that condemned ladies/suppliers, with whomever intentionally caused a woman with a child lose facing three years in prison and also a fine, and the lady benefiting from the administration facing seven years in jail and perhaps a fine[4].

Consultations on a legal framework for incited preterm birth in India began in the 1960s, when fetal removal was legal in 15 countries. The Ministry of Health and Family Welfare (MoHFW) has issued a warning due to an alarming increase in the incidence of preterm newborns. To address this, the Government of India established a Committee in 1964, chaired by Shantilal Shah, to provide suggestions for drafting India's preterm birth legislation. In 1970, the Committee's recommendations were accepted and the Medical Termination of Pregnancy Bill was introduced in Parliament. The Medical Termination of Pregnancy Act was signed into law in 1971[5].

#### **2.4 MTP ACT & Amendments:**

In 2002, the Medical Termination of Pregnancy (MTP) Act of 1971 was amended to promote improved implementation and increase access for women, especially in the private health care sector.

1. In 2002, amendments to the MTP Act decentralized the process of approving a private location to provide preterm birth services to the region level. The board of trustees at the district level has the authority to choose a private location to provide MTP advantages in order to increase the number of suppliers providing CAC benefits within the legal scope.
2. The term "neurotic" was replaced with "intellectually ill person." This change in terminology was made to emphasize that a "intellectually unwell person" is someone who is unable to get treatment due to a psychological problem other than mental illness.
3. The Act imposed harsher penalties for MTPs directed at authorized locations or by underdeveloped clinical suppliers in order to ensure consistency and the health of women[6].

#### **2.5 MTP Rules 2003:**

The MTP Rules promote improved execution and access for women, especially in the private health care sector.

- *District Level Committee composition and residency:* The MTP rules 2003 define the formation of the council, stating that one member of the advisory group must be a gynecologist/surgeon/anesthetist, and other members must come from the region's clinical calling, non-government organizations, and Panchayati Raj Institutions, as well as one member of the Committee[7].
- *Approved location for providing clinical end-of-pregnancy administrations:* The MTP Rules 2003 specify the hardware, offices, medicines, and referral links to higher offices that must be provided by an approved location for providing excellent CAC and post-fetus removal administrations.
- *Inspection of private location:* The MTP Rules 2003 provide that an endorsed may be reviewed by the Chief Medical Officer (CMO) as often as necessary to ensure that pregnancies are being terminated in a safe and sanitary environment.
- *Cancellation or suspension of a private spot endorsement:* according to the MTP Rules 2003, if the CMO of the District is satisfied that the offices specified in rule 5 are not being properly maintained in that and that the end of pregnancy at such spot can't be made under sheltered and sterile conditions, she/he will make a report of the reality to the Committee giving the denial. The advisory committee has the authority to suspend or revoke the spot's endorsement if the board of trustees provides the owner of the place a chance to be heard before the declaration made under standard 5 is revoked[8].

#### **2.6 MTP (Amendment) Bill, 2020:**

The Union Cabinet approved the Medical Termination of Pregnancy (Amendment) Bill, 2020 on January 29, 2020, to amend the Medical Termination of Pregnancy Act, 1971. The bill will need to be presented in a Parliamentary meeting before it can be amended into an Act.

The following suggestions are included in the proposed amendments:

- One enlisted medical professional's evaluation will be needed for termination of pregnancy up to 20 weeks of development, and two enrolled medical experts' assessment will be required for termination of pregnancy between 20 and 24 weeks of development.
- Extending the upper development limit from 20 to 24 weeks for special classes of women, such as survivors of assault, survivors of inbreeding, and other vulnerable women (such as differently abled women, minors), among others. • The upper incubation limit will not apply in cases of significant fetal variations from the norm as determined by the Medical Board. The organization, capabilities, and other nuances of the Medical Board are to be proposed in this manner in the Act's Rules[9].
- The name and other details of a woman whose pregnancy has been terminated will not be revealed to anybody save a person authorized by law until further notice in authority.
- The Medical Termination of Pregnancy (Amendment) Bill, 2020 aims to increase women's access to safe and legal abortions for medical, eugenic, humanitarian, or societal reasons. The proposed changes to increase the upper incubation limit for termination of pregnancy for women in extraordinary circumstances are intended to provide access to comprehensive abortion treatment under strict conditions without jeopardizing the assistance and nature of safe abortion. The change was prompted by a number of court requests for permission to terminate pregnancies at a gestational age beyond the current acceptable cutoff because to fetal abnormalities from the norm or pregnancies due to sexual barbarism seen by women. In addition, following extensive consultation with many health experts and ministry heads, the Ministry of Health and Family Welfare recommended changes[10].

### 3. CONCLUSIONS

Increasing the number of suppliers: In order to increase the availability of safe and legal fetal removal administrations, clinical specialists having four-year college education in Ayurveda, Siddha, Unani, or Homeopathy should be remembered. Obstetrician and Gynecology (ObGyn) training and fetus removal advantages are a significant part of these courses of Indian System of Medicines (ISM) experts' undergrad educational program. Preparations to search for preterm births as far as feasible. It is recommended to look for premature deliveries as far as possible based on fetal deviation from the norm beyond 20 weeks. If the infant is found to have severe fetal deviations from the norm, this would make preterm delivery possible at any point throughout the pregnancy. Furthermore, in addition to the above proposals, it is proposed to extend safe fetus removal services for defenseless classes of ladies as far as possible, including survivors of assault and interbreeding, single ladies (unmarried/separated/bereaved), and other helpless (ladies with handicaps) to 24 weeks. The intricacies for the equivalent would be defined by the changes to the MTP Rules. Increasing women's access to legal preterm birth services: In its current form, the Act imposes certain practical impediments that prevent women from accessing safe and legal fetal removal services. The following were the suggested changes. Consolidating the evaluation of two medical service providers for second-trimester pregnancies into a single social insurance provider. Just because this is seen as a barrier to women's access to safe fetal removal services in situations when two providers are unavailable:

When the MTP Act was enacted in 1971, dilatation and curettage (D&C) was the most widely available method for terminating pregnancies. D&C is currently an antiquated invasive clinical procedure that necessitates the use of a metal curette to eject origination outcomes. The



provisions in the MTP Act requiring the evaluation of two clinical suppliers or outsider permission to ensure women's safety should be reduced in light of more recent and secure mechanical advancements that make fetal removal a safe out-of-understanding clinical system. The WHO's 2012 guidance on Safe fetal removal: specialized and arranging advice for health-care systems also recommends limiting outsider approval. A woman seeking a preterm delivery is described by the WHO as a "self-governing adult," implying that "intellectually competent adults do not need the permission of any outsider," implying that human care providers should not compel external consent.

Extending the sign of contraception to include unmarried women: the MTP Act stipulates that prophylactic disappointment is the only requirement that applies to married women. The proposed revisions include making preventive disappointment suitable for all women and their partners, as well as various reasons for the termination of pregnancy under the MTP Act.

## REFERENCES

1. J. D. Gipson, A. E. Hirz, and J. L. Avila, "Perceptions and practices of illegal abortion among urban young adults in the Philippines: A qualitative study," *Stud. Fam. Plann.*, 2011, doi: 10.1111/j.1728-4465.2011.00289.x.
2. L. J. Paluku, L. H. Mabuza, P. M. H. Maduna, and J. V. Ndimande, "Knowledge and attitude of schoolgirls about illegal abortions in Goma, Democratic Republic of Congo," *African J. Prim. Heal. Care Fam. Med.*, 2010, doi: 10.4102/phcfm.v2i1.78.
3. S. Sjöström, B. Essén, K. Gemzell-Danielsson, and M. Klingberg-Allvin, "Medical students are afraid to include abortion in their future practices: In-depth interviews in Maharashtra, India," *BMC Med. Educ.*, 2016, doi: 10.1186/s12909-016-0532-5.
4. B. Sen, M. S. Wingate, and R. Kirby, "The relationship between state abortion-restrictions and homicide deaths among children under 5 years of age: A longitudinal study," *Soc. Sci. Med.*, 2012, doi: 10.1016/j.socscimed.2012.01.037.
5. E. N. Berry-Bibee, C. J. St Jean, N. M. Nickerson, L. B. Haddad, M. M. Alcime, and E. H. Lathrop, "Self-managed abortion in urban Haiti: A mixed-methods study," *BMJ Sex. Reprod. Heal.*, 2018, doi: 10.1136/bmjsex-2017-200009.
6. A. Mitrut and F. C. Wolff, "The impact of legalized abortion on child health outcomes and abandonment. Evidence from Romania," *J. Health Econ.*, 2011, doi: 10.1016/j.jhealeco.2011.08.004.
7. I. Bizjak *et al.*, "Efficacy and safety of very early medical termination of pregnancy: a cohort study," *BJOG An Int. J. Obstet. Gynaecol.*, 2017, doi: 10.1111/1471-0528.14904.
8. A. Hulme-Chambers, S. Clune, and J. Tomnay, "Medical termination of pregnancy service delivery in the context of decentralization: Social and structural influences," *Int. J. Equity Health*, 2018, doi: 10.1186/s12939-018-0888-8.



9. G. Abi Tayeh, J. M. Jouannic, F. Mansour, A. Kesrouani, and E. Attieh, "Complexity of consenting for medical termination of pregnancy: Prospective and longitudinal study in Paris," *BMC Med. Ethics*, 2018, doi: 10.1186/s12910-018-0270-9.
10. C. Fiala *et al.*, "Outcome of first trimester medical termination of pregnancy: definitions and management," *European Journal of Contraception and Reproductive Health Care*. 2018, doi: 10.1080/13625187.2018.1535058.

## REVIEW OF CAPITAL PUNISHMENT

**Sourabh Batar\***

\*Assistant Professor,  
Department of Corporate Law,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [battarsourabh@gmail.com](mailto:battarsourabh@gmail.com)

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### ABSTRACT

*Over the last several years, capital punishment has been the most contentious issue. There are many reasons in favor of capital punishment, as well as numerous ones against it. The legal power to murder an offender for breaking a law is known as capital punishment. In Britain, the first death sentence statutes were enacted in the eighteenth century B.C. for 25 separate offenses. In India, this practice has been condemned in recent years due to the country's legal and moral standards. The primary goal of this article is to demonstrate the importance of death punishment in today's society. This article focuses on the arguments in favor of capital punishment and shows how the benefits of this method exceed the disadvantages. The purpose of this article is to focus on the significance and effect of capital punishment in society. The topic of death punishment's need in society has been left for future study in this article.*

**KEYWORDS:** *Capital Punishment, Moral, Legal Authority, Principles.*

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### 1. INTRODUCTION

Only in the rarest of circumstances, in the sense of a terrible act committed by a person, can capital punishment be applied. Prisoners who commit such crimes and are sentenced to 14 years in jail will lose 14 years of their lives and will never be welcomed back into society because they will be labeled as criminals for the rest of their lives. When it comes to regulating the country's crime rate, our system must take a strict and harsh alternative, and in order to discourage individuals from committing crimes in the future, the system must come up with a severe penalty[1].

Capital Punishment may be used to relieve these prisoners of their suffering and provide them with the opportunity to leave this dismal existence. A criminal who has done a really unforgivable act should be prosecuted quickly, since their presence in society is not only likely to disrupt society's equilibrium, but also to inspire other criminals to repeat the same crime. Citizens must be accountable and responsible for the growth of their community and the nation as a whole.

### 2. DISCUSSION

#### 2.1 Emotions and Rationality:

In the moral dimension of society, capital punishment is very subjective. The practice of killing criminals as a form of punishment has sparked ethical issues among people from many walks of life. This procedure has been labeled as retributive by several of these ethical standards. Scholars believe that the logic of these procedures should take precedence over people's emotions and morals, particularly in criminal situations. Emotions cannot stand in the way of the system's functioning being stable. Phillip Smith, a sociology professor and co-Director of the Yale Centre for Cultural Sociology, stated in *Punishment and Culture*, "Punishment is a profoundly meaningful action that nevertheless needs to be interpreted if it is to be understood[2]."

When punishing a criminal for an offense committed, Indian courts do not take the emotional element of society into account. When it comes to punishing sinners, philosophical, legal, religious, or psychological considerations are irrelevant. The most severe penalty is capital punishment, and this kind of punishment requires greater justification. To punish the most heinous criminals, capital punishment is employed as a last option. These procedures' illegality cannot be defended only on emotional or moral grounds.

The issue of death punishment is a conflict between logic and passion. Emotions and reason are two interconnected ideas, and when they clash, the emotion wins, according to neuroscience. Capital Punishment is a crucial issue because it has the potential to revolutionize the way states operate, and reason and emotions cannot be used to thwart the operation of a process that has the potential to alter the system's face[3].

## **2.2 Retaliatory Practices:**

There are many types of punishment theories, which may be classified into two categories: utilitarian and retributive. The utilitarian view aims to punish offenders in order to deter them from committing the same crime again; on the other hand, the retributive approach seeks to punish criminals who deserve to be punished.

The process of death punishment is said to be a retributive activity carried out by the court in ill faith. The retributive nature of capital punishment serves as a rationale for death penalty advocates. Considering death punishment to be a retributive process not only undermines the procedure's logical goal, but it also affects the emotions surrounding it. When a terrible crime occurs, society usually reacts with indignation and retaliation. The procedure of death punishment is not based on the "Eye for an Eye" concept; rather, it aims to rid society of the vermin. Different interpretations of retribution are likely to explain differences regarding its impact on death penalty views, as well as why retribution's acceptability as a rationale for capital punishment is disputed[4].

The rationale of punishment, according to renowned Prussian German philosopher Immanuel Kant, is entirely retributive. Kant recognized that punishment sends a message to the public that criminals and their actions are morally repulsive, and therefore has a de facto universal deterrent effect. Kant's idea aims to keep society from going down the wrong path by sending a message to society that everyone will be treated equally and no one will be singled out, and that the punishment for terrible crimes committed by anybody is subject to the death penalty.

Retribution is a notion that states that offenders should be punished in proportion to the damage they have caused their victims; for example, someone who has taken the life of another with full mens rea should be sentenced to death.

We are all citizens of a society, and we are all responsible and accountable to the society in some manner. Societies are made up of individuals who live in the society, not bricks or infrastructure. We should be accountable to this society and this nation because we are a part of it; everyone in the society should be treated equally; and there is a certain level of decorum and discipline required to live in a society, and anyone who tries to undermine or break the society's decorum must face the consequences.

An offender's acts create emotions of wrath, outrage, and a desire to punish, according to a fundamental principle of evolutionary theory that anybody with the aim to take resources or basic necessities from any member of the community is a serious danger to the whole society and all social groupings. When victims are treated unjustly, they get upset, which leads to moral indignation. There would be no incentive to rid society of such fools and frauds if there was no moral indignation[5].

### **2.3 Capital Punishment's Emotional Impact:**

There are many emotional responses that must be considered in a capital case for a terrible crime committed by a person, particularly when a jury is involved. The judge may tell the jury to put their emotions aside and determine the defendant's destiny based on the law and the evidence presented before them. A jury's job is to evaluate all of the facts and evidence provided to them and make a judgment on the defendant's destiny, which in the case of horrific crimes is a very difficult choice to make collectively.

Despite the fact that moral and emotional judgments have little legal weight, they tend to make the most successful decisions due to their lengthy evolutionary history. Given the magnitude of terrible atrocities perpetrated in society, moral judgments indicate that vengeance is sometimes more human than justice.

According to Rob Canton, a De Montfort University Professor of Community and Criminal Justice, social emotions may have a role in jury deliberations in death sentence cases. He goes on to say that the retributive character of this technique helps to restore society's equilibrium; offenders are unconsciously seen as traitors and enemies of the group "not one of us," which serves to neutralize our emotions of sympathy and concern for them[6].

Criminals and criminals who want to disrupt society's harmony should not be treated with sympathy. When a criminal is seen in a humanitarian light after committing a crime, he or she is more likely to commit more crimes in the future. An criminal who commits a terrible crime cannot be regarded a member of society since they have disobeyed authority and violated the social compact; such offenders are often viewed as dirt in society and need cleaning as soon as possible to prevent them from contaminating it.

Lord Krishna reveals in the Mahabharata that the battle was required for the birth of a new planet. The conflict between the Pandavas and the Kauravas is a struggle between good and evil, justice and injustice. The battle will be crucial in eliminating the vermin known as the Kauravas, which will not only make them pay for their crimes, but also free them from all of their sins. Lord Krishna goes on to say that when a woman is molested or harassed, or when acts harm a woman's self-respect, the perpetrator or perpetrators should suffer the repercussions in order to achieve their goal.

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The Nirbhaya case in Delhi is one such example, with Nirbhaya being the pseudonym for the rape victim in the notorious 16 December 2012 Delhi gang rape assault. Nirbhaya's body was mutilated beyond human comprehension, not only sexually. There was widespread anger in society, and the perpetrators were ordered to be hung. The Supreme Court ruled that the perpetrators should face the death penalty, while the child was tried by the Juvenile Justice Board and sentenced to a three-year remand home[7].

The act committed in Delhi was not only terrible, but also demonic in nature. According to the National Crime Records Bureau's "Crime in India 2016" report, the offenders in 94.6 percent of instances were the victim's relatives, such as brothers, dads, grandfathers, sons, or acquaintances. According to the study, 38,947 instances of rape were reported in India in 2016 under the Protection of Children from Sexual Offences Act (POCSO), Section 376, and other relevant sections of the Indian Penal Code.

The graph above depicts the conviction rate for such criminal offenses. Rape is an unforgivable crime that takes just a few minutes to perpetrate but months to convict the perpetrators in a court of law. Criminals who commit rape or any other unforgivable crime should not be allowed a second chance in court; instead, in the rarest of instances, capital punishment should be imposed immediately[8].

The notion of humanity may interfere in making moral idealism judgments in capital cases, but by punishing such filth in society, we are providing the society a new hope for humanity, as the community will aspire to live in peace and harmony. Capital Punishment should not be seen as a behavior that is incompatible with the idea of humanity; rather, it should be viewed as a practice that is likely to maintain people' faith in humanity after such criminals have been removed from society.

#### **2.4 Local Democracy and the Death Penalty's Survival in the United States:**

The United States is one of the few Western democracies that continues to use the death sentence. To combat the country's high rates of violent crime, the United States government has kept the death sentence in place. Other democracies, particularly the world's biggest democracy, India, should follow this approach. Only if there is widespread public acceptance for the practice will this be feasible. Stopping the death penalty, abolitionists believe, would benefit a democratic nation by removing a practice that violates fundamental human rights, which democratic countries are supposed to defend and safeguard. In a nation like India, where abolition is usually sought via political or legal means, a frequent worry is that political elites fight for abolition despite public support for the death sentence being strong[9].

Despite the fact that abolitionists want the elimination of the death penalty, popular support for the practice has led to calls for the government to take steps to maintain the practice, as other democratic nations that are much better than India have done. Why is it that, if a democracy is defined as a government for the people, of the people, and by the people, their voice and will are given no weight in this part of the system? Despite the fact that majority rule is at the core of any coherent theory of democracy, huge public majorities continue to favor death punishment in countries like Taiwan and South Korea where governments have campaigned for abolition.

In a democratic nation like India, the people elect their representatives to make choices on their behalf while keeping the public's best interests in mind. Without understanding the people's

desire and purpose, the same leaders who were chosen by the people are limiting a behavior that is considered to be harmful to their rights. Several such horrific murders have been perpetrated in the past several years, and men, women, and children continue to be victims of such demonic events.

This procedure was employed to punish anybody who committed a capital offense during the period of rulers and kings; however, it has lost its importance in society since then.

### **2.5 Threats in the Future:**

The defendant's likelihood of future criminal behavior or dangerousness is one of the most significant considerations that juries evaluate in capital trials. During the punishment phase of death penalty cases, the state often introduces expert evidence on future dangerousness, and in some states, a risk assessment of violence is needed before juries may impose a death sentence.

According to research conducted by the Capital Jury Project, jurors spend a significant amount of time discussing the defendant's risk of future dangerousness, which they often infer to be high based on a lack of remorse, the defendant's questionable mental capacities, and the perceived brutality of the crime.

Lack of future dangerousness may be used as a statutory mitigator in capital cases in certain countries. In reality, it has been discovered that the most essential question to be addressed for a defendant trying to escape execution is the problem of future dangerousness. The primary goal of this concept of future dangerousness is to avoid additional negative outcomes in the future. The ethical side of this idea is questionable, but it is likely to prevent another such occurrence from occurring in the future, necessitating the passage of severe regulations to discourage future offenses. Along with the potential for future harm, the severity of the murder must also be considered.

When deciding on a death sentence, they examine not just the accused's criminal history, but also his or her mental state. Criminal antecedents offer a summary of all the criminal actions done by the accused, making it easier for the court to determine whether or not the individual is a danger to society. However, it is apparent from the examples cited above that the accused is not free to go just because he or she has no criminal history[10].

It's because a court examines the facts of the case to determine if a certain conduct was planned or not, and if it was, there's a good chance the accused would repeat the same crime if the circumstances demanded it. Also, if the murder was not planned, but was done in a horrific way by the accused, he has no right to life due to the severity of the crime.

As a result, it is critical to distinguish between any case and the rarest of the rare cases in order to thoroughly examine the facts, taking into account even the smallest details, and then interpret each and every detail to reach the conclusion that, given the facts of the case and the act committed, the accused can be sentenced to death.

### **3. CONCLUSION**

Capital Punishment is a weapon that may be utilized to instill a feeling of discipline in our country and demonstrate to other democratic nations that our country believes in a disciplined approach to development. The idea is that there should be a system of pure reason, and there should be a sense of urgency in punishing those who break the social compact that is engrained



in all people, and that serves as a normative state's right to punish and administer justice. The rationally approved moral systems must be consistent with our developed emotional systems in order to be successful.

The concept of capital punishment is to right a wrong. When it comes to the application of death punishment, powerful emotions like wrath, contempt, and compassion play a significant part in our processing of a horrific crime, and these emotions have developed to the point where they keep society together. Although the death sentence is enforced with the aim of instilling a sense of discipline in society, its need is still debatable. However, we must recognize that in order to comprehend punishment, we must comprehend the role of emotions in the decision-making process. Our minds will attempt to weigh the benefits and drawbacks of this technique, but it should not be overlooked; if used wisely, it may be an excellent instrument for paving the road for development. This is not a practice that can be dismissed as unreasonable. This practice goes on to state that egregious damage done to others, particularly murder and rape, cannot be condoned.

Capital Punishment is not an animalistic method to punishing offenders in terms of humanity. It's simply one more step toward ensuring that our nation moves in the direction of order, system, peace, and harmony.

## REFERENCES

1. A. Barnett, "Misapplications Reviews: The Capital Punishment Controversy: Part II," *Interfaces (Providence)*, 1983, doi: 10.1287/inte.13.5.35.
2. K. K. Aggarwal, "Capital punishment," *Medico-Legal Updat.*, 2010, doi: 10.1177/1462474501003003001.
3. J. J. Megivern, "Book Review: Capital Punishment and the Bible," *Interpret. A J. Bible Theol.*, 2003, doi: 10.1177/002096430005700126.
4. "Review: The History of Capital Punishment," *J. Crim. Law*, 1951, doi: 10.1177/002201835101500313.
5. "Book Review: Capital Punishment: Global Issues and Prospects," *Police J. Theory, Pract. Princ.*, 1997, doi: 10.1177/0032258x9707000116.
6. R. Paternoster, "Capital Punishment," in *The Oxford Handbook of Crime and Criminal Justice*, 2012.
7. C. Xingliang, "On the death penalty," *Chin. Sociol. Anthropol.*, 2009, doi: 10.2753/CSA0009-4625410402.
8. P. B. Barry, "Capital Punishment as a Response to Evil," *Crim. Law Philos.*, 2015, doi: 10.1007/s11572-013-9254-5.
9. S. J. Fogel, "Book Review: Capital Punishment and Latino Offenders: Racial and Ethnic Differences in Death Sentences," *Crim. Justice Rev.*, 2005, doi: 10.1177/0734016805284508.
10. S. Britto and K. E. Noga-Styron, "Media Consumption and Support for Capital Punishment," *Crim. Justice Rev.*, 2014, doi: 10.1177/0734016814522645.

## EVOLUTION AND DEVELOPMENT OF ARBITRATION IN INDIA

**Chandra Shekhar\***

\*Assistant Professor,  
Department of Law & Legal Studies,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- chandrashakher792@gmail.com

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### ABSTRACT

*We will always have differences, but we must resolve them all via arbitration, whether religious or otherwise Mahatma Gandhi Arbitration is the process of a neutral third person, known as an arbitrator, resolving a disagreement between two parties. Arbitration is a kind of conflict settlement that takes place outside of the courts. One of the inherent goals of this is to limit the extent of judicial involvement. It aids in the quick resolution of the issue. The Arbitration and Conciliation Act of 1996 governs arbitration in India. The history of arbitration in India may be split into three periods: ancient times, British times, and now. Arbitrators are the masters of their procedures in arbitration, and the award made by the arbitrator is legally binding on the parties to the case. Disputations are settled in various ways throughout the world, and they are classified into two categories.*

**KEYWORDS:** *Arbitration, Conciliation, Court, Disputes and Reward.*

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### 1. INTRODUCTION

The 1940s Arbitration Act was still affected after independence, although there were many complaints, including the legality of the arbitrator's compensation. The Arbitration and Conciliation Act of 1996 was enacted to address the shortcomings of previous legislation. This legislation is not limited to commercial disputes; it also applies to other types of conflicts. Arbitration is a voluntary process, although it is occasionally mandated by law. Whereas mediation, negotiation, and conciliation are diplomatic methods with no legal bound (since the parties will determine whether to accept or reject the proposed solution), arbitration and judicial settlements are legal means of settlement that are binding in nature. In India, the parties have the freedom to appoint their own arbitrators, but the number must not be an even number of arbitrators, but the odd one, which is known as the arbitral tribunal, which hears the dispute between the parties. There is no limit to the number of arbitrators who can be appointed for a dispute, and there are no requirements (hidden or indirect)[1].

In addition to the arbitral decision (final award), the interim award is considered, which must be in writing and properly signed. Before reaching a decision, all parties to a disagreement are heard equally; there is no complicated or long process to follow, as there is in other procedures, making it simple and time-saving. There are no restrictions on the parties' ability to select a language, a

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venue for arbitration, or a process to follow. Arbitration is the ideal way for settling commercial disputes such as partnerships, building projects, insurance, and time-barred debt. The Arbitration Act of 1996 was amended in 2015 and again in 2018 to address practical problems in its application and to enhance institutional arbitration (recommended by Justice B.H Srikrishna committee). Arbitral procedures are likewise kept private, with the exception of the arbitral award in certain cases. According to the new amendments of 2018, the time limit for resolving a disagreement in written submissions is 6 months, while there is no time restriction in international disputes.

## **2. DISCUSSION**

### **2.1 Period Of Antiquity:**

Long before the British administration created formal courts, the panchayats' decisions were regarded as enforceable in ancient India<sup>1</sup>. Panchayats may be made up of the head of a family, the leader of a community, or a group of town residents. There are three types of arbitrators in ancient India: Puga, Sreni, and Kula. According to Mr. Colebrooke, there were several degrees of panchayats, which were not in the character of a jury or a rural tribunal, but rather a subordinate system of arbitration. Arbitration, in the opinion of Martin C.J., "is certainly a remarkable aspect of Indian society."

And I'll go even farther and say that it is considerably more prevalent in all walks of life than it is in England." The panchayats' decisions were susceptible to reconsideration in ancient times. The judgment of the kula or kinsmen may be overturned by Sreni, who could then be overturned by Puga. An appeal from the puga's judgment may be made to pradvaca, and then to the sovereign prince<sup>[2]</sup>.

### **2.2 Law of Hinduism:**

The origins of arbitration in India are lost in the mists of antiquity, and no substantive documents exist to indicate how and to what extent conflicts were settled in this manner. Nonetheless, the law and practice of private business conflicts that are resolved without the involvement of a court are steeped in the mists of time. It was a remarkable aspect of everyday Indian life, and it pervaded all social classes. Since Vedic times, India has used arbitration as an alternative to local courts for resolving disputes.

The Brhadaranayaka Upnishad is one of the oldest recorded treaties, in which sage Yajnavalkya refers to several kinds of arbitral bodies, such as the Puga - a board of people from diverse sectors and tribes who live in the same area. The Sreni is a conglomeration of traders and craftsmen from many tribes who are linked in some manner. The Kula is a community of individuals who have been brought together through familial connections. Panchayats were such bodies, and its members were known as panchax.

The proceedings before these organizations were of a more casual character, devoid of the tangle of municipal legal jargon. Furthermore, since the members of these organizations came from the same neighborhoods and frequently came from the same walks of life as the disputants, the facts and occurrences could not be hidden from them. These bodies' decisions were final and binding on the parties. An offended party, on the other hand, may appeal from Kula's judgment to the Sreni, then from the Sreni's decision to the Puga, and lastly from the Puga's decision to the Pradvivaca. The municipal courts have the authority to examine the judgments. In the absence of

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significant faults in prejudice or wrongdoing, the court has generally accorded respect and credibility to panchayat awards.

In *Sitanna vs. Viranna*, the Privy Council upheld a panchayats' decision in a family dispute that had been pending for 42 years. Arbitral organizations dealt with a wide range of issues, including commercial, matrimonial, and even criminal problems. All conflicts amongst his people were resolved by the raja, who was the final arbiter. However, when social and economic conditions change over time, the operation of such arbitral bodies becomes insufficient and obsolete, even though, in some form or another, certain versions of such arbitral bodies still exist in some rural and tribal regions of the nation today[3].

### **2.3 Islamic Law:**

Islam arrived in India through the ports of Cochin, Surat, and Bombay in the southwest and the Khyber Pass in the north. In the commentary known as the *Hedaya*, Iman Abu Hanifa and his followers Abu Yusuf and Imam Mohammad methodically collected Muslim law. To begin the transaction between Muslims and non-Muslims, a hybrid system with arbitration rules was created. The *Hedaya* has a clause that allows the parties to settle their differences via arbitration. *Tahkeem* is the Arabic word for arbitration, whereas *Hakam* is the term for arbitrator. The characteristics of a kazi – an official judge sitting over a court of law – were needed of an arbitrator. Certain types of people were barred from serving as arbitrators. He would continue with the arbitration if two parties to a dispute selected an arbitrator and indicated a willingness to abide by his decision.

Before the award was made, any of the parties may withdraw. That would be the conclusion of the arbitration process. In the absence of such retraction, the arbitrator will continue to hear the case and determine the decision. Except in instances where the judgment was unlawful due to a legal defect, the award was binding on the parties that nominated the arbitrator. When the *Kazee* is referred to, he must give effect to the award after he is satisfied with its legality and legitimacy. In other words, an arbitrator's decision had to be approved by a court of law. The parties could not back out of an arbitral decision after they had accepted it. Any award made in favor of a parent, child, or wife was null and invalid from the start. When two or more people were chosen as joint arbitrators, it was their responsibility to work in concert to resolve the disagreement, since this was a subject that needed knowledge and judgment[4].

In most Islamic nations, arbitration is regulated by sharia, which is the Muslim religion's fundamental rule. It is made up of four parts: the Quran, Sunnah, Jima, and Qiyas. The parties agree that sharia law will control all elements of arbitration to the exclusion of any secular system as a result of their decision to submit their issues to sharia law. In the field of international business arbitration, however, the rigid application of sharia has waned as arbitration norms have emerged. Many Muslim countries, like Egypt, Algeria, and Tunisia, have accepted the UNICITRAL Model Law or the UNICITRAL Arbitration Rules, or have enacted their own arbitration laws. Most Islamic nations have ratified the New York Convention of 1958, which governs the recognition and enforcement of international awards.

When both parties are Muslims, the whole arbitral procedure is governed by sharia law, both procedurally and substantively. Sharia demands that the arbitration agreement be in writing, and it does not recognize any subsequent agreements to arbitrate. Modern law in most Islamic nations, on the other hand, recognizes the commitment to arbitrate in the future as legitimate and

enforceable. They've also passed legislation enabling the court to affirm the arbitrator's appointment, ensuring the arbitration agreement's irrevocability. According to sharia, an arbitral award is enforceable in the same way that a judicial judgment is, and it may be overturned for the same reasons.

Any reward made under any other law, according to sharia, is a foreign award. Even if a single sharia requirement is not met, the award will be considered a foreign reward. The court has jurisdiction to execute such judgments, but it does not have the authority to examine the merits of the dispute or the arbitrator's rationale. The court can look into the formal conditions, such as whether the agreement to arbitrate exists or is valid, whether all of the arbitrators signed the award, and whether it deals with the merits of the dispute. Sharia law varies from state to state and is quite complicated.

#### **2.4 Before And After The British Occupation:**

Arbitration has a lengthy history in India, dating back to the dawn of time. Panchayats have existed in India for centuries as a means of dispute resolution; they have always been seen as a representational body that is also effective in its decision-making. In India, arbitration is linked to a family's livelihood, and it is used even in everyday affairs or family disputes, where a wise man from the community or family serves as an arbitrator and resolves the issues. All conflicts were handled using just two methods: one, via the legal process in the King's courts, and the other, through various types of arbitration organizations.

These arbitration organizations have the authority to resolve issues related to their areas of competence, such as commercial conflicts, which are handled by streins (guilds), and social disputes, which are handled by kulas, which are made up of village elders[5].

These processes were followed until the Britishers arrived in India and attempted to establish a formal judicial system in India based on British jurisprudence; however, they did not abolish the arbitration laws when they took power in India, but they did so between 1772 and 1827, passing various regulations and acts to establish a system of arbitration in India based on British jurisprudence. The Bengal Regulations of 1772 and 1780 established modern arbitration law by stating that in all instances of disagreement, parties should be advised to submit their case to arbitration, with the award becoming the court's decision.

Sir Elijah Impey introduced a clause to the rule in 1781 that said that the Judge should suggest, and to the extent that he can, without force, persuade the parties to submit to the arbitration of one person, to be mutually agreed upon by the parties. Another section of his rule stated that no arbitrator's decision may be overturned unless complete evidence was presented, under oath, by two reliable witnesses, that the arbitrators were guilty of major corruption or partial corruption in the case in which they made their award. The 1787 regulation established guidelines for referring a lawsuit to arbitration with the parties' consent. However, this clause did not include any provisions governing prompt disposition of cases, how arbitration processes would be controlled, or what will happen if the arbitrators have differing views; these issues were left unresolved[6].

The rules of 1793 and 1795 allow courts to send cases worth less than Rs.200 to arbitration, as well as conflicts of a certain nature, such as Dispute Accounts, Partnership, Debt, Doubtful or disputed bargains, non-performance of contracts, and so on. The process for regulating arbitration proceedings was also established, as well as the procedures for reference, award, and



setting aside, as well as certain specific criteria for the nomination of arbitrators. The Bengal rule of 1802, as well as the regulation of 1813, broadened the scope of arbitration's jurisdiction to include issues involving property rights and conflicts over forced land distribution.

The regulations of 1814, 1822, and 1883 make a variety of procedural changes, such as allowing vakils to act as arbitrators, allowing revenue officers to refer rent and revenue disputes to Collectors for arbitration until that date, when matters of revenue were largely regulated by state legislation, and allowing Settlement Officers to refer disputes to arbitrators and exercise conciliatory authority. Similarly, regulation VII of 1816 in Madras' presidential town authorised and authorized the District Munsifs to assemble district panchayats for the administration of civil cases and the settlement of real estate and personal property disputes.

The Bombay presidency regulation VII of 1827 allowed for the peaceful settlement of civil disputes via arbitration, as well as the appointment of an arbitrator for current and future conflicts by the parties themselves. All civil court cases that are cognizable could be referred to arbitration, and any breach of the award would be considered contempt of court. Arbitrators were also given a time restriction in which to deliver their judgment. The foundation for arbitration was established until this regulation of 1827, which also clarified some prior misunderstandings about the norms and regulations to be followed for arbitration. However, further revisions were required to govern the arbitration laws[7].

Compulsory arbitration and a parallel system of courts and arbitrators for dispute settlement were established as a result of these laws, which resulted in widespread corruption. Since a result, it has become necessary to resolve disputes via arbitrators chosen by the parties or arbitrators who are highly equipped to deal with arbitration issues, as the courts will give effect to the award made by such arbitrators. The establishment of the Supreme Courts in Bengal and Madras, as well as the Recorder's Court in Bombay, as a result of reforms, changed the entire landscape of the Indian judicial system, including the conduct of arbitrations, for the better, and for this reason, the British in India introduced various acts. The legislative council for India was formed in 1834 under the charter act of 1833, and certain changes to the rules of arbitration, damages, and interested witnesses were enacted by Act IX of 1840.

Act VIII of 1857 defined civil court process, and sections 312 to 327 of that act dealt with arbitration. Section 312 allowed for references to arbitration in pending lawsuits, and sections 313-325 outlined the arbitration procedures, with sections 326 and 327 allowing for arbitration without the intervention of the courts. This Act, on the other hand, was not intended to apply to.

## **2.5 Following The End Of British Rule:**

Following the end of World War II in 1945, and especially after independence in 1947, trade and industry received a major boost, and the commercial community began to favor arbitration over court-litigation as a means of resolving disputes, which entailed long delays and high costs. There was more judicial grist exposing the infirmities, shortcomings, and lacunae in the Arbitration Act of 1940 as the emphasis on arbitration grew. For example, the provisions of this Act concerning the arbitrators' duties and powers, as well as the procedure for conducting the proceeding after a reference, were woefully inadequate.

The Act was silent on the flaws that individual private contractors have. The rules for filing awards varied from one high court to the next. The absence of provisions prohibiting an



arbitrator or umpire from resigning at any time during the arbitration proceedings exposed the parties to significant losses, especially where the arbitrators or umpires acted in bad faith. The Act also didn't distinguish between a "agreement" made in advance to submit future disagreements and a "submission" made after a disagreement had arisen. There were no clauses in the agreement that required the arbitrator to provide grounds for upholding the judgment. Although a non-speaking award could lead to suspicion and embarrassment, there was no way to avoid it[8].

### 3. CONCLUSION

In India, the arbitration procedure has existed in some form or another since the dawn of civilization. Either the panchayats serve as arbitrators, or the panchs serve as arbitrators, with the king serving as the final arbitrator. The establishment of arbitration by the British in India with the statute of 1827 represented a turning point in the history of arbitration. Following their conquest of India, the British enacted the Arbitration Act of 1940, which was based on the English Arbitration Act of 1934.

Even after independence, the laws were implemented, but there was a need for a more detailed act to reflect the current situation in independent India. The Indian form of arbitration was established in 1996, and it covered a wide range of topics, including the role of the court in arbitration. After the 2015 modification, the act is ready to function as a separate court to deal with any civil matters that may be settled with the assistance of arbitrators in a short period of time rather than litigating cases in court for years.

However, arbitration is still a relatively unknown method of resolving civil disputes in India, owing to the parties' unwillingness to work together to manage the rules and regulations, as well as the lack of institutions capable of raising awareness about the benefits of arbitration in specific civil cases. The institutions that are here are few and far between, and they have much more work than they can manage. So expecting them to assist is like expecting a dead plant to bear fruit. The systems are nearly completely disconnected from one another, and there is no clear legislation in place to protect them. There is an immediate need to raise knowledge of arbitration, its advantages, and how it may benefit society as a whole.

### REFERENCES

1. R. Moonka and S. Mukherjee, "Impact of the recent reforms on Indian arbitration law," *BRICS Law J.*, 2017, doi: 10.21684/2412-2343-2017-4-1-58-71.
2. W. L. Craig, "Some Trends and Developments in the Laws and Practice of International Arbitration," *Tex. Int. Law J.*, 2016.
3. S. D. Franck, "Development and Outcomes of Investment Treaty Arbitration," *Harvard Int. Law J.*, 2009.
4. A. Farhad, "Two steps forward, one step back: A report on the development of arbitration in the United Arab Emirates," *J. Int. Arbitr.*, 2018.
5. H. Besaiso, P. Fenn, and M. Emsley, "Evolution of Construction Arbitration," *J. Leg. Aff. Disput. Resolut. Eng. Constr.*, 2018, doi: 10.1061/(asce)la.1943-4170.0000248.
6. J. Zhang, "International Investment Arbitration: Development, Controversies, and Future

Outlook,” *SSRN Electron. J.*, 2017, doi: 10.2139/ssrn.3068727.

7. R. Muçaj, “The development of arbitration in albanian legislation, actual challenges,” *Mediterr. J. Soc. Sci.*, 2015, doi: 10.5901/mjss.2015.v6n1p347.
8. E. Фокин and E. Fokin, “Accessibility of Justice, Quality of Law and Development of Arbitration Procedural Legislation,” *J. Russ. Law*, 2018, doi: 10.12737/art\_2018\_12\_11.

## PRINCIPLE OF EQUITY IN ENVIRONMENTAL LAW

Vipin Jain\*

\*Professor,  
Department of Finance & Marketing,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- vipin555@rediffmail.com

DOI: **10.5958/2278-4853.2021.01147.2**

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### ABSTRACT

*The concept of intergenerational equality delves into the principle of environmental legislation that ensures the protection of natural resources and the environment for future generations. Its origins may be traced back to the Stockholm Declaration of 1972, and it is a cornerstone of the sustainable development regime. The purpose of this article is to investigate and comprehend the notion of equitable principle in international environmental law. According to the equity principle, resources must be distributed equally across generations and among generations. This concept must be followed while considering the geographic composition and availability of resources in various areas in order to guarantee that resources are available to all people. The use of resources in a sustainable manner will not only benefit future generations, but will also assist the planet in replenishing itself. The Earth is a common resource for all existing species and future generations of those same organisms. This concept has never received the attention it deserves. The main issues that emerge are: to what degree should future generations' interests be recognized? The government's actions, which prioritized growth above environmental preservation, contributed to the implementation difficulties. The article will discuss the development of the principle, as well as the concepts of intergenerational and intergenerational equality, and provide an appraisal of the principle's necessity. It also emphasizes the need of recognizing future generations' rights as well as the current generation's responsibility.*

**KEYWORDS:** *Environment, Equity, Development, Law and Sustainable.*

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### 1. INTRODUCTION

Human generations, as well as all other living things on the planet, rely on the natural resources of the planet to survive. The only resource we have for all of our needs is the Earth, yet the sad truth is that resources are finite, and the Earth's capacity to improve from the impacts of human-caused changes, such as greenhouse gas effects, is limited. Due to the current generation's massive and unrestricted use of these natural resources for their own growth, their availability to everyone is limited[1].

Our grandparents and parents used to tell us when we were young that the world was quite different back then, that the air was pure, that the taste of fruits and vegetables was different, and that there were no problems with global warming. When we consider our upbringing and the current state of affairs, we can see how human activities have dramatically altered the environment through time. There is a pressing need to achieve the sustainable and justified use of resources in order to balance environmental sustainability with resource conservation for future generations while fulfilling current generation requirements[2].

Sustainable development is the process through which the current generation is expected to fulfill its development requirements without jeopardizing future generations' capacity to meet their own. The idea of intergenerational and intergenerational equality underpins sustainable development.

Climate change is caused by human activity and poses a significant danger to mankind. Climate change is connected to future generations because current actions produce greenhouse gases, which cause climate change in the long run, impacting future generations with warmer temperatures, more frequent forest fires, and water shortages. As a result, a platform for discussion and negotiation between nations is required to offer a path for reducing climate change and its risks. Not only will this discussion be necessary for settling on the nation's present usage, but it will also be necessary for conserving resources and reducing climate change[3].

There are two requirements that must be balanced: the environment and development, which are traditionally contradictory yet mutually necessary for mankind's survival and wellbeing.

## **2. DISCUSSION**

### **2.1 Development vs. Environment:**

The term "environment" refers to the atmosphere as well as everything that surrounds us. Just as growth is critical for a country's development, everyone's right to a clean environment is an indisputable human right. Country growth is necessary for economic possibilities, but caution must be used to ensure that environmental harm is avoided and that resources are not depleted to the point that they are no longer accessible for future generations. Sustainable development refers to a strategy for achieving development goals while preserving the environment's quality.

The right to exploit the environment or extract natural resources does not only apply to previous and current generations, but also to future generations, who have the right to utilize the resources for their own existence. As a result, it is critical that we guarantee the resources' availability to future generations while utilizing them. In order to ensure resource availability for future generations, the current generation must make moderate use of natural resources in order to meet their immediate requirements. As a result, it is past time for nations and governments to confront the question of how much economic growth is required while simultaneously addressing environmental concerns[4].

According to a UN study, "almost all human traditions acknowledge that the living are sojourners on earth and temporary Stewards of their own resources." Because the current generation inherited much more than just the means to stay alive from previous generations, there is also an intergenerational responsibility on the present generation to preserve the earth's resources for future generations, as Dinah Shelton pointed out in a symposium on "Solidarity: A structural Principle of International Law."

## **2.2 The Sustainable Development Goals: Their Origins and Evolution:**

The notion of sustainable development has its origins in European concepts about sustainable forest management. This was done in Europe during the 17th and 18th centuries, when John Evelyn claimed that sowing and planting trees is a national responsibility of every landowner. This was done in response to increasing concern over the depletion and extinction of wood trees in England[5].

## **2.3 Sustainable Development Goals:**

Sustainable development emphasizes the need of making efforts to ensure environmental protection. It aims to improve human well-being while also preserving the environment. According to the anthropogenic perspective, we must preserve animals and natural resources in order to improve human circumstances and survival. It is not a goal in and of itself, but rather a need for guaranteeing a better standard of living for people. The concept requires a method and procedure for utilizing natural resources in such a manner that they can be readily renewed; it is a resource-use pattern that seeks to conserve natural resources for future generations while still satisfying current needs. It is built on two types of equity.

- Equity across generations
- Equity among generations

## **2.4 The Principle of Equity:**

The concept says that each generation shares the Earth with members of the current generation as well as future generations (past and future). It expresses a desire for these resources to be used in an equal and fair manner. Natural resource geography adds to the need for and consideration of principle. Equitable distribution of profits and losses is a goal of the equity principle, which also acknowledges that everyone has a right to a decent quality of life. Under environmental law, the equity principle says that future generations, as well as previous and current generations, are entitled to utilize natural resources. Given the pace at which resources are disappearing, it is critical to acknowledge its moral responsibility to future generations and their rights, as well as to adopt environmental conservation measures[6].

## **2.5 Future Generations:**

The phrase "future generations" refers to all future generations who are entitled to the planet and its resources but have yet to be born. The term "present-day generation" refers to all individuals alive now who are utilizing the resources available to them. The current generation encompasses a number of generations, including those who are alive and well now as well as those who have gone away, yet they are always referred to as the present generation.

## **2.6 Obligations and Rights:**

The equity principle discusses future generations' rights to use natural resources to meet their needs, and it places responsibilities and duties on the current generation to select a method of using resources in a manner that preserves them for future generations.

## **2.7 Intergenerational And Intergenerational Equity Are Also Important:**

The term "international equity" refers to the rights and responsibilities of current and future generations in relation to Earth's renewable and nonrenewable resources. Governments and

countries are realizing the importance and significance of existing resources, as well as the potential repercussions if resources are not accessible in the future. One of the main goals of the intergenerational equality principle is to utilize resources for development in one generation in a manner that increases the likelihood of economic sustainability in the next.

The United Nations General Assembly has defined sustainable development as development that is capable of meeting current demands without jeopardizing the availability of resources for future generations. Sustainable development allows us to benefit from both man-made and natural riches. One of the main goals of intergenerational equality is to concentrate on resource development by the current generation in order to improve the chances of economic sustainability for future generations[7].

The concept has intertemporal implications in terms of resource use, and it tends to concentrate on the fair use of natural resources by human generations in the past, present, and future. It establishes a resource conservation balance in both current and future civilizations. The intertemporal aspect attempts to achieve a fair balance between resource distributions and their recycling. Because of the growing environmental deprivation, this is a serious problem.

The primary goal is to "promote economic growth while also bridging the gap between social and economic development and environmental preservation." *Minors Oposa v. Secretary of the Department of Environmental and Natural Resources (Philippines Supreme Court)*, it was held that because our resources are limited, it is incumbent on the current generation to ensure that the present natural resources are preserved for the full enjoyment and availability of natural ecology for future generations.

The principle's primary goal is to prevent wasteful exploitation of natural resources, which may lead to their extinction in the near future. Our pace of growth is already rising, but we must keep in mind that we only have so much time on this planet, which we must share with future generations. The Rio Declaration's principles emphasize and advocate for every nation's right to development, which must be carried out in an equitable way to fulfill the developmental and environmental requirements of both current and future generations[8].

## **2.8 Equity between Generations:**

Intra-generational equity differs from intergenerational equity in that it deals with resource equivalency within the same generation in terms of resource use. This concept emerges as a result of the varying availability of natural resources and the varying technologies available to exploit them. Because not everyone is capable of extracting the same amount of resources, there must be some kind of balance and harmonic distribution to guarantee that everyone receives their fair share.

Every individual in the same generation has rights and responsibilities for the use of renewable and nonrenewable resources, as well as a responsibility to care for them. The cornerstone to a country's growth is industrialization, which necessitates an increasing amount of renewable and non-renewable resources. With this in mind, the government must adopt stringent environmental legislation relating to the execution of the intra-generational equality doctrine's principles.

In a growing nation like India, we need more and more renewable and non-renewable resources to support our businesses and development. Since a result, it is imperative that lawmakers and the government develop good environmental policies based on resource usage, as we must



conserve resources for future generations. The issue may emerge because certain resources are now accessible, but due to the pace at which they are being used, they may be depleted shortly. As a result, while dealing with this, countries must ensure that resources are allocated fairly among current generations.

The difficulties that emerge in the successful application of these principles are due to the geographic and territorial make-up of continents; some areas are wealthy in particular things, while others are not; for example, oil output is high in the Middle East but low in China. And, since we all require resources, this concept seeks to make resource availability easier and eliminate the issue[9].

## **2.9 Need For This Concept, According To Analysis:**

The two most essential concepts of sustainable development are intergenerational and intragenerational equality. Both seek to ensure equitable distribution of sustainable development by controlling the use of renewable and nonrenewable resources. The Earth is a common resource, and although the current generation may use it, they must not do so at the expense of future generations. However, the nations are unaware of this reality and are hesitant to adopt similar methods in their own countries, so they are exploiting the resources at a pace that is sufficient for their own industrial growth.

The idea of sustainable development is shaped by two pillars: first, our connection with our environment, and second, our relationship with and responsibility to future generations. We may preserve natural resources for future generations, but what good will it do if they do not live and breathe in a healthy environment? A contaminated environment with high amounts of gas emissions, rising water levels, and so forth. The current generation must not only pursue growth, but also rigorously adhere to environmental protection[10].

## **3. CONCLUSION**

Under international environmental law, the equity principle establishes rights and responsibilities for future generations and current generations, respectively. The Earth is a shared and common resource across generations. Sustainability in the utilization of renewable and nonrenewable resources is required for both intergenerational equity and intragenerational equity. Intergenerational equality seeks to distribute resources equally across current and future generations, whereas intragenerational equity strives to distribute natural resources equally among current generation participants.

The concept of sustainable development is not being properly implemented, and the present environment and atmosphere are in poor condition. At the current pace of resource extraction, future generations will struggle to meet their requirements. As a result, it is necessary to respect the rights of future generations, who have a right to utilize the planet and its resources as well. The government must handle the complexity of this issue, with equality being the primary focus. Intergenerational and intragenerational rights are discussed. When it comes to resource allocation rules, fairness among generations must be the primary consideration.

Sole controlling the manner in which they are disseminated is not the only answer; the country must also focus on environmental safety and security. In order to do this, appropriate and efficient recycling or disposal of spent materials is required. We have reached the point where

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global warming has become a recent occurrence, and if we do not take action now, future generations will be left with insufficient resources.

## REFERENCES

1. B. Campbell and Q. Hanich, "Principles and practice for the equitable governance of transboundary natural resources: cross-cutting lessons for marine fisheries management," *Marit. Stud.*, vol. 14, no. 1, 2015, doi: 10.1186/s40152-015-0028-7.
2. Z. Hadjiargyrou, "A Conceptual and Practical Evaluation of Intergenerational Equity in International Environmental Law," *International Community Law Review*. 2016, doi: 10.1163/18719732-12341336.
3. J. V. DeMarco, "Law for Future Generations: The Theory of Intergenerational Equity in Canadian Environmental Law," *J. Environ. Law Pract.*, 2004.
4. D. Shelton, "HUMAN RIGHTS, HEALTH AND ENVIRONMENTAL PROTECTION: LINKAGES IN LAW AND PRACTICE."
5. UN General Assembly Resolution, *The Right to an Adequate/Healthy Environment*. 2012.
6. J. Ikeme, "Equity, environmental justice and sustainability: Incomplete approaches in climate change politics," *Glob. Environ. Chang.*, 2003, doi: 10.1016/S0959-3780(03)00047-5.
7. A. Iles, "Rethinking Differential Obligations: Equity Under the Biodiversity Convention," *Leiden J. Int. Law*, 2003, doi: 10.1017/S0922156503001134.
8. N. BintiHashim, "Constitutional Recognition of Right to Healthy Environment: The way Forward," *Procedia - Soc. Behav. Sci.*, vol. 105, pp. 204–210, 2013, doi: <https://doi.org/10.1016/j.sbspro.2013.11.021>.
9. "The Right to A Healthy Environment," in *Circle of Rights*, .
10. L. Rajamani, "The changing fortunes of differential treatment in the evolution of international environmental law," *Int. Aff.*, 2012, doi: 10.1111/j.1468-2346.2012.01091.x.

## **SOCIO-PHILOSOPHICAL ASPECTS OF THE STUDY OF THE ISSUE OF GENDER AND ENTREPRENEURIAL WOMAN IN A NEW SOCIETY**

**Malika Sadykjanovna Ganieva\***

\*Researcher,

Department of English Language,

Fergana State University,

Fergana City, Uzbekistan

Email id: M\_ganieva85@gmail.com

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### **ABSTRACT**

*In this article, we are trying to investigate the scientific-theoretical formation of gender issues and entrepreneurial women's Relations, its evolution, as well as the socio-philosophical aspects of the significance of our country in social, economic and political development during the renewal period of our society. At present, the issue of male and female equality is not only of national but also of universal importance.*

**KEYWORDS:** *Gender Equality, Entrepreneurial Woman, Fauve, Phenomenon, Social, Cultural, Economic, Socialization, Philosophical, Evolyusia.*

### **INTRODUCTION**

The level at which the socio-economic and political life of our new society, development trends and what else can be expected from any actions are, of course, in many ways directly related to socio-cultural relations. The same relationships lead to the management of all spheres of our life - work, family, neighborhood, reading, communication and other various processes. The solution of these issues on the basis of equality in society, of course, reflects the role of women and men, that is, gender relations.

It is not surprising that in our country today the ideas of gender equality, socialization, regulation of relations are on the agenda, both legal and practical, as an urgent issue. One can cite the Law of the Republic of Uzbekistan "On guarantees of equal rights and opportunities for women and men", aimed at increasing the activity of women and girls in public life, is also proof of this.

Gender relations are a social aspect of socio-psychological relations between women and men, manifested in all spheres of life and activity of society, including politics, economics, law, ideology and culture, education and science [1]. The scientific and theoretical study of gender issues has intensified since the second half of the twentieth century, in particular, this term was first used in his works by the American philosopher John Money in 1955. In family relations in our national culture, of course, a high level of the male hormone is of particular importance. For centuries, according to the upbringing of our mothers, there was a tradition to respect men in the family, to know them as the support of the family, while in the upbringing of our fathers

there was such a delicate aspect as the care and support of women.

### **MAIN PART**

In the history of Uzbekistan, in the development of culture and art of our state, women play an important, sometimes decisive role. On their shoulders lay not only the care of the family and household, as is customary in the East; in various periods of the development of society, women actively participated in the management of the state, made a great contribution to the development of national culture, and therefore the glorification of women, respect for her has become a noble tradition that is firmly rooted in our spiritual life. For the manifestation of deep respect, the exaltation of a woman is the exaltation of the Motherland. Since the first days of independence in our country, special attention has been paid to the protection of the family, the strengthening and development of this institution as the main unit of society. At the same time, no small importance is attached to ensuring gender equality, which is one of the factors of equitable and stable development. [2]

At this wonderful time, when nature awakens, illuminating your dear, dear faces with extraordinary light and warmth, we all involuntarily realize how the words “spring” and “woman” are in tune, how harmoniously the values inherent only in them are combined. We are once again convinced with admiration that in the form of a woman of the incomparable creation of the Almighty, such exceptional qualities as beauty and tenderness, love and devotion, kindness and selflessness are embodied. [3]

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In accordance with the Constitution of the Republic of Uzbekistan, women have equal rights with men. The President of the Republic Sh.M.Mirziyoyev and the Government are taking all measures to implement women's rights in the political, economic and public life of the country. The following words of his should be particularly noted: "Further strengthening of the role and position of women in the management of the state and society will remain one of the important directions of our reforms" [3.249].

Since the first days of State independence, the Republic of Uzbekistan has had the opportunity to truly engage in creating conditions for the broad participation of women in all spheres of society, which is one of the important prerequisites for achieving social, economic, political and cultural goals.

### **RESULTS AND DISCUSSIONS**

The ongoing large-scale reforms aimed at creating legal foundations in this area and their further improvement, increasing the political, social and economic activity of women entrepreneurs, their physical, spiritual and intellectual potential, employment, health promotion, strengthening their social protection, protection of family, motherhood and childhood, and support for women entrepreneurs are yielding significant results.

It is not without reason that we remember with deep respect the names of many great mothers who left an indelible mark on the history of the people, and we always give an example. The noble qualities inherent in them today continue their life in the image of our lovely girls, wise women. The role and activity of women in the ongoing transformations and reforms in the republic, which have covered all spheres of our life, is increasing. Thanks to their intellectual level, knowledge, talent and hard work, today our women achieve great success in the family, state and public administration, medicine, education, culture, sports, science, the development of the farming movement and entrepreneurship. [4]

It should be noted that the Decree of President Sh.M.Mirziyoyev dated February 2, 2018 “On measures to radically improve activities in the field of women's support and strengthening the institution of the family”, which notes the huge role of women in the upbringing of the younger generation, their active participation in all spheres of society, in making political and economic decisions at the highest level, was of great importance in activating the purposeful activities of women in Uzbekistan. The laws of the State concerning this issue, Decrees and Resolutions of the President are aimed, first of all, at comprehensive assistance to women in taking a worthy place in socio-political and everyday life, their deep awareness of their own role.

One of the main functions of a woman is educational, most often performed by a woman, provides socialization of the personality of the younger generation, maintaining at a certain level the culture of society and meeting individual needs in parental contacts with children, their upbringing, self-realization of parents in their children. Education is, first of all, adaptation to the totality of social values, the formation of life positions, and it is the mother who prepares her children for life. [5]

The next function of women is their participation in the socio-political and economic life of the country. In the history of Uzbekistan, in the development of culture and art of our state, women have played an important, sometimes decisive role. On their shoulders lay not only the cares of the family and household, as is customary in the East; in various periods of the development of society, women actively participated in the management of the state, made a great contribution to the development of national culture, and therefore the glorification of women, respect for her has become a noble tradition that is firmly rooted in our spiritual life. For the manifestation of deep respect, the exaltation of a woman is the exaltation of the Motherland. Thanks to their life experience, women make a huge contribution to strengthening the atmosphere of harmony, love and mercy, sincerity and purity in every family, every mahalla and throughout the country. This is the practical result of actions aimed at occupying a worthy place for women in all spheres of life, the manifestation of their talent, knowledge, the application of experience and the realization of aspirations. [6]

No human society can develop harmoniously, moving towards a higher state, if the role of a woman is belittled in it and the ratio of two complementary principles - male and female - is not balanced. It is known that European women received the legal right to dispose of their own property in marriage only in the second half of the XIX century.

Whereas Islam, almost fifteen centuries ago, openly proclaimed the full financial independence of a woman and endowed her with the inalienable right to dispose of her own values, have her own personal business and sign the necessary financial documents for this.

As a rule, according to the meaning of life, women are divided into two categories: some prefer the care of men and family comfort, while others, on the contrary, value independence. So it has always been and so it will be. Each of the women decides this for themselves on their own. The example of our businesswomen says the following: women have changed along with society. These are no longer those weak, defenseless creatures in need of care. Modern women can do almost everything that men do, and sometimes they do it better than them. They can handle business, politics, military service and much more. And at the same time, having acquired in many cases masculine character traits, such as rigidity, sometimes turning into cruelty, pragmatism, purposefulness, they have not lost purely feminine character traits. [7]

Unlike some foreign countries, where women are reduced to a humiliating and dependent position, the role of women in our society continues to increase every year and our women - free, proud, talented and beautiful - not only successfully cope with their direct duties, but also try to compete with the stronger sex in traditionally male fields of activity, such as entrepreneurship. We are convinced that it is women mothers and women workers who should be surrounded with special honor in our country. Over time, our country in general should become for the whole world an example of humane and careful attitude to the issues of motherhood and childhood, a model of equality of men and women in all spheres of society without exception. [8]

How often men, being convinced that this world is in our care, do not remember that we ourselves are in the care of women from birth to the last breath, often forget that in addition to the main burden at work, they carry on their fragile shoulders the exhausting weight of our daily life all their lives. However, I personally have no doubt that, in everyday terms, our women are much harder than men, and besides, they are much more sensitive and, of course, much kinder, therefore, probably, if women still ruled the world, there would be much fewer wars in the world, because only those who give life according to the will of the Almighty know for sure its real price. It is gratifying that our women are trying to solve their problems together, that they have a sense of unity to protect their interests, and therefore it is the duty of men to help them in this important and necessary matter, since women's problems, for a number of quite objective reasons, cannot be solved by women alone. We are sincerely pleased with the increasing activation of women's business and entrepreneurship, the promotion of women in commercial firms and government bodies.

To date, the women of our country have created numerous public organizations and foundations, all kinds of charity events, marathons and festivals are regularly held, however, we still have a lot to do for them in this important area. In terms of her intellectual and physical potential, a woman is in no way inferior to a man. For her, there are no fundamentally closed, inaccessible spheres of mental and physical labor. No law should prohibit a woman from doing this or that business, mastering this or that profession. In any society, a woman has the right to happiness. Speaking about the role of women in society, it is worth considering that the physical and moral health of the younger generation depends on her, which means the future of the nation.

## CONCLUSION

It can be concluded that over the past century, the Uzbek woman has gone through a difficult path of emancipation of her spiritual consciousness to the worthy social position that she



occupies today in society. A woman of independent Uzbekistan is active in all spheres of life: politics, science, culture, business, education. Raising the cultural standard of living of women is an important factor in stimulating their spiritual life. The consideration of problems concerning women in the years of independence and in logically continuing each other in state programs speaks of a high attitude towards this beautiful sex. This simultaneously places a great responsibility on women. The level of culture and the spiritual state of any society is determined by the attitude towards a woman. And in this regard, our country is achieving results that could serve as an example for many. Because in Uzbekistan, in any case, the criterion is attention and respect for a woman, her work.

Deeply respecting the right of women to choose their own way of life, to freedom from stereotypes and imposed behaviors, we hope that the next generations of Uzbek women will retain the sensitivity, sophistication and tenderness that are so becoming to Uzbek women, and which would not prevent our women, who always strive to achieve great success in their business, overcome all life failures, achieving everything they wanted in life, but also remain a faithful wife and a wise, caring mother.

## REFERENCES:

1. Mirziyoyev ShM. Strategy Of The New Uzbekistan. Tashkent: "Uzbekistan", 2021. P. 464.
2. Karimov IA. High Spirituality Is An Invincible Force. Tashkent: "Uzbekistan", 2008.
3. Ganiyev BS. Education-Priority Sphere of Reform in the Conditions of a New Stage of Development. Central Asian Problems of Modern Science and Education, 2020;(1):106-111.
4. Khakimov NH, Ganiyev BS. The Role of Studying the Strategy of Action in Choosing a Professional Direction (Taking Into Account the Formation Of Entrepreneurial Qualities) In Students. Scientific Bulletin Of Namangan State University, 2019;1(7):296-303.
5. Usmanov N, Ganiev BS, Karimova GY. The Philosophical Basis for the Formation of Spiritual Maturity among Young People. Oriental Journal of Social Sciences, 2021;33-37.
6. Sodikjonovich GB. Social and Philosophical Aspects of Family Entrepreneurship Development. *Academicia: An International Multidisciplinary Research Journal*, 2020;10(12):1228-1234.
7. Ganiyev BS. Innovative (Entrepreneurial) Activity of Women at a New Stage of Development of Our Society. Scientific Bulletin of Namangan State University, 2019;1(11):122-129.
8. Karimov UU, Karimova GY. The Importance of Innovative Technologies in Achieving Educational Effectiveness. *Журнал Естественных Наук*, 2021;1(1).

## ANALYSIS AND OPTIMAL DESIGN OF JOHNSON COUNTER

**Rahul Vishnoi\***

\*Assistant Professor,  
Department of Electrical Engineering,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [rahulv.engineering@tmu.ac.in](mailto:rahulv.engineering@tmu.ac.in)

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### ABSTRACT

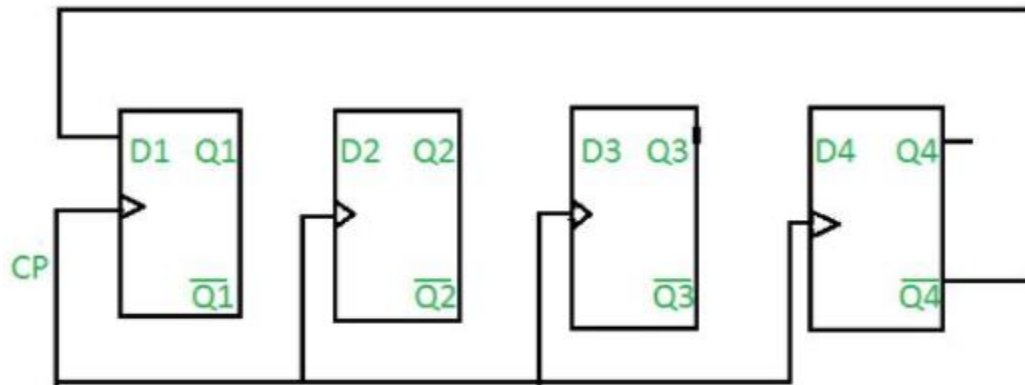
*The power consumption and propagation delay in a digital system is mainly due to sequential circuits. VLSI designers were primarily focused with low power, decreased latency and area efficient sequential circuit design. In the fulfillment of these objectives, the application of optimum design technology is essential. A counter comprises of the sequential circuit, having a broad variety of applications, including PLL, Digital to Analog, Signal Generators, Signal Synthesizers, etc. In this study a 4-bit Johnson counter is proposed for low power, high speed and cost efficient. The flip flop circuit utilized 14 transistors to produce a master D flip flop operation that triggered negative edge. The proposed counter is similar to the conventional counter's performance and price. With 43.22 percent less power dissipation than conventional versions, the suggested design has been found 48.86 percent faster. In the proposed counter, the transistor requirements are also 69.5 percent reduced, giving them an optimal area design.*

**KEYWORDS:** Clock, Flip Flop, Johnson Counter, Power Dissipation, Slave.

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### 1. INTRODUCTION

Counters are essential components of digital systems that require to synchronize various sequence representations. There are digital counters that consist of a series of flip flops that precisely change their states to create a sequence of patterns. This pattern sequence may be linked to the number of times an event occurs or a digital system regulates. A microcontroller computer has a wide application field including PLL frequency dividers, digital analogue conversion systems, signal generators and processing circuits, frequency synthesizers, digital memory, digital time and clock circuits, etc. A computer has a wide application area. The output patterns of 0 and 1 are referred to as their state and are maintained in multiple flip flops of counters shown in Fig.1. The total number of states in a counter is called the modulus count and the way in which a counter travels through these states is referred to as its counting sequence [1].



**Fig. 1: Johnson Counter Also Known As Creeping Counter, Is An Example Of Synchronous Counter. In Johnson Counter, The Complemented Output Of Final Flip Flop Is Linked To Input Of First Flip Flop And To Construct N-Bit Johnson Counter We Need N Flip-Flop.**

Sequential circuits and combination circuits on a small chip area are integrated utilizing VLSI architecture. Sequential digital circuits comprising registers and counters are used in all computer system operations, including arithmetic, logic and memory. These sequential circuits have to be built efficiently and effectively for the optimal performance of computer systems. The development's primary goals are low power and efficient design. The correct design may lead to a low power circuit with lowest number of logical CMOS gates. The choice of design technologies and flip flops have a significant effect on lowering power [2].

Johnson counter is one of the most useful computer design counters that synchronously generates a particular data pattern. This pattern is used to implement necessary logical functions in different logic systems. The traditional Johnson counter is built using the shift register where the same clock pulses for synchronous operation are supplied for all flip flops. Classic D flip flops consist of NAND gates and an inverter. The inverted output of the least significant bit flip flop in the design of Johnson is connected to the input of the most important bit flip flop[3]. The outcomes of the next crucial bit flip flop derive from all previous flip flops. Instead of conventional slave D master flip flops, the proposed Johnson counter slave D flip flop is used to reduce the count of transistors and to enhance the speed of design. In consequence, reduced transistor design reduces the circuit power dissipation. The Johnson counter proposed is built using the Cadence EDA tool [4].

One of VLSI's design goals was to reduce CMOS logical circuit power consumption. Due to the use of continuously increasing clock frequency, power consumption in CMOS logic ideas has increased in many applications. These designs show a higher power consumption even when used under modest supply voltages. CMOS logic circuit power consumption consists of a static component produced by leakage of inactive devices and tunneling current, dormant transistors, confinement current, etc. CMOS logical circuits. The loading and discharge of load capacity and short-circuit current that flows when the CMOS transistor change happens produces the dynamic dissipation. When the PMOS is on, and as soon as NMOS is begun, the last non-null load capacitance is emptied, providing the power to the ground via itself.

Sequential loops lead to the waste of power of a digital system in significant proportion. Sequence circuit changes its current state in accordance with the supplied logic in line with the clock transitions. These changes of status may occur in the positive or negative edge of the clock. Time transitions from high to low and from low to high add to the waste of electricity. Due to the non-null uptime and fall time, both NMOS and PMOS may be active for a part of the time during CMOS design during the clock changeover process. It creates a VDD-to-ground electrical channel and passes across the circuit. This current is termed a brief or thorough current that occurs during the clock changeover. This current is known as a spike [5].

## 2. LITERATURE REVIEW

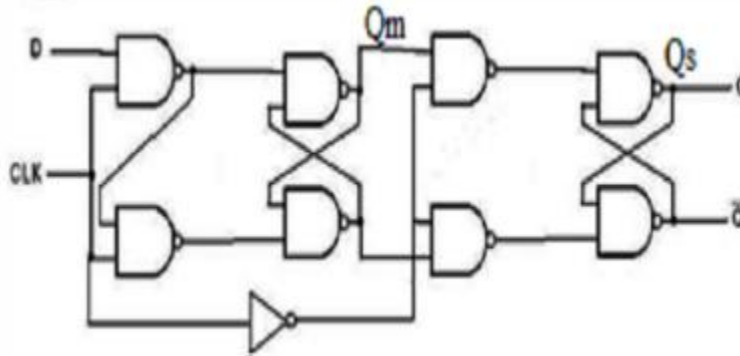
U. Kaur et al. showed in the paper that the synchronous designs operate at the maximum frequency which is loaded because many successive components need to be reached throughout the chip. Therefore, clock signals were a significant cause of power dissipation owing to high frequency and load. There are no clock signals used mainly for synchronization. There are thus no information on these signals. So you may save energy by using clock gating to minimize unnecessary clock activity inside the regulated modulus. This article shows a unique counter with clock gated flip-flop. The circuit is built on a new flip-flop method to reduce the power consumption of the signal. The number of transistors has been reduced. A flip-flop is suggested to create a binary counter of 10 bits. This counter was constructed with 1V in CMOS 90nm technology and modelled using Micro wind simulations up to its layout level. Simulations have shown that the new energy consumption and transistor count approach is effective [6].

M. Gautam et al. stated in the paper that low power design methods to reduce standby leakage power in nanoscale systems for CMOS very large-scale integration (VLSI). This increases the sub-threshold leakage current in MOSFETs, in a low power design, and also requires the transistor threshold voltage to be reduced to maintain the throughput and noise margins. The total power of digital circuitry is rising. Even if this increases p- and n-MOSFETs' under-threshold leakage current, the energy savings obtained by the power supply reduction will commence. Two PMOS and NMOS sleep transistors are positioned between power voltage and soil in transistor grating technology. The pull-up network is linked with a PMOS and an NMOS is installed between the pull-up and the ground. Both sleep transistors are turned off during standby mode. With this technique, leakage rate reduction is 17.58 percent and power is 24.38 percent. The tool for schematic simulation is CADENCE VIRTUOSO. The method of simulation is 45nm [7].

S. M. Ismail et al. demonstrated in the paper that the performance of any system relies significantly on effective techniques of design applied to various components. A specialized design, both power friendly and less complicated, is required to develop an intelligent and intelligent architecture for a computer system. Since the major portion of the computer system consists of sequential circuits, sequential circuits are extremely essential to guarantee efficiency and architectural simplicity. The different counter kinds of the sequential circuit system are considered as very important components. This research offers an arrangement for the creation of a Johnson counter based on the control of J-K flip flops with required clock gating. This design is more sophisticated and noticeable than the conventional shift register because the technique offers fewer interconnections and substantially less loss of power [8].

## 3. DISCUSSION

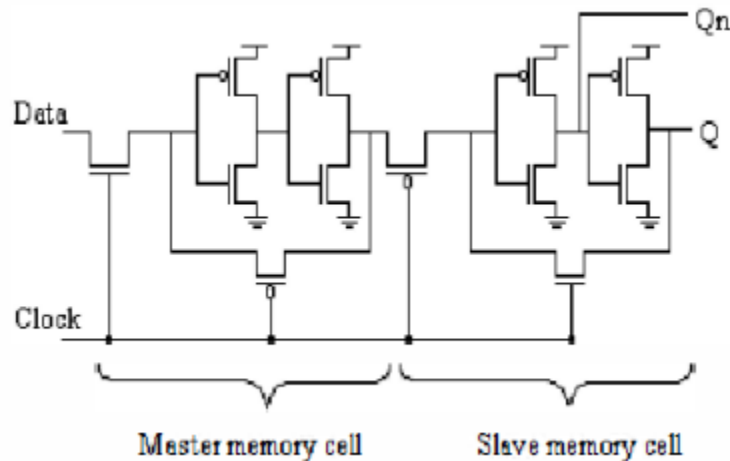
The basic memory element is a flip flop in sequential logic circuits. Data on the up or down edge of the clock pulse may be stored. The flip flop on the rising edge of the clock is referred to as the flip flop with the flip flop triggered by a positive edge and a flip flop with a negative edge. An 8 NAND portals and an inverter are built for a typical master D flip flop as shown in Fig. 2. The first step of master slave flop is the master that is applied directly with an external pulse signal and the first stage is applied with an inverted clock, which is known as a slave. The master is sensitive to the positive clock level whereas the slave is sensitive to the negative level [9].



**Fig. 2: Conventional Master Slave D Flip Flop**

The master is working and follows the D input if external clock is high. At the same time the slave is deactivated and has its previous value. The master latches sample its output value for the clock shift to logic 0 from logic 1 and slave it. For the low clock signal level, the slave is enabled and therefore transmits the stored value to its output. The master is deactivated during the negative level of the clock and thus the input applied to it is not impacted. Here an efficient and powerless area is used using the Master Slave Flip Flop that is negatively triggered by edge [10].

A master slave D flip flop with decreased transistor counts is used in the proposed Johnson counter. The transistor level of the flip flop is represented as shown in Fig. 3. It has a transistor number of 10 that is less than the typical slave master D flip flop. The master slave D flip flop shown, however, is not feasible in counter circuits because there are no reset provisions. Therefore, 2 additional NMOS transistors are connected with it which are utilized to reset their state. This increases the number of transistors to 12, but provides many required reset actions. There are still fewer transistors than usual master slave D-flops on the proposed master slaves D-flip flop.



**Fig. 3: Negative Edge Triggered Master Slave D Flip Flop**

Johnson's counter is built on the synchronous timing idea, which examines the state of each pivot flip at each triggering edge. The Johnson counter is  $2n$ , where  $n$  is how many flip flops are applied in their design. The 4-bit counter block diagram and its count sequence are given accordingly in Table 1.

The counter of the modulus is 8 in 4 bit of Johnson. The counter status is reset to 0000 at the beginning. The count sequence then goes back to 0000: 1000, 1100, 1110, 1111, 1111, 0011, and 0001. The Johnson counter is also called a twisted ring controller, because the inverted output of the least significant flip flop is linked to the input of the most significant input flip flop, just as it is in a ring counter.

**TABLE 1: STATE TABLE OF 3 BIT JOHNSON COUNTER.**

CLOCK	Q <sub>3</sub>	Q <sub>2</sub>	Q <sub>1</sub>	Q <sub>0</sub>
0	0	0	0	0
1	1	0	0	0
2	1	1	0	0
3	1	1	1	0
4	1	1	1	1
5	0	1	1	1
6	0	0	1	1
7	0	0	0	1
8	0	0	0	0

In a 45nm technology tool Cadence EDA, the proposed Johnson counter circuit was simulated and constructed. In the Cadence virtuoso schematic editor, the transistor level schematic is created. The circuit is gradually built by creating instances of various design components and then combining them to achieve the necessary response of a Johnson counter.

**4. CONCLUSION**



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A 4 bit counter using decreased transistor count was reported in this study, negative edge triggered master slave D flip flop. In terms of power dissipation, delays and counters, the performance and cost research of the counter proposed has been conducted. The design shown is similar with Johnson's conventional design. After the statistics have been examined, it may be concluded that the proposed counter design is higher than the conventional design. The idea exhibits better performance in terms of power dissipation as well as delay in propagation. In the design given, the energy dissipation has reduced in standard design to 0.2079 nW as compared with 0.36618 nW. In conventional design the latency in the proposed counter is 0.04321 ns versus 0.0845 ns. The expenses analysis of the two designs show that the proposed counter needs 56 transistors, compared with 184 required in conventional counters.

## REFERENCES

1. Y. H., "DESIGN AND IMPLEMENTATION OF SYNCHRONOUS 4-BIT UP COUNTER USING 180NM CMOS PROCESS TECHNOLOGY," *Int. J. Res. Eng. Technol.*, 2014, doi: 10.15623/ijret.2014.0305149.
2. M. Pedram, "Tutorial and Survey Paper Power Minimization in IC Design : Principles and Applications," *Design*, 1996.
3. J. Altimiras *et al.*, "YOU ARE RESPONSIBLE FOR CHECKING THAT THE VIA Mobile App gives you full overview of your travel details on your mobile . Download the app for free !," *J. Fish Biol.*, vol. 20, no. 1, p. 3707, 2013, [Online]. Available: <http://doi.wiley.com/10.1111/j.1095-8649.1999.tb00621.x%5Cnhttp://doi.wiley.com/10.1111/are.12483%5Cnhttp://eprints.gla.ac.uk/72796/%5Cnhttp://www3.interscience.wiley.com/journal/120809187/abstract%5Cnhttp://journals.plos.org/plosbiology/article?id=10.1371/journa>.
4. N. H.E.Weste and D. M. Harris, *CMOS VLSI Design: A Circuits and Systems Perspective (4th Edition)*. 2010.
5. J. Bodapati, A. G. V. Karthik Raju, and D. Yenug, "Estimation of energy in complementary metal oxide semiconductor using VLSI design," *Int. J. Innov. Technol. Explor. Eng.*, 2019, doi: 10.35940/ijitee.J9838.0881019.
6. U. Kaur and R. Mehra, "Low Power CMOS Counter Using Clock Gated Flip-Flop," *Int. J. Eng. Adv. Technol.*, 2013.
7. M. Gautam and S. Akashe, "Transistor gating: Reduction of leakage current and power in full subtractor circuit," 2013, doi: 10.1109/IAdCC.2013.6514451.
8. S. M. Ismail, S. Rahman, M. M. Rahman, and N. S. Ferdous, "A design scheme of toggle operation based johnson counter with efficient clock gating," 2012, doi: 10.1109/CIMSim.2012.52.
9. P. Saini and R. Mehra, "Leakage Power Reduction in CMOS VLSI Circuits," *Int. J. Comput.*

*Appl.*, 2012, doi: 10.5120/8778-2721.

10. P. C. Hsieh, J. S. Jhuang, P. Y. Tsai, and T. D. Chiueh, "A low-power delay buffer using gated driver tree," *IEEE Trans. Very Large Scale Integr. Syst.*, 2009, doi: 10.1109/TVLSI.2008.2004704.

## IMPACT OF MARTIAL ARTS INSTRUCTION ON AVERAGE ADULT

**Dr Manu Mishra\***

\*Professor,  
Department of Physical Education,  
Faculty of Education,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [principal.physicaleducation@tmu.ac.in](mailto:principal.physicaleducation@tmu.ac.in)

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### ABSTRACT

*Experts have so examined two different groups of people utilizing the Attention Network Test (ANT). Have at least two years of expertise in martial arts and no experience in sports. A larger sample of more than 500 individuals selected participants. 48 individuals were chosen for the Martial Arts Group: 21 and 27 in the non-martial arts Group. The various demographic variables were matched, including age and BMI. Following an earlier pilot study, these factors had a significant impact on the measurements of ANT. The repercussions of martial arts may be found online with warnings, but not with instructions. In instance, when alarms are maintained endogenously, boxers have shown performance improvements. The same happened when the extrinsic signal was provided with the control group. The study shows that years of martial arts skill and expenses have an inverse relationship because there are no external indicators. The longer a person performs a sport, the higher the intrinsic health. The findings are interpreted in relation to the effect of the development of specific brain neural cognitive pathways of special focus.*

**KEYWORDS:** *Attention Network Test, Adult, Cognitive, Executive, Martial Arts Training.*

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### 1. INTRODUCTION

To accomplish our goals it is essential that we focus on the task at hand and thus avoid distractions. Despite its essential significance in human adaptation to life, it is one of the most fragile cognitive processes. This is backed by a large body of research which shows a variety of factors, such as genetics, mental illnesses and traumatic brain injuries, which may contribute to the deficit of attention. The most significant effect on attention is undoubtedly the age and this reduction in elderly performance has been studied by a lot of studies. The decrease in the span of attention varies, but is usually gradual and is the greatest predictor of an older cognitive impairment. Care control is carried out from a neurological point of view by coordinated activation of a broad range of attention networks with different disciplines, depending on the kind of control required [1]. Attention with respect to how simple it appears to decrease attention control; it is not clear if or if this feature could be enhanced. This study investigates the effect of martial arts training on three distinct care networks (warning, education and executive). These

networks showed to be completely independent at the brain level. The findings in this research are important to understand the impact of experiences on these networks and to design appropriate intervention methods [2].

There are two ways to improve care regulation, according to Tang and Posner. Care Training (CT) are both types of care control. They are also known as Network Training and Attentional State Training (AST). AT focuses mainly on task-specific techniques and is based in Western culture. Over the past decade it has grown increasingly popular and is marketed as a training game for the brain. For example, many AT research has focused on training individuals to do specific tasks in order to develop certain cognitive skills. However, these gains are not transferrable to skill-based jobs. For example, the care task training simply improves the abilities needed for similar tasks. However, advances are frequently observed in this type of AT research. Participants educated to play video action games showed a higher visual attention than those taught to play Tetris. This may be because in this type of game it requires concentration to switch the screen for targets or opponents. In addition to being transferrable, the buff looks like short time rather than short duration. a long time seeker of growth who is working hard on Tang and Posner [3], [4].

The AST claims, on the other hand, that it is founded on East culture, which it draws attention by altered mental and physical circumstances and that it may better transfer to non-motivated work all practises containing AST are Yoga, Awareness yoga, meditation and martial arts. Gothe et al. investigated yoga in healthy adult volunteers' effects on cognitive control [5]. After doing different activities each day, people were invited three times to return to the laboratory to conduct computer behaviours. (1) Twenty four minute yoga session. (2) 24 minutes of Treadmill exercise plan. (3) Basic data collecting procedures are not in place. The three stages were performed randomly. The Flanker and tasks were utilized to provide thorough monitoring and the results show that both tasks improved during the Yoga sessions. These benefits were not found following cardiovascular exercise, which suggests that the main source of the effects is the practical component of yoga. Moore et al. found a connection between conscious experience and improved performance in attention and response inhibition tests in a similar research. Instead of utilizing the quantity of conscious experience as a variable rather than the result of the session, this cross-sectional research was unlike Gothe et al.

Martial arts and mindful yoga have numerous similarities and, while martial arts research has not been widely done in school children, they may lead to comparable performance advantages. For instance, an average of three taekwondo sessions a week over the course of a school year have proven to assist parents enhance their work memory and attention as well as concentration and control of behaviour. In addition, martial arts, attention and education in Montessori in children have been recognized by Diamond and Ling with different treatments, including team sports, aerobics and internships. Suitable for management control responsibilities, for the game or curriculum. The evaluation also reveals key characteristics, such as that children with the lowest cognitive baseline test scores and children with poorer socioeconomic situations are of the greatest value. This research indicates that neuropathological populations, particularly those with cognitive impairment and young individuals with high insufficiency, should be impacted most successfully by such an intervention. In reality, young people's stories with improved cognitive abilities are uncommon. Most advantages are produced by the long-term karate practise of cortical excitability or in the motor sensory system linked with the cortical-motor stimulation of

taekwondo athletes. Certain pathways such as the care networks (described below) connect with numerous cognitive networks, which enhance the chance that perceptual changes are effectively recognized. Despite no prior connection, unusual adult neurological consciousness [6], [7].

On the other hand, research showing that cognitive control was reduced as a consequence of ageing may assist older individuals. If cognitive control is evaluated over time, it appears to take the shape of an inverted U with a decline in its performance with age and is generally constant until early adulthood. Perhaps studies that utilize older individuals to evaluate the effect of martial arts on care management are uncommon, although not because of the physical demands of sports. This indicates that such a research is not feasible. Jansen et al. gathered the advantages of karate instruction with general practise and cognitive training, and recruited participants from 67 to 93 years old. Over 3–6 months, participants of the karate group delivered this exercise more than 20 times and reported a better health, but no substantial effect on cognitive speed or thinking [8].

In addition to seminars, though, fighters usually analyse training differences over years rather than weeks or months. Short cards may therefore not attain the same emotive qualities. On the basis of early studies, specialist's evaluated three different groups of individuals aged 63 to 83. They contrasted a karate training group, a training group for strength, and a control group that did not exercise. The findings indicated that in all four activities, the karate group obtained modest improvements. For example, the progress was not substantial at the divided attention test after five months, but, after five months of additional training it continually improved. It was found that the effect was dependable. These results clearly suggest that training time beyond that utilized in before and after intervention testing should, at least for adults, be maintained until any possible advantage is achieved.

## 2. LITERATURE SURVEY

K. Witte et al. stated in the paper that Aerobic exercise, recent research indicates, may postpone cognitive function decline in old age. Evidence indicates that a combination of aerobics, balance and coordination improves or maintains cognitive function. In particular, East Asian martial arts are rich in activities related to age. The objective of this study is to establish whether karate training improves cognitive function for elderly individuals and, if so, which cognitive areas are impacted. 89 elderly women and men, average 70 years of age, took part in this research. One intervention group (karate or fitness with 5-month intervention period) or control group was assigned to participants randomly. All participants had to complete a cognitive test battery before and after the intervention. The karate group received an extra five months of intervention in a follow-up trial. The findings show a significant increase in engine reactivity, stress tolerance and split attention only after the 5-month karate training session. Moreover, secondary study findings indicate that there are still benefits after 10 months. A five-month karate training plan may help towards increasing attention, resilience and the speed of motor response [9].

A. B. Vivas et al. stated in the paper that the processing of objectives given to regions prone to Return Inhibition has an inhibitory tagging mechanism. This technique operates by separating active representations in blocked regions from their related reactions. This inhibitory tagging process of visual attention in two studies has similarly been affected by the author's research as to whether this task-irrelevant but pre-potent feature in target stimuli, like words in the Stroop task. In an IOR approach this idea was tested using the Stroop effect. The results showed (1) IOR

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in colour-discrimination tasks, (2) stroke disruption in cued location decreased or eliminated and (3) an impact of inhibitory tagging was restricted to the shortest income asynchronous value, replicating the prior fMRI findings. The findings showed: These findings support the idea that inhibitor tagging in IOR reduces the efficacy of colour word competing in Stroop-like circumstances to respond answers [10].

### 3. THE ATTENTION NETWORK TEST

The wide range of measures used to assess attention management, which may lead to discrepancies across studies, is one disadvantage compared to most previous investigations. One way to alleviate this issue is to avoid the use of popular metrics, such as academic performance or IQ, which prevents the underlying mechanism behind the benefits from being separated. The issue may alternatively be addressed by means of a validated task to assess a particular neurological function.

Petersen and Posner reviewed the current studies on attention control, establishing the presence in the human mind of three major focus networks (Alert, Orientation and Executive). These networks, each with a specific brain structure, are independent from one other and are responsible for various aspects of attention. Alertness is related to optimal vigilance, orientation is linked to the target's spatial location and managers are linked to conflict resolution. The Attention Network Test may give measures of this signal (ANT). Using a modified flank operation with four kinds of tails to generate different types of data. Alertness measures compare the reaction of a person to objectives appearing at unexpected versus predictable periods (time queues). The directional index measures how effectively participants can direct their targets towards an unexpected location (spatial cues). Finally, the Executive Index evaluated how much reactive conflict in the related tasks people were able to resolve. Distraction generates an equal or opposite response from the (congruent) misplay in a concomitant task. All three measures are considered in operational terms as cost, and large RT or precise variations indicate poor control.

Martial Arts education is a broader learning experience, which includes not only suitable training for fitness but also the ability to achieve mental concentration and socially strong objectives. Therefore, where benefits will be seen is difficult to predict accurately. However, these measures might be affected by some factors of training. For example, a boxer should study his opponent's body for a chance to score in a fight constantly. This may occur at any time, so that monitoring training can continue with further evaluations, including randomly evaluated goals, measured by the index. In addition to scoring, all assaults from their opponents must be avoided and deflected. This requires not only adequate time (particularly with the warning system), but also better spatial orientation towards the precise region of the shot. Boxers also leap and flirt like spirits, confusing their opponents and scoring goals by surprise shots. If individuals do not address themselves to fix the underlying issue properly, the type of response evaluated by the operational metric will require conflict monitoring. Naturally, fighting is not the only aspect of practicing martial arts. Similarly, martial arts are not prohibited and may be shared with many other activities, like tennis, fencing. But it represents at least a setting of recurrent training in specific qualities similar to those of TA, brain training, etc. Additional components (typically in AST research) in concentration, meditation and discipline provide a suitable approach for care monitoring training.



Two groups of individuals selected from 500 young adults were compared by this research. One group included boxers with a minimum experience of two years, while the other group did not have any prior martial arts instruction. Group jobs cannot be random since considerable training is needed. Therefore, the most important and probable conflicts must be addressed with particular attention throughout the matching process. As the effect of different populations on ANT is not previously addressed, experts have performed experiments that previously revealed these problems.

This investigation sought to evaluate the performance of fighters and performing people who were not detrimental to the three ANT-measured attention spans. The Martial Arts Group felt that modest data were observed, indicating improved performance, compared with non-martial artists. An ANT test of the general population using an unpublished pilot study with a random unbiased sample of 41 psychology students graduating from University Bangor Did based on various demographic and lifestyle factors. The pilot had a significant effect on ANT % both for age and for the Body Mass Index (BMI). Thus, the martial arts were mainly categorized for these two characteristics instead of martial arts.

#### **4. DISCUSSION**

This study provides evidence of increased alertness networks for martial arts training. This appears to be a unique benefit of inherent readiness to stimulate unknown targets, as demonstrated by the higher benefits of unhealed improvement in my condition. This implies that martial arts perform at a higher level if the next target has no signal, but the difference between these groups is gone when the target has a reliable signal. It is important to note that there was a significant negative relationship between a warning index and the number of years of training for the advantages of the warnings in the MA group. Experts may depend on the ANT to infer the nature of such benefits, as stated at the outset. Alerts indicators were associated with the active usage of a norepinephrine-based network which links the regions cerulean to the right prefrontal cortex and parietal cortex and the prefrontal cortex (ACC) to the front cortex in a previous study employing neuroimaging techniques. People have been shown to perform cerebral cortex (OFC). Locus cerulean is the nucleus of the brain trunk which is involved in norepinephrine production and causes an increase in warning levels across the rest of the brain. As a consequence of this activation, specific areas of the brain that are involved in cognitive and motor processes may react to inputs faster.

The factors which may affect alert numbers and where they really originate from during martial arts training remain to be unknown. Further research using methods of neuroimaging may enhance the understanding of these nuances. For instance, Fan and Posner suggested that the functional connectivity of attention networks be evaluated using DTI (Diffusion Tensor Imaging). By understanding how these circuits work in a conventional group of participants, people may begin to study and demonstrate whether the experience of martial arts has an effect. The neuronal level effect on the excitement was discovered. Of reality, boxers educated for years in the fast reaction to stimuli may have altered the brain to lower the activation threshold for cognitive processing, sensory and motor control areas. However, this effect is to be generated under every circumstance whether or not, due to predictability or unpredictability, produces a quicker response time than an exclusive advantage. This idea is not supported by the findings of the martial arts group that showed no significant difference in the overall RT compared to the NMC.

## 5. CONCLUSION

According to exploration, martial arts training was linked to better cognitive performance among young individuals. But only a small number of healthy individuals have been examined. In this research, two groups of individuals evaluated by the Attention Network test were examined to determine the effect of intensive martial arts training on adult cognitive control (ANT). More than 500 individuals were chosen utilizing a bigger sample. There were a total of 48 selected: 21 individuals from the martial arts group and 27 from the non-martial arts group. In order to match the two groups, various demographic factors like age and BMI were used. This is after a recent pilot research has shown that the ANT readings have a significant effect. Online warnings are accessible, but no directions or information on the consequences of training in martial arts. In example, when endogenous alerts are maintained, boxers have shown improved performance. The same occurred in the control group when the extrinsic signal was given. This result is supported by an inverse relationship between years of competence in martial arts and expenses because there are no external indications. This implies that the longer they practice a sport, the greater the intrinsic health of a person. The findings are analysed in terms of the impact of different attention levels in specific brain cognitive circuits.

## REFERENCES

1. D. Bavelier and R. J. Davidson, "Brain training: Games to do you good," *Nature*, vol. 494, no. 7438. pp. 425–426, 2013, doi: 10.1038/494425a.
2. W. R. Boot, A. F. Kramer, D. J. Simons, M. Fabiani, and G. Gratton, "The effects of video game playing on attention, memory, and executive control," *Acta Psychol. (Amst.)*, vol. 129, no. 3, pp. 387–398, 2008, doi: 10.1016/j.actpsy.2008.09.005.
3. Y. Y. Tang and M. I. Posner, "Attention training and attention state training," *Trends in Cognitive Sciences*, vol. 13, no. 5. pp. 222–227, 2009, doi: 10.1016/j.tics.2009.01.009.
4. J. S. A. Carriere, J. A. Cheyne, G. J. F. Solman, and D. Smilek, "Age trends for failures of sustained attention," *Psychol. Aging*, vol. 25, no. 3, 2010, doi: 10.1037/a0019363.
5. N. Gothe, M. B. Pontifex, C. Hillman, and E. McAuley, "The Acute Effects of Yoga on Executive Function," *J. Phys. Act. Heal.*, vol. 10, no. 4, pp. 488–495, 2013, doi: 10.1123/jpah.10.4.488.
6. A. Diamond and D. S. Ling, "Conclusions about interventions, programs, and approaches for improving executive functions that appear justified and those that, despite much hype, do not," *Dev. Cogn. Neurosci.*, vol. 18, pp. 34–48, 2016, doi: 10.1016/j.dcn.2015.11.005.
7. S. R. Chamberlain, U. Müller, A. D. Blackwell, L. Clark, T. W. Robbins, and B. J. Sahakian, "Neurochemical modulation of response inhibition and probabilistic learning in humans," *Science (80-. )*, vol. 311, no. 5762, pp. 861–863, 2006, doi: 10.1126/science.1121218.

8. P. Jansen and K. Dahmen-Zimmer, “Effects of cognitive, motor, and karate training on cognitive functioning and emotional well-being of elderly people,” *Front. Psychol.*, vol. 3, no. FEB, 2012, doi: 10.3389/fpsyg.2012.00040.
9. K. Witte, S. Kropf, S. Darius, P. Emmermacher, and I. Böckelmann, “Comparing the effectiveness of karate and fitness training on cognitive functioning in older adults—A randomized controlled trial,” *J. Sport Heal. Sci.*, vol. 5, no. 4, pp. 484–490, 2016, doi: 10.1016/j.jshs.2015.09.006.
10. A. B. Vivas and L. J. Fuentes, “Stroop interference is affected in inhibition of return,” *Psychon. Bull. Rev.*, vol. 8, no. 2, pp. 315–323, 2001, doi: 10.3758/BF03196167.

## A REVIEW ON INDOOR AIR QUALITY MONITORING DEVICES

**Neeraj Kaushik\***

\*Assistant Professor,  
Department of Electronics & Communication Engineering,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- neeraj.engineering@tmu.ac.in

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### ABSTRACT

*Most developing nations are concerned about indoor air pollution (IAP), which has a direct effect on mortality or morbidity. Coal or biomass (crop leftovers, wood, dung, including charcoal) are the main sources of household energy for about 3 billion people across the globe. Furthermore, since people spend 80–90% of their time inside, indoor air quality (IAQ) has a direct effect on overall health and productivity. The authors of this article discussed the link between IAP exposure and related hazards. The primary goal is to explore how wireless technology may be used to create cyber-physical systems that can be monitored in real time. It also includes a critical examination of microcontrollers utilized in system architecture as well as difficulties in developing real-time monitoring systems. For researchers, this article also offers some fresh concepts and possibilities in the area of IAQ monitoring.*

**KEYWORDS:** *Air Quality, Device, Health, Indoor Air, Monitoring.*

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### 1. INTRODUCTION

With the continuous increase in quality of life, researchers in the twenty-first century have turned their attention to the breathing environment. Numerous studies show that indoor air is more dangerous than outside air. Unprocessed biomass is now used by 90% of rural families in most developing nations and approximately 50% of the world's population for open fires and poorly working cooking stoves inside. Indoor air pollution (IAP) and poor health of women or small children are caused by these inefficient cooking techniques, which are often exposed to such a contaminated atmosphere. Particulate Matter (PM), Nitrogen Dioxide Carbon Monoxide, Sulphur Oxides, polycyclic organic matter, and formaldehyde are among the hazardous contaminants carried by biomass and coal smoke. In poor nations, constant exposure to IAP from the burning of solid fuels is a leading cause of a variety of illnesses. COPD, otitis media, acute respiratory infections, TB, asthma, lung cancer, cancer of the larynx and nasopharynx, low birth rate, prenatal disorders, and serious eye illnesses that may lead to blindness are all on the list. Modernization has resulted in a major change in interior fire and heating systems from biomass fuels including such petroleum products and wood to electricity-based equipment in industrialized nations. Even with numerous advancements in cooking methods, 1.3 billion people in developing Asia are projected to depend on biomass for cooking by 2030, according to the

World Energy Outlook 2017. According to current estimates, the use of coal and solid biomass for cooking causes 2.8 million premature deaths per year. When kerosene, candles, and other hazardous fuels are used for illumination, the situation gets much worse. In general, only through advancing up the energy ladder can the kinds of fuels utilized for home requirements become cleaner and more efficient[1].

Note that animal excrement is at the bottom of the ladder, with agricultural leftovers, wood, charcoal, kerosene, gas, and electricity forming the subsequent levels. People all around the globe prefer to climb this ladder as their socioeconomic circumstances enable them to enhance their standard of living, however studies show that poverty is the primary barrier to utilizing modern and cleaner fuels. Biomass fuels will be used by impoverished families for decades due to the longer development cycle in many areas of the globe. According to data from The Energy Progress Report 2019, worldwide access to clean cooking was 58 percent in 2014 and just 59 percent in 2016. The average yearly growth rate was just 0.5 percent, and it has been steadily decreasing since 2010. With this yearly pace of development, the 2030 goal of universal access to cleaner fuels will be impossible to achieve. For the period 2016 to 2030, the yearly growth rate must increase from 0.5 to 3% in order to meet the targets. However, according on current estimates, almost 2.3 billion people globally would lack direct access to clean cooking by 2030. It also implies that the health effects of IAP will continue, particularly in regions with little ventilation[2].

When it comes to measuring indoor air quality, ventilation is crucial (IAQ). When adequate ventilation is not provided in building structures, the indoor air quality (IAQ) suffers and the buildings become unpleasant to inhabit. According to studies, IAP is one of the leading reasons of rising health problems linked to inadequate ventilation. According to a study conducted in a few remote villages in the Palp district in western Nepal, the ventilation deficit is 80 percent higher than the minimum rate recommended by the American Society of Heating, Refrigeration, and Air Conditioning Engineers. According to another study, poorly ventilated kitchens in Nepal have 100 times higher total suspended particle concentrations than the standard prescribed limit, owing to excessive smoke generation in the premises.

The cost-cutting measures help to reduce IAP generated by different biomass fuels. However, the modern way of life has resulted in poor indoor air quality. Most people now use indoor heating or cooling systems instead of natural ventilation systems as their standard of living rises. Sick Building Syndrome (SBS) cases have increased by 30 to 200 percent as a result of this scenario. The rate of air exchange, humidity, temperature, ventilation, air movement, biological contaminants, particle pollutants, and gaseous pollutants are all factors that affect the indoor environment, according to studies. Buildings are becoming more airtight, and improved insulation materials are being used to assist minimize energy losses. The air conditioning systems as well as the most recent building envelope, on the other hand, reduce the movement of fresh air. Meanwhile, the growing use of chemical goods and synthetic materials in interior settings has resulted in a rise in the prevalence of numerous VOCs (VOC). One of the most common reasons of hypersensitivity is this. As a result, it's fair to argue that we're still vulnerable to the dangers of IAP[3].

Many researchers are creating indoor environmental quality monitoring systems to cope with the increasing mortality and morbidity rate caused by IAP. The majority of individuals spend 80 to

90% of their time inside, either at home or at work. As a result, urgent action is required to enhance indoor air quality.

## **1.1.Public Health Or Indoor Air Quality:**

In India, many research on the negative effects of IAP have been published. Excessive exposure to solid fuel increased the frequency of fatalities among children aged 1 to 4 in a nationally representative case-control study published in 2010, after considering for key living circumstances and demographic variables. Because these babies are used to spending more time inside with their moms, this is the case. The prevalence ratio for females in this research was 1.33, with a 95% confidence interval of 1.33. (CI).

## **1.2.Potential Contaminants And Indoor Air Quality:**

The concentrations of various pollutants, such as particulate matter, primary, and secondary gaseous pollutants, are used to calculate IAQ. According to studies, a greater percentage of PM in the urban interior environment is of ultra-fine size. Particles smaller than 0.1 m are usually present in a small quantity, somewhere below the 10% concentration threshold, while particles bigger than 0.1 m are usually present in a small amount, somewhere below the 10percentage concentration level

Radon, O<sub>3</sub>, nitric oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), diatomic carbon, and volatile organic compounds (VOCs) are among the main gaseous pollutants. The use of chemical compounds in interior settings has skyrocketed in recent years. Under room temperature, these chemical compounds produce a variety of harmful chemical pollutants, including VOCs. These chemicals may cause a variety of health problems, including nausea, headaches, dizziness, fatigue, and irritation of the nose, eyes, and throat. Ground-level ozone is a colorless gas that is a natural component of the atmosphere and is the main cause of respiratory illnesses. Vomiting, nausea, weakness, dizziness, headache, and loss of consciousness are all common symptoms of CO poisoning. SO<sub>2</sub> is a colorless, highly reactive gas that plays an important function in the environment. It is detrimental to human health, and patients with lung illness, elderly individuals, youngsters, and those who are exposed to SO on a daily basis are at a greater risk of acquiring lung diseases and skin issues[4], [5].

VOC levels in buildings that are too high may irritate the skin, throat, nose, and eyes. VOCs have also been linked to a wider range of diseases, including headaches, respiratory problems, tiredness, and SBS, according to medical specialists. The combination of different contaminants present in indoor air may trigger a chain of chemical reactions, resulting in secondary pollutants being released into the environment. According to studies, secondary contaminants are more hazardous than primary pollutants. Secondary indoor pollutants (such as ozone, NO<sub>2</sub>, and sulphur trioxide) have been shown to cause considerable discomfort and have a negative effect on human health. Furthermore, owing to the complexity of their composition, they are difficult to quantify and forecast. Indoor air quality is harmed by volatile, non-volatile, including non-biological elements, which also degrade the environment's overall quality. Dust mites, pollen, mildew, fungus, molds, bacteria, and numerous insects, as well as animal dander, anthropoid, infectious agent, pollen, mycotoxins, infectious agents, as well as animal saliva, are among the biological creatures[6], [7].



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### **1.3. IAQM (Indoor Air Quality Monitoring) Systems Are Used To Monitor The Quality Of The Air Within A Building:**

The growing health problems caused by IAP are now a hot topic among academics all around the globe. Some experts proposed IAQ monitoring systems for a better living environment using sophisticated sensor networks and communication technology. It is impossible to evaluate all current and planned IAQ monitoring systems in this article since researchers are actively researching in this area to enhance building health. Nonetheless, research based on the most important IAP characteristics are included in this section. We chose monitoring systems that provide online access to recorded environmental variables or produce SMS-based warnings since automated alert systems are essential in our hectic schedules. Although many methods for real-time monitoring have been developed, the Wireless Sensor Network (WSN) and Internet of Things (IoT)-based models were chosen to be evaluated due to their growing importance in the Industry 4.0 revolution[8][9].

### **1.4. Other Technological Innovations:**

Some researchers experimented on architectures other than WSN and IoT, however few characteristics indicate their poor performance when compared to the real-time monitoring capability of IoT systems. The most significant disadvantage of Wu et alC-Air.'s platform was that the study was limited to PM levels only; however, in the real world, IAQ is affected by several other pollutants as well. Although the study attempted to work on multiple pollutants, it was limited to a simulation environment; the practical implementation of such systems is the real challenge. Furthermore, these researchers focused on low-cost sensors where calibration is a major problem, resulting in a lack of overall design performance. Where the system was solely tested in a controlled lab setting on breadboards. Construct a prediction model using CAN interface, but the research was once again restricted to PM levels; the effect of other contaminants was not taken into account. A useful research using FOOBOT monitors, in which various IAQ parameters were examined for real-time analysis, although sensor calibration was once again a significant issue to achieve required performance[10].

## **2. DISCUSSION**

The majority of researchers in the last few years have concentrated on WSN-based designs using ZigBee as the most reliable communication protocol, according to the trends in the development of IAQ monitoring systems. The real-time data gathering is handled by the AT mega microcontroller; however, the Raspberry Pi is another popular option for setting up a sensor network in the target area. WSN stands for Wireless Sensor Network, and it is a kind of Ad Hoc Network in which sensor networks use a lot of energy while sending data across many hops. It was discovered that sensors take a long time to transmit a signal to the monitoring device. Researchers have to concentrate on battery power management in these circumstances to enhance overall system performance. Only a few researchers, though. Most WSN-based IAQ monitoring systems utilize web servers as data access platforms, which necessitates extra effort to produce real-time warnings on user cellphones to avoid dangerous situations. The following is a list of WSN-based IAQ monitoring systems.

The majority of academics have utilized ZigBee to create a communication network between sensor nodes and controller units, however ZigBee modules have many drawbacks, including limited communication range, poor network stability, and expensive maintenance costs. The

extremely efficient IoT technologies expand the field's reach. The Raspberry Pi microcontroller, which has built-in Wi-Fi connection capabilities, and IoT architecture guarantee rapid data transmission. It's worth noting that the majority of Arduino boards don't have direct network connection. As a result, users must utilize extra modules to get access to the internet. The ESP8266 chip is a popular Wi-Fi module for Arduino boards, however it requires an additional converter for 5–3 logic shifting since most Arduino microcontrollers. Furthermore, it results in increased costs and energy usage. Furthermore, the Raspberry Pi 3 has greater processing power than the Arduino Uno since the former's clock speed is 1.2 GHz, while the latter's is 16 MHz.

### 3. CONCLUSION

Researchers must develop real-time IAQ monitoring systems in actual situations rather of working in a controlled laboratory environment or on simulation systems. Future research should focus on the development of prediction systems since it is simpler to manage the negative effects of indoor air pollution when we are aware of what is going to happen next. To build the prediction systems, deep learning models such as LSTM and GRU may be used, and immediate warnings regarding variations in indoor pollutant levels over the threshold limit must be delivered to smartphones through SMS or email. It's worth noting that LSTM is a more advanced version of the conventional Recurrent Neural Network, while GRU is an extension of LSTM that includes forget and update gates. These models use parameterized functions that have a direct effect on the data's ideal parameters, resulting in more accurate predictions. The study of mobile app-based systems is also an important element of the design. This area has a lot of room for advancement, and future researchers will need to focus on in-depth design solutions that combine IoT and deep learning models to create cost-effective, accurate, and dependable IAQ management systems. The study should not, however, be confined to the industrial environment or cities. For village locations where people are exposed to solid fuels excessively, only marginally acceptable systems must be developed. The creation of such systems has the potential to make a huge difference in the medical field.

### REFERENCES:

1. E. Akpınar-Ferrand and A. Singh, "Modeling increased demand of energy for air conditioners and consequent CO<sub>2</sub> emissions to minimize health risks due to climate change in India," *Environ. Sci. Policy*, 2010, doi: 10.1016/j.envsci.2010.09.009.
2. A. Mota-Babiloni, P. Makhnatch, R. Khodabandeh, and J. Navarro-Esbrí, "Experimental assessment of R134a and its lower GWP alternative R513A," *Int. J. Refrig.*, 2017, doi: 10.1016/j.ijrefrig.2016.11.021.
3. E. Gupta, "THE EFFECT of DEVELOPMENT on the CLIMATE SENSITIVITY of ELECTRICITY DEMAND in India," *Clim. Chang. Econ.*, 2016, doi: 10.1142/S2010007816500032.
4. A. S. S. Ba-Batin, H. A. A. Haider, L. S. Wong, and H. A. A. Tareh, "Effectiveness of green strategies to reduce carbon emission in the Putrajaya Campus Buildings of Universiti Tenaga Nasional," *Int. J. Eng. Technol.*, 2018, doi: 10.14419/ijet.v7i4.35.22865.
5. A. Mota-Babiloni, P. Makhnatch, and R. Khodabandeh, "Études récentes sur la substitution des HFC par des frigorigènes synthétiques alternatifs à faible GWP: performances énergétiques et impacts environnementaux," *International Journal of Refrigeration*. 2017,

doi: 10.1016/j.ijrefrig.2017.06.026.

6. P. Nejat, F. Jomehzadeh, H. M. Hussien, J. K. Calautit, and M. Z. Abd Majid, "Application of wind as a renewable energy source for passive cooling through windcatchers integrated with wing walls," *Energies*, 2018, doi: 10.3390/en11102536.
7. J. Winkler, J. Munk, and J. Woods, "Effect of occupant behavior and air-conditioner controls on humidity in typical and high-efficiency homes," *Energy Build.*, 2018, doi: 10.1016/j.enbuild.2018.01.032.
8. A. Mota-Babiloni, P. Makhnatch, and R. Khodabandeh, "Recent investigations in HFCs substitution with lower GWP synthetic alternatives: Focus on energetic performance and environmental impact," *Int. J. Refrig.*, 2017, doi: 10.1016/j.ijrefrig.2017.06.026.
9. H. Duan *et al.*, "Chilling Prospect: Climate Change Effects of Mismanaged Refrigerants in China," *Environ. Sci. Technol.*, 2018, doi: 10.1021/acs.est.7b05987.
10. T. A. J. Kuhlbusch *et al.*, "New Directions: The future of European urban air quality monitoring," *Atmos. Environ.*, vol. 87, pp. 258–260, 2014, doi: 10.1016/j.atmosenv.2014.01.012.

## A REVIEW STUDY ON GLOBAL WARMING AND CLIMATE CHANGE

**Navneet Kumar\***

\*Professor,  
Department of Medical Lab Techonology,  
Faculty of Medical Allied Sciences,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [navneet.computers@tmu.ac.in](mailto:navneet.computers@tmu.ac.in)

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### ABSTRACT

*Convincing evidence that the Earth's climate is experiencing substantial and worrisome, changes has gathered quickly in recent years, particularly over the last three decades. Instead, global warming is a reality verified by a large body of observations from many various sources. Indeed, the emphasis of study has now moved from trying to prove the presence of global warming to efforts to identify its causes. Although the precise amount of damage from global warming may be impossible to estimate today, it can be stated with certainty that the negative consequences of global warming on climate will substantially exceed the potential advantages. The likelihood is very strong that human produced greenhouse gases, with carbon dioxide the main culprit, are the primary cause of clearly established global warming and climate change today. This review article will provide convincing evidence that global climate change induced by global warming is already occurring and is need of our urgent attention. The conclusion that there is significant warming of the Earth's surface is not based mainly on theoretical models, although these models do succeed in reproducing the current datasets with increasing success. Much can be done today to minimize the consequences of global warming and the related climate change. Difficulties in resolving the issue are not caused mainly by unavailable technology, but by the absence of adequate incentives to adopt the new technologies more aggressively.*

**KEYWORDS:** *Climate Change, Carbon Dioxide, Global Warming, Methane, Sea Level Rise.*

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### 1. INTRODUCTION

The environment has been affected by human people for millennia. However, it is only since the beginning of the industrial revolution that the effect of human activities has started to spread to a global scale. Today, environmental problem becomes the greatest worry of humanity as a result of scientific data concerning the rising concentration of greenhouse gases in the atmosphere and the changing temperature of the Earth. Globally, temperature is rising and the quantity and distribution of rainfall is being changed. Global warming and climate change has arisen as a significant global issue cutting beyond geographical and political borders. The on-going over-production of greenhouse gases has meant that more and more heat is being trapped in the earth's

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atmosphere, thus we are basically heating up. This is what is known as global warming. Since industrialization, the earth's temperature has increased by 0.7 degrees- if we do not take action quickly, by 2100 temperatures may climb by as much as 5 degrees[1]–[3].

This temperature rise will have a significant and catastrophic impact upon the environment around us, leading to more severe weather occurrences and more widespread loss of many animal and plant species. Human activities have contributed greenhouse gases to the atmosphere: CO<sub>2</sub>, primarily from deforestation and fossil fuel burning, methane and nitrous oxides from agriculture and waste, and fluorinated gases from industrial operations. These extra greenhouse gases are accountable for the increased warming of the planet. This is the increased greenhouse effect. We can monitor greenhouse gases in the atmosphere. Carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxides (N<sub>2</sub>O) concentrations have gone increasing significantly since the beginning of the industrial revolution. CO<sub>2</sub> levels are currently around 30 percent higher than before 1750, N<sub>2</sub>O roughly 50 percent higher, and CH<sub>4</sub> nearly quadrupled. Rising fossil fuel consumption and land use changes have released, and are continue to emit, increasing amounts of greenhouse gases into the Earth's atmosphere. These greenhouse gases include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrogen dioxide (N<sub>2</sub>O), and an increase in these gases has caused a rise in the amount of heat from the sun retained in the Earth's atmosphere, heat that would usually be released out into space[4]–[6].

### **1.1.Evidences Of Climate Change:**

Climate change in IPCC use refers to any change in climate over time, whether due to natural variability or as a consequence of human action. This usage differs from that in the United Nations Framework Convention on Climate Change (UNFCCC), where climate change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods. The primary cause of climate change is the rise in the concentration of greenhouse gases in the atmosphere owing to various natural and human activities. Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have risen significantly as a consequence of human activity since 1750 and currently much surpass pre-industrial levels estimated from ice cores spanning many thousands of years. The worldwide increases in carbon dioxide concentration are attributable mainly to fossil fuel usage and land use change, whereas those of methane and nitrous oxide are primarily due to agriculture. The main characteristics of climate change are increases in average global temperature (global warming); changes in cloud cover and precipitation particularly over land; melting of ice caps and glaciers and reduced snow cover; and increases in ocean temperatures and ocean acidity – due to seawater absorbing heat and carbon dioxide from the atmosphere[7]–[9].

### **1.2.Climate Change Evidences From Physical Systems:**

Rise in CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O levels and atmospheric temperature: Carbon dioxide is the most significant anthropogenic greenhouse gas. The worldwide atmospheric concentration of carbon dioxide has risen from a pre-industrial value of approximately 280 ppm to 379 ppm in 2005. The atmospheric concentration of carbon dioxide in 2005 surpasses by much the normal range over the past 650,000 years (180 to 300 ppm) as measured from ice cores. The annual carbon dioxide concentration growth rate was larger during the last 10 years (1995–2005 average: 1.9 ppm per year), than it has been since the beginning of continuous direct atmospheric measurements

(1960–2005 average: 1.4 ppm per year) although there is year-to-year variability in growth rates. The main source of the increasing atmospheric concentration of carbon dioxide since the pre-industrial era comes from fossil fuel usage, with land-use change contributing another important but lesser component[10].

It is highly probable that the observed rise in methane content is attributable to human activities, mainly agricultural and fossil fuel usage, although proportional contributions from various source types are not clearly established. The worldwide atmospheric nitrous oxide content rose from a pre-industrial value of approximately 270 ppb to 319 ppb in 2005. The growth rate has remained roughly stable since 1980. More than a third of all nitrous oxide emissions are anthropogenic and are mainly attributable to agriculture. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change cleared many doubts regarding climate change. Warming of the climate system is now undeniable.

Increase in sea water temperature: Observations since 1961 indicate that the average temperature of the global ocean has grown to depths of at least 3000 m and that the ocean has been absorbing more than 80 percent of the heat supplied to the climate system. Such warmth causes saltwater to expand, leading to sea level rise. At the national level, rise of 0.4° C has been recorded in surface air temperatures during the last century. A warming trend has been seen along the west coast, in central India, the interior peninsula, and north-eastern India. However, cooling tendencies have been seen in north-west India and portions of south India.

### **1.2.1. Melting Of Mountain Glaciers And Snow:**

Mountain glaciers and snow cover have decreased on average in both hemispheres. Widespread reductions in glaciers and ice caps have led to sea level rise (ice caps do not include contributions from the Greenland and Antarctic Ice Sheets) (ice caps do not include contributions from the Greenland and Antarctic Ice Sheets). New data from the Third Assessment Report clearly indicate that losses from the ice sheets of Greenland and Antarctica have very likely contributed to sea level rise during 1993 to 2003. Flow speed has risen for certain Greenland and Antarctic outlet glaciers, which drain ice from the heart of the ice sheets. The accompanying enhanced ice sheet mass loss has frequently accompanied thinning, decrease or loss of ice shelves or loss of floating glacier tongues.

### **1.2.2. Sea Level Rise:**

Global average sea level increased at an average rate of 1.8 [1.3 to 2.3] millimeters per year from 1961 to 2003. The pace was quicker from 1993 to 2003: approximately 3.1 [2.4 to 3.8] mm per year. Whether the higher rate for 1993 to 2003 represents decadal variability or an increase in the longer term trend is uncertain. There is strong confidence that the pace of observed sea level rise increased from the 19th to the 20th century. The overall 20th century increase is predicted to be 0.17 [0.12 to 0.22] m. For 1993 to 2003, the sum of the climatic contributions is consistent within uncertainties with the overall sea level increase that is directly seen. These estimations are based on better satellite and in situ data currently available. For the period 1961 to 2003, the total of climatic contributions is projected to be less than the observed sea level increase. The Third Assessment Report found a similar disparity during 1910 to 1990. Satellite data since 1978 indicate that annual average arctic sea ice extent has decreased by 2.7 [2.1 to 3.3] percent each decade, with greater reductions in summer of 7.4 [5.0 to 9.8] percent per decade. Temperatures at the top of the permafrost layer have typically risen during the 1980s in the Arctic (by up to 3°C).



### **1.2.3. Shifting Patterns In Precipitation:**

Long-term changes from 1900 to 2005 have been seen in precipitation quantity across several major areas. Significantly higher precipitation has been recorded in eastern portions of North and South America, northern Europe and northern and central Asia. Drying has been seen in the Sahel, the Mediterranean, southern Africa and portions of southern Asia. Precipitation is extremely varied geographically and temporally, and data are sparse in certain areas. Long-term trends have not been found for the other major areas examined.

### **1.3. Climate Change Evidences From Biological Systems:**

Hundreds of research were done on changes in fish, plankton, and algal populations, plants, sand trees, insects, and mammals. Observations from these research indicate a fairly high connection with the changes in climate. Populations move their ranges to regions where the environment has become beneficial and vanish from areas where the climate is no longer suitable. Often this involves pole ward movement of the ranges. Blooming happens earlier. But it also implies that mismatches are developing between migratory bird nesting and availability of particular caterpillars or insects. The caterpillars or insects respond to the increased temperatures by coming out earlier, but the migrating birds still arrive at the normal time and do not find the customary food for their young.

### **1.4. Changing Cropping Pattern:**

There have been some signs of spatial alterations in cropping pattern especially in high mountain regions of Himachal Pradesh. Some apple cultivated regions have moved to higher reaches since their typical belts are showing warmer temperatures and may become inappropriate for their production. Successful growing of wheat in Kashmir during winter season and maize in Bihar are few other instances. Similarly apple in Kashmir area may suffer decrease in production owing to rise in winter temperatures in the previous years since apple needs limited range of optimal thermal regime. Pole promotes development of arable area in the places where low temperatures are restricting for crop cultivation primarily owing to rise in temperature which may be favorable for agricultural cultivation.

### **1.5. Advance Commencement Of Blooming In Trees:**

Trees are usually a very excellent bio-indicator of climate change since the blooming in perennial trees takes place as a consequence of completing the crop-specific necessary thermal unit/thermal period or degree-days. The very excellent examples might be the mango trees, which bloom according to the temperature regime/period in various areas of the nation. The mango tree usually bloom in October-November in south India, in December-January in eastern and central India and middle of February-March in north India. But there has been some evidence of blooming of mango trees in December in north India in the year 2004, which was presumably owing to persisting higher regime in December. Thus the blooming behaviour of mango, cherry, apple etc. may be utilized as a very effective bio-indicator for climate change.

### **1.6. Impacts Of Global Warming:**

Melting of Glaciers: Melting of glaciers in different areas of the world may bring floods followed by droughts in near future. Water supply may be another serious social and agricultural issue owing to increased losses of moisture via vapor evaporation and more demand for drinking

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water, industry and irrigation. Coastal flooding owing to sea level rise and water expansion may lead to increased loss of coastal biodiversity particularly mangrove plant and animal species important for coastal ecosystem preservation. In Kashmir valley Kohlai glacier has decreased by nearly 5 percent since 1960 (13 sq. miles to 11 sq. miles) (13 sq. miles to 11 sq. miles). Water level in nearly all rivers in Kashmir valley has dropped by 40 percent in the past 40 years.

### **1.7.Impact on Agriculture:**

There is considerable worry about the effects of climate change and its unpredictability on agricultural output globally. First, problems of food security appear prominently in the list of human activities and ecosystem services under threat of severe anthropogenic intervention on Earth's climate. Second, each country is naturally concerned with potential damages and benefits that may arise over the coming decades from climate change impacts on its territory as well as globally, since these will affect domestic and international policies, trading patterns, resource use, regional planning and ultimately the welfare of its people. Current research confirms that while crops would respond positively to elevated CO<sub>2</sub> in the absence of climate change, the associated impacts of high temperatures, altered patterns of precipitation and possibly increased frequency of extreme events such as drought and floods, will probably combine to depress yields and increase production risks in many world regions, widening the gap between rich and poor countries.

### **1.8.Adaptation To Climate Change:**

Adaptation refers to the change of biological and non-biological mechanism or measures, which allow the organism to deal with the new sets of environmental stressors following upon their exposure for their survival, growth and development. But there is a limit of adaptation to what degree and magnitude the organism are flexible to change them. Almost all organisms have the capacity to alter their biological systems in order to deal with the environmental stressors to different degree for their survival and production. Apart from inherent adaptation of organism including agricultural plants, some of the man-made coping techniques may also be practiced/implemented to reduce the climate hazards. For developing nations like India, adaptation involves helping the vulnerable people during severe climate events and enabling them to construct their lives and to deal with climate threats in the long run. In this backdrop, many of India's social-sector programs stress livelihood stability and welfare of the weakest *groups*.

### **1.9.Climate Change And Shifting Of Temperate Crops:**

It is very fascinating to observe the spatial distribution of temperate crops particularly chilling needing crops viz., apple, apricot, cherry, plum, saffron, cauliflower, cabbage, pea etc., as influenced by the climatic change at their respective growing locations throughout on as well as off seasons. The regions of temperate crops cultivation in India are primarily limited to higher latitude provinces such as Kashmir, Arunachal Pradesh, Uttaranchal, Sikkim, and Himachal Pradesh. The crops produced in these regions may be adversely impacted since their optimal temperature regime for blooming is limited in range.

## **2. DISCUSSION**

Here is now incontrovertible evidence that global temperatures are increasing, based on direct temperature measurements and observations of other effects like as melting glaciers and polar

ice, rising sea level, and changes in the lifecycles of plants and animals. As the scientific data on increasing global temperature became clear, critics centered their debate on whether human activities are in fact the cause of global warming. They claimed that the observed warming might be caused by natural processes such as variations in the energy released by the Sun. However, the Sun's impact has been shown to have contributed very little to observable warming, especially after the mid-20th century. In reality, there is strong evidence that greenhouse gas emissions from human activities are the primary cause of the warming.

The exponential rise in surface temperature of the planet and the global sea level in the past few decades is a significant element of climate change that has interested both academics and policy makers in recent times. The earth's atmosphere produces natural greenhouse effect which keeps the earth's surface warmer than it would have been otherwise. Life is an essential component of the earth system and all living organisms affect the composition of greenhouse gases in the atmosphere by "inhaling" and "exhaling" carbon dioxide and oxygen, thus maintaining a chemical equilibrium in the atmosphere. A range of human activities, which include majorly the burning of fossil fuels, industrial activities and the cutting down of forest for agricultural purposes and urbanization, are substantially increasing the concentrations of greenhouse gases in the atmosphere, thereby upsetting this atmospheric chemical balance.

### 3. CONCLUSION

The necessity of the hour is aggressive government engagement in resolving this issue. Only substantial commitment by the government and stakeholders to confront the issue of climate change aggressively appears likely to encourage business and industry to move considerably beyond the inertia of established methods today. We think that the pace with which the issues of global warming and climate change may be handled will be mainly decided by what the people desire, and how our governments react to their preferences. Given the numerous possibilities for tackling this huge global issue via lucrative business operations on many levels, there is no reason why reasonable politicians of both liberal and conservative orientations cannot find answers to these challenges, provided the people would have it. It would appear that we are faced with a tremendous challenge on two fronts, educational and political. One hopes future generations will say that ours made the correct decisions.

### REFERENCES:

1. T. L. Milfont, "The Interplay Between Knowledge, Perceived Efficacy, and Concern About Global Warming and Climate Change: A One-Year Longitudinal Study," *Risk Anal.*, 2012, doi: 10.1111/j.1539-6924.2012.01800.x.
2. P. M. Kellstedt, S. Zahran, and A. Vedlitz, "Personal efficacy, the information environment, and attitudes toward global warming and climate change in the United States," *Risk Analysis*. 2008, doi: 10.1111/j.1539-6924.2008.01010.x.
3. J. P. Schuldt, S. H. Konrath, and N. Schwarz, "'Global warming' or 'climate change'?" *Public Opin. Q.*, 2011, doi: 10.1093/poq/nfq073.
4. D. Benjamin, H. H. Por, and D. Budescu, "Climate Change Versus Global Warming: Who Is Susceptible to the Framing of Climate Change?," *Environ. Behav.*, 2017, doi: 10.1177/0013916516664382.

5. D. P. Shepardson, D. Niyogi, S. Choi, and U. Charusombat, "Seventh grade students' conceptions of global warming and climate change," *Environ. Educ. Res.*, 2009, doi: 10.1080/13504620903114592.
6. L. Townsend, "Sources: Encyclopedia of Global Warming and Climate Change," *Ref. User Serv. Q.*, 2008, doi: 10.5860/rusq.48n2.195.
7. G. Koneswaran and D. Nierenberg, "Global farm animal production and Global warming: Impacting and mitigating Climate Change," *Environ. Health Perspect.*, 2008, doi: 10.1289/ehp.11034.
8. R. Ramasamy and A. Swamy, "Global Warming, Climate Change and Tourism : A Review of Literature," *Cult. Rev. Cult. e Tur.*, 2012.
9. S. M. Jang and P. S. Hart, "Polarized frames on 'climate change' and 'global warming' across countries and states: Evidence from Twitter big data," *Glob. Environ. Chang.*, 2015, doi: 10.1016/j.gloenvcha.2015.02.010.
10. A. K. Mishraa, V. P. Singh, and S. K. Jain, "Impact of global warming and climate change on social development," *J. Comp. Soc. Welf.*, 2010, doi: 10.1080/17486831003687626.

## A REVIEW OF THE EFFECT OF CLIMATE CHANGE ON MALAYSIA'S AIR CONDITIONING SYSTEM AND DEPENDABILITY

Vipin Jain\*

\*Professor,  
Department of Finance & Marketing,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- vipin555@rediffmail.com

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### ABSTRACT

*The results of research on the impact of climate change on air conditioner performance and dependability in the tropics are presented in this article. The effect was primarily concentrated on three aspects: cooling or heating load, energy usage, and outside design conditions for the air conditioning system. The relevant articles were divided into three categories, and theoretical and experimental investigations were analyzed. Since the last few decades, many studies have been conducted on the effects of climate change on air conditioners in the tropics, but most of them have focused on current cooling as well as heating demands, regional overall electricity consumption, as well as existing outdoor design requirements for the air conditioning system rather than the potential impacts on heating, ventilation, as well as air conditioning systems. Based on the literature review, more extensive research is required to gain a clearer picture of the climate variation effects on air conditioning systems, so that a comprehensive guideline for future air conditioning system design in the tropics that takes into account possible climate change can be prepared.*

**KEYWORDS:** Air Conditioner, Climate Change, Cooling, Hvac Design, Tropics Electricity.

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### 1. INTRODUCTION

Air conditioners are no longer considered a luxury item owing to advancements in technology that have reduced air conditioner costs. Instead, this has become a need as a result of today's crucial climate change. Several more Southeast Asian countries, such as Malaysia, have hot and humid climates, which has resulted in a sharp increase in air conditioning systems in the residential sector, that have increased by more than 5000 percent from thirteen thousand to seven hundred seventy-five thousand in 2000, and so this increase will indeed be unimaginable with critical climate change. Other studies, on the other hand, have shown that approximately 30% of ready-to-use energy is used in the residential sector throughout the globe, and about 50% of end-use energy in the home is used for heating. Because of its ease of installation and cheap cost, the wall-mounted air conditioner is used by the majority of homes[1], [2]. As a result, the future

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performance as well as development of the aforementioned air conditioner will undoubtedly have a significant impact on global energy consumption. Commercial wall mounted air conditioners are classed as direct expansion air conditioners since they solely use refrigerant evaporation and condensation to cool or heat the system. Refrigerant is a highly evaporative material that readily absorbs heat, expands and evaporates, or condenses when heat is released. R410A, R407C, or R22 are the most popular refrigerants used in wall-mounted air conditioners.

The indoor unit, which is placed in the indoor to absorb heat (for cooling) or release heat (for heating), as well as the outdoor unit, which is fixed in the outdoor to operate in the opposite order with the interior unit, may be separated into two types of wall mounted air conditioners. There are two kinds of wall-mounted air conditioners: air cooled and water cooled. Air cooled air conditioners use air as the medium to collect or release heat from the refrigerant in the outside unit. The interior unit of a wall-mounted air conditioner with solely cooling function has an indoor heat exchanger, while the outside unit has an outdoor heating element, compressor, and expansion mechanism. In a nation with a seasonal climate, the majority of families utilize a heat pump type wall-mounted air conditioner to cool or heat their homes. The difference between a heat pump and a cooling-only air conditioner is that the heat pump's outside unit includes an additional component called a four-way valve. The four-ways valve's primary purpose is to switch the refrigerant system's flow from cooling to heating or vice versa, depending on the user's preference.

### **1.1.Impacts Of Climate Change On Cooling And Heating Loads:**

Climate change has inevitable global consequences. Due to significant weather unpredictability and severe events, the ground temperature will rise approximately 1–6 degrees Celsius from 1990 to 2100, according to the Intergovernmental Panel on Climate Change (IPCC). However, most European nations import oil for boilers or furnaces to provide space heating, and it accounts for about half of the main energy used in the continent. Exploitation of this natural resource tends to produce greenhouse gases, which accelerates the pace of global climate change. As a consequence, catastrophes such as rising sea levels, fast heat waves, and other natural disasters are becoming increasingly common[3].

Due to the significant effects of climate change on the globe, researchers have conducted many studies using various techniques focusing on a few areas such as agriculture, economics, and others. Most researchers have used the degree days method, extensive numerical building simulations, or experimental investigations to examine the effect of weather fluctuation on air conditioner cooling and heating loads

### **1.2.Changes In The Weather Have An Impact On The Amount Of Energy Used By HVAC Systems:**

Economic, climatic, and other reasons are all contributing to an increase in global HVAC system energy consumption. In a hot climate city like Jeddah, Saudi Arabia, air conditioning consumes more than 60% of energy. According to some studies on domestic energy consumption in many Asian cities, the lower income group is also ready to spend money on electricity for thermal comfort as a consequence of fast economic development. Climate change has also resulted in a rise in the ambient temperature. As a result, the rising ambient temperature necessitates Fig. 10. Actual and projected data from the RECB are compared. The rising demand for energy for air



cooling, which uses a considerable amount of electricity in Jeddah during the summer, suggests that the impact of climate change on air conditioner power consumption is genuine.

The studies above revealed that climate change and the energy industry are inextricably linked. Weather fluctuation will have a significant impact on heating and cooling demand, and the burning of fossil fuels in the energy sector generates greenhouse gases as a consequence of cooling or heating demand, resulting in significant climate change. The Intergovernmental Panel on Climate Change (IPCC) has released a study warning people about the negative effects of energy extraction on the environment. As a result, studies on the effects of weather change on renewable energy sources, particularly hydropower production and wind energy availability, have been conducted. Weather variation's effect on power consumption has lately been researched and utilized to forecast electricity demand in the near and long term. Some studies looked at the effect of weather change on energy usage at the level of specific buildings, such as the commercial buildings described earlier. Many studies have been conducted to look at the effect of weather change on air conditioner power consumption, but the methods employed are similar to those used in cooling and heating load studies[4], [5].

The degree days' technique, detailed numerical building modeling, and experimental investigations are all common approaches. Furthermore, other studies examine energy use at regional sizes, such as gas and electricity usage in the United States, using mean outdoor temperature and/or degree-days data. According to the report, household electricity consumption (REC) in Bangkok has increased by more than 200 percent since 1980. Using the stepwise multiple regression method, the household electricity consumption of Bangkok Metropolis (RECB) model was built to examine the climatic and economic variables influencing the REC in Bangkok Metropolis from 2002 to 2006. The data showed that the trends of climatic as well as economic factors can also be used to predict the REC in terms of trend, seasonal variation, business cycle, and irregular variation from 2002 to 2006. The statistics revealed that the patterns of climatic and economic factors can also be used to predict the REC in terms of trend, seasonal variation, business cycle, as well as irregular variation from 2002 to 2006[6].

Air conditioning energy consumption is important, particularly in areas with high ambient temperatures, such as Jeddah, Saudi Arabia, where the yearly increase in energy demand is one of the highest in the world. As a consequence, the results of the measurement and modeling of the changes in energy consumption produced by an HVAC system. The experiment was carried out at the Solar Energy Building, which is owned by the Thermal Engineering Department of King Abdelaziz University. Measurement devices were used in the research to collect data on energy consumption under various circumstances. A datalogger was placed to record the amount of energy used by the air conditioner. In the solar energy laboratory, a separate datalogger was installed to collect data on the interior and outdoor air conditions, as well as sun intensities.

Climate change has an impact on outdoor design circumstances. The outdoor design condition is a compilation of climatic data at a specific place for a certain time period that is often utilized by air conditioner system designers in that region. The use of indoor and outdoor design parameters to determine the peak design load is common in HVAC system design. It is an important consideration in the design of an HVAC system since it affects the size as well as efficiency of an AC plant, which varies based on location and use. The device produces thermal pain owing to the fast thermal off cycle and increased power usage if the extremely severe and conservative settings are used. If the cooling demand is underestimated, the system's dependability and

lifespan will be reduced. the influence of ambient fluctuation on the choice of a constant air volume HVAC system for a high school block in Adana, Turkey The research utilized five data sets, one of which was CURRENT, which represented current ambient design data for usage in Turkey[7].

Air conditioning system design in Hungary is based on a predetermined modeling state, wherein the design parameters are derived from a long-term meteorological record. Climate change, on the other hand, has resulted in longer summers and winters. As a consequence, existing Hungarian design methods tend to underestimate the danger level throughout the summer and winter seasons. As a result, a study was conducted to create a new risk-based modeling and to update current design values in accordance with Hungary standards. Since 2003, a new weather database has been created by continuously monitoring climatic data using a new measuring and data sampler device, namely the TESTO 175-2 data logger, with samples collected every 5 minutes. The ambient data was then used to determine the outdoor enthalpy.

Initially, two sets of measured data were gathered based on long-term meteorological climate components supplied by Bahrain's Directorate of Meteorology. The solar data from previous research was then used to create a simulation in Bahrain. The Mateo Norm program was then used to produce two weather data files, which were then translated to binary files and used as input to the building modeling software. This conversion was carried out in accordance with the ASHRAE design criteria for Bahrain. Furthermore, two buildings were selected for auditing and benchmarking, with the first case building (Bldg-1) being a low-rise office structure oriented north and south and or the second case building (Bldg-2) being a high-rise commercial building with a rectangular foundation. Finally, the Visual DOE software was used to do the building energy analysis, and findings from the two sets of produced climate data were compared to actual consumption to ensure that the developed weather data files were reliable.

## 2. LITERATURE REVIEW

Akpinar-Ferrand et al. studied about developing nations, mainly in latitudes where climate change is expected to have the most effect in the twenty-first century, will see a predicted rise in energy consumption. India offers us an once-in-a-lifetime chance to investigate this phenomenon in a big developing nation. According to this research, India's climate adaptation strategies should take into account the importance of air conditioners (A/Cs) in reducing human susceptibility to unexpected weather events like heat waves. However, with a 3.7°C rise in surface temperatures and rising incomes, the energy demand due to air conditioning alone will be in the range of an additional 750,000GWh to 1,350,000GWh by the year 2100 under various population scenarios and increasing incomes[8].

Low Carbon Buildings, as defined by Ba-Batin et al., are buildings with low carbon emissions in the construction industry. They are environmentally friendly in the sense that they reduce carbon emissions by optimizing their energy usage and using a passive cooling system. This research focused on green solutions for reducing carbon emissions from the University Tenaga Nasional's Putrajaya Campus buildings (UNITEN). To collect enough data for the study, a survey technique in the form of a questionnaire was used. The study was conducted among UNITEN building occupants from various backgrounds, including students, academic, and non-academic employees. The main finding indicates that wall insulation and the use of energy-efficient air conditioners are the most effective ways to reduce building carbon emissions. It was also

discovered that there is a poor connection between knowledge of the effect of carbon emissions from air conditioning buildings and understanding of the climate change problem, with an R-square value of 0.017. This suggests that active steps should be made to educate respondents about the significance of reducing carbon emissions from buildings in order to prevent climate change[9].

Nejat et al. looked into Heating, ventilation, as well as air-conditioning systems typically use two-thirds of a building's energy. The use of passive cooling as an alternative to traditional air conditioner systems is a green option. Two popular passive cooling methods that utilize wind as a renewable resource are wing walls and windcatchers. Natural ventilation methods, on the other hand, are fraught with dangers in areas with low wind speeds and temperatures. Integrating windcatchers with wing walls has the potential to improve the performance of ventilation systems. Because earlier studies had not taken into account this integration, the impact of this integration on ventilation performance was evaluated in the first phase of this study, and the optimal angle was discovered. However, there is still a gap in this combination; therefore, the effect of wing wall length on indoor air quality parameters was examined in the second half. To close the gap, this study used a Computational Fluid Dynamics (CFD) technique[10].

### **3. DISCUSSION**

This article presents the findings of a study on the effect of climate change on air conditioner performance and reliability in the tropics. The impact was mainly focused on three aspects: cooling and heating load, energy consumption, and air conditioning system outside design circumstances. The relevant papers were categorized into three groups, and theoretical and experimental studies were examined. Many studies on the effects of climate change on air conditioners in the tropics have been conducted over the last few decades, but the majority of them have focused on current cooling as well as heaters demands, regional overall electricity consumption, as well as existing outdoor design requirements for the air conditioning system but instead of potential effects on heating, ventilation, as well as air conditioning systems. Several research have been carried out to look at the impacts on a regional or global scale. The bulk of the studies, on the other hand, were based on a long-ago weather record and were limited to building energy analysis rather than AC system analysis. As a consequence, further study is needed to investigate the climate variable impact on AC system performance and reliability based on the most recent and projected future climate data, so that M&E engineers may include the potential climate change effects in the AC system design for current and future applications.

### **4. CONCLUSION**

Climate change has a major impact on building cooling and heating loads, energy consumption, and outside design conditions for the AC system, according to the study. A thorough literature study was performed on the impact of weather fluctuation on air conditioner performance and dependability. Numerous studies have been conducted to investigate the effects on a regional or worldwide scale. The majority of the studies, on the other hand, were based on a meteorological record from a long time ago and were only restricted to building energy analysis rather than the AC system itself. As a result, extensive additional research is required to examine the climatic change varying impact on AC system reliability or performance based on the most recent as well as predicted future climate change data, so that M&E engineers can consider the possible climate change effects in the AC design process for current and future uses.

**REFERENCES:**

1. A. Mota-Babiloni, P. Makhnatch, R. Khodabandeh, and J. Navarro-Esbri, "Experimental assessment of R134a and its lower GWP alternative R513A," *Int. J. Refrig.*, 2017, doi: 10.1016/j.ijrefrig.2016.11.021.
2. E. Gupta, "THE EFFECT of DEVELOPMENT on the CLIMATE SENSITIVITY of ELECTRICITY DEMAND in India," *Clim. Chang. Econ.*, 2016, doi: 10.1142/S2010007816500032.
3. J. Winkler, J. Munk, and J. Woods, "Effect of occupant behavior and air-conditioner controls on humidity in typical and high-efficiency homes," *Energy Build.*, 2018, doi: 10.1016/j.enbuild.2018.01.032.
4. A. Mota-Babiloni, P. Makhnatch, and R. Khodabandeh, "Recent investigations in HFCs substitution with lower GWP synthetic alternatives: Focus on energetic performance and environmental impact," *Int. J. Refrig.*, 2017, doi: 10.1016/j.ijrefrig.2017.06.026.
5. H. Duan *et al.*, "Chilling Prospect: Climate Change Effects of Mismanaged Refrigerants in China," *Environ. Sci. Technol.*, 2018, doi: 10.1021/acs.est.7b05987.
6. E. Uherek *et al.*, "Transport impacts on atmosphere and climate: Land transport," *Atmos. Environ.*, 2010, doi: 10.1016/j.atmosenv.2010.01.002.
7. J. Li, L. Yang, and H. Long, "Climatic impacts on energy consumption: Intensive and extensive margins," *Energy Econ.*, 2018, doi: 10.1016/j.eneco.2018.03.010.
8. E. Akpınar-Ferrand and A. Singh, "Modeling increased demand of energy for air conditioners and consequent CO<sub>2</sub> emissions to minimize health risks due to climate change in India," *Environ. Sci. Policy*, 2010, doi: 10.1016/j.envsci.2010.09.009.
9. A. S. S. Ba-Batin, H. A. A. Haider, L. S. Wong, and H. A. A. Tareh, "Effectiveness of green strategies to reduce carbon emission in the Putrajaya Campus Buildings of Universiti Tenaga Nasional," *Int. J. Eng. Technol.*, 2018, doi: 10.14419/ijet.v7i4.35.22865.
10. P. Nejat, F. Jomehzadeh, H. M. Hussen, J. K. Calautit, and M. Z. Abd Majid, "Application of wind as a renewable energy source for passive cooling through windcatchers integrated with wing walls," *Energies*, 2018, doi: 10.3390/en11102536.

**AWARENESS AND USAGE PATTERN OF E-SHODHSINDHU  
RESOURCES: A CASE STUDY OF SRI VENKATESWARA UNIVERSITY  
LIBRARY USERS**

**P. Vijay Mahesh Kumar\*; Dr. A. Kishore\*\***

\*Research Scholar (Ph.D.)

Department of Library Sciences,  
Dravidian University, Kuppam, Andhra Pradesh, INDIA  
Email id: vijaysimhapuri@gmail.com

\*\*Asst. Professor in Library Sciences,  
M.Lis, M.A, Ph.D.

Department of Library Sciences,  
Dravidian University, Kuppam, Andhra Pradesh, INDIA  
Email id: [kirankishoredu@gmail.com](mailto:kirankishoredu@gmail.com)

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**ABSTRACT**

*Library Consortia is a network for the purchasing and accessing e-information to provide immediate access to greater resources for users of individual libraries. The e-ShodhSindhu is the Consortium for Higher Education E-Resources merging three consortia, i.e. UGC-INFONET Digital Library Consortium, INDEST-AICTE Consortium and N-LIST in December 2015. The e-ShodhSindhu is meant to supply current and depository access to E-Resources i.e. e-books, e-journals, e-journal archives, on-line databases to its member establishments at a negotiated rate of subscription. The purpose of this paper is to find out user awareness and usage of e-ShodhSindhu Digital Library Consortium by Faculty Members and Research Scholars of Sri Venkateswara University. A structured questionnaire was designed and randomly distributed to 350 respondents for data collection, among the faculty members and research scholars. Out of which, 274 filled-in questionnaires were returned. The study reveals that most of the respondents are aware and use digital library consortium but there is a need to conduct more awareness/training programs for enhancing the use of e-ShodhSindhu Digital Library Consortium.*

**KEYWORDS:** *Library Consortium, E-Shodhsindhu, Digital Library, E-Resources, Sri Venkateswara University.*

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**1. INTRODUCTION:**

In the higher education, university libraries provide basic support to students, faculty members and research scholars in accessing resources for teaching, learning, research and advanced studies. The libraries procure both print and electronic resources to provide easy access for their users. As there is an ever increasing demand for subscriptions and access of more e-journals by the user community, no library is able to fully meet their users' needs. Cooperation between



libraries began long ago and started with the practice of online library loans because of the enormous abundance of information throughout the globe; libraries started to think about information sharing in a community and among library communities. This activity may help them privilege a wide variety of information services, which remain within the restricted budget. In a cooperative agreement between groups of libraries, Library Consortia is a network for the purchasing and accessing e-information to provide immediate access to greater resources for users of individual libraries. Library collaboration and resource distributing in India signified in the 1980s with the emergence of several library systems. However, the formation of the Data and Library Network Centre (INFLIBNET) has started at the national level in the field of higher education. The UGC-INFONET Digital Library Consortium was initiated in December 2003 with financial assistance from the UGC and implemented by the INFLIBNET (Information and Library Network) Centre, Ahmedabad. The consortium has now been merged with e-ShodhSindhu: Consortia for Higher Education E-Resources. [1,2]

## **2. E-ShodhSindhu Digital Library Consortium:**

In December 2015, E-ShodhSindhu was established by the merger of 3 consortia based on a proposal from an Expert Panel, namely the UGC INFONET Digital Library Consortium, the NLIST, and the INDEST- AICTE Consortium. E-ShodhSindhu continues to offer present as well as archival publications subscription to 10,000 core plus and peer-reviewed journals (including journals accessible via NLIST) and a variety, from several publishers and aggregators to its members, together with central-funded technical establishments, universities, and several bibliographic, quotation and accurate catalogs in various disciplines that are covered under 12 (B) and 2 (f) Sections of the UGC Act (inlibnet.ac.in). The MHRD has formed e-ShodhSindhu to provide access to peer-reviewed journals and a number of bibliographic, citation and factual databases in different disciplines to the Research and academic community in the country. The e-ShodhSindhu Consortium offers differential access to more than 7,000 full-text journals from 13 publishers, 4 bibliographic databases to core member institutions. [3]

## **3. Sri Venkateswara University Central Library**

The S.V. University Library was started in 1955 with a small collection of 6,700 books taken from the Sri Venkateswara College, Tirupati, administered by Tirumala Tirupati Devasthanams. The University Library, centrally situated and easily accessible to all the departments on the campus has steadily grown over the years and it has 3,68,315 documents as on 31st March, 2014. The collection of the library includes textbooks, reference books, general books, gift books, reports, back volumes of journals, M.Phil & Ph.D. dissertations and e-documents. The Library subscribes to about 465 current journals of national and international importance by spending Rs.6.75 lakhs per year. In order to provide better service to the users of the library, the huge and perennial growth of its collection has been arranged in such a manner that books and back volumes of journals on Science and Technology are housed in newly constructed Extension Building and books and back volumes of journals on Social Sciences, Arts and Humanities are housed in three floors of the Stack Area of the library building, so that readers may not find any difficulty in locating the documents of their choice. The Library follows Open Access System in all the wings of the Library. Besides Book Lending service, the library offers Reader's Advisory Service, Reference Service, Reprographic Service, Inter-Library Loan facility and Facility to Search E-Journals, OPAC, Databases and Internet Resources. In order to provide access to e-



resources SVU Library has established a Digital Library in the year 2005 which can accommodate 42 users at a time.

#### 4. Review of Related Literature

**Mistri (2018) [4]** explores the use of e-resources in e-ShodhSindhu Consortium by the North Bengal University library users. The study focuses on some factors like; purpose, problems, benefits and satisfaction level in using e-resources of the e-ShodhSindhu consortium by the users. **Amit (2017) [6]**, Conducted study on E-ShodhSindhu Consortium : A New Approach for E- Resource Sharing in Higher Education. He studied the main objectives to formulate E-ShodhSindhu are To develop e- Journals, e- books as archival and perpetual access basis, To promote usage in Universities, colleges and Technical Institutions by providing orientation and training programmes. **Lal, Jawahar (2017) [7]** presented the role of e-ShodhSindhu: Consortium for Higher Education Electronic Resources in the Study of Social Sciences. It deals with INFLIBNET Centre, e-ShodhSindhu: Consortium for Higher Education Electronic Resources, Aims and objectives. **Singh, (2017) [5]** investigated in his study about e-ShodhSindhu consortium, its membership, scope, aims and objectives. He suggests for inclusion of all institutions of higher education under its umbrella, organization of user orientation programs, enhancement of infrastructure facilities and organization of workshop, etc. **Lingaiah, V. (2016) [8]** investigated a study on use of E-ShodhSindhu among 33 faculty members and 71 research scholars of Jawaharlal Nehru Technological University, Hyderabad. 100% respondents were aware about E-ShodhSindhu consortium, 41.34% respondents used E-ShodhSindhu consortium for research and teaching. He suggests workshop/training programs and ICT facilities with better bandwidth. **Suman and Sharma, (2016) [9]** examines the utilization of e-resources under consortium in Mahatma Gandhi Central Library of Indian Institute of Technology, Roorkee. The studies suggest orientation/training programs, evaluation of consortium periodically and organize workshops.

#### 5. Objectives of the Study

- To know the usage pattern of the E-ShodhSindhu in selected University.
- To identify the intent of accessing E-ShodhSindhu electronic resources.
- To evaluate the impact of E-ShodhSindhu electronic resources on the academic community of higher education.
- To find out the strategies are adopted by users to recuperate data through E-ShodhSindhu electronic resources.
- To analyze the satisfactory levels of users while using E-ShodhSindhu electronic resources

#### 6. Scope of the Study

The study is mainly focused on E-ShodhSindhu in Sri Venkateswara University. The scope of the study on the use of E-journals is restricted to faculty members and research scholars of S.V.University located in Tirupati, Chittoor District of Andhra Pradesh. It is also limited to only 274 respondents.

**7. Research Methodology**

Survey method was used to collect research data from the respondents on the usage of e-ShodhSindhu by using a structured questionnaire, which is distributed to 350 respondents, which constitute 100 Faculty members and 250 Research Scholars among Science and Social Sciences departments of Sri Venkateswara University. Out of which, 274(78.29%) filled questionnaires were received which comprised of 54(19.7%) Faculty members and 220 (80.3%) Research Scholars. The Questionnaire was distributed personally by visiting Departments, Computer Centre, Hostels, and Library. The collected data from respondents (274) filled in the questionnaires were scrutinized, tabulated, and analysed by using MS-Excel for interpretation.

**8. Data Analysis and Interpretation:**

**8.1. Gender wise distribution of Respondents**

**TABLE:1**

<b>Gender</b>	<b>Faculty (N=54)</b>	<b>Research Scholars (N=220)</b>	<b>Total (N=274)</b>
Male	42(77.8%)	146(66.4%)	188(68.6%)
Female	12(22.2%)	74(33.6%)	86(31.4%)

It is observed from Table-1 that majority (77.8%) are male respondents from the Faculty members whereas only (22.2%) are female. Moreover, 66.4% male and 33.6% female respondents are from the Research Scholars.

**8.2. Awareness on E-ShodhSindhu Consortium facility**

**TABLE:2**

<b>Level of Awareness</b>	<b>Faculty (N=54)</b>	<b>Research Scholars (N=220)</b>	<b>Total (N=274)</b>
Slightly	8(14.81%)	18(8.18%)	26(9.49%)
Much	14(25.93%)	48(21.82%)	62(22.63%)
Very Much	32(59.26%)	154(70.0%)	186(67.88%)

Table-2 reflects the awareness among respondents about e-ShodhSindhu library consortium. It is observed that majority 67.88% of the respondents which constituted 59.26% of the Faculty and 70% of the Research Scholars were very much aware of e-ShodhSindhu Library consortium. Only 26% of the respondents which constituted 14.81% of the Faculty and 8.18% of the Research Scholars are slightly aware of it.

**8.3. Source of awareness about E-ShodhSindhu****TABLE:3**

Source of awareness	Faculty (N=54)	Research Scholars (N=220)	Total (N=274)
Teachers	28(51.85%)	95(43.18%)	123(44.89%)
Library Professionals	12(22.2%)	46(20.91%)	58(21.17%)
Colleagues and friends	6(11.11%)	19(8.64%)	25(9.12%)
Library Website	5(9.26%)	36(16.36%)	41(14.96%)
Any other	3(5.56%)	24(10.91%)	27(9.85%)

The analysis of the data depicts from the Table-3 that majority 44.89% of the respondents came to know about e-ShodhSindhu from their Teachers followed by 21.17% of the respondents came to know from Library Professionals. 14.96 percent of the respondents came to know from Library website and 9.85% of the respondents know through 'any other' source. Only 9.12% of the respondents came to know about e-ShodhSindhu from their colleagues and friends.

**8.4. Frequency of visiting e-ShodhSindhu****TABLE:4**

Frequency	Faculty (N=54)	Research Scholars (N=220)	Total (N=274)
Daily	9(16.67%)	20(9.09%)	29(10.58%)
Once in a week	20(37.04%)	74(33.64%)	94(34.31%)
2-3 times in a week	12(22.22%)	73(33.18%)	85(31.02%)
2-3 times in a month	9(16.67%)	39(17.73%)	48(17.52%)
Occasionally	4(7.41%)	14(6.36%)	18(6.57%)

The analysis of the data revealed that majority 34.31% of the respondents which constituted 37.04% of Faculty and 33.64% Research Scholars visited e-ShodhSindhu once in a week followed by 31.02% of respondents which constituted 22.22% Faculty and 33.18% Research Scholars visited e-ShodhSindhu 2-3 times in a week. Moreover 17.52% of the respondents which constituted 16.67% Faculty and 17.73% Research Scholars visited 2-3 times in a month. Only 6.57% of the total respondents visited e-ShodhSindhu occasionally.

**8.5. Respondents spending time on E-ShodhSindhu resources****TABLE:5**

Time Spending	Faculty (N=54)	Research Scholars (N=220)	Total (N=274)
Less than one hour	18(33.33%)	74(33.64%)	92(33.58%)
1-2 hours	24(44.44%)	99(45.00%)	123(44.89%)

2-3 hours	8(14.81%)	35(15.91%)	43(15.69%)
More than 3 hours	4(7.41%)	12(5.45%)	16(5.84%)

It is obvious from Table 5.13 and Fig. 2.12 that 44.89 percent of total respondents spent 1-2 hours of time daily in E-ShodhSindhu followed by 33.58 percent who spent less than one hour, 15.69 percent who spent 2-3 hours and the remaining 5.84 percent spent more than 3 hours in E-ShodhSindhu resources.

**8.6. Preferred place for Accessing E-ShodhSindhu**

**TABLE:6**

Preferred place	Faculty (N=54)	Research Scholars (N=220)	Total (N=274)
University Library	23(42.59%)	143(65.00%)	166(60.58%)
Departmental Library	29(53.70%)	65(29.55%)	94(34.31%)
Hostel	0(0.00%)	10(4.55%)	10(3.65%)
Home	2(3.70%)	2(0.91%)	4(1.46%)
Through Mobile Apps	0(0.00%)	0(0.00%)	0(0.00%)

It is observed from the table-6 that 60.58 percent of total respondents preferred “University Library” as the place for accessing E-ShodhSindhu followed by 34.31 percent respondents preferred ‘Departmental Library’, 3.65 percent of total respondents preferred ‘Hostel’ and nobody is accessing E-ShodhSindhu resources ‘Through Mobile Apps’. It is also observed that majority 53.7% of the faculty members preferred “Departmental Library” whereas 65% of Research scholars preferred “University Library” for accessing e-ShodhSindhu resources.

**8.7. Most frequently Used E-ShodhSindhu Journals by the respondents of Sri Venkateswara University Library**

**TABLE: 7**

Usage of E- ShodhSindhu Journals	Total Respondents (N=274)		
	No. of Responses	Percentage	Rank
American Chemical Society	192	70.07	6
American Institute of Physics	189	68.98	7
American physical Society	214	78.10	2
Annual Reviews	187	68.25	8
Economic and Political Weekly	199	72.63	3
Oxford University Press	197	71.90	4

Project Muse	226	82.48	<b>1</b>
Jstor	182	66.42	<b>9</b>
Spinger Link	178	64.96	<b>10</b>
Tayler and Francis	194	70.80	<b>5</b>

Table-7 exhibits the usage of E-Journals from E-ShodhSindhu by the Faculty and Research Scholars of Sri Venkateswara University. Based on the number of responses and percentage the purposes are ranked. It is evident from the table that majority (82.48%) of the respondents are completely preferred and gave first rank for ‘Project Muse’ followed by American Physical Society (2<sup>nd</sup> rank), 3<sup>rd</sup> rank for Economic and Political Weekly, Oxford University Press (4<sup>th</sup> rank), Taylor and Francis (5<sup>th</sup> rank), American Chemical Society (6<sup>th</sup> rank), American Institute of Physics (7<sup>th</sup> rank), Annual Reviews (8<sup>th</sup> rank) and Jstor (9<sup>th</sup> Rank). They assigned 10<sup>th</sup> rank for Spinger Link. That means majority of the faculty preferred the usage of E-Journal ‘Project Muse’.

**8.8. Purpose of seeking information by the respondents**

**TABLE:8**

Purpose of seeking information	Faculty (N=54)	Research Scholars (N=220)	Total (N=274)
For Teaching purpose	28(51.85%)	8(3.64%)	36(13.14%)
For Research purpose	12(22.2%)	123(55.91%)	135(49.27%)
For Learning Purpose	8(14.81%)	72(32.73%)	80(29.20%)
For various academic purposes	6(11.11%)	17(7.73%)	33(12.04%)

The Table -8 reflects that majority (51.85%) of the faculty seeks information ‘for teaching purpose’ whereas the majority of respondents (55.91%) of the Research scholars seeks information ‘for research purpose’. 29.20 percent of total respondents seeks information ‘for learning purpose’, whereas 12.04 percent of total respondents ‘for various academic purposes’.

**8.9. Frequency of facing difficulties while accessing E-ShodhSindhu resources**

**TABLE:9**

Frequency	Faculty (N=54)	Research Scholars (N=220)	Total (N=274)
Rarely	19(35.19%)	60(27.27%)	79(28.83%)
Frequently	23(42.59%)	119(54.09%)	142(51.82%)
Most frequently	12(22.22%)	41(18.64%)	53(19.34%)

It is obvious from Table-9 that 51.82 percent of total respondents spent faced difficulties ‘frequently’ while accessing E-ShodhSindhu followed by 28.83 percent respondents faced ‘rarely’ and 19.34 percent of total respondents faced difficulties ‘most frequently’ while accessing E-ShodhSindhu resources.

**8.10. Activities to maximize the usage of E-ShodhSindhu resources**

**TABLE:10**

Activity chosen	Faculty (N=54)	Research Scholars (N=220)	Total (N=274)
Conducting orientation programs	12(22.22%)	47(21.36%)	59(21.53%)
Conducting workshops	9(16.67%)	43(19.55%)	52(18.98%)
Conducting seminars	6(11.11%)	23(10.45%)	29(10.58%)
Conducting awareness programmes	8(14.81%)	40(18.18%)	48(17.52%)
Conducting trainings frequently	19(35.19%)	67(30.45%)	86(31.39%)

Table-10 reflects that majority (31.39%) of the total respondents expressed that ‘conducting trainings frequently’ will maximize the usage of E-ShodhSindhu resources. 21.53 percent of the respondents opined that ‘conducting orientation programmes’, 18.98 percent expressed ‘conducting workshops’, 17.52 percent opined ‘conducting awareness programmes’ and only 10.58 percent of the total respondents expressed that ‘conducting seminars’ will maximize the usage of e-ShodhSindhu resources.

**8.11. Level of satisfaction with existing E-ShodhSindhu resources**

**TABLE: 11**

Level of Satisfaction	Faculty (N=54)	Research Scholars (N=220)	Total (N=274)
Very satisfied	18(33.33%)	78(35.45%)	96(35.04%)
Satisfied	15(27.78%)	47(21.36%)	62(22.63%)
Neutral	12(22.22%)	37(16.82%)	49(17.88%)
Not satisfied	9(16.67%)	67(30.45%)	77(28.10%)

It is observed that 35.04% of the respondents which constituted 33.33% of the Faculty members and 35.45% of the Research Scholars are ‘Very Satisfied’ with existing e-ShodhSindhu resources. Followed by 28.10% of the respondents which constituted 16.67% of the Faculty members and 30.45% of the Research Scholars are ‘Not satisfied’. Moreover, 22.63% of the respondents which constituted 27.78% of the Faculty members and 21.36% of the Research Scholars are ‘satisfied’. Only 17.88% of the total respondents are “Neutral” with the existing e-ShodhSindhu resources. Overall analysis depict that majority of the respondents were ‘Very satisfied’ with the existing e-ShodhSindhu resources.



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## 9. Major findings of the Study

- Among 274 respondents from S.V. University library users there are 68.6% male candidates and 31.4% female candidates. There are 19.7% Faculty members and 80.3% Research Scholars in total respondents.
- Majority (90%) of the total respondents are aware of e-ShodhSindhu library consortium whereas, only 10% are slightly aware.
- Majority of the respondents (75%) expressed that 'Teachers', 'Library professionals' and 'colleagues and friends' are the main sources to know about e-ShodhSindhu library consortium.
- Among 274 respondents majority of the respondents (34.31%) visited e-ShodhSindhu once in a week 2-3 times in a week, followed by (31.02%) 2-3 times in a week.
- Majority of the respondents (44.89%) spending 1-2 hours' time in e-ShodhSindhu resources, followed by 33.58 percent of total respondents spending less than one hour in a day.
- Majority of the faculty members (53.70%) preferred "Departmental Library" as the place to access e-ShodhSindhu resources whereas majority (65%) of the research scholars preferred "University Library".
- Majority of the respondents (82.48%) of the total respondents used 'Project Muse' followed by 'American Physical Society' (78.10%) and 'Economic and Political Weekly' (72.13%) which are ranked 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> accordingly.
- Majority of the faculty members (51.85%) seeking information from e-ShodhSindhu "For the purpose of Teaching" whereas majority (55.91%) of the research scholars seeking information "For the purpose of Research".
- Majority of the total respondents (81%) faced problems "frequently" or "Rarely" while accessing e-ShodhSindhu resources whereas only 19 percent of the total respondents faced difficulties "most frequently".
- Majority (53%) of the total respondents expressed that 'conducting trainings frequently' and 'conducting orientation programmes' will maximize the usage of E-ShodhSindhu resources.
- Moreover, 35.04% of the total users are 'very satisfied', followed by 22.63% of the users 'satisfied' with the existing e-ShodhSindhu resources.

## 10. CONCLUSION

In nowadays worlds libraries are subscribing a lot of variety of e-resources and pay a lot of funds on on-line resources. Its associate degree obligation for us to form use of those resources within the paramount suggests that, in order that library fund won't be wasted. E-ShodhSindhu Digital Library Consortium plays an awfully vital role for educational communities' and it absolutely was tried by many studies as discussed in review of literature. The faculty and research scholars of Sri Venkateswara University also united that it's terribly useful for them and it produces a great deal of useful impact on their academic and research programmes. E-ShodhSindhu e-journals are a unit perceived as a tool with positive impact and this learning has power-assisted to respondents to state their satisfaction and want for improvement. Survey, usage statistics, and feedback invariably keep undefeated tools to live the usage to enhance the usage of e-resources and it ought to be conducted at a time of interval. Also, there's a lot of variety of journals demanded to feature in e-ShodhSindhu Digital Library Consortium. Library professionals ought to conduct user education programmes, awareness programmes, workshops, etc, and take a lot of actions to achieve the expectations of the respondents.

**REFERENCES**

1. Gupta S. E-ShodhSindhu Consortium: Awareness and Use. SRELS Journal of Information Management, 2017;54(2), April.<http://www.inflibnet.ac.in>
2. Kumar GT, Kumar BTS. Perception and usage of e-resources and the internet by Indian academics. The Electronic Library, 2010;28(1):137–156.
3. Kumbar BD, Hadagali Gururaj S. Use of UGC e-Journals Consortium by faculty members and research scholars of Karnataka University, Dharwad: A Study. SRELS Journal of Information Management, 2009;46(1):61-72.
4. Mistri SK. Use of E-Resources in the e-ShodhSindhu Consortia: A Study of North Bengal University Library Users, SRELS Journal of Information Management, 2018;55(6): 330-333.
5. Singh K. E-ShodhSindhu, consortium for higher education electronic resources for scholarly content, an overview. International Journal of Advanced Multidisciplinary Research, 2017;4(3):43-50.
6. Amit. E-ShodhSindhu Consortium : A New Approach for E- Resource Sharing in Higher Education. 2017;7(2):121–124.
7. Lal J. Role of e-ShodhSindhu: Consortium for Higher Education Electronic Resources in the Study of Social Sciences. Library of Progress-Library Science, Information Technology & Computer, 2017;37(2):244-253.
8. Lingaiah V. A study on use of e-ShodhSindhu resources by the scholars and faculty member in Jawahrlal Nehru Technological University, Hyderabad. Journal of Advances in Library and Information Science, 2016;5(3):268-272.
9. Suman, Sharma S. Use of INDEST-AICTE Consortium in the Mahatma Gandhi Central Library of Indian Institute of Technology, Roorkee. Scientific Society of Advanced Research and Social Change, 2016;1(1):1-22.

## A REVIEW STUDY ON VARIOUS TYPES OF CIRCUIT BREAKER AND ITS APPLICATION

**Raghvendra Kumar Singh\***

\*Assistant Professor,  
Department of Electrical Engineering,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- raghvendra.engineering@tmu.ac.in

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### ABSTRACT

*The generation, transmission, distribution, and substation are all parts of the power system. All power system components need appropriate protection devices as part of the protection system to safeguard the system in the event of a failure. The circuit breaker has been chosen as one of the protective devices in many applications in this article. Oil circuit breakers (OCB), air circuit breakers (ACB), sulphur hexafluoride (SF<sub>6</sub>) circuit breakers, vacuum circuit breakers, and DC breakers (hybrid DC breaker and solid-state DC breaker) are among the circuit breakers discussed in this article. Normally, the failure disrupts or damages the systems or circuits. The kind of faults and causes of faults must be understood in order to install a protective system in the system or circuit. The substation is required to regulate the voltage transferred at high voltage from the producing station in order to deliver the appropriate voltage to the consumer. A substation must also include a protection system.*

**KEYWORDS:** Air Circuit Breaker, Circuit Breaker, Hybrid Dc Breaker, Oil Circuit Breaker, Vacuum Circuit Breaker.

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### 1. INTRODUCTION

The electrical power system's goal is to generate and deliver electric power to users. It is necessary to have dependability and economy in order to build and manage the transmission of energy to the point of use. If a terrible disruption occurred often in a contemporary society, the dependability and security of supplies would be questioned. Because the power system is engaged in generation, transmission, distribution, and residential, it requires protection in order to prevent damage to electrical appliances and death[1]–[3].

The power system is one of the few areas in electrical engineering that deals with the shortest and quickest time to trip and isolate the defective region in the power system so that the fault does not directly impact the system. As a consequence, the system's stability and dependability stay intact. A sensor to detect the fault state and a mechanism to send a tripping signal to the circuit breaker are the two most important components of protection. The protection system must be able to quickly and automatically disconnect the defective part of the power network, while

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also minimizing the disconnection or interruption of power to the customer. Power system protection, which is a circuit breaker, should have the ability to trip if a problem occurs in the power system. Circuit breakers have the following tripping capabilities: dependability, selectivity, sensitivity, speed, and stability[4], [5].

### **1.1.Circuit Breaker:**

A circuit breaker, also known as an autonomously controlled electrical switch, interrupts current flow when a defect is detected. Circuit breakers come in a variety of sizes, ranging from tiny devices to huge switchgear, and they're employed to safeguard anything from low current circuits to high voltage circuits. As stated in the introduction, this article will cover four different kinds of circuit breakers: oil, air, SF<sub>6</sub>, and vacuum circuit breakers. A circuit breaker has two types of contacts: fixed and movable contacts.

- Under typical circumstances, these two contacts are in the closed position, meaning they are touching each other.
- When a circuit breaker is needed to separate the system's defective components, the movable contact moves, disrupting the regular circuit.
- The current flow will be stopped while the two contacts separate. As a consequence, the connections created an arcing shape.
- The contacts are placed in the closed chamber, which also contains the insulating media, which is either gas or liquid. The arc will be quenched by this insulating material.

#### **1.1.1. Oil Circuit Breaker:**

Among the many kinds of circuit breakers, this is one of the oldest. The oil circuit's design and architecture were extremely basic, and it consisted of a mixture of water and oil that filled two wooden barrels. The two vertical blades that make up the contacts are linked and positioned at the top. The vertical blades contact would drop into the stationary contact to complete the circuit. The oil circuit breaker has been developed and enhanced since its inception, while maintaining its fundamental characteristics of simplicity of construction and primary capacity for massive current interruption[1], [6]–[8].

In the power system, the oil circuit breaker is extensively employed. There are two kinds of oil circuit breakers: bulk oil circuit breakers and low oil circuit breakers. The tank of a bulk oil circuit breaker uses a lot of oil. Low oil circuit breakers, on the other hand, require less oil than bulk oil circuit breakers. In comparison to other circuit breakers, the oil circuit breaker has a straightforward idea of functioning. Oil circuit breakers are also inexpensive and dependable in operation. This oil circuit breaker does not need the employment of any specific equipment to regulate the arc produced by moving contact. When the current carried by the contacts in the oil is divided, an arc forms between the separated contacts.

The idea is that during normal operation, the current was flowing when the oil circuit breaker's contact closed. Furthermore, when a fault develops in the system, an arc is formed between the contacts when the breaker's contacts move away from one another. The arc produced during the failure causes a significant quantity of heat to be released in the circuit breaker. This arc is also

responsible for the very high temperature that resulted in the vaporization. When the distance between two contacts reaches its maximum, arcing will be terminated. Arcing is eliminated when the voltage is recovered and the arc current is reduced.

### **1.1.2. Air Circuit Breaker:**

An air circuit breaker, commonly known as an ACB, is a circuit breaker that operates at high atmospheric pressure. ACB is a medium voltage circuit breaker that was created after the oil circuit breaker and fully replaced the oil circuit breaker. ACB may be selected and favored in France and Italy until the ACB grade reaches 15kV. The ACB is an excellent option for avoiding the danger of an oil fire. In America, the ACB is extensively utilized up to the ACB 15kV rating, beyond which vacuum and SF6 circuit breakers are developed.

The operating principles of an air circuit breaker (ACB) vary from those of conventional circuit breakers. The circuit breaker's primary goal is to ensure that the contact gap can survive the system recovery voltage in order to avoid arcing when the current is turned off. The same goal is achieved by this ACB, albeit in a different way. To interrupt an arc, ACB generates an arc voltage that is higher than the supply voltage. The arc voltage is the minimum voltage needed to keep the arc going. The arc voltage of this ACB may be increased in three distinct methods[1], [9][10].

The first method is to cool the arc plasma. When the plasma temperature drops, the mobility of the plasma particles drops as well, necessitating a higher voltage gradient to sustain the arc. The second option is to lengthen the arc route, which will increase path resistance and arc voltage. Third, the arc is divided into a number of series arcs to enhance the arc voltage.

### **1.1.3. Cross-blast Circuit Breaker:**

The explosion in this breaker travels at a precise angle to the arc. This cross blast's idea consists of a fixed contact and a moving contact. The operation will create arching between the contacts when the moving contact begins to travel in the opposite direction of the stationary contact. The explosion will flow between the two points of contact, removing or quenching the arc that forms.

### **1.1.4. Axial Blast Circuit Breaker:**

The axial blast circuit breaker likewise includes a fixed contact and a moving contact that operate in tandem. The spring closure, which functioned to draw the moving contact back to its original position, supported the movement of the moving contact. An arching chamber, air valve, air reservoir tank, and series insulator make up the axial blast circuit breaker's construction.

The two fixed and movable contacts are in the closed position during typical working conditions. Because the air valve is closed during normal operation, the arching chamber is linked to the air reservoir tank via an air valve under this situation. The tripping pulse is generated during the fault situation, causing the air valve to open. When the air valve is opened, the air pushes against the spring pressure, pushing the moving contact away. The moving contact arced after extracting the distance from the stationary contact. The ionized gases were being taken away by the high pressure of air blast while this process was taking place. As a consequence, the arc was snuffed out.

### **1.1.5. SF6 Circuit Breaker:**

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This kind of circuit breaker uses gas that known as Sulphur hexafluoride (SF<sub>6</sub>) (SF<sub>6</sub>). This kind of circuit is high voltage circuit breaker owing to the outstanding to quench the arc and isolation characteristics. So that, it is frequently utilized as a protection in high voltage. This gas was chosen because of the properties of this gas that has strong electro-negativity. The kind of SF<sub>6</sub> circuit breaker that is commonly utilized in power industry is the puffer types of SF<sub>6</sub> circuit breaker.

SF<sub>6</sub> circuit breaker comprises of two kinds of contact which are fixed contact and movable contact. In this arrangement, the location of the cylinder is unfixed or adjustable but the piston in the fixed position. The cylinder is coupled with the moving contact as it may moving with that contact. When the moving contact begins to moves, the SF<sub>6</sub> gas starts compressed owing to the fixed position of the piston. Arc will be manufactured. The electronegativity of the SF<sub>6</sub> is strong and as a consequence, it may absorb the free electron. Absorption occurred when the molecule of SF<sub>6</sub> collides with the free electron and create the negative ion.

### **1.1.6. Vacuum Circuit Breaker:**

This vacuum circuit breaker is also known as the VCB is one of the circuit breakers that classifies in the medium voltage level. The functioning of this circuit breaker has a distinct concept from conventional circuit breakers. The arc quenching takes place in a vacuum. The opening and closing the contact and associated arc interference take place in a vacuum chamber known as a vacuum interrupter. The primary aim of all CB is to quench the arc generated when the contacts parted. In VCB, the dielectric strength of vacuum is considerably greater than the SF<sub>6</sub>. Since the dielectric strength is strong then the arc may be quenched inside the tiny gap. When the two contacts are separated, it is not separate immediately. It occurred in a microsecond and thus the surface of the contacts became the hot point. In high temperature, the metal vaporized and form the conducting route for the arc. Since the ionization does not occur in a vacuum, then the arc will be removed. After the current goes to zero, this VCB will produce strong dielectric strength to prevent the reestablishment of arc. The prior study of this circuit breaker was performed by utilizing software and construct the breakers modelling to observe all factors that participate in this VCB. Below is part of the outcome of the observation of the behaviour of the VCB.

The initial output waveform of the transient voltage has measured. This measurement of the simulated VCB is being used to estimate the characteristics of the breaker in terms of dielectric withstand. The second waveform in Figure 5 illustrates the simulation result for the voltage achieved at the developed breaker inside the transformer system. The comparison has been done in term of phase, it is because the present cutting is evaluated inside the phase. Unfortunately, the voltage restriking observation for the opposite phase is not matched for the comparison because virtual current chopping interrupts the initial current. That current chopping is influenced by the capacitive coupling.

In the simulation, this capacitive coupling between the phases greater compared to the other simulation findings. These occurrences arise owing to the conventional transformer model being combined with stray capacitances in the transformer simplification model. Other study, they attempted to reduce overvoltage and inrush currents at VCB switching, the technology of controlled switching is of significant significance. The basic concept of controlled switching is shutting or opening an electrical network at optimum instants. Besides that, they also create the



simulation model of a circuit breaker where the principles of controlled switching may be realized and the major characteristics of actual vacuum circuit breakers can be considered.

#### **1.1.7. Circuit Breaker for DC Grid:**

Positive technological development of power electronic devices is also the primary element in the transition to a new electrical power source within the application of the DC grid. To ensure the safe grid operation, DC breaking ideas are needed inside the operating system. There are many kinds of the DC breaker idea exist and typically utilized in DC grid. The DC breaker that addressed in this subtopic is Hybrid and Solid-state DC breaker.

#### **1.1.8. Hybrid DC Breaker:**

The hybrid DC breaker system comprises of the combination main breaker with the bypass system. The bypass for this hybrid DC breaker comprises of the series connection of ultrafast disconnecter and load commutation switch. In this DC breaker, the essential semiconductor component is split into a few parts for complete voltage and current breaking capabilities that comprise of individual arrester bank. Besides, the disconnecting CB will interrupt residual current at the same time will also be islanded the fault state inside the DC grid after the fault clearing. This job is to cover the arrester banks inside primary semiconductor breaker to overheat.

During such a regular state of the hybrid DC breaker, the current only flow through the bypass that comprises of the series connection of load commutation switch and fast disconnecter. When the DC fault occurs, the fast disconnecter instantly opens and the load commutation switch also will fast- functioned to direct the current flows towards the main breaker. The primary DC breaker will perform it essential role to stop the current from flowing when the mechanical switch in the quick disconnecter opens.

#### **1.1.9. Solid State DC Breaker:**

This solid state CB typically utilized in dc application system with high voltage supply. The benefits of this DC breaker are it has a quick reaction of switching speed, efficient current interruption, and it capable of withstanding under high voltage situation. The other benefits compared to the other circuit breaker is that has absence of mechanical component. Due to this less mechanical component, this solid-state topology becomes more responsive and effective which leads to a shorter turn off time. Besides, the maximum voltage across the inductor may create the maximum overvoltage that can enable the demagnetization process to be efficiently responded. The fundamental structure of this solid-state circuit breaker comprises of thyristor instead of integrated gate commuted thyristor for semiconductor devices.

Uninterruptible Power Supply (UPS) has been extensively utilized in industry. Due to the rapid growth and improvement of the technology, the UPS capacity grows significantly. The prior power electronic researcher had to perform some invention to improve constant dependability and capabilities of UPS system. This Super UPS had been developed to solve the issue. This super UPS has two separate energy source that activates the system. Furthermore, power electronic converter was also utilized to improve the dependability of the UPS system. Due to the short circuit current increase in the super UPS, the quick reaction DC breaker like the solid-state DC breaker is needed.

## 2. DISCUSSION

The contemporary power system works with large power network and vast quantities of related electrical devices. During a short circuit fault or any other kind of electrical fault (such as electric cable problems), a high fault current will flow through this equipment as well as the power network itself. This enormous current may destroy the equipment and networks permanently. For preserving these pieces of equipment and the power networks, the fault current should be removed from the system as soon as feasible. Again once the problem is eliminated, the system must return to its regular operating state as quickly as feasible for providing dependable quality power to the receiving ends. In addition to that for effective regulation of the power system, various switching operations are needed to be conducted. So for timely removing and rejoining various components.

## 3. CONCLUSION

Several kinds of circuit breaker have been examined as the chosen protective mechanism. From the reviewed that has been done via this article, the observation result of the circuit breaker application, there are many conclusion that can be reached. First, each circuit breaker has its classifications within the low, medium, and high voltage that are commonly employed in power system protection. Second, each kind of transmission fault have their effective circuit breaker to remove the fault with its arrangement relies on the fault feature. Third, the defect does not have a definite parameter and fixed causes. The natural phenomena is not the only fault factor, but it has many additional component that may produces fault such as human errors, instrument error, and installation and setup error. Last, substation is required to regulate the voltage delivered at high voltage from the producing plant. Protection system is also needed in a substation.

## REFERENCES:

1. H. H. Goh *et al.*, "Types of circuit breaker and its application in substation protection," *Indones. J. Electr. Eng. Comput. Sci.*, 2017, doi: 10.11591/ijeecs.v8.i1.pp213-220.
2. J. G. Lee, U. A. Khan, H. Y. Lee, and B. W. Lee, "Impact of SFCL on the four types of HVDC circuit breakers by simulation," *IEEE Trans. Appl. Supercond.*, 2016, doi: 10.1109/TASC.2016.2542847.
3. X. Ding, G. Tang, M. Han, C. Gao, and G. Wang, "Design and Equivalence Evaluation of Type Test for Hybrid DC Circuit Breaker," *Dianwang Jishu/Power Syst. Technol.*, 2018, doi: 10.13335/j.1000-3673.pst.2017.1293.
4. M. Liao, J. Huang, G. Ge, S. Wang, and X. Duan, "Development and research of native and foreign hybrid circuit breaker," *Gaodianya Jishu/High Volt. Eng.*, 2016, doi: 10.13336/j.1003-6520.hve.20160616002.
5. S. Ma, M. Chen, J. Wu, Y. Wang, B. Jia, and Y. Jiang, "High-Voltage Circuit Breaker Fault Diagnosis Using a Hybrid Feature Transformation Approach Based on Random Forest and Stacked Auto-Encoder," *IEEE Trans. Ind. Electron.*, 2018, doi: 10.1109/TIE.2018.2879308.
6. F. Iberraken, R. Medjoudj, R. Medjoudj, and D. Aissani, "Combining reliability attributes to maintenance policies to improve high-voltage oil circuit breaker performances in the case of competing risks," *Proc. Inst. Mech. Eng. Part O J. Risk Reliab.*, 2015, doi: 10.1177/1748006X15578572.

7. A. N. Shpiganovich, A. A. Shpiganovich, and K. A. Pushnitsa, "On the applicability of the Mayr arc model for studying current chopping and overvoltages generated by low-oil current breakers," *Russ. Electr. Eng.*, 2017, doi: 10.3103/S1068371217060141.
8. K. C. Randall, "Oil Circuit Breakers," *Trans. Am. Inst. Electr. Eng.*, 2009, doi: 10.1109/taiee.1915.4765216.
9. S. Fang *et al.*, "Contact parameter computation and analysis of air circuit breaker with permanent magnet actuator," *J. Electr. Eng. Technol.*, 2013, doi: 10.5370/JEET.2013.8.3.595.
10. Z. Ren, M. Wu, F. Yang, Z. Yang, and J. Zhang, "Numerical study of the arc behavior in an air DC circuit breaker considering turbulence," *IEEE Trans. Plasma Sci.*, 2014, doi: 10.1109/TPS.2014.2323815.

## A SURVEY OF THE LITERATURE ON THE RELATIONSHIP BETWEEN CONCRETE RESISTIVITY AND CORROSION RATE

**Rahul Rathore\***

\*Assistant Professor,  
Department of Computer Science,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [rahul.engineering@tmu.ac.in](mailto:rahul.engineering@tmu.ac.in)

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### ABSTRACT

*The movement of ions through the concrete microstructure helps to regulate the process of reinforcement corrosion in concrete. Ions are charged, and the electrical resistivity of a substance determines its capacity to withstand charge transfer. As a result, a link between the corrosion process of steel buried in concrete and the electrical resistivity of concrete might be anticipated. The study on the connection between corrosion rate and concrete resistivity is reviewed in this article. In general, the parameters have an inverse proportional relationship. However, the connection between corrosion rate and resistivity varies across research, and no one relationship can be established. To resolve the discrepancy, the paper examines and analyzes the impact of variables such as the experimental setup, concrete mix design, and corrosion cause.*

**KEYWORDS:** *Concrete Resistivity, Corrosion Rate, Material Impact, Propagation Period, Reinforcement.*

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### 1. INTRODUCTION

Steel corrosion in concrete has resulted in many expensive repairs and a significant number of structural failures throughout the ages. It is critical to thoroughly assess the corrosion process, not only for existing structures but also for the design of future ones[1]. In this regard, concrete resistivity is regarded as one of the most significant criteria for assessing steel corrosion in concrete. Concrete resistivity has been linked to both the initiation and propagation periods, according to research. The connection between corrosion rate and concrete resistivity also known as the "C-R relationship" is the subject of this article. Under typical environmental exposure circumstances, it is now generally recognized that as concrete resistivity increases, the corrosion rate reduces excluding submerged structures[2]. However, there are significant and poorly explained differences across research reported in the literature. A material's electrical resistivity  $\rho$  (X m) defines its capacity to tolerate charge transfer.

It is defined as the ratio of applied voltage to resultant current multiplied by a cell constant, and therefore is a geometry-independent characteristic. Conductivity  $\sigma$  is the inverse of resistivity.

Resistivity has one of the most extensive ranges of any material attribute. It ranges from  $10^6 \text{ X m}$  for oven dried samples to  $10 \text{ X m}$  for soaked concrete in concrete[3]. Microstructure features such as porosity and pore solution characteristics are attributed to electrical resistivity in concrete. The degree of pore structure saturation has been found as the most critical element affecting concrete resistivity, but temperature has a significant effect as well. Steel is shielded from corrosion in the extremely alkaline environment of the concrete pore solution by a thin coating of iron-oxides passive film. However, in the presence of a significant quantity of chlorides or when the concrete around the steel is carbonated, this passive layer is unstable[4]. Corrosion may develop as a result. Corrosion of steel buried in concrete is a multi-step electrochemical reaction involving four distinct stages. Each step symbolizes a stumbling block to the cell's current flow.

Because the resistances are linked in series, the corrosion current will be restricted by the resistance with the greatest value. In comparison to the other three methods, the resistance of current flow through steel will be minimal. As a result, corrosion rate is limited by cathodic, anodic, or concrete resistance, which is dependent on environmental and/or material characteristics[5]. By defining the passage of current between the anode and cathode areas, concrete resistivity may have a direct impact on the corrosion process. It may, however, have an indirect connection to the corrosion process by affecting the anodic and cathodic reaction rates due to its ability to characterize the moisture stage and the movement of ions such as chlorides through the concrete microstructure. Current density is a term used to characterize the pace of corrosion. Carbonation-induced reinforcement corrosion typically affects a wide region of the reinforcing surface[6]. The cathodic and anodic regions are contiguous, resulting in a homogeneous breakdown of the steel. Microcell or homogeneous corrosion is the name for this process. If the chloride concentration along the rebar is extremely high, uniform corrosion may occur.

Localized pits, on the other hand, tend to form in the presence of chlorides. The anodic area in the localized pit is considerably smaller than the cathodic area the passive rebar surface around the pit, and the two areas are separated in space, forming a macro cell. As a result, corrosion that occurs in the presence of chlorides is known as macrocell corrosion[7]. When compared to other corrosion science characteristics such as the corrosion rate, it is generally recognized that concrete resistivity can be readily measured, particularly in the field. As a result of the connection between concrete resistivity and corrosion rate, it would be possible to evaluate the corrosion stage in an efficient and cost-effective manner[8].

This may be regarded as the primary motivation for the C–R relationship's extensive study over the past several decades. The literature contains assessment criteria for quantifying corrosion activity using concrete resistivity measurements[9]. However, there is a lot of variance in the threshold levels. The comparison identifies a lower limit of  $1000\text{--}2000 \text{ X m}$  above which the corrosion rate will be minimal. Concrete with a resistivity of less than  $50 \text{ X m}$ , as a bottom limit, is likely to enable severe corrosion. On-site, resistivity values of  $50$  to  $1000 \text{ X m}$  are typical for ordinary Portland cement (OPC) concrete, and up to  $6000 \text{ X m}$  for mixed cements. The main goal of this paper is to summarize current studies on the connection between corrosion rate and concrete resistance. The study examines the C–R relationship's application and limitations, as well as its appropriateness for estimating and forecasting the propagation duration. Finally, important points for further study in the field are highlighted[10].

## 2. DISCUSSION

A thorough review of the literature was conducted. International studies that looked at the connection experimentally were the primary sources of information. The most relevant material was compiled into a review. A comparison of the experimental setup was performed. The information obtained from the literature search was complemented by two models based on the C–R connection and tested against experimental data. The literature evaluation is supplemented with a selection of papers providing information on the C–R connection. Investigations into both chloride and carbonation-induced corrosion were examined. Different language has been used to explain the connection in the various research. Some researchers linked corrosion rate to concrete resistivity, whereas others favored concrete conductivity. The usage of different words has an impact on the relationship analysis. An inverse proportionality is shown by a connection between concrete resistivity and corrosion rate, while a direct proportionality is indicated by a relationship between concrete conductivity and corrosion rate.

**Symbols and abbreviations** The experimental settings are described in great detail. The properties and scales that were utilized to examine the C–R connection were compared. Aside from the ones already mentioned. Measurement data is included in the research. It is the sole study based on field studies that was identified in the literature search. In most publications, the experimental data was fitted to linear trend lines. In the two most frequently used scales in the literature, the regression lines were compared. The fitted lines from the sources were reproduced and the scales were transformed simply by selecting 10 equally dispersed points from each trend line and connecting them with a straight line. The regression lines were drawn in the range in which they were observed in the published studies to the extent feasible. The graphical comparison could not incorporate some of the evaluated experimental data. This information was presented in characteristics that were determined by the sample geometry and measurement setup. In the relevant publications, the details on these issues were not sufficiently explained.

There is no standardized test technique for examining the C–R connection. Individual experimental settings were created based on the criteria mentioned above and the emphasis of the project. The majority of the studies looked at not just the C–R connection, but also additional corrosion factors including electrical potential and chloride transport. The sections that follow compare the experimental settings that have been described in the literature. The degree to which setup variations may affect the C–R connection will be addressed. The experimental settings are compared. Generally, no information regarding the kind of steel inserted was given; both ribbed and smooth steel were utilized. Several reinforcing bars were put parallel in cover depths varying from 7 to 76 mm in the majority of the experiments. The degree to which sample size affects experimental studies of the corrosion process is seldom addressed. From an electrochemical standpoint, it seems to be of little significance for localized corrosion, as long as adequate cathode surface is present. Cathodic control may be in effect for samples with highly corroding anodes and a relatively small cathode area, limiting the rate of corrosion. There is no information in the report regarding the size of the anode or the ratio between the anode and the cathode. Moisture fluctuations, chloride penetration, and carbonation occur mostly in the cover concrete. As a result, the concrete resistivity is expected to vary with cover depth and may be significantly different from the resistivity at the reinforcement depth.

To allow for an accurate comparison with the corrosion rate, either the cover resistance or the resistivity at the depth of the reinforcement must be recorded, depending on the anticipated effect



of resistivity on the corrosion process. Another issue is that the resistance of the interfacial transition zone (ITZ) between bulk concrete and steel is more important than the bulk resistivity in the case of general corrosion. It's unclear how closely the ITZ's resistance can be matched to the bulk resistivity. It's crucial to take these resistivity disparities into account when interpreting the results. The non-destructive linear polarization resistance (LPR) approach is the most often employed. The corrosion rate was determined using LPR in all of the publications examined, with some variations in the measurement technique. The LPR technique is based on the fact that at the corrosion potential, the polarization curve is linear. A counter electrode (CE) is used to provide a tiny current, and the amount needed to produce a specified change in the potential is recorded. A reference electrode is used to monitor the potential (RE). With the assistance of the Stern–Geary equation, the instantaneous polarization resistance may be estimated from the data and converted into the total corrosion current ( $I_{corr}$ ). Divide the total corrosion current  $I_{corr}$  by the corroding area to get the corrosion rate  $i_{corr}$  current density. Despite its simplicity in principle, the LPR method has a number of difficulties in reality.

In most measuring circumstances, the quantity of corroded surface area is unknown. As a result, determining the corrosion rate is as simple as dividing the total corrosion current by the area impacted by the measurement. This estimate may be sufficient for uniform corrosion involving vast areas of corroded surface. Localized corrosion, on the other hand, affects just a few relatively tiny pits. The average result for the steel area impacted by the measurement is considerably greater than the local current density within a pit. As a result, in these situations, the corrosion rate will be underestimated. In the event of localized corrosion, the latter must be taken into account for the examined experimental results since the real corroding region was unknown in all tests. The ohmic drop, or difference in polarization resistance between the RE and the WE working electrode, in this case corroding steel bar, may have a significant impact on the observed polarization resistance. In cases when the concrete resistivity is quite high, a significant mistake may be made. The polarization resistance in these instances may represent the concrete resistance rather than the corrosion rate. To prevent this effect, it is generally recommended that LPR readings be corrected for ohmic drop. In several of the examined studies, no ohmic drop adjustments were made or no information regarding this was provided.

If the ohmic drop is overlooked, the corrosion rate will be underestimated. As the review progresses and the findings of these research are discussed, this must be taken into account. Other factors that affect corrosion rate and concrete resistivity measurements, such as confinement methods, sweep rate, delay time, and others, are not included here. Differences in corrosion rate and concrete resistivity measurements can only be explained if all factors affecting corrosion rate and concrete resistivity measurements are examined. In most studies, mortar or concrete samples with a w/b ratio of 0.4 to 0.65 by mass were examined. The quantities of the mixture and the amount of cement in it varied. Only one study utilized w/b ratios of 0.9 and 1.1 to produce a quick shift in the internal environment while altering the exposure. The present practice does not allow for such high w/b ratios. In several of the experiments, blended cements such as fly ash or slag cements were utilized. In, no specific information regarding the cement type was provided. Ordinary Portland cement was most likely used in these instances, since a remark would have been anticipated otherwise. Throughout the testing period, the specimens were exposed to various and/or changing exposure circumstances. The samples were exposed to high relative humidity (RH) in most experiments, since it is known that RH between 90% and

95% promotes high corrosion rates. The samples were sometimes subjected to drier conditions to obtain a broad variety of concrete resistivities.

In several of the investigations, samples were exposed to outdoor environments, particularly marine climates. In most trials, the temperature did not change much. Experiments were carried out over a period of one to five years in most cases. It is desirable to cover a broad range of values for both parameters in order to adequately assess the application, limitation, and scatter of the C–R relationship. This may be accomplished by altering the materials used as well as the exposure circumstances. However, in order to differentiate between the effects of substance and exposure, both must be expressly separated from one another. This may be accomplished by running several sets of material mixtures in parallel and exposing them to different environmental conditions. In the majority of the studies examined, both the substance and the exposure were altered; in most instances, the exposure was altered equally for all samples. This allows for the assessment of material impact on the C–R connection, but no information regarding the dependence of various exposure regimes/histories on the C–R relationship could be found in these instances. The bulk of the research looked into chloride-induced corrosion. Only one research focused exclusively on corrosion caused by carbonation.

In two trials, a combination of chloride and carbonation exposure was explored. In most instances, mixed-in chlorides were the source of chloride-induced corrosion. Only a portion of the cyclic exposure to chloride solution was utilized. Storage in carbonation cabinets with a high CO<sub>2</sub> content and low RH hastened carbonation. When comparing experimental findings to real-world applications, the method by which corrosion is produced is critical. The presented research' corrosion start and exposure circumstances vary from one another. The most common mode of corrosion was mixed-in chloride corrosion. Although this shortens the time to depassivation, mixed-in chlorides may cause substantial changes in the pore structure of the concrete as well as the corrosion process. This effect may explain differences between experiments with and without mixed-in chlorides using the same mix design. As demonstrated in the preceding sections, the experimental setting may have a significant impact on the observed C–R relationship.

The measuring techniques, in particular, include a range of factors that influence the collected data. The authors believe that the specimen geometry and overall setting have a minimal impact on the findings. The material and exposure circumstances should be carefully selected to provide for a sufficient overview of variables influencing the C–R relationship. In any case, practice-related outcomes are desired, and corrosion initiation must be chosen appropriately. This is especially advantageous for experimental findings that need be fed into prediction models. When developing and/or assessing an experimental setting, the topics mentioned above must be carefully considered. For assessing the C–R connection, a uniform approach would be beneficial. The experimental results collected in various labs and circumstances may then be compared. A technique like this should ensure that practice-related materials and exposure conditions are fulfilled. The authors found just one research that reported field data. To detect potential discrepancies between laboratory research and reality, a comprehensive field assessment of the C–R relationship is required.

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### 3. CONCLUSION

There is a definite trend that the corrosion rate reduces as the concrete resistivity increases. Once corrosion has begun, the connection may be seen (active conditions). It will not be true in the situation of saturated concrete, when the corrosion rate will be low despite the low resistivity owing to a lack of oxygen. Different factors that may affect the C–R connection were discovered. However, there are still a few issues that need to be thoroughly discussed and investigated. To alter the C–R connection, the cement type was determined. When comparing concretes produced of OPC and slag cements in the presence of chlorides, this was very noticeable. Carbonated samples produced with various cement kinds also showed differences. The C–R connection seems to be affected by the carbonation of the concrete layer. Carbonated and non-carbonated samples suffering from chloride-induced corrosion produced with OPC showed differences. The variations were less apparent in slag cement samples. However, additional in-depth study is required to support this conclusion. Because of the many variables that change and influence the complicated C–R connection, prediction models run the danger of oversimplifying it. Both of the models presented here lacked thorough separation of factors that affect the C–R relationship. Only a few research took field data into consideration. Collecting further field experience to evaluate the C–R relationship's viability is of great interest.

### REFERENCES:

1. P. G. Cavalier and P. R. Vassie, "INVESTIGATION AND REPAIR OF REINFORCEMENT CORROSION IN A BRIDGE DECK.," *Proc. Inst. Civ. Eng. (London). Part 1 - Des. Constr.*, 1981, doi: 10.1680/iicep.1981.1784.
2. A. Udaipurwala, A. Poursaee, and S. D. Schiff, "Corrosion Activity in Precast Concrete Elements and Cementitious Closure Pours," *J. Bridg. Eng.*, 2015, doi: 10.1061/(asce)be.1943-5592.0000757.
3. K. Reichling, M. Raupach, H. Wiggenhauser, M. Stoppel, G. Dobmann, and J. Kurz, "BETOSCAN – Robot controlled non-destructive diagnosis of reinforced concrete decks," *7th Int. Symp. Nondestruct. Test. Civ. Eng.*, 2009.
4. Y. Zheng, G. Yu, and Y. Pan, "Investigation of ultimate strengths of concrete bridge deck slabs reinforced with GFRP bars," *Constr. Build. Mater.*, 2012, doi: 10.1016/j.conbuildmat.2011.09.002.
5. K. M. Belli, R. A. Birken, R. A. Vilbig, and S. J. Wadia-Fascetti, "Simulated GPR investigation of deterioration in reinforced concrete bridge decks," 2013, doi: 10.4133/sageep2013-099.1.
6. R. G. Giorgini, H. van Den Hondel, and J. J. W. Gulikers, "Assessment of the throwing power generated by a surface applied galvanic cathodic protection system on a light weight concrete bridge deck soffit," 2016.
7. R. Bäßler, A. Burkert, and G. Eich, "Integrated protection system for chloride deteriorated concrete structures," 2006.

8. C. Sodeikat, C. Gehlen, and A. Schießl, "Damage assessment of a RC bridge structure showing damages at the prestressing steel," 2006.
9. R. Bäßler, A. Burkert, G. Eich, and J. Mietz, "Integrated protection system for chloride deteriorated concrete structures," 2004.
10. I. A. Basunbul, H. A. Dehwah, and M. Maslehuddin, "Durability evaluation of repair materials in hot-arid environments," 1994.

## A LOOK AT THE UTILIZATION OF WASTE GLASSES IN CEMENT AND CONCRETE MANUFACTURING

**Dr. Varun Kumar Singh\***

\*Associate Professor,  
Department of Applied Science (Chemistry),  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- drvarun.engineering@tmu.ac.in

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### ABSTRACT

*Due to rising disposal costs and environmental concerns, the use of recycled waste glasses in Portland cement and concrete has piqued attention across the globe. Glass is pozzolanic or even cementitious in nature when finely crushed since it is amorphous and contains comparatively high amounts of silicon and calcium. As a result, it may be used to substitute Portland cement in concrete. The use of broken glasses as aggregates in Portland cement concrete has certain detrimental effects on the concrete's characteristics; nevertheless, practical application may be achieved even with 100% crushed glass as aggregates. The major issue with using crushed glasses as aggregates in Portland cement concrete is the glass aggregates' expansion and breaking. This article highlights the developments and outlines the guidelines for using waste glasses in Portland cement and concrete properly.*

**KEYWORDS:** *Broken Glass, Cement, Concrete, Hardened Properties, Waste Glasses.*

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### 1. INTRODUCTION

Recycling discarded glass is a significant issue for towns all around the globe. In 1994, the United States' municipal trash stream included about 9.2 million metric tons of post-consumer glass. Container glass made up around 8.1 million metric tons (or 80 percent) of the waste glass[1]. New York City alone collects over 100,000 tons of glass each year and pays Material Recycling Facilities (MRFs) up to \$45 a ton to dispose of it, which is mixed with metals and plastics. The use of recycled glass in glass production lowers energy usage, raw material use, and equipment wear and tear[2]. However, due to impurities, expense, or mixed hues, not all old glass can be recycled into new glass. According to reports, the amount of mixed trash glass has already surpassed the amount of color-sorted glass. Markets for mixed waste glass need to be developed. Because of the huge quantity, low quality standards, and ubiquitous building sites, using recycled materials in construction is one of the most appealing alternatives. The primary uses are partial aggregate substitution in asphalt concrete, fine aggregate in un bond base course, pipe bedding, landfill gas venting systems, and drain gravel backfill[3]. Many research has recently focused on the use of glassed wastes as aggregates for cement concrete or as cement substitutes.

Glass, on the other hand, is pozzolanic or even cementitious in nature when finely crushed since it is amorphous and contains comparatively high amounts of silicon and calcium. Using glass as a cement component in concrete increases its value and enables for the use of the energy that was previously given to it during the glassmaking process[4]. The goal of this article is to examine the chemistry and structural properties of glasses, as well as current research on the use of waste glasses in Portland cement and concrete and future directions. Glasses are divided into the following groups based on their main compositions: vitreous silica, alkali silicates, soda-lime glasses, borosilicate glasses, lead glasses, barium glasses, and alumina silicate glasses[5]. Small quantities of chemicals are often added to glasses during manufacturing to give them various colors or enhance particular characteristics. Containers, floats, and sheets are most often made from soda-lime glassware. Soda lime glasses account for more than 80% of the weight in trash glasses. Clear accounts for 63 percent, amber for 25%, green for 10%, and blue or other hues for 2%.

Except for a tiny quantity of color additives, the basic composition of these glasses is the same. Typical compositions of various kinds for various purposes. Soda-lime glasses are made up of about 73 percent SiO<sub>2</sub>, 13–13 percent Na<sub>2</sub>O, and 10% CaO. Soda-lime glasses will be pozzolanic-cementitious materials due to their chemical makeup[6]. Lead glasses, which come from color TV funnels, neon tubing, electrical components, and other sources, will be the second main kind. The high lead concentration in the glass, however, is a significant issue when utilizing this kind of glass in cement and concrete. Which may perhaps leak into the environment. A glass is formed when molten materials are rapidly cooled. A two-dimensional framework of SiO<sub>4</sub> tetrahedral, shown schematically, may be used to explain the structure of a glass. According to the suggested network theory. Network formers have tiny ionic radii, the greatest attainable ionic valencies, and four oxygen atoms around them[7].

Through tetrahedra, they create a more or less chaotic three-dimensional network containing oxygen atoms. These network formers and oxygen atoms typically have binding energies more than 335 KJ/mol. In vitreous blast furnace slag, Si and P are common network formers. The greater the content of the network formers, the higher the glass condensation degree. Network modifiers have high ionic radii and coordination numbers of 6 or 8. The presence of network modifiers causes network abnormalities and de polymerization. Network modifiers and oxygen atoms typically have bond energies of less than 210 KJ/mol. In vitreous blast furnace slag, network modifiers like as Na, K, and Ca are common. Intermediates may serve as network formers as well as modifiers. In vitreous blast furnace slag, the amphoteric metals Al and Mg are common intermediates. When acting as network formers, they have a coordination number of 4, and when acting as network modifiers, they have a coordination number of 6. Their oxygen atom bond energies vary from 210 to 335 KJ/mol. According to the binding energies of network formers and network modifiers, the more network formers there are, the less reactive the glass will be. Bridging and non-bridging oxygen ions are the two kinds of oxygen ions. Non-bridging oxygen ions belong to just one polyhedron, whereas bridging oxygen ions connect two polyhedra. Regions with imbalanced negative charge are caused by the presence of non-bridging oxygen ions[8].

To balance the excess negative charge of the non-bridging oxygen ions, network modifiers, or cations with a low positive charge and a big size, such as Na<sup>+</sup>, K<sup>+</sup>, and Ca<sup>2+</sup>, may reside in holes between the oxygen polyhedra. In the 1960s, many experiments were performed to see



whether crushed waste glasses could be used as aggregates in cement concrete, and all of the concretes containing glass aggregates broke. They discovered that using 100 percent crushed glasses as aggregates, 80 percent ASTM Type III Portland cement, and 20 percent met kaolin as cementitious materials, and the right amount of water, a practical concrete mixture could be made[9]. The characteristics of concretes with different amounts of waste E-glass particles. Grinding electrical grade glass yarn trash into tiny particles yielded waste E-glass particles. The size distribution of cylindrical glass particles ranged from 38 to 300 micrometers, with approximately 40% of E-glass particles being smaller than 150 micrometers. The optimal E-glass concentration was determined to be 40–50% by mass based on the characteristics of cured concrete. Mechanical characteristics and microstructures of mortars using 30–70% ground glasses instead of fine sand[10].

## 2. DISCUSSION

The interaction between cement paste and crushed waste glass with particle sizes up to 100  $\mu$ m was shown to have no detrimental impact on a macroscopic level. The beneficial contribution of waste glass to the micro-structural characteristics, on the other hand, resulted in a significant increase in mortar mechanical performance. The use of discarded glasses as aggregates had no discernible impact on concrete workability, although it did reduce slump, air content, and fresh unit weight. To get the same workability, concrete with glass particles would need a greater water content than concrete with traditional aggregates. Compressive, flexural, and indirect tensile strengths, as well as Schmidt hardness, decrease as waste glass aggregates rise. When the glass content was more than 20%, the strength was significantly reduced. At ambient and high temperatures, the impact of replacing fine and coarse particles with recycled glass on the fresh and hardened characteristics of Portland cement concrete. The findings showed that when temperatures rise above 700°C, the compressive strength of concrete produced with recycled glasses drops by up to 20% of its original value.

In general, concretes made with 10% aggregate replacement with the effect of replacing fine and coarse aggregates with recycled glass on the fresh and hardened properties of Portland cement concrete at ambient and elevated temperatures, coarse waste glass and a combination of fine and coarse waste glass had better properties in the fresh and hardened states at ambient and elevated temperatures, coarse waste glass and a combination of fine and coarse waste glass had better properties in the fresh and hardened states at ambient and elevated temperatures. At ambient and increased temperatures, concretes produced with FWG aggregates exhibited greater compressive strengths than concretes manufactured with coarse waste glass or a mix of fine and coarse waste glass. Concrete containing glass aggregates had a slightly lower durability index than ordinary concrete in freezing-thawing experiments, according to ASTM C666. However, as described in detail in the next section, the major issue with using waste glasses as concrete aggregates is expansion and cracking. For decades, concrete containing glass aggregate has been known to expand and fracture. Even in mortars produced with high alumina cement and low alkali gypsum plaster, sodium and potassium siliceous glasses were extremely expansive, according to research using synthetic glasses. The color of the expansion bars is determined by the color of the glass. Clear soda-lime glass, for example, was the most reactive, followed by amber glass. More growth was produced by green glass.

The volume expansion and strength of concretes incorporating various waste glass particles. The use of low-alkali Portland cement does not, in fact, decrease the expansion of concrete produced

from crushed mixed waste glass. Similar glasses containing lithium and lead, on the other hand, did not expand under the same testing circumstances. The expansion of concrete is affected by various colored glass. According to research conducted at Columbia University in the United States, Cr<sub>2</sub>O<sub>3</sub> in green glass may limit the expansion of concrete containing glass aggregate? However, a research conducted at the University of Sheffield in the United Kingdom showed no difference between green, amber, and flint glasses. Of course, the size of the glass aggregate has an impact on the pace and value of growth. However, findings from a Columbia University research. The former discovered that the pessimum sizes for clear (flint) soda-lime glass, Pyrex glass, and fused silica appear to be 1.18 mm, 150 μm, and 75 μm, respectively; while the latter looked at different size ranges of glass aggregate up to 12mm and discovered that the expansion increased as the glass aggregate size increased. Various efforts have been made to decrease or eliminate the expansion of glass aggregate-containing mortars or concrete. It will decrease or remove the expansion if there are pores to allow the expansive reaction products to penetrate into these pores or to alleviate the expansive pressure.

According to laboratory findings, air entrainment or the use of porous lightweight aggregate are both excellent methods for reducing or eliminating expansion. Adding an air-entraining agent reduced expansion by approximately 50%. In another research, when the volume of expanded shale exceeds 60% of the total aggregate volume, the specimens' growth is significantly decreased and well below the detrimental expansion limit. In fact, when porous glass is utilized as a concrete aggregate, the specimens do not expand at all. Porous aggregate is widely recognized for its ability to reduce expansion caused by alkali–aggregate interactions. To minimize or eliminate the alkali–aggregate interactions, supplementary cementing materials such as ground blast furnace slag, fly ash, silica fume, and met kaolin are often employed. The use of these components may also decrease the expansion of concrete containing glass aggregates, according to laboratory experiments. Of course, the material's chemical and physical properties will influence its efficacy. The most effective substance has been shown to be metakaolin. Some studies have tried to explain the growth of cement concrete using mixed waste glasses as aggregates using conventional alkali–silica reaction ideas. The published studies show that the expansion phenomena of cement concrete using mixed waste glasses as aggregates vary from those of the conventional alkali–silica reaction. Several discrepancies between traditional alkali–silica reaction expansion and glass aggregate expansion.

The normal mode of generating swelling pressure within the concrete appears to be due to the alternation and softening of the aggregate grains caused by inward diffusion of alkali metals and hydroxyl ions, followed by imbibition of water, resulting in significant osmotic pressure, tensile failure, and cracking of the surrounding matrix. With the remnants of changed aggregate particles and copious quantities of isotropic alkali silicate gel and gel secondary reaction products, reaction rims on the perimeter of aggregate grains are frequently seen. It is widely known that when the pH of the environment exceeds 12, amorphous silica is readily eroded. At 20°C, the pH of a saturated Ca (OH)<sub>2</sub> solution is approximately 12.4. As a result, the pH of low alkali Portland cement is high enough to cause soda lime glass to corrode. In order to prevent damaging expansion and cracking of concrete containing big glass particles, the pH of the concrete must be kept below 12. According to the chemical makeup of waste glasses, they are mostly composed of SiO<sub>2</sub> and should be acceptable as cement raw materials. The primary issue will be how the alkalis in the glasses will interact with the minerals in the cement clinker, as well

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as how much alkali will remain in the cement clinker. Recently, two research published laboratory investigations and trial production for the utilization of waste glasses as raw siliceous materials in Portland cement manufacture. Glass was studied, and it was discovered that the chemical makeup of glasses did not differ substantially depending on their hue or origin, but rather on their use. The overall composition of glass satisfies the requirements for cement raw materials.

The alkali content ( $\text{Na}_2\text{O}$ ) of glass bottles found mostly in Hong Kong waste glasses, which is a significant issue for cement manufacturing, ranges from 10% to 19%, with an average of about 15%. Two plant experiments were carried out, one at a load of one t/h for 24 hours and the other at 1.77 t/h for 56 hours. The concentration of contaminants in the stack exhaust does not vary much. They also discovered that the alkaline content increased somewhat, but remained within three times the standard deviation calculated from the previous year's statistical data. Glass has no substantial effect on the feeding rate evaluated, according to a thorough study of the cement product quality. During the feeding and processing of glass, there was no negative impact on the rotary kiln plant's functioning. In another research several extremely intriguing occurrences were found. It was discovered that adding glass to cement raw mix causes more liquid phase to develop between 950 and 1250 C; a reduction in C3S content in the clinker; and the creation of NC8A3, which causes flash setting owing to the high alkali content and the formation of compound  $2\text{CaSO}_4\text{K}_2\text{SO}_4$ .

When the burning temperature exceeds 1350 C, about 40% of  $\text{Na}_2\text{O}$  and 80% of  $\text{K}_2\text{O}$  evaporate, and no further change occurs above that temperature. If soda-lime glass is utilized as a raw material for cement manufacture, the majority of the  $\text{Na}_2\text{O}$  will remain in the clinker. The development of cement pastes comprising white, green, and amber cullet in terms of compressive strength. The strength development of mortars containing different-colored finely ground glass cullets is clearly different: white and green finely ground glass cullets produce a slight increase in 28-day compressive strengths relative to the glass-free control at replacement levels of around 10%, whereas amber finely ground glass cullet only achieves similar strengths to the control. When compared to the control, the rate of strength growth in mortars containing finely ground glass cullet is significantly faster between 7 and 28 days. This behavior indicates the presence of a pozzolanic response. There are many advantages to reusing leftover glasses in cement and concrete manufacturing. Reduces waste disposal costs, which are expected to increase as a result of the landfill tax; extends the life of our landfill sites, assisting in the conservation of the environment.

### 3. CONCLUSION

This article examined the three potential applications of waste glasses in cement and concrete manufacturing, which may be summarized as follows: The use of waste glasses as concrete aggregates reduces the workability, strength, and freezing-thawing resistance of cement concrete by a small amount. The primary issue, however, is the expansion and breaking of glass aggregate-containing concrete. It is necessary to keep the pH of the system below 12 to avoid possible glass aggregate corrosion and concrete expansion, which may be accomplished by replacing Portland cement with pozzolanic materials such as fly ash, silica fume, and metakaoline. As siliceous sources, waste glasses may be utilized as raw materials in cement

manufacturing. However, it will raise the clinker's liquid content, resulting in the production of certain Na-compounds and a rise in the alkali content of the cement. The impact will be determined by how much waste glass is utilized. The impacts may be extremely little if the proportion of waste glass utilized in the raw materials is low. Ground glass powders have a high pozzolanic reactivity and may be used as a cement substitute. As anticipated, as fineness rises, so does pozzolanic reactivity. If the aggregates are alkali-reactive, alkalis in the glass powder may induce alkali–aggregate reactivity and expansion. The alkali–aggregate reaction expansion reduces as glass replacement rises, and it will be below the detrimental limit if the glass replacement is 50% or higher, according to ASTM C 1260 testing. Other additional cementing materials, such as coal fly ash, ground blast furnace slag, and metakaolin, may also help to reduce alkali–aggregate reaction expansion. Lithium salt may be a highly efficient addition in concrete containing glass particles to avoid the alkali–aggregate reaction expansion. Depending on the end uses and production size, the environmental and economic advantages of recycling waste glasses in cement and concrete manufacturing may be considerable.

#### REFERENCES:

1. J. F. Archibald, D. O. Degagne, P. Lausch, and E. M. De Souza, "Ground waste glass as a pozzolanic consolidation agent for mine backfill," *CIM Bull.*, 1995, doi: 10.1016/0148-9062(96)81923-1.
2. E. De Souza, J. F. Archibald, and D. Degagne, "Glassful - An environmental alternative for waste glass disposal," *CIM Bull.*, 1997.
3. C. Kılıçoğlu and S. Çoruh, "Recycling of waste glass in concrete plant as aggregate and pozzolan replacement," *Int. J. Glob. Warm.*, 2017, doi: 10.1504/ijgw.2017.10001534.
4. E. A. Byars, B. Morales-Hernandez, and Z. HuiYing, "Waste glass as concrete aggregate and pozzolan Laboratory and industrial projects," *Concrete (London)*. 2004.
5. R. Wattanapornprom and B. Stitmannaitum, "Comparison of properties of fresh and hardened concrete containing finely ground glass powder, fly ash, or silica fume," *Eng. J.*, 2015, doi: 10.4186/ej.2015.19.3.35.
6. L. M. Federico and S. E. Chidiac, "Waste glass as a supplementary cementitious material in concrete - Critical review of treatment methods," *Cem. Concr. Compos.*, 2009, doi: 10.1016/j.cemconcomp.2009.02.001.
7. A. Ray *et al.*, "Evaluation of waste perlite fines in the production of construction materials," 2007, doi: 10.1007/s10973-006-8107-z.
8. V. G. Haach *et al.*, "Desenvolvimento e caracterização de argamassas de cal aérea e terra. A influência da terra como agregado parcial," *Constr. Build. Mater.*, 2016.
9. A. Sadrmomtazi, O. Alidoust, and A. K. Haghi, "Effects of polypropylene fibers on expansion properties of cement based composite containing waste glass," in *Polymer*

*Research and Applications*, 2011.

10. S. N. Mihaljevic and S. E. Chidiac, "Use of Post Consumer Waste in Concrete & Concrete Block – Literature Review," 2009.

## A STUDY OF COMPUTATIONAL DESIGN OPTIMIZATION OF CONCRETE MIXES

Ankit Kumar\*

\*Assistant Professor,  
Department of Civil Engineering,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- ankitengg2011@gmail.com

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### ABSTRACT

*This paper presents a thorough overview of optimization research on the design and proportioning of concrete mixes. The necessity for designers and decision-makers to proportion concrete mixes that meet various sometimes conflicting performance criteria, including as cost, workability, mechanical characteristics, durability, and environmental sustainability, is driving mixture design optimization. We begin with a discussion of typical mathematical problem formulations, choices, goals, and constraints related to concrete mixture design optimization in this study. Following that, we look at the many kinds of models used to simulate concrete characteristics, such as a range of linear combination, statistical, machine learning, and physics-based models that are needed to optimize a mixture's proportions. Then, in the context of the material reviewed, we examine and discuss computer techniques for optimizing concrete mixes. Finally, in light of the present state of the art, we highlight and analyze current trends and possibilities for improving the area of concrete mixture design optimization.*

**KEYWORDS:** *Cement, Concrete Mixture, Environmental Effect, Proportioning, Optimization.*

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### 1. INTRODUCTION

Many research projects have tried experimental optimization of concrete mixes due to the flexibility of performance-based methods and a goal to obtain the most cost-effective mixture design solutions that satisfy performance requirements. The entire experimental optimization procedure is shown[1]. By changing the water-to-cement (w/c) ratio, coarse aggregate-to-total-aggregate ratio, total aggregate-to-cement ratio, and curing temperature, the goal was to experimentally optimize the compressive strength of concrete mixes. Similar research focused on the development of concrete with empirically optimized flexural strength, water absorption, and consistency index (a measure of workability). Experimental design optimization suffers from exponential increases in the necessary number of samples and experiments when numerous mixture parameters or values of those parameters are included as variables in the optimization, despite being helpful in their purpose[2].



As a consequence, thorough experimental optimization of concrete mixes may take a long time and use a lot of resources. Furthermore, due to nuanced differences in concrete performance introduced by spatiotemporal environmental variability (i.e., temperature, humidity) and specific constituent characteristics, such as the type and chemistry of cementitious materials and the size, shape, and texture of aggregates, the generalizability of experimental optimization results is limited[3]. While both prescriptive and performance-based methods provide acceptable design solutions, both strategies produce well-performing proportions of concrete mixes rather than really best-performing solutions. Furthermore, both methods require a long and iterative design process, with just one acceptable mixed design option.

To overcome these methods' experimental constraints, a large amount of recent research has concentrated on developing and verifying computational design optimization approaches and tools. for concrete mixture proportioning that takes use of a plethora of experimental data on OPC concrete, sophisticated mathematical methods, and the computational capability of high-performance computers[4]. Mixture proportioning is approached mathematically rather than experimentally in computational design optimization of concrete mixes. Shows that computational optimization of concrete mixes is a method for determining the best design solution. The decision-maker in computational design optimization must choose the problem formulation, the modeled relationships, and the optimization method to use[5]. The problem formulation process includes identifying the issue's decision variables, goals, and constraints. Choosing suitable mathematical connections to represent each goal as a function of the choice variable is what modeling entails. An optimization method is usually selected based on its ability to solve the issue analytically. Each of the three stages of computational design optimization of concrete mixes, namely (1) formulating, (2) modeling, and (3) solving the concrete mixture design optimization issue, is thoroughly discussed in this study. Each stage is addressed in the context of examples from the most relevant and up-to-date literature in a separate part of this review [6].

Furthermore, this study offers a critical overview and discussion of research and development requirements in the area of concrete mixture design optimization. The initial stage in optimization is problem formulation, which involves specifying the optimization issue's choices, goals, and constraints. Decisions, sometimes known as decision levers, are variables in an optimization problem over which the decision-maker usually has influence. To put it another way, choices are variables that can be changed to improve a problem's performance. Decision variables may be discrete or continuous in terms of categorization[7]. Decisions that might be made in the case of a concrete mixing issue are given as examples.

For example, discrete choices might be whether or not to include a particular kind of additional cementitious materials (e.g. fly ash) or any other mixture component in concrete mixture optimization issues. The quantity of a specific mixture ingredient (e.g., mass of coarse aggregate per unit volume), a ratio of two individual components (e.g., w/c ratio), or concrete drying conditions (e.g., ambient temperature, humidity) are all examples of continuous choices. There is a discussion of the many choices that may be made in a concrete mixture optimization issue. A goal is a numerical representation of a desired result for the issue being solved (i.e., minimize or maximize). Objectives are represented as functions of choice variables in optimization problems (for example, the cost of a mixture is a function of the kinds and quantities of the mixture components). Furthermore, optimization problems may be expressed as single- or multi-

objective, which influences the techniques used to solve them[7]. Because the aim of the research was to simply maximize one objective, such as cost or compressive strength, single-objective issues were addressed. Researchers have recently looked into multi-objective issues, elucidating and studying tradeoffs between conflicting goals[8].

Physical performance, cost, and environmental effects are often included in these goals. Unlike single-objective problems, multi-objective problems have multiple potential solutions that represent different levels of compromise between objectives, and the decision maker must ultimately decide which of the potential solutions (and thus which level of compromise between the objectives) is the most desirable for that particular problem. Constraints are mathematical functions of the decision variables that, if broken, render the solution infeasible and cause it to be removed from the solution set[9]. As a result, a constraint may put a limit on a decision variable or goal, or it may exist as a distinct function of choice variable values that imposes additional constraints on an acceptable solution. A limitation on the coarse aggregate content, for example, would be a decision variable limit; a restriction on the hardened concrete's workability, on the other hand, would be an objective output constraint. A minimal w/c ratio, a function of two choice variables, could alternatively be stated as a constraint if both water and cement were independent decision variables[10].

## 2. DISCUSSION

The manner in which restrictions are enforced is also worth discussing. A designer may impose a constraint or a code or standard can impose a restriction. For example, a designer may set a limit on the cured concrete's compressive strength. A standard-imposed restriction, on the other hand, might be a limit on the w/c ratio, which is often established to give additional instances of potential limits on a specific mixture design optimization issue. Although constraints are helpful for defining acceptable limits for a problem formulation, they should be implemented with caution since solution sets that violate the constraint even slightly would be rejected and considered undesirable. The problem's precise choices, objectives, and restrictions are selected to reflect the actual mixture design problem's unique aims.

For example, if an engineer is creating OPC concrete, the combination choice variables (i.e. components) will only need to contain cement, water, fine aggregate, and coarse aggregate quantities. More choice factors, such as aggregate size, superplasticizer dose, and the quantities of fly ash, slag, or silica fume, would likely be added if the objective is to create a more customized or high-performing concrete (HPC). Similarly, the problem's aims are determined by the designer's own ambitions. For some decision-makers, cost may be the sole consideration; for others, weighing tradeoffs among several goals may be critical. A decision-maker, for example, may be asked to create a concrete combination with the lowest cost and CO<sub>2</sub> emissions.

The kind of optimization issue is determined by the nature of the choices, goals, and constraints, as will be described. The term "models of the objectives" refers to mathematical formulations that link the choice variables to the intended goals of a specific mixture design issue. Objective models are necessary because they calculate the values of the objective functions that are needed to solve the issue. Goals, as previously mentioned, link choice factors to the economic, mechanical, environmental, or other characteristics of concrete mixes; as a result, numerous expressions are used to represent these objectives. Linear combination, life cycle assessment, statistical, machine learning, and physics-based models are examples of these connections.

Simple linear combinations of important choice variables may effectively represent certain goals. Modeling the cost of a concrete mixture as a function of its various mixture components is a good application for these connections. For example, in a research performed by the Office of Infrastructure Research and Development, the optimization problem's only goal was to reduce costs.

Cement, silica fume, high-range water reducing admixture (HRWRA), coarse aggregate, fine aggregate, and water were all given a price, and the cost was modeled as a linear combination of cement, silica fume, HRWRA, coarse aggregate, fine aggregate, and water. For modeling a cost goal in concrete mixture design, linear combination equations are the simplest and, as a result, the most often utilized. When dealing with issues of various orders of magnitude, however, caution should be used since linear models may fail to account for economies of scale. In other words, the cost of a component in a small quantity will differ from the cost of the same ingredient in a big quantity. As a result, cost coefficients that are suitable for the size of the project in question must be utilized. Life cycle assessment (LCA) models are often used to measure environmental goals. LCA is the process of calculating the environmental effects of a product or process (e.g., global warming potential, water depletion, resource depletion, land transformation, eutrophication).

To assign effects to a specific material or process within the material system under consideration, LCA software or a life cycle inventory database is often employed. Because the impact factors for a material or process are simply multiplied by the amount of that component in the system, LCA models could be considered a subset of linear combination models; however, we consider LCA models to be distinct from other linear combination models because of the specific and well-defined process of conducting an LCA. A linear combination of variables for each stage of the pavement life cycle to estimate the global warming potential of all main pavement types in the United States as an example of an LCA model. Global warming potential was modeled as a linear sum of individual contributions from inside the system boundary in this scenario. Environmental effects of particular kinds of concrete systems, such as high strength mixes, mixtures with supplemental cementitious materials (SCMs), and combinations with recycled aggregates, have been studied using similar LCAs.

Although these studies specifically address the life cycle environmental effects of concrete, there is a growing tendency in recent research to include environmental impact goals into concrete mixture design optimization. Only a handful of the research included in this evaluation included life-cycle CO<sub>2</sub> emissions as a goal. The caution regarding economies of scale is equally valid for life cycle assessment, as it was for linear cost modeling; impact variables do not always scale in a linear manner. Instance-based learning methods are a second class of algorithms that compare a data point of input values (a "query") to a collection of closest neighbors within a dataset to identify the output variable(s) of that data point. A complete dataset is kept for retrieval and comparison to a new query in instance-based learning. This query is categorized based on the current data it is similar to, which may be identified in a variety of ways. In metric distance minimization, for example, the characteristics of the query are anticipated based on the single data point nearest to it.

The k-nearest-neighbor's method is similar, except it returns an average of the characteristics of the k closest neighbors. Locally weighted regression is a form of instance-based learning in which points near a query are found and weighted by distance to create a local regression model.

In general, the number of local locations evaluated by these algorithms varies. Instance-based learning ideas were originally established in, and subsequent research that built the nearest-neighbors method were published consecutively. Although ANN algorithms have dominated research in predicting concrete characteristics, a few studies have utilized instance-based learning to investigate the usefulness of these less-used, computationally simpler machine learning methods. Multiple k-nearest-neighbor's methods, for example, may be used to forecast concrete compressive strength. This research found that these algorithms are less computationally expensive than ANNs and do not need data training; nevertheless, instance-based algorithms are susceptible to the existence of localized outliers. Although these algorithms do not predict as well as the other learning algorithms discussed here, they are still a useful technique for both private and public entities that have access to a large pre-existing dataset of mixture decisions and resulting concrete properties and can use a simple instance based algorithm to predict the properties of future query.

Decision trees are a machine learning framework that derives formal rules from data patterns. To anticipate the characteristics of a query, decision trees, like ANNs, must be trained on data. Classification trees are the algorithms for discrete issues. These algorithms categorize data characteristics in order to generate predictions about future inquiries. The method is known as a regression tree for continuous datasets. The algorithm in this approach runs a series of tests on the data in order to divide it repeatedly. The partition that minimizes the squared sum of the deviations from the mean in the two partitions is chosen by the algorithm. Partitioning continues until user-defined stopping criteria indicate that a branch should not be divided any further and should instead become a terminal node. The anticipated values of the output variable are stored in this terminal node.

The first regression tree method about the same time that other machine learning algorithms were being created. Basic tree-based techniques have difficulty identifying the model that performs the best in terms of prediction. As a consequence, machine learning research has concentrated on enhancing the idea of a basic tree-based model with additional design elements since the 1960s. Multiple additive regression trees (MART), for example, combine a succession of models, each with a lower rate of error than the preceding, and "boost" or fit them together for improved performance. Bootstrap aggregation, often known as "bagging" regression trees, is another technique. To build an individual regression model, bootstrap aggregating uses random resampling of the dataset (with replacement). This process is done many times in order to generate several regression models, which are then averaged to get the final prediction model. Model trees are a variant of regression trees that go one step further by fitting a regression model inside each node of the tree. Variations on regression trees typically outperform other machine learning algorithms in research comparing the effectiveness of machine learning algorithms for predicting concrete mixture characteristics. For concrete property prediction, regression tree ensembles with bagging and boosting outperform the basic decision tree model. Additionally, the model tree method has been used to estimate compressive strength for a range of concrete types, including HPC, RAC, FRP, and high-volume mineral-admixture concrete.

### 3. CONCLUSION

Traditionally, decision-makers in the area of concrete mixture design have been primarily concerned with meeting necessary goals for certain concrete characteristics, such as reaching a specified early-age compressive strength while retaining a workable concrete. However, in

recent years, new computational tools and methods have been developed and used to create concrete mixes with customized and fine-tuned characteristics. Recent research has focused on modeling and improving key concrete characteristics like compressive strength and slump as a function of specific mixture components, requiring models that link constituents to concrete performance in both the fresh and hardened states. This article looked at the various kinds of issue formulations that are common in the area of concrete mixture design optimization, as well as the modeling and optimization techniques that are accessible, as well as their application to different types of design challenges. Models based on linear combination, statistics, machine learning, and physics may all be applied to represent specific goals. Mathematical programming and metaheuristic search techniques are frequently employed in optimization. This study also outlined future research directions in this area. Decision-makers are increasingly required to evaluate numerous goals and meet many design requirements, resulting in an ever-increasing need for concrete mixes that are less expensive, stronger, more workable, durable, and ecologically friendly. As a result, growth in the area will be aided by the development of suitable and realistic models for these goals, as well as the implementation of multi-objective optimization techniques. Advances in the fields of life cycle evaluation and data visualization will also aid designers in making educated choices regarding concrete mixes that best meet various performance requirements.

#### REFERENCES:

1. M. Á. Ospina, L. Á. Moreno, and K. A. Rodríguez, "Análisis técnico-económico del uso de concreto reciclado y el concreto convencional en Colombia," *Actas Ing.*, 2017.
2. T. L. Cavalline and D. C. Weggel, "Recycled brick masonry aggregate concrete," *Struct. Surv.*, 2013, doi: 10.1108/ss-09-2012-0029.
3. E. F. Montanelli and I. srl, "Fiber/Polymeric Compound for High Modulus Polymer Modified Asphalt (PMA)," *Procedia - Soc. Behav. Sci.*, 2013, doi: 10.1016/j.sbspro.2013.11.096.
4. Z. Wu, X. Chen, L. N. Mohammad, and Z. Zhang, "Field structural performance of stabilized blended calcium sulfate materials under accelerated pavement testing," *Int. J. Pavement Res. Technol.*, 2009, doi: 10.6135/ijprt.org.tw/2009.2(3).98.
5. M.-Y. Cheng, D. Prayogo, and Y.-W. Wu, "Novel Genetic Algorithm-Based Evolutionary Support Vector Machine for Optimizing High-Performance Concrete Mixture," *J. Comput. Civ. Eng.*, 2014, doi: 10.1061/(asce)cp.1943-5487.0000347.
6. S. Bhanja and B. Sengupta, "Investigations on the compressive strength of silica fume concrete using statistical methods," *Cem. Concr. Res.*, 2002, doi: 10.1016/S0008-8846(02)00787-1.
7. O. M. A. Daoud and H. S. Sagady, "Production and properties of high strength concrete for heightening concrete dam in Sudan," *Int. J. GEOMATE*, 2013, doi: 10.21660/2013.8.24b.
8. M. Ismeik, "Effect of mineral admixtures on mechanical properties of high strength concrete made with locally available materials," *Jordan J. Civ. Eng.*, 2009.
9. E. Ghafari, M. Bandarabadi, H. Costa, and E. Júlio, "Prediction of Fresh and Hardened State Properties of UHPC: Comparative Study of Statistical Mixture Design and an Artificial

Neural Network Model,” *J. Mater. Civ. Eng.*, 2015, doi: 10.1061/(asce)mt.1943-5533.0001270.

10. J. F. Ramírez and O. Fuentes, “Prediction of stellar atmospheric parameters using instance-based machine learning and genetic algorithms,” *Exp. Astron.*, 2001, doi: 10.1023/A:1021899116161.



## IMPACTS OF RESERVATION

**B. R. Maurya\***

\*Assistant Professor,  
Department of Business Law,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- brmourya.mourya321@gmail.com

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### ABSTRACT

*Reservation policy in India's local governments, known as Gram Panchayats, is one of three major affirmative action strategies for ensuring that lower caste groups are equitably represented in political institutions. Local political reserves for SC and ST populations have been linked to more SC and ST-friendly policies, more welfare spending and infrastructure investment, and reduced household poverty levels, according to researchers. This research looks at one possible indirect advantage of reservations: higher educational attainment. The theory of role model effects is applied to the context of political reservations - more SC and ST Presidents in Gram Panchayats could operate as a positive role model of stereotype-defying success for SC and ST youngsters, motivating increased investment in educational attainment. Using a sample of 13,408 SC children and 6,066 ST children aged 5 to 18 in Karnataka, the research uses a dose-response regression model to examine the link between reservation rates and average completed years of schooling at the sub-district level. More SC and ST Presidents in Gram Panchayats are linked to higher educational achievement among SC and ST children, according to the findings of the study. To strengthen these findings and increase the literature on indirect advantages of reserves, more study is needed.*

**KEYWORDS:** *Affirmative Action, Jobs, Occupation, Quota, Reservation.*

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### INTRODUCTION

India is thought to be socially stratified due to its unique form of caste, which has resulted in a split of humans into lower and upper castes. Dalits are a group of people in India who are classified as lower castes and untouchables. It is a Hindi translation of the word "depressed classes," and it is not a new term. It had been used to refer to the planned class in recent years. SCs have traditionally been at the bottom of the caste system, facing the worst discrimination and social marginalization. With its various levels of subordination, the caste system has existed and continues to exist in all religions. The principle of discrimination to aid the backward classes was established in the Indian Constitution as a reservation policy. The Constitution contains the provisions essential to implement a reservation policy on favor of the backward classes. Because scheduled castes are the most vulnerable to prejudice and untouchability, the reservation system

for them aims to increase their possibilities in order to enhance their social standing. Dalits have long faced discrimination and have been denied access to public spaces and opportunities to integrate into society.

The reservation system was established to boost their representation and to assist those who were otherwise socially and economically disadvantaged. Reservation policy, on the other hand, is limited to the government and public sectors of the government, as well as educational institutions. Reservation was established with the goal of assisting the dalits in their development. The term "development" is difficult to define with a set of parameters. However, some of the most essential factors, such as education, employment, and poverty, were taken into account in the essay in order to assess development. The essay provides a study of the dalits' development. In the essay, the terms "Dalit" and "Scheduled caste" are used interchangeably. The goal of this essay is to see if the reservation policy has helped the dalits develop, which is also the research question [1]–[3].

The essay's main topic is Dalits, Poverty, and Development. The purpose of this essay is to look at education, employment, and poverty as elements that influence development. The following statistics were used in the essay to analyze their progress over time. The focus of this paper is on the effects of reservation on education, employment, and poverty. Because there have been diverse perspectives on development, it is probable that the researcher did not cover all aspect of development. In terms of examining the impact of reservation on dalits, the essay is analytical. The Education Effects of the Reservation Policy The reservation policy has played a significant role in increasing Dalit access to education and jobs.

In the sphere of education, one common argument stated against reservation policies is that it gives preferential admission to one student while ignoring the other who is deserving of it. According to a research published in the American Economic Review, the reservation strategy does not place beneficiaries in academic programs for which they are not prepared. One of the study's key findings is that the reservation policy has helped the backward classes or disadvantaged groups, such as the dalits, raise their college attendance rates. Affirmative action is frequently questioned as to whether it is working in the way it was intended. It appears to be operating as intended, according to the research.[4], [5]

## **Impact of the Reservation Policy on Employment**

Reservation has aided the Dalits in gaining jobs and education in the public sector, which has helped them flourish. Although the Dalit accessible share comes close to the mark in Group D and Group C, it falls short in Group B and Group A. The rise of Dalits in government jobs has had a number of positive repercussions on the social situation. Their shares are entirely filled even in the elite All India Service. Because there are multiple sub castes within a caste, the reservation policy has not been able to provide equal chances within each group, resulting in a situation where not all beneficiaries have benefited. It is critical to investigate if the Dalits have been able to thrive economically and socially despite regulations such as reservation.

The socially and spiritually anchored caste system in India created schisms among the population, resulting in vast ethnic and caste minorities. Around half of the country's population belongs to the Scheduled Castes (SC), Scheduled Tribes (ST), and Other Backward Classes (OBC). Butchers and day laborers are stigmatized vocations for the lower castes - SC, ST, and BC - due to historical ideas that historically lesser castes are impure by birth and membership.

OBCs have been pushed to the outside of society due to their socioeconomic status. The three minority caste groups were the first to be identified as being discriminated against. During their colonial control, the British instituted a variety of anti-discrimination policies. Special schools for SCs, which were established in 1892, were given a five-year budget of 300,000 rupees in 1944. These students were given extra attention.

In addition, the British imposed quotas for political representation. Quotas for civil service recruits were instituted in 1919, while military recruit quotas were enacted in 1934. In 1950, the Indian Constitution was finalized. Today's reservation policy is divided into three categories: reservations for local government posts, reservations for local government responsibilities, and reservations for local government positions, which serve as the cornerstone of legal protection against caste-based discrimination. Governments, civil service employment, and educational institutions are all examples of this. Vacancies in local government gram panchayats (GP) are distributed proportionally to SC, ST, and OBC candidates.[1]

### **Populations Exist In Local Administrations.**

Despite the policy's stated goal of reducing caste-based prejudice, reservation policy has occasionally sparked debate among the general public. Reservation rules at various institutions have created a debate about whether they benefit society or are simply a means to an end. People who identify as SC, ST, or OBC benefit unfairly. There has been a great deal of research. There has been a lot of research on the impact of reservations in the last decade, but the impact evaluation in the literature has been limited.

Direct evaluation has been the focus of evaluation. Spending, public goods, infrastructure, and poverty are all affected by GP policy. Specific aspects of well-being, such as health and education, may, on the other hand, be impacted. Reservations had an unintended consequence that is still being investigated. Given the high level of terrorism, the economic growth and development of India must be assessed. The reservation policy can be used as part of an inclusive growth strategy. The purpose of this study was to see how reservations influenced the outcome of the game. According to this article, the educational attainment of SC and ST children differs at the local government level.[6]–[8]

### **LITERATURE REVIEW**

The impact of reservations on policy results, public goods, other household benefits, and household poverty levels has been investigated by researchers. Over the last decade, academics have expanded the subject beyond GP policies and spending to the outcomes of these policies and expenditures in terms of public goods given to households and poverty levels. The first set of studies looks at the kinds of policies that emerge when political reservations are in place. Pande examines how minority representation in state legislatures influences policy results. She examines the influence of SC and ST reservations on total spending, education spending, job quotas, and ST welfare spending using state-level panel data from 16 major states from 1960 to 1992. She comes to the conclusion that increasing minority representation improves minority group transfer policies.

ST reservation raises spending on ST social services while reducing education and government spending overall. SC reservation also boosts minorities' proportion of government positions. Similarly duflo et al. conducted interviews with villagers and GP presidents in the district of

Birbhum, West Bengal, in 2000. The authors look at investments in local public amenities made since 1993 in a number of hamlets that were given SC/ST reservations by GP presidents at random. While SC presidents distribute more public goods to SC hamlets and the share of investments in SC hamlets is 10% greater, reservations have no effect on the mix of public goods delivered, according to the study. As a result, reservation policies allow recipients to choose their preferred recipients, but not the items themselves.

Researchers have looked into the impact of reservations on policy outcomes, public goods, and other household benefits, as well as household poverty levels. Academics have enlarged the subject beyond GP policy and spending in terms of public goods provided to households and poverty levels throughout the last decade. The first set of research examines the policies that develop when political reservations are in place. Pande investigates how the presence of minorities in state legislatures affects policy outcomes. Using state-level panel data from 16 major states between 1960 and 1992, she investigates the impact of SC and ST reservations on overall spending, education spending, job quotas, and ST welfare spending. She concludes that more minority participation enhances minority group transfer policies. ST reserve increases spending on ST social services while decreasing general government and education spending. Minorities have a higher percentage of government jobs thanks to the SC reservation. [4], [9]

In the same district of Birbhum, West Bengal, Duflo et al. conducted interviews with villagers and GP presidents in 2000. The authors examine investments in local public amenities made by GP presidents at random in a number of hamlets since 1993. According to the study, reservations have no effect on the mix of public goods given because SC presidents distribute more public goods to SC hamlets and the share of investments in SC hamlets is 10% higher. As a result, reservation regulations allow recipients to select their favorite recipients but not the specific things. Others have looked at how reservations affect public goods and household benefits.

In West Bengal and Rajasthan, Chattopadhyay and Duflo employ village-level data, but they concentrate on the one-third of presidential seats allotted for women and the policies they enact. Results demonstrate that between 2000 and 2002, women presidents in reserved seats invest more in public amenities that are prioritized by local women, such as drinking water and roads in West Bengal and drinking water in Rajasthan. The authors show that mechanisms based on identities and gender can have considerable impacts on policy decisions, even while no significant impact on benefits for female-headed families is found.

Besley et al. examine household and village level data in Andhra Pradesh, Karnataka, and Tamil Nadu to see how reservations for GP presidents affect household benefits. They discover that SC and ST reservations in GPs boost private home advantages such house construction and toilets, as well as water and electricity connections, between September and November 2002. Regardless of reservations, however, public goods and infrastructure, including road development, grow in the presidents' region.

According to a comparable study conducted by Bardhan et al. in West Bengal, SC and ST reservations increased household benefits, particularly toilets, in 69 villages between 2003 and 2005. The increase in benefits for SC/ST households was most commonly the result of a diversion of employment benefits from landless non-SC/ST households to SC/ST households, according to GP expenses. In his updated article, Bardhan finds no positive influence of women's reservations in GPs and mixed results for SC/ST reservations in GPs on program targeting. The

insignificance of impacts of SC and ST reservations when combined is partly responsible for the latter's mixed results.

The impact of policy on household well-being is examined in the most recent study. To investigate the impact of GP reservations on household poverty levels, Chin and Prakash use reservation shares in 16 states' SC and ST seats. The report builds on earlier studies by calculating the policy's total impact on rural, urban, and aggregate poverty. The methodology uses a poverty headcount per ratio and a poverty gap index to calculate both the percentage of the population living in poverty and the level of poverty. While STs see considerable reductions in poverty, SCs do not. This could be due to the homogeneous living environment and geographic isolation of many ST hamlets.[4][2][4] [10]

## CONCLUSION

After examining three distinct metrics to assess the development of dalits as a result of reservation, it is reasonable to conclude that reservation has had a favorable impact on them throughout time. The dalits' overall economic and social progress is also indicated by the aggregate influence of numerous indicators. Their progress is reflected in the measures of human development outlined above, such as employment, education, and income level. The statistical analysis in the essay shows how the dalits have progressed in each of the specific parameters. Over time, there has been a significant improvement in the representation of dalits in school and government work, resulting in a significant reduction in poverty levels.

Despite reservations, dalit employment in higher-paying jobs has not increased, and has rather dropped. Despite the fact that the number of students enrolling in institutions as a result of reservation has increased significantly, this does not guarantee them higher-paying government positions. According to the report, the reservation policy has aided dalits in obtaining jobs in the government sector. Although the development of dalits has been slower than that of the non-dalit population, it has been feasible thanks to the reservation policy. This essay looked at individual parameter development; however, it did not look at total development based on all of the parameters.

Returning to the topic of whether affirmative action in the form of reservation was the best development model for India to follow. Based on the findings of the essay, it is feasible to infer that the policy has so far succeeded in bringing dalits into the mainstream and ensuring their integration into society. It is reasonable to assume that the reservation policy has aided the development of dalits. Although it is impossible to state that they have benefited to the fullest degree feasible, it is impossible to deny that they have benefited from reservation. A policy like this was needed to give them additional chances to get back on their feet.

## REFERENCES:

1. D. V, V. Sudharshan, and R. R, "Reservation-A Contemporary Analysis," *Int. J. Trend Sci. Res. Dev.*, 2018, doi: 10.31142/ijtsrd18943.
2. C. P. S. Chauhan, "Education and caste in India," *Asia Pacific J. Educ.*, 2008, doi: 10.1080/02188790802267332.
3. C. M. Malish and P. V. Ilavarasan, "Higher education, reservation and scheduled castes: exploring institutional habitus of professional engineering colleges in Kerala," *High. Educ.*,

2016, doi: 10.1007/s10734-015-9966-7.

4. T. E. Weisskopf, "Impact of Reservation on Admissions to Higher Education in India," *Econ. Polit. Wkly.*, 2004.
5. R. Chattopadhyay and E. Duflo, "Impact of Reservation in Panchayati Raj: Evidence from a Nationwide Randomised Experiment," *Econ. Polit. Wkly.*, 2004.
6. C. McAndrew, J. L. Smith, and R. W. Thompson, "The Impact of Reservation Prices on the Perceived Bias of Expert Appraisals of Fine Art," *SSRN Electron. J.*, 2011, doi: 10.2139/ssrn.1327026.
7. I. S. Bamrah and A. Girdhar, "Investigation on impact of reservation policy on student enrollment using data mining," 2016, doi: 10.1109/ICCIC.2015.7435773.
8. A. H. Malik and R. Singh, "Impact of Reservation in Panchayati Raj in Utter Pradesh and Madhya Pradesh," *Asian J. Res. Soc. Sci. Humanit.*, 2015, doi: 10.5958/2249-7315.2015.00078.7.
9. D. Campbell and S. Wheeler, "Reservation of Title Clauses: Impact and Implications," *J. Law Soc.*, 1992, doi: 10.2307/1410067.
10. P. K. Bardhan, D. Mookherjee, and M. Parra Torrado, "Impact of Political Reservations in West Bengal Local Governments on Anti-Poverty Targeting," *J. Glob. Dev.*, 2010, doi: 10.2202/1948-1837.1025.



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## AN OVERVIEW OF THE APPLICATIONS OF NANOMATERIALS IN CONCRETE

**Ankit Kumar\***

\*Assistant Professor,  
Department of Civil Engineering,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- ankitengg2011@gmail.com

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### ABSTRACT

*The topic of nanomaterials in concrete was addressed in this review article. Nanomaterials have recently attracted a lot of interest as a way to improve the characteristics of traditional concrete. The use of nanomaterials in concrete will eventually improve its strength and durability. Nanomaterials are described as materials with particle sizes of fewer than 200 nanometers. The application of nanomaterials must be at least 500 nm in size for the purpose of concrete research. The inclusion of ultrafine nanomaterial will aid in the reduction of cement content by partly substituting cement on a weight-for-weight basis to enhance the binding effect. The ultrafine nanomaterial particles will also aid in the reduction of micro pore development by serving as a filler agent, resulting in a highly thick concrete that will automatically decrease micro pore growth in UHPC structures. Furthermore, this article discusses the advantages and benefits of using nanomaterials to improve concrete.*

**KEYWORDS:** Nano Material, Nano Silica, Nano Alumina, Nano Kaolin, Nano Clay.

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### 1. INTRODUCTION

The evolution of concrete began with ordinary concrete grades 5–45. Those grades were popular in the early 1900s for building and offer sufficient strength for most applications. The standard grade concrete mix percentage comprises of cement less than 380 kg/m<sup>3</sup>, normal kind of aggregates usually granite, medium water demand, and a little dose of superplasticizers to accomplish the design[1]. Eventually, beginning in 1960, a unique structural design was developed, and the majority of the structure now bears loads ranging from 50 to 95 MPa. Since then, new concrete technologies have emerged, such as High Strength Concrete (HSC). HSC can resist pressures ranging from 50 to 90 MPa. Concrete has previously been used for high-rise buildings, bridges, and heavy-load constructions. HSC needs more cement, a higher aggregate content, less water, and an appropriate superplasticizer in terms of mix proportions. Additives and additional materials including silica fume, fly ash, metakaolin, and other pozzolans were used to achieve this[2]. Because of its capacity to enhance strength at a reasonable proportion of cement replacement, silica fume was widely used in HSC mixes.

Fly ash (FA) in the HSC mix, on the other hand, improves flowability and acts as a natural admixture. FA may also be used as a substitute for superplasticizer in HSC mixes since it can be used at larger dosages and is less expensive[3]. Metakaolin (MK) has been used as a cement substitute material since the early 1990s. After heat treatment, metakaolin is a subsequent product of kaolin. MK is unusual in that it is clay-based and allows for little water penetration into concrete. The various mix proportions utilized in previous research for regular concrete, high strength concrete with silica fume inclusion, and UHPC mix. Those three distinct concretes show a clear rise in cement component[4]. In addition, various characteristics like as aggregates, admixture, water to cement ration, and slump vary. Nano concrete is defined as a concrete that contains nanomaterials or a concrete that contains nanomaterials with a particle size of less than 500 nanometers[5]. The addition of nano particles to concrete was thought to enhance the strength of ordinary concrete. Nano particles improve the bulk characteristics of concrete, commonly known as the packing model structure. By refining the intersectional zone in cement and creating higher density concrete, ultra or nano particles may provide a fantastic filler effect[6].

Their manipulation or modification in the cement matrix system happens as a result of their function as an excellent filler, resulting in a new nanoscale structure. Micro voids, porosity, and degradation owing to alkali silica reaction will all be removed from concrete microstructure. Nano materials then begin to develop as a new binding agent that is smaller than cement particles. This enhances the hydration gel's structure, resulting in a clean and stable hydration structure. In addition, a novel concrete called nano concrete has been created using a mix of filler and an extra chemical reaction in the hydration system. It is durable and has improved performance. In response to the growing need for UHPC, nanotechnology has been implemented in concrete from the early millennium[7]. The use of silica fumes in traditional UHPC mix formulas improves the durability and strength of the material. However, owing to the restricted availability and expensive cost of silica fume, UHPC technology is dwindling and becoming less demanding than HSC. Since then, developing nanotechnology has created a viable alternative to silica fume.

A common nano substance that replicates the effect of silica fume has been developed using the nano manufacturing idea. Nano silica is a relatively recent nanotechnology that has been utilized as a replacement to silica fume. Many nano-based particles have been created for usage in concrete since the discovery of nano silica. Nano materials utilized in nano concrete include nano alumina, titanium oxide, carbon nanotubes, and poly carboxylates. The manufacturing and use of nanomaterials are discussed in the next section[8]. The notion and concept of manufacturing nanomaterials have been explored since the advent of nanotechnology in the late 1960s. When compared to micro-based materials, the nano size of nano particles has a larger impact on filler. Nanoparticles may be created from any material. When nano particle production may affect the purity or basic chemical composition of parent materials, it is considered a success. Two techniques were created as a result of this.

The first is a top-down strategy, while the second is a bottom-up one. The two techniques were chosen based on their applicability, cost, and nano behavior knowledge. Milling is one method for a top-to-bottom approach. The milling method was chosen owing to the milling machine's availability and its practicality, since any change may be performed directly without the need of any chemicals or electrical equipment. The top-down method is defined as the reduction of

bigger structures to nanoscale while preserving their original characteristics or chemical composition without affecting atomic level control. In other words, mechanical attrition and etching methods are used to break down bulk materials into nano particles. In large industries, this technique is used[9]. Nanoparticles are generated in large quantities using the milling method because it is cost-effective and simple to maintain since it uses fewer mechanical instruments and requires less chemical modification. The phrase "current technique in nano manufacturing" is another name for the top-down approach. However, with a top-down method, the end product's consistency and quality are uneven[10].

## 2. DISCUSSION

Although the top-down method has drawbacks, the quality of nano particles may be enhanced by modifying milling procedures such as the number of balls used, the kind of ball used, the speed of milling, and the type of jar used. Nanomaterials, nanograins, nanoalloys, nano composites, and nano quasi crystalline materials are all synthesized using high energy ball millings. John Benjamin was the first to use the milling method to produce oxide particles in nickel superalloys. His first foray into milling was when he changed and strengthened an alloy component for use in a high-temperature construction. Plastic deformation, cold welding, and fracture are all variables that influence the deformation and transformation of materials into the desired shape during milling. Milling is the process of combining multiple particles or materials and converting them into new stages of material composition, as well as breaking them down into smaller pieces. Normally, the milling method's ultimate result is flakes in form, however refining may be done based on the ball used and the milling technique used. However, most nanomaterials utilized in concrete, such as nano silica, nano alumina, and nano clay, are made utilizing a bottom-up method. When materials are created from atoms or molecular components via an assembly or self-assembly process, a bottom to up method is used. It's also known as molecular nanotechnology or molecular manufacturing, and it's used for more indirect purposes like synthesis and chemical formulation. Chemical synthesis may be used to design and control the size and form of nanoparticles produced utilizing a bottom-up method. The difference between this technique and top to down is that the bottom to up approach will result in a more homogeneous and tidy nano particle structure. In other words, since the atoms or molecules are precisely organized or crystalline, bottom to up also creates new nanocrystals. Electronic conductivity, optical absorption, and chemical reactivity are the methods used.

The bottom to up method allows for a decrease in size and the creation of tidy surface atoms, as well as a significant shift in surface energy and morphologies. Normally, nanoparticles may be applied in a variety of ways utilizing this method, including increasing catalytic capacity, detecting wave ability, novel pigments, and paint with self-healing and cleaning properties. The disadvantages of the bottom-up method include its high operating costs, the need for knowledge in chemical applications, and its restricted applicability since it was designed for laboratory use exclusively. Nanoparticles collected this way, on the other hand, are ideal for advanced applications such as electrical components and biology. In conclusion, two (2) distinct methods to produce kaolin as nanomaterials for use in UHPC were described, in addition to assessing the impacts of nanomaterials. As a result, it is clear that there are two distinct techniques for creating nanomaterials in the development of novel UHPC. Various nano materials have been used in concrete since the emergence of nanotechnology in the area of building. As previously stated, nanomaterials may be used to enhance the performance and durability of concrete.

The topic of nanomaterials described by earlier researchers and their application in UHPC will be expanded in this subsection. Nano silica is a breakthrough in nanomaterials that has been used in ultra-high-performance computing. Nano silica was created mostly from micro silica. In terms of performance strength and durability improvement, the favorable reactions produced by nano silica in UHPC are comparable to silica fume or micro silica. When compared to silica fume, concrete with nano silica added improved early strength. It was also discovered that adding nano silica to concrete enhanced its workability when super plasticizers were only used in small amounts. The round form of nano silica, which offers a ball bearing motion in cement particles, is the cause for the improved workability. Furthermore, the size of nano silica, which serves as an ultra-filler in concrete in nano particles. To achieve a clean concrete microstructure, micro voids in concrete will be densified and polished. Other benefits of nano silica include the ability to regulate the water-to-cement ratio and the ability to quickly modify desired strength with controlled dose. Another study found that adding micro silica to HSC at a certain dose not only increased its strength but also served as a cement substitute. Nano silica may decrease the cement content by 20 percent to 30 percent. As a result, nano silica may be used as a cement substitute. Nano silica, on the other hand, has a disadvantage in terms of cost and availability in certain regions. To be utilized in the concrete industry, certain nations must import nano silica.

Two main chemicals involved in cement hydration are silica and alumina. The purpose of silica in cement is to alter the strength characteristics, whereas alumina regulates the cement's setting time. Alumina is used to make nano alumina. Only a few research on the usage of nano alumina in concrete have been published. The addition of nano alumina to concrete, particularly UHPC, has a significant impact on concrete characteristics because it regulates the cement's setting time. The purpose of nano alumina in cement is to reduce the time it takes for UHPC to start setting. Segregation and flocculation will be reduced as a result. Because cement disruption causes non-homogeneity in UHPC mixtures, the performance of UHPC will be harmed. Nano alumina in UHPC serves as a cement particle dispersion agent. Furthermore, since the size is nano, nano alumina acts as a nano filler to refine the voids in the hydration gel.

Because the cement concentration of present UHPC is so high, cement grain dispersion in UHPC must occur simultaneously with silica action during the hydration process. Because the interior structure of the hydration gel cannot be accessed by silica component without nano alumina refinement of the hydration product, the hydration process will be delayed. The route will be formed by adding nano alumina, and silica or binding materials will be readily injected into the microstructure of the hydration gel, allowing the refining process to begin. Allotropes of carbon having a cylindrical nanostructure are known as carbon nanotubes (CNTs). Nanotubes may have a length-to-diameter ratio of up to 132,000,000:1, which is much more than any other material. These cylindrical carbon molecules offer unique characteristics that are useful in nanotechnology, electronics, optics, and other materials science and technology areas. Carbon nanotubes, in particular, find use as additions to different structural materials due to their exceptional thermal conductivity, mechanical, and electrical characteristics. The fullerene structural family includes nanotubes. Their name comes from the fact that they have a long, hollow structure with walls made of one-atom-thick sheets of carbon called graphene.

These sheets are rolled at precise and distinct angles, and the nanotube characteristics are determined by the combination of the rolling angle and radius. Single-walled nanotubes (SWNT) and multi-walled nanotubes (MWNT) are two types of nanotubes (MWNT). Individual

nanotubes naturally form “ropes” that are held together by van der Waals forces, or more precisely pi-stacking. The so-called ropes in the CNT structure are chemically linked together. Nanotubes have chemical bonds that are comparable to those of graphite. Nanotubes have a particular strength due to their bonds, which are stronger than those found in alkanes and diamond. The flexibility of CNT in UHPC is a benefit. As a result, the design of UHPC may be changed to be either unique or rigid. The strength of UHPC is further enhanced by the flexibility offered by CNT. CNT is the best nanomaterial for increasing the flexibility and strength of UHPC when compared to other nanomaterials.

Most importantly, as compared to other nanomaterials, CNT has a lower volume and size. CNT's primary response in UHPC is to increase tension and compression capabilities. CNT may be used to replace steel reinforcing sections, allowing for the handling of additional loads. It was thought that by substituting steel with UHPC, more lightweight and fewer reinforcing sections might be produced. Furthermore, building time and expense may be minimized. The scarcity of CNT supplies, on the other hand, limits the appeal of using CNT in UHPC. CNT is not inappropriate for UHPC mix despite being very expensive, having little knowledge, and having restricted rules in its preparation. Polycarboxylates are a kind of nanomaterial that has been utilized in the construction of concrete. Polycarboxylates (PCE) are a kind of polymer made up of methoxy-polyethylene glycol copolymer, which works as a secondary or side reaction, and methacrylic acid copolymer, which serves as the primary component. Water particles make up the carboxylate group, which provides a negative charge along the PCE backbone. The polyethylene oxide group has a non-uniform electron cloud distribution, which provides the secondary or side reaction chemical polarity. The quantity and duration of secondary or side responses are both easily adjustable factors. When secondary or side reactions contain a large number of electron units, they decrease their high molar mass and alter the density of the polymer, resulting in poor cement suspension performance. Long side particles with a high charge density must be linked from one reaction to the next in order for both chains to merge and couple at the same time. Polycarboxylate is often used in concrete as a high-range water reducer (HRWR). The inclusion of PCE will aid in the management of concrete workability at low water-to-cement ratios.

The characteristics of PCE in concrete are determined by the PCE dose. In concrete, a high dose will result in a false set or no hydration. Aside from that, using PCE at the proper dose will result in Self Compacting Concrete (SCC). SCC improves the workability of concrete and creates a flow concrete that has a big effect when it comes to pouring concrete in low- and high-intensity areas. PCE's potential to be utilized in maritime structures is another benefit of having it in UHPC or concrete. Because PCE may eliminate air bubbles while increasing concrete density, pores or spaces in UHPC will be minimized, resulting in a more compact construction. Furthermore, while dealing with maritime conditions, improving the microstructure of UHPC will prevent or decrease the rate of permeability. Seawater attacks, such as sulphate and chloride levels, may be managed or decreased as a result. Furthermore, as compared to silica fume and other additives, the usage of polycarboxylate in improving the microstructure of UHPC is regarded a greener method.

When compared to silica fume, the use of PCE in HSC improves workability and performance. In addition, almost 70% of UHPC's reliant materials, such as silica fume, superplasticizers, and fibers, may be decreased. Adding TiO<sub>2</sub> to UHPC and concrete has been shown to have a



significant impact on self-cleaning ability and contribute to the use of green materials in construction. The self-cleaning properties of TiO<sub>2</sub> have been used in structures, paving materials, and the finished product, as evidenced in the construction of Rome's Jubilee Church. Another advantage of TiO<sub>2</sub> is that it increases the strength of concrete at a young age. Furthermore, the performance of concrete improves, and its abrasion resistance improves. TiO<sub>2</sub> provides these effects in UHPC and concrete owing to its capacity to function as a glass layer or pigment outside the concrete particles as well as in the microstructure of UHPC and concrete. These layers react to the hydration gel during mixing and serve as a protective layer that allows the concrete surface to self-clean. The self-cleaning action of TiO<sub>2</sub> surrounds the outside surface concrete and covers the hard and porous concrete surface. TiO<sub>2</sub> in concrete creates a fiber reinforced system that resembles the glass fiber effect for improved performance. By functioning as a fiber, the hydration gel may be refined and tailored, resulting in stronger and more durable concrete.

### 3. CONCLUSION

Based on a study of the available literature, it is apparent that the incorporation of nanomaterials in concrete improves certain technical characteristics of cement-based materials while having some shortcomings, such as water consumption. The use of nanomaterials in concrete is also discussed in this paper. Nano silica, alumina, and titanium oxide are some of the nano materials that are currently being utilized in the development of nano-based concrete. The impact of nanomaterials in concrete is comparable to that of micro-based compounds such as metakolin and silica fume. Pore refinement, as well as improved concrete strength and longevity, are anticipated. The only difference is that the materials' sizes are reduced to the nanoscale. Because micro-based materials have been shown to increase concrete strength and durability, concrete characteristics are expected to improve when nano particles are used. The presence of nano metakaolin and nano Meta clay in concrete has not been discovered yet, which is why further research is being conducted. According to the literature, metakaolin as a cement replacement ingredient in UHPC improves the characteristics of concrete in a similar way as silica fume.

### REFERENCES:

1. N. A. Megahed, "Photocatalytic technology in architectural context: From science to societal debates," *Indoor Built Environ.*, 2014, doi: 10.1177/1420326X13481236.
2. S. Takru, R. Singh, V. Sen, Y. Sakaria, S. Sharma, and R. Holmukhe, "Revolutionizing 3D Printer Into 4D Printer," *Int. J. Eng. Tech.*, 2018.
3. S. abdalkhaliq Hasan, "The use of Nanotechnology in construction sector.pdf," *Al-Qadisiya J. Eng. Sci.*, 2014.
4. R. Rezaiesarlak and M. Manteghi, "Chipless RFID Tag," in *Chipless RFID*, 2015.
5. T. M. B. Albarody, Z. B. Mustaffa, and M. S. Liew, "Smart and robust composite tube columns frames for offshore sub-structure construction," 2014, doi: 10.4028/www.scientific.net/AMR.983.11.
6. A. Alfadhli, "Sustainability and OHS Global Reporting in Petrochemical Industries: The GRI Reporting Standard and Corporate Social Responsibility," *J. Mater. Process. Technol.*, 2018.
7. C. Tavşan and S. Sipahi, "Types of architectural structures and the use of smart materials,"



2017, doi: 10.1063/1.4989952.

8. S. M. Fufa and P. J. Hovde, "Nano-based modifications of wood and their environmental impact: Review," 2010.
9. N. C. Karmakar, E. M. Amin, and J. K. Saha, "Passive Microwave Design," in *Chipless RFID Sensors*, 2016.
10. R. Castro Triguero, M. Á. Gómez Casero, and E. García Macías, "Smart Structures: nanotubos de carbono en el hormigón para diseñar estructuras inteligentes," *Nanotechnol. Constr.*, 2015.

## TAJIKISTAN AND THE TALIBAN: NATIONAL PRIORITIES, CHALLENGES AND SCENARIOS

**Azlarkhon Achilov\***

\*Master's Student,  
Tashkent State University of Oriental Studies,  
UZBEKISTAN

Email id: azlarkhon47@gmail.com

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### ABSTRACT

*This article reveals actual question on the current relationship between the Government of the Republic of Tajikistan and the new Government of the Islamic Emirate of Afghanistan ruled by the Taliban movement, as well as determining the main problems of the complexity of relations between the two countries. On August 15, the Taliban entered Kabul without any resistance. Former Afghan President Ashraf Ghani, most government officials and leaders of the anti-Taliban movement fled the country. In the countries neighboring Afghanistan, in one way or another they considered the likelihood of militants coming to power, but then they suddenly had to publicly declare their policy towards Afghanistan, ruled by a radical group. In general terms, the neighbors said that the Taliban are a reality, and they are ready to at least negotiate with the new leaders of Afghanistan. All except Tajikistan.*

**KEYWORDS:** *Tajikistan, Taliban, Drug Trafficking, NFSA (National Resistance Front Of Afghanistan), Tajiks, Pashtuns, IRPT (Islamic Renaissance Party Of Tajikistan).*

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### INTRODUCTION

China, Iran, Uzbekistan and Turkmenistan stated that they did not interfere in the internal affairs of Afghanistan, and expressed the hope that cooperation with the Taliban was possible. This is not true of the Tajik Government, which has taken a different stance, and it has raised questions as to why President Emomali Rahmon and his Government continue to openly oppose the Taliban in Afghanistan (President of Tajikistan Emomali Rahman at the 76th session of the UN General Assembly 24.09.2021). In response, Taliban representatives warned the Tajik government not to interfere in the internal affairs of Afghanistan (Abdul Salam Hanafi 2 Deputy Prime Minister of Afghanistan interviewed Qatari Al Jazeera on September 27). It would seem that everything should be the opposite. If anyone in Central Asia needs to worry about good relations with the Taliban, it is Tajikistan. The Tajik border with Afghanistan is long, mountainous, and it is difficult to control it, and in recent years there have been more than once terrorist attacks in the country. However, unlike its neighbors in Central Asia, as well as Russia and China, Tajikistan is not only in no hurry to establish ties with the new authorities in Kabul, but also took on the role of their main adversary and supports the remnants of Afghanistan's

opposition forces. Officially, President EmomaliRahmon justifies this position by saying that the Taliban cannot be trusted because they violate the rights of national and religious minorities. (President of Tajikistan Emomali Rahman at the 76th session of the UN General Assembly 24.09.2021) [1]

## MAIN FINDINGS AND RESULTS

Recently, President EmomaliRahmon has returned to the topic of the situation in Afghanistan under the Taliban in almost every speech - even in those that are not related to foreign policy. He paid particular attention to this issue in a solemn speech at the celebration of the 30th anniversary of Tajikistan's independence on September 8.

At meetings with world leaders and at international venues, the President states: "Tajikistan will not recognize any other government formed in this country through oppression and persecution, without taking into account the position of the entire Afghan people, especially all its national minorities"( President of Tajikistan Emomali Rahman at the 76th session of the UN General Assembly 24.09.2021). According to President EmomaliRahmon, ethnic Tajiks make up more than 46% of the population of Afghanistan, although according to the UN Population Fund their share is estimated at 20%. ([UNFPA - United Nations Population Fund](#) 17 авруста 2021)

Tajikistan is the only country in the region that promised to receive up to 100 thousand refugees from Afghanistan in the summer. EmomaliRahmon also posthumously awarded the leaders of the anti-Taliban movement (ethnic Tajiks) - the legendary mujahideen commander Ahmad Shah Masood and ex-president of Afghanistan Burhanuddin Rabbani - orders of IsmoilSomoni I degree. (EmomaliRahmon awarded Burhanuddin Rabbani and Ahmad Shah Masood the Order of IsmoilSomoni, 02.09.2021) [2]

First, it is worth considering that President EmomaliRahmon was the leader of Tajikistan more than 20 years ago, when the Taliban controlled most of Afghanistan.

President EmomaliRahmon's policy was aimed at supporting the Northern Alliance, the core of which is the ethnic Tajiks of Afghanistan, who fought the Taliban in the late 1990s. This policy was aimed at providing moral support to ethnic Tajiks in Afghanistan. A large number of ethnic Tajiks live in Afghanistan, they make up about 25% of the country's population, and Tajiks in Tajikistan feel a strong connection with them. This is a unique situation: none of the other neighboring states of Afghanistan is in such a situation. (Makhmadshoyev R. 2011 345 p.)

Secondly, during the civil war of 1992-1997, the Islamic Renaissance of Party of Tajikistan (IRPT) was the main group in the alliance of forces fighting against the government of the country. The war ended in a peace agreement, according to which 30 percent of government posts were to be occupied by representatives of the military opposition. IRPT was legalized and became the second largest party in Tajikistan after the People's Democratic Party of Tajikistan, President EmomaliRahmon. (Deputy Chairman of the Islamic Renaissance Party of Tajikistan MahmataliKhaib 02.05.2012) [3]

IRPT was also potentially the biggest threat to the growing power of the current government of Tajikistan, and in September 2015 - after many years of pressure on IRPT and its leadership and a decrease in its presence in state bodies, and after a high-ranking officer of the Ministry of Defense who is a supporter of this party, Former commander of the riot police of the Ministry of Internal Affairs of Tajikistan Gulmurod Halimov, who joined ISIS in 2015, became the new military leader of the terrorist organization (Former commander of the Tajik riot police became the military leader of ISIS), and accused IRPT that the party was trying to organize a coup. IRPT was quickly declared an extremist organization and its activities in Tajikistan were banned. In this regard, it is difficult to imagine how the Tajik Government can establish ties with the Taliban, let alone consider recognizing the authority of the Taliban. And the chief Islamic clergyman of Tajikistan, Saidmukarram Abdulkodirzoda, in an interview on September 11, 2021, the state news agency Khovar made it clear that there could be no question of building relations with the Taliban.

"Islam is compassion and brotherhood," Abdulkodirzoda said. "Today, however, the terrorist movement known as the Taliban calls itself an Islamic state and executes women, children and brothers." (Mufti of Tajikistan Saidmukarram Abdulkodirzoda in an interview with the state news agency on September 11 «Xovar»)

All speeches of high-ranking clergy of Tajikistan are in the field of view of the government, so Abdulkodirzoda's views can be considered as the government's point of view.

The big question is how confident the Tajik government can feel in confronting the Taliban.

The armed forces of Tajikistan, despite the small number, have been receiving assistance from a number of countries for many years. The largest supplier of weapons to Tajikistan is Russia. China has been increasing its support for the country's armed forces for more than a decade. And the United States, NATO, the European Union and the OSCE, which did not supply weapons, helped financially and provided equipment for border posts and surveillance, SUVs, winter and summer clothes for military personnel and other things (R. Mirzobekova. 21.11.2011). Hardly any of this can warn the Taliban or (more importantly for Tajikistan) some of the extremist groups that have been fighting the Taliban for years and have roots in Tajikistan. [4]

And President Emomali Rahmon understands that very well.

Few countries welcomed the Taliban to power in Afghanistan. Official statements often express fatalism about the development of events, but there is little enthusiasm about what happened after the start of the withdrawal of US-led coalition troops. Which gives the Taliban a favorable position and some opportunities to defend their positions in the international space. EEA officials say they are willing to engage with the world, but do not accept interference in their internal affairs. Given the potential threats and challenges posed by the collapse of one system and the emergence of another, it is difficult to say about security assurances, especially for bordering States.

In this situation, the Government of Tajikistan defends its position on the radical Taliban movement. "Now that the United States has left the region, Russia does not want to give full control of Afghanistan to Pakistan," This is in the hands of EmomaliRahmon, and he took the opportunity to express his position and become closer to people", (Alexei Alexandrov and Andrei Serenko August 16, 2021,) [5]

Russia has a military base in Tajikistan, and China has a small military post in the eastern part of the country.

Both Moscow and Beijing expressed confidence that the Taliban could be dealt with, but both countries are concerned about the presence of militants from their countries as part of Taliban-allied groups operating in Afghanistan.

There are citizens of other countries on the territory of Afghanistan, and the governments of these states should take this into account, commenting on Afghan events.

After President EmomaliRahmon said during a meeting with Pakistani Foreign Minister Shah Mahmud Qureshi on August 25 that Tajikistan did not recognize any non-inclusive Afghan government, he mentioned that he expected ethnic Tajiks to be included in the cabinet. (Kirill Krivosheev26.08.2021)

Although in the list announced on September 7, 2021 with the interim government of the IEA, which, at the request of the international community, was to be inclusive and in which various ethnic groups in the country were to be represented, The Taliban included 2 Tajiks and one Uzbek in the person of and. about. Minister of Water Resources and Electricity - Latif Mansur, and. about. Second Deputy Prime Minister - Abdul Salam Hanafi (deputy head of the political office). This did not satisfy the demand of the International Community and especially the European countries, which refused to recognize the new Government of Afghanistan. And this proved the obvious presence of certain foreign policy dividends that can be received by openly opposing the Taliban's rule in Afghanistan. [6]

Nevertheless, it is too early to say that Tajikistan and Afghanistan were on the verge of war. The rhetoric of the government sounds tough, but it acts extremely carefully. Both the President and other high-ranking Tajik officials refrain from attacks against the Taliban itself, but argue in their criticism that the new Afghan government is not inclusive enough because it does not include sufficient representation of national minorities.

President Emomali Rahmon hardly mentions the Taliban directly, and if he talks about it, it is very streamlined. For example: "The rise of the Taliban to power has further complicated the already complex geopolitical process in the region". (President of Tajikistan Emomali Rahman at the 76th session of the UN General Assembly 24.09.2021)

Many of Dushanbe's statements remain on paper. For example, the Tajik authorities' July promise to accept 100,000 refugees is unlikely to be fulfilled in the foreseeable future. In

September, Interior Minister Ramazon Rakhimzoda said at a meeting with the UN High Commissioner for Refugees: "for 20 years, no international organization has provided practical assistance in creating infrastructure for receiving refugees and asylum seekers. In this regard, it is not possible in Tajikistan to receive a large number of refugees and asylum-seekers. "In mid-October, the head of the State Committee for National Security, Saimumin Yatimov, said that up to 600 Afghans are trying to cross the border every day, and at the moment the number of Afghan refugees in the country is 15 thousand. That is, the growth is relatively small, because by the beginning of September, when the Taliban just came to power, there were already 10 thousand of them. (SimuminYatimovChairman of the State Committee for National Security of Tajikistan)

Officially, Tajikistan refutes all reports that it supports the Afghan National Resistance Front. And the stay in the country of Ahmad Masood Jr. is explained by the fact that he came to Dushanbe to negotiate with the Taliban, which did not take place.

Tajikistan also did not break off trade relations with the new Afghan government, although Afghanistan accounts for only 1.5% of the country's total trade. The main item of Tajik exports to Afghanistan is electricity, continues to flow, although the Taliban still have nothing to pay, and their debt to Tajikistan exceeded \$11 million. There are those in the ranks of the Taliban who are ready to mend relations with Tajikistan.

The Taliban leadership is making diplomatic efforts to reduce tensions with Tajikistan. "The Ministry of Foreign Affairs maintains contacts with all countries and is working to establish good relations," said Rohullah Omari. Earlier it was reported that Tajik leader EmomaliRahmon and Pakistani Prime Minister Imran Khan agreed to organize negotiations in Dushanbe between the Taliban and the Afghan resistance. (Rohulla Omari. Member of the Taliban Culture Commission on October 7)

Given all these facts, the following predictions can be made:

1. The most negative scenario is the interweaving from a low-intensity conflict in high with active military operations and clashes on the border of the two countries, which can lead to the strengthening of various radical forces not only in Tajikistan, but in all bordering countries, as well as Russia. At the same time, this could lead to the strengthening of the military contingent of Russian troops in Central Asia and turn at least one country in the region into a new zone of instability, which is not beneficial to the Taliban itself, as it will lead to the strengthening of the NFSA on the border with Afghanistan, which will lead to the outbreak of a new civil war, as well as the strengthening of other terrorist organizations represented by ISIL, Al-Qaeda, etc., who will gladly want to break their share, which may lead to the division of Afghanistan into zones of interest of a number of countries.
2. A neutral scenario in which this trend of exchange of "pleasantries" can continue and Tajikistan will be, as it were, a point of pressure on the Taliban movement used by external



players against Pakistan. This status quo, which exists between them, is beneficial to both sides, including the Taliban, as an occasion for the constant mobilization and strengthening of the army in poorly controlled "Taliban" sites, which are mainly inhabited by Tajiks, Uzbeks and Hazaris, whose unification and coordination is of concern to the Taliban.

3. The most optimistic forecast is the coming to a compromise between Tajikistan and the Taliban after the talks in Dushanbe, which is trying to organize Pakistan. This can mainly affect the NFSA, support that will require the termination of the Taliban by Dushanbe, and they, in turn, will require the extradition of participants in the 1992-1997 armed intra-ethnic conflicts in Tajikistan between supporters of the central government and various groups represented by the United Tajik opposition, which followed the declaration of independence of the country. Many of whose members are hiding in Afghanistan.

## DISCUSSION

Tajikistan is not going to go into a direct confrontation with the Taliban. Rather, acting a little more risky than its neighbors, the Tajik leadership expects to add popularity both domestically and internationally. Dushanbe can afford such a risk, because I am sure that in the extreme case the Russian military will come to the rescue, ensuring security on the Afghan-Tajik border. In addition, in addition to Russia, Tajikistan closely cooperates militarily with China.

Given that the situation in Afghanistan is unlikely to stabilize in the foreseeable future, the Afghan topic may yet again lead to certain benefits for the Government of Tajikistan. At the same time, Dushanbe is careful enough not to go too far in his rhetoric. Thanks to this, he still has the opportunity to establish contacts with the Taliban if pressure on the border with Afghanistan becomes too dangerous. Thus, the realities in the region suggest that political stability in Afghanistan must be ensured as soon as possible. The departure of educated and talented people from Afghanistan also does not contribute to the development of the country. A number of experts believe that the Afghan people may face serious problems due to drought caused by climate change, as well as political and economic problems. Thus, international actors must take steps to ensure that Afghanistan does not become a problem of regional and global security, in particular for neighboring countries.

## REFERENCES:

1. Rashid A. Taliban: Militant Islam, Oil and Fundamentalism in Central Asia. Yale Univ Pr. 2001. 274p.
2. Shshok LA. The evolution of the radical Islamic Taliban movement from its foundation to the present day. Ethnosocium, 2020. 113p.
3. Umarov T. One against the Taliban. Why is Tajikistan in conflict with the new Afghan authorities? 2021.
4. Makhmadshoyev R. Processes of ethno-political and sociocultural development of Tajiks of Afghanistan: mid-18th - early 20th centuries. Moscow: IOS RAS, 2011. 345p.

5. Nogayeva A, Keskin O. What does the Taliban's rise to power in Afghanistan mean for the region? 2021.
6. Balashov YuA. Problems of divided peoples and solutions in the international political continuum, 2007. 62p.

## REFLECTION OF BLOGGING: THE USE OF ONLINE JOURNAL'S TO ENGAGE STUDENTS IN REFLECTIVE LEARNING

Vipin Jain\*

\*Professor,  
\*Department of Finance & Marketing,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id-vipin555@rediffmail.com

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### ABSTRACT

*Reflective learning has long been studied in many disciplines. Journaling is one of the most common ways to teach reflection. Journaling has gone to the Web in the form of blogs since the emergence of e-learning. The current article examines the current status of journaling and blogging research and offers particular marketing education recommendations. The results of a study in which 350 student blogs with a total of 15,951 diary entries were graded for reflective learning content are provided. When it came to journaling, the students were also asked what type of learning they had experienced. The findings backed up the notion that blogging may be an effective tool in marketing education.*

**KEYWORDS:** *Blogging, Students, Online, Reflecting.*

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### 1. INRODUCTION

The difficulty for marketing instructors is to make the subject they teach relevant to their pupils. Marketing education should aim to assist students understand themselves as part of the marketing exchange, rather than considering market behavior and relationships as something that happens "out there." The current research examines one specific e-learning tool in terms of its potential to meet this particular educational goal. Blogging is the tool, and reflective learning is the desired educational consequence. Reflective learning is the interaction with and application of what students are learning to their own lives and experiences. When a student is given a stimulus, setting, or event, the student compares it to other prior experiences, knowledge, or values through blogging for reflective learning. In this study, I examine how blogging can aid in the development of reflective learning. The purpose of this article is to assist marketing instructors in evaluating blogging's capacity to help them reach their specific educational goals, as well as to provide tips to help them improve the reflective learning process. While teaching students how to reflect is the most essential aspect of a successful blogging assignment, there are other factors to consider. First and foremost, the assignment must be put up in such a manner that it does not take up too much of the instructor's grading time. There is substantial evidence that

online courses take more time for professors to teach than conventional ones. The amount of diary entries that students must complete must be carefully considered. As the quantity of diary entries Anderson demanded grew, his pupils started to protest that they were being "journalled to death." If students are overburdened with journals, the quality of their reflection may suffer as they attempt to complete the assignment [1].

Another important consideration is whether the journals should be made public and therefore accessible to other students, or kept private and accessible only to the teacher. Students may speak about extremely personal and private aspects of their life that should not be shared with the whole class. Journals should probably be kept private if this is likely to happen. Many students said they enjoyed reading other people's submissions more than they enjoyed writing their own. Making diary entries public may make them a learning experience for everyone if students are not sharing things that are personal in nature. A third important issue is whether students should be given in-progress feedback so they can see how well they are doing on the task [2].

## **1.1 Journaling in Reflection:**

Reflective learning is more about a student's attitude toward the content than it is about the resolution or conclusions he or she reaches after having "learned" something. Reflective learning requires the ability to think carefully about the content and make connections to what one already knows. Since the publication of Schön's seminal book *The Reflective Practitioner*, a substantial literature has emerged on the importance of developing students' ability to engage in reflective learning. This literature has persuasively shown that constructing people's ability to engage in reflective learning improves professional development in many fields. Schön's concepts have even been incorporated into a number of practitioner credentialing schemes. Students' learning is improved by assisting them in connecting course work with experience through reflection. This increases their grasp of the topics provided as well as their capacity to apply those concepts in a variety of circumstances. Evidence demonstrates that having students voice their ideas on what they're learning while they're studying is a great method to stimulate introspection. This usually takes the form of a written task, such as journaling. "Written records that students make while they think on various concepts, experiences, or interactions over a period of time for the aim of obtaining insights into self-awareness and acquiring knowledge," according to the definition of reflective journals.

Such writing assignments are being used by instructors in a range of academic disciplines to enhance reflective learning. Reflective journaling necessitates a distinct set of abilities than standard content-based learning since it pushes students to use intelligences other than linguistic and mathematical/logical intelligences. Students are less concerned with acquiring knowledge and more concerned with connecting the subject to other life experiences and prior knowledge. Reflective journals have grown in popularity in higher education because they allow students to explore their own experiences, assumptions, and opinions regarding the topic at hand. The research is unmistakable in its assertion that journaling benefits students by encouraging creativity and critical reflection. As a result, journaling may be an extremely valuable aspect of a marketing education since it encourages students to be reflective learners rather than merely passive users of marketing information [3].

## **1.2 Benefits of Blogging Online:**

Reflective journaling has moved online with the introduction of the Internet and classroom management software. Though blogs and online journals are often used interchangeably, blogs often refer to a collection of many journal posts. Online blogs have various advantages over traditional journals. One of the most significant advantages of online journaling is that it offers the instructor far more control over the journaling's timetable. It is critical that the timing of reflection match with the presentation of the content being reflected on for reflection to take place. When using paper journals, this typically necessitates skipping class to journal. Even if the assignment is an out-of-class assignment, instructors can use online blogs to open and close the journaling assignment to correlate with the time the subject is presented.

Similarly, blogs have a significant benefit in that the entries are time-stamped. According to research, reflection improves when it is practiced on a regular basis. In my class, students are required to read five days a week and report on their reading for the blogging assignment. I used to have my students bring their diaries to class and date them with an ink pad before I had access to journaling software. Even then, classes may be as long as five days apart, so I had no way of knowing if they were journaling on five different days each week. Instructors can track which day's students submitted their journals using online journals. This can be used to ensure that students are blogging at regular intervals, among other reasons [4].

Another benefit of online blogging over paper journals is that the instructor may monitor the blogs' progress at any time and provide feedback or make changes to the assignment. Paper notebooks would have to be physically taken up and returned to track their development. Students needed to be notified when their journals were due to be collected, the process had to be arranged ahead of time, and it took up class time. Moving and keeping the journals while they were being reviewed was also a logistical headache. It also created the issue because, while the instructor has the journals in his or her office, the students do not. As a result, they are unable to journal. An instructor can log on to the classroom management software at any moment to observe how the assignment is progressing with online journals.

Another benefit of online blogging over traditional journals is that journal posts are submitted as text files rather than on paper. They are easier to read in digital form, and the computer format allows for the employment of plagiarism detection software. Students are becoming increasingly accustomed to conversing and writing papers via the Internet as time goes on. Of course, this has the drawback that students must submit the work via an electronic device (computer, laptop, tablet, or smartphone). However, as electronic devices become more prevalent and students' comfort level with e-learning grows, this disadvantage is becoming less of a concern [5].

The collection of instructor tools that often come with the classroom management system is a final advantage of online blogging. These vary depending on the class management system in use, although some tools are common to all systems. For example, blog grades can be instantly recorded into the grade book, making faculty management easier and providing students with rapid feedback. Other students can comment on their colleagues' blogs, and blogs can be peer evaluated. This is, of course, at the instructor's choice. Blogs can also have various levels of anonymity applied to them. In traditional paper blogs, none of these features are available [6].

## **1.3 Using Blogs to Teach Marketing:**

In marketing education, there has been very little research on journaling or blogging. In a marketing class, I did some journaling research, but the goal was to enhance time management rather than to engage students in reflective learning. Students were given notebooks to help them reflect, however these journals were audio recordings [7]. Given how many aspects of marketing lend themselves to reflective learning, it might be beneficial to include blogging tasks in marketing classes to facilitate this type of learning. Samples of good and problematic journal entries are also provided for several of these assignments (space limitations prevent samples for all of the assignments). These are not directly from actual student writings due to privacy issues, but they correctly depict the types of errors I've seen in journal entries. The summarizing (repeating what is authored in the book in different terms), the book report (trying to discuss the class material without reflection), dear diary (trying to discuss one's experiences without directly relating these experiences to the material), and the third person (trying to discuss how the substance relates to a hypothetical third-person and not the student's own life) are all examples of problematic entries (providing a narrative of an experience without reflecting on what actually happened) [8].

#### **1.4 Instruct Students On How To Use A Blog:**

It's critical to realize that just assigning a blogging assignment to students does not guarantee reflective learning. The effectiveness of using journals (either online or on paper) to accomplish reflective learning has been studied extensively. While certain journaling assignments have been demonstrated to be quite beneficial in promoting reflective learning, others have had mixed results. The empirical evidence strongly suggests that the assignment will not produce the desired educational consequence of contemplation unless the instructor is very explicit about what is expected of students. If one wants students to engage in reflective learning, teaching them how to complete a journaling assignment is essential. Few students intuitively knew how to engage in reflective journaling, but with training, students' reported capacity to engage in reflection improved significantly. So, what exactly does this kind of training entail? Effective blog training consists of four key elements [9].

#### **1.5 Technology Education:**

Based on how acquainted students are with the classroom management system, some instruction on the technology of blogging may be required. Even if pupils are very comfortable with technology, some guidance on how to use it properly may be required. This includes choose whether or not to send attachments and whether or not to use the HTML editor [10].

## **2. DISCUSSION**

Educational outcome objectives should guide the selection of e-learning instruments. The current article looked at how to use blogging as an e-learning tool to attain a specific educational goal of reflective learning. Blogging is not always the best task for achieving many educational goals. However, if one of an instructor's goals is to promote reflective learning, blogging is an e-learning tool worth exploring.

The current study was encouraging in that it backed with previous findings that blogging can really contribute to reflective learning when students are properly trained. This finding was supported by the students' journals as well as their personal perceptions. Almost all of the students showed some level of reflection in their journal entries after being sufficiently



instructed, and 25% of them showed significant reflection. When asked to rate their blogging experience, nearly a third of the students said it was ineffective in helping them remember and retain essential educational concepts. It's worth noting that this is about the same percentage of students that had a negative attitude toward e-learning after taking an online class. These percentages drop dramatically to 26% for the blogging task assisting students in applying the subject and 22% for assisting them in thinking about the material.

The recent study found that the majority of students did not finish all of their journals. This could indicate a problem with pupils feeling obligated to journal too frequently. Students were more inclined to believe that three days of journaling per week was sufficient for the current project. If the quantity of diary entries were reduced, perhaps the percentage of students who engaged in significant reflection would rise. Future research could look into the relationship between the number of journal entries requested and the quality of the journals obtained. The current study was carried out in the context of reading reflection. A large amount of research has evolved concentrating on the use of blogging or journaling to achieve reflective learning. I've reviewed as much of this literature as space allows in this paper. Instructors who desire to lead their students along the path of reflective learning should rest easy knowing that others have gone before them. Not only can individuals be sure that blogging has resulted in reflective learning, but they can also learn a lot from other people's experiences. According to the studies shown in this study and elsewhere, blogging is an effective tool for motivating and directing students as they build their ability to reflect.

### 3. CONCLUSION

Technology is progressing. The requirement for students to reflect on the stuff they are learning, on the other hand, will always be a difficulty for marketing educators. The current research demonstrates how reflective learning can be achieved through blogging. It has a number of benefits over traditional paper journals. Blogging allows the instructor to have far more control over the journaling assignment while maintaining the high quality of the reflection. At any time during the semester, entries can be date-stamped and evaluated. If the entries aren't up to par, additional training can be produced. The entries are submitted in text format, which offers a number of benefits in terms of grading and avoiding plagiarism. A classroom management system's array of capabilities can be used to improve the assignment. All of this may be accomplished with very little class time. As a result, online journaling appears to be one of those examples when e-learning can give a superior tool for reaching a certain educational end aim, and marketing instructors should explore using it in their classes to achieve reflective learning.

Additional technology may arise in the future to supplement or possibly replace computer blogging. Social media, for example, could eventually supplant blogging, and a virtual school could supplant classroom management systems. Even if this occurs, the guidelines outlined here must be observed (e.g., the importance of training, the need to focus on reflection and not just retention or recitation). Reflective learning has changed over time, and it may continue to do so in the future, but the substance remains the same. Students in marketing require a framework through which to apply what they've learned in class to their personal life through reflection.

### REFERENCES

1. H. A. Alsamadani, "The Effectiveness of Using Online Blogging for Students' Individual and Group Writing," *Int. Educ. Stud.*, 2017, doi: 10.5539/ies.v11n1p44.

2. G. Thevenot, "Blogging as a Social Media," *Tour. Hosp. Res.*, 2007, doi: 10.1057/palgrave.thr.6050062.
3. Y. C. Kuo, B. R. Belland, and Y. T. Kuo, "Learning through blogging: Students' Perspectives in collaborative blog enhanced learning communities," *Educ. Technol. Soc.*, 2017.
4. L. Kerawalla, S. Minocha, G. Kirkup, and G. Conole, "An empirically grounded framework to guide blogging in higher education," *J. Comput. Assist. Learn.*, 2009, doi: 10.1111/j.1365-2729.2008.00286.x.
5. G. Kirkup, "Academic blogging: Academic practice and academic identity," *London Rev. Educ.*, 2010, doi: 10.1080/14748460903557803.
6. J. Schmidt, "Blogging practices: An analytical framework," *J. Comput. Commun.*, 2007, doi: 10.1111/j.1083-6101.2007.00379.x.
7. M. D. Kaplan, B. Piskin, and B. Bol, "Educational Blogging," *J. Mark. Educ.*, 2010, doi: 10.1177/0273475309335652.
8. E. P. S. Baumer, M. Sueyoshi, and B. Tomlinson, "Bloggers and readers blogging together: Collaborative co-creation of political blogs," *Comput. Support. Coop. Work*, 2011, doi: 10.1007/s10606-010-9132-9.
9. Z. Papacharissi and S. Meraz, "Blogging Culture," in *The International Encyclopedia of Media Studies*, 2012.
10. E. Akdag and Y. Özkan, "Enhancing Writing Skills of EFL Learners through Blogging," *Read. Matrix An Int. Online J.*, 2017.

## REVIEW STUDY ON MEDICAL USE OF TURMERIC

**Dr Bajrang Lal\***

\*Professor,  
Department of General Medicine,  
Faculty of Medicine,  
TeerthaSnker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [dr.bajranglalbanthia52@gmail.com](mailto:dr.bajranglalbanthia52@gmail.com)

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### ABSTRACT

*Turmeric is an ancient spice made from the rhizomes of *Curcuma longa*, a ginger family member. Turmeric, often known as the "Golden Spice of India," has been utilized for medical reasons in India for ages. It has been used as a home remedy for biliary disorders, anorexia, cough, diabetic sores, hepatic disorders, rheumatism, and sinusitis in traditional medicine. Turmeric and its components, namely curcumin and essential oils, have a broad range of biological activities in addition to its usage as a spice and color. Anti-inflammatory, oxidative, anti-carcinogenic, anti-mutagenic, anticoagulant, antifertility, anti-fertility, anti-diabetic, antibacterial, antifungal, antiprotozoal, antiviral, anti-fibrotic, anti-venom, antiulcer, hypotensive, and hypocholesteremia properties are among them. Turmeric's modern popularity began in the 1970s, when researchers discovered that the plant may have anti-inflammatory and antioxidant effects. Both turmeric and curcumin are well tolerated at extremely high doses without causing any harmful consequences, according to safety studies. As a result, turmeric and its components have the potential to be used in contemporary medicine to cure a variety of illnesses.*

**KEYWORDS:** *Ayurvedic, Curcuma, Cancer, Health, Medicine, Turmeric.*

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### 1. INTRODUCTION

Turmeric powder may help relieve eye irritation. This powder is cooked in approximately half a liter of water until it is reduced to half its original weight. A few drops of this water, applied three or four times a day to the afflicted eyes, provides relief. Turmeric powder used to boils accelerates the healing process. In the event of new boils, a few dried turmeric roots are roasted and the ashes diluted in a cup of water before being administered to the afflicted area. The boils will ripen and explode as a result of this remedy. It may be used to treat skin conditions including ringworm and scabies. In such situations, fresh turmeric juice is administered externally to the afflicted areas. Turmeric juice combined with honey should be taken orally at the same time. India grows almost all of the world's turmeric and consumes nearly all of it. Indian turmeric is regarded as the finest in the world due to its natural characteristics. In South

East Asia, fresh spices are favored above dried spices. Fresh rhizomes are shredded and used to curry meals; in Thailand, it's also used to make a yellow curry paste[1]–[3].

Turmeric has also found its way into Ethiopian cuisine as a result of Indian influence. Turmeric is used to cleanse the blood and treat skin problems, in addition to flavoring meals. Turmeric is well-known as a traditional Middle-Eastern spice, but few are aware of its therapeutic properties. Turmeric is a part of the ginger family, Zingiberaceae, and is also known as *Circuma longa*. The Latin name comes from the Persian word "kirkum," which means "saffron," referring to the rhizome's bright yellow-orange hue. Although it is native to Southeast Asia, it has long been consumed and grown in India. Turmeric is very useful because of its effects on the digestive system and liver. It is regarded as a bitter digestive and carminative in both Ayurvedic and traditional Chinese medicine[4], [5].

Unani practitioners utilize it to remove phlegm or kapha, as well as to open up blood vessels and promote blood circulation. It may be used to aid digestion and decrease gas and bloating by including it into meals such as rice and bean dishes. It's a cholagogue, which means it stimulates bile production in the liver while also promoting bile evacuation via the gallbladder. The body's capacity to absorb fats is improved as a result of this. Turmeric is not used directly in Western cuisine, although it is found in a variety of spice blends and sauces, and it is also used to give mustard paste a brilliant yellow hue. Curcumin seems to be helpful in halting the development of Alzheimer's disease in mice, according to preliminary research.

## **1.1.History Of Turmeric:**

Turmeric (*Curcuma longa*) and many other curcuma genus species grow wild in the woods of Southern Asia, including India, Indonesia, Indochina, and neighboring Asian nations, as well as certain Pacific Islands, including Hawaii. Traditional culinary and therapeutic applications may be traced back to prehistoric times in all of these locations. Turmeric is renowned in the Indian Ayurveda herbal medicine system for its ability to strengthen and warm the whole body. Traditional Indian uses include improving digestion, improving intestinal flora, eliminating worms, relieving gas, cleansing and strengthening the liver and gallbladder, normalizing menstruation, relieving arthritis and swelling, as a blood purifier, warming and promoting proper metabolism correcting both excesses and deficiencies, and for local application on sprains, burns, cuts, bruises, and insufficiency[6]–[8].

This plant was utilized by the ancient Hawaiians to cure a variety of ailments, including sinus infections (it is extremely astringent and seems to draw mucus out), ear infections (swimmers ear), and stomach ulcers. Turmeric is widely consumed throughout Asia, both raw and cooked. While turmeric root resembles ginger root in appearance, it is less fibrous, chewable, crisp, and succulent. The raw root (not the powder) has a somewhat sweet and nutty taste that is balanced by its bitterness. As a consequence, eating it is not unpleasant and chewing is not tough. It may be eaten whole or diced up and added to salads uncooked. Mashing/grinding it in a mortar to create a paste to combine with other spices for flavour in curries is a traditional usage. The dried root powder is the most frequent usage in contemporary times in India and other neighboring nations as the basis of most curries[9]–[11].

## **1.2.Health Benefits Of Turmeric In Our Daily Life:**

- Is a natural painkiller and cox-2 inhibitor?
- May aid in fat metabolism and help in weight management.

- Has long been used in Chinese medicine as a treatment for depression.
- Because of its anti-inflammatory properties, it is a natural treatment for arthritis and rheumatoid arthritis.
- Boosts the effects of chemo drug paclitaxel and reduces its side effects.
- Promising studies are underway on the effects of turmeric on pancreatic cancer.
- Studies are ongoing in the positive effects of turmeric on multiple myeloma.
- Has been shown to stop the growth of new blood vessels in tumors.
- Speeds up wound healing and assists in remodeling of damaged skin.
- May help in the treatment of psoriasis and other inflammatory skin conditions.

### **1.3. Turmeric Medicinal Uses:**

#### **1.3.1. Menstrual Problems Of Woman:**

If you get monthly menstrual cramps, consider taking turmeric extract or bitters twice a day for two weeks before your period is due. Turmeric relieves digestion and menstrual cramps by acting as an antispasmodic to smooth muscles. It should lessen the intensity of discomfort, if not eliminate it entirely. Certainly, food and lifestyle have an impact on the menstrual cycle, but turmeric is a fantastic complement.

#### **1.3.2. Atherosclerosis:**

Turmeric may assist in one of two methods to avoid artery blockage, which may lead to a heart attack or stroke over time. Turmeric lowers cholesterol levels and prevents LDL oxidation (bad cholesterol). The development of atherosclerotic plaque is aided by oxidized LDL, which accumulates in the walls of blood vessels. Turmeric may also help to avoid platelet clumping on the insides of a blood vessel that has been damaged. Platelets clump together at the site of a broken blood vessel, causing blood clots and arterial obstruction.

#### **1.3.3. Other Health Disorders:**

Turmeric helps to relieve congestion and irritation caused by clogged mucous membranes. Turmeric soothes the mucous membranes that line the throat, lungs, stomach, and intestines, reducing inflammation. Turmeric may help with Colitis, Crohn's disease, diarrhea, and post-giardia or post-salmonella symptoms when used regularly. Turmeric may help to relieve the irritation and inflammation associated with hemorrhoids and anal fissures. Turmeric is also beneficial for skin problems such as eczema, psoriasis, and acne, since it is a powerful detoxifier.

#### **1.3.4. A Beneficial Derivative:**

Curcumin is the main curcuminoid found in turmeric and is well recognized for its anti-inflammatory properties. Bromelain, a protein-digesting enzyme present in pineapple, is occasionally added to improve absorption and enhance its anti-inflammatory properties. This combination should be taken 20 minutes before or between meals on an empty stomach.

Curcumin is equally effective as hydrocortisone or phenylbutazone, a non-steroidal anti-inflammatory (NSAID) drug, in decreasing inflammation and swelling in rheumatoid arthritis and osteoarthritis, according to animal and human research. Curcumin 400 mg to 600 mg three times a day is suggested for inflammatory disorders.

#### **1.3.5. Digging Deeper:**

Curcumin is being researched in Alzheimer's disease individuals who have mild to moderate symptoms. Curcumin's safety, tolerability, and absorption are being investigated in an ongoing research to see whether it may improve cognition, behavior, and everyday function in Alzheimer's patients. Curcumin is also being studied for its antiviral and antibacterial properties, as well as its potential use as a preventative and therapy for stomach ulcers, multiple sclerosis, atherosclerosis, and HIV/AIDS.

### **1.3.6. Anticancer Agent:**

Turmeric, thanks to its antioxidant action, has a lot of potential as an anticancer agent. Several recent studies have linked regular turmeric use to a reduced risk of breast, colon, lung, and prostate cancer.

Curcumin may inhibit the formation of tumors and limit the spread of cancer cells, according to laboratory studies. Curcumin's effectiveness in patients with advanced pancreatic cancer is now being studied in clinical studies. Curcumin is also often advised to protect healthy cells from the damaging effects of radiation and chemotherapy without decreasing their efficacy.

### **1.4.Spice Up Your Veggies:**

Prostate cancer is the most common disease among males, with thousands of new cases identified each year. The good news is that researchers from the State University of New Jersey recently discovered that combining curcumin with phenethyl isothiocyanate, a naturally occurring substance found in cruciferous vegetables, significantly reduced tumor growth and cancer's ability to spread in mice implanted with human prostate cancer cells. Best of all, when cauliflower, broccoli, kale, turnips, and cabbage are seasoned with turmeric, they taste fantastic.

### **1.5.Further Dietary Assets:**

Turmeric is one of our greatest cholesterol fighters, and it can be found right in our own kitchens. Curcumin has been shown in studies to decrease LDL cholesterol levels, raise HDL cholesterol levels, and prevent the formation of cholesterol gallstones.

Turmeric is also an effective liver tonic. Turmeric is seen to be similar to milk thistle in terms of treating hepatitis and increasing liver function by many herbalists. Turmeric increases the formation of bile in the liver, which aids in the breakdown of lipids. It boosts glutathione, a strong molecule found in the liver that aids in the detoxification and elimination of pesticides, heavy metals, and toxic substances. It also enhances peristalsis, the rhythmic contractions that transport food through the digestive system.

Turmeric may be used often and liberally in the diet, but some people may have stomach discomfort if they do so for an extended period of time. Curry recipes, rice, poultry, fish, vegetables, and lentils all benefit from its mild, somewhat bitter, peppery flavor and golden yellow color. Turmeric is also available as a tincture, pills, and a powder that may be mixed with water or juice. Consider adding a healthy amount of turmeric to your favorite dish the next time you make it.

### **1.6.External Applications:**

The dried rhizome has been used externally to new wounds and insect stings, as well as to aid in the healing of chickenpox and smallpox. Turmeric is also said to improve the skin's complexion



and has been used topically to eliminate hair, serve as a tonic, and relieve itching. Hiccups are said to be relieved by inhaling turmeric smoke. Turmeric is used as an antiseptic for wounds, burns, and bruises, as well as a treatment for stomach issues in Ayurvedic medicine. Turmeric is used in every vegetable and pulse meal prepared in Indian kitchens. It functions as a blood purifier. When you have bruises or have been in an accident, it heals your body from the inside out. Turmeric is a dermatological antibiotic that is often used in India. The use of turmeric powder helps to prevent bacterial and fungal diseases.

## **1.7.Uses of Turmeric:**

Turmeric has been used as a traditional medicine and for cosmetic maintenance since ancient times. Turmeric is an essential herbal medication used in the Ayurvedic school of Indian medicine to treat a variety of ailments. Turmeric is even used to patch radiator leaks in water-cooled radiators in contemporary times.

## **1.8.Side Effects of Turmeric:**

Herbs have been used for centuries to help strengthen the body and cure illness. Herbs, on the other hand, include active ingredients that may cause negative side effects and interact with other herbs, vitamins, and medicines. As a result, herbs should be used with caution and under the guidance of a competent practitioner in the area of botanical medicine. While pregnant women do not need to avoid meals containing turmeric, it is not advised to use turmeric as a medical plant during pregnancy since the consequences are unknown.

## **2. DISCUSSION**

Despite the fact that the turmeric herb has been present for thousands of years, it has only recently received recognition for its therapeutic qualities. Many people claim it has antibacterial properties and that it may be consumed orally or applied to a raw wound. Turmeric has traditionally been used to help prevent infection. It has been used to treat a variety of illnesses, including gastrointestinal problems, when taken orally. All of these conventional treatment techniques have been shown to be effective in the majority of instances. Curcumin, which is contained in the rhizomes of the plant, is believed to have therapeutic qualities. Turmeric is used for medicinal purposes. On the wedding eve in India, women (and even grooms) are coated with turmeric. It not only gives the skin a golden shine, but it also maintains it healthy and attractive by decreasing inflammation, smoothing the skin, and treating and preventing skin conditions such as pimples, rashes, acne, blackheads, and blemishes. Turmeric is used in a variety of products, including creams, lotions, and face packs. Caries and periodontal diseases are infectious illnesses caused by bacteria found in dental plaques, and it is well recognized that dental plaque removal is critical for the oral cavity's health. Dental plaques, on the other hand, are difficult to see with the naked eye, and confirming their attachment location and extent exactly is challenging.

## **3. CONCLUSION**

Ayurveda and other traditional Indian medical systems, as well as Eastern Asian medical systems like traditional Chinese medicine, utilized turmeric. It was historically used in India for skin,

upper respiratory tract, joint, and digestive system problems. Turmeric is also used to treat menstruation difficulties, pain, epilepsy, respiratory tract infections, bleeding, diarrhea, jaundice, and rheumatic diseases when taken orally. It has lately acquired a reputation as an anti-inflammatory agent, a hypercholesterolemia therapy, an antioxidant, and a cancer preventive, as well as a claim to protect cardiovascular and other degenerative aging changes. There are additional claims that it may help with allergies, AIDS, cataracts, and other illnesses. Curcumin is used to prevent oxidation and enhance the color of foods like butter and margarine. Turmeric is a highly prized spicy spice that has long been used to aid digestion and cure dyspepsia and inflammatory conditions. Turmeric and its main component, curcumin, are also marketed as antioxidants, cancer, HIV, and hypercholesterolemia therapies, and heart disease prevention.

## REFERENCES:

1. K. Krishnaswamy, "Traditional Indian spices and their health significance," *Asia Pacific Journal of Clinical Nutrition*. 2008, doi: 10.6133/apjcn.2008.17.s1.63.
2. J. R. Ficke, N. M. Moroski, S. D. Ross, and R. Gupta, "Integrative Medicine as an Adjunct to Orthopaedic Surgery," *Journal of the American Academy of Orthopaedic Surgeons*. 2018, doi: 10.5435/JAAOS-D-16-00134.
3. T. P. Chaturvedi, "Uses of turmeric in dentistry: An update," *Indian Journal of Dental Research*. 2009, doi: 10.4103/0970-9290.49065.
4. L. Horev, Y. Ramot, and L. Klapholz, "Yellow Feet in a Patient with Breast and Thyroid Carcinoma, Due to Oral Intake of Turmeric," *Drug Saf. - Case Reports*, 2015, doi: 10.1007/s40800-015-0006-4.
5. M. Sharma, A. Gupta, and R. Prasad, "A Review on Herbs, Spices and Functional Food Used in Diseases," *Int. J. Res. Rev.*, 2017.
6. H. Sehgal, T. Jain, N. Malik, A. Chandra, and S. Singh, "Indian Institute of Chemical Engineers Chennai Regional Centre Isolation and Chemical Analysis of Turmeric Oil From Rhizomes," *Chem. Eng. Towar. Sustain. Dev.*, 2016.
7. F. A. Soebiantoro, E. Tarigan, L. Hwa, V. P. Halim, and L. Sapei, "Drying characteristics of curcuma longa using solar dryer," *Pertanika J. Sci. Technol.*, 2018.
8. P. Putthapiban, W. Sukhumthamarat, and C. Sriphraprang, "Concealed use of herbal and dietary supplements among Thai patients with type 2 diabetes mellitus," *J. Diabetes Metab. Disord.*, 2017, doi: 10.1186/s40200-017-0317-3.
9. M. Boaz, E. Leibovitz, Y. B. Dayan, and J. Wainstein, "Functional foods in the treatment of type 2 diabetes: Olive leaf extract, turmeric and fenugreek, a qualitative review," *Functional Foods in Health and Disease*. 2011, doi: 10.31989/ffhd.v1i11.114.
10. A. Jawa *et al.*, "Turmeric use is associated with reduced goitrogenesis: Thyroid disorder

prevalence in Pakistan (THYPAK) study,” *Indian J. Endocrinol. Metab.*, 2015, doi: 10.4103/2230-8210.152768.

11. M. Strom *et al.*, “Eligibility of rheumatoid arthritis patients for a phase 1b clinical trial evaluating Turmeric supplementation,” *FASEB J.*, 2017.

## THE BRIEF REVIEW ON THE REFRIGERANTS AND THEIR WORKING PRINCIPLES

**Sunil Kumar Gaur\***

\*Assistant Professor,  
Department of Mechanical Engineering,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- sunilkg.engineering@tmu.ac.in

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### ABSTRACT

*The impacts of different refrigerants on the ozone layer deterioration and the increase of global warming are becoming a growing concern in today's climate. Chlorine with halogenated hydrocarbons, known as CFCs, which are utilized as refrigerants in refrigerators and air conditioners in all home, industrial, and commercial applications, is the main cause of this environmental impact. This article looks at the many refrigerants that have been developed in order to solve a variety of other problems, such as flammability and toxicity of refrigerants from generation to generation. By examining the physical, chemical, environmental, and safety characteristics of several refrigerants. With the advancement of refrigeration and air conditioning technology, we must have heard that science is currently in the process of selecting or creating an ecologically benign refrigerant to replace previous refrigerants. Furthermore, next-generation refrigerants are designed to have a 'zero' ozone depletion potential and a low global warming potential, making them both ecologically stable and benign.*

**KEYWORDS:** Compressor, Condenser, Valve, Evaporator, Receiver, Refrigerants.

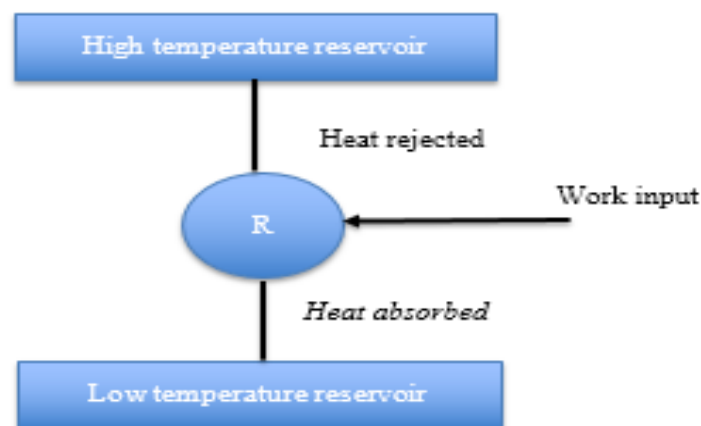
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### 1. INTRODUCTION

A refrigerant is a working fluid that is utilized in the refrigeration cycle of air conditioning systems and heat pumps, where it transitions from a liquid to a gas and back again. Because of their toxicity, flammability, and contributions of CFC and HCFC refrigerants to ozone depletion and HFC refrigerants to climate change, refrigerants are highly controlled. CFCs were found to be causing significant damage to the ozone layer that shields the planet from ultra-violet radiation, as well as ozone holes over polar areas, by scientists in the early 1980s. This resulted in the signing of the Montreal Protocol in 1989, which sought to phase out CFCs and HCFCs. while ignoring the role of HFCs in climate change. Because HCFCs had a much lower Ozone Depletion Potential (ODP) than CFCs, their adoption was expedited, and they were used in most U.S. households in air conditioners and chillers from the 1980s. However, their ODP was still not zero, which led to their ultimate phase-out. Refrigeration (figure 1) is a process that involves moving heat from one location to another.

Domestic refrigerators, commercial freezers, cryogenics, air conditioning, and heat pumps are just a few of the applications for refrigeration. Some kind of labor must be done in order to comply with the Second Thermodynamics Law. The job is traditionally done using mechanical tools, although it may also be done with magnets, lasers, or other methods. Refrigeration's application in the preservation of perishable food items, agriculture, and fisheries has gradually increased since the turn of the century. The goal of food refrigeration is to prevent microorganisms, chemical, and physical processes from degrading food. A short length of storage duration may be achieved by chilling at temperatures just slightly above zero, which is also required for safe shipping and marketing. The degradation may be delayed even further by freezing to temperatures as low as  $-30^{\circ}\text{C}$ , which extends the storage period. Refrigeration is also used in a variety of industries, including chemical processing, petroleum, refinery, and paper and pulp manufacturing. Figure 1 shows the refrigeration system [1].

Coolants and refrigerants may be found in refrigerators, air conditioners, central air conditioning systems (HVAC), freezers, and dehumidifiers across the industrialized world, in homes, workplaces, and industries. When these units are repaired, there is a danger of refrigerant gas being inadvertently or deliberately released into the atmosphere, necessitating the development of technician training and certification programs to guarantee that the material is conserved and handled properly. The ozone layer has been found to be depleted by improper handling of these gases, which is thought to contribute to global warming. It is unlawful to intentionally release any refrigerant into the environment in the United States, with the exemptions of isobutane and propane (R600a, R441a, and R290), ammonia, and  $\text{CO}_2$ . The act of treating old refrigerant gas that has previously been used in some kind of refrigeration loop such that it satisfies requirements for fresh refrigerant gas is known as refrigerant reclamation. The Clean Air Act of 1990 in the United States mandates that used refrigerant be handled by a qualified reclaimer that is licensed by the US Environmental Protection Agency (EPA), and that the material be collected and transported to the reclaimer by EPA-certified personnel.



**Figure 1: Refrigeration system**

### 1.1 Components Of Cooling System

To heat the material, the refrigeration system has five main components: evaporator, compressor, condenser, expansion valve, and refrigerant. Each component must be present in the refrigeration process for the cooling cycle to function properly [2].

### **1.1.1 Expansion Valve:**

Before the evaporator, this is located at the end of the liquid line. It's a mechanism that keeps track of how much refrigerant is flowing through the evaporator. This is where you'll discover the flood back, which is required to maximize the evaporator's efficiency by preventing excess liquid refrigerant from returning to the compressor. This device also enables the air conditioning system's high and low pressure characteristics to be distinguished. The device's liquid line carries a high-pressure liquid refrigerant to the valve, but its presence reduces the amount of liquid refrigerant entering the evaporator.

### **1.1.2 Evaporators:**

The evaporator's primary purpose is to remove excess heat from a material using liquid refrigerants. Low-pressure liquid refrigerant is required. The heat transferred from the material to the liquid refrigerant and the compressor's elimination of low-pressure vapor are two variables that may be used to determine low-pressure.

### **1.1.3 Compressor:**

This draws low-temperature, low-pressure vapor from the evaporator into the suction line; the vapor will be squeezed instantly when redirected, but the temperature will rise as the vapor is compressed. In simple words, a compressor can convert low temperatures to high temperatures, resulting in a pressure increase. A compressor can rapidly dissipate the heat [3].

### **1.1.4 Condensers:**

The heat from the refrigerant may be removed using this method. The air is drawn from the condenser coils by fans placed above the condenser device. The condensation temperature should be between  $-12^{\circ}\text{C}$  and  $-1^{\circ}\text{C}$ , and the vapor should be cooled before refrigerating the liquid refrigerant again [4].

### **1.1.5 Receiver :**

The receiver acts as a vapor seal and serves as a temporary holding tank for liquid refrigerant. The receivers may be mounted horizontally or vertically for the primary purpose of keeping steam flowing down the liquid line to the expansion valve.

## **1.2 Classification of Refrigerant**

They are usually split into the following two groups:-

### **1.2.1 Primary Refrigerants:**

All refrigerants that communicate directly with the refrigeration mechanism are known as primary refrigerants. Main refrigerants are further categorized in the following categories:-

#### **1.2.1.1 Halo-Carbon Or Organic Refrigerants:**

Both of these compounds are synthetically developed in the Freon family of refrigerants, and their designation depends on the chemical composition (chlorine, hydrogen and Fluorine).

#### **1.2.1.2 Chlorofluorocarbons (Cfcs) :**

Contains R11, R113, R114, R12 and R115.



### **1.2.1.3 Hydro Chlorofluorocarbons (Hcfc):**

Includes R22 and R123

### **1.2.1.4 Hydrofluorocarbons (HFCs):**

Includes R134a, R407C, R410a and R404a

### **1.2.2 Azeotropic Refrigerant:**

There is an equal combination of the composition of the liquid phase and the composition of the vapour phase with a wide temperature spectrum. Four of the azeotropic species are R500, R502, R503 and R504.

### **1.2.3 Inorganic Refrigerants:**

They are used earlier because of their thermodynamic and physical properties due to the advent of halo-carbon refrigerants. Any of the inorganic refrigerants are R717, R729, R744, R764 and R118 [5].

### **1.2.4 Hydrocarbon Refrigerants:**

These types of refrigerants are primarily used for industrial and commercial uses because of their thermodynamic properties, which are highly flammable and explosive. Hydrofluorocarbons (HFCs)-includes R134a, R407C, R410a and R404a.

### **1.2.5 Secondary Refrigerant:**

Refrigerants which do not interfere directly with the refrigeration mechanism but are first cooled by primary refrigerant and then further used for cooling purposes are known as secondary refrigerants. In general, this type of refrigerant uses a small refrigerator [6] with less refrigerant. Two of the widely used secondary refrigerants are water and brine calcium/sodium solution.

## **LITERATURE REVIEW**

The most significant disadvantage of hydrocarbons as a well-known refrigerant is their flammability, which was regarded as a serious safety concern by the majority of research participants, while the main advantages include increased output coefficient of equipment (COP) and better TEWI factor. This resulted in a decrease of 12% in energy usage. Despite its outstanding thermodynamic characteristics, ammonia's use has been limited to commercial refrigeration because of its toxicity [7].

## **DISCUSSION**

This paper discusses about the process of refrigeration entails transferring heat from one place to another. Refrigeration is used in a variety of applications, including domestic refrigerators, commercial freezers, cryogenics, air conditioning, and heat pumps. To conform to the Second Thermodynamics Law, some sort of work must be performed. Mechanical tools are usually used for this task, although it may also be done using magnets, lasers, or other techniques. Since the turn of the century, refrigeration's use in perishable food preservation, agriculture, and fisheries has steadily grown. The aim of food refrigeration is to keep food from deteriorating due to microbes, chemical reactions, and physical processes. Chilling at temperatures just above zero for a short period of time may be accomplished, which is also needed for safe transportation and marketing. Freezing to temperatures as low as  $-30^{\circ}\text{C}$  may postpone deterioration even further,

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extending the storage duration. Chemical processing, petroleum, refinery, and paper and pulp production are just a few of the sectors that utilize refrigeration.

### CONCLUSION

By examining the physical, chemical, environmental, and safety characteristics of several refrigerants. With the advancement of refrigeration and air conditioning technology, we must have heard that science is currently in the process of selecting or creating an ecologically benign refrigerant to replace previous refrigerants. Furthermore, next-generation refrigerants are designed to have a 'zero' ozone depletion potential and a low global warming potential, making them both ecologically stable and benign. The most significant disadvantage of hydrocarbons as a well-known refrigerant is their flammability, which was regarded as a serious safety concern by the majority of research participants, while the main advantages include increased output coefficient of equipment (COP) and better TEWI factor. This resulted in a decrease of 12% in energy usage. Because of its toxicity, ammonia's use was largely limited to commercial refrigeration despite its outstanding thermodynamic characteristics. Carbon dioxide's main disadvantage as a refrigerant is its high working pressure, which is considered a safety risk. The hefty initial investment expenditures, as well as the scarcity of qualified service specialists, are both cause for worry. The industrial refrigeration sector is where CO<sub>2</sub> is most often used.

### REFERENCES

1. P. Dhankhar, "A Study on Development of Coconut Based Gluten Free Cookies," *Int. J. Eng. Sci. Invent.*, 2013.
2. E. Bellos and C. Tzivanidis, "A comparative study of CO<sub>2</sub> refrigeration systems," *Energy Convers. Manag.* X, 2019, doi: 10.1016/j.ecmx.2018.100002.
3. A. S. Dalkilic and S. Wongwises, "A performance comparison of vapour-compression refrigeration system using various alternative refrigerants," *Int. Commun. Heat Mass Transf.*, 2010, doi: 10.1016/j.icheatmasstransfer.2010.07.006.
4. "The 6 Main Components of a Refrigeration System." <https://www.bartlett ltd.co.uk/blog/6-main-components-refrigeration-system/>.
5. A. Rezk, A. Elsayed, S. Mahmoud, and R. AL-Dadah, "Adsorption refrigeration," in *Advances in Engineering Research*, 2014.
6. I. Dincer, "Refrigerants," in *Comprehensive Energy Systems*, 2018.
7. R. K. Dreepaul, "A study of alternative refrigerants for the refrigeration and air conditioning sector in Mauritius," 2017, doi: 10.1088/1755-1315/93/1/012054.

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## AN OVERVIEW ON THE ANTI-LOCK BRAKING SYSTEM AND CONTROL IN THE AUTOMOBILE

**Dr. Vinod K. Singh\***

\*Professor,  
Department of General Medicine,  
Faculty of Medicine,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- deepakkr094@gmail.com

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### ABSTRACT

*One of the main threads of every living person traveling over a road vehicle is rapidly developing injuries. According to a research published in a well-known magazine, one person dies every four minutes in India as a result of a traffic accident. And one of the main causes of these collisions is speeding. Engineers develop 'ABS' to prevent accidents caused by brake failure and power loss (Anti-lock Braking System). Prevents the wheels from locking during the panic brake, preventing the wheels from sliding. Other anti-lock braking systems, such as the Traction Control System (TCS), Electronic Stability Control (ESC), and Electronic Brake Power Distribution System (EBFD) or (EBD), have subsequently been created to help reduce the problem. Skidding and a lack of control cause injuries in any stage of the track.*

**KEYWORDS:** *Braking, Abs, Wheel System, Vehicle, Automotive.*

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### 1. INTRODUCTION

"Unfortunately, India ranks first in the world in terms of fatalities, accounting for approximately 11% of all deaths," said Nitin Gadkari, Minister of Road Transport and Highways. As the number of road vehicles increases, so does the number of accidents, deaths, and injuries, which is a cause for worry for everyone traveling on Indian roads. According to reports published by the Indian Ministry of Road, Transport, and Highways in September 2019, On Indian roadways, there were 4,67,044 events, with 1,51,417 persons killed and 4,69,418 severely wounded. In addition, more than 35% of fatalities, or 1, 64,313 accidents, are caused by two-wheeler vehicles alone, and 47,560 individuals died out of the total deaths, or more than 30% of the total deaths, according to this research.

Tamil Nadu, Madhya Pradesh, Uttar Pradesh, Karnataka, and Kerala are the top five cities, accounting for more than half of all accidents (2,39,783) [1]. Accidents may occur for a variety of causes, including driver error, excessive speeding, intoxicated driving, running a red light, and many more. However, among all of these factors, speeding is one of the most significant, accounting for more than 3,000,000 lakh events and 98,000 lakh deaths. According to documents, there was a sudden loss of brakes.

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*1.1 Brakes:* a mechanical device that prevents a vehicle from rolling by exerting external pressures or absorbing the energy of a moving body. Brakes are based on Newton's first law of motion, which states that "an object in motion must continue in motion until some external force acts on it." [8]."

Brakes are grouped into three categories:

1.1.1 Mechanical braking

1.1.2 Hydraulic braking

1.1.3 Pneumatic pedals

1.1.4 Air brake compressed

1.1.5 Vacuum brake

1.1.6 Electro-dynamic brakes

Mechanical and hydraulic brakes are commonly used for 2 and 4 wheeled vehicles.

**Mechanical [7] Braking or Brakes for Friction:** Similar like all brakes, these brakes often act under the principle of mechanical friction. This brake consists of two semi-circular shoes called brake pads or brake shoes, with a friction rubber pivoted to a fixed fulcrum within the revolving drum, when the driver is retaining the brakes because of the force applied, the brakes are extended to apply the [6]friction force to the rotating drum to stop the acceleration.

**Hydraulic Breaks:** This brakes use the law of the Pascal ('The pressure applied to the incompressible fluid is equal in both directions.') to translate the force applied by the driver to the pressure. Hydraulic friction is used in these brakes to apply the brakes. Pressure produced is used to squeeze a pair of brake pads using pistons within the brake callipers to add force to the rotation of the rotor/disk connected to the wheel that contributes to the full locking of the wheel. This is ideal for emergency braking, but it also improves slippage and injuries due to panic braking [5].

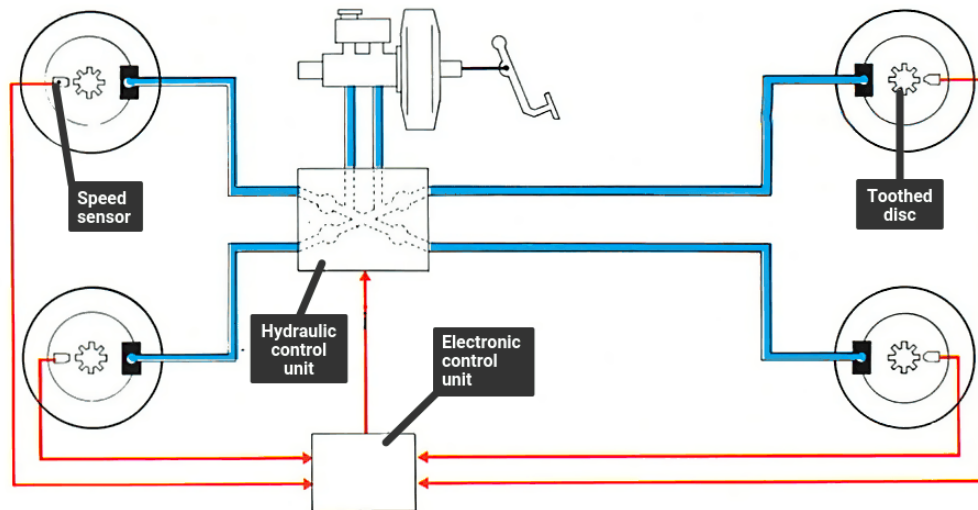
In order to address the issue of crashes leading to emergency braking, panic braking or often sudden locking of wheels engineers create a device known as 'ABS' (Anti-lock Braking System). If known from the name itself, ABS avoids the complete locking of the wheels during a rapid or panic break to stop the skidding of the wheels. In the same way, with the aid of multiple sensors and ECU, the ABS system works at a much higher speed and power than humans can handle. ABS also increases the longevity of the tyres by reducing friction between the road and the wheel. [4]ABS Includes a range of devices and controls, such as speed sensors, EBD, ECU and HCU.

## 2. LITERATURE REVIEW

The Antilock Braking System (ABS) is one of the most critical safety features offered by the automotive industry using an electronics motor. The ABS system helps minimize the vehicle's stopping distance, boosts tyre performance and preserves vehicle stability [4]. ECU is a computerized device that processes signals from a single sensor impacting various parts and segments of the vehicle. It functions like an industrial mind with an inserted structure consisting of both machinery and [2] programming. Microcontroller is a primary computer that assumes an integral aspect of it. ECU has feedback pins connected with sensors and actuators.

### 3. DISCUSSION

ABS is a car safety mechanism that allows the wheel in the vehicle to keep traction contact with the ground surface while stopping, keeping the wheels from being stuck to avoid skidding or uncontrolled skidding. This system is based on the concepts of threshold braking and cadence braking practiced by trained drivers in the previous braking system. Cadence braking is a strategy that helps the driver to steer and brake on slippery surfaces by pumping the brake pad very rapidly (figure 1).



**Figure 1 : Working of ABS system [1]**

ECU is a computerized device that processes signals from a single sensor impacting various parts and segments of the vehicle. It functions like an industrial mind with an inserted structure consisting of both machinery and [2] programming. Microcontroller is a primary computer that assumes an integral aspect of it. ECU has feedback pins connected with sensors and actuators. Electronic brake force distribution (EBFD) is designed to make braking effective. As a special feature of the ABS, the EBFD guarantees that the amount of braking force applied to the wheel is equal to the load of the wheel at that moment. Locking wheels are really dangerous and you're losing all of your steering control. Locked-up rear wheels not only increase the chance of skidding, they also cause the front wheels to do all the work that can result in spinning and loss of balance. EBD eliminates these risks by balancing the applied braking force according to the total weight distribution of the car [3].

### 4. CONCLUSION

The automobile industry is rising towards an electric engine. With the aid of an electric engine, the manufacturer will deliver a lot of equipment to consumers. The Antilock Braking System (ABS) is one of the most critical safety features offered by the automotive industry using an electronics motor. The ABS system helps minimise the vehicle's stopping distance, boosts tyre performance and preserves vehicle stability. However, there are certain drawbacks such as its performance in unfavourable road conditions, so to address this automotive industry has made new developments in the ABS system known as Electronic Brake-Force Delivery (EBFD). EBFD allows the car more stability in unfavourable road conditions.

**REFERENCES**

1. "How ABS works." <https://www.howacarworks.com/technology/how-abs-works>.
2. Road Accidents In India [2018] Report By Govt. Of India; Road, Ministry Of Transport And Highways, Transport Research Wing, New Delhi.
3. Encyclopaedia of Automotive Engineering by David Crolla & David E. Foster
4. Antilock Braking System and Its Advancement by Divyata Khachane, Prof. Anjali Shrivastav
5. The Research and Design of a New ABS System for Automotive by Using the GMR Sensor, Msc By Research Project Electronics Department University of York Chenhui Bao.
6. A Review Paper on Anti-Lock Braking System (Abs) And Its Advancement by Dr. Deepak Kumar, Shivam Sharma, Shubham Singh
7. ABS & EBD & ESP & TCS
8. ROAD ACCIDENT STATISTICS IN INDIA
9. Automotive Engineering Fundamentals By Richard Stone And Jeffrey K. Ball.



## **A REVIEW ON SOFT SKILLS – AN IMPORTANT KEY FOR EMPLOYABILITY IN THE "SHIFT TO A SERVICE DRIVEN ECONOMY" ERA**

**Vipin Jain\***

\*Professor,

Department of Finance & Marketing,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id-vipin555@rediffmail.com

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### **ABSTRACT**

*In recent times, the change from a manufacturing to a service economy has raised the importance of soft skills between graduates in general, and IT (Information Technology) in particular. Although market requires a decade ago were mostly centered on a candidate's specialist knowledge, there is now a greater emphasis on soft skills. Employers' complaints about the dearth of soft skills among IT graduates prompted this study, which maps the true market soft-skills needs. A total of 2000 IT classified adverts relating to IT experts were analyzed as part of the study. Human contact skills were found to be in high demand (41.2 percent of the soft skills ads), common (or general) skills were second (22.8 percent of the ads), task interaction was third (20.2 percent of the ads), and organizational skills were indeed the least sought (41.2 percent of the ads) (15.8 %).*

**KEYWORDS:** *Soft Skills, Changes, Behavior and Information Technology.*

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### **I. INTRODUCTION**

The recent decade's move from a manufacturing to a service-based economy has had an impact on the relevance of soft skills for graduate employability in general, and IT (Information Technology) graduates in particular. We use the term IT to refer to the overall computing sector, as well as the use of computers and software applications to manage information, throughout this study. Applicants for various IT professions used to be required to have mostly excellent technical skills. However, due to the rapid progress of computing technologies, flexibility and the ability to learn have become increasingly vital. Furthermore, because of the increased complexity of newly produced applications, the majority of development work is done by teams of developers. As a result, interpersonal and social interaction skills, as well as the ability to function in a team setting, are essential [1].

Many new technologies address a variety of business and organizational concerns, therefore IT graduates, particularly those who will be involved in the design, definition, and development of

such systems, must have a strong understanding of business processes and functions. These new advancements in the IT field have resulted in a new notion that graduates should have both technical and soft (or non-technical) abilities. The study's major goal was to match diverse soft talents to real-world job requirements. 2000 classified ads relating solely to IT jobs were evaluated and studied for this purpose. The word "soft talents" is defined by the Collins English Dictionary as "desirable attributes for some types of job that are not dependent on acquired information." They include common sense, interpersonal skills, and a positive, flexible attitude.' Soft skills are a major differentiator, a sinequa-non for employment and life success in the twenty-first century. According to a Harvard University research, soft skills account for 80 percent of career success and hard skills account for only 20 percent [2]. Soft skills training, according to experts, should begin when people are students in order for them to do effectively in both their academic and future job environments. According to a Mc Donald's UK public interest study, over half a million people will be excluded from job sectors by 2020 due to a lack of soft skills. Workers are expected to "own their skills" and successfully market them to employers, according to Bonnie Urciuoli, who associated "skills" with occupational needs of neoliberal economies in 2016. Training to reward employees for personal attributes like reliability and conscientiousness can result in a considerable return on investment for a company. As a result, employers are increasingly looking for soft talents in addition to traditional degrees [3]. According to studies conducted by the Stanford Research Institute and the Carnegie Mellon Foundation among Fortune 500 CEOs, soft skills accounted for 759 percent of long-term job success, while technical skills accounted for just 25%. As a result, soft skills are just as vital as cognitive abilities. Soft skills are crucial because they help students cope with the disappointments and obstacles they will face as adults, as well as the responsibilities of job. Soft skills enable students to learn, live, and work more effectively.

Some companies indicated that graduates lacked the technical capabilities they needed, with the exception of fundamental IT and digital skills. Coding and programming, job-specific technical skills, and data processing and analysis were the most concerning areas. Employers seek employees who can think on their feet, make sound judgments, and efficiently handle challenges. These tasks necessitate excellent analytical and critical thinking abilities [4]. Employers seek employees who can solve problems by breaking down complex scenarios into step-by-step manageable components, whether it's a difficult teammate or a difficult project. In school and part-time job, recent graduates like yourself would have had some experience utilizing such abilities to solve difficulties. The research report, titled 'Importance of Soft Skills in Your Career,' examines the importance of soft skills in the workplace. According to Urban Pro, "alongside technical talents, the management is intently looking forward to a specific kind of skill in its potential employees in the engineering and manufacturing industry, as in any other form of profession." Whatever function you aspire to in your company, having excellent soft skills will set you apart from the competitors and turn you into a true professional [5].

## 1.1 Soft Skills:

Non-technical skills are referred to by a variety of terms in the business, including "soft skills," "people skills," "emotional skills," "employability skills," and so on. These non-technical skills refer to a set of personality qualities and attitudes that guide a person's actions. Non-technical capabilities are outlined in the IS 2002 (IS 2002 Model Curriculum) and IS 2010 (IS 2010 Curriculum Guidelines for Undergraduate Degree Programs in Information Systems) standards.

"Strong analytical and critical thinking skills to succeed in a competitive global economy," for example, or graduates must "display strong ethical beliefs and have exceptional interpersonal communication and team skills" are among the non-technical talents. Listening skills are one of the "most ignored aspects of communication," according to other experts and scholars. Various surveys were done in order to better prepare graduates for real-world activities. New grads, according to some companies, "lack crucial interpersonal skills." Oral and written communication, problem solving, and the ability to learn are the most critical soft skills that apply to all IT occupations. Reference analyzed 250 software developer job descriptions and discovered nine soft skills that were required: 1) communication; 2) interpersonal; 3) analytical and problem-solving skills; 4) organizational skills; 5) quick learning; 6) teamwork; 7) ability to work independently; 8) inventive and creative thinking; and 9) openness to change. Although there were significant variations between North America and the rest of the globe in terms of interpersonal, analytical, organizational, and openness to change skills, communication was the most essential set of skills in this study. The open and global character of software, as well as the fact that many software development projects are conducted overseas or substantially outsourced, may explain this. These globalized kinds of employment, such as product development, cooperation, and service supply, are distinctive of the twenty-first century and necessitate a strong emphasis on communication skills [6].

Human interactions are the most important when contrasted to task and machine interface skills. The massive upheaval the software industry has gone in during the last three decades could be a possible explanation for this conclusion. Engineers and technicians' most essential qualifications used to be tied to their technical talents. These credentials have altered as a result of rapid technological advancements and the critical role computers play in organizational performance and development. In the current situation, our engineers are involved in a variety of organizational functions, including dealing with users from all functional units. And this necessitates superior communication and presentation abilities. According to a general analysis of the 'situation unoccupied' type of advertisements, 41.2 percent of the soft skills adverts required considerable human interaction abilities. In the end, academic institutions should accept this transformation and adapt learning outcomes to incorporate the development and enhancement of soft skills. The success of one's profession is influenced by how well one interacts with others [7].

## **1.2 Soft Skills for IT Graduates: Roles and Meanings:**

IT graduates must possess and demonstrate both technical and non-technical or soft skills in order to have a successful profession. It has already been noted that project managers are expected to exhibit mastery of both technical and soft abilities. IT graduates, particularly those with an emphasis on IS (Information Systems), have gained a deep understanding of applied computers and business as a result of their studies, and are able to identify and evaluate problems, create solutions, and execute these designs into a working application. Furthermore, they are anticipated to be able to learn and use new technologies due to the quick new development in the computer field. They must also be able to work in groups, as computer applications have become too complicated for a single programmer to handle, and the majority of applications are built in groups. Because Information Systems are considered Technology-Enabled Business Development, an IT professional who bridges the gap between the computing/technical world and the business world must be able to communicate effectively with

peers, explain and file work, and interact with other stakeholders. Because of their intangibility, software-based systems are typically complicated, necessitating numerous levels of abstraction. Although abstraction is a difficult concept to grasp, it is necessary for a better knowledge of the system requirements.

Despite rapid advances in tools, technologies, and techniques, project managers who organize their teams' labor into a coherent effort to get things done cannot accomplish success just through technical abilities. A crucial pillar for success is the ability to persuade, assign, oversee, delegate, monitor, negotiate, and manage. For a manager to be effective, good interpersonal or soft skills are required [8]. Project management abilities are now frequently split 50/50 between traditional "hard" skills like risk management and scheduling and "soft, people-oriented skills like interpersonal communication." Soft skills are not confined to project managers or IT professionals aspiring to be future managers as required modern competencies. Many software characteristics, such as complexity, intangibility, and abstraction, apply to all professionals, not just managers. The relevance of non-technical skills like communication among IT professionals grows as these characteristics are nurtured. In a 1981 article, he evaluated long-term changes in companies in relation to IT and IS, and he described "new" skills that should be acquired among systems workers, known as "Hybrid" skills. He claimed that in order to integrate Information Systems successfully, professionals cannot ignore organizational and political issues as unimportant. As a hybrid employee, "a person who possesses excellent technical abilities while also possessing significant business understanding, or vice versa. Money can always buy technology and technicians, but the world's wealthiest individual must cultivate and create relationships. Organizations and individuals with exceptional soft skills are more likely to succeed. According to experts, ninety percent of graduates are currently unemployed or underemployed. Our universities issue degrees, but they lack the appropriate attitudes and principles. There is undoubtedly a concept behind soft skills or behavioral skills training. The goal of training is to improve an individual's "existing skill set," make them into better performers, and, most importantly, prepare them to be "more employable [9]."

Numerous surveys have addressed the importance of soft skills for IT graduates' future career. Although many of these surveys were designed to analyze future technology trends in order to better prepare students for new market demands, they also demonstrated the importance of soft skills. According to an early study on the difference between the skills taught in academia and the skills required by businesses, academic studies place a greater emphasis on technical characteristics, whereas professional requirements place a greater emphasis on business and human orientation. Reference agreed with these results after discovering a gap between academic IS programs and corporate requirements. Employers place a higher value on non-technical abilities than technical skills, according to other surveys. The proposed rationale was that non-technical abilities are applicable to all IT positions, whereas technical skills are often exclusively applicable to a single role. According to the source, "Most project-management gurus would have responded technical skills five years ago if you asked them to define the most critical characteristics project managers should have. They'd be more likely to put communication or negotiation skills at the top of their priority list today".. This notion of the relative value of soft skills is now shared by the whole IT professional community, not just project managers.

Both technical and non-technical abilities are required by business and industry in terms of IT competencies. Professional approaches for needs elicitation process, systems engineering,

computer interaction interface design, software validation and verification, software quality, and software development and implementation are all examples of technical skills. Communication, cooperation, collaboration, planning, topic leadership, presentation delivery, writing skills, and work assessment are examples of non-technical talents or soft skills. The IS curriculum specifically addressed these developments in the relative importance of soft skills in the computing profession. Technical and non-technical skills are referred to as necessary competencies in both the IS 2010 and the prior IS 2002. Graduates should have four high-level competencies, according to IS 2002: 'Business Foundations,' 'Technology,' 'Analytical and Critical Thinking,' and 'Interpersonal, Communication, and Team Skills,' are the four topics covered. Only by combining these four competencies would the graduate be able to develop effective IS, which this model curriculum defines as "Technology-Enabled Business Development [10]."

## 2. LITERATURE REVIEW

Gruzdev et al. discussed about the essential of organizing the conversation between education and industry to ensure maximum quality of training professionals determines the relevance of the topics covered in the essay. Soft skills are viewed from the perspective of a unified set of needs for human resource training, evaluation, and evolution. The primary focus is on trying to analyses workers' organizations' attitudes toward soft skills, which have been approved by the Russian Federation's Ministry of Education for the order to prepare of bachelor's degree: the importance of soft skills for firm (organization) employees; the extent of soft skill formation between many university graduates who apply or work at the enterprise; functions (tasks). This section presents the results of a study of employers on the transferable skills of college graduates, in which 36 people participated - heads of institutions and legislators of personnel services from various spheres (wellness, society, education, broadcast electronic parts, petro chemistry, housing and communal services, tourism, construction, and so on), as well as various kinds of assets and the enterprise The survey was carried out in the form of a one-on-one interview [11].

## 3. DISCUSSION

Human interaction skills are the most important when comparison to task and machine interaction skills. The massive upheaval the tech sector has gone through the last 3 decades could be a possible explanation for this conclusion. Originally, the most significant requirements for IT professionals were tied to their technical talents. These credentials have altered as a result of rapid technological advancements and the critical role computers play in organizational performance and development. Employees from the IT department are currently active in many aspects of the organization's operations, dealing with users from all functional areas. Excellent communication and presentation abilities were essential for this type of partnership. Because of the increased complexity of current software projects, engineers must collaborate in groups. This refers to a collection of soft skills that includes the ability to work well in a group, listen, deliver, and accept constructive feedback, and have strong interpersonal relationships. Furthermore, modern agile development approaches like Scrum place a premium on quick functionality delivery above extensive documentation. This is accomplished through a rapid iterative process that produces a working version of the program in a short amount of time and necessitates great interpersonal skills. This could explain the nearly twofold difference in human interaction soft skills (needed for around 40% of advertised occupations) and other soft skills (task interaction – 20.2 percent, organizational skills – 15.8%, and common skills – 22.8 percent). The study's most



essential outcome is an objective assessment of the market's soft skill requirements. Although logical, the fact that 41.2 percent of the soft skills ads required human interaction skills is remarkable. This confirms prior findings (to mention a few), but the significance of this research lies in the actual data it generates by referring to a real market situation. The increasing autonomy of today's employee may explain why task interaction abilities were advertised in 20.2 percent of soft skill ads. Because of economic pressures and the drive to be more efficient, firms are increasingly hiring personnel who can deliver with less supervision. Organizational skills (15.8% of all soft skills advertising) are particularly relevant for professions involving business systems. This is in line with IS 2010, which established a 'Business Fundamental' requirement.

#### **4. INSTRUCTIONAL IMPLICATIONS**

Although there is a widespread appreciation of the importance of soft skills for graduates' future careers, the academic curriculum has been sluggish to respond to these demands. Some instructors use strategies to help students develop these abilities. For example, in our college, the Software Analysis and Design workshop (a third-year course) uses team-based projects in which students are obliged to research and design a solution for a genuine customer's problem. The session comprises a requirement collection simulation to help students improve their communication skills, as well as a customer presentation to help them improve their presenting skills. The workshop grade is based on the activities of all team members, with the goal of reinforcing team-based credentials. The students are also assessing the work of their colleagues, which improves their critical thinking and feedback-giving abilities. Despite the fact that certain courses addressing the soft skills issue currently exist, based on the findings of this study, much more needs to be done. During the learning years, extra attention should be paid to certain abilities in order to cultivate them. For example, early in the learning process (even during the first year), employing team-based tasks, spending more time on numerous options to answers, and asking students to assess their level of creativity. Implementing a presenting method in which students must defend their answer while commenting on its uniqueness is another option. Furthermore, in order to teach pupils, the value of soft skills, grade calculations should consider additional factors such as simplicity, creativity, and originality, rather than only concentration and technical capability evaluations.

#### **5. CONCLUSION**

The findings of this study demonstrated that the soft skills profile of IT graduates as represented by industry requirements has changed dramatically. Initially, only technology abilities were considered crucial throughout the hiring process; however, soft skills are now considered equally important in determining future employee performance. These findings suggest a paradigm shift in the last decade in terms of the relative relevance of soft skills for IT professionals. The importance of IT for the well-being of enterprises, as well as the fact that IT personnel must communicate with other business departments and all levels of management, prompted this transition. Furthermore, as IT-based solutions become more complicated, larger development teams are necessary. This suggests that the IT professional should have excellent interpersonal and teamwork skills. Human interaction is emphasized in even recent agile development approaches. The bottom line is that academic institutions should embrace this transformation and adapt learning outcomes to incorporate the development and enhancement of the soft skills examined in this study. The poll will be repeated in future research efforts, with an additional set of needs analyzed. This fresh survey will be done a sufficient amount of time after the first one



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to ensure that all of the prior positions have been filled. Another approach to take is to examine soft talents on a larger, international basis.

## REFERENCES

1. R. Shakir, "Soft skills at the Malaysian institutes of higher learning," *Asia Pacific Educ. Rev.*, 2009, doi: 10.1007/s12564-009-9038-8.
2. Hadiyanto, A. Mukminin, Failasofah, N. ARIF, N. FAJARYANI, and A. HABIBI, "In search of quality student teachers in a digital era: Reframing the practices of soft skills in teacher education," *Turkish Online J. Educ. Technol.*, 2017.
3. J. Balcar, M. Šimek, and L. Filipová, "Soft Skills of Czech Graduates," *Rev. Econ. Perspect.*, 2018, doi: 10.2478/revecp-2018-0003.
4. R. Ibrahim, A. Boerhannoeddin, and K. K. Bakare, "The effect of soft skills and training methodology on employee performance," *Eur. J. Train. Dev.*, 2017, doi: 10.1108/EJTD-08-2016-0066.
5. M. M. Robles, "Executive Perceptions of the Top 10 Soft Skills Needed in Today's Workplace," *Bus. Commun. Q.*, 2012, doi: 10.1177/1080569912460400.
6. M. S. Rao, "Soft skills: toward a sanctimonious discipline," *Horiz.*, 2018, doi: 10.1108/OTH-06-2017-0034.
7. S. A. Hurrell, "Rethinking the soft skills deficit blame game: Employers, skills withdrawal and the reporting of soft skills gaps," *Hum. Relations*, 2016, doi: 10.1177/0018726715591636.
8. W. Cukier, J. Hodson, and A. Omar, "'Soft' skills are hard; A review of the literature," *J. Technol. Sci. Educ.*, 2018.
9. M. S. Rao, "Enhancing employability in engineering and management students through soft skills," *Ind. Commer. Train.*, 2014, doi: 10.1108/ICT-04-2013-0023.
10. N. Golowko, "The need for digital and soft skills in the romanian business service industry," *Manag. Mark.*, 2018, doi: 10.2478/mmcks-2018-0008.
11. M. V. Gruzdev, I. V. Kuznetsova, I. Y. Tarkhanova, and E. I. Kazakova, "University graduates' soft skills: The employers' opinion," *Eur. J. Contemp. Educ.*, 2018, doi: 10.13187/ejced.2018.4.690.

## A REVIEW ON HEALTH MONITORING SYSTEM USING IOT

**Alok Singh Sengar\***

\*Assistant Professor,  
Department of Computer Engineering,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [aloks.computers@tmu.ac.in](mailto:aloks.computers@tmu.ac.in)

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### ABSTRACT

*Nowadays, health care is dominated by technology. Humans are confronting an issue of untimely mortality owing to a lack of timely medical treatment. As a result, a bodily health monitoring system must be developed. A patient will be carrying hardware with sensors and an Android phone application in the proposed system. The sensors will detect the patient's body temperature and heart rate, and this information will be sent to an Android smartphone through Bluetooth/Wi-Fi. The system includes a cloud database that saves all information about a patient's health, and physicians use this data to diagnose symptoms and prescribe medication. The suggested method is adaptable since it enables the patient to roam about freely while still being monitored. This study proposes a dependable, energy efficient patient monitoring system that uses a mix of web and android applications. The patient's health is constantly monitored in the present proposed system using a separate sensor linked to the Arduino board, and the collected data is sent to the server via an Ethernet shield coupled to the Arduino board. An alarm is sent to the doctor through an Android application placed on the doctor's smart phone if any of the parameter values exceed the threshold value. The Internet of Things (IoT) enables the integration of various devices capable of connecting to the internet and giving information on the state of health of patients as well as real-time information to physicians who help.*

**KEYWORDS:** HMS (Healthcare Management System), Internet of Things (Iot), Radio Frequency, Smart Healthcare, WSN (Wireless Sensor Networks).

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### 1. INTRODUCTION

Health care is a broad field that needs constant monitoring. Continuous monitoring of patient parameters such as heart rate and rhythm, respiration rate, blood pressure, blood oxygen saturation, and a variety of others has become a standard component in major health-care systems. Electronic monitors have been widely utilized to gather and show physiological data when precise and rapid decision-making is required. There are also situations when patients are unwilling to stand in lines, make appointments for check-ups, or have their health constantly monitored. In most cases, a patient monitoring system identifies and warns against severe or life-threatening occurrences in critically sick patients. Repeated or continuous observations of the patient's physiological function, as well as the performance of life support equipment, for the goal of directing management choices, are what a patient monitoring system is. This involves

determining when therapeutic treatments should be made and evaluating the effectiveness of such therapies. A patient monitoring system may not only notify caregivers of any problems with the patient[1–3].

Many also offer physiologic input data needed to operate directly linked life-support equipment, which may be life-threatening. In the actual world, human action is needed for registration; for example, when a patient is in critical condition, there is a risk that no warnings will be produced, which may result in death. They also lack the ability to remotely monitor the patient in the absence of physicians. Radio Frequency Identification (RFID) was a comparable technology used in the early years of Near Field Communication (NFC) (RFID). The cost of RFID was expensive since an RFID reader was required. The data collected from sensors is intermittently sent in the current system. If a critical parameter is detected, an alarm message is sent to the registered caregiver using the Global System for Mobile (GSM) technology. The current method has a flaw in that it does not allow for continuous monitoring of patient health. Even if the patient is brought to the hospital in a timely manner, the doctor may not be able to determine which severe health state the patient has returned to without additional tests. This may cause therapy to be delayed. The goal of the proposed study is to create a health monitoring system that combines IoT and cloud computing. The Internet of Things (IoT) is the interconnection of physical devices, vehicles, buildings, and other things that are embedded with electronics, software, sensors, and network connections that allow these objects to gather and share data. The potential of ordinary devices to become part of the IoT has also been significantly aided by the processing of data on web-connected computers in big data centers through cloud. These gadgets may connect to the internet by delivering data to your phone or another piece of specialized hardware in your house that serves as a hub through a local communication mechanism. Smart surveillance, automated transportation, better energy management systems, water distribution, urban security, and environmental monitoring are some of the additional IoT uses. Wearables are an important part of a health monitoring system. Sensors and software are included into wearable devices to gather data and information about their users. These gadgets serve a wide range of exercise, health, and entertainment needs. A mobile phone-based patient health monitoring system is used to remotely and concurrently monitor the various parameters of patients. The doctor may use this method to keep an eye on things[4–6].

Various parameters of patients when he is in his room and even while he is not with the patient. The goal of this project is to gather data such as body temperature, heart rate, sugar level, and suggest a course of action based on this information. Doctors may download the findings to their phones so that they can see the patient right away if additional treatment is required. This article conducts a thorough examination of different methods to Health Monitoring Systems. The article also ends with a prediction for the future.

There has been emphasis on the different wireless technologies and the benefits of utilizing such technologies for quicker communication. This article offers an IPv6 vehicular platform which combines e-Health devices and enables transmitting recorded health-related data to a Personal Health Record (PHR) application server on the IPv6 Internet. Security is a major issue in the IoT devices administration. The four specified security needs are

1. Secure authentication and authorization,
2. Secure bootstrapping of objects and transfer of data,

3. Security of IoT data,
4. Secure access to data by authorized people.

The key distribution is needed to protect the e-health apps. A protocol for key management which enables the recorded data to be transmitted via a secured channel was suggested. An IoT deployment in healthcare requires extra security since the data of any patients is more sensible and it should not be abused by any undesirable elements in the community. Application store readings from the sensors into a file that can be retrieved by a remote server utilizing a free Cloud service such as Ubuntu. The security needs and authentication methods for RFID based on elliptic Curve Cryptography (ECC). Created an RFID technology and intelligent systems, which identifies the disinfected items and notifies the medical personnel to wash the hands after the contact with the disinfection products. IoT methods may be utilized to promote healthcare in a better manner. The health relevant information may be engaged with physicians who are in emergencies. Even in the absence of the doctor near the patient or at the hospital, the doctor may know the patient's condition so that the doctor's advice is provided in crucial circumstances. Cristina established a method to preserve health care data of a patient gathered in various geographic areas. The data is accessible to physicians, hospitals, labs etc., to examine the medical history of the patients. Boyiet demonstrated IoT based system for giving assistance to emergency medical services by showing how IoT data can be gathered and integrated for interoperability. Farid Touati Low power de- vices, to alleviate the interoperability issue efficient header compression, network auto-configuration utilizing neighbourhood discovery unicast/multicast and broadcast support, fragmen- tation, support for IP routing (using RPL) and support for link layer mesh. Long examined the required and requirements aspects of the software for healthcare and suggested an architecture for healthcare and IoT. Also taken the parameters like ECG, blood oxygen, respiration, temperature. The context aware decision method assists in optimum prioritizing of medical resources without human labour. The human users may be informed proactively depending on their fitness and previous medical or biological background[7,8].

Data sensed and communicated via the wireless devices are received in the local system that has to enable accessing of data in heterogeneous forms, may be helpful in creating real time applications and to be updated in the mobile application of the doctor as well as the user. Required data can be obtained at the subscribers end by altering data at the subscribers end we can directly access the data on so a so time precisely by utilizing COSS. Other systems such as those suggested earlier are based on the IoT technology offer benefits in terms of observation, transfer and use of information in the area views of health and medical care. Enabling smart, an accessible and communication system based on IoT hosting sectors such as: medical equipment, information management control medication of patients, telemedicine, mobile medical care, and personal health management, among others. With the growing health related issues and lack of appropriate solution in healthcare to monitor the patients in the absence of doctor, the patients confront severe problems and lost lives in critical circumstances, Hence to address these issues the new Patient Health Monitoring System (PHMS) was suggested to monitor and assess the state of each patient by the doctor even in their absence in hospital or near the patient.

### 1.1 Gaps In The Current System:

IoT technology may be incorporated to accommodate different device which is not found in majority of current system. Data which is saved may not be safeguarded. Complex systems include numerous gaps between individuals, stages, and processes. Analysis of accidents typically shows the existence of numerous gaps, but very rarely do gaps cause accidents. Safety is improved by knowing and strengthening practitioners normal capacity to bridge gaps. This perspective opposes the usual idea that systems ought to be separated from the unreliable human element. We know little about how practitioners detect and bridge new gaps that emerge as systems change.

It integrates design and problem solving abilities of engineering with medical and biological sciences to enhance patient's health care and the quality of life of people. A medical device is designed for use in the diagnosis, or in the cure, treatment, or prevention of illnesses. This study presents and focuses on the heart beat rate and body temperature monitoring system that is able to monitor the state of the patient. The system calculates the pulse rate and body temperature every minute or as per the time set and then transmits it to an android application. The data is also saved in the database. Thus, the physicians may watch and diagnose the patient's condition constantly and might advise early precaution for the patients themselves. This technology is cost efficient and user pleasant and therefore its use is neither restricted nor limited to any class of users. It is a highly efficient system and extremely simple to use and therefore offers tremendous flexibility and acts as a big upgrade over other traditional monitoring systems. In future: By utilizing capacitive touch screen the system may be deployed in hospitals to preserve patient's data. Voice alerts may be used to start the different controlling of devices and their condition of operation. Apart from the excellent Soldier Navigation and Health Monitoring use, this device may be employed by pro trekkers who travel frequently in isolated regions and have no means of contact. By utilizing this method the trekkers may be watched and in case of crisis assistance can be given to them as quickly as feasible. Also, for professionals like wild life photographers and vet physicians who have to travel deep into the forest may make use of this technology. This method is helpful for the miners also since they labor in deep caverns and may encounter health problems.

Internet of Things (IoT) based smart health monitoring system is a patient monitoring system in which a patient can be monitored 24 hours. In the present world, IoT is changing the infrastructure of technologies. By facilitating effortless interaction among various modules, IoT has enabled us to implement various complex systems.

By introduction of 'IoT' it has been possible to distinguish between 'health data' in the analyzing and diagnostic of a physician after systems of physical sensors. The biggest benefit of the 'IoT in healthcare' is to reduce maintenance burden, followed by an increase in the chance of healthcare. The addition individual and online health care network was great learning experience and anticipated that mobile information and general technology killing applications would lead to the development of cloud health services. IoT is already offered as a primary platform for neurological awareness monitoring. Because effective surveillance devices are not available, it is possible to take many higher risks. Technologies such as IoT are played here. The best interest of the patient is such caution. Multiple sensors are used to analyze patient details. The caregiver can provide adequate guidance on health care. Increased monitoring is required for IoT devices commonly used for disabled patients[9,10].



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The Architecture of IoT in HealthCare IoT is a network of physical object-linked devices that enable distant devices to hear, analyze, and monitor. The computational method for connecting computer hardware to allow communication between sensors and smart sewing equipment. IoT implementations in IoT data processing depend largely on the middleware layer. Smart grid, smart city, clever home, clever agriculture, clever communications... are all other IoT technologies. The three-layer IoT architecture is built on the levels of understanding and networking. It is further extended to cover middleware and business applications.

Perception layer: The sensory and physical instruments are recognized in the cognitive layer. The perceptual layer sensor system points to and then identifies an item and collects object information. Information on temperature, mobility, location, wetness, vibrations, distance, speed, chemical changes etc may be gathered according to the type of sensor.

The information is subsequently transferred to the next processing layer. When a lady wears fixed earrings which are clean to her ears and aid detect different organ problems and gain a position? Woman's the viewing layer sends the gathered data to the processing network layer via the node. Perception Layer the "Broadcast Layer" is frequently called, with its main function being to link different users, intelligent items and network devices. Collect sensor data on sensor devices sends. The system of communication may be infrared, Bluetooth, ZigBee, Wi-Fi, UMTS and 3 G technologies. After network layer coating, the information.

## 2. DISCUSSION

By introduction of 'IoT' it has been possible to distinguish between 'health data' in the analyzing and diagnostic of a physician after systems of physical sensors. The biggest benefit of the 'IoT in healthcare' is to reduce maintenance burden, followed by an increase in the chance of healthcare. The addition individual and online health care network was great learning experience and anticipated that mobile information and general technology killing applications would lead to the development of cloud health services. IoT is already offered as a primary platform for neurological awareness monitoring. Because effective surveillance devices are not available, it is possible to take many higher risks. Technologies such as IoT are played here. The best interest of the patient is such caution. Multiple sensors are used to analyze patient details. The caregiver can provide adequate guidance on health care. Increased monitoring is required for IoT devices commonly used for disabled patients.

## 3. CONCLUSION

In this article, IoT was defined as main distributor of health care systems as one of IoT most important uses. Helps to better to provide people with healthcare at any time in any region by eliminating geography, time and other barriers while increasing their coverage and efficiency at the same time. The IoT health revolution is a reality and thus fair, affordable care provides high-quality care to people. These applications produce large quantities of sensor data to be handled properly for monitoring and handling. Cloud computing, through its Base, is a promising approach for efficient knowledge processing in the health sector. The framework provided is special and can be used to handle cloud device and network data specific to a patient. Built on IoT and its design principles, the cloud app allows for direct communication of sensor devices while at the same time making it versatile and effective to serve stored data, users and sensors. Wireless sensor networking in which single access is provided to embedded sensor control systems and the complete system service. This paper thrives to lead to a fully integrated IoT-



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based health care system and acknowledges the need to integrate the various IoT services further. Further work on safety issues in relation to the different implementation phases needs to be completed.

**REFERENCES:**

1. Kumar, C.N.S. and Hussain, M.A., "A review on Employee's health monitoring system using IOT," *Int. J. Eng. Technol.*, 2018, doi:10.14419/ijet.v7i2.7.11608.
2. Tokognon, A.C., Gao, B., Tian, G.Y., and Yan, Y., "Structural Health Monitoring Framework Based on Internet of Things: A Survey," *IEEE Internet Things J.*, 2017, doi:10.1109/JIOT.2017.2664072.
3. Soppimath, V.M., Jogul, A., Kolachal, S., and Baligar, P.K.D., "Human Health Monitoring System Using IoT and Cloud Technology - Review," *Int. J. Adv. Sci. Eng.*, 2018, doi:10.29294/ijase.5.2.2018.924-930.
4. Budida, D.A.M. and Mangrulkar, R.S., "Design and implementation of smart HealthCare system using IoT," *Proceedings of 2017 International Conference on Innovations in Information, Embedded and Communication Systems, ICIECS 2017*, ISBN 9781509032945, 2018, doi:10.1109/ICIECS.2017.8275903.
5. Yeh, C.C., Zan, H.W., and Soppera, O., Solution-Based Micro- and Nanoscale Metal Oxide Structures Formed by Direct Patterning for Electro-Optical Applications, *Adv. Mater.*, 2018, doi:10.1002/adma.201800923.
6. Ms.Nithya, R. Rajaduari, M. Ganesan, K.A., "a Survey on Structural Health Monitoring Based on Internet of Things," *Int. J. Pure Appl. Math.*, 2017.
7. Deshmukh, M.P.P., Indurkar, P.P.R., and Khatri 3 1 Student, P.D.M., "IoT based Smart Health Care Kit: A Review," 2017.
8. Tsang, Y.P., Choy, K.L., Poon, T.C., Ho, G.T.S., Wu, C., Lam, H.Y., Koo, P.S., and Ho, H.Y., "An IoT-based Occupational Safety Management System in Cold Storage Facilities," 2016, doi:10.2991/iwama-16.2016.2.
9. Chepuru, A. and Rao, D.K.V., "a Survey on Iot Applications for Intelligent Transport Systems," *Int. J. Curr. Eng. Sci. Res.*, 2015.
10. Wan Abdullah, W.A.N., Yaakob, N., Elobaid, M.E., Mohd Warip, M.N., and Yah, S.A., "Energy-efficient remote healthcare monitoring using IoT: A review of trends and challenges," *ACM International Conference Proceeding Series*, ISBN 9781450340632, 2016, doi:10.1145/2896387.2896414.

## 3D MODELS DEVELOPMENT OF TOURISM FACILITIES

**F.E. Gulmurodov\***; **N.Sh. Umarov\*\***; **P.J. Khamidova\*\*\***

\*PhD, Senior Teacher,  
Samarkand State Institute of Architecture and Construction,  
Samarkand, UZBEKISTAN

\*\*Senior Teacher,  
Independent Researcher,  
Samarkand State Institute of Architecture and Construction,  
Samarkand, UZBEKISTAN

\*\*\*Master,  
Samarkand State Institute of Architecture and Construction,  
Samarkand, UZBEKISTAN

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### ABSTRACT

*This article discusses the process of creating a geographic information system of tangible cultural heritage sites in Samarkand by integrating the visualization of tourist facilities with 3D tools. The use of electronic cards and 3D models based on modern methods is leading in the development of tourism processes in the world and in different regions. Given the growing demand for accurate information electronic maps and 3D models for the global tourism industry, the introduction of new methods of creating electronic tourist maps and 3D models based on geographic databases using modern technologies is required.*

**KEYWORDS:** *Visualization, Delone Triangulation, Triangulation, Model, 3D Model, Interpolation Method, Integration, Algorithm, Optimization, Incremental, Perimitiv, Projection.*

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### INTRODUCTION

The use of electronic cards and 3D models based on modern methods is leading in the development of tourism processes in the world and in different regions. Given the growing demand for accurate information electronic maps and 3D models for the global tourism industry, the introduction of new methods of creating electronic tourist maps and 3D models based on geographic databases using modern technologies is required. In this regard, it is important to use modern methods for obtaining complete, reliable, fast and easily accessible information about tourist resources and infrastructure for tourism purposes.

Analysis of the scientific literature in the field has shown that, along with foreign scientists, scientific research has been conducted in our country on the development of tourism maps on the basis of modern technologies. Consequently, with the theoretical and practical aspects of creating tourist maps and 3D models based on modern methods, foreign scientists AM. Berlyant [1,2], I.K.Lure [7], A.V. Koshkareva [6], V.A. Hosseini [8] and others engaged.

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Scientific researches on mapping of tourism in Uzbekistan on the basis of modern geoinformation systems (GIS) technologies conducted by the local scientists such E.Yu. Safarov [9], I.S. Tukhliev [10], F.E.Gulmurodov [3,4] and achieved positive results.

## MAIN BODY

Modern geographic information systems and technologies are widely used in trade, real estate market, urban planning and architecture management, agriculture, tourism and other fields. Of course, this is explained by its positive aspects. Firstly, geoinformation systems and technologies are explained by the fact that they are a convenient way to display semantic data models from a database using visualization, as well as to show their mutual geographical location. Secondly, the existence of a spatial-address image of the database of semantic data models is explained by the fact that the system has an expanded volume of information. Third, modern geoinformation system technologies are considered to have a good system, as well as simplify the method of analysis and processing of existing semantic data models in the system and speed up the optimization process.

The design of geographic information systems allows the implementation of spatial requirements and the analysis of the obtained results, which significantly reduces the time to search for the desired solution. That is, the system data helps to find the area and geographical objects that meet the user's demand, to establish the interrelationships between the various parameters, and to implement spatial images that justify the decisions made.

In its turn, geographic information is not a complete basis for finding the final decisions of the system, it is only a convenient and effective tool that increases the speed and efficiency of the decision-making process.

Creating maps and geographic analysis is nothing new. However, geoinformation system technology is a new, effective and convenient approach to the analysis of modern problems and the solution of various problems, in which the information required for decision-making must be in cartographic form.

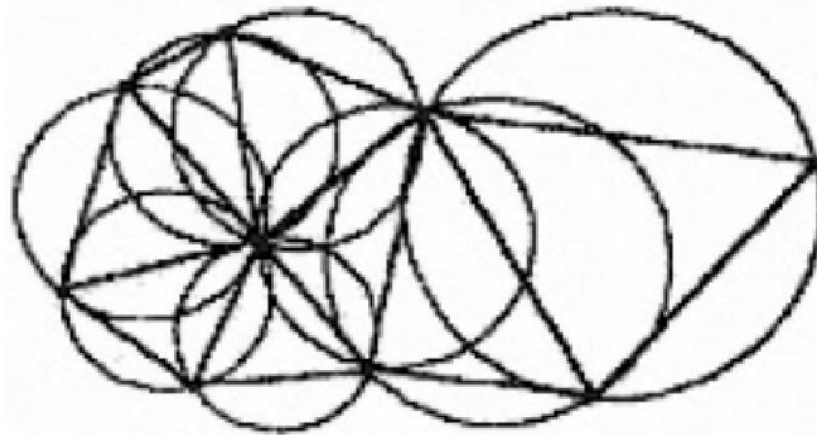
The developed geoinformation system combines the tools of simple packages of cartographic image, the function of thematic display on the basis of tabular data on addresses and streets. At the same time, the city of Samarkand combines additional possibilities of three-dimensional visualization of material cultural heritage and tourism objects, ie architectural monuments, archeological monuments, sights, monumental art monuments and objects of tourism and tourism infrastructure. In other words, this software product combines two- and three-dimensional geographic imaging tools, spreadsheet tools, an editor for working with three-dimensional objects, and a database management system.

In this paper, we will consider the main methods and stages of creating a geoinformation system using 3D visualization.

Triangulation is a system of triangles in which the sides of an irregular network are unequal, the structure of which is carried out according to the incremental algorithmic Delone of triangulation.

Delone triangulation is defined as the triangulation  $DT(S)$  for the  $S$  site or many points on a plane, no point  $A$  is in a circle from  $S$ .

An example of Delone triangulation is shown in Figure 1.



**Figure 1. Delone triangulation**

We classify the method of constructing an optimized model of relief. Suppose that the sum of a lattice triangle is defined by some set  $H$  (1) and the set of auxiliary perimitives is determined by the set  $P$  (2). Auxiliary perimitives are products of the final surface, for example, a perimitiv-model that classifies changes in the surface according to some given property. We formulate many conditions based on a complex of auxiliary perimitives and materials  $\Omega$  (3).

- 1)  $H = \{h_1, h_2 \dots h_n\}$
- 2)  $P = \{p_1, p_2 \dots p_n\}$
- 3)  $\Omega = \{q_1, q_2 \dots q_n\}$

When examining the complex of conditions formed, a result is obtained which indicates what sign should be given to this or that surface.

On the basis of the plural  $P$  and the plural  $\Omega$  we form a single space of symbols, denoting it  $m_x, u$ . Only one mark of the surface  $\mu_{x,y}$  corresponds to each surface point of the triangulation network. The formation of the surface space  $\mu_{x,y}$  is done as follows, each triangle in the plural  $H$   $[\mu_{\min i}, \mu_{\max i}]$ ,  $i = 1..n$ , corresponds to some line of the sign (4, 5).

- 4)  $\mu_{\max i-1} \neq \mu_{\min i}$
- 5)  $\mu_{\min i+1} \pm \mu_{\max i}$

The interpolation method is indicated by an interval  $[\mu_{\max i}, \mu_{\min i+1}]$ , in which the resultant surface is calculated by the following method (6).

$$(6) F = q_1 \frac{\mu - \mu_{\max i}}{\mu_{\min i+1} - \mu_{\max i}} + q_{i+1} \frac{\mu_{\min i+1} - \mu}{\mu_{\min i+1} - \mu_{\max i}}$$

The optimization process has an integrative character, the number of integrations depends on the degree of optimization of the end surface of the relief.

The system structure to be developed includes the following components:

- Data refers to the location of objects in the city and has all the classifying information about the objects, characteristics, images, classifications (negative or attributive);
- Hardware supply: computers, scanners, digitizers, computing networks;
- Software supply: basic data optimization tools, tools for analyzing and processing user requirements and data, tools for working with system graphical information;
- Technologies supply: applied algorithms, methods, order of actions.

The development of a geographic information system involves three main stages:

- ❖ Preparation of topographic basis (map): scanning or import of cartographic materials, digital processing or optimization of the received images; digitization, editing of cards, creation of miniature copies of the map-navigators;
- ❖ Preparation of vector layers: formation of reception library, conditional symbols, connections and classification of connections and path types. Forming a vector layer by assigning a usage name and visualization attribute as well as external functions and digitizing the vector topography;
- ❖ Preparation of the final software product: development of a voluntary information environment for the user, the formation of user function integration.

Characteristics of the developed geographic information system: initial stage data system that requires little accuracy of the topographic basis (street network, local transport, urban enterprises, urban tangible cultural heritage sites, user records).

The main functions performed by the developed system:

- Find the address and objects depicted on the map;
- Optimal transportation of local transport by road or city;
- Placing user accounts on the map;
- Production of information about the selected object;
- Triple visualization of the selected object or the whole card according to user requirements.

Simple geographic information systems have a two-dimensional image. In the depiction of buildings and tangible cultural heritage sites to create a built-in system, a three-dimensional graphical framework integration is implemented to select field-based symbols.

The three-dimensional graphical framework is the most complex part of the development of a system for building polygonal models, because the framework used in this system should not require initial installation and should use minimal resources of the system. A well-established system of object visualization shows good results on medium-voltage computers.

An object-oriented model of the real world was created to show the geometric models of the created space. The Qt Creator programming environment was used to create the framework. This

environment is selected on the basis of several factors: freedom, cross-platform, ease of production, and more. The graphics processing system is based on OpenGL three-dimensional graphics package. OpenGL or Qt is used to create models.

The main difficulty with the development was that neither Qt nor OpenGL had the function to process files with model information.

Only three-dimensional models needed to develop personal file processors that supported several of the most common formats.

The data count was performed as follows: first the data on the geometry of the objects is transmitted to the formed array OpenGL input, then the texture and polygon data is loaded in this way and QGIWidget classes are applied-Qt signals classes to interact with OpenGL functions. To read three-dimensional data written in QXML-xml format. To form the main functions of the Qapplication-Qt application. The geographic information system approaches the system of depiction of three-dimensional models as follows: when using the geographic information system, the user is given the opportunity to depict the object of interest in the form of a spatial geometric model. After selecting this model, a three-dimensional image window with the corresponding model is called.

The created graphical framework can work with files of the following formats: .obj, .3ds, .off, .stl, .3dxml, .dae.

Three-dimensional modeling allows the creation of absolutely fantastic projects or, conversely, the depiction of a real being. All three-dimensional models are built using Autodesk 3ds Max9 software, which makes it easy to understand a real being or synthesize individual images that reflect scenes from an imaginary image life. The main figure of space geometric models is a box primitive transformed into this polygonal frame. Model columns represent the perimeter of a "cylinder". Appropriate textual material is provided for each element. The main difficulty in creating three-dimensional models of urban buildings and monuments is the adjustment of materials. To create the tile volume effect, tiles-type cards are used, which are then placed on a table of bump material. All textures are created using layout cards without the use of external photographic textures. To give the models a view, the proportions are given a UVW map modifier, and the projection parameters make changes to the model. In the end, the model will be visualized in full HD format with 3ds Max standard methods.

Examples of several created urban objects with real construction drawings are shown in Figures 2,3,4.

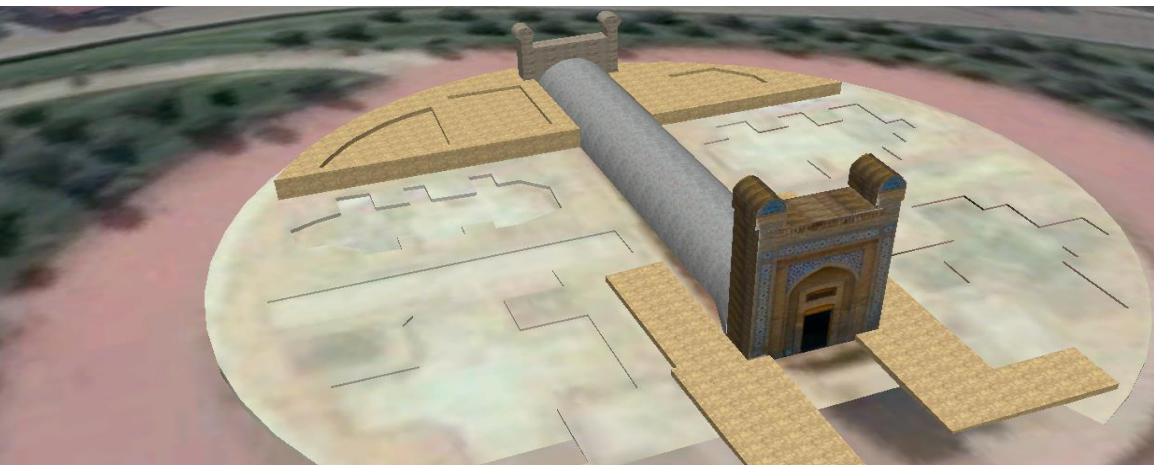




**Figure 2. Registan Square**



**Figure 3. Sherdor Madrasa**



**Figure 4. Ulughbek Observatory**

## CONCLUSION

In the study, we considered the concept of a geographic information system, as well as its components. We provided information on the implementation of algorithms and methods of system implementation, as well as the method of optimizing the digitization of the topographic basis. The method of converting three-dimensional models into a geographic information system and the scheme of processing three-dimensional spatial geographic models, as well as the developed models of urban objects were presented with examples.

## REFERENCES

1. Berlyant AM. Geoiconics. M.: Moscow State University, 1996.
2. Berlyant AM. Geoinformation mapping. M.: Astreya, 1997. 64 p.
3. Gulmurodov FE, Ravshanova O. Creating tourism e-cards using ARCGIS software. Scientific and technical journal of architectural and construction problems.2016;(3).
4. Gulmurodov FE. Importance of modern GIS technologies in cartographic research of tourism. Scientific and technical journal of problems of architecture and construction. 2019;106-109.
5. Evseev AV, Krasovskaya TM, Tikonov VS. The use of geoinformatics tools to assess the prospects for the development of recreation on the Arctic coast of Russia. Geoinformatics. 1999;(1):52-59.
6. Koshkarev AV, Tikunov VS. Geoinformatics. M.: Kartgeo-center, 1993.
7. Lurie IK. Geoinformation mapping. Methods of geoinformatics and digital processing of satellite images. M.: Publishing house of KDU, 2008. 428 p.
8. Hosseini VA, Rubtsov NK, Bulatov GN. Determination of priority zones for the development of desert tourism using GIS. 2016.
9. Safarov EYu. Geographic information systems. Tashkent: University, 2010.
10. Tuxliev IS, Amriddinova RS, Abdukhamidov SA, Ablaqulov AA. Geoinformation systems in tourism. Study guide. Samarkand: SamISI, 2018. 252 p.

## DATA VISUALIZATIONS: A LITERATURE REVIEW AND OPPORTUNITIES FOR TECHNICAL AND PROFESSIONAL COMMUNICATION

Pirtibha Sharma\*

\*Associate Professor,  
Department of English,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id-ica.pratibha.pdp@gmail.com

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### ABSTRACT

*This paper discusses the need for an integrative literature review on data visualizations, particularly in health and medical contexts. The paper analyzes 25 studies across disciplines. The findings suggest there is little agreement on the best way to visualize complex data for lay audiences, but some emerging effective practices are being developed. Pictographs, icon arrays, and bar charts seem to hold promise for comprehension by users, and visualizations need to be kept as simple as possible with attention to integrating other design features such as headings and legends. The review ends with five specific research areas in which technical and professional communicators should focus their attention on empirical studies that examine: interactive displays, merge attention and comprehension, look at numeracy and risk and finally, cross health and medical subjects. We present a visualization system for reviewing the turn-taking patterns in a face-to-face meeting. Without the need to directly observe a group, a user can use the system to gain insight into the interaction dynamics of a meeting. We evaluated the visualizations by asking outside observers to make qualitative judgments about the individuals represented visually, and then compared their assessments to our own, made from direct observation of the meetings.*

**KEYWORDS:** *Data Visualizations, Health Communication, User Experience, Visuals, Social Visualization, Meeting Support, CSCW.*

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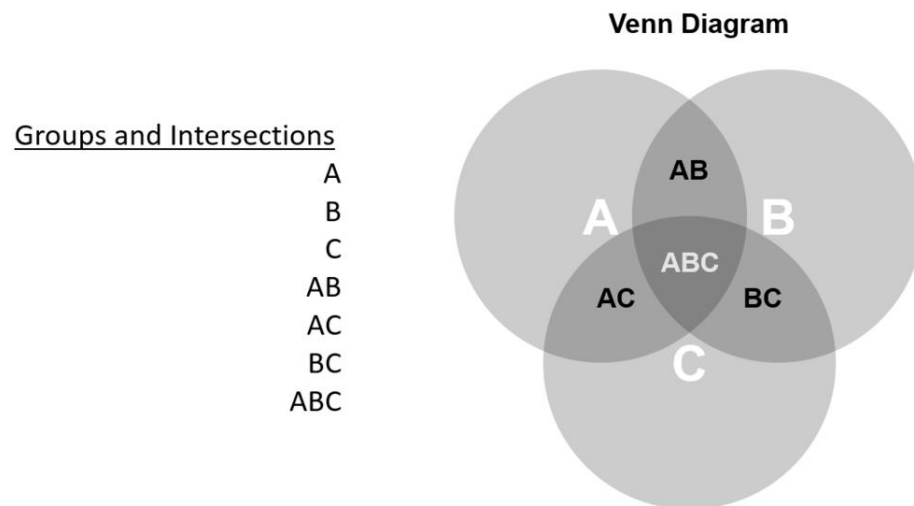
### INTRODUCTION

Technical and professional communicators have always been concerned with how information is delivered to potential readers. Complex information from technical subjects, like medicine, science, and the environment, creates additional challenges. Because our lives are filled with a continual flow of information, sometimes the best way to communicate is through visuals. But how can we leverage data visualizations to communicate complex ideas to non-expert audiences?

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Data visualization means using visuals to present large amounts of data according to certain parameters or categories such as the collection of data into charts, graphs, scatter plots or other standard visualization types [1]. While data visualizations are usually part of an information design strategy that includes data visualization, explanatory text, headings, and other layout features, we confine this integrative literature review to data visualizations because they are typically the first thing that draws the reader’s attention. As such, it becomes important for the field to understand the landscape of current research.

The last ten years, in particular, have brought about new technologies and an increase in the amount of data available [2]. The scale and variety of data has posed new analytic challenges on data visualization, and this has made it easier to create complex visualizations. More so because of these advancements, data visualizations deserve specific attention outside the realm of simply being part of document design [3]. With the proliferation of information graphics and online tools that create data visualizations and research that shows the effectiveness of including visuals in health and medical communication, there is an increased urgency to determine effective practices for their creation and use [4]. However, scholarship in TPC (and in other fields) has not kept pace with these advancements, which means we have little empirical evidence on which to base current practice. Currently, data visualization research is dispersed across a range of fields and disciplines, which makes it difficult to build a coherent body of research. For example, psychologists study the comprehension of bar graphs, public health researchers examine cultural data representations and physicians study how to explain cardiac risk [5]. Three multidisciplinary review essays attempted to bring together this diverse research, but the authors relied solely on searching two databases, which eliminated the work in the humanities, technical communication, engineering, and social sciences. Unlike in the technical fields above, scholars in technical and professional communication have focused on theoretical explorations rather than empirical ones [6].



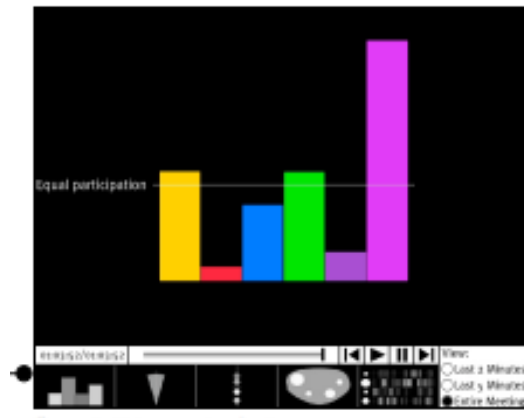
**Fig. 1 Venn Diagram**

Even with this wide range of research, scholars and practitioners across fields, who need to understand the best ways to visually communicate complex scientific and technical information to lay audiences, still lack a coherent body of scholarship. Thus, to be able to ascertain if there is enough existing, empirical information to determine effective practices, we have undertaken a



cross disciplinary integrative literature review on data visualization [7]. With the increased reliance on data visualizations in technical, engineering, and scientific disciplines and the need for the information to be communicated clearly and accurately in visual form, TPC needs to have a better understanding of the scholarly landscape in data visualizations [8].

While TPC has long claimed visual rhetoric and visual communication as part of the field's knowledge and expertise, research in this area by TPC scholars has not kept pace. Much of the work on data visualizations is in other disciplines, which precipitates the need to aggregate that information in one place to determine what roles TPC can play in moving forward and more importantly, to help move toward effective practices for data visualizations of complex information. An integrative literature review in this area will allow TPC, which has long claimed an expertise in this area, to re-examine the relationship of the practice of data visualization and hopefully, to begin to do empirically based studies. Communicating complex information has moved from transmission to transaction and there is an increasing imperative for researchers to develop effective practices on the types and kinds of data visualizations that increase comprehension and understanding for end users [9].



**Fig. 2 Histogram Visualization**

TPC has done some recent research on visual communication, however much of this research is not directly focused on empirical research that addresses data visualization. Recent work that attempts to address design lore in the field does little to mitigate this problem, and since TPC has not directly investigated effective practices for producing data visualizations of complex information, we were forced to go outside of the field to see whether other disciplines had broached the subject. To do this, we have performed a version of the integrative literature review. Before beginning our database searches, we had placed two restrictions on our searches. First, we restricted our search of the literature to post-2000, with the majority of the research we examined closely being in the last 10 years [10]. The improved tools for data visualization creation and more data readily available means that techniques used over 15 years ago have little bearing on current practices. The results reported here include research through 2016. Second, we also restricted our search to studies that report empirical research reported as journal articles. While we appreciate theoretical orientations and foundations, empirical research provides more reliable data for trying to ascertain effective practices for data visualization creation for end-user application. For example, some research based recommendations on visualization types on their

own research of “best practices” that were not clearly explained nor empirically supported. Thus, this type of research article was not included in our analysis [11].

We also limited our search to studies that intersected with communicating patient focused information in health and medical settings. As recent research has suggested, technical and professional communicators are well qualified to talk a leading role in health communication, particularly those that involve patient entered information such as patient education materials, decision aids for shared decision making, and health risk communication. These patient-cantered materials require data visualizations (and information design) to help patients and their families or caregivers make better decisions about their health. The type of information included in these materials needs to be patient cantered and they need to find ways to discuss subjects such as prevalence of disease in a population, probability that a positive test result indicates a "true positive", frequency of various outcomes from different treatment procedures in ways that patients can understand. With health literacy levels in the US hovering at around 12% according to the US government, researchers in health and medicine are conducting the most advanced and diverse around ways to communicate complex data and information in both visual and textual ways [12].

## *Evaluation*

To determine if these visualizations effectively provide summarizing information about a group’s interaction, we conducted a study asking subjects use these visualizations alone to evaluate two groups and make judgments regarding the behaviour of individuals and the groups. The two meetings we asked subjects to evaluate had four members and lasted an average of 20 minutes each. The individuals in the meetings discussed a defined topic until they came to consensus, with no knowledge of how they would be evaluated. Evaluation Procedures a total of eight subjects used the visualizations to make qualitative assessments of the groups’ interactions. Each subject was given a 15-minute tutorial on how to use the application, viewing an example meeting to demonstrate the application features. After the subject was familiar with the application and the data, he/she then examined the two groups using the visualizations while filling out a questionnaire about the dynamics and individual behaviour. The subjects were encouraged to fill out the questionnaire in any manner they found useful, and if desired, to directly compare the groups’ visualizations to each other to answer a question. The subjects could use all of the visualizations and in most cases, used the overlapped speech and the timeline visualizations for the majority of the questionnaire. The study subjects were affiliated with our department, but none had had prior exposure to the application or to the individuals in the recorded meetings. They spent an average of 40 minutes evaluating the two 20 minute meetings. Although this was not faster than watching a real-time video, we believe that this time would decrease dramatically once familiar with the tool. To evaluate the subjects’ assessments, we compared them to our assessment of the groups based on watching videos of their meetings. To perform our assessment, two of the investigators separately filled out the subject questionnaire while watching the videos.

## **DISCUSSION**

We present a visualization system for reviewing the turn-taking patterns in a face-to-face meeting. Without the need to directly observe a group, a user can use the system to gain insight into the interaction dynamics of a meeting. One of the key features of on-line conversations is



their persistence. Asynchronous discussions such as newsgroups or mailing lists are inherently persistent, and recorded logs bring persistence to the more ephemeral synchronous chats. Yet the drawbacks of the text-only interface are exacerbated when perusing the archives of a discussion. The rhythms of the conversation's exchanges are obliterated and the reader is likely to approach the mass of accumulated archival material by searching another non-linear approach, often losing in the process much of the conversation's context. To help the reader apprehend the discussion's structure and history and become familiar with its community, new interfaces for viewing, searching and annotating the amassed material are needed. Graphical interfaces can provide a way to see information that is hidden or unavailable in a textual representation. One can show the size of the audience in an on-line chat or highlight key moments in the mass of an archive; the graphics can be added ex post facto or they can be integrated into the design of the conversational interface. Indeed, there are an infinite number of ways that a conversation can be visualized. The essential problem is to identify the salient data and to represent it accurately and intuitively.

## CONCLUSION

Second Messenger provides a method for reviewing a meeting, not for content, but for the social and behaviour dynamics between individuals. We have demonstrated that several aspects of a meeting, such as who is dominating, who is quiet, who is extroverted, and who has sided with whom in a debate, can all be revealed through visualizations of speaking patterns. While not as complete a video analysis, our system conveys general impressions to an observer that can be used to examine group behavioural trends our primary intention for this application is for groups to use it as a method for reflecting upon their own social interaction, to gain a better understanding of it. As an alternative to hand-coding group behaviour, and as a less arduous task than filling out self-evaluation questionnaires, Second Messenger provides an automated method for gathering basic information about group interaction dynamics. This research will continue to explore these claims by providing these visualizations to many types of groups during their meetings, in both experimental and real-world settings.

## REFERENCES

1. I. M. Lipkus, "Numeric, verbal, and visual formats of conveying health risks: suggested best practices and future recommendations," *Med. Decis. Making*, vol. 27, pp. 696-713, 2007.
2. J. S. Ancker and D. Kaufman, "Rethinking health numeracy: a multidisciplinary literature review," *J. of Amer. Med. Informatics Assoc.*, vol. 14, pp. 713-721, 2007.
3. P. S. Houts et al., "The role of pictures in improving health communication: a review of research on attention, comprehension, recall, and adherence," *Patient Educ. And Counselling*, vol. 61, pp. 173-90, May 2006.
4. Z. Hildon et al., "Impact of format and content of visual display of data on comprehension, choice and preference: a systematic review," *Int J. Qual. Health Care*, vol. 24, pp. 55-64, Feb. 2012.
5. N. Amare and A. Manning, *A Unified Theory of Information Design: Visuals, Text, and Ethics*. Amityville, NY: Baywood, 2013.

6. L. Brasseur, "Florence Nightingale's visual rhetoric in the rose diagrams," *Tech. Commun. Quart.* vol. 14, pp. 161-182, 2005.
7. J. Buehl, "Toward an ethical rhetoric of the digital scientific image: Learning from the era when science met Photoshop," *Tech. Commun. Quart.* vol. 23, pp. 184-206, 2014.
8. C. Kostelnick and M. Hassett, *Shaping information: The rhetoric of visual conventions.* Carbondale, IL: Southern Illinois University Press, 2003.
9. S. Dragga and D. Voss, "Hiding humanity: Verbal and visual ethics in accident reports," *Tech. Commun.*, vol. 50, pp. 61-82, 2003.
10. M. A. Kimball, "London through rose-colored graphics: Visual rhetoric and information graphic design in Charles Booth's maps of London poverty," *J. Tech. Writing Commun.*, vol. 36, pp. 353-381, 2006.
11. C. Reeves, "Scientific visuals, language, and the commercialization of a scientific idea: The strange case of the prion," *Tech. Commun. Quart.* vol. 20, pp. 239-273, July-Sept. 2011.
12. C. Welhausen and R. E. Burnett, "Visualizing public health risks: Graphical representations of smallpox in the seventeenth, eighteenth, and nineteenth centuries," in *Visible Numbers: The History of Statistical Graphics*, C. Kostelnick and M. Kimball, Eds. Farnham, Surrey: Ashgate, 2015.

## REVIEW OF UNDERWATER OPTICAL COMMUNICATION SYSTEM

**Dr. Varun Kumar Singh\***

\*Associate Professor,  
Department of Applied Science (Chemistry),  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email id: drvarun.engineering@tmu.ac.in

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### ABSTRACT

*From deep oceans to coastal waterways, UOWC offers a wide range of possible uses. However, the most significant obstacle to underwater wireless communication is the fundamental properties of ocean or sea water; overcoming these obstacles necessitates a deep understanding of complicated physio-chemical biological systems. The major goal of this article is to determine the feasibility and dependability of high data rate underwater optical connections in light of different propagation phenomena that affect the system's performance. This article gives a comprehensive review of current UOWC developments. UOWC-specific noise sources, channel characterization, modulation methods, coding approaches, and different noise sources are all covered. This article intends to give not only comprehensive research in underwater optical communication, but also the creation of new concepts that will aid in the future expansion of underwater communication. All of this has spurred the rise of underwater optical wireless communication (UOWC), which provides faster data rates and lower power consumption than traditional acoustic communication systems, as well as lesser computing complexity for short-range wireless communications. UOWC has a wide range of applications, from deep seas to coastal rivers. The basic characteristics of ocean or sea water, on the other hand, are the most important impediment to underwater wireless communication; overcoming these difficulties requires a thorough understanding of complex physio-chemical biological systems.*

**KEYWORDS:** *Underwater Communication, Optical Communication, EM Wave's Propagation.*

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### 1. INTRODUCTION

Optical wireless communication has gained popularity in recent years for terrestrial, space, and underwater communications due to its ability to provide high data speeds with minimal power and bulk requirements. Many researchers have worked on terrestrial and space links, but underwater optical wireless links have received less attention since they are more difficult to implement than atmospheric links. The broad diversity of physical processes in many sorts of underwater settings, ranging from shallow coastal water to deep sea or oceans, provide a substantial barrier to successful underwater communication. Low bandwidth, high transmission

losses, time changing multipath propagation [1], high latency, and Doppler spread restrict the current technology's performance for underwater communication.

All of these variables cause temporal and spatial fluctuation in the auditory channel, limiting the system's usable bandwidth. Underwater acoustic communication now accessible can enable data rates of tens of kbps over large distances (in kilometers) and hundreds of kbps over small distances (few meters). Acoustic connections are categorized as very long, long, medium, short, and very short depending on the transmission distance. Various underwater vehicles, sensors, and observatories, on the other hand, need a communication link with data speeds ranging from a few to tens of megabits per second. Fiber optic or copper cables are employed in big and stationary equipment to obtain high data speeds, but they have substantial technical and maintenance difficulties. A wireless link with high data rates is a viable choice for moving platforms. When utilized for high data rate transfer over short distances, electromagnetic (EM) waves in the radio frequency (RF) band [2] are a viable alternative for underwater wireless communication.

The speed of electromagnetic waves is primarily determined by permeability, permittivity, conductivity, and volume charge density, all of which vary according on the type of underwater circumstances and frequency utilized. The attenuation of RF waves rises with frequency and is substantially attenuated by sea water, according to research. Optical waves, on the other hand, have a wide bandwidth but are subject to temperature changes, scattering, dispersion, and beam steering. Due to significant water absorption in the optical frequency spectrum and considerable back scatter from suspended particles, wireless underwater communication is restricted to small distances. However, underwater, the blue-green wavelengths of the EM spectrum have a comparatively low attenuation optical window. As a result, the creation of blue-green sources and detectors has sparked a surge of interest at UOWC. Over modest distances, the blue-green wavelengths can provide high bandwidth transmission (up to 100s of meters). Table 2 presents a comparison of several wireless underwater systems.

The purpose of this survey is to give an overview of the different problems and existing technologies in use in the UOWC system. This article presents a variety of experiments, future prospects, and applications. The author of this study draws attention to UOWC [3], a largely under-utilized technology that might be a viable alternative for low-cost, low-power devices. The goal of this study is to assess how well the UOWC system performs in a range of underwater settings and to create a realistic underwater optical channel system design model. This study focuses on a number of intriguing characteristics of quickly shifting underwater channels that impact the reliability and practicality of underwater optical communication links. This study also discusses several technologies that increase the efficiency of UOWC systems, such as hybrid acousto-optic systems and cooperative diversity. These technologies not only provide a more energy-efficient system, but they also increase the capacity and variety of applications that require real-time video streaming across an underwater network.

## 2. DISCUSSION

Because the fundamental characteristics of different water bodies (ranging from shallow water to Deep Ocean) are extremely varied, propagating an optical beam underwater is a difficult task that necessitates a full grasp of the complicated physio-chemical underwater environment. The characteristics of diverse water bodies vary depending on their geographical location (from deep

blue ocean to coastal waters near land) and dissolved material content. The following water kinds are regarded in general:

- Pure sea water: Pure sea water absorption is the sum of absorption in pure water (no suspended particle matter) and absorption by salts in pure salt water. In the visible spectrum, the latter is thought to be insignificant (400 - 700 nm). The major limiting element in this case is absorption, which rises as the wavelength increases. As a result, red light with a wavelength of 500 nm is attenuated more than blue light, giving the deep blue ocean water its hue.
- Clear ocean water: Ocean water contains more dissolved particles, such as dissolved salts, mineral components, colourful dissolved organic materials, and so on. They are further classified into Type 1 - III (based on Jerlov water type) [67] depending on the concentration of suspended particles and their geographic location.
- Coastal ocean water: Coastal ocean water has a considerably greater concentration of dissolved particles, which increases turbidity. This water type has a greater absorption and dispersion impact.
- Turbid harbour: Due to the high concentration of dissolved and suspended particles, absorption and scattering restrict the propagation of optical beams.

There are two types of optical characteristics in water: intrinsic optical properties and apparent optical qualities. The medium, especially the composition and particle matter present in the medium, determines inherent optical characteristics, whereas apparent attributes are determined by both the medium and the geometric structure of the illumination, such as collimated or diffused beam. The absorption coefficient, scattering coefficient, attenuation coefficient, and volume scattering function are all intrinsic optical characteristics that are utilized to calculate the link budget in UOWC. Apparent characteristics determine the optical beam's directional property and are used to assess ambient light levels for communication near the water's surface. Radiance, irradiance, and reflectance are three typical apparent characteristics. Only regular and stable sources of illumination can produce the seeming characteristic. As a result, the downwelling irradiance from the Sun is not an obvious characteristic since it varies depending on the time of day and cloud cover.

Water's physical characteristics differ not just in terms of geography, but also in terms of vertical depth. The euphotic zone is the uppermost layer, and since it gets significant amounts of sunshine, it supports a lot of photosynthetic life (as chlorophyll is the main component of phytoplankton). In clear ocean water, this zone can be up to 200 meters deep, 40 meters deep on continental shelves, and 15 meters deep in coastal water. From the surface to the bottom, the change of chlorophyll with depth produces a skewed Gaussian profile. The deep-chlorophyll maximum is the peak on skewed Gaussian chlorophyll-depth profiles where the attenuation coefficient is at its greatest value.

The dysphotic zone [4] lies a few kilometers below this zone, when sunshine is insufficient for photosynthetic development. The aphotic zone is located below this zone, where no light ever reaches. Each of these zones has its distinct physical features, necessitating different connection budgets from one zone to the next.

Scattering occurs when the optical beam is deflected from its original path due to suspended particles or a change in density or refractive index, resulting in reflection or refraction. If the bit

rate is not reduced to account for temporal scattering, it causes a drop in the received signal's strength and ISI. It is generally wavelength agnostic, relying instead on the different particles present underwater. As a result, it has a stronger impact on coastal regions than on open waters. A volume scattering function (VSF) is designed to represent the scattering of light by suspended particles. It describes the angular distribution of scattered light to the incident irradiance per unit volume. The scattering becomes angle dependent if the input light is unpolarized and the water is isotropic.

According to the previous explanation, both absorption and scattering have an influence on the optical beam underwater; however, depending on the underwater environment, each of these phenomena has a dominant role. For example, absorption will be the limiting force in pure sea water or clear seas at first, but when the water gets closer to the land, where organic matter and dispersed particles are present, scattering will take over. As a result, the optical wavelength with the smallest absorption window shifts from blue-green to yellow-green. This means that in a wavelength-dependent underwater environment, a single wavelength is not a suitable choice. Proposes a multi-wavelength adaptive system with rate adaptive transmission to mitigate the unpredictable underwater environment.

UOWC delivers high-capacity, low-latency connections; but, due to the unique characteristics of the underwater channel, they are not capable of long-distance transmission. As a result, in order to maximize the benefits of an optical carrier in an underwater environment, its small range of coverage must be expanded. Several approaches have been investigated in attempt to overcome this restriction by taking use of the spatial and multipath diversities in UWOC systems (such as MIMO, OFDM [5], spatial modulation techniques etc.). Another approach for combating the difficult effects of UOWC and extending the range of optical communication is cooperative diversity (or relay-assisted diversity).

Multi-hop transmission is a type of relay-assisted transmission in which relays are set up in a serial configuration to divide up a relatively long route into shorter distances with less absorption, dispersion, and fading effects. With limited transmitted power, this aids in boosting connection coverage. The major issue in an underwater wireless sensor network, for example, is forwarding data from the source node to a control station that is situated distant. In this scenario, a hop-by-hop method is particularly useful, in which the nearest relay detects the data and transmits it to the next relay until it reaches the control station in the last hop. This technique not only spans a greater distance but also saves energy; otherwise, due to the negative effect of underwater channels, battery-operated source nodes would be unable to reach relatively far-flung control stations. Many researchers recently looked at a cellular underwater wireless optical code division multiple-access (OCDMA) network based on optical orthogonal codes (OOC) for various water kinds.

Some of the researchers use cooperative diversity in underwater settings, where each source node uploads its own data to a distantly placed optical base transceiver station (OBTS) using the OCC-OCDMA approach. The BER performance of relay-assisted OCDMA was examined, and it was discovered that even a dual-hop transmission in a 90 m point-to-point clear ocean connection outperformed direct transmission by 32 dB. Nicolaou et al. [6] presented a hop-by-hop technique of moving packets from the source to the destination node using a routing vector utilizing a geographic routing protocol, namely vector-based forwarding (VBF). Additionally, delay tolerant networking with the store-and-forward approach aids in underwater link outages,



particularly when there is no physical end-to-end connectivity owing to channel turbulence or any other barrier (e.g. ships). In cooperative diversity for underwater wireless communication systems, amplify-and-forward (AF) techniques enhance performance by 5 dB.

The transmission range of underwater optical wireless communication is just a few meters, but it has a high data rate, low power demand, and low latency. Acoustic communication, on the other hand, has a lower bit rate, higher power consumption, and considerable delay, but it has a longer range. Acoustic modems can transmit data at speeds ranging from 100 to 5000 bits per second over modest connection lengths, or at greater data rates over shorter distances. As a result, a hybrid system is required in order to benefit from both technologies. When operating within optical range, the hybrid system will provide high data rate and low latency, and when operating beyond optical range, it will provide extended range and resilience. The aim of underwater AUVs or sensors is to transmit a large amount of data to a central base station, where it is analyzed.

Both acoustic [7] and optical modems [8] are installed on these AUVs. After the alignment is aided by acoustic communications, the acoustic modem is utilized for long distance communication and the optical modem is used for short distance communication. As a result, optical transmitters consume the majority of the uplink capacity in hybrid systems by sending highly-directional high-bandwidth signals. The downlink signal from the base station or ship to the AUVs is a low-frequency acoustic signal with a broad field of view (FOV) that is used to aim or track the AUVs. The laser beam incident at the air-water boundary is exponentially attenuated by the medium in the linear regime of optical-acoustic conversion, creating an array of thermo-acoustic sources relating to the heat energy and physical dimensions of the laser beam in water, resulting in local temperature fluctuations that cause volume expansion and contraction.

### 3. FUTURE SCOPE

UOWC is a supplement to traditional acoustic connections since it offers high data rates with negligible latency over short distances. This lowers power consumption [9], allowing enabling more dependable underwater monitoring and surveillance applications over longer periods of time. Environmental monitoring, data collecting (such as water temperature, pH, etc.), oil/gas monitoring, and security are all areas where UOWC can be used. UOWC will provide an efficient and reliable means of communicating between surface vehicles, underwater equipment, and the seabed thanks to continuous research and advances in this sector. It finds use in heterogeneous network settings or dense underwater wireless sensor networks because to its inexpensive cost, compact size, low power consumption, and interoperability with other optical systems. A hybrid communication system [10] employing a dual mode (acoustic and optical) transceiver may provide extremely high data rates and can be utilized to aid underwater robotic sensor networks. In the event of a highly murky underwater environment, the system can convert to a low-data-rate acoustic transceiver, enhancing the communication link's dependability.

### 4. CONCLUSION

The growing number of autonomous vehicles in space and underwater necessitates an upgrade to the underwater communication infrastructure. Acoustic signals are used in traditional underwater communication, and despite significant advancements in this sector, acoustic communication struggles to offer sufficient bandwidth with minimal latency. Due to the significant absorption of electromagnetic signals at radio frequencies, RF transmissions for UOWC can only be utilized at

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ELF. The range and mobility of underwater activities are limited by the usage of optical fibers or coaxial connections. Because of its high data speeds, low latency, lower power consumption, and smaller packaging, optical underwater communication has a lot of promise to supplement traditional acoustic communication. Furthermore, this technique can profit significantly from advances in terrestrial optical wireless communication.

## REFERENCES

1. R. Movahedinia, J. Hautcoeur, and G. Panther, "Modelling and Simulation of GPS Multipath Propagation," 2010, doi: 10.1109/IEEECONF35879.2020.9330370.
2. H. Haas, C. Chen, and D. O'Brien, "A guide to wireless networking by light," *Progress in Quantum Electronics*. 2017, doi: 10.1016/j.pquantelec.2017.06.003.
3. G. S. Spagnolo, L. Cozzella, and F. Leccese, "Underwater optical wireless communications: Overview," *Sensors (Switzerland)*. 2010, doi: 10.3390/s20082261.
4. C. Färber, M. Wisshak, I. Pyko, N. Bellou, and A. Freiwald, "Effects of water depth, seasonal exposure, and substrate orientation on microbial bioerosion in the Ionian Sea (Eastern Mediterranean)," *PLoS One*, 2015, doi: 10.1371/journal.pone.0126495.
5. E. Abdullah, A. Idris, and A. Saparon, "Papr reduction using scs-slm technique in stfbc mimo-ofdm," *ARNP J. Eng. Appl. Sci.*, 2017.
6. J. H. Cui, P. Xie, Z. Zhou, N. Nicolaou, A. See, and Z. Shi, "Efficient vector-based forwarding for underwater sensor networks," *Eurasip J. Wirel. Commun. Netw.*, 2010, doi: 10.1155/2010/195910.
7. S. Sendra, J. Lloret, J. M. Jimenez, and L. Parra, "Underwater Acoustic Modems," *IEEE Sens. J.*, 2016, doi: 10.1109/JSEN.2015.2434890.
8. G. Cossu *et al.*, "Sea-Trial of Optical Ethernet Modems for Underwater Wireless Communications," *J. Light. Technol.*, 2018, doi: 10.1109/JLT.2018.2871088.
9. H. Kaushal and G. Kaddoum, "Underwater Optical Wireless Communication," *IEEE Access*, 2016, doi: 10.1109/ACCESS.2016.2552538.
10. F. Campagnaro, A. Signori, and M. Zorzi, "Wireless remote control for underwater vehicles," *J. Mar. Sci. Eng.*, 2010, doi: 10.3390/JMSE8100736.

## AN OVERVIEW ON COGNITIVE LOAD THEORY AND CONCEPTS OF HUMAN–COMPUTER INTERACTION

**Dr Vinay Kumar Mishra\***

\*Associate Professor,  
Department of Computer Science,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- vinaym.computers@tmu.ac.in

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### ABSTRACT

*With the ever-increasing complexity of e-learning environments, ideas from cognitive load theory (CLT) and human–computer interface (HCI) must be integrated (HCI). Both disciplines' fundamental ideas were compared and contrasted. A search of the literature database "The Guide to Computing Literature" for the terms "cognitive load theory" and "Sweller" yielded no results. In the titles or abstracts of 65 articles, the term "cognitive burden" appeared. The terms intrinsic, extraneous, and relevant cognitive burden were verified in every article. CLT principles have been used to HCI, according to the review. The notion of relevant cognitive load, on the other hand, has received little attention until now. The authors offer two conceptual models. Extraneous cognitive load is divided into two types in the first model: burden generated by instructional design and load caused by software use. The approach explains the emphasis of current instructional design concepts drawn from CLT, as well as conventional usability considerations. The second model incorporates CLT ideas into user-centered design's fundamental components. When it comes to creating e-learning environments, the idea of relevant cognitive burden shows that increasing cognitive load may be beneficial. Future interdisciplinary research topics have been sketched out.*

**KEYWORDS:** *Cognitive Load Theory, Human–Computer Interaction, Computer Assisted Instruction, Learning.*

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### 1. INTRODUCTION

Cognitive load theory (CLT) has become a widely accepted and applied theory in the field of instruction and learning since its inception in the 1980s. Research on instructional techniques for reducing unnecessary cognitive load due by poor learning task design dominated the first decade of CLT. Since then, research has focused on a variety of topics, including the importance of learners' degree of competence in relation to instructional principles and strategies for fostering the pertinent cognitive load needed for relevant learning processes. The goal of this article is to point out a new approach, namely the use of CLT in the design of complex electronic learning environments. CLT research has moved from investigating paper-based learning activities to

examining web-based learning, and it has extended to include CLT principles in both solo and group e-learning situations. The use of software tools that enable learners to produce media as part of their learning process is one example of such situations [1], [2].

Instructional design experts have been in charge of ensuring that cognitive load is optimized in traditional CLT research. They create learning materials in the first step, which are then used by students in the second. When learners actively participate in the media creation process or have the ability to change the presentation of learning materials, this responsibility is taken away from instructional design experts to some extent. As a result, we argue that the optimization of cognitive load should be considered in the design of learner software. Recent research on task selection for individual learners or cognitive load in collaborative learning has outlined some possible approaches [3], [4].

If CLT keeps moving in this direction, it will have to deal with a number of issues relating to software design and usage. Traditionally, these issues have been addressed in the field of human-computer interaction (HCI). As a result, the following questions are addressed in this paper:

- (a) Are the concepts of CLT and HCI compatible?
- (b) To what degree have HCI theories and methods absorbed CLT ideas and principles?
- (c) Is it possible for both areas to benefit from each other?

To do so, the fundamental assumptions of CLT must first be described. The historical development of the HCI discipline, as well as key concepts and methodologies, are outlined and contrasted with CLT in the following step. In addition, the use of CLT concepts in HCI is examined by conducting a literature search for CLT-related publications in HCI literature databases. Finally, two models are presented that combine basic CLT and HCI concepts. The models are used to sketch out areas where interdisciplinary research could be conducted.

## **2. COGNITIVE LOAD THEORY AND ITS BASIC ASSUMPTIONS**

The fundamental assumptions and ideas of CLT are described in the following sections. CLT is based on the idea of having a small working memory and a large long-term memory. Working memory is made up of partly separate processors that are linked to various sensory channels, such as an auditory "phonological loop" and a visual "visual-spatial sketchpad." Working memory capacity may be enhanced in some situations by using several sensory channels at the same time rather than just one. Working memory is required for all conscious cognitive activities. CLT's central claim is that any instructional design must consider working memory limitations in order to avoid an overload of working memory capacity and, as a result, a decline in learning.

To model learning, CLT refers to the schema theory. Long-term memory information is stored in mental schemata, according to this theory. Schemata are created during the learning process. Complex higher-order schemata that allow skilled performance are built by integrating lower-level schemata. Working memory limitations can be overcome by treating a schema as a single element. Information can also be processed without putting a strain on working memory thanks to schema automation [5]–[8]. The cognitive load theory (CLT) distinguishes three types of cognitive load that occur in working memory during learning. The first is intrinsic cognitive

load, which is defined by the inherent complexity of the information to be learned. It is contingent on the elements' interactivity. Because each word can be learned independently, vocabulary learning is an example of low element interactivity. Learning how to construct sentences in a foreign language, on the other hand, is an example of high element interactivity because it necessitates a knowledge of various parts of speech and their order. Only in relation to a learner's level of expertise can the intrinsic load of a task be determined.

Extraneous cognitive load is caused by an ineffective presentation of learning material or by requiring students to participate in activities that are unrelated to learning. Extraneous cognitive load is increased when information from spatially separate sources of information must be integrated; information from one source must be kept in working memory in order to integrate it with information from the other source. The final type of cognitive load, germane cognitive load, arises from active schema construction processes and is thus advantageous to learning. CLT used to only distinguish between intrinsic and extraneous cognitive load.

### **3. HUMAN–COMPUTER INTERACTION AS A FIELD OF RESEARCH**

Next the presentation of CLT's fundamental assumptions and ideas, the following sections will introduce HCI as an area of study. HCI is a multidisciplinary field that focuses on “the design, development, and implementation of interactive computer systems for human use, as well as the study of significant phenomena that surround them.” When monitors and workstations were accessible in the late 1970s and early 1980s, it became a separate research field that allowed non-engineers to utilize computers. Existing ergonomics and human factors expertise was used to create interface devices that addressed perceptual and motor problems. Later on, cognitive psychology knowledge was used to create command languages and menu designs. By the mid-1980s, the user base had expanded even further. With respect to interactive learning environments or training simulators, the use of computers for educational purposes became a focal point [9]–[11].

Network technology and mobile devices expanded the scope of research in the 1990s, taking it beyond individual users and desktop computers. The aim was to create interactive systems for people and groups in a variety of settings, including work, education, and entertainment, at home or on the move. Experts from various disciplines, such as sociology and anthropology, were engaged in the research. Theories and models of human behavior when interacting with technology, general or more specific guidelines or heuristics for the design and evaluation of information technology, methods for user-centered information technology development, and the development of new interaction paradigms and technologies are all major HCI research areas.

#### **3.1. Human Cognitive Models In HCI:**

A significant portion of HCI research and key ideas established in the 1980s were inspired by the theories used to describe human cognition in CLT. The idea that human working memory can only store a finite number of things at a time is well-known in user-interface design models of sensory memory, short-term memory, and long-term memory, and the component model of working memory inspired the human processor model of computer interaction. The reduction of cognitive burden for users was a key aim in interaction design developed from these theories.

#### **3.2. Usability:**



One of the most important ideas in HCI is usability. Usability, according to the International Organization for Standardization, is defined as the capacity of a user to do a job effectively, efficiently, and satisfactorily using a tool. Only in the context of its particular users and the specific activities to be completed can the degree of usefulness of a tool or application be determined. As a result, creating highly useable software applications requires a thorough knowledge of the users and their activities. Various usability guidelines, spanning from high-level usability objectives to very detailed design concepts, have been created. In terms of learnability, a system should enable new users to achieve a sufficient degree of competence in a reasonable period of time. The ease with which a system may be re-used once it has been learnt is referred to as memorability. It's especially essential when it comes to systems that aren't utilized very often. The effort required by a user to accomplish a job is referred to as efficiency of usage. System failures caused by improper user activities should be minimized, and if they do occur, the user should be able to recover quickly. Satisfaction refers to how enjoyable a system is to use, which is particularly essential for systems in a network domain.

A function that allows the user to choose an option from a menu rather than having the user enter a command is an example of a particular design concept that can be applied to prevent mistakes since spelling errors can be avoided in this manner. Regardless matter how precise the rules are, a common usability objective is to minimize user memory burden. Having users focus on recognition rather than recall, for example, by externalizing information; preventing users from having to remember information from one screen to the next; using generic commands such as copy and paste; keeping displays simple and clear, for example, by applying Gestalt laws; and only offering functionalities in the context in which they are used are all methods for reducing memory load.

### **3.3. User Experience Goals:**

With the expansion of computer applications outside the workplace, other considerations arose, such as the degree to which a system was deemed entertaining, motivating, aesthetically appealing, or encouraging of creativity, in addition to usability objectives. According to the study on user experience objectives, it may be interesting to design systems that are less efficient to use or more difficult to learn in the context of entertainment, thereby going against conventional usability goals while affecting motivation or pleasure. Usability and user experience objectives are not mutually exclusive since usability influences the quality of the user experience, and components of the user experience may affect how usable a system is perceived.

### **3.4. Human-Computer Interaction and Learning:**

In terms of two main elements of HCI, learning processes play a role. One basic feature is that in order to accomplish particular activities, inexperienced users must learn how to utilize a computer system. The second component is instructional software, which is designed to aid in the acquisition of information and skills in a variety of fields. In the case of educational software, many academics have looked at the importance of usability in the classroom. Traditional usability metrics, for example, were used to evaluate the usability of one of two online learning systems. After 15 minutes of utilizing one of the learning systems, students were required to take a test. Students who used the system that was regarded as the most useful had substantially higher learning results. According to researchers, the notion of usability in the area of educational computers must be tailored to pedagogical methods and learning theories. The



distinction between learning technology and technology employed as a productivity aid, according to researchers, is that learning technology should not only assist the efficient execution of a job. Increased usability may have a detrimental effect on learning in certain instances, since completing a job quickly may inhibit important learning processes.

## 4. DISCUSSION

CLT and HCI ideas and concepts have followed similar historical paths. In the 1970s and 1980s, the roots of both CLT and HCI were based on the same cognitive ideas. Both places a significant emphasis on lowering irrelevant cognitive burden. CLT incorporated concepts to promote germane learning processes, which may result in an increase in cognitive load, using the notion of germane cognitive load. Similarly, studies in HCI suggested that it may be advantageous to create apps that are less efficient or simple to use when creating applications for entertainment or education. However, this HCI study path is still young and contradicts conventional HCI ideas. Some CLT design concepts seem to have been used in software design in comparable ways when comparing CLT instructional design principles to usability objectives and principles. This is particularly true of the split-attention and redundancy principles. If a requirements analysis in software design indicates that different pieces of information are related to each other and are required for the completion of a task, the usability heuristic "The user should not have to remember information from one part of the dialogue to another," as well as the application of Gestalt laws, the user should not have to remember information from one part of the dialogue to another." In addition, the usability heuristic "Every additional unit of information in a conversation competes with the appropriate units of information" would prevent information from being repeated onscreen, in accordance with the redundancy principle. Furthermore, both CLT and HCI theories and methods recognize the importance of learner attributes, especially previous knowledge. Other CLT principles don't seem to have an equivalent in HCI. This is true of CLT principles that promote germane cognitive burden, as well as concepts that decrease extraneous cognitive load, such as the worked-example principle and the modality principle. This may be due to the fact that these concepts are more particular to learning processes.

We have suggested that by expanding CLT research into situations that utilize sophisticated software tools to assist individual and group learning, as well as learner-created media, CLT is confronted with a set of HCI-related problems. As a result, we looked at whether CLT and HCI concepts are compatible, as well as how widely CLT ideas have been embraced in the HCI literature. Both disciplines seem to share fundamental assumptions about the human cognitive system, and both fields have initially concentrated on reducing irrelevant load. Both disciplines have lately accepted the idea that designing apps that raise cognitive burden may be helpful. CLT and particularly the three kinds of cognitive load have made their way into the HCI literature, according to a literature search in the HCI related database "Guide to Computing Literature." Germane cognitive load, on the other hand, has found its way into the HCI literature to a lesser degree. One explanation for this may be because using relevant cognitive burden to attempt to increase cognitive load runs counter to HCI's still-dominant overall aim of reducing cognitive load.

## 5. CONCLUSION

Two models were proposed to further integrate CLT and basic HCI concepts. The models are meant to be high-level conceptual aids with implications for research and complicated

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educational software creation. The first model treats software-related cognitive load as a distinct type of extraneous load. This approach emphasizes the necessity of creating software that is simple to use and understand, as well as delivering software training as early as feasible in the learning process. The second model included CLT ideas into the user, task, and tool components of user-centered design. The notion of relevant cognitive load is critical in this paradigm because it illustrates the unique challenges of developing software tools to aid learning: The ultimate goal of employing such a tool is to create mental schemata. As a result, instructional software must allow for germane cognitive load, and increasing germane load may be beneficial.

Several areas for future research can be identified: CLT research involving sophisticated instructional software, for example, may benefit from using current usability standards and concepts to minimize unnecessary cognitive burden. The relevance of current CLT educational design concepts for educational software design should also be experimentally tested. It is not to be expected that CLT and its instructional design principles provide ready-to-use educational technology solutions. Such recommendations should always be implemented based on an in-depth knowledge of the users and their particular activities or objectives, according to user-centered software development techniques. This leads to another possible topic of future research: techniques for the design and assessment of educational software systems that include CLT principles. For example, in order to obtain a deeper knowledge of cognitive processes during the use of complicated educational software, think-aloud techniques may be used to correlate user comments with relevant and superfluous cognitive burden related to the learning topic and software use. In addition, the effect of learner characteristics on cognitive load and CLT principles should be further explored. While prior knowledge of the learning matter has been studied to some extent, CLT research on complex software systems would benefit from including prior knowledge of software usage. Depending on the level of software expertise, an educational software system may produce different learning outcomes. In addition, it would be fascinating to look into how current user experience research relates to cognitive load: For example, how do user experience factors, such as the visual aesthetics of educational software, influence cognitive load, learning outcomes, or mediating components such as motivation.

## REFERENCES

1. N. Hollender, C. Hofmann, M. Deneke, and B. Schmitz, "Integrating cognitive load theory and concepts of human-computer interaction," *Computers in Human Behavior*. 2010, doi: 10.1016/j.chb.2010.05.031.
2. M. R. Davids, M. L. Halperin, and U. M. E. Chikte, "Optimising cognitive load and usability to improve the impact of e-learning in medical education," *African J. Heal. Prof. Educ.*, 2015, doi: 10.7196/ajhpe.569.
3. S. Oviatt, *The Handbook of Multimodal-Multisensor Interfaces*. 2017.
4. S. Kopp and K. Bergmann, "Using cognitive models to understand multimodal processes: the case for speech and gesture production," in *The Handbook of Multimodal-Multisensor Interfaces: Foundations, User Modeling, and Common Modality Combinations - Volume 1*, 2017.
5. T. Lopez-Soto, "The Cognitive Construction of Dialog: Language and Mind," in *Logic, Argumentation and Reasoning*, 2012.

6. S. Oviatt, "Theoretical foundations of multimodal interfaces and systems," in *The Handbook of Multimodal-Multisensor Interfaces: Foundations, User Modeling, and Common Modality Combinations - Volume 1*, 2017.
7. F. Jia, W. Zhang, and X. You, "Cognitive research framework of virtual geographic environment," *Yaogan Xuebao/Journal Remote Sens.*, 2015, doi: 10.11834/jrs.20154013.
8. J. V Anastasiade, "Instructional strategies for developing problem-solving skills: The worked-example effect using ill-structured visual pattern recognition problems," *Diss. Abstr. Int. Sect. A Humanit. Soc. Sci.*, 2010.
9. S. Kumar, "Author productivity in the field of human computer interaction (HCI) research," *Ann. Libr. Inf. Stud.*, 2014.
10. S. S. Rautaray and A. Agrawal, "Vision based hand gesture recognition for human computer interaction: a survey," *Artif. Intell. Rev.*, 2015, doi: 10.1007/s10462-012-9356-9.
11. E. S. Poole, "HCI and mobile health interventions: How human-computer interaction can contribute to successful mobile health interventions," *Transl. Behav. Med.*, 2013, doi: 10.1007/s13142-013-0214-3.

## UPGRADATION IN EFFICIENCY OF CENTRIFUGAL PUMP

Dr. Varun Kumar Singh\*

\*Associate Professor,  
Department of Applied Science (Chemistry),  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- drvarun.engineering@tmu.ac.in

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### ABSTRACT

*The main objective of this work is to understand role of the computational fluid dynamics (CFD) technique in analyzing and predicting the performance of centrifugal pump. Computational Fluid Dynamics (CFD) is the present-day state-of-art technique for fluid flow analysis. The critical review of CFD analysis of centrifugal pump along with future scope for further improvement is presented in this paper. Different solver like ANSYS-CFX, FLUENT etc. can be used for simulations. Shear stress transport model has been found appropriate as turbulence model. Study of pressure contours, velocity contours, flow streamlines etc. can be studied by CFD techniques. Unsteady Reynolds Averaged Navier Stokes (URANS) equations are solved by solver to get flow simulation results inside centrifugal pump. CFD results has to be validated with testing results or with performance characteristics curves. Performance prediction at design and off-design conditions, parametric study, cavitation analysis, diffuser pump analysis, performance of pump running in turbine mode etc. are possible with CFD simulation techniques.*

**KEYWORDS:** *Computational Fluid Dynamics (Cfd), Centrifugal Pumps, Flow Rates, Pressure.*

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### INTRODUCTION

Centrifugal pump is a most common pump used in industries, agriculture and domestic applications. The centrifugal pump creates an increase in pressure by imparting mechanical energy from the motor to the fluid through the rotating impeller. The fluid enters from impeller eye and flows along its blades. In this centrifugal force developed due to rotation of impeller. This centrifugal force increases fluid velocity and then kinetic energy is transformed to pressure.

In this study, the performance of impellers with the same outlet diameter having different outlet blade angles is thoroughly evaluated. The numerical solution of 3D, incompressible Navier-Stokes equations over an unstructured and non-uniform grid is accomplished with a commercial CFD finite volume code. For each impeller, the flow pattern and the pressure distribution in the blade passages are calculated and finally the head-capacity curves are compared. When the pump operates off design, the percentage raise of the head curve, due to the increment of the outlet blade angle, is larger for high flow rates and becomes smaller for flow rates  $Q/Q_N$ . trailing edge

for designed flow rate are presented. The pressure contours show a continuous pressure rise from leading edge to trailing edge of the impeller due to the dynamic head developed by the rotating pump impeller[1]–[3].

Near leading edge of the blade low pressure and high velocities are observed due to the thickness of the blade. trailing edge for designed flow rate is presented. The pressure contours show a continuous pressure rise from leading edge to trailing edge of the impeller due to the dynamic head developed by the rotating pump impeller. Near leading edge of the blade low pressure and high velocities are observed due to the thickness of the blade design and large flow rates. The pump head and efficiency are also influenced by the blade wrap angle. The highest head and efficiency are also observed for the largest angle. An experiment rig is designed and built to test the performance of the pump with the largest wrap angle.

The test results show that the wide space of its efficiency area and the stability of its operation ensure the excellent. CFD plays an important role in Fluid flow analysis of Centrifugal pump and performance prediction. Different solver like ANSYS, FLUENT etc. can be used for simulation of Centrifugal Pump. Blade angles, wrap angle, number of blades, turbulence model used etc. have deep effect on performance of centrifugal Pump. As discharge increases, head decreases, power input of pump shaft increases, & efficiency of pump increases. Efficiency is maximum at rated conditions, beyond this as discharge increases, efficiency decreases. Pressure continuously increases as the mechanical energy imparted in form of impeller rotation is converted into the pressure energy. Shear stress transport (SST) turbulence model provides better result than any other turbulence model.

At high flow rates, increase in outlet blade angle causes improvement in Hydraulic efficiency. At low flow rates very high recirculation of flow takes place in suction side of the blade. With increase in wrap angle head and efficiency of pump increases. Performance prediction at design and off-design conditions, parametric study, cavitation analysis, diffuser pump analysis, performance of pump running in turbine mode etc. are possible with CFD simulation techniques.

Pump improvements often handle maintenance and repair difficulties as well as efficiency, extending pump life and dependability, preventing expensive product from flowing down the drain, and even preventing spills that may result in costly cleanups and penalties from regulatory bodies such as the EPA. In many circumstances, the upgrade's decreased downtime trumps all other advantages.

During poor times, allocating precious funds to improving rather than merely maintaining a pump may be problematic. However, as the preceding example shows, the payback might be quite swift. The money saved may then be used to pay for things like wasted energy and more costly repairs down the road. It's vital to keep in mind that if a pump is due for maintenance or is in need of immediate repair, the cost of improvements may be small. Pumps with improved efficiency and dependability may also be specified during plant expansions and new installations. Most pump manufacturers can meet these requirements, and skilled service facilities can generally update off-the-shelf pumps as needed.

Coating improvements are one of the finest methods to enhance performance and extend the mean time between failures in most typical pump applications (MTBF). Surface coatings have nothing to do with aesthetics, despite the fact that they resemble paint. Coatings, on the other hand, are made to minimize friction (and hence increase efficiency) or to withstand erosion and

corrosion (thereby improving reliability and extending pump life). They achieve both aims in certain instances. Coating enhancements are often applied to the impeller and volute's rough surfaces to boost efficiency and protect this comparatively soft brass or cast iron elements from erosion and corrosion.

When a pump is removed for repair or maintenance, abrasive wear is obvious, but it's typically dismissed as "normal for the application." Indeed, some plant managers consider low pump life to be so "typical" that they replace pumps on a regular basis. Erosion-resistant coatings for the wet end, on the other hand, may often increase the life of a pump while also lowering operating expenses. Furthermore, the coating may frequently be renewed on a regular basis for a fraction of the cost of replacing the pump. Coating enhancements may be advantageous within bearing housings or even on exterior pump surfaces, depending on the application.

Coating the interior of the pump bearing housing with a protective coating may extend bearing life by removing a damaging contaminant: rust. According to SKF, even little contamination reduces the life of oil-lubricated bearings by a factor of four. After components have been cleaned and exposed to moisture in the environment during the repair process, rust may develop on bare cast iron and steel surfaces within a few hours. Moisture in the air may oxidize inner surfaces after installation. Rust may be prevented from developing and being washed into the bearing by lubricating oil by using the suitable paint or industrial coating.

No one would paint a submersible sewage pump's exterior to make it appear nice. However, a decent protective coating might be the difference between affordable reconditioning and costly replacement the next time the pump is serviced.

Even if the main goal is to guard against wear and corrosion, any of the coatings developed for pump wet-end applications will give a smoother surface that decreases friction. Nonetheless, certain coatings, including a variety of polymer kinds, are specifically intended to cure to an extremely hard, durable, and slick surface, reducing friction losses even more. As a consequence, the pump is more efficient and resistant to corrosion and erosion. When energy efficiency is a priority, proper coating material selection will result in lower running costs.

## **DISCUSSION**

Piping is used to contain the fluid and carry it from the pump to the point of use. The critical aspects of piping are its dimensions, material type, and cost. Since all three aspects are interrelated, pipe sizing is an iterative process. The flow resistance at a specified flow rate of a pipe decreases as the pipe diameter gets larger; however, larger pipes are heavier, take up more floor space, and cost more than smaller pipe. Similarly, in systems that operate at high pressures (for example, hydraulic systems), small-diameter pipes can have thinner walls than large-diameter pipes and are easier to route and install. Fluid system designs are usually developed to support the needs of other systems. For example, in cooling system applications, the heat transfer requirements determine how many heat exchangers are needed, how large each heat exchanger should be, and how much flow is required.

Pump capabilities are then calculated based on the system layout and equipment characteristics. In other applications, such as municipal wastewater removal, pump capabilities are determined by the amount of water that must be moved and the height and pressure to which it must be pumped. The pumps are sized and configured according to the flow rate and pressure



requirements of the system or service. After the service needs of a pumping system are identified, the pump/motor combination, layout, and valve requirements must be engineered. Selecting the appropriate type of pump and its speed and power characteristics requires an understanding of its operating principles. The most challenging aspect of the design process is cost-effectively matching the pump and motor characteristics to the needs of the system. This process is often complicated by wide variations in flow and pressure requirements. Ensuring that system needs are met during worst-case conditions can cause designers to specify equipment that is oversized for normal operation.

In addition, specifying larger than necessary pumps increases material, installation, and operating costs. For practical pump applications, the energy of a fluid is commonly measured in terms of head. Head is usually expressed in feet or meters, which refers to the height of a column of system fluid that has an equivalent amount of potential energy. This term is convenient because it incorporates density and pressure, which allows centrifugal pumps to be evaluated over a range of system fluids. For example, at a given flow rate, a centrifugal pump will generate two different discharge pressures for two different density fluids, but the corresponding head for these two conditions is the same.

The total head of a fluid system consists of three terms or measurements: static pressure (gauge pressure), height (or potential energy), and velocity head (or kinetic energy). Static pressure, as the name indicates, is the pressure of the fluid in the system. It is the quantity measured by conventional pressure gauges. The height of the fluid level has a substantial impact on the static pressure in a system, but it is itself a distinct measurement of fluid energy. For example, a pressure gauge on a vented tank reads atmospheric pressure. If this tank is located 50 feet (ft) above the pump, however, the pump would have to generate at least 50 ft of static pressure (for tap water, the gauge would have to read 21.7 pounds per square inch [psi] to push water into the tank. Velocity head (also known as “dynamic head”) is a measure of a fluid’s kinetic energy.

In most systems, the velocity head is small in comparison to the static head. For example, the flow velocity in cooling systems does not typically exceed 15 ft per second, which is roughly equivalent to 3.5 ft of head (if the system fluid is water, this velocity head translates to about 1.5 psi gauge. The velocity head of a fluid must be considered when siting pressure gauges, when designing a system, and when evaluating a reading from a pressure gauge, especially when the system has varying pipe sizes. A pressure gauge downstream of a pipe. The damaging aspect of cavitation occurs when these vapor bubbles return to liquid phase in a violent collapse. During this collapse, high-velocity water jets impinge onto surrounding surfaces. The force of this impingement often exceeds the mechanical strength of the impacted surface, which leads to material loss[4]–[11].

Over time, cavitation can create severe erosion problems in pumps, valves, and pipes. Other problems that cause similar damage are suction and discharge recirculation. Suction recirculation is the formation of damaging flow patterns that result in cavitation-like damage in the suction region of an impeller. Similarly, discharge recirculation is the formation of damaging flow patterns in the outer region of an impeller. These recirculation effects usually result from operating a pump at a flow rate that is too low. To avoid this type of damage, many pumps are listed with a minimum flow rating. A throttle valve chokes fluid flow so that less fluid can move through the valve, creating a pressure drop across it. Throttle valves are usually more efficient than bypass valves, because as they are shut, they maintain upstream pressure that can help push

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fluid through parallel branches of the system. Bypass lines allow fluid to flow around a system component.

A major drawback of bypass valves is their detrimental impact on system efficiency. The power used to pump the bypassed fluid is wasted. In static-head-dominated systems, however, bypass valves could be more efficient than throttle valves or systems with adjustable speed drives (ASDs). Pump speed control includes both mechanical and electrical methods of matching the speed of the pump to the flow/pressure demands of the system. ASDs, multiple-speed pumps, and multiple pump configurations are usually the most efficient flow control options, especially in systems that are dominated by friction head, because the amount of fluid energy added by the pumps is determined directly from the system demand. Pump speed control is especially appropriate for systems in which friction head predominates.

## CONCLUSION

Although pumps are available in a wide range of types, sizes, and materials, they can be broadly classified into the two categories described earlier—positive displacement and centrifugal. These categories relate to the manner in which the pumps add energy to the working fluid. Positive displacement pumps pressurize fluid with a collapsing volume action, essentially squeezing an amount of fluid equal to the displacement volume of the system with each piston stroke or shaft rotation. Centrifugal pumps work by adding kinetic energy to a fluid using a spinning impeller. As the fluid slows in the diffuser section of the pump, the kinetic energy of the fluid is converted into pressure. Although many applications can be served by both positive displacement and centrifugal pumps, centrifugal pumps are more common because they are simple and safe to operate, require minimal maintenance, and have characteristically long operating lives.

Centrifugal pumps typically suffer less wear and require fewer part replacements than positive displacement pumps. Although the packing or mechanical seals must be replaced periodically, these tasks usually require only a minor amount of downtime. Centrifugal pumps can also operate under a broad range of conditions. The risk of catastrophic damage due to improper valve positioning is low, if precautions are taken. Centrifugal pumps have a variable flow/pressure relationship. A centrifugal pump acting against a high system pressure generates less flow than it does when acting against a low system pressure.

A disadvantage is that positive displacement pumps typically require more system safeguards, such as relief valves. A positive displacement pump can potentially system piping and components. For example, if all the valves downstream of a pump are closed—a condition known as deadheading—system pressure will build until a relief valve lifts, a pipe or fitting ruptures, or the pump motor stalls. Although relief valves are installed to protect against such damage, relying on these devices adds an element of risk. In addition, relief valves often relieve pressure by venting system fluid, which may be a problem for systems with harmful or dangerous system fluids.

## REFERENCES

1. X. Han, Y. Kang, D. Li, and W. Zhao, “Impeller optimized design of the centrifugal pump: A numerical and experimental investigation,” *Energies*, 2018, doi: 10.3390/en11061444.
2. F. E. Selamat, W. H. I. Wan Izhan, and B. S. Baharudin, “Design and analysis of centrifugal pump impeller for performance enhancement,” *J. Mech. Eng.*, 2018.

3. S. A. I. Bellary, A. Husain, A. Samad, and R. A. Kanai, "Performance optimization of centrifugal pump for crude oil delivery," *J. Eng. Res.*, 2018, doi: 10.24200/tjer.vol15iss1pp88-101.
4. V. Cucit, F. Burlon, G. Fenu, R. Furlanetto, F. A. Pellegrino, and M. Simonato, "A control system for preventing cavitation of centrifugal pumps," 2018, doi: 10.1016/j.egypro.2018.08.074.
5. S. Derakhshan, M. Pourmahdavi, E. Abdolahnejad, A. Reihani, and A. Ojaghi, "Numerical shape optimization of a centrifugal pump impeller using artificial bee colony algorithm," *Comput. Fluids*, 2013, doi: 10.1016/j.compfluid.2013.04.018.
6. H. xun Chen, J. wu He, and C. Liu, "Design and experiment of the centrifugal pump impellers with twisted inlet vice blades," *Journal of Hydrodynamics*. 2017, doi: 10.1016/S1001-6058(16)60822-3.
7. M. G. Tan, X. H. He, H. L. Liu, L. Dong, and X. F. Wu, "Design and analysis of a radial diffuser in a single-stage centrifugal pump," *Eng. Appl. Comput. Fluid Mech.*, 2016, doi: 10.1080/19942060.2016.1210027.
8. A. Sojoudi, A. Nourbakhsh, and H. Shokouhmand, "Experimental evaluation of temperature rise in centrifugal pumps at partial flow rates," *Journal of the Brazilian Society of Mechanical Sciences and Engineering*. 2018, doi: 10.1007/s40430-018-1078-8.
9. L. Tan, B. Zhu, S. Cao, Y. Wang, and B. Wang, "Influence of prewhirl regulation by inlet guide vanes on cavitation performance of a centrifugal pump," *Energies*, 2014, doi: 10.3390/en7021050.
10. Y. Ren, Z. Zhu, D. Wu, J. Mu, and X. Li, "An improved turbulence model for separation flow in a centrifugal pump," *Adv. Mech. Eng.*, 2016, doi: 10.1177/1687814016653310.
11. Y. Ye, X. Zhu, F. Lai, and G. Li, "Application of the semi-analytical cavitation model to flows in a centrifugal pump," *Int. Commun. Heat Mass Transf.*, 2017, doi: 10.1016/j.icheatmasstransfer.2017.04.021.

## A REVIEW ON WOMEN'S EMPOWERMENT VIA WOMEN'S NETWORK LEARNING

**Mohita Verma\***; **Ruby Sharma\*\***

\*Assistant Professor,  
Department of Education, English, Faculty of Education  
Teerthanker Mahaveer University, Moradabad, Uttar Pradesh  
Email Id- mohitav.education@tmu.ac.in

\*\*Assistant Professor,  
Department of Education, English, Faculty of Education  
Teerthanker Mahaveer University, Moradabad, Uttar Pradesh  
Email Id- <sup>1</sup>mohitav.education@tmu.ac.in

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### ABSTRACT

*The goal of advanced education envisions networking, learning and therefore the sharing of ideas about common interests among teacher, student, and other people. Since, learning ignites psychosocial information processes by connecting the observer cognition, the network learning reinforces structure, content, and sorts of processing the info among groups and cohorts. Women when, network with learning communities hidden opportunities onset to let loose barriers between the interest progress. Virtual research environments and cloud computing, social network sites, blogs, then made the learning as a collaborative exercise. Constructivist's cognitive learning of Piaget, Situated learning of Jean Lave, and Transfer of learning from Salomon and Perkins support the network learning model paradigm. This paper aims to bringing forth the utility of girl's network learning to spice up education. Women network learning enhances quality, progress and optimism in education within the near future. The experts' research works supplements the knowledge to shape and uplift the ladies network learning as a social quality stroke to education in our overprotective social organization.*

**KEYWORDS:** *Community, Education, Empowering, Network Learning, Women Learning Network (Wln), Women.*

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### 1. INTRODUCTION

Women Network Learning is a global initiative that adds value to women's education. In the social network age, productive networks among women's communities enhance learning practice in education, a possibility that has not been completely utilized. Women have traditionally been seen as followers of patriarchal social norms, rather as official instructors and learners, in societies. Women's movements have gained worldwide prominence in recent decades, and a technological revolution has accelerated the women's network's ability to promote change via education. With the aim of creating a network learning women's community, not only will the battle against social evil be strengthened, but it will also be eradicated collectively via the

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greatest educational effort possible. Furthermore, the value of WNL education, in addition to addressing problems that afflict the weaker part, attempts to eliminate them via a collaborative method linked by a digital network. Collaborative learning methods play an essential part in society's fight against evil [1].

The links in network learning disseminate information and knowledge across the community. Because the structure of human connections is enormously vast, information flows rapidly via the internet. The learning approach improves the structure of data production, distribution, and consumption in the community. Furthermore, "learning via networks" relates to an interaction society in which individuals may communicate and engage "anytime, anywhere" by concentrating on various data flows or information science. People's knowledge, in a sense, awakens the issues. WNL is defined in this article as a therapy for women's communities that uses the network effect in education innovation to bring about social change. As a result, the value of education liberates society's issues by combating evils. As a result, "networked learning provides educational institutions with greater operational efficiency, lowering costs for employers and taxpayers [2]."

The Online and smartphones phones, among some other digital technologies, are critical for attaining the Sustainable Development Goals by 2030. The International Development Research Centre of Canada's Networked Economies initiative has funded research that has shown that Under the proper circumstances, digital technology may help achieve the Sustainable Development Goals (SDGs) by promoting economic development, strengthening governance, and increasing educational achievements as well as your health. Simultaneously, the beneficial benefits of digital innovation may be all too readily countered.

The influence of technology in exacerbating economic and social inequality. Women and girls, for example. Many people in underdeveloped countries lack the ability to utilize digital technology, as well as equitable access to it. tools. This not only exacerbates the existing substantial pay disparities, but it also implies that as more occupations migrate online, women will struggle to take advantage of 21st-century career possibilities. online. A more serious issue is that women who do get internet skills and access are more likely to use them. suffer extreme abuse as internet "trolls" attempt to humiliate, insult, and isolate them Female voices are heard. The fact that women are underrepresented in the digital world adds to the prejudice. Computer science and engineering are two disciplines that influence technology design. In order to ensure women's participation in these places, technical advancements must be made. built with their needs in mind, such as to combat prejudice or harassment, or to offer information on improved sanitation, or to encourage flexible work arrangements. The NE program's aim is to learn how digital innovation affects developing and middle-income countries. Countries with a high level of income may promote democratic and inclusive economic possibilities. The schedule is as follows: seeks to achieve this objective through enhancing cyberspace governance and connecting individuals in cyberspace. by introducing the global South to the internet world and economic possibilities; and by testing and scaling. Entrepreneurship, education, and democracy will all benefit from digital advances. The program's goal is to use technology to promote improved gender-related outcomes. growth in three areas that are intertwined [3].

- Increasing the visibility of pro-women policies and rights on the internet;



- Using testing to improve governance and provide economic possibilities for women and scalability of digital advances.
- Improving technology access as well as the skills required to develop and innovate.

This article proposes that women should network in education due to the obvious empowering framework for our education and, as a result, for society's benefit. To put it another way, the study looks at how women's network learning contributes to the online learning community for women in education and, in turn, to the social construction of gender toward societal empowerment. How may educational methods be used to bring about change for the betterment of the educational field? The meta-analysis technique was used to review sources from govt repositories as well as scientific papers that analyze the research results of collaborative or connective learning in digital society to improve the status of girls in society, liberate control frameworks, as well as achieve growth and prosperity in structured social hierarchy paradigms [4], [5].

### **WNL Is The Result Of A Literature Review Analysis:**

The best way to characterize our civilization is as a network society. In-depth research shows how social networks are changing our everyday lives and how organizations are adapting to the digital age. Technology has far-reaching consequences for the social construction of gender and the greatest quantity of information as a business in our daily lives. The literature on WNL as a learning, construction, and reworking function, in particular, was referred to, identified, and evaluated for worthy social groupings. Figure 1 depicts the relationship between girls' network learning and online learning, as well as gender social construction and future social paradigms [6].

### **WNL as a Women's Online Learning Community:**

Women have been learning to control the destinations of male domination from the beginning of their schooling by rearranging the traditional gender power equations in the social sphere. "Network social support satisfies some advantages for the women which is assistance for women future," says a woman who is part of a women's network that boosts social support and transforms the idea of girls. Women's education has always been handled unequally in cultures; but, in the digital age, women are learning to act in connections as much as they do in groups and classes. "The studies show that women have bigger networks and get support from various sources, while males prefer to trust their wives exclusively," according to the research on diabetes patients. Similarly, women benefit from collaborative online learning because "online collaborative learning has been that anybody may engage completely and equally regardless of what their accessibility problems are, as long as they're provided an acceptable way of entering the conversations."

In fact, "today's college students are characterized as preferring digital, linked, immersive, instantaneous, and social learning experiences." They seem to have no fear of technology or connecting with individuals they haven't met face to face" since they are always connected. Furthermore, "in advancing teaching and learning environments, but perhaps they're best viewed as supplements to direct interaction and engagement with face-to-face teachers, especially when considering the requirements of struggling students with less than ideal educational backgrounds," computer and Internet-based interactions have useful roles to play. As a result, "there may be a medium-level connection between online learners' feeling of community and



their views of team development process success.” Learning communities are defined as “a family of programs that intentionally create community to achieve specific learning objectives, increase interaction and collaboration with peers and school both in and out of the classroom, and use active learning techniques to specialize in multi or interdisciplinary concerns” in simple terms. Community members "report an enhanced feeling of duty to engage in the learning experience and an understanding of their responsibility for both their own learning and, as a result, the learning of others," according to the study. The synthesized collection demonstrates unanimity in defending the WNL as a future learning community for women. Because "even one voice becomes strong when the whole world remains quiet."

### **WNL as an Online Gender Social Construction:**

Women's empowerment begins with social construction of gender, and online learning aids in the development of gender ideas among the users of the girl's community. Because "issues of gender shouldn't be addressed in isolation from other variables like learning styles, educational backgrounds, and skills," social construction of gender is linked with numerous elements. Gender certainly affects online behavior, as "more females than men prefer to build their online social identities using pictures, particularly with symbolic interpretations," according to the study. Furthermore, among females, online social networks show "creation and reconstruction of identity," "impression management," and the use of "dominant heterosexual cultural norms and values." Patriarchal dominance continues to exist in cultures, despite the self-regulated online learning environment. As a result, network learning creates a new social order for women. Higher education is improved through social innovation; women's empowerment breaks new ground, and social media improves network linkages in the pursuit of gender parity.

The goal of this study is to learn more about the purpose of women's network learning and how it may aid in women's empowerment. This article conducts a survey using online google forms as well as online sites that aid in the collection of real data for the purpose of empowering women via women network learning. In this article, researchers discover the results of empowering women via women network learning, as well as describe how women network learning benefits women's lives and what the network learning's real effect is.

The Association for Modern Communications is an international network dedicated to empowering individuals and organizations by providing easy and affordable access to a free and open Internet that contributes to improved their lives. This is an area of study that focuses on these problems. The project will offer an overview of major issues, trends, and recommendations. Efforts in digital communication technologies pertaining to gender and associated problems, with an emphasis on identify the gaps in existing efforts, especially in governance, entrepreneurship, and education. research; and evaluate the variables that contribute to success and the major difficulties that research networks confront, especially Among the wide field of information or communication, those that concentrate on gender, sexuality, including inclusion technologies [7].

## **2. LITERATURE REVIEW**

Oblinger et al. Studied about New ideas regarding learning environments provide a major potential for higher education to improve the success of learners and learning. Today's learning spaces have the ability to serve the new learning paradigm while also meeting the requirements and expectations of the most recent generation of students: the Net Generation, thanks to the use

of information technology. Learning and the environment in which it takes place are important since education is the fundamental purpose of higher education. We must create learning environments that maximize the confluence of the Net Generation, contemporary learning theory, and information technology in order to best serve the educational business. This chapter outlines the connections between Net Generation students, learning theory, and technology, demonstrating how they are relevant to the notion of learning environments. Over the last decade, the concept of learning space has broadened and grown considerably more inclusive. The implications of learning theory for both Net Generation students and learning space design will be addressed. It will be determined if there are any links between this new notion of learning environments and the behaviors and features of Net Gen students. Finally, scenarios will depict how these new places may appear [8].

Kandpal et al. looked into Engagement in a community-level female empowerment program in India improves members' physical mobility, political participation, and access to work, according to this study. Support groups, literacy camps, adult education courses, and vocational training are all part of the program. We untangle the program's processes using truncation-corrected matching and instrumental variables on primary data, separately examining the impact on working women and those who do not work but whose reservation pay is raised by participation. In comparison to women in untreated areas, we also detect substantial spillover effects on non-participants [9].

Mikael Wiberg et al. investigated connect with one other in completely new ways thanks to modern information technology. *The Interaction Society: Theories, Practice, and Supportive Technology* gives readers a comprehensive overview of the developing interaction society made possible by modern technology and communication (ICT). Readers will gain a theoretically deep understanding of the essential issues surrounding the character of the emerging interaction society, be exposed to empirical case research findings that can aid in understanding the impact of this emergence through analysis of concrete examples, as well as benefit from descriptions of concrete designers aimed at designing new novel information technologies to support activities [10].

Erdem Aydin et al. studied about The goal of this research is to see whether there is a link between Turkish online learners' feelings about their classroom community, their views of team building success, as well as their preferences for studying in groups. Data was collected using a survey instrument that contained the Sense of Classroom Community Scale, Tuckman's Teamwork Questionnaire, and a few additional questions. According to the findings, there is a moderate connection between online learners' feeling of community and their views of team building success. To put it another way, the research indicates that a feeling of classroom community may be utilized to predict collaboration performance and vice versa. It was also discovered that each step of the team development process had an impact on the next; therefore, when an issue arose in one level, it often resurfaced in subsequent stages. Furthermore, the bulk of the issues happened during the formation stage, which is the initial step of the team development process, according to the findings [11].

### 3. DISCUSSION

Researchers conduct a survey on Empowering Women via Women Network Learning in this article. Sharing, encouragement, and validation are all part of networking. It's all about

establishing trust and encouraging one another to achieve common goals. Connecting and discussing problems and ideas will lead to the formation of new relationships, as well as the gathering of feedback and knowledge from women. It's incredible how networks have helped women communicate and learn from one another, despite obstacles such as poor connectivity that prevent emerging technology targeted at local women from being promoted. The Association for Modern Communications is conducting this research scoping projects.

Networks will go even further to bridge the gap among both women's lack of awareness, networks will build capacity, and networks will connect women in need. In this research, women's opinions on Empowering Women through Women Network Learning were gathered via an online survey using a Google Form and other websites that assisted in the collection of data for Empowering Women through Women Network Learning. This study also aided in determining the effect of technology on women's lives, as well as how online learning may assist women in their educational pursuits. Following the completion of this study, the author observed how women network learning aids in women's empowerment and what impact women network learning has on women's lives. 79 percent of women said that women network learning has aided in a positive manner, ten percent of women said that women internet backbone learning has had no effect on their lives, and eleven percent of women are in the neutral category.

#### 4. CONCLUSION

The importance of education is summed up by Gandhi's words, "Live as if you were going to die tomorrow." Learn as though you'll be measuring for the rest of your life." Women's network learning is envisioned in the article as a method of attaining learning and empowerment in education for society. "Studies assessing the efficacy of learning communities indicate that they enhance students' achievement of a good range of educational and social outcomes essential to graduates confronting new social, political, and economic challenges," according to the report. By linking users' information and expertise to individuals and communities, online learning helps the women's community. Such interconnectedness contributes to women's empowerment in terms of learning and expressing themselves in society. Women are accommodated within the scope of learning innovation in order to hasten society's development and prosperity.

The crucial network is beneficial, particularly if you're a female entrepreneur, and it's been helpful for women throughout the years. Many women across the globe have voiced their support for women's empowerment via women's network learning. Life will alter if you network with others who share your goals. You discover new forms and information on a topic you were previously unaware of. For example, we've heard a lot about the Development Goals (SDGs), women's empowerment ideas, how to get funding as a start-up for non-governmental organizations (NGOs), and much more in the past month. We work together and hear from one another that we're driven, so distance isn't an issue for waste electrical equipment (WEE). We have a powerful weapon in the form of networking. The effect of women network learning in the future will aid in the development of the nation as well as boosting the percentage of educated and working women in every industry.

#### REFERENCES

1. R. A. Rhoads, "MOOCs, High Technology, and Higher Learning."
2. E. Lytras, Miltiadis D., Ed.; Gasevic, Dragan, Ed.; Ordonez de Pablos, Patricia, Ed.; Huang,

Weihong, "Technology Enhanced Learning: Best Practices."

3. O. M. Agunbiade, M. O. Obiyan, and G. B. Sogbaike, "Identity construction and gender involvement in online social networks among undergraduates in two universities, Southwest Nigeria," *Inkanyiso*, vol. 5, no. 1, pp. 41–52, 2013.
4. J. Benes, M. Brejcha, And V. Bergsteinova, *Einfluss einiger Antibiotika auf das Nachirradiationssyndrom bei Mäusen und Ratten. II*, vol. 4, no. 3. 1957.
5. E. Carm and L. Øgrim, "M-learning—a Potential for Women's Empowerment?," *World Stud. Educ.*, vol. 14, no. 1, pp. 57–77, 2013, doi: 10.7459/wse/14.1.05.
6. Manuel Castells, "The Rise of the Network Society July 2000."
7. V. Tinto, "Learning better together: The impact of learning communities on student success," *High. Educ. Monogr. Ser.*, vol. 1, pp. 1–8, 2003.
8. D. Oblinger, *Learning Spaces / EDUCAUSE e-book*. 2006.
9. E. Kandpal, K. Baylis, and M. Arends-Kuenning, "Empowering women through education and influence: An evaluation of the Indian Mahila Samakhya program," *IZA Discuss. Pap.*, no. 6347, 2012.
10. Mikael Wiberg, "The Interaction Society: Practice, Theories and Supportive Technologies."
11. I. Erdem Aydin and S. Gumus, "Sense of classroom community and team development process in online learning," *Turkish Online J. Distance Educ.*, vol. 17, no. 1, pp. 60–77, 2016, doi: 10.17718/tojde.09900.

## A STUDY OF THE WORKING OF THE GAS ARC WELDING

**Shri Bhagwan\***

\*Assistant Professor,  
Department of Agriculture Science (Botany),  
Faculty of Agriculture Science,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email [Id-shakuli2803@gmail.com](mailto:Id-shakuli2803@gmail.com)

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### ABSTRACT

*MS-1018 is a non-hardened ductile steel with a low carbon content. It's been widely utilized for machining applications including machine components, rods, bolts, and studs, among others. It implies that welding capacity is robust and that carburized components are often welded. The impact of welding current, voltage, gas flow rate, welding speed, and gas pressure on mechanical characteristics such as tensile strength and percentage of elongation of GMAW welded MS 1018 plate joints is investigated in this article. GMAW welding is a high-deposition-rate welding technique in which the wire is supplied continuously from a gun or spool. GMAW welding has a number of benefits, including the ability to weld in any location, the ability to weld for extended periods of time, and so on. The goal was to identify the best welding conditions in order to improve the tensile strength and percentage elongation of welded connections. The confirmation test was also carried out to ensure that the parameter settings were as intended. According to the review articles, when welding current, voltage, and GFR rose, tensile strength dropped, but as welding speed increased, tensile strength increased as well. MS-1018, Tensile strength, Elongation Percentage, Taguchi Technique, Current, Voltage, and Gas Flow Rate are some of the terms used in this paper.*

**KEYWORDS:** *GMAW Welding, Mechanical Properties, Metal, Taguchi Technique.*

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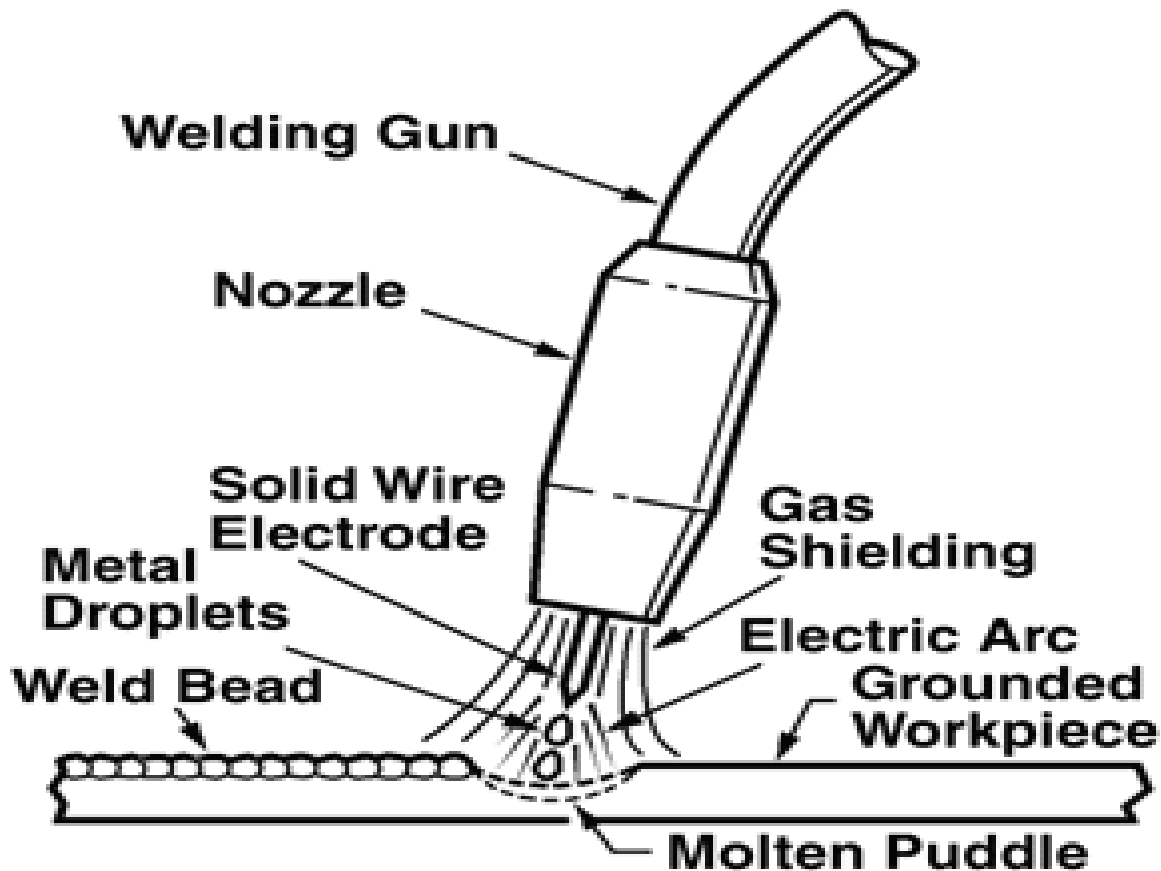
### 1. INTRODUCTION

Welding is a technique in which two identical and non-similar metals or non-metals are joined together using heat and pressure, however in rare cases the process has been completed without the use of pressure. With the aid of a spool cartridge, filler wire is inserted into the metal during the GMAW process. Welding is used to create long-lasting

joints. It's utilized to make automobile parts, railway wagons, airplane frames, machine parts, tanks, structural works, boilers, and shipbuilding furnishings, among other things [1]. Gas metal arc welding (GMAW), also known as metal inert gas (MIG) or metal active gas (MAG), is a welding technique in which an electric arc develops between a consumable MIG wire electrode and the workpiece metal(s), heating them and fusing them together (melt and join). A shielding gas is sent through the welding gun together with the wire electrode, protecting the operation from ambient contamination.

The procedure may be semi-automated or completely automated. The most common power source for GMAW is a constant voltage, direct current power source, although alternating current and constant current systems may also be utilized. In GMAW, there are four main techniques of metal transfer: globular, short-circuiting, spray, and pulsed-spray, each with its own set of characteristics, benefits, and drawbacks. Figure 1: Gas Metal Arc Welding (GMAW) is an arc welding technique that involves heating metals with an arc between a continuous metal filler electrode and the workpiece. By transferring the required gas through the nozzle and forming a protective shield around the welding field, the arc and welding pool are shielded from ambient exposure [2].





**Figure 1: Gas metal arc welding [3].**

Gas metal arc welding (GMAW) is often utilized in chassis components where the joint's strength and stiffness are critical. The technique also allows for the connection of different-shaped pieces to structural elements like pipes and brackets. The welding joint's extended fatigue life is a requirement. Spatter, fit-up, and void issues in the components generated during welding must be addressed. Spot resistance welds are not permitted in some component designs [4]. Additionally, there are closed portions that can't be reached with resistance spot welding arms [5] For such situations, the GMAW technique is preferred. Metal inert gas or metal active gas welding are other names for the GMAW method. Carbon dioxide is the active shielding gas in the latter phase. Consumables of similar strengths are selected to meet the joint's mechanical qualities requirements, although low-strength wires have been utilized to accomplish mechanical characteristics by depositing additional steel [6].

A control switch, a contact tip, a power cable, a gas nozzle, an electrode conduit and liner, and a gas hose are all essential components of a GMAW welding gun. When the

operator presses the control switch, or trigger, the wire feed, electric power, and shielding gas flow are all started, resulting in an electric arc [7]. The contact tip, which is usually made of copper and is chemically treated to minimize spatter, is linked to the welding power source through the power cable and directs the electrical energy to the electrode while directing it to the weld region. Because it must enable the electrode to pass while preserving electrical contact, it must be securely fastened and appropriately proportioned. The electrode conduit and liner protect and guide the wire on its route to the contact tip, preventing buckling and ensuring an unbroken wire feed. The shielding gas is directed uniformly into the welding zone by the gas nozzle. The weld region may not be properly protected if the flow is inconsistent. Larger nozzles allow for more shielding gas flow, which is beneficial for high-current welding processes with a large molten weld pool. The shielding gas is delivered to the nozzle through a gas pipe from the shielding gas tanks. A water hose is sometimes incorporated inside the welding gun to keep it cool during high-heat operations.

Semiautomatic air-cooled electrode holders are the most popular. It circulates compressed air to keep the temperature at a comfortable level. It is used to weld lap or butt joints with lower current levels. The semiautomatic water-cooled electrode holder is the second most popular kind, with the main difference being that water replaces air. For welding T or corner joints, greater current levels are used. A water-cooled automatic electrode holder is the third kind of holder that is often used with automated equipment [8].

## **1.1 Benefits**

*1.1.1* As utilized in such transmission modalities, high deposition performance is required. Other techniques require you to account for stub depletion, flux/slag, and other factors, while with this approach, both electrode weights are introduced into the weld.

*1.1.2* No chip slag relative to SMAW and FCAW

*1.1.3* If correctly configured, the technique may be easily expanded to thin materials. Although GTAW may be used on thin textiles, GMAW outperforms GTAW in some circumstances, such as auto body [9].

*1.1.4* High hydrogen welding deposit for both electrodes

*1.1.5* High output factor as no slag is needed to be extracted and a continuous electrode is used.

*1.1.6* With the parameters appropriately set for the application, no one can weld after a very limited period of practice.

## **1.2 DISADVANTAGES:**

1.2 .1 Needs a wire feeder that is difficult to transfer and may also be a maintenance/repair strain.

1.2 .2 Requires Shielding Gas so welding can be difficult in windy conditions.

1.2 .3 No slag device so out of place welding is sometimes more difficult.

1.2 .4 *Increased* risk of loss of fusion if the parameters and welding technique are not *regulated*.

1.2 .5 It's hard to get the pistol to close areas [10].

1.2 .6 It is not ideal for windy weather.

## **2. LITERATURE REVIEW**

Metal inert gas or metal active gas welding are terms used to describe the GMAW process. The active shielding gas in the later phase is carbon dioxide. Consumables of similar strengths are selected to meet the joint's mechanical qualities requirements, although low-strength wires have been utilized to achieve mechanical characteristics by depositing more steel [9].

## **DISCUSSION**

Welding is a method for joining two identical and non-similar metals or non-metals together using heat and pressure; although, in rare instances, the process has been accomplished without the application of pressure. During the GMAW process, filler wire is introduced into the metal using a spool cartridge. Welding is a technique for making long-lasting joins. Automobile components, railway carriages, aircraft frames, machine parts, tanks, structural works, boilers, and shipyard furnishings are just a few examples of what it's used for.

Metal inert gas (MIG) or metal active gas (MAG) welding, commonly known as gas metal arc welding (GMAW), is a welding method in which an electric arc forms between a consumable MIG wire electrode and the workpiece metal(s), heating and fusing them together (melt and join). A shielding gas, together with the wire electrode, is delivered via the welding gun to protect the process from contamination from the environment. The process may be fully automated or semi-automated. A constant voltage, direct current power source is the most popular for GMAW, although alternating current and constant current systems may also be used. There are four major metal transfer methods in GMAW: globular, short-circuiting, spray, and pulsed-spray, each having its own set of features, advantages, and disadvantages.

## CONCLUSION

According to the review paper report, when welding current, voltage, and GFR rise, tensile strength falls, but as welding speed increases, tensile strength improves as well. When it comes to extending, the tensile strength is almost same. The goal was to discover the best welding conditions in order to improve the tensile strength and percentage of elongation of welded connections. Taguchi's experimental strategy was used to optimize the GMAW parameters of Mild Steel 1018 in this study. For the Tensile Strength response variables, the process was carried out utilizing a specific set of controllable parameters: Voltage, Current, and Gas Flow Rate. The study was carried out using L9 orthogonal series and S/N variance ratio analysis. The results of the research revealed that the control variables had a variety of impacts on the response variables.

## REFERENCES:

1. B. Pesch *et al.*, "Airborne exposure to inhalable hexavalent chromium in welders and other occupations: Estimates from the German MEGA database," *Int. J. Hyg. Environ. Health*, 2015, doi: 10.1016/j.ijheh.2015.04.004.
2. E. Uddin, U. Iqbal, N. Arif, and S. R. Shah, "Analysis of metal transfer in gas metal arc welding," 2018, doi: 10.1063/1.5114003.
3. "How to Improve Your Welds: Helpful hints for GMAW." .
4. D. Petring, C. Fuhrmann, N. Wolf, and R. Poprawe, "Investigations and applications of laser-arc hybrid welding from thin sheets up to heavy section components," 2003, doi: 10.2351/1.5060040.
5. A. B. Murphy, "The effects of metal vapour in arc welding," *J. Phys. D. Appl. Phys.*, 2010, doi: 10.1088/0022-3727/43/43/434001.
6. E. Karadeniz, U. Ozsarac, and C. Yildiz, "The effect of process parameters on penetration in gas metal arc welding processes," *Mater. Des.*, 2007, doi: 10.1016/j.matdes.2005.07.014.
7. J. A. Siefert, J. M. Sanders, J. M. Tanzosh, W. F. Newell, and J. P. Shingledecker, "Development of EPRI P87 solid wire," 2010, doi:

10.3184/096034010X12820642590729.

8. P. A. Peters and A. W. Gaertner, "Properties of line pipe - a producer's view for the year 2000.," 1986.
9. J. Norrish, "Gas metal arc welding," in *Advanced Welding Processes*, 2006.
10. R. W. Messler, "The Metallurgy of Welding," in *Joining of Advanced Materials*, 1993.

## STUDY OF ANCIENT MONUMENTS IN NAMANGAN REGION

**Feruza Kudratqizi Rakhmatova\***

\*Student,  
Namangan State University,  
Namangan, UZBEKISTAN

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### ABSTRACT

*During the years of independence, the study of archeological monuments in the Namangan region has begun. The services of archaeologists in this regard are invaluable. Archaeological excavations in recent years have revealed that Namangan region has also been extensively developed by primitive farmers. Especially in the foothills, where small mountain streams flow, created conditions and opportunities for the emergence and development of sedentary agriculture. The ruins of these small rivers, such as Govasay in Chust, Tergachi on the banks of the Kosonsoy, and other ancient villages, are typical of this period.*

**KEYWORDS:**History, Monument, Region, Tradition, Monument, National, Generation, Scientist.

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### INTRODUCTION

Historical monuments further enrich the spiritual life of society, evoke feelings of respect and reverence for the motherland, the people, past generations. Therefore, the issue of attitude to monuments is one of the most important problems of today. Because the history of national culture, national art, the path of national creativity is directly reflected in these monuments. A person can be a patriot only if he knows the past of his nation and people. Because a person who does not know and appreciate the past does not know the value of today and tomorrow.

According to sources, Namangan region has a long history and is one of the most ancient places of human civilization. Many historical monuments: the addresses of the Stone Age, rock carvings, cemeteries, Bronze Age villages, the remains of medieval castles and cities, the magnificent architectural structures testify to this. [1]

Archaeological excavations in recent years have revealed that Namangan region has also been extensively developed by primitive farmers. Especially in the foothills, where small mountain streams flow, created conditions and opportunities for the emergence and development of sedentary agriculture. The ruins of these small rivers, such as Govasay in Chust, Tergachi on the banks of the Kosonsoy, and other ancient villages, are typical of this period.

More than twenty Bronze Age monuments discovered so far in Chust, Dalvarzin, Chimbay, Ashkoltepa and other valleys date back to the end of the second millennium BC - the first half of the first millennium. The most famous and best-studied of these sites is Chust. [2]



Two kilometers north of Chust there is an old hill on the shores of Govasay. This is the ruins of an ancient village. Named the Buonamozor in the vernacular, the site was discovered in 1950 by archaeologist M.E. It was discovered by Voronets in 1951-1961 by archaeologist V.I. Studied by Sprishevsky. During the excavations, it was discovered that the owners of these settlements lived in houses made of straw and in hut-type huts. Several narrow rooms with mud walls and some areas with raw bricks were also identified. Our Buonamozor ancestors lived mainly in houses of the earthen type. Consequently, such houses were cool in summer and warm in winter.

According to V. Sprishevsky, who is also seismically reliable at the same time, the Buonamozors skillfully built wooden tent-type houses in the summer. According to Ya.Gulamov, such houses served as a summer shelter for the Buonamazors.

Farmers' dwellings are surrounded by thick defensive walls made of straw and raw bricks. In 1954, V. Sprishevsky was the first to identify and study the defensive walls at the Buonamozor. This defensive wall is located on the north-west side of the site and covers an area of about 1.5 hectares. This is one-third of the size of the entire ruin. The well-preserved 286 meters of the wall are well studied according to the plan. It is 3 meters wide and 4 meters high and is mainly made of cotton and raw bricks. The size of the bricks is 55x32x8 cm, and the lower part of the wall is 55x33x10 cm. According to the researcher, the defensive wall was used at night to house the animals and at the same time to avoid enemy attack. It can be said that these early defensive walls served as arches and signaled the beginning of signs of development of private property strata in society. [3]

Many monuments of the distant past have been preserved in the territory of Namangan oasis. Among them are the ruins of ancient cities, castles, fortresses, large medieval temples and many mausoleums. The art of local architects is reflected in these buildings.

Archaeological excavations also show that by the middle of the 1st millennium BC, the stratification of slavery in Central Asia began to take shape. This led to the formation of cities, surrounded by strong defensive walls, occupying a large area. By this time, the population of cities began to live in groups. Artisans began to produce products for the market by industry. For example, potters built their pottery in a certain part of the city and began to make pottery. Thus, handicrafts are separated from agriculture, which is the second division of labor. The ancient cities of Kasan and Akhsikent in the Namangan oasis are among the settlements formed during this period. According to the results of archeological excavations in Kosonsoy, Mughkhana was found. The modern city of Kosonsoy was recently discovered for the first time by A. Bernstamm and later studied by various researchers. The walls of the Mugtepa structure are built in the form of an oval (5x8.5 m) without the use of a mixture of broken and thin stones. The inner room is an exit hole and is covered with a stone slab. According to experts, the findings of Mughkhana belong to the semi-settled tribes of Northern Fergana. Very little is known about the events that took place in the territory of Fergana in the 2nd-1st centuries BC. After the collapse of the Greco-Bactrian Empire, new states were formed in Central Asia. One of such states is called Davan-Fergana. Zhang Qian, a Chinese traveler who made two trips to the Fergana Valley, wrote about this in 136-128 and 115 BC. Davon has a population of 60,000 families, 300,000 souls, an army of 60,000 cavalry, and more than 70 cities in the valley. Let us turn to archeological research, as ancient monuments testify that the number of settlements has increased rapidly since the first centuries AD. We have found and studied the settlements surrounded by the above-

mentioned walls. Such a hall, typical of ancient settlements, can be seen in medieval cities. (Uzgen, Akhsikent, Hakkulabod cities).

Among the houses were castles, courtyards and temples. Another reason for the shifts in social life is the widespread use of irrigation. This was due to the increase in the number of slaves. With the invasion of Central Asia by nomadic tribes in the III-IV centuries AD, the process of Turkification of Fergana began. By the middle of the 5th century AD, a semi-nomadic Hephthalite state was formed in Central Asia. This period is associated with the collapse of slavery and general social chaos. It is believed that feudal relations began in Fergana at that time, and in the 6th and 7th centuries it developed rapidly. At the same time, the appearance of the settlements has changed, and this has been reflected in the changes in social relations. The construction of several fortified settlements surrounded by fortified walls became widespread. In the settlements, the ruler's fortress - an arch, a city adjacent to it and a city - Shahrstan, consisting of trade and handicraft rastas, stand out. Akhsikent, an economic center, is a military-political center that can easily compete with Kasan. [4]

There are no more than six central cities in the oasis (Kasan, Andijan, Uzgen, etc.). There were about a hundred settlements in Fergana. In particular, it is known that the part of the ancient period or the period of slavery called Akhsikenti dates back to the III and IV centuries BC.

This is a new page in the history of Akhsikent, which "extended" its age to the 13th century. It turned out that Akhsikent was a city on a par with Afrosiab in terms of youth.

The research carried out in the 60s and 70s, and especially in the recent history of the city of Akhsikent, has provided remarkable news. Shahrstan is surrounded on three sides by high tower walls, on the south side it crosses the Syrdarya, and low walls are preserved. In the eastern part of Shahrstan there are 10 towers, which are located at a distance of 20-30 meters from each other. Only 2 towers survive in the north and 3 in the west. Excavations at two of the towers on the east side revealed that they were surrounded only by raw bricks. The middle and inner parts of Shahrstan were completely destroyed. Nevertheless, topographically identified neighborhoods, buildings, pools, streets and roads to the gates have been identified. According to sources, the city has four walls, one of which is on the northwest side, on the northeast side and on the east side of Shahrstan.

As a result of excavations carried out by researchers in different years, it became clear that the lower strata of Shahrstan date back to the III-II centuries BC. Reinforced defensive walls, 4 -6-room houses made of raw bricks, plastered and various paints, hearths, sofas and wells, warehouses and kitchens were found.

Archeology is a branch of history. The long history of humanity can be studied only on the basis of archeological data. Archaeological monuments are material historical sources, the study of which sheds light on the past of human society. There are many archeological monuments in our region. In Turakurgan district - Axsikent and Aкси, in Pop district - Munchoktepa, in Chust district - Buonamozor, in Kosonsoy district - Mugtepa, Uchurgan and Naryn districts - Kayvonot and Eyloton, in Chartak district - ancient irrigation devices-corridors as important archeological monuments. Has a value and tells about the distant past. In particular, Munchoktepa is an archeological monument. In 1989, Munchoktepa, located on the right bank of the Syrdarya River in the Pop district of Namangan region, was discovered by archaeologists. These archeological

monuments were studied by the Pop detachment of the Namongon archeological expedition led by B. Matboboev.

The stages of historical and cultural development of the oasis can be conditionally defined as follows. The first stage is the so-called Eilat culture of the Early Iron Age, which covers the VII-IV centuries BC.

The second stage is a monument of the Neolithic (New Stone Age). Gortepa (kultepa) village on the left bank of the Syrdarya.

The third stage is the ruins of Buonamozor in Chust district. Monuments in the villages “Tergachi” and “Yortepa” on the banks of the Kosonsoy.

The fourth stage belongs to the III century BC, II-V centuries AD. Monuments found on the territory of Uchkurgan district and Kosonsoy coast.

The fifth stage dates back to the VI-VIII centuries AD. During this period, the city of Kosonsoy was the political center of Fergana.

The sixth stage – “Afrosiyobi Valley” of the Middle Ages (IX-XIII) and the late Middle Ages (X-III) - is a monument to Akhsikent. [5]

Unique floral pottery found in the ruins of Govasay in Chust, Tergachi on the Kosonsoy coast, Dalvarzin, Ashkoltepa, Chimbay and other ancient villages in the Karadarya tributaries can be divided into separate archeological cultures. This culture is called Chust culture. The ruins of the first studied and included monuments of the Chust period, found in the Fergana Valley, belong to the Late Bronze Age in terms of historical and archeological chronometry.

The population of the Chust culture lived a sedentary life. They were engaged in irrigated agriculture and animal husbandry. In agriculture, wheat, barley and millet were planted, horses, cattle, sheep, pigs, dogs were kept on the farm, and wild animals such as foxes, deer, and mountain goats were hunted. The people of the Chust culture were of the racial type of Europeans and were firefighters according to their religious beliefs. There is an ancient hill on the shores of Govasay, 2 km north of Chust, which is popularly known as Buonamozor. In 1982-1984 with the participation of scientists of Uzbekistan and Leningrad Yu.A.Zadneprovsky, EAVolkova, BXMatboboev, U.Rakhmonov, a full member of the USSR, Doctor of Historical Sciences, Professor AhmadaliAskarov, schoolchildren and students of Chust district excavations were carried out using During the excavation of the tombstone, archaeologists found samples of ceramic vessels of 35 different shapes. This shows that pottery is highly developed. During the excavations, V.Sprishevsky found 196 whole preserved archeological vessels and about 200,000 pieces of pottery. A.Askarov and Matboboev found more than 600 labor and manufactured weapons here. Household items were found: stone axes, ceramic pots, pieces of pottery. The ceramics used for home decoration were painted red and polished. [6]

By the end of the 3rd century BC and the beginning of the 2nd century AD, the ancient city of Kasan, located in the northern part of the Kushan Empire, one of the most powerful states in Central Asia, was built on the north side of the present-day city of Kosonsoy. Today, the capital is called Mugtepa, where in the 50s and 80s of the last century a group of archaeologists led by the famous archeologist Yu. Zadneprovsky from St. Petersburg (Leningrad) conducted scientific

excavations. Took. As a result of the excavations, the ruins of the ancient fortress and the remains of the surrounding defensive walls were found.

This is a monument “Mugxona”. In ancient times, the “Mugxona” (structure, Mugtash) was the residence of firefighters, and secondly, in the 3rd-2nd centuries BC, in the 5th-6th centuries BC, it served as a stone tomb in the form of grass.

The walls of the "museum" are made of smooth and thin stones in the form of an oval (5 - 8.5 m) without the use of mixtures. Human bones, jugs, pots, bowls, knives, swords, brass and iron arrowheads, brass mirrors, zircons, beads and others were found in the museum. Material evidence found in the museum shows that Zoroastrianism is deeply rooted here. [7]

The Avesto is the oldest manuscript. Avesto is 3,000 years old. Earlier, the Avesto consisted of 21 books. During the reign of King Darius of Iran, the Avesto was completely inscribed in golden letters on the skins of 12,000 black cattle. The founder of the Avesto doctrine is a person who went down in history under the name of Zoroaster. Zoroaster means “Golden Camel” or “Golden Camel Leader”. “Avesto” is a pre-Islamic religious doctrine in our country. The holy book “Avesto” serves as a source of programmatic practice in the study of the comprehensive lifestyle, lifelong traditions, education, and management system of our great ancestors. This book was recognized in the East and West and had a positive impact on the spiritual development of various peoples. Until 2001, Zoroastrianism was considered the homeland of Iran. The tomb of Zoroaster, the founder of the religion, found in Khorezm as a result of research by the Great Silk Road Expedition, proved that the homeland of the Avesta was the Khorezm oasis of Central Asia. In November 2001, with the participation of UNESCO and similar organizations, the Alley of Avesto was opened and celebrated in Urgench, the capital of Khorezm. In 1994, philologist Fozila Suleymanova presented her book “West and East” to a wide audience.

In the summer of 1989, archaeologists discovered one of the rarest finds in Central Asia over the past 30 years at Munchoktepa on the right bank of the Syrdarya River in the Pop district of Namangan region. [8]

Pop is first mentioned in written sources as “Bop” by Arab geographers and travelers. The ancient city of Pop is said to have existed on the site of the present-day village of Sang between the 2nd and 3rd centuries BC. The findings of Munchoktepa allow us to determine when and where the city of Pop or the fortress was located.

Therefore, it is known that the city of Pop was formed in the beginning of AD in one of the places on the right bank of the Syrdarya in the present-day Govasay oasis.

A very small part of the city center, the ArkiAlo, and the surviving parts of the inner city are popularly known as the High Hill.

In the outer city, only the necropolis cemetery survives. The locals call it Munchoktepa, referring to various beads that were found during excavations. Munchoktepa is 4 interconnected hills, two of which have been turned into cotton fields in recent years. Two of them, though damaged, provide rich archeological materials.

Workers led by chemist-archaeologist Sharif Ilkhomov came across the right during the excavations. 47 coffins were laid in Sagana, 22 of them were exhumed. When the coffins were

examined, they contained headgear, weapons, jewelry, and tools. There are even baskets of food, mutton and poultry, fruits, pistachios and peanuts in the coffin.

Archaeological excavations have uncovered about 80 pottery items, indicating the development of pottery at that time. In particular, weaving machines, sewing tools, various wooden items, scales, weapons with pictures of animals, handicrafts, bronze rings give information about the crafts of that period.

## REFERENCES

1. Askarov A Matboboev B. The old root of dehonchilik. Science and life, 1995;(1):36.
2. Anorboev A. Akhsikent in ancient and medieval times. Ancient Fergana in the history of Uzbekistan. Tashkent: Science, 2001. p.95.
3. Anorboev A. Ancient Akhsiken. Namangan Haqiqati, 2000. p.15.
4. Anorboev A. Akhsikent in ancient and medieval times. Ancient Fergana in the history of Uzbekistan. Tashkent: Science, 2001. p.102.
5. Rahimova MN. Excerpts from the history of Kosonsoy.-Namangan: Namangan regional publishing house, 1996. p.27.
6. Inamov Sh. Popim-sahovatliyurtim. Namangan: Namangan region publishing house, 1996. p.44.
7. Khalimovich ON, Rasuljanovna IN, Shakarovich GI. The Purpose and Outcome of Diplomatic Missions in the II-I Centuries between Central Asia and China. Journal of Critical Reviews, 2020;7(9):126-128.
8. Rasuljanovna IN, Rakhmonqulovich KN. Trade Relations between Ancient Bacteria and China on the II-I BC. The American Journal of Social Science and Education Innovations, 2020(07):47-51.

## A SOCIO-LEGAL STUDY OF POLICE ATROCITIES

**Sourabh Batar\***

\*Assistant Professor,  
Department of Corporate Law,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- battarsourabh@gmail.com

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### ABSTRACT

*This article focuses on the intentional approach on compensating and rehabilitating victims of severe abuse. This work investigation is divided into five parts. From the very beginning of the issue, 'Police Outrages,' the investigation breaks down the previous correct previously given to the victims of police brutality, at all levels, and moves toward the remuneration and recovery strategy which could be available for the survivors of police atrocities, while contacting and discussing the Human Rights Groups and other gatherings' investments. The 'Police Atrocities' include random Lathi charges on crowds, counterfeit captures, counterfeit experiences, custodial brutality, custodial, death, custodial assault and attack on women, various types of provocations while dealing with the standard guilty party, arrestees, and occasionally inconsiderate conduct and cruel treatment of blameless residents as well. Despite this, police officers engage in illegal activities and take a number of dubious and unethical actions, particularly while acting in the role of maintaining lawfulness. These and other types of human-rights violations occur on a daily basis as a result of police authority, prompting a man of ordinary reason to consider drastic reforms in the police structure. The investigation would include few suggestions, as it was seen, while the investigation was conducted for insurance against police violence, pay, and recovery methods.*

**KEYWORDS:** *Atrocities, Human-Rights, Investigation, Police And Rehabilitation.*

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### INTRODUCTION

In India, police abominations are widespread, and the regional structure of police regulations is to blame. In this manner, police reform becomes a need; yet, with the exception of particular circumstances, police changes have always been a "distraction" for policymakers. Police Reform aims to reform the police framework to the point that it is in line with India's majority rule system, is stronger in combating wrongdoing and maintaining lawfulness, is more accountable and respectful of human rights, and is free of negative consequences (for example de-politicized). Police have a large number of optional forces that they frequently misuse. With numerous instances of police monstrosities, the police leadership is also not excellent. The police division's exemption lifestyle isn't a coincidental occurrence; rather, it's a purposeful result of the



existing border rules, which, despite everything, remain in force. There is no duty assigned to the police or the insusceptibility described in section 197 of the Criminal Procedure Code[1].

Furthermore, every act of responsibility by police is consumed, and it is necessary to obtain legislative penalties before initiating preliminary proceedings against the police force. Responsibility requires a willingness or commitment to accept responsibility for one's actions, and this is by all accounts lacking in the Indian Police System, resulting in an increase in police outrages. According to the National Human Rights Commission, 60 percent of the significant number of police arrests are either unlawful or useless, and 75 percent of the significant number of human rights complaints received are against the police. Before the discomfort of the crisis in India, the Congress government gave no real concept to the police adjustments.

Despite this, the Janta Government established the National Police Commission (NPC) in 1977 to prepare recommendations to depoliticize police authority and begin the process of police reforms after seeing police torture and other police barbarities. Regardless, the findings and NPC were put aside until later when the Janta Government was thrashed in the following political choice. There are many ways for protecting the rights of victims of police heinous acts. The parliament, the official (who is finally reliant on authority), and a free, impartial legal executive are all striving toward this goal and trying to achieve the goals of Rule of Law and Justice in various ways. In any case, none of these efforts are sufficient; there is a need to rethink these emerging issues. Victims of police brutality require social insurance in the form of pay and recovery, as a mechanical device. The instrument of remuneration and recovery is a particular purpose of conversation in this work with required recommendation. I will be taking a gander at the International, Regional and National system and approaches in profound for the 'Privileges of Victims of Police Atrocities' just method of assurance and to appreciate the privilege to existence with human pride[2].

### *Types of Police Terrorism*

The police have the power to use legal and situationally justifiable force against the people in contemporary democratic countries. According to Albert Reiss, at law, police in contemporary democracies have a near monopoly on legal use of force against civilians, and investigating police use of force is to investigate an activity at the heart of politics and society. To put it another way, the police have the legal authority to use lawful force to make an arrest, maintain order, or preserve the peace.

It's disputed how much force is acceptable in certain situations. A instance of police atrocities occurs when an officer uses excessive force or breaches the law in general. Various types of outrages have been the methods of this wonderful organization since the beginning of the concept of police monstrosities in just countries. All of this has been rehearsed by the police for the purpose of supporting lawfulness in the state. In this case, the analyst is trying to depict a fraction of the instances of police brutality or abuse of authority[3]. The following are some of them:

- Police torture is one of the first things that comes to mind.
- Arrest without authority
- In-custody rapes

- Imprisonment or death in custody
- Inhumane treatment of detainees
- Illegal imprisonment
- Profane and abusive words
- Stops and searches in the field
- The use of physical force

The 'Police Atrocities' include random Lathi charges on crowds, counterfeit captures, counterfeit experiences, custodial brutality, custodial, death, custodial assault and attack on women, various types of provocations while dealing with the standard guilty party, arrestees, and occasionally inconsiderate conduct and cruel treatment of blameless residents as well. Despite this, police officers engage in illegal activities and take a number of dubious and unethical actions, particularly while acting in the role of maintaining lawfulness. These and other types of human-rights violations occur on a daily basis as a result of police authority, prompting a man of ordinary reason to consider drastic reforms in the police structure[4].

## LITERATURE REVIEW

- Based on this corpus of material, many writers undertook research both nationally and globally to address the problem of police brutality and its societal consequences. Before proceeding any farther with this subject, the word "police brutality" should be defined as follows:
- Police brutality is defined by Thompson (2004) as any incident in which a police officer uses excessive force against or while dealing with members of the public while executing his or her responsibilities.
- The Indian police: A critical assessment, by A Verma, was last visited on May 4, 2020.
- CR Epp, the legal complex in India's fight against police brutality, was last visited on May 3rd.
- India's Constitutional Law – Narendra Kumar

## DISCUSSION

*The Indian Constitution protects the rights of victims of police brutality.*

The perpetrator remains the central character throughout the criminal justice system, but the victim is totally forgotten. Nobody cares what happens to the victim once the crime is committed against him. Interrogation, delays, adjournments, court appearances, harassment by individuals, police, and attorneys, loss of wages, waste of time, and frustration, to name a few things, confront the victim. There haven't been many genuine empirical studies on the destiny of victims of criminal offenses. Only a few decades ago, criminologists and sociologists recognized that they needed to focus their attention on a process to assist and ensure that the victim gets paid. As a result, the concept of victim compensation has been limited mostly to criminal situations[5].

In recent years, the Supreme Court of India has awarded compensation to victims of governmental abuses by citing Article 32 of the Constitution in a number of instances. No system

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can properly grow unless it is aligned with the socioeconomic development of the masses whose fates it is supposed to direct and govern. Recognizing the significance of victim compensation, the Supreme Court has awarded compensation/exemplary expenses to individuals whose rights have been infringed by the state and its administration, particularly the police force. Though both ideas include the concept of victim recompense, exemplary expenses are necessary in the nature of punitive damages. Exemplary costs are a measure of punishment for the state and, at the same time, a measure of damages for the victim of the state's wrongdoing.

*Different Statutes Provide Protection*

In *Khetri v. Territory of Bihar* (AIR 1981 SC 928) our Supreme Court brilliantly considered the subject of granting money-related pay to an individual whose crucial right to life and individual freedom was encroached by the police. The court forced the state to pay remuneration to the casualty for infringement of his own freedom under the Constitution. *Sant Bir v. Province of Bihar* (AIR 1982 SC 1470), in which the victim was a criminal lunatic, the question of compensation to the victim of state overabundances was raised again.

As a result, in each of these instances, the Supreme Court expressed concern about awarding any compensation to the survivors of state overabundances, but did not actually authorize the equivalent. This is now referred to as 'Casualty logy Jurisprudence.' In *Rudal Shah v. Province of Bihar* (AIR 1983 SC 1086), the Supreme Court granted a cash compensation of Rs 35,000 to a common citizen who was kept in illegal imprisonment for almost 14 years after his absolution by the Bihar government.

The main legal concern was to "correct the damage" caused by state authorities to the deceived citizens. The court also granted minor reliefs such as restitution, reimbursement of costs incurred by the candidate for medical treatment, and remuneration for the unlawful imprisonment, thus allowing these safeguards under Article 32 for the effective implementation of the fundamental right under Article 21. In any event, the legal warning is that such compensation will only be awarded by the court in cases when the facts are disgusting, stupid, and strange when seen through the eyes of experts[6].

In *Peoples' Union for Democratic Rights v. Province of Bihar* (AIR 1987 SC 355), the court advanced a working rule for granting remuneration to the survivors of police abominations if there should arise an occurrence of death, Rs. 20,000, and for each instance of injury, Rs. 5000, without bias to any simply guarantee for remuneration, the court, while giving course to the legislature of Bihar, advanced a working rule for grant of remuneration

In another writ appeal under Article 32 of the constitution, *Saheli, a Women's Resource community, through Ms. Nalini Bhanot v. Official of Police Delhi*. (AIR 1990 SC 513), the Supreme Court awarded the mother of the casualty Rs. 75,000 in compensation for the death of a multi-year-old child as a result of a beating and ambush by a Police official. This is yet another instance involving the oppression of police officers, who, in collaboration with the home's owner, devised illegal methods to force the residents to vacate the premises.

The occupant, Kamlesh Kumari, was beaten and assaulted by S.H.O. of Police as a result of this circumstance, and Naresh, Kamlesh's kid, was brought to such a horrible state that he died. The Supreme Court ordered the Delhi Administration to pay compensation to Kamlesh Kumari in the amount of Rs. 75,000 within a month of the date of the judgment, based on previous judgments

relating to the risk. If we examine the preceding examples of pay, we can conclude that the Apex Judiciary made great progress in expanding the scope of Article 32 of the constitution, which is also one of the fundamental rights providing answers for the Indian populace's first core rights[7].

Our Supreme Court had another opportunity to enlighten the compass of Article 32 in *M.C. Mehta v. Association of India* (AIR 1987 SC 1986), stating that this Article not only gives power to it to grant writs heads, but it also allows it to create new remedies and design new methods. The court determined that its power under Article 32 is "not only injunctive in scope, that is, it prevents the encroachment of an important right, but it is also healing in scope and provides assistance against the encroachment of a fundamental right already devoted." It has the authority to provide compensation in appropriate circumstances. It indicates that remuneration may not be available in all circumstances.

It must be allowed when the intrusion is severe enough to shock the court's still, tiny voice, for example. Along these lines, the interpretation of Article 32 of the Constitution as providing compensation to the victim in the event of state overabundances/handedness/disorder (here in this proposition, it implies Police-arranged rebellion and a wide range of cases depicting police brutality) has given the law of victimology in India a new dimension. In all of the aforementioned judgments, our Supreme Court permitted pay/model expenses only in extreme situations, when the invasion is obvious and unmistakable. Despite this, no comprehensive criterion has been established to assess such difficulties[8].

*The Supreme Court ushers in a new era of compensatory jurisprudence.*

The guilty person remains the central character throughout the whole criminal organization of equity process, while the victim is completely ignored. No one likes to witness what happens to the victim once a crime is committed against him. Cross examination, delays, suspensions, court appearances, provocation on the part of people, police and legal counsel, loss of profit, waste of time, and discontent, to name a few examples.

There have been very few reliable precise studies conducted to consider the fate of survivors of criminal acts. It was only a few decades ago that criminologists and sociologists agreed to devote their efforts to finding a way to assist and ensure that the victim gets compensated. In criminal proceedings, the ability to provide compensation to victims has been severely limited. In recent years, the Supreme Court of India has granted compensation to the survivors of state wealth by using Article 32 of the Constitution[9].

No framework can mature well unless it adapts to the financial progress of the majority of those whose destinies it is supposed to direct and manage. Recognizing the importance attached to the concept of compensation for victims, the Supreme Court has granted pay/commendable costs to individuals whose rights have been violated by the state and its organizations, especially the Police authority. Despite the fact that both concepts recognize the potential of compensating victims, good costs are central to the concept of reformatory damages. Praiseworthy expenses are calculated as a percentage of the state's discipline and, at the same time, as a percentage of the damages caused to the victim as a result of the state's wrongdoing.

The open-law need for police authority may be found in the Indian Constitution and regulatory legislation. The courts have repeatedly held the police subject to open law for violations of basic

rights enshrined in Part III of the Constitution, such as the right to life and liberty, protection against self-assertive captures and unlawful confinement, assurance from separation and inconsistent treatment, and so on[10].

## CONCLUSION

Giving the impression that everything is OK with the average citizens and dealing with their concerns is dependent on the basis of a police force that is productive, honest, and knowledgeable. The findings of several commissions and advisory groups, the complaints received by human rights commissions, the narratives exposed by the press, and the interactions of ordinary people in the city all support the fact that such a police force does not exist in India. The need for police reforms is both apparent and urgent. There are two categories in which police reforms must be pursued simultaneously. One is to establish legal institutional courses of action that would ensure that the state government's administration of police authority is limited, ensuring that police execution is in strict compliance with the law.

At the end of the day, the ability of the police to establish the rule of law, not the quality of governmental problems, is what matters. This would need shielding them from ill-conceived outside control and providing them with meaningful self-sufficiency. When police officers are granted utilitarian autonomy, they should be held accountable for their actions. The existing elements of accountability must be strengthened and enhanced. Furthermore, new components must be established that operate independently to monitor police activity and inquire into open police complaints. Both the appearance of the police as an organization and the behavior of police officers as individuals need constant monitoring.

The second option is to consider doing all possible to strengthen and enhance police within the present circumstances. Aside from rethinking recruitment, training, and administration principles, the working and daily surroundings of lesser police faculties need significant improvement—an activity that should begin with elevating the standing of constabulary. Various relapse studies were used to examine the wonder and the states of the survivors of police monstrosities, as well as the impact of pay and rehabilitation procedures.

The findings point to a possible flaw in our police framework's structure. This investigation speaks to subjective endeavors through some subjective meetings, in the field of measures or keeps an eye on the unbridled forces of the police, and, without a doubt, to recognize the effect of remuneration and restoration arrangements on casualties in the same way that specialists do. The observational research is exploratory in nature, and the findings are tentative. In summary, the investigation has Police brutality has been discovered in the broader public, such as at police headquarters, penal institutions, and even on the streets. The investigation's main goal was to make these victims aware of the procedures for their restoration and compensation.

## REFERENCES

1. S. Uma and V. Hiremath, "Police atrocities and the quest for justice," *Economic and Political Weekly*. 2018.
2. G. S. Banerjee, "Victims of doubled-edged violence: A socio-political study of tribal-rural folks living in the forest tract of Eastern India," *Int. J. Interdiscip. Soc. Sci.*, 2010.
3. S. Gopalakrishnan and T. S. Chauhan, "A struggle over class and space in an Indian City,"

*Economic and Political Weekly*. 2014.

4. A. Sengupta, "WHO IS THE PEOPLE? NOTES ON SUBJECTIVITY AND THE ADIVASI RESISTANCE IN LALGARH, WEST BENGAL, INDIA," *Soc. Regist.*, 2017.
5. S. Field, " Review of Violence Workers, Police Torturers and Murderers Reconstruct Brazilian Atrocities ," *Oral Hist. Rev.*, 2005.
6. E. B. Westermann, "Stone-Cold Killers or Drunk with Murder? Alcohol and Atrocity during the Holocaust," *Holocaust Genocide Stud.*, 2016.
7. T. Guberek and M. Hedstrom, "On or off the record? Detecting patterns of silence about death in Guatemala's National Police Archive," *Arch. Sci.*, 2017.
8. H. G. Krishna and N. Maithreyi, "Recruitment and selection in banking industry," *Int. J. Appl. Bus. Econ. Res.*, 2017.
9. Z. Spencer and O. N. Perlow, "Reconceptualizing Historic and Contemporary Violence Against African Americans as Savage White American Terror (SWAT)," *J. African Am. Stud.*, 2018.
10. A. Ayddn-Aitchison, "Police and Persecution in the Bosnian Krajina: Democratisation, Deprofessionalisation and Militarisation," *SSRN Electron. J.*, 2018.



## A REVIEW OF SHEAR ZONE GEOMETRY

**Amit Kumar\***

\*Assistant Professor,  
Department of Civil Engineering,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- amitkmrs14@gmail.com

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### ABSTRACT

*Shear zones are divided into three types: brittle, brittle-ductile, and ductile. These zones' geometry and displacement boundary conditions are determined. The directions and values of major finite strains, rotation, and deformation aspects of pre-existing planar and linear structures are characterized as geometric properties of ductile shear zones important to geological investigations. The fabric associated with the finite strain state may be seen in ductile shear zones. The techniques for calculating stresses and displacements from field investigations are discussed. Shear zones are frequent in conjugate sets, but the two oppositely oriented sets do not seem to be able to function in lockstep. Conjugate ductile shear zones have different angular correlations than brittle shear zones. Termination of all kinds of shear zones presents complicated compatibility issues, for which various solutions are proposed. A synthesis of shear zone geometry in crustal contraction and extension areas is presented, as well as suggestions for how deep level ductile shear zones connect to high level brittle shears and gliding nappes.*

**KEYWORDS:** *Finite Strain, Oblique Plane, Tool Geometry, Tool Failure, Shear Zone.*

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### 1. INTRODUCTION

Generations of geologists have observed strong flow in the zone as a natural stage of deformation when a specific limit to coherent deformations of the Earth's crust has been achieved. The ductile shear zone is a third kind of shear deformation that is frequently localized in narrow, sub-parallel deformation [1]. The sided zones, which have been informally referred to as shear deformation and differential displacement of the walls, are achieved completely by ductile flow, and on a scale of tens of meters. Faults, also known as brittle shear zones, are unique rock outcrops in which no discontinuities may be observed. Shear zones, where a distinct discontinuity between Marker layers in country rock can be seen through the sides of the zone, and when the shear zone walls are the shear zone, are deflected and may alter their nearly unstrained or perhaps brecciated appearance. They're thick, but they're not broken. The limiting elastic characteristics of the rock basement rocks granites, gabbro's, gneisses which have been subjected to orogenic stress are usually ascribed to brittle failure con- zones are very frequent in deformed crystalline rocks.

Other fault-like structures, which may be green schist, blue schist, amphibolite, or granulite facies, have been deformed under metamorphic circumstances with some ductile deformation in the walls. Shear zones that are both brittle and ductile are the appropriate word for them[2]. The walls, which seem to be the main deformation mode, may exhibit persistent strain for up to 10 meters on each side of the fault break, with huge amounts of physically homogenous rock on either side. Rock may alter form under medium to high degrees of metamorphism in the past, and these distortions were frequently ascribed to localized metamorphism. As the opposing walls of the fault moved through the shear zone, the mineralogy of the rock in the ductile effects generally reveals the features of each other, as well as the deformation of marking layers of rock metamorphic facies under which it formed[3]. It is entering this flow zone that has been utilized to identify historically significant as well as relevant to this last the approximate movement sense of the displacement point to notice that the initial knowledge of the geogvector. Because of the shape of the deflected marker surfaces, importance of hornblende schist was derived from a study of shear zones in the Lewisian rocks of NW The line of junction of the land by controls this zone.

He was able to trace an initial surface as well as the shear zone, rather as the move unmetamorphosed basaltic dyke with typical igneous merit vector [4]. It's possible that the ductile portion of the deformation history developed at a separate period than the fault in brittle-ductile shear zones, mineralogy through an amphibolite grade shear zone. Forming a  $30^\circ$  or greater angle with the shear zone, and sometimes displaying a sigmoidal shape If the rock material between the extension fissures is unstrained, then the following displacement biotite-oligoclase rock with a highly schistose fabric, fields are possible: The primary goal of this work is to establish the geometrical characteristics of shear zones, particularly those with (ii) heterogeneous volume change [5].

For the mathematical explanation of the third of these crust, they seem to be the deep level equivalents of brittle shear zones and faults observed at upper levels. These are some examples of different kinds of shear zones. The geometrically simplest shear zones have two boundary conditions: first, the shear zone must be parallel sided, and second, the displacement profiles along all cross sections of the zone must be identical[6]. This second requirement indicates that the finite strain profiles, as well as the orientations and geometric characteristics of small scale structural features across profiles, are similar these are more readily recognized boundary conditions in geological terms. Although these conditions will never be completely realistic because all shear zones must eventually come to an end (their sides must eventually come together or splay apart, and their displacement profiles must change near their termination), I have found that many shear zones often approximate these over very long zone lengths. These boundary constraints limit the kinds of displacement field, as can be seen from the structure of the generic displacement equations.

The order of the basic shear and volume change components must be stated in the mathematical description of the third of these possibilities. Even though the two impacts may have been geologically contemporaneous, the simple shear component is followed by a volume decrease in this study[7]. When the two effects are reversed, this option results in mathematically simpler equations. The intermediate or Y axis of the finite strain ellipsoid in all three forms. The Y axis of the strain ellipsoids will have no particular connection to the shear zone plane with all three kinds, and the main strain axes will have a changeable orientation throughout a zone profile.

There are no basic restrictions on the kinds of strain (i.e. apparent flattening or apparent constriction), and any type is conceivable depending on the orientations of the different 'componential' stresses. Despite the fact that all six fundamental kinds are geometrically distinct, their overall visual impact on marker surfaces traversing the shear zone is strikingly similar[8]. This implies that if the field geologist only sees distorted planar markers, he must be particularly cautious about rushing to assumptions about the displacement field.

Natural shear zones, in my experience, closely resemble these six models. Some geologists may object to the inclusion of models involving differential volume loss in the category of shear zones, but I believe it is necessary for two reasons. Their fundamental geometric boundary conditions are similar to those of more "traditional" shear zones where shear is dominant, and their effects on oblique planar markers are similar to those of shear zones with differential shear displacement parallel to the zone walls. The displacement of originally planar markers may be used to determine the amount of volume change over a shear zone, as will be demonstrated later[9]. Zones of deformation involving just volume loss are known as pressure solution zones. In comparison to their walls, these zones are typically lacking in some mobile mineral species. Quartz or calcite are typically removed from the rock in low to medium grade metamorphic settings, where such zones are prevalent, resulting in a proportionate increase in relatively stationary components such as clays, chlorite, and micas. The color striping is caused by variations in the relative quantities of mineral species[10].

## 2. DISCUSSION

Heterogeneous simple shear is the fundamental component in almost all shear zones. As a result, it's important to look at the geometric characteristics of this kind of displacement, as well as how stresses are connected to displacement and how structural features seen in deformed rocks inside a shear zone may be linked to displacement and strain. A zone with heterogeneous simple shear may be thought to be made up of an infinitesimally tiny number of homogeneous simple shear components. It is mathematically easy to connect the  $x$ -coordinate direction parallel to the shear direction and the  $z$ -axis normal to the plane of shear in such a tiny homogeneously stressed element ( $xy$ ). The shear strain  $q$  (more precisely  $\gamma$ ) generated by the deflection of the lines originally parallel to  $z$  is linked to the angular shear strain produced by the displacement of the top face of an initially cube element by a distance  $s$ . The shear displaces any passive plane marker such that its trace on the  $zz$  plane forms an angle  $\alpha$  with the  $x$ -direction before deformation and an angle  $\alpha'$  after distortion. The mathematical connections relate to a unique coordinate reference frame in which  $x$  is perpendicular to the shear direction. The displacements with the shear direction at an angle  $\phi$  to the  $x$ -direction are occasionally more helpful. For example, one may be interested in calculating the effects of superposed shear zones at different angles on an element. From the geometry, if the shear zone is oriented at an angle  $\phi$  to the  $x$ -direction.

The incremental strain axes  $X$  and  $Z$  are parallel to the main strain rate axes and have the same orientation. Because the angle between schistosity and shear zone walls is a function of shear strain, the angle between schistosity and shear zone walls may be used to quantify shear zone parallel shear strain and the form of the strain ellipsoid at that location. This method may be expanded to integrate consecutive finite shear strains over a shear zone profile and compute the total differential displacement across a zone with heterogeneously generated shear, as it was initially devised. The effects of using this approach on a regional basis are often eye-catching. A

collection of shear zones forming a major movement zone in the Precambrian Laxfordian orogenic region of NW Scotland has a minimum displacement of 25 km, which may be resolved into an 18 km horizontal component and a 16 km vertical component. As previously stated, when pre-existing planar structures travel through a ductile shear zone, their orientation is altered. It is important to note that the angle change in equation 10 only applies to the trace of the initial plane measured in the shear zone's  $zz$  profile.

This continuity in shear zone structural geometries reflects the various deformation processes at work in the crust, namely the transition from brittle (fracturing) at or near the surface to ductile (flow) deformation as depth increases. The ductile reaction to deformation begins to emerge after going through the brittle–semi brittle transition. This transition happens across a depth range - the so-called alternating zone - where brittle fracture and plastic flow coexist. The primary reason for this is because rocks are often hetero mineral, with various minerals responding differently to applied pressures (for instance, under stress quartz reacts plastically long before feldspars do). Different rheological responses are determined by lithology, particle size, and previous fabrics. Although it does not directly relate to the dihedral angle between two planes, it is simple to calculate the modification of such dihedral angles. Variations in the amount of local shear exerted on the layers when a set of sub-parallel planes passes a shear zone with a varying displacement gradient profile brings up folding with a distinctive comparable style. The line of intersection of the original plane structure and the  $xz$  plane of the zone controls the axes of these folds. Their axial planes run parallel to the zone and are positioned based on local variations in shear gradient and the plane's orientation prior to shearing.

Variations in layer orientation may be utilized to compute finite strain values at various points in the zone, as well as to calculate total shear throughout a zone. A magnificent study of fundamental dykes flowing through shear zones along the orogenic front of west Greenland demonstrated the practical use of this method for estimating displacements. If the sheared layers are not passive but exhibit a competence difference with their matrix, mechanical instabilities are created in the competent layer, resulting in the development of novel structures. Buckle folds occur with wavelengths typical of the thickness of the competent layer and the degree of the competence contrast if the layer is reduced during deformation (equal to the passive layer thickening). The obliquity of the layer to the shear zone determines the direction of the folds' axis. It is determined by the direction of maximum shortening inside the surface of the contracting competent layer and is unrelated to the shear system's primary displacement characteristics (as with the similar folds produced by passive layer deflection).

The fold axes, for example, do not have to be parallel to or  $Y$ , nor do they have to be in the  $xy$  shear plane or the  $Xi$  plane of the finite strain ellipsoid. Pinch and swell or boudinage structures may form if the competent layer is positioned in such a way that it is expanded by the shearing. The greatest extension directions in the layer being sheared will govern the necking directions of these boudins, which will not be linked to the  $xy$  plane of the shear zone in general. In reality, both extensions and contractions are likely to occur inside the deflected competent layer's two-dimensional stresses. Both buckle folding and boudinage evolve at the same time, with one of them likely dominating the other. Another potential difficulty that may arise in competent layers is layer shortening followed by extension due to the initial orientation and degree of shear. There's a chance that layers may form buckle folds, which will then be unfolded or boudinaged. Within the ductile environment, ductile shear zones may, and in some instances do, come to a

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halt. The boundary requirements for the endpoints of shear zones are considerably more complex than those for the six fundamental kinds mentioned previously, which are simple parallel sided zones with constant displacement profiles.

There are no full mathematical solutions for the potential finite strain and displacement fluctuations when a shear zone ends, as far as I am aware. However, one may go with their gut and attempt to come up with geometric resolutions that suit field observations and natural circumstances. The first is a plane strain model, while the second is a solution in which all displacements occur normal to the shear zone (in the y-direction). The non-plane strain model creates constrictive and flattening deformations on either side of the shear zone tip, whereas the plane strain model creates constrictive and flattening deformations on both sides of the shear zone tip. If the boundary deflections observed in the plane strain model are restricted, right handed shear zone tips will bend and propagate in a clockwise direction with respect to the main shear zone, whereas left handed shear zones would propagate in an anticlockwise direction. This phenomenon may explain why shear zones with comparable displacement sensation have been seen crossing or merging in certain areas. The behavior of regional shear zones, which transition from ductile to brittle at higher crustal levels, is of special interest to structural geologists.

This issue is crucial in discussions of basement-cover relationships in orogenic belts and regional crustal extension zones. By thrusting and nappe gliding, most, if not all, orogenic belts exhibit an overall shortening of the sedimentary sheets of cover layers. These cover layers are typically continental shelf facies that were put down on a crystalline continental type foundation. There are typically ductile shear zones when this basement is exposed in the orogenic zone. The graphic depicts the connections between deep level ductile shear zones and upper level thrust that best match my personal experience. As a consequence of the crustal thickening, the basement shortens, causing an elevation of the interior portion. The ductile shear zones travel upwards over the basement-cover unconformity, and ductile shear common to both basement and cover accounts for many of the angular relationship variations between the two series of rocks. The ductile shear zone becomes a brittle ductile zone at higher levels, with the upper side of the zone having fewer ductile characteristics than the lower. Internal deformation of the cover sediments becomes less pronounced at higher levels, and is mainly due to displacements caused by flexural slip motions in inadequate strata within the succession.

Low angle thrusts flow into strata-guided 'glide sheets' to complete the cover shortening that is not taken up by these folds. As a consequence of the crustal thickening, the basement shortens, causing an elevation of the interior portion. The ductile shear zones travel upwards over the basement-cover unconformity, and ductile shear common to both basement and cover accounts for many of the angular relationship variations between the two series of rocks. The ductile shear zone becomes a brittle ductile zone at higher levels, with the upper side of the zone having fewer ductile characteristics than the lower. Internal deformation of the cover sediments becomes less pronounced at higher levels, and is mainly due to displacements caused by flexural slip motions in inadequate strata within the succession. Low angle thrusts flow into strata-guided 'glide sheets' to complete the cover shortening that is not taken up by these folds.

### 3. CONCLUSION

The structural characteristics of the top crustal levels are well understood thanks to studies of graben and rift systems, but the structural connections between these high-level events and the



underlying basement are less well understood. At the highest levels, moderately to steeply inclined normal faults prevail, with fault plane geometry dictated by strata competency and steepest in the most competent layers. Geometric characteristics linked to compatibility are produced by normal fault displacements across uneven fault surfaces. The rheological difference of the cover layers becomes less pronounced at deeper depths, and we travel through lower shear zones. These shear zones allow the deep crustal layers to shear zone, which may result in internal tension.

## REFERENCES

1. O. Lexa, J. Cosgrove, and K. Schulmann, "Apparent shear-band geometry resulting from oblique fold sections," *J. Struct. Geol.*, 2004, doi: 10.1016/S0191-8141(03)00072-5.
2. K. S. Kalenchuk, D. J. Hutchinson, and M. S. Diederichs, "Application of spatial prediction techniques to defining three-dimensional landslide shear surface geometry," *Landslides*, 2009, doi: 10.1007/s10346-009-0168-1.
3. F. Stadlbauer, T. Koch, F. Planitzer, W. Fidi, and V. M. Archodoulaki, "Setup for evaluation of fatigue crack growth in rubber: Pure shear sample geometries tested in tension-compression mode," *Polym. Test.*, 2013, doi: 10.1016/j.polymertesting.2013.06.003.
4. A. Abedini, C. Butcher, and M. J. Worswick, "Fracture Characterization of Rolled Sheet Alloys in Shear Loading: Studies of Specimen Geometry, Anisotropy, and Rate Sensitivity," *Exp. Mech.*, 2017, doi: 10.1007/s11340-016-0211-9.
5. S. Vandebril, A. Franck, G. G. Fuller, P. Moldenaers, and J. Vermant, "A double wall-ring geometry for interfacial shear rheometry," *Rheol. Acta*, 2010, doi: 10.1007/s00397-009-0407-3.
6. K. S. Kalenchuk, M. S. Diederichs, and D. J. Hutchinson, "Three-dimensional numerical simulations of the Downie Slide to test the influence of shear surface geometry and heterogeneous shear zone stiffness," *Comput. Geosci.*, 2012, doi: 10.1007/s10596-011-9245-3.
7. P. Bhattacharyya and D. M. Czeck, "Using network analyses within geographic information system technologies to quantify geometries of shear zone networks," *Geosphere*, 2008, doi: 10.1130/GES00124.1.
8. B. Qin and P. E. Arratia, "Characterizing elastic turbulence in channel flows at low Reynolds number," *Phys. Rev. Fluids*, 2017, doi: 10.1103/PhysRevFluids.2.083302.
9. G. T. Gray, K. S. Vecchio, and V. Livescu, "Compact forced simple-shear sample for studying shear localization in materials," *Acta Mater.*, 2016, doi: 10.1016/j.actamat.2015.09.051.
10. J. B. Boitte, C. Vizcaïno, L. Benyahia, J. M. Herry, C. Michon, and M. Hayert, "A novel rheo-optical device for studying complex fluids in a double shear plate geometry," *Rev. Sci. Instrum.*, 2013, doi: 10.1063/1.4774395.



## A REVIEW ON HUMAN COMPUTER INTERFACE

**Rahul Rathore\***

\*Assistant Professor,  
Department of Computer Science, Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- rahul.engineering@tmu.ac.in

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### ABSTRACT

*Man-machine studies or man-machine interaction were the former names for Human Computer Interface (HCI). It is concerned with the design, implementation, and evaluation of computer systems and associated phenomena for human use. Over the last half-century, the trend has been away from approaching the computer as a mechanism and toward approaching the computer as a behaving and aware organism. The history of human-computer interaction is briefly discussed, as well as three HCI models and structures: CSCW, CSCL, and CSCR. HCI is demonstrated to be a fragmented field with no agreed-upon set of unifying design principles by a number of sources. The eight most well-known HCI principles are discovered via a study of usability requirements based on author citation frequency.*

**KEYWORDS:** HCI, CSCW, CSCL, CSCR, USABILITY.

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### 1. INTRODUCTION

The purpose of any human-computer interaction is to transmit data. For more than two decades, visualization has been a useful tool for communicating information. While many visualization systems help users comprehend their data better, they are frequently difficult to use and are not a trustworthy or accurate means of communicating information, which restricts their acceptability and usage. As the amount of scientists', medical researchers', and information analysts' datasets grows exponentially, efficient, precise, and repeatable data transmission becomes more important. When the datasets under study are multivariate and/or vector datasets, the issues get much worse.

The human perceptual system, which consists of several perceptual channels/modalities: visual perception, auditory perception, haptic and tactile perception, olfactory and gustatory perception (smell and taste), and kinesthesia (perception of body movement/position), allows humans to be aware of their surroundings. One kind of kinesthesia that is occasionally utilized for successful interaction and 3D space perception is proprioception, which is the body's inherent awareness of where joints and body segments are in space [1]–[4].

Physical inputs are translated into information via these perceptual pathways, which are then transferred to the brain. Pre-attentive processing refers to the processing of certain information at a very low level in parallel without conscious thinking. Other information requires the use of

conscious thinking or attention in order to be perceived. The visual perception channel is the most commonly utilized communication channel in visualization, with the auditory and haptic channels being employed to communicate extra information or as redundant modes of communication to improve communication accuracy or speed. To effectively communicate information via perceptualization, it is necessary to first understand how people perceive information.

The history of HCI begins in 1959 with a paper on "Computer Ergonomics," which was the first time these problems were addressed. Following that, Licklider published what has become regarded as the foundational article on "Man – Computer Symbiosis" (1960), in which man and computer coexist. There was nearly a decade of inactivity before the first HCI conference and specialized magazine, "The International Journal of Man-Machine Studies," was established in 1969. Three additional HCI publications and conferences with an average attendance of 500 people were launched in the 1980s. The "I" in HCI did not change from "interface" to "interaction" until the 1990s, reflecting the greatly increasing variety of digital technology [5]–[8]. It was also in the 1990s that the word "usability" became associated with practically all HCI operations. Prior to this, HCI had five development or improvement goals:

- Security
- Practicality
- Affordability
- Effectiveness
- Convenience

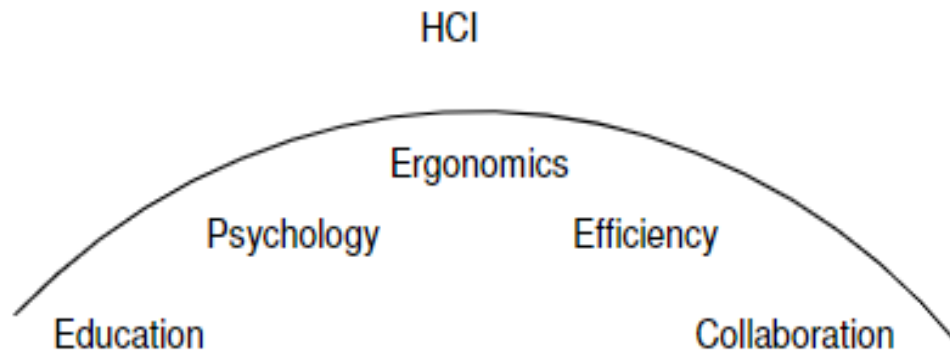
Usability was formerly the least important factor, but it has now been elevated to include everything. "The study of human-computer interaction became the study of usability." Researchers looked at the history of HCI from a technical standpoint, finding that it began in 1960 with university study on direct manipulation of graphical objects, followed by commercial research in 1970 and commercial devices in 1980. Researchers also highlight some of the most promising topics of contemporary HCI research, including:

- Gesture Recognition: input device based on a pen,
- Multi-media: several windows with text and graphics integrated
- 3-D: ultrasonic three-dimensional location detecting system
- Virtual Reality and "Augmented Reality": NASA funded a lot of early research on head-mounted displays and the DataGlove.
- Computer-Assisted Collaborative Work the involvement of a large number of individuals from different locations through the internet
- Speech and natural language: basic research for speech and natural language comprehension and generation

## **2. THE BASIC CHARACTERISTICS AND STRUCTURE OF HCI**

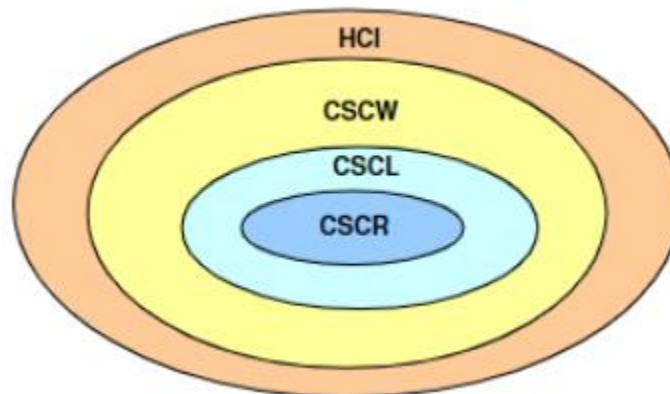
Human computer interaction may be described as the science of designing, evaluating, and implementing interactive computing systems for human use, as well as the study of significant phenomena that surround them [9], [10].

As illustrated in Figure 1, HCI has become a catch-all phrase encompassing a variety of fields, including educational theories, psychology, cooperation, efficiency, and ergonomics.



**Figure 1: Illustrates the components of human computer interface.**

Adaptive interfaces, speech recognition, gestures, and the role of time have all recently gained popularity in the field of human-computer interaction. Computer Supported Collaborative Working (CSCW), Computer Supported Collaborative Learning (CSCL), and Computer Supported Collaborative Research (CSCR) are all subdomains of HCI, as shown in Figure 2.



**Figure 1: Represents the domain relationships of human computer interface.**

### 2.1. HCI Theories and Principles:

There are typically thousands of rules developed for usability evaluation, and numerous attempts have been made to reduce the complexity to a manageable set of rules. All user interface designers should follow the ten rules known as usability heuristics, which are designed to explain a large proportion of problems observed in interface design.

1. **Natural And Simple Dialogue:** Make every effort to avoid providing irrelevant information. According to Nielsen, every additional unit of information competes with units of relevant information, lowering its visibility.
2. **Speak the User's Language:** All information should be expressed in terms that the user understands rather than terms that the operator or the system understands.
3. **Reduce The User's Memory Load:** It's critical that the user doesn't have to recall information from one section of a conversation to the next. Help should be provided at readily accessible locations across the system.

4. **Consistency:** No matter where they appear in the system, words, circumstances, and actions should always imply the same thing.
5. **Feedback:** Users should constantly be kept up to date and informed about what is going on in the system.
6. **Clearly Indicated Exits:** People often make mistakes by selecting features that aren't needed, therefore there should be a fast emergency escape that allows them to return to the prior state without having to participate in lengthy conversation.
7. **Shortcuts:** Required by the expert user (but invisible to the beginner user) to speed up system interaction.
8. **Effective Error Messages:** These should be written in simple language that the user understands, and they should be detailed enough to identify the issue and propose a remedy.
9. **Avoid Errors:** Careful planning will ensure that an issue does not arise.
10. **Assistance and documentation:** Even the most advanced systems may be operated without manuals. When such assistance is required, it should be readily available, focused on the user's job, and provide a list of precise steps to solutions.

### 3. HCI MODELS

A number of distinct models have been proposed, each of which is intended to offer an HCI theory in a specific situation. Norman's Model, Abowd and Beale's Model, and the Audience Involvement Model all offer a new theoretical foundation for audience participation in HCI.

#### 3.1. Norman's Interaction Model:

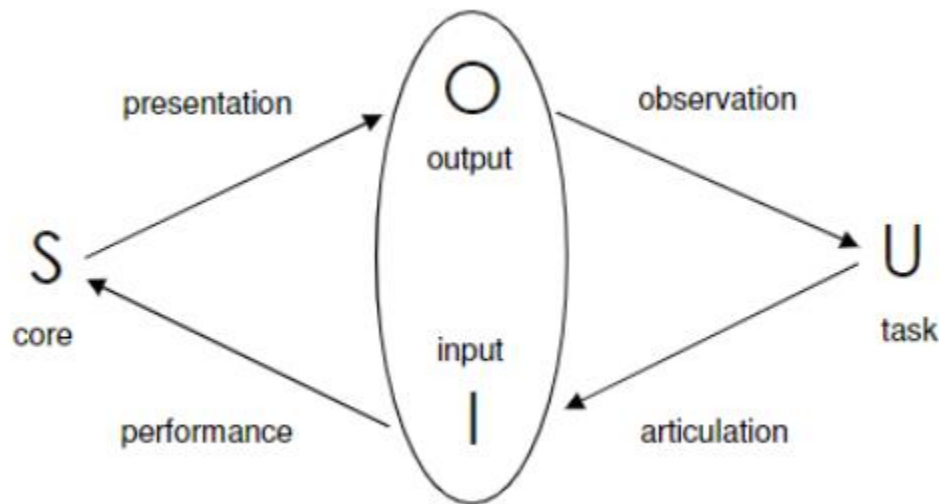
Because it reflects human intuition, this is most likely the most influential. In essence, this approach is built on the user developing a strategy and then executing it at the interface. This has been split into seven phases by Norman:

1. Identifying the objective
2. Creating an intention
3. Defining the sequence of events
4. Carrying out the activity
5. Recognizing the current condition of the system
6. Determining the condition of the system
7. Assessing the current status of the system in relation to the objectives and aims

#### 3.2. The Interaction Model:

Abowd and Beale created an interaction framework based on Norman's concept, although it is intended to be more realistic. This has four main components (Figure 3):

1. the system S
2. the user U
3. the input I
4. the output O



**Figure 3: Illustrates the general interaction framework model and how it works.**

The Error! Interface stands between the user and the system, and it follows a four-step interaction cycle, as indicated by the marked arrows. The reference source could not be located. The user creates a task in order to accomplish an objective. The machine is controlled by the user through input expressed by the input language. To execute the process, the input language is translated into the system's core language. The system has entered a new state, which is shown as an output. Observation is used to convey the output to the user.

### 3.3. Model of Audience Participation:

The traditional view of computers is that they are deterministic boxes that mindlessly obey their instructions, with humans unable to alter the path of the computer program. He responds with an alternative, arguing that users should be seen as audience members rather than participants. Old models have the belief that the majority of people want to be amused rather than creative, and that any creative thought while using a computer is considered a mistake. As a result, computer users lack a suitable framework through which to express themselves. This is a rather unconventional approach. He then goes on to talk about the emonic environment, which he describes as a framework for creating, modifying, exchanging, and performing audiovisual material. The three levels are as follows:

- Contribution (interfaces for sampling)
- Architectonic (a neural network for providing structural control)
- Observational (direct media modification)

Because its field of application is intended to mimic the creative inspiration of the artist fighting against the mechanical controls of the machine, this later and more radical model is unlikely to have any meaningful applicability to the CSCL issue at hand.

## 4. DISCUSSION

To evaluate the efficacy of HCI measures, a variety of methods have been developed. The User Needs Analysis, which recommends how and when user-centered design and requirements engineering methods should be incorporated, has been improved. They propose a revised method

after evaluating different process models for user-centered design analysis and identifying the key issues as follows:

- It's important to figure out where to start and finish the analysis.
- Choosing how to record and display the results

The history of HCI demonstrates a lack of coherence. There is no consensus on:

- What should HCI be?
- What HCI is capable of?
- What HCI can do about it?
- How can HCI be trusted to accomplish it?

According to Diaper 2005, the fragmentation of the HCI field is so wide that it is difficult to even characterize the technique of approach. Different practitioners, for example, have different goals and methods. Some methods begin with requirements, while others begin with assessment, while still others begin with conversation, user modeling, scenarios, information, design, artifacts, or procedures. This lack of consensus emphasizes the need for the creation of a general systems model, both in the general HCI approach and in the collaborative method specifically.

## 5. CONCLUSION

HCI theories have not yet been completely developed, and the field is extremely fragmented, making it impossible to characterize a single way of approach or even a set of recognized principles. Because there is no consensus among authorities in this area, the method must be carefully adapted to the particular requirements of the environment to which it is applied. This section briefly reviewed the history of HCI, demonstrating how, since the 1960s, usability has been a key element of almost all HCI operations. HCI's structure has been examined in order to demonstrate how it includes a variety of fields. Three HCI models were studied, showing how interactive description became more refined over time, culminating in Abowd and Beale's interaction theory. The technique of Lindgaard et al, which focuses on user requirements, has developed from the approach to HCI analysis. This is a popular technique, and it will be discussed in more depth when the methodology for this project is examined. Because of the dispersion of HCI principles, a frequency analysis of HCI writers and their selected principles was deemed essential at this point. This was done on the basis of the most significant characteristics mentioned by each contributor. These were then weighted according to the writers' own citation frequency. The goal was to come up with a collection of principles that would be the most widely accepted. This study resulted in the establishment of eight regulations.

## REFERENCES:

1. H. Limerick, D. Coyle, and J. W. Moore, "The experience of agency in human-computer interactions: A review," *Frontiers in Human Neuroscience*. 2014, doi: 10.3389/fnhum.2014.00643.
2. K. Li, A. Tiwari, J. Alcock, and P. Bermell-Garcia, "Categorisation of visualisation methods to support the design of Human-Computer Interaction Systems," *Appl. Ergon.*, 2016, doi: 10.1016/j.apergo.2016.01.009.



3. A. Jaimes and N. Sebe, "Multimodal human-computer interaction: A survey," *Comput. Vis. Image Underst.*, 2007, doi: 10.1016/j.cviu.2006.10.019.
4. A. Dix, "Human-computer interaction, foundations and new paradigms," *J. Vis. Lang. Comput.*, 2017, doi: 10.1016/j.jvlc.2016.04.001.
5. S. S. Rautaray and A. Agrawal, "Vision based hand gesture recognition for human computer interaction: a survey," *Artif. Intell. Rev.*, 2015, doi: 10.1007/s10462-012-9356-9.
6. A. Henderson, "Interaction design: beyond human-computer interaction," *Ubiquity*, 2002, doi: 10.1145/512526.512528.
7. D. Bachmann, F. Weichert, and G. Rinckenauer, "Review of three-dimensional human-computer interaction with focus on the leap motion controller," *Sensors (Switzerland)*. 2018, doi: 10.3390/s18072194.
8. H. Bansal and R. Khan, "A Review Paper on Human Computer Interaction," *Int. J. Adv. Res. Comput. Sci. Softw. Eng.*, 2018, doi: 10.23956/ijarcsse.v8i4.630.
9. A. Haria, A. Subramanian, N. Asokkumar, S. Poddar, and J. S. Nayak, "Hand Gesture Recognition for Human Computer Interaction," 2017, doi: 10.1016/j.procs.2017.09.092.
10. M. J. Smith, F. T. Conway, and B. T. Karsh, "Occupational stress in human computer interaction," *Industrial Health*. 1999, doi: 10.2486/indhealth.37.157.

## THE IMPACT OF SOCIAL MEDIA ON THE ACADEMIC DEVELOPMENT OF SCHOOL STUDENTS

**Vinod Kumar Jain\***

\*Professor,  
Department of Education, Faculty of Education,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- vinod.education@tmu.ac.in

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### ABSTRACT

*Today, it is crucial to determine the impact of social media on the academic performance of students. Technology is booming rapidly from year to year, and the younger generations are the ones caught in this rapid change. Questionnaires were distributed through Facebook and E-mails, to find out whether students' academic performance is impacted by social media or not. The findings demonstrate that there is no relationship between social media and academic performance; this is clearly projected in their overall grade average.*

**KEYWORDS:** *Social Media, Education, Younger Generation, Academic Development, Egypt.*

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### INTRODUCTION

There are two types of social media users; digital natives and digital immigrants. Digital natives are the ones who were born after 1980, they came to this world when the digital media existed. However, digital immigrants are the ones who were born before 1980 and adapted their lives to digital media (AntonSon and Christopher, 2014). Social media platforms vary from Web blogs, to micro-sharing platforms, to life streams to social networks and much more (AntonSon and Christopher, 2014). The younger generation discussed in this research paper are school students between the ages of 12 to 19 years old. A few of the platforms they use are Facebook, YouTube, Google, and many others that will be discussed in the findings of this research. The younger generation are the individuals that will lead our world in the future, they must be well educated to be able to impact this world and make Egypt a better country on the road to success. Therefore, research must be conducted about the different things they are exposed to, that may affect them negatively or positively.

This research aims to assess the frequency at which the students are social networking, and whether it has any effect on their academic performance. If there is an impact on their academic performance, in what way does it effect it. All these questions will be answered through this research paper. Social media has been utilized in so many different ways throughout the years. Egypt is known to be one of the heavy users of social media, specifically Facebook. It dominates 25% of the total MENA region, having almost 11 million users, even though the penetration rate is only about 13%. In the first six months of the year 2012, Egypt had an additional 1,608,420 users on Facebook, which is the highest number in the MENA region [1, 2, 11, 3–10]. Luke

Richards stated that 46% of Egyptian social media users believe that social media has great influence in empowering them to change their country (Richards, 2012). According to Dr. Anthony Curtis, in 2014, there is about 1.28 billion Facebook users and 255 million Twitter users, 55 million of the Facebook users and 3.7 million of the Twitter users are from the Arab world (Curtis, 2013). This research aims at measuring the impact of social media on the younger generation's academic performance; therefore, this paper is structured in the following order: the literature review outlining previous research conducted on university students and high-school students outside of Egypt. Following with the research methodology and the results obtained from the distribution of the questionnaires; followed by the discussion that will answer the suggested hypotheses of the paper. The final part will be the conclusion and the limitations of this study.

## DISCUSSIONS

There was a total of 110 responses received. The demographics were 68% females and 32% males. The majority of the respondents were between 16 and 17 years old and they made up 72% of the respondents. The rest of the 28% were 14, 15, 18 and 19 years old. This means the majority were from grades 11 and 12, which are 85% of the respondents. The respondents were asked to mention their overall grade range at school. 61% of the respondents were between the 90-100% grade range, 20% were of the 80-90% grade range and 9% were of the 70-80% grade range, leaving 10% of the grade range 70% and below. When it came to looking at which platforms students use mostly, 41% mostly used Facebook and 32% used Google.

The least platform that was used was SnapChat since 40% of the respondents voted for it the least. The other platforms were, Instagram 27% used most frequent. Twitter and YouTube, their level of usage was a three out of five, as observed by the scores on the Likert Scale used in the questionnaire. They were also asked to mention whether they use social media to study or not and how they use social media to study. 92% of the respondents use the internet to study. Others students stated clearly, that they use social media platforms with their math homework since they can Google equations. Therefore, most of them use social media in a positive way, which helps them do better at school. The respondents were also asked to mention the number of hours they spend daily on social media and studying; the results were quite surprising. 50% of the respondents spend 1-3 hours studying a day and 33% spent that same amount of time on social media per day. From this it is clear that the respondents do not study more often than they browse social media, and the overall grade averages of the majority is quite high.

Figure 1 illustrates the relationship between the numbers of hours the students spend daily on social media networks versus their overall grade range in school. Looking at the results, it is clear that the number of students within the grade range of 90%-100% are 67 in total, which is almost 61% of the total respondents. Looking deeper into the bar graph, it is clear that among the 67 students, the majority of them spend between one to three hours a day, three to six hours a day and more than six hours a day on social media. A minority of them spend less than an hour a day on social media. Moving on to the grade range of 80%-90%, there are a total of 22 students, which is about 20% of the respondents. They are also distributed throughout the four categories of number of hours spent daily on social media. The majority spend between one to three hours on social media, and the second half spend between three to six hours and more than six hours daily on social media.

Chi Square analysis conducted, between the use of social media and the number of hours spent daily on studying. The null hypothesis in this case is that ‘the usage of social media, effects the number of ours the students study daily; looking at the Chi Square analysis, it is shown again, that, there is a violation regarding the expected count, so the ‘Likelihood Ratio’ will be considered, and the significant level is 0.000, therefore, the null hypothesis will be rejected. The students use of social media does not affect the number of hours they study daily. According to the above findings, it contradicts what Sanzhar Naizabekov has said, that social media causes procrastination as a result of its distracting nature (Naizabekov, 2012). In this research’s case, there is no significant relationship between using social media and the students’ academic performance. On the other hand, the results of this research, somehow agrees with the conclusion stated by Napoleon Egedegbe, that, there is no impact either positive or negative, by using social media, on the academic performance of students (Egedegbe, 2013).

Table 1. Frequency of social media usage and the number overall grade average of the students  
Value df Asymp. Sig. (2-sided) Pearson Chi-Square 1317.463a 24 .000 Likelihood Ratio 735.781 24 .000 N of Valid Cases 1109 a. 26 cells (74.3%) have expected count less than 5. The minimum expected count is 0.01. Table 2 is another Chi Square analysis conducted, between the use of social media and the number of hours spent daily on studying. The null hypothesis in this case is that ‘the usage of social media, effects the number of ours the students study daily; looking at the Chi Square analysis, it is shown again, that, there is a violation regarding the expected count, so the ‘Likelihood Ratio’ will be considered, and the significant level is 0.000, therefore, the null hypothesis will be rejected.

The student’s use of social media does not affect the number of hours they study daily. According to the above findings, it contradicts what Sanzhar Naizabekov has said, that social media causes procrastination as a result of its distracting nature (Naizabekov, 2012). In this research’s case, there is no significant relationship between using social media and the students’ academic performance. On the other hand, the results of this research, somehow agrees with the conclusion stated by Napoleon Egedegbe, that, there is no impact either positive or negative, by using social media, on the academic performance of students (Egedegbe, 2013).

## CONCLUSION

June Ahn stated, “Emerging studies find that youth spend a considerable portion of their daily life interacting through social media.” According to this study, it is a true statement given that the majority of the Egyptian students spend between one to more than six hours daily on social media platforms, such as Facebook and Google. As noticed in the discussion, whether the students spend less than one hour on social media or more than six hours on social media, or even the average amount of time which is between one to three and three to six hours a day, students still share the same grade range average. 61% of the respondents have the highest grade ranges which is 90%-100% and they varied between all four time ranges on social media per day.

By this, it is safe to conclude that there is no negative impact from the use of social media on the academic performance of the school students, and it is proven by the Chi Square analysis, which resulted with no significant relationship or difference between both the frequency of using social media with the overall grade average; and with the number of hours spent daily on studying. The objective of this research was to find out the type of impact that is caused by social media on the

students' academic performance, why this impact is caused, and how. After conducting the research, it is clear that social media does not impact school student's academic performance in any way because although they spend hours on social media, they still manage to find time to study, and achieve good grades. The first limitation of this research is the small range of respondents that were contacted to test the effects of social media on Egyptian youth. As a result of the small range, these generalizations cannot be made to the whole of Egypt.

Another limitation of this study was that not much research has been done regarding the impact of social media on the academic performance of the young generation. It was difficult to find a starting point to build on as the majority of the studies conducted regarding the impact of social media was done either on university students' academic performance, or the effects it causes psychologically, and even these were not conducted in Egypt. A third limitation to this study was having a short-period of time to conduct the research. A result of this, is that the generalization of there being no relationship between the uses of social media on the academic performance of school students, is not 100% accurate.

## REFERENCES

1. Brahim, T. and Sarirete, A., "Learning outside the classroom through MOOCs," *Comput. Human Behav.*, 2015, doi:10.1016/j.chb.2015.03.013.
2. Liu, W.C. and Wang, C.K.J., "Home environment and classroom climate: An investigation of their relation to students' academic self-concept in a streamed setting," *Curr. Psychol.*, 2008, doi:10.1007/s12144-008-9037-7.
3. Lu, M.-Y., Newman, R., and Miller, M., "Connecting Secondary and Postsecondary Student Social Media Skills: Recommendations for Administrators.," *Educ. Leadersh. Adm. Teach. Progr. Dev.*, 2014.
4. Ferreira, D.A.V., Aranha, R.N., and Souza, M.H.F.O. De, "Academic leagues: A Brazilian way to teach about cancer in medical universities Approaches to teaching and learning," *BMC Med. Educ.*, 2015, doi:10.1186/s12909-015-0524-x.
5. Lee, C., "The Impact of Belonging to a High School Gay/Straight Alliance," *High Sch. J.*, 2002, doi:10.1353/hsj.2002.0005.
6. Walks-Harper, K., "Classified staff perceptions of their impact on student achievement in middle school," *Diss. Abstr. Int. Sect. A Humanit. Soc. Sci.*, 2018.
7. Benson, V. and Morgan, S., "Social university challenge: Constructing pragmatic graduate competencies for social networking," *British Journal of Educational Technology*, 2016, doi:10.1111/bjet.12448.
8. Andrew Chris, L., "Influence of Social Media on Study Habits of Undergraduate Students in Kenyan Universities," *Int. J. Nov. Res. Humanit. Soc. Sci.*, 2015.
9. Kindermann, T.A., "Handbook of Social Influences in School Contexts Social-Emotional,

Motivation, and Cognitive Outcomes Kathryn R. Wentzel, Geetha B. Ramani,” *Handb. Soc. Infl. Sch. Context. Motiv. Cogn. Outcomes Routledge. Accessed*, 2018.

10. Gray, T. and Pigott, F., “Lasting Lessons in Outdoor Learning: A Facilitation Model Emerging from 30 Years of Reflective Practice,” *Ecopsychology*, 2018, doi:10.1089/eco.2018.0036.
11. El-Badawy, T.A. and Hashem, Y., “The Impact of Social Media on the Academic Development of School Students,” *Int. J. Bus. Adm.*, 2014, doi:10.5430/ijba.v6n1p46.



## A COMPREHENSIVE STUDY OF BLOCKCHAIN TECHNOLOGY AND ITS USES

**Arpit Jain\***

\*Associate Professor,  
Department of Computer Science, Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- arpit.computers@tmu.ac.in

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### ABSTRACT

*Large data management is a major worry issue for academics in today's digital era. Several applications, such as big data, data analysis, image processing, and data mining, require large-scale data processing. The Blockchain is a distributed ledger technology that securely saves data across many systems to allow peer-to-peer transactions by establishing a trustworthy source of truth and eliminating the need for so-called trust intermediaries. A blockchain is a method for creating distinct kinds of distributed databases made up of immutable blocks of data, each with a list of transactions and a peerless reference to the block before it. Blockchain-based applications are surfacing in a variety of areas, including reputation management, the Internet of Things (IoT), big data, and financial services, among others. This method uses a shared, distributed ledger to make recording transactions and monitoring assets in a corporate network simpler. We wanted to provide a close-up perspective of Blockchain technology in this paper. We also go through the basics of Blockchain design, how various Block chains vary, and how Blockchain operates. We believe that, given its rapid growth and development, Blockchain will soon become a very widespread and well-known phenomena.*

**KEYWORDS:** *Big Data, Bitcoin, Blockchain, Consensus Protocol, Consortium Blockchain Distributed Ledger.*

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### 13. INTRODUCTION

Artificial intelligence, cloud computing, robotics, and the mobile economy are examples of technological innovations that have quickly established themselves in recent years through developments similar to digital identities and social media, and have now become a key component of the social and commercial economies [1]. In recent years, data has grown at a breakneck pace. Academics and businesses needed an intelligent data analysis tool and methodology to help them meet the requirement to analyze huge amounts of data. It is thus critical for businesses to comprehend the impact of technology advancements on their business models in order to adapt to the new scenario. The Blockchain has sparked attention as a new technology that is anticipated to provide significant cost savings by allowing transactions to be

carried out as peer-to-peer procedures between users [2]. It is a viable alternative to the conventional approach of enlisting the help of a reputable third-party mediator.

In today's situation, governments, private investors, and technology developers are all paying close attention to blockchain technology. Cryptocurrencies, namely bitcoin, are the most well-known modern uses of Blockchain technology [3]. This method has evolved into a publicly accessible platform for developing decentralized apps with built-in compatibility. This approach enables new types of distributed software architectures, where agreement on shared state for decentralized and transaction data may be formed over a large network of untrustworthy individuals. A blockchain is a distributed ledger that, in most cases, can validate and record any kind of transaction. Bitcoin is the most well-known example of Blockchain technology, as well as the most controversial, since it enables to allow a multibillion-dollar worldwide market of anonymous transactions free of official oversight.

### **13.1. Blockchain Models:**

Depending on the situation, the Blockchain architecture may take a variety of shapes. There are a variety of implementation options available, each fulfilling its own set of needs and criteria. The sections that follow provide a quick overview of the many kinds of Blockchain.

#### **13.1.1. Public Blockchain:**

A transaction and block validation node may be implemented in this kind of system. The Blockchain is protected via cryptographic verification backed by incentives for miners on the public Blockchain, or by utilizing a central server [4]. To collect and broadcast such transactions, someone may serve as a miner. Because no one has implicit confidence in the public Blockchain to reassert transactions, everyone follows an algorithm that reasserts transactions by devoting hardware and software resources to brute force a solution. Because of the methods used (i.e., proof-of-stake, proof-of-work), the validation time for transactions and blocks is uniformly lengthy, which implies that some applications of the technology are not feasible. Ethereum and Bitcoin are the most well-known examples.

#### **13.1.2. Private Blockchain:**

A fully private Blockchain is one in which write rights are concentrated inside a single entity [5]. Permissions to look at files may be open to the public or limited to a certain degree. Because there is only one validation and no need for a consensus process, there is only one validator in this situation, which offers excellent performance in terms of validation time. The trade-off is that this is another instance of a conventional situation in which a single third party must be trusted. This kind of infrastructure isn't really a Blockchain since it doesn't guarantee that the data can't be tampered with or that it won't be hacked by a third party. If all of the nodes belong to the same entity, there is no need to duplicate the Blockchain because, if a third party wishes to improve or degrade the register, it has control over all of the nodes. To save money, it's better to revert back to a centralized register rather than over utilizing storage capacity. In other words, continuing to use a private database maintained by a third party might be preferable. Compliance agents for regulations such as the Health Insurance Portability and Accountability Act (HIPAA), anti-money laundering (AML), know-your-customer (KYC) legislation, and the Accountability Act may be provided by private Blockchains.

#### **13.1.3. Consortium Blockchain:**

The R3 consortium Blockchain technology is a distributed ledger in which a pre-selected group of nodes controls the consensus process [6]. Validation is carried out by a variety of organizations, but the consortium selects and approves them. In other words, the faith aspect is still distributed across various entities, but without the resource constraints associated with resource-intensive consensus mechanisms like Bitcoin's proof of work, because the choice of validators allows the system to reduce hazard and thus streamline validation processes. The ability to read the Blockchain can be public or granted to the user, and there are also hybrid routes, such as making the root hashes of the blocks public and providing an application programming interface that allows members of the public to submit a limited number of queries and receive cryptographic proofs of some aspects of the Blockchain state. These Blockchains are distributed ledgers that may be considered decentralized to some degree. The consortium may take many different forms and include a variety of institutions, related businesses, and organizations of all kinds, as well as smaller structures, as long as they can get the necessary information technology resources.

### **13.2. Differentiate Blockchains:**

It's important to distinguish between public, consortium, and private Blockchains. Private Blockchain, as opposed to public Blockchain, has a number of advantages. The rules of a Blockchain may be changed by a private Blockchain operator. If there is a Blockchain among financial partners, they will be able to change transactions if errors are discovered. Transactions are not costly on the private Blockchain since they only need to be validated by a few nodes that can be trusted to have a lot of computing power. Public Blockchains have higher transaction costs, however this will change as scaling technologies advance, bringing public Blockchains closer to a lower cost in order to build a more efficient Blockchain system. Public Blockchain technological advancements, such as Ethereum's proof-of-stake, may bring public Blockchain closer to the goal of instantaneous confirmation, but private Blockchain will always be faster. Private Blockchain may offer a higher degree of privacy if read permission is limited. The public Blockchain provides a method to protect app users from developers by declaring that certain actions are prohibited even by app developers.

### **13.3. Structure of Blockchain:**

The Blockchain creates a distributed public ledger with transactions that are stored and controlled by particular protocols according to the network's nodes' agreement. The Blockchain ledger is not kept on a single server with specific permissions. Instead, it's a shared data structure in which every network node has an identical copy of every other node and can read any transaction in the ledger. A Blockchain is a virtually continuous chain of blocks that is used to store transactions. Every block has at least one related transaction, and the blocks are arranged in ascending time order. Users with application access to the chain can read any transaction in the sequence and add a new block at the end of the sequence, as a result of each block acting for a set of events that took place over a specific timeframe that is subsequent to the previous chain of blocks and earlier to the very next chain of blocks, and users with application access to the chain can read any transaction in the sequence and add a new block at the termination of the sequence.

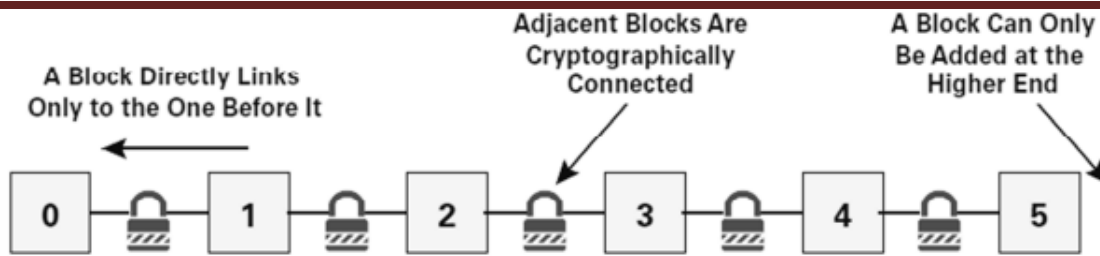


Figure 1. The Block Chaining Structure [7].

Each block has a unique parent and successor, as illustrated in Figure 1. Only at the newer, or upper end of the chain, is a block added. While will be shown, there may be a branching structure for the time being as the chain develops. Each block in the Blockchain is required to be connected to the block before it using a cryptographic method. The system is set up in such a way that adding a new block to the end of the chain is computationally feasible, but substituting a block inward or inserting a new block between two living blocks in the chain is computationally impossible. After that, a read-only block is added to the chain.

From one application to the next, the proper structure of a block may differ. Every block starts with a magic number that identifies this chain without a doubt. The magic number for Bitcoin is 0xD9B4AEF9. Following this number comes a block size field, which indicates the total amount of bytes in the block's residue. The connection between Blockchain blocks is shown in Figure 2.

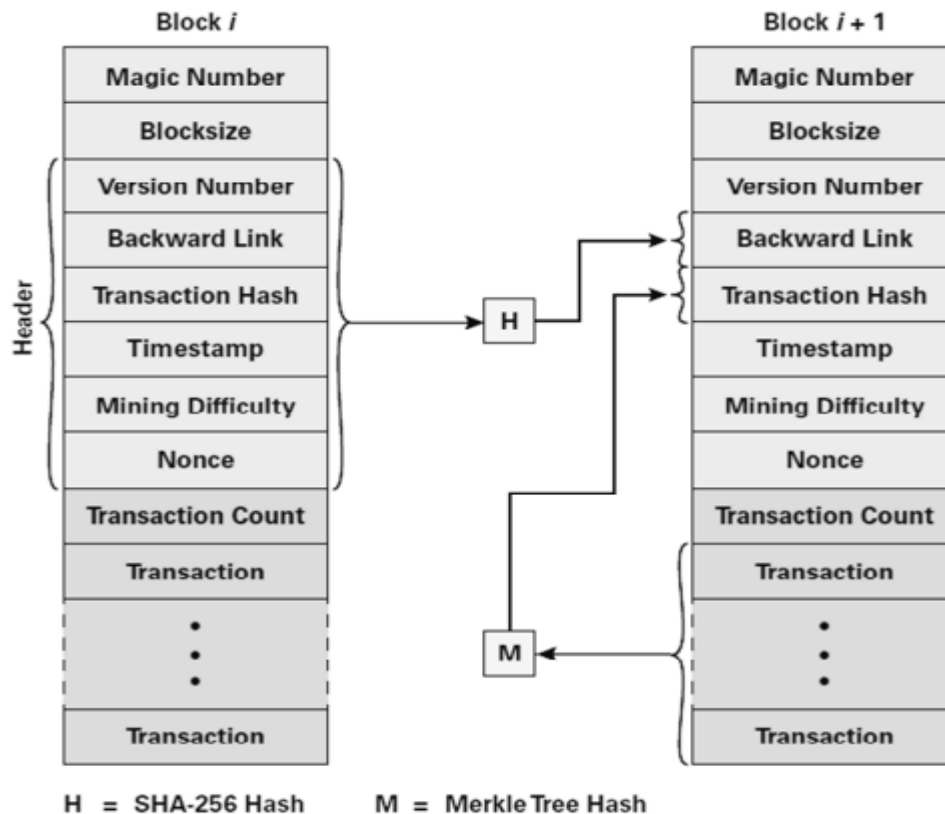


Figure 2. The linkage between Blockchain blocks [8].

## **14. DISCUSSION**

### **14.1. Blockchain Applications:**

#### **14.1.1. Healthcare Payments Management:**

Clinical attachments in healthcare claims now include a large number of actors, information, and records, making effective information association a difficult job. Clinical in comparison payment data matching necessitates a high level of detail and may be extremely expensive and time consuming [9]. This complex connection may be made simpler by using blockchain to automate data collection and exchange. Blockchain is used to store legal documents and associated contract histories in a common repository. Chaincode facilitates the document management business process or workflow. When several affined documents are present, chaincode examines the consistency of these documents to eliminate inaccuracies.

#### **14.1.2. Maintenance of Vehicle Registration:**

Government authorities may establish a Blockchain car template that is updated by the manufacturer when the vehicle is transferred to the dealer, original possessor, or future possessor. Other information, such as maintenance records or car thefts, may be added to this. Using Blockchain as a shared record of car history data, including use, maintenance, warranty work, and vehicle component replacement.

#### **14.1.3. Food Safety:**

The secure paperwork is affixed to the raw material and sewn into concentricity onto the package for shipping. Distributors, regulators, auditors, consumers, and retail buyers may all see the food supply chain in real time thanks to blockchain.

#### **14.1.4. IoT to Economy of Things:**

The Blockchain serves as a distributed transaction ledger for IoT transactions, as well as peer-to-peer communications and independent device coordination [10].

#### **14.1.5. Commercial Paper and Livestock Registry:**

The Blockchain links corporate treasuries with worldwide advisers for financial advice, as well as the execution, settlement, and clearing of transactions. Farmers, slaughterhouses, governments, and cattle markets all benefit from a shared record created by blockchain. All aspects, including movements and transactions, have access to verified livestock data. The intelligent contracts specify the terms of movements and transactions based on the kind of animals.

#### **14.1.6. Keep an Eye On Gun Ownership:**

From the producer to the consumer, a Blockchain system may help maintain track of gun ownership. The system would keep track of the buyer's information, such as previous gun purchases and background checks, and the ledger would be accessible to gun dealers and authorities.

#### **14.1.7. Manufacturing Origin:**

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Each producer in the manufacturing process, such as government regulators, maintainers, and aircraft owners, will have access to a full provenance description of each component part stored on the blockchain.

#### **14.1.8. Intelligent Appliances:**

An intelligent appliance is a gadget that connects to the internet and provides you with more information and control than previously available. A code attached to your appliance, for example, may be linked to the internet and alert you when your cookies are ready or if your washing has stopped. These restrictions maintain your appliances in good working order, save you money on energy, and allow you to manage your gadgets when you're away from home, among other benefits. Encrypting these appliances on the Blockchain secures your ownership while also allowing them to be alienated.

### **15. CONCLUSION**

The Blockchain technology is one of the most well-known phenomena in recent years; it has already changed people's lifestyles in certain areas owing to its significant impact on many companies and industries, and what it can accomplish will continue to have an impact in many areas. At its heart, Blockchain technology consists of an immutable distributed ledger and a decentralized network that is cryptographically secure. The technology's most potent characteristics are its obstacles to undermining or alienating information that has been introduced to the chain. In principle, the Blockchain should be more cost-effective, more rigid, and faster than any other method now in use. In this article, we examine the state-of-the-art of current Blockchain models, as well as the structure of a Blockchain network, the terms used in Blockchain, and the features of a Blockchain network. As a result, we're attempting to emphasize the technological challenges that Blockchain technology has encountered in recent years. Finally, potential Blockchain technology applications and services are summarized. Following that, we want to do a thorough study of Blockchain security and privacy.

### **REFERENCES**

1. S. J. Russel and P. Norvig, "Artificial Intelligence Connections Artificial Intelligence &," *Encyclopedia Britannica*. 2016.
2. H. Covington and Y. B. Choi, "Blockchain and Bitcoin," *Int. J. Cyber Res. Educ.*, 2018, doi: 10.4018/ijcre.2019010103.
3. C. Dierksmeier and P. Seele, "Cryptocurrencies and Business Ethics," *J. Bus. Ethics*, 2018, doi: 10.1007/s10551-016-3298-0.
4. L. Xu *et al.*, "Enabling the Sharing Economy: Privacy Respecting Contract based on Public Blockchain," 2017, doi: 10.1145/3055518.3055527.
5. Praveen Jayachandran, "The difference between public and private blockchain," *Ibm*, 2017.
6. J. Gu, B. Sun, X. Du, J. Wang, Y. Zhuang, and Z. Wang, "Consortium blockchain-based malware detection in mobile devices," *IEEE Access*, 2018, doi: 10.1109/ACCESS.2018.2805783.
7. H. S. Kim and K. Wang, "Immutability measure for different blockchain structures," 2018, doi: 10.1109/SARNOF.2018.8720496.



8. A. Prashanth Joshi, M. Han, and Y. Wang, "A survey on security and privacy issues of blockchain technology," *Math. Found. Comput.*, 2018, doi: 10.3934/mfc.2018007.
9. M. Hölbl, M. Kompara, A. Kamišalić, and L. N. Zlatolas, "A systematic review of the use of blockchain in healthcare," *Symmetry (Basel)*, 2018, doi: 10.3390/sym10100470.
10. N. Kshetri, "Can Blockchain Strengthen the Internet of Things?," *IT Prof.*, 2017, doi: 10.1109/MITP.2017.3051335.

## AN OVERVIEW ON TECHNOLOGY INTEGRATION

**Vibhor Jain\***

\*Associate Professor,  
Department of Marketing & HR,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- vibhor.manage,ment@tmu.ac.in

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### ABSTRACT

*It is critical for politicians, school administrators, and educators to assess existing technology use or integration levels in schools before making decisions regarding budgetary allocations, staff development, and employee training. The goal of this study is to look at and evaluate the tools used to assess a school's level of technology integration. The literature was researched for determining tools in the article. Cos of their widespread use, the assessment instruments Loti, OPTIC, PETI, and TAGLIT were selected. Each tool is examined separately and compared in a table that shows the device's features. The results of the study may assist decision-makers, educators, researchers, and educators in choosing the best technology integration assessment tool. Computers, laptops, portable computers, software, and the Internet are some of the most commonly used technologic. Technology refers to the instruments we use to provide content and better implement processes. Efficient method, according to some, may make a difference in the classroom [1].*

**KEYWORDS:** *Loti, Optic, Peti, Technology Integration, Taglit.*

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### 1. INTRODUCTION

Rapid advances in technology, such as computers and the Internet, provide up new possibilities for teaching and learning. As we go through the Information Age, technological advances are altering the structure and functioning of organizations. This change has an impact on education as well. It is critical for educators to rise to the challenges that these developments bring in them to prepare students to be productive citizens in society. Many schools' appearance and functions are likely to change as a result of technological and educational advances. If students are to live and work successfully in an increasingly complicated and information-rich world, they must be able to utilize technology. Technology may also have an impact on students' life. To excel in future professions and to be good citizens, students must be technologically savvy. As according studies, technology accelerates, enriches, and deepens basic skills; encourages and engages students in learning; helps connect academics to the practices of today's workforce; strengthens instruction; and boosts the financial potential of tomorrow's employees[2].

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### **1.1. Technology Integration:**

Many people have used the term integration of technology to mean many separate stuff. Russel & O'Dwyer. Hew & Sweep. Miller. Hard to truly & Chan. Information technology is understood and explored by some scholars in terms of the different types of teachers' desktop use in the classroom setting, and for others, it is understood and explored in terms of how educators used technology to carry out surely more dependably and productively, and how these use may be realigning these activities. Others define integration of technology as teachers utilizing software to help students improve their critical thinking skills. Technology integration, as according Griffin, is the intentional use of instructional technology in the development and technique of curriculum delivery. Technology integration is a process of incorporating technology and technology-based activities. Into school programs, work, and administration. As according Protheroe, effective integration of technology does not mean using technology for teaching the same content in the same way; rather, it involves using technology to promote new learning models, such as chances for learners to engage and develop knowledge. Integration must also be regular, smooth, efficient, and effective in attaining school goals and outcomes in order to remain effective. Content and effective instructional techniques are more important than technology when it comes to incorporating digital. Learning and training should be its primary focus. Integration is defined by how and why technology is used, instead of the amount or type of technology used. Term Technology integration refers to the use of computer to achieve learning goals and empower students throughout the educational program. Despite the lack of a clear definition, certain common themes seem to cut through current discussions over technological integration. Teachers are trained in a range of technology applications and in identifying their appropriate roles and applications; students and teachers use technology on a regular basis; and teachers and students are empowered and supported in executing those choices[3].

## **2. Tools for Assessing Technology Integration:**

### **1.2. The Level of Technology Implementation:**

The Level of System Integration. Framework and Questionnaire was introduced in 1994 to support teachers in reorganizing the staff's curriculum to include ideation teaching, genuine technology usage, and qualitative assessment. The primary emphasis is on classroom behaviors and attitudes which influence teaching and learning practices; computer skills are less important. Teachers will move from low levels of technology integration, which are professor, to greater levels of usage, which are learner-centered, according to the Loti framework. The Loti instrument measures eight specific stages of technology implementation: Awareness, Exploration, Infusion, Mechanical Integration, Regimen Integration, Expansion, and Refinement, and is based in part on the Concerns-Based Adoption Model. And findings from Apple Classrooms of Tomorrow. Research. Teachers can show seven discrete implementation levels in the Loti framework, ranging from nonuse. Through refinement. A succession of changes to the instructional curriculum are noticed when a teacher moves from one level to the next. Level of Technology Integration. Current Instructional Practices. And Personal Computer Usage. Are the three dimensions that affect technology use in the classroom? The PCU profile assesses a participant's comfort and proficiency with pcs, whereas the CIP profile evaluates preferences for instructional methods for a specific subject or beginner curriculum design. There really are 50 questions in the Loti Questionnaire. The options are presented on a Likert scale, with 0

indicating "no answer. Representing "not true of me now. Indicating "somewhat true of me now," and indicating "very true of me now." The answers are entered into a response database that includes a PCU and CIP column, as well as a table that organizes each question by degree of integration from 0 to 6. Each Loti level indicates a distinct stage of implementation, ranging from non-use to sophistication. Higher education faculty, school administrators, media experts, instructional specialists, in-service teachers, and preservice teachers each have their very own survey[4].

### **1.3. NETC OPTIC:**

The Observing Protocol for Technology Integration in the Class. Was developed by the Northwest Instructional Technology Consortium to assess the degree of integrating technology in classrooms and across the school. The protocol sets out a framework for classroom observation in order to collect some of the data needed for the evaluation. OPTIC was not developed or validated to be used in teacher assessment. This protocol is intended to assist in the monitoring of classrooms or technology labs in order to collect data on the how technology is being incorporated into the curriculum[5].

### **1.4. SETDA PETI:**

The On all Company was hired by the American State Instructional Technology Directors Allianc. to create Profile Educational Integration Of technology input is a framework and set of tools intended to help academic institutions track their technology progress over times. The PETI involves three main surveys. Site visitation protocols. A report framework, and sampling methods to help school systems collect data more effectively. The technologies are interdependent and are designed to work jointly. Using them in any other manner weakens trust in the tools' validity and reliability. The tools, protocols, and other tools are available for free, subject to some restrictions, and may be downloaded via SETDA's website[6].

### **1.5. TAGLIT:**

Taking a Good Look at Technology Management. is an online assessment tool designed to offer educational institutions more useful data for assessing technology use and integration in the classroom. TAGLIT helps principals as well as other school leaders in gathering, evaluating, and producing reports on how technology is utilized in their schools in teaching and learning. Moersch. as well as a final report. Assessments for School Leaders, Instructors, and Students are included in package. The School Leader Questionnaire collects information on technology planning, policy, budget, personnel, technical and pedagogical assistance, career development, etc. community involvement from school leaders. The teacher questionnaire gathers information on technology skills, classroom integration, student involvement, resources, technological and instructional support, career development, and the school's technology strategy. A student survey is used to collect information on student digital learning in the classroom, covering resources, skills, knowledge, usage, and application. The system involves sophisticated data analysis tools as well as a complete summary report. Moersch. All tests are available for schools and school districts to take online via TAGLIT's website[7].

### **1.6. Problems of Technology Integration:**

Teachers admitted that "they did not resist technology per such, but agreed that they could not completely integrate it into their own practices due to organizational, organizational,

pedagogical, or personal constraints,” as according Lehi . As according Lehi, the teachers recognize that “technology was more of an issue with many aspects than a solution. Defining interactive tools in a broad sense aids educators, especially novice instructors, in understanding the pedagogical issues that must be addressed when information system into the teaching and learning process. “National organizations engaged in teacher standards should realize that teachers need to... establish a foundation upon which to expand their understanding of software integration,” Lehi adds. While it is critical to equip teachers with technological skills, Bosch and Cardinale believe that it is also critical to train them on how to utilize such skills to support learning. If technology is not considered a component of teaching, incorporating it into a syllabus is less likely to have an effect on students' learning. Technology should not be regarded as a distinct entity, but rather as an integral part of educational delivery. In regard to particular instruction, the teacher must be able to evaluate the appropriateness of any technology used for teaching and learning. The instructor should also think on how the technology chosen fits into the lesson's goal, teaching techniques, or e-valuation.

## **1.7. The Scope of Instructional Technology:**

A technical device or tool used to enhance instruction is commonly defined as technology in education. “Learning environment might comprise media, models, projected or non-projected visuals, as well as sound, video, and digital media,” as according Lever-Duffy, Macdonald, and Miscues. Some "educators may take a narrower perspective" and "confine educational technology," by these writers. In a general sense, technology integration may be described as the procedure of improving learning via the use of current tools, equipment, or material, including electronic media. In order to facilitate learning, it entails organizing and arranging additional instructional aids and resources. It also entails the selection of suitable technology based on students' learning needs and instructors' capacity to adapt such technology to particular learning activities. It requires instructors' ability to choose technology available when preparing courses. It also demands teachers to deliver and evaluate teaching using appropriate technology, as well as to use technology for follow-up learning activities. Teacher is able to develop a rational approach to technology integration with the help of such a broad definition of technology in education.

## **1.8. Relationship between Technology in Education and Pedagogy:**

Technology in education is commonly defined as a technical instrument or tool used to enhance instruction. According to Lever-Duffy, Macdonald, and Mistier, “the educational environment may include media, models, projected or quasi images, as well as audio, audio, and electronic content. By these authors, some "teachers may adopt a narrower viewpoint" and "confine instructional technology." In a general sense, technology integration is a process of facilitating learning via the use of contemporary tools, gear, or materials, including such electronic media. It entails organizing and arranging extra instructional aids and resources in order to enhance learning. It also entails the selection of suitable technique based on the learning needs of students and the ability of instructors to adapt such technology to specific learning activities. It necessitates teachers' capacity to choose available technologies in designing courses. It also requires instructors to utilize appropriate technology to provide and assess instruction, as well as to use technology for follow-up learning activities. With the help of such a broad definition of technology in education, teachers may create a logical approach to technology integration.

### **1.9. ONE-TO-ONE Computing Initiatives:**

The primary objective of one-to-one computing initiatives is to provide students greater access to technology in the classroom. Providing each teacher and student at a school individual access to an internet-enabled laptop or a laptop. For use both in the classroom and at home is essentially what this implies. As a consequence of this access, schools would be accountable for supplying and managing the infrastructure required to support these technologies. While the number of these programs has grown globally, the rate of expansion has been sluggish, owing to its high costs of implementation and maintenance. In reality, significant one-to-one computing programs in the U's require large federal or state funds, which are frequently aimed to Title I classrooms in high-risk regions. These programs often work with equipment manufacturers to reduce implementation costs, as well as the costs of maintaining and updating equipment. These partnerships have resulted in several pockets of technology-rich schools across the country, some of which have excelled in effectively integrating technology. More frequently, one-to-one computer programs have given equipment to schools, but kids' access to it isn't ubiquitous, and having more computer equipment hasn't dramatically changed the way most classrooms teach[8].

### **3. DISCUSSION**

Students will be able to select technology tools to assist them obtain information in a timely way, analyze and synthesize the information, and deliver it professionally once they are able to integrate right technology. Technology helps with scheduling, service collaboration, student and teacher tracking, and data collection and data analysis. We want kids to see detach as a tool to help them study better efficiently. In schooling, mobile and flexible technological innovation is most successful. The use of technology to enhance a student's learning opportunity is alluded to as "integration of iota." Learners who are actively involved with educational objectives are created when various kinds of technologies, including an online course, are used in the schoolroom. Students will benefit from technology since it offers them with quick access to knowledge, rapid learning, and enjoyable ways to practice what they've learned. It allows students, particularly in STEM, to study new topics and get a better grasp of challenging ideas. It is an indispensable instrument that we cannot do it without, and it plays a major part in the bulk of our lives. Technology is defined as the tools, methods, and strategies that are utilized to assist us in resolving issues and making our life better and easier in some manner. In our daily lives, technology is unavoidable. To summarize, seamless innovation provides the following benefits[9].

### **4. CONCLUSION**

The objective of this essay is to provide information on how teachers may enhance their use of technology in education. It addresses relevant pedagogical issues that must be considered in order to successfully integrate technology into teaching. It is critical that educators see technology as an integral part of the educational process. The connection between education and technology for education is also recognized in this essay. Teachers must be acquainted with the pedagogic principles governing the use of technology for teaching and learning. There are suggestions on how to improve technology integration. Educators are urged to have a broad view of integrating technology and to be reflective in their teaching while using technology to assist or facilitate instruction. Information technology should be seen as an integrated element of the instructional strategic planning. Just as students' preparedness is evaluated, class goals are



defined, presentation methods are created, and evaluation strategies are decided, educational technologies should be recognized at the planning phase. At the planning phase, follow-up actions should be developed. Poor technical integration implementation is likely to impact on the intended result. Even as adoption, diffusion, and usage of technology in all aspects of education increases, evaluating the degree of technology use in education becomes increasingly important. Decision-makers (school admins, educational leaders, authorities, and local governments) need to understand this in order to create good budgeting choices, identify educator personal development needs, and guarantee that technology is used efficiently and effectively in schools. There are many assessment tools available for assessing a school's degree of technology integration. Some of these tools are chosen and analyzed in this study to assist academics and educators with selecting processes. While some tools have distinct measurement procedures for each professional organization, others assess schools as a whole. Various data collecting methods and instruments are being used by different tools. Some of the features of the tools examined are summarized and compared in the table below[10].

## REFERENCES:

1. C. M. Kim, M. K. Kim, C. J. Lee, J. M. Spector, and K. DeMeester, "Teacher beliefs and technology integration," *Teach. Teach. Educ.*, 2013, doi: 10.1016/j.tate.2012.08.005.
2. J. Harris, P. Mishra, and M. Koehler, "Teachers' technological pedagogical content knowledge and learning activity types: Curriculum-based technology integration refrained," *J. Res. Technol. Educ.*, 2009, doi: 10.1080/15391523.2009.10782536.
3. D. Ruggiero and C. J. Mong, "The teacher technology integration experience: Practice and reflection in the classroom," *J. Inf. Technol. Educ. Res.*, 2015, doi: 10.28945/2227.
4. P. S. Hsu, "Examining Current Beliefs, Practices and Barriers About Technology Integration: A Case Study," *TechTrends*, 2016, doi: 10.1007/s11528-015-0014-3.
5. H. C. Tsai, "A senior teacher's implementation of technology integration," *Int. Educ. Stud.*, 2015, doi: 10.5539/ies.v8n6p151.
6. E. A. Lawrence, "Exploring Technology Integration In A Second Grade Classroom," 2012.
7. R. Christensen, "Effects of technology integration education on the attitudes of teachers and students," *J. Res. Technol. Educ.*, 2002, doi: 10.1080/15391523.2002.10782359.
8. B. Berrett, J. Murphy, and J. Sullivan, "Administrator insights and reflections: Technology integration in schools," *Qual. Rep.*, 2012, doi: 10.46743/2160-3715/2012.1815.
9. M. O. Taylor, "Stories of Sustainability Concerning School-Wide Technology Integration," 2013.
10. L. Guo, S. Cui, and B. Yu, "Empirical analysis on technology integration capability and its components based on integration process," 2014, doi: 10.1109/ICMSE.2014.6930414.

## THE BEGINNING OF RUSSIAN MUSIC CULTURE

**Kodirjon Karimberdievich Rakhimov\***

\*Teacher,  
Namangan State University,  
Namangan, UZBEKISTAN

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### ABSTRACT

*The origins of Russian music go back to the culture and life of the Shagan East-Slavic tribes in the territory of Ancient Russia before the formation of the first Russian state (KievanRus) in the ninth century. The Slavic traditions of paganism included practicing witchcraft, singing songs, and playing musical instruments (gusli instruments have been popular since the 6th century). Traces of the ancient pagan beliefs of the Slavs in their songs associated with seasonal rituals (related to agricultural work) and family rituals (gatherings, sannashs (prichitanie), and wedding rituals) preserved.*

**KEYWORDS:** *Music, Culture, Faith, Tradition, Melody, Instrument, Tribe, Religion, Worldview.*

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### INTRODUCTION

The war songs of the Slavic druids, which flourished in the X-XI centuries, later served as the basis of the Russian heroic epic, which formed a cycle of epics.

Examples of high peaks of national art are lyrical folk songs, which were popular in the XVI-XVII centuries.

From the 16th century onwards, historical songs, as well as songs of social protest, became popular among the people.

The Skomorokh (Russian traveling actors) have long been the main promoters of folklore traditions and professional musicians in Russia. Their musical instruments consisted mainly of multi-stringed, stringed instruments such as gussets, trumpets, circles, conical tubes, beeps. Some kind of singers consisted of kinyaz and his band – “bon”. With the adoption of Christianity, church music, the only written form of ancient Russian professional music, began to develop. Although church music originally came from Byzantium, it later acquired a distinctive national character. The school of Moscow musicians, led by Savva Rogovoy in the middle of the 16th century, played an important role in the development of the art of church singing. Fyodor Krestnin, Stefan Golish, Ivan Nos and others were students and successors of Savva Rogovoy.

Russian musical life from the second half of the XVII century to the XIX century. In the second half of the seventeenth century, new musical traditions were formed due to changes in social conditions and religious worldview. Singing with one voice flag (Znamenniyraspev) is squeezed out by singing a few beautiful, multi-voiced, partes songs from Ukraine. In Partes's singing, the number of votes ranged from 3 to 12, in some cases 16, 24 and even 48. NP Diletsky's research

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“Music Literacy” is devoted to this area. This book was originally written in regimental language in 1675; in Church-Slavic 1677; published in Russian in 1679, 1681.

At the end of the XVII-beginning of the XVIII century the school of polyphonic choral writing began to be founded, among the prominent figures of this field were VP Titov, N. Kalashnikov, N. Bavikin, F. Redrikov and others. They can cite religious a capella choir concerts as the highest form of creativity. During this period, the genre of polyphonic household songs, such as psalma, kant, became widespread. [1]

The reforms of Peter I paved the way for the emergence of new forms of Rossi's musical life, modeled on Western Europe. During this period there was a revival in secular music. Musical a cappella will appear near the palaces, and amateur music lessons will begin to develop in the houses of landowners and high-ranking officials.

In the 1730s, Italian opera (later French opera) appeared in the palace, and in 1750, foreign opera masters appeared in Moscow and St. Petersburg. During this period there were 2 palace orchestras and palace choirs. Famous Italian composers F. Arai, B. Galuppi, T. Traetti, J. Paiziello, J. Sarti, V. Manfredini, V. Martin-i-Soler, D. Chimaroza and others were active in Russia during this period. Opera performances have been performed in a number of remote cities, as well as in the serf theaters of P.M. Volkonsky, N.P. Sheremetev, A.R. Vorontsov.

From the 1770s mass concerts were organized, the first mass theaters (in Moscow in 1776 - the theater of M. Medoks and P.V. Urusov, from 1780 the theater was renamed the Petrovsky Theater, and now it is the Rossi Bolshoi Theater). In 1779, the K. Knipper Theater was established in St. Petersburg, and in 1783, the Kamenny (Bolshoi) Theater was established.

In the last quarter of the 18th century, under the influence of the ideas of the Russian Enlightenment, national schools of composition began to take shape. In 1776-95 the first printed collections of folk songs collected by VF Trutovsky, and in 1790 by NA Lvov and I. Prach appeared. Although opera emerged as a leading genre in the 18th century, it was often dominated by domestic comedies with musical numbers. More complex forms of opera include V. A. Pashkevich, E. I. Fomin, and D. S. Bortnnsky. In the middle of the XVIII century as a new genre appeared chamber-vocal lyrics – “Rossi’s songs”. The authors of these songs in the late XVIII century were F. M. Dubnsky, O. A. Kozlovs appear. The development of instrumental music is facilitated by the work of the founders of the Russian violin school DS Bortsky and IE Khandoshkin. D.S. Bortnsky and MS Berezovsky are the organizers of Russian choir concerts.

### **Russian Music Culture in the First Half of the XIX Century**

At the beginning of the XIX century there was a romantic trend in Russian music, which led to the folk-epic content (Kavos’s opera “Il-Pahlavon” in 1806), fairy-tale-fiction (1805-1807 Davidov’s “Mermaid of the Dnieper”). Such as operas). A Verstovsky is a major representative of the romantic trend in Russian opera, one of his best operas is “AskoldovaMogila” (1835).

During these years, the genre of romance became widespread in connection with Russian poetry (especially the work of AS Pushkin). Among the masters of popular song lyrics are AA Alyabyev, AE Varlamov, and A.G. There were composers like Gurilyov.

The new stage of development of Russian music of the XIX century is mainly connected with the work of the founder of national classical music MI Glinka. He put Russian music alongside the

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leading musical traditions of Europe and marked the next directions of Russian music culture; Examples of classical music include his 1836 opera Ivan Susanin (originally The Soul of the King), his 1842 operas Ruslan and Lyudmila, symphonic operas such as Kamarinska, and Spanish overtures such as Aragonese Hata and Madrid Evenings. Chamber and vocal works (especially romances based on Pushkin's poems). Glinka's work was a great contribution to the performing arts (O.A.Petrov, A..Petrova, EASemyonova, and later FISTravinsky and others contributed to the Russian musical culture), critical thinking (VFOdoevsky, NAMelgunova, M. Neverova, V. Stasova, ANSerova, GALarosh and others). Glinka's younger contemporary and successor, A. Dargomijsky, reflected the ideas of critical realism in the 1840s and 60s.

**A. Alyabyev (1787 - 1851):** Alexander Alexandrovich Alyabyev was born in 1787 in the city of Tobolsk. He took part in the Patriotic War of 1812 against Napoleon. He has written 200 romances, 6 operas, 20 musical comedies and works in other genres.

In St. Petersburg, he interacted with literary and theatrical figures such as ASGriboedov, AA Shakhovskiy. From 1823 he was active in Moscow, in 1825 he wrote the music for the prologue "Music Ceremony" with A.N. Verstovskiy and F.E. Scholz on the occasion of the opening of the Bolshoi Theater. In the same year he was arrested on trumped-up charges and exiled to Siberia, from where he was taken to the Caucasus, then to Orenburg and the Moscow province. From the beginning of 1843 he lived in Moscow, although under police surveillance. During the years of exile he wrote many Caucasian, Bashkir, Kyrgyz, Turkmen and Tatar folk songs.

A. Alyabyev is a master of the romance genre, the author of the famous song "Bulbul" (lyrics by AADelvigniki), one of the first to compose Pushkin's poetry in music ("I love you", "Oh, why does he lick", "winter way" and others). Alyabyev's vocal work is connected with the traditions of Russian folklore and embodies the best features of the lyrics of folk songs of his time. Alyabyev's contribution to chamber music (linking the principles of the classical sonata cycle to Russian singing) and to orchestral music (which embodied vivid images of early Russian symphony) is enormous. AA Alyabyev died in 1851 in Moscow. [2]

**List of his Works:** Operas, including "Moonlight" or "Night Ghost" (1823, St. Petersburg), Ammalat-Bek (1847); comic operas (many co-written with AN Verstovskiy and FE Scholz); the ballet The Magic Drum or The Investigation of the Magic Flute (1827); cantatas; for orchestra - symphonic (1850) overtures, dances; chamber and instrumental ensembles - 2 piano trios, 3 string quartets, etc.; piano pieces; choirs; More than 150 romances; processed folk songs; music and other works for drama theater performances.

**A. Varlamov (1801-1848):** Russian composer Alexander Egorovich Varlamov was born in 1801 in Moscow into a family of junior officials and retired officers.

From 1829 he worked as a singing teacher in the singing palace of the St. Petersburg Palace, in 1832-43 as a "music composer" and assistant conductor of the imperial theaters in Moscow. In 1845 he died in St. Petersburg.

A master of romance, Varlamov wrote about 200 works in this genre (most of them were written by Russian poets). His song "Kizil sarafan" became a national song. Varlamov's songs "Storm is building in the street", "Don't wake him up in the morning", "White-faced kaelkan" and others have also become popular.

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Varlamov was often a performer of his works and appeared in concerts as a chamber singer (tenor), as well as guitarist and conductor. Varlamov was one of the first in the field of vocal pedagogy to publish a Russian methodical manual "Complete textbook of singing" (M., 1840).

**List of his works:** Ballets – "The Sultan's erma" (1834, Moscow), "The cunning boy and the cannibal" (1837, in collaboration with AS Gurnov); romances and songs; choirs; music for dramatic theatrical performances, including Hamlet (1837); Processed Russian folk songs - The collection of songs "Russian singer" (1846) included 43 songs, but was not completed.

**A. Gurilyov (1803-1858):** Russian composer, pianist, violinist, sixth Alexander Lvovich Gurilyov was born in 1803 in Moscow. His father was a serf musician of Count Orlov and conducted the serf orchestra.

Gurilev's first teacher was his father. He later studied piano for many years in Russia with John Field, a famous Irish pianist and composer, and I. I. Genisht, a composer on music theory. In 1831 he was released from serfdom with his father. Despite working in Moscow as a novelist, pianist, and educator, he was always in need. In the last years of his life he suffered from a serious mental illness and died in 1858 from this disease.

The main part of Gurilyov's creative heritage is vocal lyrics. Together with AE Varlamov, he is a bright representative of the democratic trend in Russian romance. Many of his songs have become folk songs. "Russian songs", as well as "Separation", "You" You don't understand my grief" and other romances. An important part of his creative activity is piano music. Among them are variations on the themes of folk songs, romances, operas, including Varlamov's novel "Don't wake him up in the morning", as well as dance poems. Gurilev collected and processed folk songs. His "Forty-Seven Selected Russian Folk Songs for Voice and Piano" was published in Moscow in 1928. The works of Alyabyev, Varlamov and Gurilyov are a rich contribution to the treasury of Russian music. Their best songs and romances are included in the concert repertoire of singers and choirs, and are still loved and sung among the people.

### **Russian Musical Culture In The Second Half Of The XIX Century:**

The social upsurge of 1850-60 also left its mark on Russian music culture: concert activity in the country expanded, and the foundations of professional music education began to be laid. In 1859, at the initiative of A.G. Rubinstein and other musical public figures, the Russian Music Society (RMO) was founded in St. Petersburg. Its Moscow branch was established in 1960 and later in other Russian cities. [3]

In 1862 conservatories were opened in St. Petersburg, and in 1866 in Moscow. In 1862, Free Music Schools (BMM) were established in St. Petersburg by G. Lomakin and M.A. Balakirev.

The democratic ideas of the 60's are reflected in the work of composers united under the name "Mighty Gang" (Moguchakuchka). M.A. Balakirev, A.P. Borodin, M.P. Musorgsky, N.A. Rimsky-Korsakov, T.S.A. With his general democratic aspirations, Tchaikovsky also resents the "gang", but some of their views are negative. Tchaikovsky's work is primarily devoted to revealing the mental state of a psychologically complex person. Opera is still the leading genre in 19th century music. During these years he wrote "Boris Godunov" (1869), "Khovanshchina" (1883), "Eugene Onegin" (1878), "Pikovadama" (1890), "Snegurochka" (1881), "Sadko" (1896), "Tsarskanvesta" (1898), "Princess Igor" (1890) and others. AN Serov made a great contribution to the opera



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genre. The classical period of Russian ballet is associated with the work of Tchaikovsky and later AK Glazunov.

In the second half of the XIX century, a classical Russian symphony was born in the works of Tchaikovsky and Borodin. During these years, a great role was given to program symphony, including Balakirev's "Tamara", Rimsky-Korsakov's "Shahrizoda", Tchaikovsky's "Romeo and Juliet". Tchaikovsky's and Borodin's ensembles, "gangsters" and Tchaikovsky's chamber-vocal romances are the best examples of works in the chamber-musical genre. There are also great achievements in the field of piano music, such as Tchaikovsky's concerto for piano and orchestra, Balakirev's piano fantasy "Islamey", Mussorgsky's "Scenes at the Exhibition" (Kartinki s vystavki). During these years A.G. and N.G. Rubinsteins and K.Yu. The executive culture of Davidov et al.

In the 1880s and 90s, A.K. Glazunov, S.I. Taneev, A.K. Ldov, A.S. Arenskiy, Vas.S. Kalinnikova, M.M. Ippolitov-Ivanov, A.T. Grechaninov, S.M. The work of Lpunov and other composers is formed. Founded in the 1880s, the Belev Circle went down in history as a follower of the Mighty Gang. This period is marked by a slight academicization of some of the innovative principles of the "gang", the composers' special attention to the problems of mastery, including the interest of Taneev and Glazunov in polyphony.

**Life and work of Alexander Porfirevich Borodin:** Russian composer, chemist-scientist, public figure Alexander Porfirevich Borodin was born in 1833 in St. Petersburg. She receives home schooling in a variety of fields, including music. In 1856 he graduated from the St. Petersburg Medical-Surgical Academy. In 1858 he received the degree of Doctor of Medicine. Professor of the Medical and Surgical Academy since 1864, Head of the Department of Chemistry since 1874, Academician since 1877. One of the organizers (1872) and educator (until 1885) of women's medical courses. [4]

The friendship of progressive scholars D. Mendeleev, I. Sechenov, N. Zinin and others, as well as the study of articles by V.Belinsky and A.Gertsen helped to form. Independently mastering the art of composition, he spends most of his time on music. He has been a member of the Mighty Gang since the 1860s. Under the influence of M.A. Balakirev, V.V. Stasov, as well as A.S. On the basis of his conversations with Dargomijsky, Borodin's musical-aesthetic views as a follower of M. Glinka were formed. During these years he wrote his first symphony, Persian-opera (comedy-opera) "Heroes" (Bogatiri), romances "Sleeping Beauty". His constant involvement in scientific and pedagogical activities, as well as his high demands on the composer's work, ultimately limited the duration of his work on each piece of music. For example; the music of the 2nd symphony (later this symphony was called "Bogatirska" by Stasov) was written for 2 years, but it did not take several years to record the score. Borodin worked on the opera "Princess Igor" for 18 years, but the work was not completed. Rimsky-Korsakov and A.K. The Glazunovs reached the end.

Borodin's creative legacy is small in size. His works reflect the love for the Motherland, the glorious ideals of the Russian people, the love of freedom. In Borodin's music, the heroic images of Russian history, the epic of national heroism, to which he appealed to understand modernity, play a key role. In Borodin's music, epic breadth is in harmony with deep lyricism. His lyrics are courageous, calm and at the same time passionate and painful. Borodin not only penetrated sincerely and deeply into the character of Russian music folklore, but also understood the music



of the peoples of the East. In his works, charming, flirtatious, warlike Russian and oriental images stand side by side. Not only for the figurative content, but also for Borodin's entire musical style, epicity is characterized by grandeur and grandeur. The musical dramaturgy of Borodin's works is based on the hasty development of musical material, long standing in the same emotional state. Its melodies are similar to Russian ceremonial and lyrical folk songs with their structure and mood. The distinctive features of Borodin's style are the generalization and repetition of its characteristic features by means of original musical images, the absence of folklore quotations, and the use of classical forms when he became acquainted with folk (Russian and Oriental) music. Borodin's harmonium, which has a diatonic basis, is characterized by a melody derived from the Russian folk polyphony.

One of Borodin's most important works is the opera "Princess Igor", a musical example of the epic of national heroism. The play combines the features of epic opera and historical folk musical drama.

Borodin is one of the founders of the Russian classical symphony. His 2nd symphony testifies to the epic heroic direction of Russian symphony. Borodin is also one of the creators of the Russian classical quartet, especially his 2-string quartet, which is known for its lyricism. Borodin is also one of the innovators in chamber-vocal lyrics. He was one of the first to include images of a Russian heroic epic in the romance. Along with epic romances and ballads, he also wrote satirical and humorous songs.

**List of works:** Operas - Persian opera "Heroes" (1867), "Princess Igor" (1890). Works written for the orchestra are 3 symphonies (1-1867), 2- Bogatirski, (1876), 3- unfinished, part 1 of which was written by A.K. Written and orchestrated by Glazunov in memory, Central Asian musical landscapes (1880).

Chamber-instrumental ensembles - 2 string trio (1855-62), piano trio (1862), 2 string quartet (1879-81), string and piano quintets (both 1862), string sextet (1861) and others works. A small suite for piano; 2-handed, 4-handed piano works; A.S.Pushkin, N.A. Romances and other vocal ensembles to the words of Nekrasov, G. Heine.

## REFERENCES:

1. Begmatov S. Music: A textbook for 6th grade. Revised 6 th Edition. T.:Gafur Ghulam Publishing House. 2017. p.21
2. Selevko, Fomenko VT. Classified according to technology. Scientific Journal Kubgau. 2012;10(84):56
3. National Encyclopedia of Uzbekistan. T: State Scientific Publishing House, 2000. p.76
4. Gruber R. History of Musical Culture. 1953. p.45

## A REVIEW STUDY ON FAULT DETECTION OF TRANSMISSION LINE

**Raghvendra Kumar Singh\***

\*Assistant Professor,  
Department of Electrical Engineering,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- raghvendra.engineering@tmu.ac.in

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### ABSTRACT

*Transmission line is the most essential component of the power system. Transmission lines a main quantity of electricity. The need of electricity and its allegiance has gone up tremendously throughout the contemporary period, and the main function of a transmission line is to transfer electric power from the source region to the distribution network. The mismatch between limited supply, and a large claim has increased the emphasis on reducing power losses. Losses like transmission loss and also speculation factors as such as physical losses to different technological losses, Another item is the main reason it has a reactive power and voltage deviation are significant in the long-range transmission power line. In basically, fault analysis is a highly focused problem in power system engineering to clear fault in short time and re-establish power system as soon as feasible on very minimal disruption. However, the fault detection that interrupts the transmission line is itself difficult job to analyze problem as well as increasing the dependability of the system. The transmission line is vulnerable given all factors that link the entire power system. This article provides a review of transmission line fault detection.*

**KEYWORDS:** *Fault, Transformers, Transmission Line, Power System, Wave.*

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### 1. INTRODUCTION

Regarding the distribution system, transmission lines perform the most essential role that is to transmit electric power from the producing station to load centres. Since the establishment of the distribution and transmission system, power system engineers have been an object for finding and detecting problems. As long as the fault identified in brief duration, it offers a good service for safeguarding the apparatus as well as an open method for disconnecting the component where this event occurred at fault, and with the aid of this, it delivers safe route to the system from any damages. So it is essential to identify the problem else due to fault it produces any disruption which further difficult time to the linked system that dependent on limits[1]–[3].

Suppose when more than two conductors develop touch each other or with the contact take place on the ground to 3 phase systems that are regarded at fault which may be a balanced fault or unbalanced fault. Due to these errors stresses are generated in power system equipment that may

harm the power system components. So to prevent these damages and to make power quality better, it is necessary to identify the causes of fault as well as the position of the transmission lines and fix it correctly. Most essential job is to gather all information about fault from this it is to be simple to investigate and make it possible to repair quickly. Lots of researchers have been worked for understanding the abilities for identifying the places of fault in distribution as well as in the transmission network linked to techniques of artificial intelligence like fuzzy set theory and artificial neural networks[4], [5].

## 1.1. Fault Detection Method:

Transmission lines function distributing electricity from a producing station to distant load centres. Due to the presence of lightning strokes, the system has some mis-operation like a short circuit with this issue line may be overloaded thus it can harm the equipment. Due to the presence of a defect, the phase voltage does drop and huge current flow, which may harm the equipment. In this situation, defect detection play essential function which may interrupt in the system very fast. In the transmission line, the fault is composed of 10 components that may interrupt in the three phase system, single line to ground, line to line fault, double phase to ground and the final one is three phase fault. A single line to ground fault happens when it makes contact with the ground during the occurrence of fault the impedance.  $Z_{fag}$ , having some value it might not be called zero impedance but still less than the impedance line. The magnitude of the fault current is often increased as opposed to the normal current that is operated, while the magnitude of voltage stays constant frequently.

The series compensation is more efficient on transmission voltage that is important to know since in series compensations have encountered certain technical difficulties when it is run primarily with this problem has happened like sluggish voltages and also high voltages. These operational issues arose owing to a various kind of causes such as line loading circumstances and voltage control modified. In series compensations system has utilized a capacitor. This capacitors one side needs to properly regulate else it would be dependent on voltage issues. For this reason, we may utilize series compensation for decreasing voltage issues else most certainly overvoltage might create these problems. On the other hand, in series compensation raise the voltage when the lines are highly loaded and also low voltages happened on the line. And flashovers occur owing to excessive voltages or shorten the lifespan of electronics and created short circuits. We may utilize series compensation as a flows control of power. On the other hand, in a series compensated line depending on current and voltage inversions each other[6]–[8].

The fault identification method for the series compensated by the fault and its magnitudes change in fault voltages as a positive sequence and terms of fault current change as a positive sequence. When in series compensated lines created by the algorithm for fault currents and phase voltages to obtain the decisions by utilizing EMTDC/PSCAD. We may use a capacitor or don't have utilized capacitor regarding the testing procedure of series lines by simply altering the source capacity, fault resistance, the fault inception angle, power flow direction those are the various system condition.

During the measuring of current signals and voltage signals in both instances utilized fault location method, two subroutines employed for finding faults and also for extended fault loop model by getting assistance utilizing various formulae. The fault is happened in anyplace the fault doesn't keep any distance of the criteria. The usage of parameter both-end signals for

monitoring asynchronously compensating bank and it primarily relies on the position of the bank. In the specific kinds of faults may be detected by utilized to ATP-EMTP for the compensated of double-circuit series line.

By utilizing the technique to verify the identified the fault in the transmission line is detailed on a double-circuit line. Moreover, this technique is suitable for the protection of uncompensated double circuit lines, and also series- compensated double circuit lines via the applied phase currents may measure. To obtain the simulation result we of cognitive software of ATP-EMTP. Measurement channels the SCs & MOVs banks are created by a comprehensive model of the transmission line. The suggested method utilized for two subroutines that are used to identify unbalance and balanced lines currents and about 99 percent correct fault classification by symmetrical parallel line but in case of the line is unbalanced more than 85-95 percent accurate[9], [10].

Furthermore, a double-circuit transmission line is a technique which relies on digital distance relaying and this approach may safeguard the first-zone of transmission lines series double circuit. To an approximation, the fault distance as a considered from one end of the lines and this technique is autonomous on fault current and source impedance. The double series circuit and utilizing MATLAB/SIMULINK software of this approach may estimate precise fault distance. Through the algorithms to identify the fault site, it is suitable for both single lines and double-circuit series lines. The series-compensated is expected at the relays of current differential are measured to find more refined fault locating solution. The method of fault location which one is suggested by using the fault stated it is accomplished by differential protective relays and also using this manner differential relays are used with communication infrastructure. With the goal that is detachable for identifying the zones where the fault is happened by the only line which is defective exactly as well as showing a specific kind of fault both one is essential that receive assistance from data of one end alone.

The faults include different frequency bands are produced by transient current waves and utilizing the transient current signal that captures frequencies having two bands up to the 1dB that act as wavelet like wavelet mother which is utilized. By utilizing the frequencies of these two bands, it is identified by fault zone and to pick faulty phase is employed the mother wavelet. This phase which is defective regarded as average which has some value of factors of all current and by utilizing 6 dB as mother wavelet to produce a model signal. The external or internal relating fault into the account by defining two of the energies linked to signal model.

The transmission lines which are parallel linked to issues of protection which depend on the 3 phase line voltages of the two parallel circuit lines and the six phase line currents at both ends is suggested. Phasors of the current having magnitudes of comparable phases are recognized by distinguishing line having double circuit each one of line it caused in internal faults. For the power it is essential for researching and identifying the kind of defects properly, it is effectively distributed to various places.

During the problem, the tripping act of circuit breaker depends on waveforms of voltage as well as current and the correct protection of transmission line is active tripping of circuit breaker guarantees first. According to the categorization of faults, energy level % has been done by utilizing Discrete Wavelet Transform (DWT) (DWT). With the assistance of Current Differential Pilot relay (CDPR), the series recompensed line may be safeguarded that is disputed by applying

transform wavelet. We may obtain simulation results using MATLAB and utilized db4 to perform analysis using mother wavelet. For identifying various kinds of defects, classification is done using wavelet based method. Another method that is utilized for distinction among the fault type which is a probability based technique called Bayesian linear discrimination.

With the usage of adaptive wavelet algorithm, BLD is caused for producing the wavelets. Wavelet of adaptive that is utilized in transmission line linked to high speed protection system like filters. It is important that the electricity should be transmitted from the producing station to the consumers it should be kept away. Moreover, in the transmission line, the likelihood of fault is to be significant and signal processing in the digital distance protection is employed.

For identifying flaws are employed Fourier transform and wavelet transformations. In case of security of high speed EHV transmission line has been utilized the discrete wavelet analysis. Discrete wavelet analysis is accessible by utilizing an algorithm which is linked to identify and categorize the defect. And all three phase signals of fault are detected by comparing various wavelet coefficients and utilized ATP-EMTP and MATLAB Wavelet toolbox for simulation. For EHV transmission line protection of the algorithm is fast, powerful appropriate and this is highly prolific.

A novel method is presented for boundary protection of series-compensated transmission lines and fault classification. The frequency bands waves of transmission lines fault current may identify the fault site to have the appropriate boundary protection with various frequency bands. The frequency bands of 4 dB are a mother wavelet which may give a transient fault current signal. It is indomitable by calculating the spectral energy of bands of db4 of frequencies if the fault is internal or external. The average value of the frequency bands of 4 dB its wavelet coefficients of every single current wave are classed as a faulty phases. Author may investigate power system disorder such as transmission line failures using Haar wavelets and Biorthogonal by utilizing wavelet transform method suitably. In this review article, the method of the mother wavelet transforms the frequency based on 4 dB is used to identify transmission line defects and in the index for transmission line may choose which frequency wavelet is appropriate for this application.

## **1.2.Methods Analysis:**

Most of the techniques that have been examined rely on the values whether it could be phasor voltage or else current that is computed given voltage as well as a current transformer at the substation or converting locations. This is needed for collecting the material at any rate three transformers that are linked to the end terminal of sub-transmission line or may say to transmission line. Transformers that are linked with the end of a transmission line are very much luxury especially when HV lines become twisted in the system. Some algorithm fault impedance-based algorithm required both current and voltage information.

The main drawbacks of employing a current transformer during transient fault that is involved in their performance the aforementioned potential of magnetic core saturation. With the likelihood of saturation condition, the flux stays up to the fixed for some length of time when the voltage is no longer persuaded regard of the secondary coil and the current of secondary maintained beside the zero position. Time of saturation (period) depends on the amount of current particularly on current transformer coupled with power factor and primary ratio.



Magnetic field and conductors with these both the transmission line may be checked while without needing a current and voltage transformer. Due as we know, the conductors that have been linked in transmission line generates the magnetic field because of passage of electricity. So from this analysis, the consequence magnetic field is produced that is formed from its conductor via the transmission line. In the end terminal of transmission line two detecting coils are utilized for recognizing the magnetic field.

The functioning of one detecting coil is equivalent to detect the vertical magnetic field strength, and horizontal magnetic field intensity detects by another one. The information may be resolved by these two dimensional magnetic fields intensity. In case of other fault detection, unexpected changes occur within the monitored data when problems are identified. In this case study, just the modifications took place in the magnetic field forces that operate as vertical as well as horizontal without having a single variation that is evaluated the voltages or else currents of the conductor. Besides the transmission line along with algorithms, investigate fault as well as location of fault techniques is to discuss linked to the research of the anticipated performance of a magnetic field.

In this technique, two methods are single ended method used for a frequency that is linked to phasor information and multi terminal method that is used for operating any data depending on usage. The technique that is used for detecting the location of fault with the use of voltage and current termed impedance base method in a transmission line to examine the region of fault whether it is to occur or not. These calculations are required by the impedance of the transmission line per unit length. That why the single ended impedance based fault does not require communications owing to the simplest and quickest fault finding technique. It has excellent numbers of use in power system having solid sequence with some value, having high ability to resist the fault as well as tapping the loads along with non-homogenous that provides difficulties on the accuracy of detecting fault termed single ended technique. It contains 2 kinds of single-ended technique that are basic reactance and Takagi-based.

This technique termed simple reactance method used to function well for a homogeneous system it is occurring for the situation once fault does not have significant involvement with the resistance of fault and current that is taken from the load. For the researching fault, big errors are done that is calculated by different factors like sources of power system linked to impedance, angles of transmission lines, impedance related to load.

The major difficulties of one terminal impedance linked to examining fault technique, it has been utilized exclusively for measuring from one end of the transmission. This issue may be addressed in many different ways. One of the finest ways that state handled by Takagi method. With the use of Takagi technique, it involves altering computation and makes the difference between the current that is measured before and after the fault. From this study, it eliminates the fault impedance as well as eliminating these kinds of important source.

The technique that is utilized for the enhancement of the accuracy of single ended method termed two ended method. For the load fault, this is essential to have expertise for gathering information for identifying the location of phase defect. The difficulties connected to one-terminal impedance based fault finding technique may be addressed with the usage of both sides of transmission line. It is to be tough to detect short time fault correctly having impedance linked to discovering location technique of a fault having limited information exists for voltage as well



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as for the current and information which is previously stated very unnecessary for a condition called steady state.

## 2. DISCUSSION

The construction of the transmission line designed to explore the location of the fault and may provide separation just the section where the fault occurs. Stimulating technique assist in finding and localize the problem in quick time. A steady voltage may be obtained through the use of a series capacitor achieved. Series capacitors line inductance may be decreased by along the line. If the line current leads the voltage, mean voltage rises. On the opposite side, there may be a voltage drop if line voltage is behind by the line current.

In this perspective, the voltage that has been raised up and the voltage fell reduced by the series capacitor as if the line inductance is less for the series recompensed line as connected with the unpaired line. The issue of identifying the kind of defect linked to the transmission line as well as locating the location of the fault is a fairly difficult task. The most unique issue of being concerned is to examine fault for the power business. Apparently for the detection of fault certain protection devices are employed (relay) and also create control over it with the aid of special control devices as well as devices called recording these all are used to clip the session where the fault is being happened in the system.

## 3. CONCLUSION

Focusing on any study job related literature review is the very most essential duty since it sets up the ideas and powerful setting that may grow fast. This advancement enables for developing changes based on unanswered problems therefore clearly explain any limits linked to the progress of research activity. Most of the prose works on detection of problem linked to the power supply. For the enhancement of power quality meaning that to make power purer, the compensated circuit is regarded to be connected. While to improve the system with dependability and delivery of electricity respected time. Thus more essential is to identify of problem as well as finding them as soon as feasible.

## REFERENCES:

1. S. Adhikari, N. Sinha, and T. Dorendrajit, "Fuzzy logic based on-line fault detection and classification in transmission line," *Springerplus*, 2016, doi: 10.1186/s40064-016-2669-4.
2. K. Chen, C. Huang, and J. He, "Fault detection, classification and location for transmission lines and distribution systems: A review on the methods," *High Voltage*. 2016, doi: 10.1049/hve.2016.0005.
3. D. Guillen *et al.*, "Fault detection and classification in transmission lines based on a PSD index," *IET Gener. Transm. Distrib.*, 2018, doi: 10.1049/iet-gtd.2018.5062.
4. X. Tong, S. Yu, and H. Wen, "Fault Detection of Transmission Lines Based on Fault Component of Positive Sequence Current," *Dianli Xitong Zidonghua/Automation Electr. Power Syst.*, 2018, doi: 10.7500/AEPS20180303002.
5. K. M. Silva, B. A. Souza, and N. S. D. Brito, "Fault detection and classification in transmission lines based on wavelet transform and ANN," *IEEE Trans. Power Deliv.*, 2006, doi: 10.1109/TPWRD.2006.876659.

6. H. H. Goh *et al.*, "Transmission line fault detection: A review," *Indonesian Journal of Electrical Engineering and Computer Science*. 2017, doi: 10.11591/ijeecs.v8.i1.pp199-205.
7. T. Bouthiba and M. A. Denai, "High speed fault detection in EHV transmission lines based on neural networks," *Adv. Model. Anal. B*, 2004.
8. T. K. Patel, P. C. Panda, S. C. Swain, and S. K. Mohanty, "A fault detection technique in transmission line by using discrete wavelet transform," 2017, doi: 10.1109/ICECCT.2017.8118052.
9. S. Upadhyay, S. R. Kapoor, and R. Choudhary, "Fault Classification and Detection in Transmission Lines Using ANN," 2018, doi: 10.1109/ICIRCA.2018.8597294.
10. D. Guillen, G. Idarraga-Ospina, A. Zamora, M. R. A. Paternina, and J. M. Ramirez, "Fault detection and classification in transmission line using the Euclidian Norm of the total WSE," 2014, doi: 10.1109/TDC-LA.2014.6955188.

## A GENERAL OVERVIEW OF CONCRETE AT HIGH TEMPERATURES

**Rahul Rathore\***

\*Assistant Professor,  
Department of Computer Science,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [rahul.engineering@tmu.ac.in](mailto:rahul.engineering@tmu.ac.in)

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### ABSTRACT

*Material characteristics may be used in a variety of ways in theoretical research. It relies on the particular approach, the goal, and the necessary quality of outcome. This paper provides a concise overview of the current state of knowledge in the area of high-temperature concrete characteristics, which may help to solve the issue of predicting the fire behavior of concrete parts. A novel materials model is created and presented based on current research findings. The report is broken down into three sections. A short introduction to different concrete test techniques is provided in contains a description of analytical methods for calculating the fire behavior of concrete components based on current literature, and Section 4 has a description of concrete characteristics based on available literature. The word drying will be removed in the following for the purpose of brevity. However, it is important to remember that the drying process is likely one of the most important factors influencing concrete behavior when exposed to heat.*

**KEYWORDS:** *Aggregate, Concreate, Heating Rates, Humidification, Temperatures.*

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### 1. INTRODUCTION

During the past four decades, many studies on the effects of fire on concrete and concrete components have been published. Nonetheless, high-temperature thermal and mechanical characteristics of concrete are currently being studied[1]. This is because many of the reported test results are difficult to interpret because: the tested types of concrete are different and the test descriptions are incomplete; the test procedures used are different and the test conditions are not comparable; the test specimen shapes and test equipment used are different. The essential characteristics of concrete behavior at high temperatures are described and addressed in this paper. It is basically a review of current data with regard to real-world fire scenarios, i.e., a temperature range of 20-1000°C is examined, and material behavior during short-term exposure durations of 0.5 to 5 hours is discussed[2]. Due to the fact that fire exposure causes a very fast loss of moisture in concrete components, the characteristics listed above are typically evaluated using unsealed concrete specimens. When testing unsealed concrete, the fast drying of the cement gel affects all characteristics to some extent. As a result, rather of speaking simply about

creep and strength as mentioned above, one should talk exclusively of drying creep and dry compressive strength[3].

The concrete characteristics are inextricably linked to the test technique used. As a result, the feasibility of converting such characteristics into material equations is influenced by a variety of variables. Appropriate rheological models must be constructed if mechanical characteristics are taken into account. Because this is not always feasible, test techniques that are closely comparable to real-world circumstances should be chosen[4]. Under fire circumstances, concrete undergoes transitory processes, necessitating the measurement of characteristics that are determined under these conditions. Other characteristics obtained under steady-state circumstances should be separated from these. Heating, application of the load, and strain control are the three major test parameters[5]. These may be fixed, i.e. constant values, or transient, i.e. values that change throughout testing. There are six practical regimes for determining mechanical characteristics. Starting at time  $t = 0$ , the specimen is heated to the appropriate test temperature ( $T_1$ ,  $T_2$ , or  $T_3$ ) at a continuous heating rate  $T$ . The heating rate should be in the range of 0.1 - 10 K/min for practical reasons (size of the specimen) and to allow for exposure under fire situations. The specimen is exposed to a constant rate of loading  $\dot{\epsilon} = \text{constant}$  after an initial preheating phase, say at time  $t^*$ . The modulus of elasticity, compressive strength, and ultimate strain may all be calculated using the test results[6]. This test technique is similar to the previously described stress-controlled  $\sigma$ - $\epsilon$  tests. At a steady heating rate  $T$ , the specimen is heated to the necessary temperature  $T^*$ . When the specimen has achieved consistent temperature after the first heating phase, it is loaded at a constant strain rate. This method produces full  $\sigma$ - $\epsilon$  curves, which may be used to calculate the greatest mechanical energy dissipated by the specimen during fracture ultimate mechanical dissipation energy[7]. Tests of steady-state creep  $T^*$  is the temperature at which the specimen is (slowly) heated. The load is applied when thermal equilibrium is achieved ( $t = t^*$ ). Throughout the test, the temperature  $T^*$  and the applied load  $\sigma_0$  are maintained constant. When the force is applied at time  $t^*$ , an immediate elastic deformation occurs, followed by creep deformation under sustained constant load. The test has limited significance in a fire scenario since the test durations are often far longer than the length of structure fires[8].

Concrete is extensively utilized as a main structural material in building owing to many benefits it has over other construction materials, such as strength, durability, simplicity of manufacturing, and non-flammability. When utilized in structures, concrete structural members must meet the necessary fire safety standards outlined in building regulations. Because fire is one of the most severe environmental situations to which buildings may be exposed, providing adequate fire safety measures for structural components is a critical part of building design. The duration during which a structural member exhibits resistance in terms of structural integrity, stability, and temperature transmission is measured in terms of fire resistance, which is the duration during which a structural member exhibits resistance in terms of structural integrity, stability, and temperature transmission. Concrete, in general, has the highest fire resistance of any construction material.

Concrete's component elements (cement and aggregates) mix chemically to create a material that is largely inert, has low thermal conductivity, high heat capacity, and slower strength deterioration with temperature, resulting in good fire resistance. Concrete may serve as an efficient fire shield not just between neighboring areas but also to protect itself from fire damage

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due to its slow rate of heat transfer and strength loss. A heating technique similar to the steady-state creep test is used first. The load is applied and the instantaneous elastic strain measured at time  $t^*$ , when thermal equilibrium is achieved. The initial strain is maintained throughout the test, and the stress level is recorded. The test has limited significance in a fire scenario since the test durations are often far longer than the length of structure fires. The findings of steady state creep and relaxation tests will not be addressed further since this study is dedicated to the modeling of concrete under fire. At time  $t = 0$ , the concrete specimen is loaded up to a constant load level  $a$ . The initial compressive strain is taken into account[9].

Following that, it is heated at a steady pace. The initial elastic strain is maintained during the heating time by changing the applied external load constantly. Heating is typically kept going until the total force recorded at time  $t = 0$  falls below the initial load level. The specific density,  $p$ , the thermal conductivity,  $k$ , the heat capacity, percent, and the thermal diffusivity,  $a$ , are all concrete characteristics that are required to calculate heat transport and temperature distributions in concrete members. The density of concrete has only a minor temperature dependency, which is mostly due to moisture losses during heating. However, owing to the breakdown of the calcareous material, limestone concretes exhibit a considerable reduction in density at about 800 °. Concrete's thermal conductivity is determined by the conductivity of its components. The moisture content, aggregate type, and mix proportions are the most important variables. The conductivity of any particular concrete changes roughly linearly with the amount of moisture present[10].

## 2. DISCUSSION

The conductivity seems to increase with temperature up to 100 °C. After then, there is a decrease of conductivity. Up to temperatures of 1000°C, the conductivity of lightweight concretes may be virtually stable or slightly rising. The density of the aggregate is the deciding factor in this instance. Typical statistics for conventional and lightweight concretes. The property of specific heat seems to be the least known in the context of thermal characteristics. The thermal diffusivity of concrete is dictated by its components' thermal characteristics, or it may be estimated using non-steady-state data. The published results show a lot of variance, which may be related to the kind of test technique used, the type of concrete being tested, or the particular treatment of the specimens before to the testing. The importance of diffusivity values in temperature estimates in concrete components under fire necessitates the immediate acquisition of more trustworthy and precise thermal data. For a structural concrete using quartzite aggregate, some measurement findings and a suggested empirical connection.

When it comes to the cooling time after a fire, it's important to remember that concrete's thermal characteristics are extremely irreversible, meaning they don't return to their former state after a fire. Normally, consistent characteristics are assumed throughout the cooling time, with the highest temperature reached being essential in each instance for the corresponding thermal property to be used during cooling. This approximation does not hold true for temperatures over 100 °C, since concrete moisture is more important in this temperature range. In such scenario, estimating material characteristics necessitates more advanced considerations. Many studies have been conducted on the compressive strength of various concretes. In the vast majority of instances, the loading rates have not been specified. However, it seems that loading rates have little effect on high temperature strengths within a typical range.

The following broad inferences may be made from the given data. Within the realistic range of use for structural concretes, original strength and water-cement ratio have little effect on high temperature-strength properties. When concrete is subjected to high temperatures, the aggregate-cement ratio has a major impact on its strength. For lean mixtures, the decrease is proportionately less than for rich combinations. The strength-temperature properties are influenced by different kinds of aggregates. In comparison to siliceous concretes, calcareous and lightweight aggregate concretes lose strength at higher temperatures. The assessment of concrete structures often necessitates the collection of data that allows for the identification of multiaxial stress states. The use of uniaxial material characteristics, especially when plates or slabs are being examined, may result in unanticipated mistakes or erroneous findings. Over the past two years, researchers have been researching concrete's biaxial high temperature strength. Regardless of the individual stress ratio and temperature level, biaxial compressive strength is obviously greater than uniaxial compressive strength. Using a structural lightweight concrete, similar results were achieved. Furthermore, it was discovered that in a biaxial condition of pressures, the relative increase in strength at high temperatures is substantial.

The impact of biaxial strains is becoming more important in terms of material failure, especially at temperatures over 450 °C. It is a list of variables that influence the behavior of concrete at high temperatures. The screening was performed based on prior information and personal experience. Even when considering effects on the modulus of elasticity of concrete at high temperatures, the compilation remains true. In general, the reduction in elasticity of concrete with rising temperatures is greater than the decrease in strength. The majority of these experiments have been conducted using stress-rate controlled methods. Strain-rate controlled testing are now feasible because to recent advancements in the area of contemporary hydraulic test equipment.

The typical o-e curves are shown. Within the practical range of concrete application, original strength and water-cement ratio have little effect on the form of a-e curves. The form of the o-e curve is substantially altered when a prolonged load (e.g., restress) is applied during heating. This is true regardless of the concrete type being tested. When compared to specimens that were not loaded during heating but evaluated under the same circumstances, specimens under a sustained load (load level) during the heating period show a substantial relative increase in compressive strength and modulus of elasticity. With loaded specimens, the final strain is also substantially decreased. Concrete specimens behaved similarly to unheated specimens up to test temperatures of about 450 °C. The test temperatures have little effect on the a-e curves. The load level during heating seems to have just a small impact.

The goals of thermal expansion measurements are to see how single components of a composite material affect the thermal strain and how incompatibilities in the composites' thermal strains impact the mechanical characteristics of concrete at high temperatures. The findings of several thermal strain measuring tests are examined. Shrinkage is usually included in thermal strain measurements. Because the tests are conducted on unopened specimens, this is inevitable. The thermal strain of concrete may be partially irreversible, i.e., residual strains might be positive (residual dilatation) or negative (residual shrinkage) after cooling. The first instance happens when most concretes are cooled after being heated to less than 400 °C. The second instance may be seen by cooling concretes that have been heated to above 400 degrees Celsius.



After heating to a specified maximum temperature and cooling to ambient temperatures, Transient tests for evaluating total deformation or restraint of concrete have the greatest theoretical relationship to building fires and are expected to provide the most realistic results with direct fire relevance. For certain heating rates, the experiments provide strain-temperature relationships (parameter: load level). Recently, there have been a slew of papers in this area of material science. The major characteristics examined are the mix percentage, the kind of aggregate, the curing condition and age of concrete, and the test circumstances, according to theoretical considerations and experimental studies. In the temperature range of 20 - 300 °C, the curing conditions are critical.

Transient creep is much smaller in air-cured and oven-dried specimens than in water-cured specimens. At higher temperatures, the effect of moisture content on overall deformations is minimal. As a result, most statements about transient creep data are inversely) valid for restraining data, for example, if a special type of concrete is supposed to have a low thermal expansion and a high transient creep, theoretical considerations suggest that relatively low restraining forces should be expected. Moisture content, aggregate type, and curing conditions, among other things, have a big impact on restraining forces. Temperature curves for typical restraining forces. In the temperature range of 20 to 200 °C, the moisture content is a factor that affects the maximum value of the restraining forces. A maximum occurs between roughly 100 and 200 °C with 100 °C oven-dried specimens. At 20 °C, the restraining forces are in the range of 60-80 percent of the maximum strength. The peak is quickly diminishing. Concrete with a high moisture content, i.e. after water storage, has a very different behavior. When compared to dry specimens, moisture favors greater creep deformations, resulting in a considerably lower restraining peak at 100 °C. A significant low in restraining forces occurs in the temperature range of 100 - 200 °C, which is linked to fast drying and shrinking effects. The ultimate maximum constraint occurs at about 450 °C in this instance. The restricting forces diminish as the temperature rises owing to increased flexibility. Air-conditioned specimens (20 °C/65 percent relative humidity) are restrained similarly to wet specimens.

It's worth noting that transitory creep in this context includes not only creep stresses caused by fast drying of capillary water and, as a result, an internal redistribution of moisture in the microstructure, but also complete loss of gel water and chemically bonded water. Both phenomena are often referred to as dehydration; that is, temporary creep holds for strains that occur during the change of materials until the strength or strain limitations are surpassed. The microstructure transforms into a solid with a significant number of interior micro and macro fractures during the transformation of matter. It's worth noting that virtually no transitory creep occurs when concrete cools after being exposed to heat.

### 3. CONCLUSION

Different models for predicting concrete structure fire behavior have been developed. The models utilize various levels of complexity and incorporate steady-state, transient state, and mixed data. Transient state models, as one would assume, closely resemble fire scenarios. Concrete models should include transitory creep or at the very least adequate strain effects, according to new study findings. The study of transitory effects is especially important when the theoretical calculation of concrete members involves the determination of deformations and restraint. The suggested concrete model accounts for the majority of temperature changes seen in concrete under fire and can therefore be utilized for practical design reasons. The prevailing

modulus of elasticity is set according to the matching prior maximum temperature and stress states, which is a fair assumption for the concrete behavior during cooling. Furthermore, one must remember that in cooling circumstances, thermal stresses may be substantially irreversible. This is particularly true at temperatures over 600 °C, and it is largely dependent on the kind of aggregate used in the concrete. When it comes to concrete's stress behavior at high temperatures, it's typical to overlook it in structural design. Concrete's tensile strength falls quickly as the temperature rises.

## REFERENCES

1. M. K. Darabi, R. K. Abu Al-Rub, E. A. Masad, and D. N. Little, "Cyclic Hardening-Relaxation Viscoplasticity Model for Asphalt Concrete Materials," *J. Eng. Mech.*, 2013, doi: 10.1061/(asce)em.1943-7889.0000541.
2. M. K. Darabi, R. K. Abu Al-Rub, E. A. Masad, C. W. Huang, and D. N. Little, "A modified viscoplastic model to predict the permanent deformation of asphaltic materials under cyclic-compression loading at high temperatures," *Int. J. Plast.*, 2012, doi: 10.1016/j.ijplas.2012.03.001.
3. Z. P. Bažant and T. Wang, "Algorithm for Aging Viscoelastic Structures Under Periodic Load," *J. Eng. Mech.*, 1984, doi: 10.1061/(asce)0733-9399(1984)110:6(972).
4. J. Gales, L. Bisby, and C. MacDougall, "Fire induced transient creep causing stress relaxation and tendon rupture in unbonded post-tensioned structures: Experiments and modeling," 2010.
5. U. Schneider and M. Schneider, "Calculation of restraint axial forces of concrete cylinders under transient temperature conditions," 2010.
6. H. C. Seo *et al.*, "Design of a Lighting Tensegrity Sculpture for the Bella Sky Hotel in Copenhagen," *J. Struct. Constr. Eng. (Transactions AIJ)*, 2012.
7. P. T. Williams, R. Kirby, C. Malecki, and J. Hill, "Measurement of the bulk acoustic properties of fibrous materials at high temperatures," *Appl. Acoust.*, 2014, doi: 10.1016/j.apacoust.2013.09.016.
8. Y. Cheng, W. Wang, G. Tan, and C. Shi, "Assessing high- and low-temperature properties of asphalt pavements incorporating waste oil shale as an alternative material in Jilin Province, China," *Sustain.*, 2018, doi: 10.3390/su10072179.
9. S. Le Foll, A. Delmas, and F. André, "Identification of radiative properties for heterogeneous materials at high temperature," *Int. J. Therm. Sci.*, 2017, doi: 10.1016/j.ijthermalsci.2017.06.019.
10. N. Takahashi, M. Morishita, D. Miyagi, and M. Nakano, "Comparison of magnetic properties of magnetic materials at high temperature," 2011, doi: 10.1109/TMAG.2011.2158517.

## A REVIEW ON EMG SIGNAL CLASSIFICATION FOR HUMAN COMPUTER INTERACTION

**Dr Vinay Kumar Mishra\***

\*Associate Professor,  
Department of Computer Science,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- vinaym.computers@tmu.ac.in

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### ABSTRACT

*Human Computer Interaction (HCI) systems have become an increasingly essential aspect of our everyday lives as the importance of computerized devices in society grows. The efficient use of the available information flow of computer, communication, and display technologies is determined by HCI. In recent years, there has been a lot of buzz about developing intuitive interfaces that can detect and convert the user's body motions into computer instructions. Various biomedical signals (biosignals) that may be obtained from a specific tissue, organ, or cell system like the nervous system can be utilized for neural connection with computers. Electroencephalogram (EEG), Electrooculogram (EOG), and Electromyogram are some examples (EMG). Physically handicapped people benefit greatly from such methods. Many efforts have been made to create HCI using EMG signals from gesture. The development of continuous EMG signal categorization for graphical controller, which allows the physically handicapped to utilize word processing applications and other personal computer software, as well as the internet, is presently underway in the field of EMG signal processing and controller. It also allows for the manipulation of robotic devices, prosthetic limbs, I/O for virtual reality games, and fitness equipment, among other things. The majority of developmental research is focused on the use of neural networks to recognize patterns. The EMG controller may be configured to recognize gestures via signal analysis of muscle action potential groups. The aim of this review article is to examine the different methods and algorithms used for EMG signal categorization in order to convert EMG signals into computer commands.*

**KEYWORDS:** *HCI, EMG, Neural Network, Hidden Markov Model, Bayes Network Etc.*

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### 1. INTRODUCTION

Human Computer Interaction (HCI) systems have become an increasingly essential aspect of our everyday lives as the importance of computerized devices in society grows. The efficient use of the available information flow of computer, communication, and display technologies is determined by HCI. In recent years, there has been a lot of buzz about developing intuitive

interfaces that can detect and convert the user's body motions into computer instructions. Various biomedical signals (biosignals) that may be obtained from a specific tissue, organ, or cell system like the nervous system can be utilized for neural connection with computers. Electroencephalogram (EEG), Electrooculogram (EOG), and Electromyogram are some examples (EMG). Physically handicapped people benefit greatly from such methods. Many efforts have been made to create HCI using EMG signals from gesture. The development of continuous EMG signal categorization for graphical controller, which allows the physically handicapped to utilize word processing applications and other personal computer software, as well as the internet, is presently underway in the field of EMG signal processing and controller. It also allows for the manipulation of robotic devices, prosthetic limbs, I/O for virtual reality games, and fitness equipment, among other things. The majority of developmental research is focused on the use of neural networks to recognize patterns. The EMG controller may be configured to recognize gestures via signal analysis of muscle action potential groups. The aim of this review article is to examine the different methods and algorithms used for EMG signal categorization in order to convert EMG signals into computer commands [1]–[4].

This article began by discussing several kinds of non-biosignal based devices/systems, their applications, and some of their benefits and disadvantages. The article then go on to discuss several EMG signal classification methods utilized in the area of HCI. Finally, a summary table containing the classifier's characteristics described in this article is provided.

## **2. TECHNIQUES USED IN HCI**

### **2.1. Non-biosignal Approach:**

Aside from using biological signals, many efforts have been made to develop a practical HCI solution for handicapped people. These gadgets, which are based on motor abilities, are still in use. The "Tonguepoint," a pressure-sensitive isometric joystick controlled by the user's mouth, is based on IBM Trackpoint. Cursor control is provided via the joystick, while left and right button choices are made by two switches (a biting switch and a manual switch placed outside the mouth). Another commercially available gadget is a pointing device called "Headmouse," which converts head movement into cursor movement on the screen. This gadget measures head motion via infrared distance measuring. Infrared light is used to monitor a tiny disposable target (reflective accessory) that is put on the user's forehead or spectacles using the wireless sensing technology. The user's head movement is then proportionate to the mouse pointer movement on the screen, which is utilized to activate a switch that allows the user to control different system operations [4]–[7].

The necessary motor abilities are a particular issue with head mouse devices. For certain types of users, the methods described have potential drawbacks. A user with cerebral palsy, for example, may not have the fine motor skills needed to operate the Tonguepoint gadget. Similarly, a user with a fusion of the spinal vertebrae may be unable to move his or her head, making the Headmouse useless. Patients with severe multiple sclerosis and SCI have a limited range of motion in their necks, which makes utilizing these types of devices challenging. Subjects with impairments were also shown to have a slower response time and spend more time attempting to fine-tune cursor location. For certain individuals with neck mobility limitations, filtering and gain adjustment features in some head-control systems may enhance usability. However, actual tests have shown the limits of these systems. More adaptable methods were also discovered to

enable head control for automated modification to the requirements and skills of a specific user. However, actual tests have shown the limitations of these systems. More adaptable methods were also discovered to enable head control for automated modification to the requirements and skills of a specific user.

A single switch governs the operation of a Head mouse mechanism. This enables the user to provide single instructions at the right moment while reducing head motions. However, a major flaw with this method is that it requires precise timing, which often leads to increased head movement and spasticity, particularly when the user is attempting to work quickly. Head motions can require a lot of muscle and ligament work, and they may injure users if they are overused. Other, more sophisticated methods have tried to offer computer interface functions with even less user skills. The eye-gaze tracking interface method is a good example. Mason K. A. (1969) patented this concept, which is based on the discovery that reflected light creates a bright spot (glint) on the cornea, whose location changes as the eye-gaze direction changes. An infrared illuminator and a video camera are employed in the most popular kinds of these systems to capture continuous pictures of the subject's eye. The use of digital image processing methods allows for the real-time separation of two landmark reflections from the subject's eye: the pupil reflection and the smaller and brighter cornea reflection. The instantaneous orientation of the eye's line of sight is defined by determining the centers of these reflections and their respective locations in the picture recorded by the camera in real time. In these systems, the clicking action has been tried by assigning a "dwell latency" and performing a click whenever the pointer stays inside a "dwell neighborhood" for at least that length of time. However, if a user is merely looking intently at a tiny region of the screen, this clicking process may result in false clicks, an issue known as the "Midas Touch" problem. Eye-gaze-tracking systems are very costly due to their intricacy and processing needs, and they demand a lot of attention and effort to accomplish effective cursor control.

## **2.2. Biosignal Based Approach:**

### **2.2.1. EOG Signal Approach**

Some biosignals have also been demonstrated to be suitable for the development of a novel human-computer communication interface. When compared to traditional, mainly audio-visually based HCI, the usage of biosignals opens up whole new possibilities in this field. The most common of all human motions is probably eye movements. The eye is one of the most important subsystems of the body in terms of our basic senses. The visual information of interest is closely related to the location of the eye. Using the location of the eye, it is feasible to offer a highly intuitive assistance technology. Using the location of the eye, it is feasible to offer a highly intuitive assistance technology. Optical, mechanical, and electrical methods may all be used to determine the position of the eye. The EOG, or electrical technique of measuring, is the least intrusive way to determine the location of the eyes [8]–[10].

In the fields of neurology and psychology, as well as ergonomics, advertising, and design, eye movement research is of considerable interest. Eye movements may now be utilized as a strong input device, with numerous practical applications in HCI, since they can be controlled volitionally to some extent and monitored by current technology with high speed and accuracy. EOG is one of the few techniques for capturing eye movements that does not require a direct connection to the eye. The capacity of people to visually track the movement of an item using



dynamic adjustments is a simple job for the vast majority of them. The EOG is an electrical recording that corresponds to the direction of the eye, making it ideal for applications such as the Man Machine Interface (MMI). Because the majority of the machines that must be operated are computer-controlled. HCI and MMI are interchangeable terms.

There are a variety of methods for measuring eye movement, some of which are more precise than EOG, but the majority of them are much more costly and cause users a great deal of pain and discomfort. EOG is a noninvasive, low-cost, and simple to use technique. Many people with severe impairments have the capacity to regulate their eye movements, according to a research, which may be utilized to create new HCI systems to help them interact with others or operate specific equipment. Furthermore, this EOG-based HCI application may be expanded to a group of ordinary people for games or other entertainments. EOG signals differ from EEG signals in that their amplitude is relatively large, the connection between EOG and eye movements is linear, and the waveform is simple to identify.

To identify the applications of EOG-based HCI, it is necessary to understand the system's limits and possible mistakes. The accuracy of the HCI utilizing EOG signals may be influenced by a number of major sources of inaccuracy. Head and muscle movement interface, signal drift, and channel crosstalk are all issues that need to be addressed. Whether the user makes a decision or just sits idle, small head motions are inevitable. The gaze vector is difficult to distinguish from EOG signals, however, since the EOG signal is readily impacted by noise caused by head movement. Angular displacement between the head and the torso, physiological abnormalities, a person's perception of gaze point, and movement of the individual relative to a known reference point are some additional variables that may influence HCI performance.

The cursor's response time is very quick, and users quickly became acquainted with the interface. The user was pushed to improve accuracy quickly in a short amount of time. Furthermore, the game-like trial environment may put the user in a stressful scenario, and it can track the user's performance over time. However, excellent outcomes may not be replicated for every user, and the learning curve may differ significantly. The system's performance was occasionally hampered by the contrived stress scenario. If the user is permitted to perform a free training, the signal's steadiness may improve substantially. A specified testing environment, on the other hand, is required for the HCI to be characterized and compared to other methods. It's debatable whether an EOG system is still adequate when maximum performance is desired. The user may also look for an eye tracking system that is more accurate than the EOG system. However, the benefit of a simple system vanishes as either the hardware or software computing power increases by a factor of ten.

### **2.2.2. EEG Signal Approach:**

Individuals with severe neuromuscular impairments may learn to utilize a Brain Computer Interface (BCI) by manipulating different characteristics in their EEG, according to several studies. The BCI is a cutting-edge multidisciplinary technology that allows a person's brain to control a computer without relying on traditional neuromuscular pathways. The technology's most significant uses are for paralyzed individuals with severe neuromuscular diseases, since BCI may give them with communication, control, or rehabilitation tools to assist compensate for or recover their lost skills. The EEG is one of the several brain signal collection techniques that the BCI community is interested in. The electrical brain signal is recorded by the EEG from the



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scalp, where it starts from postsynaptic potentials, accumulates at the cortex, and travels through the skull to the scalp. EEG-based technology that needs the extraction of raw EEG data from the brain and the conversion of that data into device control instructions using appropriate signal processing methods. The EEG records the cerebral electrical activity of the brain using electrodes placed to the surface of the skull. The electrode signals are amplified, filtered, and digitized before being processed in a computer, where feature extraction, categorization, and an appropriate control command are conducted.

In recent years, EEG-based BCI technology has advanced significantly. EEG-based BCI technologies, which do not rely on peripheral nerves and muscles, have gotten a lot of press as potential means of communication for the handicapped. Slow cortical potentials, P300 potentials, and mu and beta rhythm control are examples of EEG phenomena that may help severely handicapped people engage more with their surroundings. The modulation of mu (8-12 Hz) and beta (18-25 Hz) rhythms through motor imagery is one of the most common phenomena used for BCI control. Actual or imagined motor motions cause these rhythms to de-synchronize (drop in amplitude) in the sensorimotor cortex. By adjusting the amplitude of these rhythms and switching between motor imagery tasks, users may directly operate a BCI.

### **2.2.3. The EMG Signal and Its Importance:**

EMGs are thought to be the source of a new kind of HCI, i.e. an alternate input method, among these bioelectric signals. In reality, since the electrical activity generated by a human's arm muscle movements can be read and converted into computer control instructions, an input device created utilizing EMGs is a natural method of HCI. EMGs may also be readily obtained on the surface of human skin using simply attachable electrodes.

EOG-based systems, as opposed to optical systems, provide more options for mouse pointer control and are more practical and useful for individuals with SCI. Their complicated learning and calibration processes, on the other hand, are the major drawbacks and need additional improvement. One of the main drawbacks of BCI systems, on the other hand, is the significant risk of EMG contamination. EEG signals are generated in the brain's neurons and must travel through the skull and pericranial muscles to reach the surface electrodes. The EEG bio-potential amplifiers are intended to include high amplification since the EEG signals are modest in amplitude (5–300 V). As a result, any muscle movement in the head or neck may cause a significant amount of noise contamination in the EMG signal. From the perspective of an application, this is a major annoyance for a user, particularly if the person has cerebral palsy. The majority of BCI researchers have made every effort to remove any EMG artifacts, particularly eye blinks and neck movements.

The electroencephalogram (EEG) is a noninvasive monitoring technique that records brain activity on the scalp. Signals obtained using this technique, on the other hand, reflect the massed activity of numerous cortical neurons and have a poor spatial resolution and signal-to-noise ratio (SNR). On the other hand, invasive monitoring techniques record the activity of specific cortical neurons in the brain. However, numerous basic neurobiological issues and technological challenges must be addressed, and considerable training for brain activity-based interface techniques is needed. An ENG and an EMG can detect signals produced by bodily movements at the level of the peripheral nervous system. Damage to the neural tissue and continuous differential motion of the electrode inside the fascicle induce a decrease in the SNR and a

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progressive drift in the recorded nerve fiber population, thus ENG-based interfaces have limits in terms of SNR, dimensions, and drifts. EMG signals, on the other hand, are easier and safer to monitor than other brain signals. Furthermore, the SNR produced by this noninvasive monitoring technique is excellent. As a result, given present technology, an EMG-based HCI is the most feasible.

### 3. DISCUSSION

The review reveals that ANN plays a critical role in the categorization of EMG signals for subsequent computer command interpretation. Many academics have successfully used different algorithm-based neural networks throughout the past few decades. Despite the fact that HMM produces satisfactory recognition results when combined with other artificial intelligences such as Fuzzy logic, it is clear that neural networks, as well as their composition with other artificial intelligences such as Fuzzy logic, produce satisfactory results. The success rate of the neural network using Yule-Walker algorithm and Learning vector quantization (LVQ) was about 78 percent. A BP-based neural network can also achieve effective classification accuracy, but the problem is that it cannot achieve high learning and discrimination performance because the EMG patterns differ significantly at the start and end of the motion, even if they are in the same class. For complex data, such as bioelectric signals, PNN with LLGMN is effective. The accuracy improves as the number of base directions increases, but a high number of base directions necessitates a considerably longer learning period. Using FMMNN, a 97 percent average recognition rate was observed. In the area of voice recognition, HMMs are widely used dynamic classifiers. HMM are excellent time series classification methods. Although HMM are not widely used in the HCI field, research have shown that they are effective classifiers for HCI systems.

### 4. CONCLUSION

For those with significant physical disabilities, using a conventional interface to use a computer is ineffective. This is due to the fact that it necessitates the consistent use of hand motions. The development of HCI based on various biosignals will aid in improving handicapped people's quality of life. The EMG signal is one of the most well-known biosignals that contains important information about the nervous system. The methods and approaches used to categorize EMG signals in the area of HCI were the subject of this review article. It may be stated that for HCI development, the neural network dominates EMG classification. By enhancing HCI and making it more natural to use for handicapped individuals, there are still a lot of possibilities for them to work. Aside from neural networks, artificial intelligence may be used in a variety of ways to improve HCI.

### REFERENCES

1. J. Gomez-Gil, I. San-Jose-Gonzalez, L. F. Nicolas-Alonso, and S. Alonso-Garcia, "Steering a tractor by means of an EMG-based human-machine interface," *Sensors*, 2011, doi: 10.3390/s110707110.
2. M. Tavakoli, C. Benussi, P. Alhais Lopes, L. B. Osorio, and A. T. de Almeida, "Robust hand gesture recognition with a double channel surface EMG wearable armband and SVM classifier," *Biomed. Signal Process. Control*, 2018, doi: 10.1016/j.bspc.2018.07.010.
3. M. Tavakoli, C. Benussi, and J. L. Lourenco, "Single channel surface EMG control of

- advanced prosthetic hands: A simple, low cost and efficient approach,” *Expert Syst. Appl.*, 2017, doi: 10.1016/j.eswa.2017.03.012.
4. F. Lotte *et al.*, “A review of classification algorithms for EEG-based brain – computer interfaces To cite this version : A Review of Classification Algorithms for EEG-based Brain-Computer Interfaces,” *Hum. Brain Mapp.*, 2018.
  5. W. Guo, X. Sheng, H. Liu, and X. Zhu, “Toward an Enhanced Human-Machine Interface for Upper-Limb Prosthesis Control with Combined EMG and NIRS Signals,” *IEEE Trans. Human-Machine Syst.*, 2017, doi: 10.1109/THMS.2016.2641389.
  6. D. Tkach, H. Huang, and T. A. Kuiken, “Study of stability of time-domain features for electromyographic pattern recognition,” *J. Neuroeng. Rehabil.*, 2010, doi: 10.1186/1743-0003-7-21.
  7. M. Hamed, S. H. Salleh, M. Astaraki, and A. M. Noor, “EMG-based facial gesture recognition through versatile elliptic basis function neural network,” *Biomed. Eng. Online*, 2013, doi: 10.1186/1475-925X-12-73.
  8. W. L. Zheng and B. L. Lu, “A multimodal approach to estimating vigilance using EEG and forehead EOG,” *J. Neural Eng.*, 2017, doi: 10.1088/1741-2552/aa5a98.
  9. A. Dasgupta, S. Chakraborty, and A. Routray, “A two-stage framework for denoising electrooculography signals,” *Biomed. Signal Process. Control*, 2017, doi: 10.1016/j.bspc.2016.08.012.
  10. S. Chambon, M. N. Galtier, P. J. Arnal, G. Wainrib, and A. Gramfort, “A Deep Learning Architecture for Temporal Sleep Stage Classification Using Multivariate and Multimodal Time Series,” *IEEE Trans. Neural Syst. Rehabil. Eng.*, 2018, doi: 10.1109/TNSRE.2018.2813138.

## BLUE WATER FOOTPRINTS VS. BLUE WATER AVAILABILITY: GLOBAL MONTHLY WATER SCARCITY

Dr Vipin Jain\*

\*Professor,  
Department of Finance & Marketing,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- [vipin555@rediffmail.com](mailto:vipin555@rediffmail.com)

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### ABSTRACT

*In many areas of the globe, the inexorable increase in demand for water to produce food, feed industry, and maintain urban and rural populations has resulted in a rising shortage of freshwater. Freshwater scarcity is a growing concern, placing considerable importance on the accuracy of indicators used to characterize and map water scarcity worldwide. We improve upon past efforts by using estimates of blue water footprints (consumptive use of ground- and surface water flows) rather than water withdrawals, accounting for the flows needed to sustain critical ecological functions and by considering monthly rather than annual values. We analyzed 405 river basins for the period 1996–2005. In 201 basins with 2.67 billion inhabitants there was severe water scarcity during at least one month of the year. The ecological and economic consequences of increasing degrees of water scarcity – as evidenced by the Rio Grande (Rio Bravo), Indus, and Murray-Darling River Basins – can include complete desiccation during dry seasons, decimation of aquatic biodiversity, and substantial economic disruption.*

**KEYWORDS:** *Water Scarcity, Footprints, Blue Water, Fresh Water, Scarcity.*

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### 1. INTRODUCTION

For long stretches of the year, a growing number of rivers [1]run dry before reaching the sea. Groundwater is being drawn at rates that surpass replenishment in many places, diminishing aquifers and river base flows. Governments, businesses, and communities are becoming more worried about the availability and sustainability of water resources. Researchers have created a variety of measures over the past two decades to assist define, map, and monitor the worldwide geography of water shortage. The ratio of population size to renewable water supply and the ratio of water withdrawals to renewable water supply are two examples. These water scarcity indicators have helped chronicle the development of water scarcity through time by highlighting the imbalance between water supply and demand. Water shortage evaluations are being used to inform global food, poverty and human development, economic and commercial prospects, and environmental health assessments. Because water shortage indicators are so widely used, their

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accuracy is crucial. We combined three advances in monitoring water consumption and availability to create a new and more accurate estimate of [2] global water shortage.

To begin, we assess water usage in terms of consumptive use of ground- and surface water flows – i.e., the blue water footprint – rather than water withdrawals, as has been done in previous water use studies. Because approximately 40% of water withdrawals in agriculture usually return to local rivers and aquifers and are therefore accessible for reuse, the amount of water used is a more accurate foundation for assessing shortage than the volume of water taken. Even 90–95 percent of the water taken will be returned in businesses and homes. Second, we include the fluxes required to maintain key ecological processes when evaluating water availability, as Shakhty et al. Did before. We adopt a newly suggested presumptive criterion that states that reducing a river's natural flow by more than 20% poses a danger to ecological health and ecosystem services Third, similar to Wada et al. , we examine water consumption and availability on a monthly rather than yearly basis. This manner, we can account for the year-to-year fluctuation in water availability and consumption, as well as the seasonal character of water shortage. Our analysis of global water shortage is the first to include all three advances into a single evaluation. It compares the consumptive use component of blue water withdrawals to the projected environmentally acceptable percentage of runoff on a monthly basis. We define blue water scarcity in a river basin as the ratio of the blue water footprint in that basin to the blue water available, with the latter accounting for environmental water requirements by subtracting from total runoff the estimated flow required for ecological health. We have concentrated on shortage of water accessible in rivers and groundwater, or “blue” water, as we have in prior water scarcity indicators; we do not include scarcity of direct precipitation, or “green” water. The monthly blue water footprint of mankind was calculated for the globe as a whole at a five by five arc minute geographical resolution, differentiating between agricultural, industrial, and residential water footprints, based on. The amount of surface and groundwater consumed as a consequence of human activities is referred to as the blue water footprint; with consumption referring to the volume of freshwater utilized and then evaporated or integrated into a product.

To account for assumed environmental flow needs, total natural runoff is reduced [3]by 80% to estimate blue water availability. The amount of water that may be used without causing environmental harm is referred to as blue water availability. However, flows devoted to the preservation of ecological health may be utilized for other purposes; the presumption requirement is fulfilled as long as net depletion is less than 20% of the normal monthly flow. Because it combines these three improvements over previous studies: use of water consumption instead of water withdrawal, explicit incorporation of environmental flow requirements, and a monthly time-step, we believe our indicator provides a more reliable and accurate rendering of the status of water budgets (inputs minus outputs) at the river basin scale than has been available to date. As a result, this indicator helps decision-makers understand where and [4]when present levels of water usage are likely to result in water shortages and ecological damage in river basins throughout the globe. The ratio of the total blue water footprint to the blue water availability in a river basin over a particular time period is described as blue water scarcity in a river basin. A 100% shortage of blue water implies that all of the available blue water has been used. Blue water shortage is seasonal, varying throughout the year and from year to year. We quantify blue water scarcity by river basin on a monthly basis in this research.

## 2. DISCUSSION:



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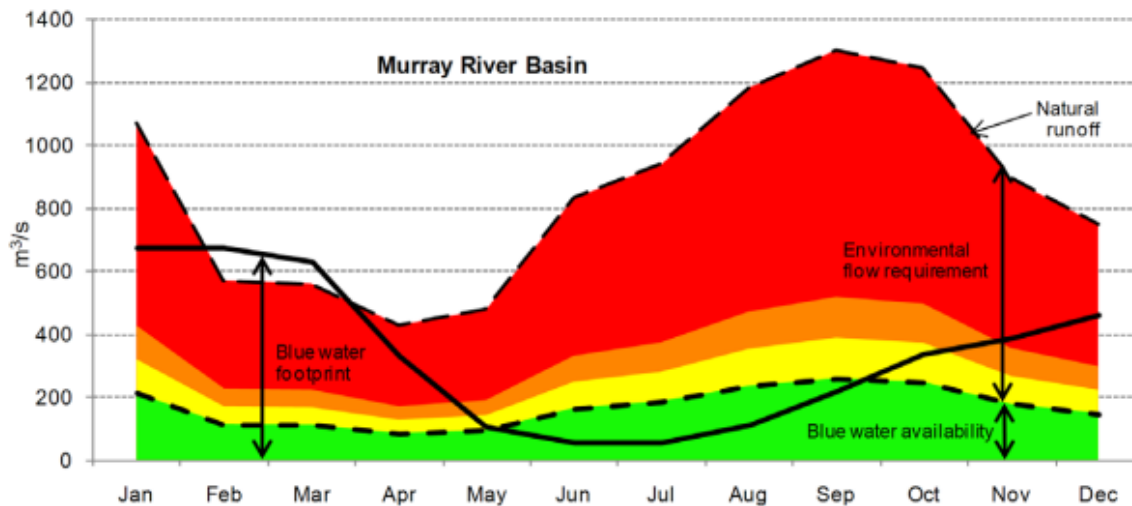
Blue water footprint and availability are measured in millimeters each month. To account for climatic variability, we use the ten-year average for the years 1996–2005 for each month of the year, while recognizing that averaging may mask inter-annual fluctuation in shortage. The worldwide blue water footprint was measured at a 5 by 5 arc minute geographic resolution by Mekonnen and Hoekstra, and average monthly blue water footprints per river basin were calculated for the period 1996–2005. They provided yearly values at the nation level, while we utilize the same underlying data to present monthly values at the river basin level in the current research. Agriculture, industry, and residential water supply are the three main water-consuming industries. Mekonnen and Hoekstra used a daily soil water balance model at the stated resolution level to determine the blue water footprint of crop production. Two distinct soil water balance scenarios are used to determine blue water use in irrigated crop production.

The first soil water balance scenario is based on the premise that no irrigation is applied to the land. The second soil water balance scenario uses the same crop characteristics as the first but assumes that actual irrigation is adequate to satisfy the irrigation demand. The blue crop water consumption is equal to the total crop water evapotranspiration as calculated in the first scenario minus the crop water evapotranspiration throughout the growth period as simulated in the second scenario. The blue water footprints of industries and domestic water supply were calculated by spatially distributing national data on industrial and domestic water withdrawals from the Food and Agricultural Organization of the United Nations (FAO) [20] according to population densities around the world as provided by CIESIN[5] and the International CIESIN. We have divided the yearly water consumption statistics for industrial and household usage evenly across the twelve months of the year due to a lack of data, without allowing for potential monthly fluctuation. The monthly blue water availability in a river basin was determined as the basin's "natural runoff" minus the "environmental flow requirement" for a certain time. By combining the actual runoff and the entire blue water footprint within the river basin, the natural runoff was calculated. The Composite Runoff V1.0 database provided monthly real runoff data with a 30 by 30 arc minute precision. These figures are based on model predictions that were calibrated against runoff observations across several time periods, with 1975 serving as the mean central year. We adjusted the 1975 real runoff data by adding the aggregated blue water footprint each basin as in 1975 in order to approximate the natural (undeleted) runoff. [6] The latter was calculated by Mekonnen and Hoekstra to be 74 percent of the blue water footprint per basin for the central year 2000. The proportion of the worldwide blue water footprint in 1975 to the global blue water footprint in 2000 is 74 percent. We used Richter et al. and Hoekstra et al.'s suggested "presumptive environmental flow norm" to determine the environmental flow demand. It's important to emphasize that applying this criterion doesn't mean that 80 percent of total runoff isn't accessible[7] for use.

In reality, all of the runoff may be utilized as long as water use does not deplete more than 20% of the total runoff. This presumptive criterion, according to Richter et al., should be used only when a site-specific scientific study of environmental flow requirements has not been conducted. When comprehensive local studies have not been completed, the presumptive norm is intended to be a cautious approach to calculating environmental flow needs. Figure 1 discloses the Water Scarcity over the Year for the Murray-Darling River Basin in Australia (Average For The Period 1996–2005). Net Available Water – That Is Natural Runoff Minus Environmental Flow Requirement – Is Shown In Green. From October Until [8]May, The Blue Water Footprint



Exceeds Net Available Water; In These Months, The Presumptive Environmental Flow Requirement Is Not Met. When The Blue Water Footprint Moves Into The Yellow, Orange And Red Colors, Water Scarcity Is Moderate, Significant And Severe, Respectively.



**Figure 1: Water Scarcity Over The Year For The Murray-Darling River Basin In Australia (Average For The Period 1996–2005). Net Available Water – That Is Natural Runoff Minus Environmental Flow Requirement – Is Shown In Green. From October Until May, The Blue Water Footprint Exceeds Net Available Water; In These Months, The Presumptive Environmental Flow Requirement Is Not Met. When The Blue Water Footprint Moves Into The Yellow, Orange And Red Colors, Water Scarcity Is Moderate, Significant And Severe, Respectively.**

Blue water scarcity is minimal (, 100%): the blue water footprint is less than 20% of natural runoff and does not surpass blue water shortage. river runoff is unaltered or little changed; water availability changed; environmental flow requirements are not assumed violated. N mild blue water shortage (100–150%): the blue water is in short supply. Natural runoff accounts about 20 to 30 percent of the footprint; environmental flow needs are not met; substantially modified met. N considerable shortage of blue water (150–200%): the blue water Natural runoff accounts for about 30 and 40% of the footprint; Environmental flow needs have been substantially altered. not complied withal significant lack of water (.200 percent). The blue water that appears once a month Runoff is severely impacted since the footprint surpasses 40% of natural runoff Environmental flow criteria aren't being fulfilled, therefore the design has been changed.

Monthly Blue Water Scarcity on a Global Scalene looked at 405 river basins that span 66% of the country. (Excluding Antarctica) and account for 65 percent of the world's land area. Population of the world in 2000 (estimate based on CIESIN and CIAT data) we used the given river basin borders and names. By the Global Runoff Data Centre (GRDC) (Figure S1). The terrain Greenland and the Sahara, for example, are not included. North African deserts, the Arabian Peninsula, Iran, and Afghanistan Asia's Sahara and Gobi deserts, as well as North

America's Mojave desert as well as the Australian desert. Many smaller landowners are also excluded. Regions that are not inside main river basins, typically along the coastlines basins. Blue water footprint on a monthly basis. Agriculture is responsible for 92% of the world's blue water impact.

The rest is split evenly between industrial and agricultural output. Household water supply (n.d.) (n.d.) (n.d.) However, the water percentages are different. Agriculture, industry, and residential water supply all need different amounts of water. Spanning river basins and over the course of a year. While the water is blue, Agriculture's carbon impact fluctuates from month to month, depending on the weather. Irrigation time and intensity, and household water supply and industrial output were expected to stay the same. All during the year as a result, for certain months in specific years, basins 100% of the blue water footprint can be avoided. Industry and residential water supplies have been blamed. The entire blue water footprint's intranasal fluctuation is shown on a graph. We get the maps as indicated in the data to the level of river basins. Each month, allowing for a direct comparison.

Throughout the year, a huge blue water imprint is seen. Because irrigation takes place in the Indus and Ganges River Basins, all during the year during a portion of the trip, there was a huge blue water footprint. For basins like the Tigris-Euphrates, the year is approximated. Murray-Darling, Guadiana, Colorado Huang He (Yellow River)(Pacific Ocean) and Krishna are two names for the same person. When we think about Europe and the European Union, we can see a distinct peak in the blue water over North America as a whole. Throughout the months of May to September (in the northern hemisphere) summer). In Australia, we're seeing a rise in blue water footprints. October through March are the months (around the southern summer). One in the blue water, there are no such clear seasonal patterns.

Because of them, we have a presence throughout South America, Africa, and Asia. Climate conditions are more varied between continents. Natural runoff and blue water availability on a monthly basis. Basin of the river the availability of natural runoff and blue water varies by basin. Figures S3, S4, and S5 illustrate the worldwide maps throughout the course of the year. Tables S2 and S3 Together, the Amazon and Congo River Basins. In the 405 river basins, they contribute for 28% of natural runoff. In the months of January and April to August, the average is lower than the national average. During the rest of the year, the average is higher. When we examine the data, we can see that runoff by region, we discover that the majority of the runoff occurs in the north. America is from April to June, whereas Europe is from September to December.

In Asia, between May and September, and in Africa, between March and June. January, August, and September in North America, and January, August, and September in South America. From January until May the Amazon and Congo River Basins, on the other hand, show a lot of variation over the year, but it's a lot crisper. In other basins, slopes may be seen. Some areas of the globe are experiencing a famine. Within a few weeks or months, a significant part of the yearly runoff occurs. Months, causing floods in one portion of the year and drought in another.

In the course of the other section even in places where there is plenty of water, Intra-annual fluctuation may significantly restrict the supply of blue water. In such circumstances, considering blue water availability on an annual basis on an annual basis on an annual basis on an annual basis on an annual basis. On a yearly basis, we get an incomplete and often inaccurate picture per-basin view of blue water availability. Water shortage by river basin on a monthly basis. For this study,

we looked at 405 river basins.69 percent of worldwide runoff is accounted for by them, and 75 percent is accounted for by them individually.65 percent of the world's irrigated land and 65 percent of the world's population. Fore classify water shortage by river basin and month. Depending on the ratio of blue water footprint to green water footprint, the severity ranges from mild to severe. (Natural runoff minus environmental flow) blue water availability requirements).

In the river basins shown in [10],The blue water footprint is less than 20 in a given month for green.% of the natural runoff for that month Water is scarce or non-existent. Shortage and the basin completely fulfills the probable forecast for that month Requirement for environmental flow Table S4 contains the data. We show the connections between blue water footprint, Blue water, natural runoff, and environmental flow requirements show the Murray-Darling River Basin's availability. The Murray-Darling River's blue water imprint is visible. When water availability is at its lowest, the basin is at its biggest. The During a period of dry weather, the blue water footprint surpasses natural runoff. Length of time, which is enabled by the transient depletion of Storage of groundwater or surface water reservoirs. shows the number of basins and the amount of people that live in them of individuals who are dealing with minor, moderate, substantial, and severe water shortages scarcity for a certain amount of months each year In the river 223basins (55 percent of the basins examined) with a population of 2.72 billion people(The basins covered in this[9] study have a population of 69 percent of the overall population.)According to the research, the blue water footprint surpasses the supply of blue water. At least one month out of the year.

With 201 of these basins, there was acute water shortage for the whole population of 2.67 billion people. At least once a month throughout the year, emphasizing the fact that hen there is a significant water shortage, it generally means that the situation is dire. That greater than 40% of natural runoff is being absorbed in 35 years, there was serious water scarcity in river basins containing 483 million people. For at least half of the year, there will be shortage. When examining the social, economic, and political aspects of the situation, the severity and long-term effects of water shortage on the ecosystem are both significant.

### 3. CONCLUSION

We applied the estimated blue water footprint from to the estimated actual runoff from to estimate natural (undeleted) runoff in each river basin. As a result, we overestimate natural runoff in months when the blue water footprint partly depletes the basin's total yearly water storage (e.g., from aquifers) rather than decreasing that month's runoff. In the same way, we underestimate natural runoff during the months when water is being saved for later use. Furthermore, since such water should not be included in natural runoff, we overestimate natural runoff in those months and basins where a part of the water used originates from fossil (non-renewable) groundwater. However, actual data on the use of renewable vs. fossil groundwater on a worldwide basis is very difficult to come by; thus far, only approximate estimates based on models and assumptions have been produced The problem of water contamination was not addressed in this research.

The term "blue water scarcity" has been defined to mean "quantitative scarcity." Because agricultural, industrial, and residential return flows are not consumed, they have no impact on our scarcity metric. If one considers shortage of uncontaminated water, water scarcity is considerably greater in many areas than we propose. Despite these caveats, our estimates are a

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substantial improvement over prior water scarcity indicators and relative geographic and temporal patterns of water shortage across the world because they offer a more comprehensive evaluation of when and where water scarcity occurs. In addition, for two reasons, the estimated scarcity numbers for each river basin and month are conservative approximations of real shortage. For starters, by assessing water shortage at the basin level, we miss out on spatial differences within basins. Flows may be much depleted at the sub basin level than at the basin level, for example. Second, we assume an average year in terms of both blue water footprint and availability, although inter-annual fluctuations in many basins are significant, exacerbating the shortage issue in dry years[7].

**REFERENCE:**

1. P. M. Mohlotsane, E. Owusu-Sekyere, H. Jordaan, J. H. Barnard, and L. D. van Rensburg, "Water footprint accounting along the wheat-bread value chain: Implications for sustainable and productive water use benchmarks," *Water (Switzerland)*, 2018.
2. A. Mehmeti, A. Angelis-Dimakis, G. Arampatzis, S. J. McPhail, and S. Ulgiati, "Life cycle assessment and water footprint of hydrogen production methods: From conventional to emerging technologies," *Environ. - MDPI*, 2018.
3. A. M. Boulay *et al.*, "The WULCA consensus characterization model for water scarcity footprints: assessing impacts of water consumption based on available water remaining (AWARE)," *Int. J. Life Cycle Assess.*, 2018.
4. L. Menzel and A. Matovelle, "Current state and future development of blue water availability and blue water demand: A view at seven case studies," *J. Hydrol.*, 2010.
5. M. S. Tom, P. S. Fischbeck, and C. T. Hendrickson, "Energy use, blue water footprint, and greenhouse gas emissions for current food consumption patterns and dietary recommendations in the US," *Environ. Syst. Decis.*, 2016.
6. M. M. Mekonnen and A. Y. Hoekstra, "The blue water footprint of electricity from hydropower," *Hydrol. Earth Syst. Sci.*, 2012.
7. N. Ranchod, C. M. Sheridan, N. Pint, K. Slatter, and K. G. Harding, "Assessing the blue-water footprint of an opencast platinum mine in South Africa," *Water SA*, 2015.
8. Ľ. Jurík, T. Kaletová, and P. Halaj, "Water Management for Sustainable Growth Strategies," *Visegr. J. Bioeconomy Sustain. Dev.*, 2016.
9. M. Kummu *et al.*, "The world's road to water scarcity: Shortage and stress in the 20th century and pathways towards sustainability," *Sci. Rep.*, 2016.
10. J. Rockström, M. Falkenmark, L. Karlberg, H. Hoff, S. Rost, and D. Gerten, "Future water availability for global food production: The potential of green water for increasing resilience to global change," *Water Resour. Res.*, 2009.

## MORPHOGENETIC AND PHYSICAL PROPERTIES OF GRASSLAND- ALLUVIAL SOILS ALONG THE ARAL

Lazizakhon Akramovna Gafurova\*; Gulnaz Muratbayevna Shamuratova\*\*

\*Professor,  
Doctor of Biological Sciences,  
National University of Uzbekistan named after Mirzo Ulugbek,  
UZBEKISTAN

\*\*PhD Student,  
National University of Uzbekistan named after Mirzo Ulugbek,  
UZBEKISTAN

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### ABSTRACT

*The article examines the physical and morphogenetic properties of hardly meliorated soils for rice cultivation in Nukus district of the Republic of Karakalpakstan. In our field research experiment, morphogenetic properties of irrigated meadow-alluvial soils were studied, the soil was excavated up to groundwater, and the agrophysical properties of the soil were excavated to the groundwater and samples were taken from genetic layers.*

**KEYWORDS:** Soil Morphology, Agrophysical Properties, Aral Sea Region's Soils, Volume Weight, Specific Gravity, Porosity.

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### INTRODUCTION

Today, the increasing population of the world is driving an increment in demand for food. It is known that food products and raw materials required for the industry are basically grown in agriculture. Hence, incredible attention is paid to the improvement of agriculture, progressing the reclamation of irrigated lands, and the rational use of water resources.

The ripeness of irrigated soils depends on several factors, one of the foremost imperative of which is the physical properties of the soil. Physical properties of soils have a noteworthy impact on soil formation processes, soil fertility, plant growth, and development [1, pp. 533-540; 5]. In the analysis of the physical properties of the soil, its genetic properties must also be evaluated.

Studies on the study of physical properties of soils in Uzbekistan In the research of R. Kurvontayev [8, pp. 35-69], M.U. Umarov [11, pp. 53-70], S.A. Abdullaev [2, pp. 5-267], L.T. Tursunov [10, pp. 25-30], L.A. Gafurova [4, pp. 331-351], M.E. Saidova [5, pp.5-10], and others studied the physical-mechanical, water-physical and agrophysical properties of soils of desert and irrigated regions of the republic.

The process of formation, mineralization and outflow of groundwater in the Aral Sea region was studied in detail by N.V. Kimberg, M.I. Kochubey, S.A. Shuvalov [7, p. 132].

## THE MAIN FINDINGS AND RESULTS

Numerous studies have shown that the physical properties of soils are one of the leading factors determining its fertility [3, pp. 5-267; 9, pp. 62-72; 10, pp. 25-30].

Object and method of research: The research was conducted in selected key zones of difficult reclamation soils of the Nukus district. The work carried out within the field was carried out by comparative-geographical, genetic, historical-comparative methods of studying soils. In our field research test, in order to consider the morphogenetic properties of irrigated meadow-alluvial soils, the soil was excavated to groundwater, and tests were taken from genetic layers and their geophysical properties were also studied. The volumetric weight of the soil was determined by the N.A. Kachinsky method (using a barrel V-100 cm<sup>3</sup>), the specific gravity of the soil by the pycnometer method, and by calculating the porosity of the soil [6, p. 198].

Research results: At stationary point 1 in our field, more horizontal layers were found than at other stationary points, and this can be seen from the following data:

0-15 cm - the soil is gray, moist, moderately sandy, low-density, semi-rotten plant remains, gradually moving to the next layer with animal traces.

16-26 cm - gray, moderately moist, moderately sandy, low-density, with roots of plants and semi-rotten roots, the transition to the next layer is gradual.

27-37cm - moderately moist, moderately sandy, moderately dense, semi-rotten roots and traces of insects, sharp to the next layer, depending on the mechanical composition.

38-42 cm - moderately moist, heavy mechanical layers, grainy, strongly compacted, dark spots, and the transition to the next layer is sharp.

43-55 cm - moderately moist, heavy-grained, in the form of a donsomon, moderately compacted, the transition to the next layer, depending on the sharp humidity.

56-70 cm - moderately moist, heavy, low-density, the transition to the next layer is characterized by sharp humidity.

Groundwater is from 70 cm.

Stationary point 2 is slightly different from stationary point 1, the groundwater is relatively close and differs in morphological features.

0-23 cm - the soil is gray, moist, layered, with heavy mechanical composition, there are plate-like, soft, semi-rotten plant remains, roots and blotches, the transition to the next layer is gradual.

24-40 cm - wet, layered, heavy mechanical layers, plate-like, strongly compacted, plant roots and rust spots, gradually transition to the next layer.

41-50 cm - layered, heavy mechanical layers, plate-like, strongly compacted, the transition to the next layer is gradual.

51-60 cm - moderately moist, soft, the transition to the next layer is sharp.

Groundwater is from 60 cm.



Stationary point 3 differs from the above 1-2 stationary points in the thickness and color variation of the horizon.

0-28 cm - the soil is gray, moderately moist, heavy sandy, coarse, medium-dense, semi-rotten plant remains with roots and traces of insects, the transition to the next layer is gradual.

29-42 cm - moderately moist, moderately sandy, soft, with plant roots, transition to the next layer.

43-48 cm - high humidity, medium sand, soft, sharp to the next layer.

49-65 cm - high humidity, medium sand, soft, sharp to the next layer.

Groundwater is from 65 cm.

Stationary point 4 differs from other stationary points in mechanical composition, structure and the presence of new lesions.

0-29 cm - dark gray, moist pleasant, medium sandy, coarse, low-density, semi-rotten plant remains occur roots, the transition to the next layer is gradual.

30-41 cm - moderately moist, medium sandy, coarse, low-density, semi-rotten plant remains with roots and dark spots, the transition to the next layer is gradual.

42-48 cm - medium, heavy sandy, plate-like, moderately dense, with plant roots, transition to the next layer.

49-58 cm - high humidity, medium sand, soft, sharp to the next layer.

59-80 cm - high, medium sandy, soft, sharp to the next layer.

Groundwater is from 80 cm.

**TABLE 1 GENERAL PHYSICAL PROPERTIES OF MEADOW-ALLUVIAL SOILS OF NUKUS DISTRICT**

Intersection number	Depth of layer, cm	Volume weight, g / cm <sup>3</sup>	Specific gravity, g / cm <sup>3</sup>	Porosity, %
<b>Intersection 1</b>	0-15	1,59	2,74	41,9
	15-26	1,54	2,70	42,9
	26-37	1,56	2,72	42,7
	37-42	1,42	2,69	47,2
	42-55	1,26	2,65	52,4
	55-70	1,49	2,68	44,3
<b>Intersection 2</b>	0-23	1,36	2,67	48,9
	23-40	1,48	2,69	45,0
	40-50	1,35	2,66	49,2
	50-60	1,49	2,70	44,9
<b>Intersection 3</b>	0-28	1,33	2,66	50,1
	28-42	1,33	2,65	49,8
	42-48	1,56	2,70	42,4
	48-58	1,28	2,64	51,6
	58-65	1,28	2,64	51,6

It was observed that the general physical properties of irrigated meadow-alluvial soils distributed in Nukus district change under the influence of degradation processes, which affects soil fertility and agronomic properties. It was found that the specific gravity varies from 2.64 to 2.74 g / cm<sup>3</sup> along the profile, and the volume weight from 1.26 to 1.59 g / cm<sup>3</sup>. Depending on the specific gravity and volume weight, the porosity varied from 41.9% to 51.6%.

At the same time, difficult-to-reclaim irrigated meadow-alluvial soils in our study area are characterized by high specific gravity and low porosity due to low sand content, low humus content (Table 1).

## CONCLUSION

It was found that the morphogenetic and general physical properties of irrigated grassland-alluvial soils in the Nukus district of the Republic of Karakalpakstan vary depending on the nature of the soil degradation and soil formation processes. Based on the above data, it should be noted that the formation and development of soil horizons of the farm of Nukus district took place in connection with the constantly changing conditions of the environment. Due to the soil moisture regime and the occurrence of difficult reclamation soils, it has affected the composition and structure of the vegetation cover.

According to research conducted in Nukustuman of the Republic of Karakalpakstan, it has been observed that the physical properties of the soil change in rice fields due to the impact of the irrigation system and degradation processes.

It was found that the morphogenetic indicators of soil cover of Nukus district are directly related to the relief features of the area, soil-forming rocks, vegetation cover, climatic conditions, location of groundwater levels, and salinity of soils.

## REFERENCES

1. Gafurova LA, Saidova ME, Ergasheva OX, Kadirova DA, Dauletmuratov MM. Modern ecological - biological condition of salt- affected soils in the Aral Sea area. *International Journal of Advanced Science and Technology*. 2019;28(15):533-540.
2. Abdullaev SA. Agrophysical foundations of reclamation of saline soils in the lower reaches of the Amu Darya: Abstract. Diss. Doctor of Agricultural Sciences. Tashkent. 1995. pp. 5-267.
3. Abdullaev SA. Agrophysical foundations of reclamation of saline soils in the lower reaches of the Amu Darya: Diss. Doctor of Agricultural Sciences. Tashkent. 1995. pp. 5-267.
4. Gafurova LA. Soils formed on tertiary red-colored sediments, their ecological state and fertility. Diss. Doctor of Biological Sciences. Tashkent. 1995. pp. 331-351.
5. Saidova ME. Influence of soil-ecological factors on changes in the enzymatic activity of saline soils in the Southern Aral Sea region. *J. Scientific Review. Biological Sciences*. 2019;(3):5-10.
6. Kachinsky NA. Mechanical and micro-aggregate composition of the soil, methods of its study. Publisher: Academy of Sciences of the USSR. 1958. p.198.
7. Kimberg NV, Kochubei MI, Shuvalov SA. Soils of the Karakalpak ASSR Publishing House "Uzbekistan". Tashkent. 1964. p. 132.

8. Kurvontoev R, Rizaev FR. Physical properties of soils. Soils of Khorezm region. "Fan". Tashkent. 2003. pp. 35-69.
9. Turapov I, Kurvantaev R, Kutbiddinova O, Pirakhunov A. Physical and water properties of irrigated soils in the right-bank part of the Amudarya delta. Collection of reports and abstracts of the III Congress of Soil Scientists and Agrochemists. Tashkent. 2000. pp. 62-72.
10. Tursunov LT. Physical degradation of soils in the lower reaches of the Amu Darya in the process of desertification. Abstracts I delegate congress of soil scientists of Uzbekistan. Tashkent. 1990. pp. 25-30.
11. Umarov MU. Soil physics. Tashkent: Mehnat. 1988. pp. 53-70.

## THE BLOCKCHAIN AND SOCIALISM: A REVIEW PAPER

Dr Vipin Jain\*

\*Professor,  
Department of Finance & Marketing,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- vipin555@rediffmail.com

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### ABSTRACT

*Bitcoin (BTC) is referred to as cryptocurrency since it is a cryptographic-based type of electronic cash. It is often referred to as libertarian. However, the blockchain technology that underpins Bitcoin has characteristics that make it perfect for socialist ideologies. The current literature supports the Libertarian perspective by emphasizing on Bitcoin's potential to circumvent central authority and offer anonymity; seldom is blockchain technology's capability for decentralized transparency and auditability examined in favor of a Socialist paradigm. The blockchain, libertarianism, and socialist ideologies are all examined in this study. It then delves into socialist forms of public ownership, as well as the blockchain's inherent cooperative characteristics, which make it perfect for enabling socialist societies. In conclusion, this paper contends that blockchain technologies are not just libertarian tools, but they also benefit socialist government.*

**KEYWORDS:** *Anarchism, Bitcoin, Blockchain, Cryptocurrency, Fiat Money, Libertarianism, Marxism, Socialism.*

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### INTRODUCTION

Bitcoin (BTC) is referred to as cryptocurrency since it is a cryptographic-based type of electronic cash. It has risen to popularity since its start in early 2009, not least in terms of market capitalization; at the time of writing, its total market capitalization was over US \$6 billion [1]. Furthermore, governmental organizations are starting to investigate the blockchain technology that underpins BTC because certain of its characteristics, as we will describe below, may have consequences that go beyond economics and into the social, political, and humanitarian realms. This study looks into that possibility and sees whether blockchain has any ideological inclinations that go beyond the typical Libertarian narrative, which argues for individual liberty and little government interference in people's lives. The paper specifically inquires as to whether the technology is directly relevant to Socialism, an economic philosophy and style of government that promotes communal ownership.

To begin, this paper provides an overview of Bitcoin (BTC) and blockchain technology [2]. It then goes through libertarian philosophy before looking at how it relates to blockchain. Then we talk about socialist ideology and how it might be applied to blockchain technology. This enables us to see whether BTC and blockchain's fundamental ideas are well-suited to supporting the social and political ideologies mentioned. The word “state” is used in this paper to refer to an organized political entity that constitutes a single governing system. Furthermore, parliament is the legislative, elected branch of government in the United Kingdom, and parliamentary sovereignty is a premise of the United Kingdom constitution. It establishes Parliament as the highest legal authority in the United Kingdom, with the power to enact and repeal any law. As a result, we use the words sovereign, state, and government interchangeably in this paper.

**15.1. Bitcoin:**

In a 2008 whitepaper, Satoshi Nakamoto suggested BTC as an implementation of electronic currency that would not need bank authorization. The mechanism Nakamoto outlined was a peer-to-peer (P2P) network with the primary goal of propagating transactions that required validation to all ecosystem members. A transaction, which includes certain inputs that translate to one or more outputs and operates similarly to individual lines in a double-entry bookkeeping ledger, is therefore a basic component of BTC. BTC owners notify the network that they have transferred ownership of part of their coins to other users via transactions. Those new owners may then initiate a new transaction that authorizes the transfer to continue. As a result, a blockchain, or a chain of ownership, is created.

BTC transactions are explained by Antonopoulos using the example of Alice purchasing a cup of coffee from Bob's coffee business. Alice uses a BTC wallet on her smartphone to spend BTC with Bob (there are a number of wallets to choose from). She does so by scanning a two-dimensional barcode, often known as a QR code, on Bob's BTC equipped point-of-sale (POS) system's payment request (again, several POS systems exist). This includes Bob's final destination location, the amount Alice should pay, and the trade's textual description. The transactions are shown in Figure 1 below.

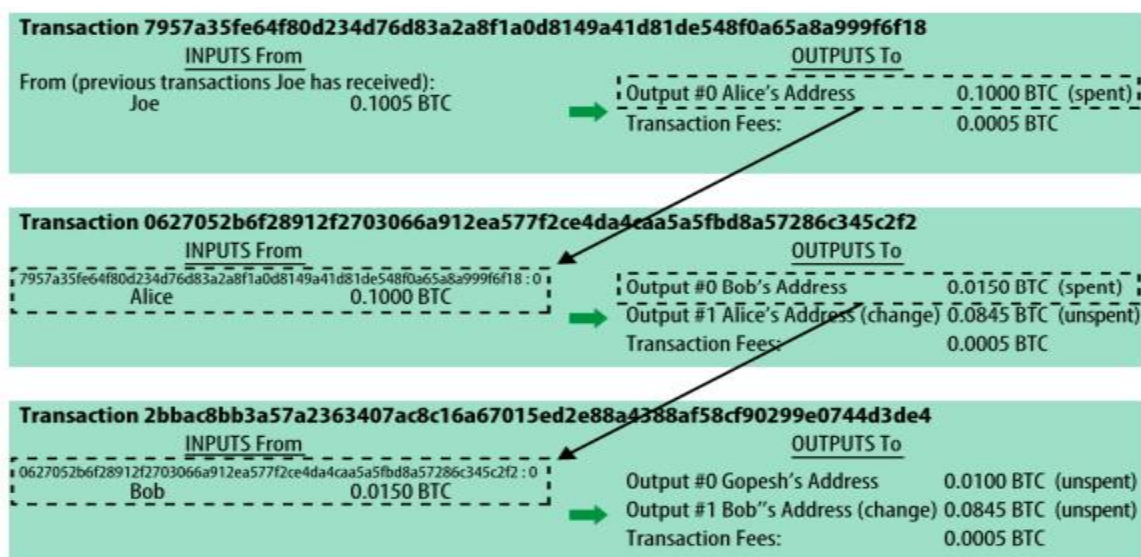


Figure 1. Bitcoin (BTC) transaction [3]

### **15.1.1. Blockchain Technology:**

Because it is an immutable record of all Bitcoin (BTC) transactions that have ever occurred, the blockchain is an important component of Bitcoin (BTC). Because BTC is a GitHub project, any developer may fork the code and build their own cryptocurrency implementation. Indeed, BTC has generated a collection of rival blockchain technologies known as altcoins, including as Ethereum, Ripple, Litecoin, and Stellar, since its debut [4], [5]. Although various methods of consensus or optimizations are used by different cryptocurrencies, they all utilize the same basic methodology based on a decentralized P2P network, which implies they have no single point of failure provided the Internet is operational. The technology, according to the authors of a study for the UK government, is basically an asset database that can be shared over a network of different locations, regions, or organizations. The blockchain, on the other hand, has much more possibilities than a traditional asset database because it contains algorithms that offer a safe method for electronic cooperation that does not depend on a central authority to trust the assets. This includes smart contracts, which are blockchains' capacity to run autonomous scripts that may represent verifiable application logic and aid in the automation of a system's rule set. Furthermore, blockchain technology is a distributed network of transactions that includes recorded modifications and uses public-private key encryption to manage write rights. As a result, the blockchain is a trustworthy, shared public record that everyone can examine but that no single party can control. Because no central control means individual liberty, those are the characteristics of blockchain that are generally seen as libertarian, as shown below. However, we shall demonstrate that the mechanics of blockchain technology are well adapted to socialist ideology.

### **15.1.2. Bitcoin Mining:**

The concept behind BTC validation is that network validators must provide evidence that they have solved a tough cryptographic challenge, known as a proof of work (PoW). The procedures required to create a BTC-based blockchain network are defined by Nakamoto in his initial paper on BTC:

- i.** New transactions are broadcast to all nodes.
- ii.** Each node collects new transactions into a block.
- iii.** Each node works on finding a difficult proof-of-work for its block.
- iv.** When a node finds a proof-of-work, it broadcasts the block to all nodes.
- v.** Nodes accept the block only if all transactions in it are valid and not already spent.
- vi.** Nodes express their acceptance of the block by working on creating the next block in the chain, using the hash of the accepted block as the previous hash

### **15.1.3. Bitcoin's Energy Use:**

PoW is a hashing method based on the SHA256 algorithm that generates a cryptographic hash with a value smaller than a target nonce. The amount of CPU time it takes to calculate the PoW for a mined block is proportional to the number of zeroes required. The BTC network analyzes timestamps and determines the amount of time it took to create 2106 blocks; ideally, 1,209,600 seconds have passed, equating to one block being created every ten minutes. The creation of



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blocks, on the other hand, is based on a random Poisson process in which many or few blocks may be discovered in a given hour. If BTC finds that the construction of 2016 blocks takes less than 1,209,600 seconds, it increases the hashing difficulty. If creation takes longer, however, the difficulty is reduced. As more processing power is added to the BTC network, the difficulty level rises inexorably. The BTC difficulty, for example, is 163,491,654,909 at the time of writing. The difficulty of the first BTC was 1. This implies that mining a BTC today is approximately 164 billion times more difficult than mining the first.

## 16. DISCUSSION

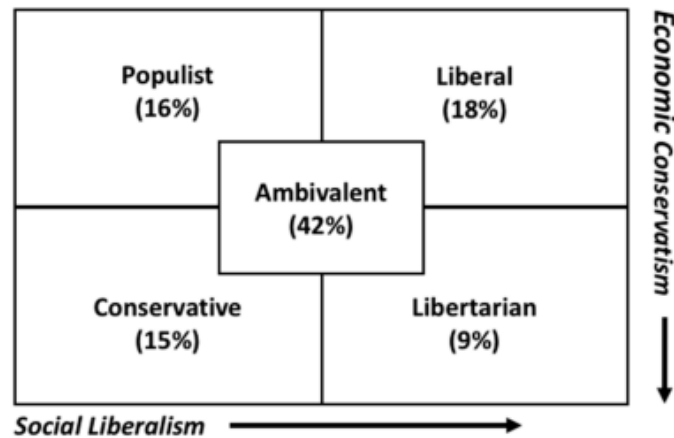
### 16.1. Libertarianism and Money:

The right to private property, freedom of speech, freedom of religion, legal equality, and moral autonomy are the main political principles of a Libertarian [6]. Indeed, the classical libertarian viewpoint favors individual liberty above group judgment. As a consequence, there is a profound distrust of the state and its authority, as well as a conviction that society should be free of government-backed financial institutions. Libertarians, in particular, would argue that banks' risks should not be borne by the government. Indeed, a Libertarian thinks that the government's role should be limited to enacting laws that safeguards private liberties.

Because money is based on a government guarantee that its worth would be returned by fresh notes of equal value, the connection that money establishes between trust and its issuing power is critical, according to Martin. He thinks the Sovereign has unique benefits as a money issuer, including (1) conducting by far the largest number of economic transactions; (2) having political power; and (3) having legitimacy. In democratic countries, the people who utilize the money issued have conferred this power on the sovereign. As a result, Martin characterizes confidence in the Sovereign's legitimacy as ideological and even spiritual. The sovereign has delegated the power to issue money to central banks in contemporary economies, such as the Bank of England in the United Kingdom, the Federal Reserve in the United States, and the European Central Bank (ECB) for the Eurozone. The Libertarian Party in the United States, on the other hand, wants the government to stop its inflationary monetary policy. They also think fiat money should be phased out. They think that money should have a subjective value given to it by individuals rather than governments, and that people should be free to trade whatever they choose. It seems that the Oxford English Dictionary alludes to the American version of Libertarianism when it defines it as an extreme laissez-faire political ideology supporting only minimum governmental interference in individuals' lives.

Libertarian ideas on individual liberty are firmly rooted in American culture. Their national song declares the United States to be "the country of the free." Although hardline Libertarians believe that government control of money is incompatible with personal liberty: politicians have often labored under the delusion that money is something they can create and manipulate, when, in fact, it is the spontaneous institution of a free society and will continue to evolve in ways beyond their grasp, U.S. Libertarians, who tend to take a more moderate approach, believe that government control of money is compatible with personal liberty [7]. This is in favor of free-market capitalism guided by the government. Indeed, Adam Smith, an 18th-century economist who continues to have a significant influence on Capitalist thought, tended toward the Libertarian belief that social good is the result of the free reign of private self-interest: we expect our dinner, not from the benevolence of the butcher, the brewer, or the baker, but from their

regard to their own interest. As a result, a conservative-liberal split in the United States may moderate a Libertarian's political beliefs, as illustrated in Figure 2.



**Figure 2. The conservative-liberal divide of U.S. Libertarianism [7]**

### 16.2. Socialism and Money:

Socialism is a broad word that refers to a variety of political ideologies. Marxism, Utopian Socialism, and Anarchism are the three main branches. Despite significant differences, they all share egalitarian ideals, non-hierarchical societal structures, and different types of social ownership in which a community owns the means of production and distribution [8]. Marx believed that Socialism would be a logical extension of the current Capitalist system, which he saw as founded on conflict because of the antagonism between those who work but own nothing and those who possess the means of production. Marx thought that eventually, the world's workers will revolt and set themselves free [9]. Following that, a socialist society would develop, in which producers would have control over production and products and services would be produced for the benefit of society rather than for profit. Barrington describes a socialist state as the ragged treasured philanthropists, where workers devote themselves to art or science, and others will offer their services to the community as supervisors and managers, and the State will always be glad to hire all of those who are interested in helping in the Great Work of production and distribution. From everyone according to his abilities, to each according to his needs, Marx said. The coordination of the entire economy through central State planning is central to Marxism: National centralization of the means of production will become the natural foundation for a society composed of an association of free and equal producers acting deliberately according to an overall and rational plan.

### 16.3. Socialism, Bitcoin and Blockchain Technology:

Interesting because it has characteristics that may enable for non-hierarchical self-organization and peer-to-peer cooperation inside a communitarian network structure, Scott says of blockchain [10]. The argument is that Nakamoto's BTC architecture, which is built on a community of validators producing cooperative consensus, has characteristics that are compatible with socialist philosophy. Scott specifically inquires as to whether blockchain systems can be utilized to offer governance for large-scale cooperation in the Anarchist tradition, which relies on the individual's social and interdependent nature to build smaller-scale, egalitarian institutions. Indeed, some

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writers are delving into the technology's socialist philosophy as well as the concept of blockchains, which allow cooperation via distributed autonomy. Swan, for example, claims that blockchain has democratization potential, using the idea of decentralized groups as an example. The blockchain, according to Wright et al., allows collective organizations and social institutions to become more flexible and encourage more involvement, possibly changing how corporate governance and democratic institutions function [11]. According to Valkenburgh et al., blockchain-based smart contract-enabled distributed autonomous groups represent some kind of communal or non-profit interest [12]. Valkenburgh and his colleagues share the Anarchist distrust of large-scale hierarchical organizations, considering them to be flawed and inefficient. Indeed, they claim that blockchain's mix of digital currencies, smart contracts, and distributed data storage would bring in whole new decentralized organizations that establish safe, auditable governance using source code.

Furthermore, digital assets native to blockchain may be utilized in a socialist society if it is considered acceptable; they do not have to be used for money. They might, for example, be used as Marxist labor credentials. According to Fairfield, blockchain technology has tamper-resistant algorithms for establishing public, cryptographically secure ledgers of property rights, but the immutable audibility mechanisms of blockchain technology may be used to audit the creation of products as well. This would enable Anarchist societies to form since the blockchain could be used to audit the allocation of goods and services to those in need. In the United Kingdom, for example, the current government is charging residents in social housing for what they consider to be extra beds. The legislation has sparked debate and numerous accusations that the tax is unjust; for example, one family successfully challenged the charge after caregivers utilized their extra bedroom to assist the family in caring for their kid. Imagine an Anarchist community backed by blockchain smart contracts that codify what society considers fair, and where the family above was granted their additional room without having to go to court, on the premise that their kid has a serious handicap.

## 17. CONCLUSION

The goal of this paper isn't to advocate one political ideology over another; rather, it's to explore how blockchain may be used to support many social ideas. Although blockchain technology is often characterized as a libertarian ideal, many writers and academics provide a definition of the technology that differs significantly from libertarianism's conventional depiction. They point to blockchain's cooperative consensus-driven cooperation paradigm and describe distributed autonomous groups with socialist overtones. According to our research into cryptographic technologies such as blockchain, some anarchist goals are feasible, if not inevitable. Indeed, although BTC has characteristics that promote libertarian principles, much about blockchain technology and its growth is directly relevant to different kinds of socialism, according to this study.

## REFERENCES

1. A. Xu, M. Li, X. Huang, N. Xue, J. Zhang, and Q. Sheng, "A blockchain based micro payment system for smart devices," *Int. J. Des. Anal. Tools Intergrated Circuits Syst.*, 2016.
2. A. Urquhart, "The inefficiency of Bitcoin," *Econ. Lett.*, 2016, doi: 10.1016/j.econlet.2016.09.019.

3. M. Ober, S. Katzenbeisser, and K. Hamacher, "Structure and anonymity of the bitcoin transaction graph," *Futur. Internet*, 2013, doi: 10.3390/fi5020237.
4. S. K. Kim, J. Mason, Z. Ma, A. Miller, S. Murali, and M. Bailey, "Measuring ethereum network peers," 2018, doi: 10.1145/3278532.3278542.
5. Litecoin.info, "Litecoin," *litecoin.info*, 2018. .
6. J. Brennan, "A libertarian case for mandatory vaccination," *J. Med. Ethics*, 2018, doi: 10.1136/medethics-2016-103486.
7. "Libertarianism: what everyone needs to know," *Choice Rev. Online*, 2013, doi: 10.5860/choice.51-0522.
8. R. Llorente, "Marxism, Socialism and Democracy," *Dialogue and Universalism*, 2018, doi: 10.5840/du201828343.
9. P. Chattopadhyay, "Lenin reads Marx on socialism," *Econ. Polit. Wkly.*, 2012.
10. B. Scott, "How Can Cryptocurrency and Blockchain Technology Play a Role in Building Social and Solidarity Finance?," *United Nations Res. Inst. Soc. Dev.*, 2016.
11. A. Wright and P. De Filippi, "Decentralized Blockchain Technology and the Rise of Lex Cryptographia," *SSRN Electron. J.*, 2015, doi: 10.2139/ssrn.2580664.
12. "Distributed Collaborative Organisations." [http://bollier.org/sites/default/files/misc-file-upload/files/Distributed NetworksandtheLawreport, Swarm-Coin Center-Berkman.pdf](http://bollier.org/sites/default/files/misc-file-upload/files/Distributed_NetworksandtheLawreport_Swarm-Coin_Center-Berkman.pdf) (accessed Sep. 24, 2018).

## AN OVERVIEW ON RELATIONS BETWEEN LAW AND LITERATURE

**Yogesh Chandra Gupta\***

\*Assistant Professor,  
Department of Constitutional Law,  
Faculty of Commerce, Management & law,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email id- Cognitor.Yogesh@Gmail.Com

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### ABSTRACT

*Morality, together with narrative, is the common foundation for both literature and law. Literature sanitizes social moralities, while law upholds constitutional morality. When defined in terms of woman's agency, however, the juxtaposition of constitutional and social morality seems to be incompatible. However, since they are both accountable for representing social reality, they complement each other at the same time. They act as commentators and mirrors of societal thought. As a result, establishing a complimentary connection between law and literature is critical. In terms of women's agency, this connection would assist women in reclaiming their voices and taking a recursive action by using rules that were previously employed in writing to construct a narrative. This convergence would result in a shift in awareness, and both disciplines would be accountable for constructing active narratives of women's agency. The literature's reaction not only sensitizes individuals, but it also leads to positive measures in terms of utilizing legislation to bring about social change. This article will concentrate on establishing a complimentary connection between law and literature in order to achieve equality in the context of reframing women's agency from both a legal and literary standpoint. In this environment, the emphasis of this article will be on short tales written by women that promote awareness and encourage reflection. It's fascinating to seek such an understanding of the reader's reaction, which is not just psychological but also social when it produces action and redefines agency. As a result, this study will try to examine literary works via the lens of legal narrative, making this exercise unique.*

**KEYWORDS:** *Constitution, Law, Literature, Morality, Relations.*

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### 1. INTRODUCTION

The topic of law and literature arose in the 1970s, and although this course is scrutinized, attorneys, students, literary critics, and ordinary readers have praised this unionization. The relationship between the two sectors, as well as the extent to which they should affect one another, is still up for debate. Perhaps this paradox arises from the difference between constitutional and social morality, where law concentrates on preserving constitutional morality

and literature depicts social morality, yet we ostensibly fail to see that social realities shape not just literature but also our laws. Many critics and legal academics believe that both law and literature are founded on language, but their substance and context may differ, sparking new arguments[1].

Their similarity, however, is based on associative storytelling. Although it is difficult to describe associative narratives in this context, I would want to investigate this idea while decoding pieces of literary works that include legal recursive activity. Narratives often have an effect on our psyche, and literature may assist in bridging the gap between what exists inside us and what exists outside of us. In both legal and literary sense, the scope of truth is restricted. In both disciplines, perspectives and interpretations determine what truth is. However, legal logic is also semantic, and it is under-represented[2]. The short tales selected for this presentation will attempt to strike a balance between legal reasoning and literary reflection. We criticize too much these days to grasp the truth, and although criticism may lead to transformational action, it also causes restlessness in both the critic and the criticized, resulting in the separation of reality and uniqueness without tangible results. To reconstruct reality, it is thus necessary to bridge the gap between the person and others. We are oblivious to the fact that we are all part of the same system and energy network. The same intellect that produces, reads, and comprehends literature also interprets and makes laws[3]. Even though their situatedness seems to vary depending on the situation, the mind articulates the context. It's also essential to consider how we're explaining the setting, whether in literary or legal writings. However, we cannot explain this by dismissing the importance of literature in comparison to law, or vice versa. Rather, it would be beneficial to consider how various areas may come together to effect change on an individual's and community's conscious levels[4].

Community should be a space for increasing awareness; instead of reflecting hierarchies, it should be a place where we may all become Buddhas and engage in reciprocal retrospection and reflection. Instead of criticizing, we should first reflect on our behavior and make appropriate adjustments. It is important to question because if we do not question, we are supporting the same system that we are attempting to criticize. Merely criticizing will not create tangible results; instead, adopting acts in accordance with self and others, while seeing others as a part of oneself, will. Biases in law and literature represent a de-configuration of self from others, and this deconstruction further contributes to women's subordination, since women are seen as the "other" in this patriarchal system. As a result, it is critical to integrate oneself and others in order to create a community that is willing to examine its own traditions without fear of retaliation. In this article, I will attempt to focus on the interconnectedness of law and literature in order to produce tangible results in the social aspects of community reconstruction based on awareness.

It may seem utopian, but it may be one of the realistic answers for enhancing women's autonomy in the workplace. I think that in order to provide more room for women's opinions to be heard, community members must become more aware of the fact that a woman's expression is not seen as an active reciprocation. Their facial expressions are considered passive. As a result, it is important to emphasize how women understand law via literature and how they utilize literature as one of the instruments to increase awareness among themselves about the use of law to explain their own self-justification. In law and literature, self-regulation of utterances leads to partial treatment of voices[5].



As a result, in legal and literary tales, disjuncture between self and others leads to adjudicated predicaments. To reduce this gap, we should be willing to accommodate people inside ourselves. To bridge the distance between the self and others, I would use Erich Fromm's psychoanalysis from a Zen Buddhist viewpoint. I would use associative narratives as the core method to reconstruct the relationship between self and others in order to understand the link between law and literature. Associative narratives is a concept that focuses on the concept of total aliveness and the synthesis of subjectivity and objectivity. This method of associated narrative is derived from Zen, which tries to see the object as it is, without distortions, which leads to the highest objectivity, but I would not investigate the relationship between law and literature by ignoring their differences. As a result, while associating them with women's agency, I would deconstruct the language of selected literary texts using Zen to mitigate differences between them. I chose two short stories from the anthology "Muffled Moans Unleashed" as examples for this paper.

Using associative narratives to reinterpret law and literature could help us understand their commonalities in a way that restores balance to the existing social system. In order to enlighten its citizens, a society must be balanced. According to Fromm (1970), full awakening to reality is linked to achieving a productive orientation in which "there are no veils that separate me from the 'not me.'" As a result, the object is no longer an object; it no longer stands against me, but rather alongside me. From a feminist perspective, productive association would dilute the hierarchies that try to repress women's expressions, and these subjections lead women to not exercise their agency. If I define agency from a Zen perspective, it is about channeling one's own energy to facilitate interaction with one's own self in order to comprehend the self's representation. As a result, it's critical to comprehend the relationship between the self and the integration of energies with the self. This contact is closer to natural laws, which are still prohibited, but it is the truth, which has led to partnerships on a variety of levels, including one between law and literature[6].

## **2. DISCUSSION**

### **2.1 The Importance of Gathering Literature and Law:**

Posner claims that law is one of the most frequent topics in literature, leading to a closer connection between the two disciplines. Even if the author is a lawyer or a law enthusiast, law is often portrayed in literature as a metaphor rather than a "thing of interest in itself" (Posner, pp.41). According to Ellis (1974), thinking about a legal book or play and resolving larger problems of legality, governance, and justice is very difficult in and of itself, since literature is a work of imagination while law is concerned with social reality.

Rather, legal experts are not the only ones who can ponder on moral problems. Although literature may address such problems and raise awareness, most of the work on the relationship between law and literature overlooks this associative narrative. Posner believes that law is dramatic in nature and leads to conflicts, but that law attempts to resolve conflicts by providing metaphors to authors, and that literary texts frequently convert legal trials into "ready-made dramatic technique," which can lead to increased awareness among people from various groups[7].

Laws are often enacted to remedy socioeconomic inequalities, although most people are unaware of them. As a result, literary works may be used to generate knowledge of specific rules that individuals can apply. Literature has a wide audience, and it may assist women in exercising

their conscience and using the law to protect themselves from abuse. Atwood (1985) highlighted books such as James Gould Cozzen's *The Just and the Unjust*, claiming that it was a well-written novel on law that gave the impression that the author was a lawyer, despite the fact that Cozzen had no legal background. Understanding the law, in this case, led to the production of a masterpiece as well as the resolution of moral problems. While writing such a book, the conflicts between constitutional morality and political self are taken into account. By representing and placing self within the system of networking of energies that might be merged with self, the relationship between law and literature produces a balance in society. For eliminating prejudice and difference, Smart (1995) said that we must be able to imagine a society without gender.

As a result, I intended to use Zen philosophy to demolish the differentiation culture. We frequently fail to appreciate the real essence of our item when we distinguish. As a result, it's critical to consider whether we're viewing women as women or as a woman should be. Zen philosophy, according to Fromm (1970), would see the thing as it is rather than as it should be. Smart also views legislation as a whole rather than breaking it down into its constituent parts (Price, 2015, pp.97). Fromm's psychoanalytic framework also considers integrating the self and other as a single energy to bring about internal change, which is equally essential for establishing laws. Laws would otherwise generate referential disparities.

Second-wave feminism brought up the subject of anti-woman domestic legislation, and radical feminists created terminology that had never been used in the public arena, increasing public awareness. If I see these laws through the eyes of a Zen feminist, I would question a society that has seldom concentrated on spiritual enlightenment of its citizens, leading to the development of laws that are inherently conflictual: legislation, as a means for resolving disputes, is inherently conflictual. Overemphasis on criticism, according to Fromm, victimizes the concept that keeps natural laws responsible. Because humans prefer to think that there is a specific truth about human nature, yet there is no definition of human nature, the principle of non-accreditation of human nature is often broken. It is entirely reliant on survival circumstances and processes. As a result, literature is a portrayal of human brains attempting to live in various circumstances[8].

It may be frightening to highlight relative facts since people are frequently preoccupied with determining the certainty of a single truth. People underestimate exaggeration as a result of positivism and objectivism. Inward closeness lacks vision, and we establish rules based on a society that only existed because we thought it did. Literature reproduced the organization we call society, and there are notional norms to follow in order to be a part of this civilized society, leading to the development of mandates we call laws. The importance of the literature given above is only applicable to social aspects, while we will not be able to address societal issues if we do not seek solutions inside.

Each person is a part of society, and each person is accountable for fostering a society that is focused on Enlightenment. Neutrality does not imply focusing only on one topic, but it is one method of comprehending both sides of the coin. However, feminists have criticized neutrality by citing positivism, but I would like to argue that neutrality, as defined by Zen philosophy, is about creating a balanced view of the object without attaching mere signifiers, because attaching signifiers leads to the creation of stereotypes, which perpetuates inequalities[9].

Through this research, I want to highlight the need of forging a positive connection between law and literature based on Fromm's psychoanalytic framework, which will lead to the

deconstruction of traditional 'othering' beliefs. Because the self recognizes its environment from an egoist viewpoint, it is critical to consider who the other is. Othering is nothing more than a connoted impression that we prefer to dismiss. When it comes to gender, the notion of othering leads to a deficiency in exercising agency. As a result, the main goal of this research is to go beyond binaries in order to rethink women's agency. Agency is not a materialistic concept; rather, it is about identifying oneself through channeling the energy inside oneself without using othering as a reference point. It is essential to engage critically with othering as a mental process that develops ideologies of subordination to fulfill its ego and survival needs[3].

## **2.2 Using Legal Analysis to Analyze Literature:**

I used two short tales to demonstrate how female-authored literature raises women's awareness of the need to resist injustice via legal means. To dissect the language of the tales, I would utilize narrative analysis.

In Anupama Dalmia's debut tale, "The Vicious Circle," Meena accuses her husband of sexually abusing her housemaid's 11-year-old daughter under the POCSO Act. Sundar, Meena's husband, wakes her up and says, "Meena, get up!" After you passed out, the cops arrived to my house to arrest me. They are in possession of a search warrant. They claim that I sexually assaulted Radha and that I violated the POCSO Act. That brat had the guts to file a complaint against me. You come in and inform the cops that they are not allowed to detain me in that manner.

Sundar is attempting to get Meera to admit that he has done nothing wrong, and he is as upset to learn that Radha has filed a complaint against him. He also attempts to enslave Meera and Radha in order to build his poisonous masochism. As a result, adding a signifier such as "that bitch" subjected a woman to a male gaze capable of disintegrating herself via conceptualization of the other. Othering occurs on two levels in this story: on the basis of gender and on the basis of social status. Sundar was under the impression that sexually assaulting a housemaid would result in no repercussions, as is customary. The process of othering normalizes the violence that leads to self-destructive behavior. As a result, it's more essential to consider who a woman is than to imagine who a guy should be. As Fromm has said, reality should be understood for what it is rather than for what it should seem to be[2].

Shows how misogynists like Sundar, who believe women don't have views, need both an internal agency and a support structure to confront them. The law serves as a support system here, but internal disputes must be addressed in order to combat gender and class contradictions. To utilize law, the fragmented self must merge with the forces around them. Radha would not have been able to stand up to Sundar without the help of Meena. The tale itself exemplifies how women may assert their autonomy in the face of societal problems. As a result, literature provides a mental space that may aid us in thinking and acting appropriately. If the reader is unfamiliar with the POCSO Act, this tale will assist them get a better understanding of it, as well as raise awareness about child sexual abuse and the legal options available to them. As a result, we can see how literature and law may work together to produce a healthy society that values enlightenment[10].

## **3. CONCLUSION**

The tales showed that writers often use fragmented representations of reality. Literature is about creating fractured realities by reflecting the civilization that our thoughts have created.

Everything that occurs in the mind has meaning and value. The images we see lead to the deconstruction of reality, yet the images we see in our heads do not reflect reality. They are ideal pictures that have attempted to be seen without much thought. The act of thinking and non-thinking caused the self to disintegrate, and the self-formed a conflictual relationship with itself as a result.

We will not be able to comprehend the essence of truth until and until we embrace awareness, as Fromm has argued that truth can only be seen if there is no distinction between me and not me. As a result, although literature and law are two distinct fields, associative narratives connect them to produce a holistic picture in the minds of readers, which not only provides insights but also empowers people to exercise their agency. Their associative story provides a significant area for progressive conversations that may assist women in reorganizing themselves in order to connect with energies and integrate them with their own selves. Literature helps in thinking, and legislation aids in doing, but it is always necessary to consider before acting. Overemphasizing the act of thinking may sometimes result in problems. As a result, we must direct our thoughts toward becoming the Buddha.

Although I am unable to speak specifically about women's agency, women's literature is an example of agency exerted by women for women. The term "associative narrative" refers to a story that goes beyond binaries and attempts to reconcile the disparities we've made in our heads. Because there is no ultimate human nature, there is plenty of room to apply this idea to comprehending the nature of human nature. We alter our behavior in response to changing circumstances and requirements.

As a result, Zen philosophy may be able to assist us in locating our fragmented selves and protecting us from the process of othering that has resulted in discriminating and distinction. It is important to recognize that we are all the same, even though we are different, since our existence is maximized by our interactions with energies that may become a part of the self.

## REFERENCES

1. T. Spijkerboer, "Gender, Sexuality, Asylum and European Human Rights," *Law Crit.*, vol. 29, no. 2, pp. 221–239, 2018, doi: 10.1007/s10978-017-9219-2.
2. C. Nicholson and I. Ward, "Law and Literature: Possibilities and Perspectives," *Mod. Lang. Rev.*, 1998, doi: 10.2307/3733638.
3. T. Nagy, "Law, literature and intertextuality," *Acta Juridica Hungarica*, 2012, doi: 10.1556/AJur.53.2012.1.6.
4. K. Dolin, *Law and literature*. 2018.
5. M. Škop, "Law and Literature – a Meaningful Connection," *Filoz. Publiczna i Eduk. Demokr.*, vol. 4, no. 1, pp. 6–20, 2018, doi: 10.14746/fped.2015.4.1.1.
6. E. S. Anker and B. Meyler, *New directions in law and literature*. 2017.
7. A. Bianchi, "Terrorism and armed conflict: Insights from a law & literature perspective," *Leiden J. Int. Law*, 2011, doi: 10.1017/S0922156510000567.
8. A. Schur, "Flourishing or perishing? Law and literature airbrushed," *Law Lit.*, 2014, doi: 10.1080/1535685X.2014.888189.

9. T. G. Mayerhöfer, H. Mutschke, and J. Popp, “Employing Theories Far beyond Their Limits—The Case of the (Boguer-) Beer–Lambert Law,” *ChemPhysChem*. pp. 1948–1955, 2016, doi: 10.1002/cphc.201600114.
10. R. Ginsberg, “The Law as Literature,” *Soc. Philos. Today*, 1991, doi: 10.5840/socphiltoday1991642.

## AN OVERVIEW OF EMERGING DEVELOPMENT IN GREEN TECHNOLOGY

Dr. S.R.Ali\*

\*Professor,  
Department of Civil Engineering,  
Faculty of Engineering,  
Teerthanker Mahaveer University,  
Moradabad, Uttar Pradesh, INDIA  
Email Id- drsrli.engineering@tmu.ac.in

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### ABSTRACT

*The application of science to human requirements is technology. Technology the present technological advancements are speeding to the point where they may irreversibly damage our world. Every technology has benefits and drawbacks, but they choose to overlook the negative consequences that are causing significant disruptions in human life and animal ecosystems. As a consequence, green technology seeks to preserve the environment via the utilization of never-ending natural energy. It also helps to reduce the impacts of air pollutant emissions by replacing garbage with refurbished products, which contributes to vegetation and greening. There are only a few divisions. They all have no harmful consequences and will therefore be learnt by future generations. It is only because we harm this planet that we are responsible for saving. In addition to the green technical benefits, this research demonstrates value.*

**KEYWORDS:** *Green Building, Green Energy, Green Technology, Pollution, Renewable.*

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### 1. INTRODUCTION

In addition to the protection of the natural resources of the planet. It is also beneficial to reduce. Another term for it is clean technology. Sustainable development is the main concept here. This technology is a technology and technology for the generation of renewable electricity. Examples include solar, wind turbines, hydropower production and other technologies that produce energy. Green technology works by avoiding or correcting the factors that produce pollutants within the environment. This adds to the economic and ecological equilibrium of the environment. It aims to reduce greenhouse gas emissions and loss of ozone layer, increasing key research and development components. Systems which contribute to sustainable practices are important for a stable, secure and balanced world. The Government of Denmark has planned to convert renewable electricity to 100 percent by 2050 (Fig. 1) [1].





**Fig. 1: Emerging Technologies for Sustainable Development.**

Over \$100 billion was invested in 2007, establishing new world records for new renewable energy resources, industrial facilities and research & development. However, because renewable energy ambitions lag behind practice owing to the rapid pace of change in recent years. This document compiles the data and offers a 2007 summary of the worldwide state of renewable energy. The study analyzes economics, investment, industry and policy trends and renewable energy from the rural sector (off-grid). The article is not intended to comment on current issues or predict green energy for the future. Many of the accomplishments have shown the importance of renewable energy to conventional energy [2]. This study analyzes the increase in the use of energy in the data centers in the US and globally from 2005 to 2010. It produces a cohesive time series utilizing data and the same approach as prior assessments. The main findings of the research are as follows:

- The growth of an installed server base in data centers had already begun to decline before early 2007 due to virtualization and other causes.
- The financial crisis of 2008 and its consequent recession as well as further progress towards virtualization led to a significant drop in the real server installation base in 2010, in contrary to the installed basis projection of 2007.
- Between 2005 and 2010, the growth in energy consumption per server was presumably more demand-intensive than between 2000 and 2005.
- Assumed that the intermediate point between the Upper and Lower Boundaries is a genuine fact, global consumption of energy from data centers increased by about 56 percent between 2005 and 2010 instead of doubling (as it did from 2000 to 2005) and by around 36 percent in the USA.
- The total energy consumption of worldwide data centers was projected in 2010 to be between 1.1 percent and 1.5 percent. The percentage in the United States varied from 1.7 percent to 2.2 percent. In the United States, the amount of electricity used in 2010 was slightly lower than anticipated in the Congress 2007 evaluation of data centers. This result revealed lower growth rates for electricity than previously anticipated in this study, driven mainly by a smaller installed server base than was envisaged rather than by the expected performance improvements stated in the Congress report.
- Although Google is a highly profile database server user, less than 1 percent of the world's energy utilizations by database centers accounted for the company's data center operations. In summary, the exponential increase that occurred between 2000 and 2005 in the data center

energy use dropped considerably between 2005 and 2010, accounting for about 1.3 per cent of the overall use of electricity by the data centers and 2 per cent for use by the United States in 2010 [3].

In 2007, Intel has set itself the goal of decreasing their greenhouse gas global warming effect by 20 percent until 2012. By altering its IT operations and total intellectual transactions through sustainable IT usage, the Intel information technology group is considered as an important contributor to the business's sustainability objective. According to this research, Intel has achieved the advantages of sustainability to date by improving four key functions. The technologies were integrated into the maturity framework for Sustainable Information Communications Technology (ICT), a model created by an industry collaboration in which the authors played a significant role. The article concludes with lessons gained from Intel's insights into the application of businesses and IT managers in other organizations [4].

## 2. LITERATURE SURVEY

B. Châte described the research summary framework linked to solar and wind green energy applications, with an emphasis on poor nations. A summary of some of the major projects conducted by a range of United Nations agencies and bodies is given, including: and the Secretariat's Department of International Economic and Social Affairs; the Department of Technical Cooperation for Development and its Centre for Natural Resources, Energy, and Transport; federal commissions; financial institutions (United Nations Development Program and UNEP), the United Nations Industrial Development Organization (UNIDO), the United Nations Institute for Training and Research (UNITAR), and the United Nations University (UNU); specialist organizations such as World Health Organization (WHO); and the Committee on the Peaceful Uses of Outer Space (COPUOS). The forthcoming, which was just approved by the United Nations General Assembly, is described in depth [5].

## 3. RESOURCES AND RENEWABLE ENERGY

Renewable fuels, such as wind, sun, and tidal, may never exhaust the globe. It's broad and unending in nature, despite the fact that we use it frequently. They may be offered at a low or free price. It helps to decrease air pollution and improve the health of all living things on the planet. No energy may be produced or lost, but it may be transformed from one form to another, in line with the energy conservation law. This also makes it possible to produce energy for required purposes. Let us study every renewable resource more carefully [6], [7].

The sun, which is hundreds of kilometers from the earth, produces the bright and enormous radioactive energy. In solar cells, too much green energy is stored. Energy is collected for production throughout the day and home appliances are also extensively used, such as solar cookers, solar water heaters, solar calculators and solar panels. For heating, drying, and pasteurization, solar cookers depend on the sun. Concentrated solar panel systems direct a wide field of sunlight through lenses and mirrors via a tiny beam. Photovoltaic converts light into energy by use of the photoelectric effect. Solar energy is another term for solar energy. According to the 2000 World Energy Assessment for solar power of the United Nations Development Program, there are 1,575 to 49,837 solar panels each year (EJ). This is much greater than the entire demand for global energy in 2012, estimated at 559.8 EJ. The Earth absorbs 174 PW of solar radiation on the upper layer of the atmosphere. The remainder of it reflects back to space with about 30 percent. The rays of the sun maintain the surface of the

Earth at 14°C. Green plants are converting solar sunlight into chemically stored energy, which is utilized for the production of fossil fuel, wood and biomass. Solar energy produces most power in the world while reducing greenhouse gas emissions, the International Energy Agency stated [8].

Biofuel is produced in a non-oxygen atmosphere by the decomposition of organic waste. Examples of organic waste include agricultural waste, sewage and food waste. As a consequence, there is no net CO<sub>2</sub> generated (carbon dioxide). In future decades if CO<sub>2</sub> emissions are not addressed, the atmosphere on the Earth would change permanently resulting to disasters. As of 2011, biogas has been used to cook in more than 44 million homes. Powerful biofuels such as compressed natural gas (CNG) are used for automobiles instead of petrol or gasoline. Ethanol is the world's most prevalent biofuel. It produces alcohol fuels produced by rice, sugar cane, molasses and other sugar or starch. The three techniques utilized to turn biomass into useable energy-containing molecules are heat conversion, chemical conversion and biochemical converting. The conversion of biomass generates fuel that is solid, liquid or gaseous. The first generation or traditional bio fuels are termed organic fuels from food crops cultivated on suitable soil. Second-generation biofuels are oils generated by different biomasses. Biomass is a broad term for any fast-renewed resource within the carbon cycle. Algal farming and algae fuel are the first examples of third generation biofuels that can generate green diesel with vegetable oils and animal fats [9].

Generator control for electricity production. Wind energy is abundant, sustainable, clean, and free of greenhouse gas emissions, low power usage, and soil needs. Wind turbines are devices which convert the wind's kinetic energy into electricity. Since 2015, Denmark has started manufacturing. A wind farm is a collection of wind turbines with land that may be used for agriculture or for other reasons between them. More than 200,000 turbines with a total output of 432 Giga watts have been installed globally by 2015. Wind power fuel prices are not available [10].

#### **4. OBJECTIVES OF GREEN TECHNOLOGY**

Any job to complete to meet the needs of today's era. Researchers need to take into account risks, however, not just the benefits of complexity. The primary goals of green energy technology are to fulfill needs without harming resources or the environment. This includes the use of sustainable materials in the environment. Researchers will squander numerous resources if they want to produce each time. The aim is next to recycle the recycled materials. Researchers call the 3R idea in more detail, which includes

- Reduce
- Reuse
- Recycle

Reducing means reducing waste or eliminating the demand for excess. Through waste awareness, researchers may lead healthier lifestyles for current and future generations. For example, researchers may use an internet document rather than using paper for anything. Reuse materials throughout the recycling process is another alternative for disposal of waste.

The term recycled refers to the method old materials are gathered, processed and recycled. This may reduce pollutant levels. Also easily recyclable materials include glass, paper and metal. The US individual produces 730 kilograms of garbage yearly only in the United States. For example, the breakdown of coke aluminum tins into the soil may take up to 50 years. Instead of being thrown, they must.

The recycling of these tins saves sufficient electricity to broadcast a 3-hour TV show. A pound of steel recycling saves sufficient electricity to power up a light bulb of 60 watts a day. Each journal may be recycled for reuse instead of chopping down trees for new papers.

## 5. DISCUSSION

It originates from energy sources such as sunshine, wind and biomass that are renewable green. Traditional energy sources dependent on the combustion of carbon burning emit CO<sub>2</sub>, which is responsible for most emissions, into the environment, as we all know. Toxins that damage the environment, which is considered to be the main cause of global conflict, are listed. The International Energy Agency (IEA) estimates that approximately a tenth of the worldwide energy expenditure will be saved by a broad transition to energy-efficient lighting solutions. Environmentally friendly bulbs provide a sustainable method of conserving both energy and resources. Motion sensors help to keep lights off while not in use, dimmers provide the ideal illumination, and timers alter the stuff they require. A green car is a road vehicle which is less polluting. The amount of greenhouse gases driving climate change rises with vehicle emissions. Over 85 percent of transport greenhouse gas emissions accounted for CO<sub>2</sub> emissions from road vehicles. The most greenhouse emissions are generated by the transport sector.

Green Computing, also known as green ICT, has been developed by the International Federation of Global and Green ICT to study and utilize environmentally friendly computing or information technology (IFGICT). As a result, carbon emissions from the information system would be reduced. Green networking and information management designs use materials that negatively impact the environment through human touch. Many corporate IT departments use green computational methods to minimize their IT operations' environmental impact. All people, networks and hardware are important components for modern IT systems and must all be handled via a green computing approach. Five key areas in which energy-efficient data center best practice should be pursued should be acknowledged by the Department of Energy of the United States:

- IT systems
- Environmental circumstances
- Air management
- Cooling systems
- Electrical systems

First appeared Term Green IT Energy Star has been established by the U.S. Environmental Protection Agency, a program that enables businesses, through energy efficient products, to save money and reduce greenhouse gases emissions. There are several advantages to green computing, including reduced environmental effects (lower GHG emissions, less electric waste

and fewer virgin materials used in the manufacturing of modern equipment), lower energy prices, and longer lasting computing systems as well as reduced safety risks for engine workers.

Green nanomaterials and devices for the atmosphere and people are created in green nanotechnology. Manufacture micro and Nano goods using low temperature non-toxic materials and renewable inputs. Green nanotechnology is intended to produce non-atmospheric or human health-dangerous nanoparticles and technologies and products that deal with environmental issues. Current green Nano-machinery advances include Nano-machinery modelled by a bioengineer bacteria used to eat plastics. Plastics decay hundreds of times faster than microbes bioengineered. Another notable example is the Light Emitting Diode displays.

## 6. CONCLUSION

As a consequence it is simple and ecologically harmful to produce electricity from renewable resources. This green technology makes life simpler and more dependable. In particular, air quality has to be monitored, since it continuously deteriorates leading to an exponential rise in mortality. According to a 2014 WHO report, Delhi is the first capital to exceed permissible levels of pollution. Nine times higher than the permitted levels were recorded in 2013. The increased density of cars produced respiratory problems and deaths due to soil particles and smoke. It was claimed that PM 2.5 with PM10, with a concentration of 250 to 350, would have major health and pulmonary issues, and PM 2.5 with a concentration of greater than 153 in Delhi and other parts of the globe. As a consequence, it is essential that trash be reduced and our environment preserved. People are not the only ones harmed; if no action is done, both animals and fish are also affected. It is essential to think about our atmosphere and promote environmentally friendly goods, rather than growing into dangerous materials or radioactive chemicals.

The United States invested in 2007 a new global milestone, spending more than 100 billion dollars in new renewable energy, industrial facilities and research & development. But renewable energy targets have lagged behind reality in recent years because of the rapid rate of development. This report offers an overview and assessment of the worldwide situation of green energy in 2007. The study analyzes changes in environment, economics, production and policy, as well as renewables from rural (off grid) sources. This article does not aim at evaluating, discussing current issues or predicting green energy for the future. As a consequence of a series of advances, renewable energy becomes more important than conventional energy. This study analyzes the growth in energy consumption of data centers between 2005 and 2010 in the U.S. and across the globe. It utilizes similar data and methods as previous studies to create a consistent series of data center energy consumption.

The world's resources would never be exhausted from renewable energy like the wind, sun and tidal energies. They are plentiful and limitless in nature, but we use them often. Everything is supplied at or at a reduced cost. It contributes to the elimination and general well-being of all living creatures on the planet of emissions of greenhouse gases. Energy can't be produced or lost, but it may be converted from one form to another in line with energy conservation laws. As a consequence, electricity for essential applications may also be produced.

## REFERENCES

1. *Key World Energy Statistics 2014*. 2014.

2. REN21, "Renewables 2007 Global Status Report," 2007.
3. J. Koomey, "Growth in Data Center Electricity use 2005 to 2010," *Anal. Press.*, 2011.
4. E. Curry, B. Guyon, C. Sheridan, and B. Donnellan, "Developing a sustainable IT capability: Lessons from Intel's journey," *MIS Q. Exec.*, 2012.
5. B. Châtel, "Some solar energy programmes in the United Nations system," *Sol. Energy*, 1979, doi: 10.1016/0038-092X(79)90165-8.
6. J. A. Laub, "Assessing the servant organization; Development of the Organizational Leadership Assessment (OLA) model. Dissertation Abstracts International," *Procedia - Soc. Behav. Sci.*, 1999.
7. United Nations Development Programme, *World Energy Assessment. Energy and the challenge of Sustainability*. 2000.
8. W. A. Smith, "Solar energy, technology and applications," *J. Power Sources*, 1976, doi: 10.1016/0378-7753(76)80025-0.
9. Y. Deligiannakis, "Nanomaterials for environmental solar energy technologies: Applications & limitations," *KONA Powder and Particle Journal*. 2018, doi: 10.14356/kona.2018004.
10. A. Queiroz, F. T. Najafi, and P. Hanrahan, "Implementation and Results of Solar Feed-In-Tariff in Gainesville, Florida," *J. Energy Eng.*, 2017, doi: 10.1061/(asce)ey.1943-7897.0000373.



## THE ANALYSIS OF METAPHORS AND METONYMIES IN POLITICAL SPEECHES

Ziyoda Tohirjonqizi Hakimova\*

\*Master's Student,  
Fergana State University,  
UZBEKISTAN

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### ABSTRACT

*The paper studies metaphors and metonymies usage in 2007 pre-electoral speech by the former Croatian Prime Minister Ivo Sanader, who has the reputation of being an excellent rhetorician, delivered at the 11th Croatian Democratic Union annual meeting. Successful politicians' language happens to be persuasive and for the purpose of persuasion, among other rhetorical strategies, they use highly conventionalized metaphors and metonymies. This paper aims at classifying metaphors and metonymies and examining their purpose, thus identifying the speaker's covert intentions. The analysis shows that metaphors and metonymies are used for creating positive self-representation of both the speaker and his political colleagues and simultaneously negative representation of the speaker's political opponents. In addition, the speaker attributes himself the roles of a father and a savior the nation so desperately needs.*

**KEYWORDS:** *Metaphor, Metonymy, Persuasion, Political Speech, Rhetoric.*

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### INTRODUCTION

Politics is a struggle for power with the aim of putting political ideas into practice. What plays a crucial role in this process is language since every political action is well prepared, influenced and realized by the use of language. In addition to a politician's physical presentation and style, voters create impressions based on a politician's honesty and integrity, which is accomplished through the consistency of one's words and actions and the efficiency of one's political arguments. Therefore, whenever speaking publically, politicians carefully plan and choose their rhetoric. [1,2]

### LITERATURE REVIEW

Rhetoric is inseparably connected with persuasion, though not identical. As Charteris-Black (2011, p.13) [4] says "persuasion, therefore refers to the intention, act and effect of changing an audience's thinking"; being a speech act. In comparison to persuasion, rhetoric refers to the strategies a speaker uses in order to obtain votes. To paraphrase, one needs to make a distinction between a speaker's style, namely rhetoric, and persuasion being done by *ethos* (credibility), *pathos* (emotional impact) and *logos* (use of reasoning) as Aristotle suggested. The Aristotelian concepts of *ethos*, *pathos* and *logos* will not be analyzed with respect to Sanader's persuasive power in the paper. It means that Sanader's credibility, reasoning and the impact he has on the audience are not that relevant when it comes to the analysis of his persuasive powers because he

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is giving a speech in front of the like-minded, i.e. he does not have to convince anyone in anything; the audience is there because they think like him.

This paper aims at studying the rhetoric, more precisely metaphors and metonymies usage, of the former Croatian Prime Minister Ivo Sanader. We decided to take the Critical Metaphor and Metonymy Analysis approach aiming to detect the types of metaphors and metonymies in Sanader's speech and the purpose of their usage, i.e. reveal covert intentions of the speaker. When it comes to metaphors, only OBJECT, WAR, FINANCE, TIME and BUILDING metaphors were subjected to the analysis. It shows that politicians use metaphors very often – sometimes to conceal the real state of the matter, and sometimes as a means of a positive self-presentation. Sanader is not an exception in that sense as the paper shows; in some examples he comes as a very smart and well-read politician, in some he evokes either positive or negative feelings, in some he conceals the truth, etc. With respect to metonymies, there are few metonymic types that are analyzed in the paper, and those are: COUNTRY FOR THE GOVERNMENT, THE STATE FOR THE EVENT, YEAR FOR THE EVENT, INSTITUTION FOR THE PEOPLE RESPONSIBLE and PARTY FOR POLITICIANS. They are used for more or less the same purpose as metaphors, as is evident in the paper.

## MATERIAL AND METHODOLOGY

The material analyzed in this paper is a speech of the former Croatian Prime Minister Ivo Sanader made on the 11th Croatian Democratic Union annual meeting delivered on 30th June 2007, divided into 7 videos and posted on the website <https://www.youtube.com>. The authors of the paper downloaded and transcribed the videos. Prior to carrying out a large-scale research, a pilot study was conducted. Both qualitative and quantitative research methods were used in the pilot study. First, metaphors and metonymies were categorized based on discerned themes and domains. Each author classified metaphors and metonymies individually and the final categorization was based on a mutual agreement especially in cases of ambiguity. Secondly, based on the frequency of occurrence, metaphors and metonymies listed in section 1.1 were included in the analysis. Furthermore, the Critical Metaphor and Metonymy Analysis approach proposed by Charteris-Black (2004) is applied in the study. Charteris-Black (2004, p. 35-41) [5] proposes three stages. Firstly, with close and repetitive reading, we identified metaphors and metonymies in our corpus. Secondly, we interpreted and classified metaphors and metonymies identifying the type of social relations construed through them. Finally, we explained their function being the basis of rhetorical motivation.

When it comes to the metaphor identification, Steen proposes five steps of metaphor identification (cited in Semino, 2003). The first step includes *metaphor focus identification*. “Steen introduces the first step of his procedure as the identification of linguistic expressions used metaphorically in the discourse, which he refers to as the ‘metaphorical foci’”. (Semino, 2003, p. 1274). The second step is *metaphor idea identification*. “Steen introduces the first step of his procedure as the identification of linguistic expressions used metaphorically in the discourse, which he refers to as the ‘metaphorical foci’. These, he explains, are expressions that activate concepts “which cannot be literally applied to the referents in the world evoked by the text” (Steen, 1999, p. 61)“. The following example is provided:

The royal court is going to hunt

P1 (REF COURT LIONS)

P2 (HUNT COURT)

P3 (MOD COURT ROYAL) (Steen, 1999: 63)

The metaphorical idea is captured by P2, where what is involved is no longer words, but the concepts (in SMALL CAPITALS) activated by the words of the original expression. Here, P1 highlights the metaphorical idea, by spelling out that the concept COURT is being applied nonliterally to LIONS. As Steen explains, the output of step 2 is a proposition in which we have a nonliterally used concept (expressed by the linguistic focus identified in step 1) that is related to one or more literally used concepts identified in step 2 which evoke the relevant literal referent (Steen, 1999, p. 66). The third step includes *nonliteral comparison identification* for which Steen says:

In step 3, the metaphorical propositions that come out of step 2 are put through a procedure which transforms them into comparative structures (see Miller, 1993). This is necessary, according to Steen, in order to be able to arrive at the sets of correspondences across different domains which constitute metaphorical mappings in the cognitive paradigm. Step 3 itself, however, is “highly mechanical” (Steen, 1999, p. 67).

The fourth step provided by Steen is called *nonliteral analogy identification*. Whereas step 3 is mechanical, step 4 is highly interpretative, since it involves filling in the empty slots from the output of step 3 so as to arrive at a complete nonliteral analogy. Step 4 consists of *focus interpretation* whereby a literal expression is filled in to replace the metaphorical focus and the *vehicle identification*, whereby some elements of the source domain evoked by the metaphorical focus are chosen to fill in the second incomplete proposition from step 3. (Semino, 2003, p. 1276).

Regarding step 4, Steen stresses out that *focus interpretation* (i.e. finding a literal equivalent for the metaphorical expression) is constrained by the context in which the metaphor occurs, *vehicle identification* has to rely on “prototypical or default knowledge about the source domain” (Semino, 2003, p. 1276).

The last step of the process is *nonliteral mapping identification* for which is said: “Step 5 involves the identification of “the complete nonliteral mapping [...] by filling out the conceptual structure of the two sides of the nonliteral analogy, the source and target domain” In other words, with step 5 we move from the output of step 4 to the sets of cross-domain correspondences that are normally proposed in cognitive metaphor theory.” (Steen, 1999, p. 71; Semino, 2003, p. 1276).

Given the process of metaphor identification, the paper will try to answer a few questions: 1) What is the purpose of using metaphors and metonymies in political discourse? 2) Can a historical and social background of a certain nation have some influence on the use of metaphors and metonymies?

### **Theoretical Background**

Prior to Jakobson and Halle’s book (1956), only literary research was applied to the study of metaphors so it marks the beginning of linguistic researches in the field of metaphors. However, the turning point was Lakoff and Johnson’s book *Metaphors we live by* (1980) which revolutionized the study of metaphors. They established three major theses: metaphors are

omnipresent and should not be limited to literary contexts, metaphors show high level of systematicity and coherency and they are not just a mere figure of speech but the way of thinking. The essence of metaphor is understanding one thing in terms of another, i.e. conceptual (target) domain A is understood in terms of conceptual (source) domain B (Lakoff and Johnson, 1980, p. 3-5), thus highly abstract entities are conceptualized through concrete ones. Being associated on the basis of similarity, the conceptual correspondence between two domains is referred to as mappings (Kövecses, 2002, p. 6). However, as Lakoff and Johnson (1980) point out, mapping is unidirectional, i.e. it only goes from the source to the target domain. [6]

Lakoff and Johnson (1980) differentiate between three main types of metaphors, namely structural, orientational and ontological. Structural metaphors allow us to use a highly abstract concept to structure a concrete one (Lakoff, 1992, p. 61) exemplified with the conceptual metaphor LOVE IS A JOURNEY where lovers are perceived as travelers on their joint journey towards the same goal – realization of their love. Orientational metaphors are more extensive than structural ones organizing a whole system of concepts with respect to one another (Lakoff and Johnson 1980, p. 14). These metaphors are based on spatial relations, such as up and down where all positive connotated aspects are perceived as up, whereas negative are perceived as down, e.g. HAPPY IS UP (I'm *on cloud nine*) and SAD IS DOWN (I'm *feeling down*). Finally, ontological metaphors deal with understanding of our experiences in terms of substances and entities. They allow us to treat parts of our experience as entities or substances referring to, quantifying, categorizing and reasoning them (Lakoff and Johnson 1980, p. 26). In addition, understanding our experiences in terms of entities also means perceiving them as containers being grounded in perceiving our bodies as containers. A representative of the ontological metaphors is STATES ARE CONTAINERS exemplified as *Mark is in love with Anna*. Being a universal bodily experience, we are using metaphors subconsciously which makes them universal as well. However, next to universality, metaphors might also be discourse-related. [7]

## Metaphor in Political Discourse

Charteris-Black (2011, p. 28) [4] claims that metaphors in political context are frequently used for ideological purposes since they activate unconscious emotional associations thereby contributing to myth creation and telling the right story. As he continues (2011, p. 32), the main function of metaphors usage in political rhetoric is to frame our view of political issues by eliminating alternative points of view. Therefore, politicians use metaphors for positive self-representation and negative presentation of their political opponents attacking their ideas.

Many political issues are complex and abstract for voters to understand them; hence metaphors can serve to help voters comprehend abstract entities through more concrete ones (Mio, 1997). In addition, politicians need to show that besides understanding complicated issues, they can resolve them. Therefore, by applying experienced and concrete to abstract concepts, they use metaphors to make persuasive arguments clearly demonstrating their ability of thinking rationally (Brukholder & Henry, 2009) [3]. However, given the nature of metaphors and many possible interpretations, voters may attribute their own meanings to them; either positively or negatively connotated. Due to that, politicians' choice of metaphors and metonymies may vary according to the context and the audience, which one needs to take into account when interpreting.

When analyzing metaphors and metonymies, one needs to conceal a speaker's intentions since metaphors and metonymies can be manipulative (Rozina & Karapetjana, 2009) but are more commonly persuasive. Van Dijk (2006) differentiates between manipulation and persuasion and the consequences as follows:

“( . . . ) in persuasion the interlocutors are free to believe or act as they please, depending on whether or not they accept the arguments of the persuader, whereas in manipulation recipients are typically assigned a more passive role: they are *victims* of manipulation. This negative consequence of manipulative discourse typically occurs when the recipients are unable to understand the real intentions or to see the full consequences of the beliefs or actions advocated by the manipulator. This may be the case especially when the recipients lack the specific knowledge that might be used to resist manipulation.” (p. 361) [8]

Given the nature of metaphors and metonymies, a speaker exploits associative power of language trying to provoke affective responses, thus showing the persuasive power of metaphors and metonymies.

This paper studies conceptual metaphors and metonymies in Ivo Sanader's 2007 pre-electoral speech delivered at the 11th Croatian Democratic Union annual meeting. The aim of this paper was to detect the types of metaphors and metonymies used in the mentioned speech and to study their purpose by applying the Critical Metaphor and Metonymies Analysis approach.

Political speeches have always been associated with the notion of persuasion which, among other linguistic devices, is realized with the use of conceptual metaphors and metonymies. Conceptual metaphors and metonymies from our corpus have an important role in activating either conscious or subconscious associations. The examples have proved to be highly conceptualized and based on audience's experience. The metaphors in our corpus are used for a positive self-representation of both the speaker and the party he affiliates himself with. Simultaneously, the expressions are used for a negative representation of the major opponent party. In other words, using euphemisms and dysphemisms, especially in the metonymy usage, the speaker is glorifying or vilifying the political parties.

Furthermore, since Croatia is the country that has recently been involved in war, it comes as no surprise that, based on the experience, war metaphors are highly conventionalized in the Croatian language. Once again, the opponent party is negatively represented as the party that wants to be involved in some kind of a fight, which evokes highly negative feelings amongst Croatians. In comparison, Sanader's party is perceived as the party wanting to help Croatian people with solving their problems and overcoming fears. Also, war metaphors are used to present the current state in the country – those who refuse to make some sacrifices for the country's progress, might be perceived as national enemies who do not want for the country to be received in a wealthy and developed European Union family. Additionally, war metaphors are indirectly connected with building metaphors since destruction as a consequence of war eventually results in construction in the time of peace. The speaker presents his party as the one, and to his mind probably the only one, able to deal with a long-term and difficult process of constructing what someone else has destroyed or failed to construct. Hence, he attributes himself the role of an architect who will construct new and improve the existing they are long lasting. Consequently, time is of major importance being perceived as a limited resource and valuable commodity. The speaker anticipates the possible questions and elaborates on their efficient use of time while not leading



the country. Simultaneously, the speaker negatively presents the opposing party for taking the innate right of dignity from people in the only mandate they won, i.e. the opposing party used their time in vain, which should not be forgotten or repeated. In addition, the metonymic examples show that the speaker chooses them wisely. In positive contexts, he boasts about running the entire country, while in the problematic ones, he thinks ahead and creates an alibi should his party not complete the task of leading the country. He mentions the former regime and the events important for the Croatian history evoking feelings which should unite Croatian people.

To summarize, by the use of metaphors and metonymies, the speaker creates a positive representation of all politicians affiliated with his party and negative of all opponent party politicians. The aim of his speech is to show the audience that he thinks right, has the right intentions, tells the right story and has the skills and will to work towards Croatia's progress.

## REFERENCES

1. Basson A. *Divine Metaphors in Selected Hebrew Psalms of Lamentation*. Germany: Mohr Siebeck Tübingen. 2006.
2. Brdar M and Brdar-Szabó R. The (non)metonymic use of place names in English, German, Hungarian, and Croatian. In P. Klaus-Uwe, L. L. Thornburg and A. Barcelona (Eds.). *Metonymy and Metaphor in Grammar*. Amsterdam Philadelphia: John Benjamins Publishing Company, 2009. pp.229-259.
3. Burkholder TR, Henry D. Criticism of Metaphor. In J.A. Kuypers (Ed.). *Rhetorical Criticism: Perspectives in Action*. Lanham, MD: Lexington Books, 2009. pp.97-114.
4. Charteris-Black J. *Politicians and Rhetoric: The Persuasive Power of Metaphor*. New York: Palgrave Macmillan. 2011.
5. Charteris-Black J. *Corpus Approaches to Critical Metaphor Analysis*. New York: Palgrave Macmillan. 2004.
6. Chilton P. *Analysing Political Discourse: Theory and Practice*. London: Routledge. 2004.
7. Farrell K, Young M.J. The Rhetorical Situation. In J.A. Kuypers (Ed.). *Rhetorical Criticism: perspectives in action*. Lanham, MD: Lexington Books, 2009. pp.33-37.
8. Hill FI. The "Traditional" Perspective. In J.A. Kuypers (Ed.). *Rhetorical Criticism: Perspectives in Action*. Lanham, MD: Lexington Books, 2009. Pp.39-61.



## TRIBAL FARMERS' PERCEPTION TOWARDS SUSTAINABLE AGRICULTURE IN ODISHA

**Amrita Mishra\***; **Dr. Tushar Kanti Das\*\***

\*ICSSR Doctoral Fellow,  
Department of Business Administration,  
Sambalpur University, Odisha, INDIA

\*\*Professor,  
Department of Business Administration,  
Sambalpur University, Odisha, INDIA

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### ABSTRACT

*“Able to be maintained” this is what the term sustainable stands for. According to the Food and Agriculture Organization, sustainable agriculture is “the successful management of resources for agriculture to satisfy changing human needs while maintaining or enhancing the quality of environment and conserving natural resources”. The Sustainable Development Goals are a framework of 17 goals and 169 targets across social, economic, and environmental areas of sustainable development. The second goal is to focus on the promotion of sustainable agriculture. This research will help in filling the major gaps in sociological studies of sustainable agriculture. This information will be helpful for farmers, development organizations, donors, and policy makers in formulating the development of effective initiatives and policies to support the development of sustainable agriculture. The main aim of this study is to evaluate farmer’s awareness of sustainable agriculture and issues related to it. This study was done in southern region of Odisha, India. 150 respondents have been selected from that region. Chi-square analysis was used to test the hypotheses. There was significant relationship ( $p \leq 0.05$ ) among respondent’s age, educational background, farm size, social aspects, benefits, and awareness of Sustainable Agriculture.*

**KEYWORDS:** Sustainable-Agriculture, Tribal-Farmers, Environment, Natural-Resources, Eco-Friendly.

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### INTRODUCTION

Agriculture is the major livelihood of rural India. Nearly two third of the total population is engaged in Agriculture based activities. India is very rich in its natural resources still it fails to give food security to its own citizens. When it’s come to sustainability of agriculture, India needs to increase the productivity without causing any harm to the natural resources. For the sustainability of agriculture, we should learn how to produce food and fiber by using natural resources which are eco-friendly in nature rather than chemicals those are available in the market. Agricultural practices to be counted as sustainable when it satisfies three conditions that are it should be environment friendly, it should be pocket friendly and it should satisfy society’s

need. In other words, we can say it should be economically viable, socially responsible, and ecologically sound. [1-30]

The Sustainable Development Goals are a framework of 17 goals and 169 targets across social, economic, and environmental areas of sustainable development and among all these seventeen goals the second goal is focusing on the promotion of Sustainable Agriculture. This study was designed to examine the awareness of tribal farmers towards sustainable agriculture. Here, in this thesis the area like Kalahandi, Kora put and Rayagada has taken as the research area because these three districts are mainly known as the tribal districts of Odisha and people of these areas are very poor. As sustainable agriculture is economically viable everyone can afford to adopt sustainable agriculture practice. So, in this present study it was planned to examine their awareness towards sustainable agriculture. [32-33]

### **Objective-**

**This study was designed to examine farmers' awareness of sustainable agriculture by providing answers to the following research questions:**

1. What are the demographic characteristics of the selected tribal farmers in southern region of Odisha?
2. What are the farmers' present sources of information on Sustainable Agriculture?
3. Do the farmers have the knowledge required for practicing Sustainable Agriculture?
4. Do the farmers aware about Sustainable Agriculture?
5. What are the factors that contribute to formation of awareness about Sustainable agriculture?

### **Significance of the study:**

The findings of the study are being expected to provide valuable information to the farmers, policy makers, Government, Development Organizations for making policies and development initiatives on sustainable agriculture.

### **Review of literature-**

**P.Ramesh, 2010 [23]**, this study revealed that it is economically feasible to practice organic farming when the farmers are able to get premium price for their produce and with the reduce cost of cultivation by not depending upon the purchased off-farm inputs.

**Dr. Suresh Patidar, 2015 [13]**, this study revealed that the important influencing factors for adoption of organic coconut farming and compare the perceptions of growers who have and have not adopted organic farming. The authors concluded with positive perception of organic farming with significant relationships between age, educational background, farm size, benefits of organic farming, and social factors. This indicates that the communities will have high adoption rate of innovations related to organic farming and other agricultural policies.

**Christian A. Klo"ckner, 2009 [10]**, this study revealed that People with strong personal norms use "organic production", the "EU-BIO-Label" and "ingredients" as additional criteria during their decision process. For people with strong ecological norms the price difference between organic and conventional milk, the lack of knowledge about organic milk, and convenience are less important constraints. Finally, people with strong personal norms react more sensitively to proposed norm-centred interventions.

District	Block	Villages	Respondents
Kalahandi	Lanjigarh	Luma	13
		Hatisaal	11
		Kumarpada	13
		Dangajorh	13
Koraput	Kundra	Naaragaon	12
		Mudinayakguda	15
		Chancharaguda	12
		Baraguda	11
Rayagada	Muniguda	Karadabandha	22
		Talachelianaala	15
		Khuntabadi	13
Total-3 districts	3 blocks	11 villages	150 respondents

**Sushil Kumar, 2011 [31]**, this paper revealed the factors affecting awareness level of consumers on organic food products. The survey results revealed that only 58.8% of total respondents were aware of ‘organic food’ in which only 12.8 percent irregularly/regularly consumed organic food. It indicates that for majority of the even aware people ‘organic food’ is still away from their food basket.

**Koen Mondelaers, (2009) [19]**, this paper revealed that consumers classify organic products among other quality niche products. However, they attribute a better score to the health and environment related quality traits of organic products, indicating a difference in quality cues between organic products and quality products in general. Price becomes less important, whereas presence of an organic label becomes more important with increasing buying intensity of organic vegetables. Undesirable traits such as pesticide residue levels trigger a stronger response than desirable traits, such as environmental or health benefits.

**Research Methodology-**

**Study Area-**

**Sampling Procedure-** A multi-stage convenient sampling was used for this study. 150 respondents were selected from these 11 villages shown above.

**Research type-**The type of research design followed for the study will be exploratory research design.

**Data collection-** This research is mainly based on quantitative pattern; hence the data was obtained by means of structured questionnaires. The data will be collected from farmers by doing field visit.

**Data analysis tools-** Percentage analysis and Chi-square test has been performed to get the findings. With the help of Microsoft Excel all the data has been analysed.

**Hypotheses-**

Based on objectives and different variables, the following null hypothesis were formulated and tested for significance."

H1: Age of the respondent does not affect his/her awareness towards sustainable agriculture.

H2: Gender of the respondent does not affect his/her awareness towards sustainable agriculture.

H3: Education of the respondent does not affect his/her awareness towards sustainable agriculture.

H4: Farm size of the respondent does not affect his/her awareness towards sustainable agriculture.

H5: Knowledge of the respondent does not affect his/her awareness towards sustainable agriculture.

H6: Cost aspects do not affect respondent’s awareness towards sustainable agriculture.

H7: Benefits aspects do not affect respondent’s awareness towards sustainable agriculture.

H8: Environmental aspects do not affect respondent’s awareness towards sustainable agriculture.

H9: Social aspects do not affect respondent’s awareness towards sustainable agriculture.

**Analysis and Discussion-**

Descriptive analysis and factor analysis were done to present the findings. Chi-square analysis was used to test the hypotheses.

**Demographic characteristics-**

**Age –**

Sl. No.	Categories	Percentage
1	Young Age (21-35 yrs)	43
2	Middle Age (36-50 yrs)	45
3	Old Age (above 50 yrs)	12

**Gender-**

Sl. No.	Category	Percentage
1	Male	63
2	Female	37

**Farm Size-**

Sl. No.	Categories	percentage

1	Small farm size (up to 2 hectare)	28.89
2	Medium farm size (2.01-4.0 hectare)	55.55
3	Large farm size (above 4.0 hectare)	15.56

**Education-**

S. No.	Categories	Percentage
1	Illiterate	20
2	Up to primary	35
3	Middle school	31
4	High school and above	14

**Chi Square Test-**

Chi square tests were run for 9 factors against the awareness scores of the individual respondents. Each of the respondents given a score based on his/her awareness towards sustainable agriculture. Five-point Likert Scale has been used here (5-Strongly aware, 4-Aware, 3-Undecided, 2- Not aware, 1-Strongly not aware). In this way chi square tests were run for individual factors against awareness score.

**Chi-square test result-**

Sl.N	Variables	No. of cases	Chi-square value	P value
1	Age	150	6.85	0.043
2	Gender	150	14.58	0.333
3	Education	150	15.65	0.030
4	Farm size	150	18.21	0.029
5	Knowledge	150	14.98	0.257
6	Cost	150	8.23	0.566
7	Benefit	150	9.65	0.008

8	Environment	150	19.75	0.150
9	Social	150	11.32	0.014

Results of the test indicated that there was a significant relationship ( $p < 0.05$ ) between respondents' age, educational background, and farm size, benefits associated with sustainable agriculture, and social factors and awareness towards organic farming. On the other hand, 4 variables i.e. gender, knowledge, cost, and environment have no significant relationship ( $p > 0.05$ ) with awareness scores of the respondents. Thus, out of 9 variables 5 shows significant variance for the attitude awareness towards sustainable agriculture and 4 variables remain insignificant.

**Hypotheses Result-**

Null Hypotheses	Result (0.05 level of probability)
H1: Age of the respondent does not affect his/her awareness towards sustainable agriculture.	Rejected
H2: Gender of the respondent does not affect his/her awareness towards sustainable agriculture.	Accepted
H3: Education of the respondent does not affect his/her awareness towards sustainable agriculture.	Rejected
H4: Farm size of the respondent does not affect his/her awareness towards sustainable agriculture.	Rejected
H5: Knowledge of the respondent does not affect his/her awareness towards sustainable agriculture.	Accepted
H6: Cost aspects do not affect respondent's awareness towards sustainable agriculture.	Accepted
H7: Benefits aspects do not affect respondent's awareness towards sustainable agriculture.	Rejected
H8: Environmental aspects do not affect respondent's awareness towards sustainable agriculture.	Accepted
H9: Social aspects do not affect respondent's awareness towards sustainable agriculture.	Rejected

**Findings-**

The results of the present study revealed that most of the male tribal farmers are doing sustainable agriculture. Most of the tribal farmers belonged to middle age group. As regard the education, the farmers were found to have attained up to primary schooling. The investigation indicated that farmers possessed medium size farm. The findings of this study revealed positive perception of sustainable agriculture with significant relationships between age, educational background, farm size, benefits of organic farming, and social factors. Other factors like knowledge, environment and gender have no explanatory significance awareness of the farmers.

**CONCLUSION**

The findings of this study revealed positive perception of sustainable agriculture with significant relationships between age, educational background, farm size, benefits of organic farming, and



social factors. This shows that the communities will have high adoption rate of innovations related to sustainable agriculture. The concern, however, is that recent studies in the same geopolitical zone describe low practice of sustainable agriculture. This gap between knowledge can be bridged by understanding the system and government provisions like provision of credit facilities, training on technicalities to farmers. This study also revealed that cost associated with sustainable agriculture does not affect farmer's awareness/perception towards sustainable agriculture. Other factors like knowledge, environment and gender have no significance towards awareness of the farmers on sustainable agriculture. Farmers of southern region of Odisha are using HandiKhata and Nimastra instead of chemical pesticides, Jibamruta instead of Potas and they are using jiajala, cow dung manure, green manure in their field which is satisfying all three conditions for sustainable agriculture i.e. it is environment friendly, cost effective and satisfy society's needs.

## REFERENCES

1. Al-Swidi AK, Huque SM, Hafeez M, Shariff M. The role of subjective norms in theory of planned behavior in the context of organic food consumption. *British Food Journal*, 2014;116:1561-1580.
2. Alan D Dangour SK. Nutritional Quality Of Organic Foods: A Systemetic Review. *American Society For Nutrition* . 2009;90(3): 680–685.
3. Andreas G. Enhanced Top Soil Carban Stocked Under Organic Farming. *PNAS*. 2012; 109 (44) 18226-18231.
4. Bartholomew A. ICT adoption in developing countries: perspectives from small-scale agribusinesses. *Journal of Enterprise Information Management*. 2010; 24(1):68-84.
5. Kothari CR. *Research Methodology Methods And Techniques*, third edition. New Age International (P) Ltd. 2014.
6. Dimitri C, Dettmann RL Organic food consumers: what do we really know about them? *British Food Journal*. 2012;114(8).1157-1183.
7. Catherine B. Organic Agriculture and The Global Food Supply. *Renewable agriculture and Food System*. 2006;22(2):86-108.
8. Catherine G. UK consumer reactions to organic certification logos. *British Food Journal*. 2013; 115 (5):727 -742.
9. Chakrabarti S. Factors influencing organic food purchase in India – expert survey insights. *British Food Journal*. 2010; 112(8):902-915.
10. Klöckner CA, Ohms S. (2009). The importance of personal norms for purchasing organic milk. *British Food Journal*, 2009;111(11):1173-1187.
11. Christine H. A literature-based comparison of nutrient and contaminant contents between organic and conventional vegetables and potatos. *British Food Journal*. 2009; 111(10):1078-1097.
12. Christine H. The Nutritional and Toxicological Value of Organic vegetables- Consumer Perception Versus scientific evidence. *British Food Journal*. 2009; 111(10):1062-1077.

13. Patidar S. A Study of Perception of Farmers Towards Organic Farming. 2015.
14. Glover JD. Systematic method for rating soil quality of conventional, organic, and integrated apple orchards in Washington State. *Agriculture Ecosystems and Environment*. 2000;80(1-2): 29-45.
15. Joris A. Differences in retail strategies on the emerging organic market. *British Food Journal*. 2009; 111(2):138-154.
16. Joris A. The influence of subjective and objective knowledge on attitude, motivations and consumption of organic food. 2009;113(11):1353-1378.
17. Joris A. Personal determinants of organic food consumption: a review. *British Food Journal*. 2009; 111(10):1140 - 1167.
18. Bryceson KP, Slaughter G.. Alignment of performance metrics in a multi-enterprise agribusiness: a case of integrated autonomy? *International Journal of Productivity and Performance Management*, 2010;59 (4): 325-350.
19. Koen M. Importance of health and environment as quality traits in the buying decision of organic products. *British Food Journal*. 2009, 111(10):1120-1139.
20. Leila HE. Exploring the decision-making process of Canadian organic food consumers Motivations and trust issues. *Qualitative Market Research : An International Journal*. 2009; 12(4):443-459.
21. Marius C. Fatty acid composition of mountain milk from Switzerland: Comparison of organic and integrated farming systems. *International Dairy Journal*. 2008; 18(10-11):976-982.
22. Navjot S. Entrepreneurship education and training needs of family businesses operating in the agricultural sector of India. *Education and Training*. 2012;54(8/9).
23. Ramesh P. Status Of Organic Farming In India. *Current Science*. 2010;98(9):1190-1194.
24. Paul J, Rana J. Consumer behavior and purchase intention for organic food. *Journal of Consumer Marketing*, 2012;29(6):412-422.
25. Pellegrini. Organic consumers and new Lifestyles An Italian country survey on consumption patterns. *British Food Journal*. 2009; 111(9):948-974.
26. Roussos. Phytochemicals and antioxidant capacity of orange (*Citrus sinensis* (L.) Osbeck cv. Salustiana) juice produced under organic and integrated farming system in Greece. *Scientia Horticulturae*. 2011; 129(2):253-258.
27. Deike S. Investigations on the energy efficiency of organic and integrated farming with specific emphasis on pesticide use intensity. *Europ. J. Agronomy*. 2008; 28(3):461-470.
28. Sean LT. Land-use intensity and the effects of organic farming on biodiversity: a hierarchical meta-analysis. *Journal of Applied Ecology* . 2014;51(3): 746-755.
29. Shih-Jui T. Attitudinal inconsistency toward organic food in relation to purchasing intention and behaviour An illustration of Taiwan consumers. *British Food Journal*. 2012; 114(7):997-1015.

- 30.** Stacey C, Katija Morley DA. Coverage of organic agriculture in North American newspapers Media: linking food safety, the environment, human health and organic agriculture. *British Food Journal*. 2010; 112(7):710-722.
- 31.** Kumar S. Ali J. Analyzing the Factors Affecting Consumer Awareness on Organic Foods in India. Presentation at 21st Annual IFAMA World Forum and Symposium on the Road to 2050: Sustainability as a Business Opportunity, Frankfurt, Germany, 2011.
- 32.** Thomas N. Life cycle assessment of Swiss farming systems: I. Integrated and organic farming. *Agricultural Systems*. 2011; 104(3):217-232.
- 33.** Verena S. Comparing The Yield Performance of Organic and Conventional Agriculture. *Nature* 2009;485(7397):229-32

## MATHEMATICAL MODELING OF HYDRAULIC EQUIPMENT OF A MULTI-PURPOSE MACHINE AND THE SEQUENCE OF TRANSFER OF THE DYNAMIC MODEL TO THE GENERALIZED COORDINATE SYSTEM

**K.J.Rustamov\***; **G.Y.Husenova\*\***

\*Associate Professor,  
Phd,  
Tashkent State Transport University, Tashkent City, 100167,  
Temiryulchilar 1, UZBEKISTAN

\*\*4th year Student,  
Tashkent State Transport University, Tashkent City, 100167,  
Temiryulchilar 1, UZBEKISTAN

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### ABSTRACT

*The article proposes a specific method for automating the construction of a mechanical subsystem model of the hydraulic equipment, the calculation of which was carried out using the Taylor method, Lagrange equations.*

**KEYWORDS:** *In Order, Systems, Motion, Handles, Dimensional, Common, Shape, Coordinate.*

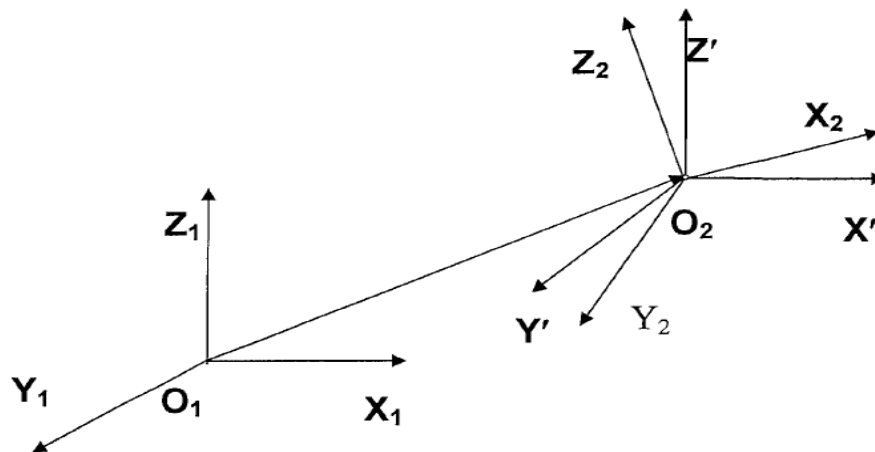
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### INTRODUCTION

Despite all the variety of the HE (hydraulic drive), all of them can be presented in the form of multi-link hinges with the main chassis, turntable, boom, handle, bucket, hinge-connector [1, 2].

In general, when describing the mechanical subsystem of the HE, the following assumptions were made [1, 3]:

- HE is a spatial hinge-link multi-branch joint (metal structural elements are absolutely rigid);
- HE is a holonomic stationary system;
- Absence of backhoes in hinged joints;
- External forces acting on the HE is directed;
- The inertial properties of metal structural elements are characterized by masses, coordinates of centers of mass, moments of inertia, moments of inertia of eccentricity;
- Excavator bodies have elastic-viscous properties of turning platforms, arrows, buckets and handles, hydraulic cylinders.
- In order to derive the HE motions equations, it is first necessary to show the coordinate systems that allow to describe the displacements in space one by one [1].



**Figure 1 - Three-dimensional spatial coordinate change.**

The Cartesian coordinate system is currently the most common and allows for the most massive and precise geometric interpretation.

The problem of determining the mutual position of HE connections can be easily solved by using the same coordinate method, the problem of converting one coordinate system to another [4, 5].

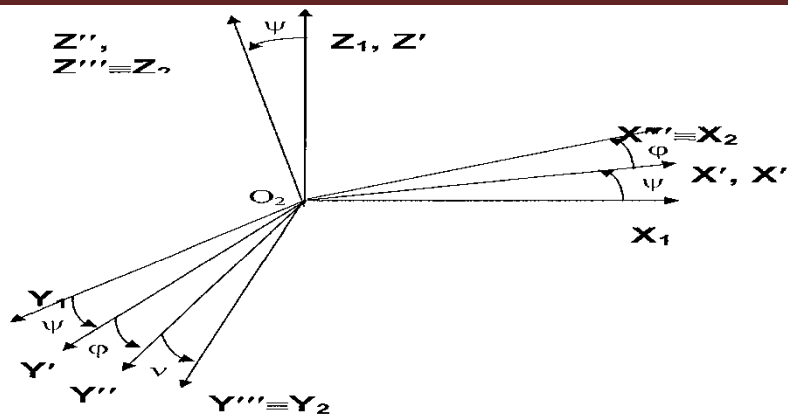
$$A_s = \left[ \begin{array}{ccc|c} & & & s \\ & E & & \\ \hline 0 & 0 & 0 & 1 \end{array} \right] A_\tau = \left[ \begin{array}{ccc|c} & & & 0 \\ & \tau & & 0 \\ \hline 0 & 0 & 0 & 1 \end{array} \right] \quad (1)$$

Here: E - 3x3 matrix;  $s = [x \ u \ z]^T$  is the vector representing the transition from one local coordinate system to another local coordinate system;  $\tau$  is a 3x3 matrix of directional cosines showing the transformation of one local coordinate system into another.

All variable data in three-dimensional space can be reduced to two different phase combinations: rotation and transfer along the coordinate axes (Fig. 1). They are represented using special matrices of the 4x4 type [4, 5].

Single coordinate system is used in the Euler transform, which performs three consecutive elementary turns to determine the angular position of  $O_2X_2Y_2Z_2$  relative to the other  $O_2X_1Y_1Z_1$  (Fig. 2) [1, 4].

1. Rotate the coordinate system  $O_2X_1Y_1Z_1$  to an angle around the  $Z_1$  axis (we get the coordinate system  $O_2X'Y'Z'$ ,  $Z'=Z_1$ );
2. Rotate the coordinate system  $O_2X'Y'Z'$  to the angle  $\phi$  around the  $X'$  axis (we get the coordinate system  $O_2X''Y''Z''$ ,  $X''=X'$ );
3. Rotate the  $O_2X''Y''Z''$  coordinate system at an angle  $\nu$  around the  $Y''$  axis (we get the  $O_2X'''Y'''Z'''=O_2X_2Y_2Z_2$  coordinate system,  $Y_2=Y'''$ ).



**Figure 2. Rotation along the Euler angle of the coordinate system**

The sign values of the angles  $\psi$ ,  $\phi$ ,  $\nu$  are taken in the opposite direction to the clock hand.

Thus, we have a matrix shape that defines the transition from one local coordinate system to another [1, 6, 4]:

$$A = A_s \cdot A_\tau = \begin{bmatrix} \tau & s \\ 0 & 0 & 0 & 1 \end{bmatrix} \tag{2}$$

The output of the  $A_s$  matrix to the initial coordinate system is obtained by multiplying the matrices along each axis of the coordinate system [4, 6].

$$A_s = A_x \cdot A_y \cdot A_z \tag{3}$$

$$A_x = \begin{bmatrix} 1 & 0 & 0 & x \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}; A_y = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & y \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}; A_z = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & z \\ 0 & 0 & 0 & 1 \end{bmatrix} \tag{4}$$

By rotating each coordinate system around its own axis and multiplying the matrices by each other, we obtain the result by creating a coordinate system with a matrix  $A_\tau$ . [1, 7, 8]:

$$A_\tau = A_\phi \cdot A_\nu \cdot A_\psi \tag{5}$$

$$A_\phi = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & \cos \phi & \sin \phi & 0 \\ 0 & -\sin \phi & \cos \phi & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}; A_\nu = \begin{bmatrix} \cos \nu & \sin \nu & 0 & 0 \\ -\sin \nu & \cos \nu & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}; A_\psi = \begin{bmatrix} \cos \psi & 0 & -\sin \psi & 0 \\ 0 & 1 & 0 & 0 \\ \sin \psi & 0 & \cos \psi & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \tag{6}$$

The use of a homogeneous coordinate system made it possible to determine the transition of one local coordinate system to another matrix A (conversion to a homogeneous matrix):



$$A = \begin{bmatrix} \cos v \cdot \cos \psi & \sin v & -\cos v \cdot \sin \psi & x \\ -\cos \varphi \cdot \sin v \cdot \cos \psi + \sin \varphi \cdot \sin \psi & \cos \varphi \cdot \cos v & \cos \varphi \cdot \sin v \cdot \sin \psi + \sin \varphi \cdot \cos \psi & y \\ \sin \varphi \cdot \sin v \cdot \cos \psi + \cos \varphi \cdot \sin \psi & -\sin \varphi \cdot \cos v & \sin \varphi \cdot \sin v \cdot \sin \psi + \cos \varphi \cdot \cos \psi & z \\ 0 & 0 & 0 & 1 \end{bmatrix} \quad (7)$$

If a point in the local coordinate system of the i-joint is represented by a homogeneous coordinate vector  $\vec{R} = [x_i \ y_i \ z_i \ 1]^T$ , then the vector  $\vec{R}_{i-1}$  in the local coordinate system of the (i-1) series [1, 4, 6].

$$\vec{R}_{i-1} = A_i \cdot \vec{R}_i \quad (8)$$

Where:  $A_i$  - (i-1) is the matrix for converting the  $i^{th}$  coordinate systems to the coordinate system of the joint.

Any point of the i-junction shown by the vector  $\vec{R}_i$  in the local coordinate system of this joint is determined in the inertial system of the coordinate vector [8, 9].

$$\vec{R}_{oi} = T_i \cdot \vec{R}_i \quad (9)$$

Here  $T_i$  is the transition matrix from the local coordinate system to the inertial coordinate system:

$$T_i = A_1 \cdot A_2 \cdot \dots \cdot A_i \quad (10)$$

The mathematical model of the HE mechanical subsystem is a system with nonlinear coefficients. The main simplification is to draw the coefficients by the Taylor method. The Taylor method allows the expansion of a weak linear function in small incremental forces obtained around a constant state point of several variables [3, 4].

$$f(q_1, q_2, q_3, \dots) = f(q_{01}, q_{02}, q_{03}, \dots) + \frac{df}{dq_1} \Delta q_1 + \frac{df}{dq_2} \Delta q_2 + \frac{df}{dq_3} \Delta q_3 + \dots + \frac{1}{2!} \cdot \frac{d^2f}{dq_1^2} \Delta q_1^2 + \frac{1}{2!} \cdot \frac{d^2f}{dq_2^2} \Delta q_2^2 + \frac{1}{2!} \cdot \frac{d^2f}{dq_3^2} \Delta q_3^2 + \dots \quad (11)$$

Where  $f(q_1, q_2, q_3, \dots)$  is a constant function of many variables,  $q_1, q_2, q_3, \dots$  - the coordinates of the steady-state points,  $\Delta q_1, \Delta q_2, \Delta q_3, \dots$ , the values of the small increments of the variables obtained near them [1].

In constructing equations, they are limited to the first order of small conditions, which leads to their approximate description by linear differential equations at small deviations. For a small deviation  $\Delta f$  of the function  $f(q_1, q_2, q_3, \dots)$  will be:

$$\Delta f \approx \sum \frac{df}{dq_j} \cdot \Delta q_j, (j=1, 2, 3, \dots) \quad (12)$$

$\Delta f \approx df, \Delta q_j \approx dq_j$  - Given that, the linear equation has the following form:

$$df \approx \sum \frac{df}{dq_j} \cdot dq_j, (j=1, 2, 3, \dots) \quad (13)$$

Defining a small increase in the generalized coordinates as  $q_j = dq_j$ , we write formula (12) in the following form:

$$df \approx \sum \frac{df}{dq_j} \cdot q_j, (j=1, 2, 3, \dots) \tag{14}$$

Point character vectors and velocity vectors are represented in the form of a linear equation as follows:

$$\vec{R}_{oi} = \sum_{j=1}^l U_{ij} \cdot q_j \cdot \vec{R}_i \tag{15}$$

$$\vec{\dot{R}}_{oi} = \frac{d\vec{R}_{oi}}{dt} \tag{16}$$

$$\vec{\dot{R}}_{oi} = \sum_{j=1}^l U_{ij} \frac{dq_j}{dt} \cdot \vec{R}_i = V_i \cdot \vec{R}_i \tag{17}$$

$$V_i = \sum_{j=1}^l U_{ij} \frac{dq_j}{dt} \tag{18}$$

$$U_{ij} = \frac{dT_i}{dq_j} \tag{19}$$

To differentiate the formula (19) is carried out using the differentiation of matrices [2, 10]

$$E_x = \begin{bmatrix} 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}; E_y = \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}; E_z = \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix};$$

$$E_\varphi = \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}; E_v = \begin{bmatrix} 0 & 1 & 0 & 0 \\ -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}; E_\psi = \begin{bmatrix} 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix} \tag{20}$$

The universal method of constructing motion equations is the second type of Lagrange equations method, which is used to solve many problems of dynamics and allows to obtain digital algorithms for modeling the motion of complex systems and is the most efficient in terms of computer time value:

$$\frac{d}{dt} \left( \frac{dK}{dq_j} \right) - \frac{dK}{dq_j} + \frac{dP}{dq_j} + \frac{d\Phi}{dq_j} = Q_j, (j = 1, 2, \dots, l) \tag{21}$$

where  $t$  is time;  $q_j$  – generalized  $j$ -coordinate;  $\dot{q}_j$  – velocity along the generalized  $j$ -coordinate;  $K$  – kinetic energy;  $P$  – potential energy;  $F$  – dissipative function; generalized  $j$  is the generalized force  $Q_j$  – moving along the coordinate [1].

The system of differential equations (21) can be expressed in the form of a vector-matrix [2].

$$A\ddot{\vec{q}} + B\dot{\vec{q}} + C\vec{q} = \vec{Q} \quad (22)$$

Where  $A$ ,  $V$ ,  $S$  are the coefficients of the differential equations of the matrices;

The vectors  $\ddot{\vec{q}}$ ,  $\dot{\vec{q}}$ ,  $\vec{q}$  – represent the values of acceleration, velocity and small deviations of the generalized coordinates, respectively;  $\vec{Q}$  is the vector of generalized forces.

Thus, a system of differential equations with variable coefficients was created, which is a mathematical model of the HE mechanical subsystem.

The values obtained by the method of frozen coefficients are determined by the method of sequential approximation [4].

The first approximation  $x_1$  is found by the method of frozen coefficients, i.e. the equation is solved:

$$a_0^0 = \frac{d^n x_1}{dt^n} + \dots + a_n^0 x_1 = f_1(t) \quad (23)$$

As a result, we obtain a definite solution of the differential equation with variable coefficients over time.

Thus, the following method is proposed to automate the construction of the EG mechanical subsystem model:

1. The following connection parameters are set according to the calculation scheme of EG: generalized coordinates, coordinates of centers of local coordinate systems of joints, coordinates of center of mass of joints, joint masses, moments of inertia of joints, moments of centrifugal inertia of joints, constructive parameters of joints, parameters of elastic-adhesive elements.
2. Based on this data, the dynamic equations are automatically constructed with variable coefficients in the form of Lagrange equations of the second type, which are solved by the method of frozen coefficients.

The mathematical model of the hydraulic drive subsystem of a multi-purpose machine excavator is based on the following sequence: [1, 4]

Is a volumetric modulus of elasticity of the working fluid during the continuous process under study?

Inertial components of the working fluid flow are not considered;

Wave processes in hydraulic elements are not considered;

The parameters of the hydraulic elements are summarized;

The pressure loss along the length of the hydraulic line is determined by the average values of the fluid flow at the inlet and outlet of the hydraulic line;

The coefficients of consumption of local hydraulic resistance in the joints during the process under study are constant;

Fluid leakage in hydraulic elements is not considered;

Fluid compression in the working cavities of the hydraulic pump and hydraulic motor is not considered;

Unevenness of hydraulic pump supply and unevenness of hydraulic motor flow are not considered;

Dry friction forces are not considered.

To describe the system as a whole, it is necessary to specify the types of functional elements that make up the hydraulic drive system, it is enough to determine the necessary physical and structural parameters of these elements and describe the structural schemes.

The structure of the hydraulic chain in the arbitrary structural scheme of the HE, after its elements are numbered, is characterized by a connection matrix of the following form:

$$S = \begin{pmatrix} i_1 & i_2 & \dots & i_k \\ j_1 & j_2 & \dots & j_k \end{pmatrix} \quad (24)$$

Where:  $i_1, i_2, \dots, i_k$  numbers of two-source elements;  $j_1, j_2, \dots, j_k$  numbers of receiving elements; the number of arc-bonds between k-elements.

The numbering of elements is represented by a matrix of the number of hydroelements that make up the structural scheme of the following form:

$$N = \begin{pmatrix} n_1 & n_2 & \dots & n_p \\ v_1 & v_2 & \dots & v_p \end{pmatrix} \quad (25)$$

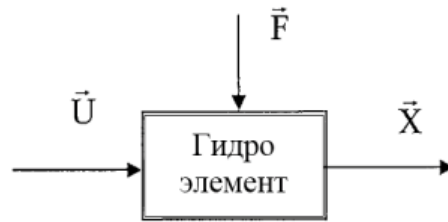
Where:  $n_1, n_2, \dots, n_p$  is the number of types of functional elements;

$v_1, v_2, \dots, v_p$  in the corresponding library of elements;

$p$  is the number of hydraulic elements that make up the structural scheme of the hydraulic drive.

This work proposes a methodology for complex mathematical models of hydraulic drives, based on the reflection of hydraulic transmissions and their individual elements in the form of multidimensional dynamic objects, whose dynamic properties are characterized by the transfer functions of their matrices. [1, 4, 6].

A separate hydraulic element or hydraulic circuit can be represented as a multidimensional dynamic object (Figure 3), the output quantity vector  $\vec{X}_j = [x_1, \dots, x_n]^T$ , the input quantity vector  $\vec{U}_j = [u_1, \dots, u_m]^T$  and the external excitation vector  $\vec{F}_j = [f_1, \dots, k_n]^T$ .



**Figure 3 - Multidimensional dynamic object**

The dynamic properties of a multidimensional object are fully determined by its equations of motion [11, 12]. A system of linear motion equations in the form of a vector-matrix has the form.

$$A(s) \cdot \vec{X} = B(s)\vec{U} + C(s) \cdot \vec{F} \quad (26)$$

where:  $A(s)$  is a square matrix of size  $n \times n$ ;  $B(s)$  is a rectangular matrix of size  $n \times m$ ;  $C(s)$  is a rectangular matrix of size  $n \times k$ ;  $s$  - Laplace operators.

The mathematical model of the linear equation of a hydraulic multidimensional object can be considered as a hydraulic multivariate. In this case, the problem of mathematical modeling is reduced to the determination of the resulting transmission functions of the hydraulic drive. In this case, the hydraulic drive model reflects the relationship between the output volume vectors and the external impact vectors, except for the vectors that connect the individual hydraulic multi-links to a single hydraulic system.

The mathematical models of the resulting hydraulic multi-link are allowed in terms of output volume vectors. [13,14]

$$\vec{X} = W_{xu} \cdot \vec{U} + W_{xf} \cdot \vec{F} \quad (27)$$

$$W_{xu} = A^{-1}(s) \cdot B(s) \quad (28)$$

$$W_{xf} = A^{-1}(s) \cdot C(s) \quad (29)$$

Where,  $W_{xu}$  is the matrix signal function of the multidimensional input-output object;  $W_{xf}$  is a function of transmitting motion effects and the output matrix.

Thus, the following method is proposed to automate the modeling of the EG subsystem.

1. The hydraulic system is described in the form of structural diagrams consisting of hydraulic elements.
2. The physical and design parameters of the hydraulic elements included in the hydraulic drive subsystem are set.
3. A matrix of the number of hydroelements that make up the structural scheme of formula (24) is constructed.
4. From formula (25) the matrix of connections between hydroelements is constructed.

5. Mathematical models of linear equations of hydraulic elements using the coupling matrix  
The mathematical model of hydraulic drive is formed on the basis of hydraulic multi-links:

$$W(s) \cdot \vec{X} = \vec{F} \quad (30)$$

where,  $W(s)$  is the block matrix, whose blocks are the matrix transmission functions of the hydraulic multi-link;  $\vec{X}$  is the block vector  $\vec{X}_i$ ;  $\vec{F}$  consisting of vectors of the output quantity;  $\vec{F}$  is the vector of external influences  $\vec{F}_j$ .

We find the output vector from the system of equations.

$$\vec{X} = W^{-1}(s) \cdot \vec{F} \quad (31)$$

## REFERENCES

1. Juraboevich RK. Development of a Dynamic Model and Equations of Motion for Hydraulics of Multipurpose Machine MM-1. Electronic Journal of Actual Problems of Modern Science, Education and Training. 2021;8(4):75-86.
2. Nekrasevich KYa. Mathematical model of a hydraulic system implemented using the combined principle of adaptation to load. Dynamics, strength of machines and structures. 2014;26(1):23-31.
3. Rebrov AS. On the issue of increasing the productivity of single-bucket construction excavator. Proceedings of the Stroydormash Research Institute. M.: Mashgiz, 1954;(9).
4. Shcherbakov BC. Mathematical description of a loosening unit in homogeneous coordinate systems. 1980. 48 p.
5. Medvedev BC, Leskov AG, Yushchenko AS. Control systems of manipulative robots. M.: Nauka, 1978. 416 p.
6. Rustamov KJ, Komilov SI, Kudaybergenov MS, Shermatov ShX, Xudoyqulov ShSh. Experimental Study of Hydraulic Equipment Operation Process. Conmechydro. 2021, 264;02026.
7. Ruppel AA, Shcherbakov IS. Override the geometric parameters of the unit Body in the system modeling 154 Matlab/Simulink. Сборник scientific works. 2006;(5):107-109.
8. Yurevich EI. Theory of automatic control. Textbook for higher education students. textbook. institutions. 2nd edition. L.: Energiya, 1975. 416 p.10.
9. Balovnev VI, Xmara LA. Intensification of land works in road construction. M.: Transport, 1983. pp.3-9
10. Korobochkin BL. Dynamics of hydraulic stankov sistem. M.: Mashinostroenie, 1976. 240 p.



- 11.** Askarhodjaev T, Rustamov K, Aymatova F, Husenova G. Justification of the hydraulic system parameters of the excavation body of a multi-purpose road construction vehicle based on the TTZ tractor. *Journal of Critical Reviews*, 2020;7(5):229-234.
- 12.** Rustamov KJ, Komilov SI, Djumaev KhDj, Tadjikhodjayeva MR, Abdugarimova Sh. Innovative Approaches and Methods in Teaching Technical Subjects. *Turkish Journal of Computer and Mathematics Education*, 2021;12(5):1861-1866.
- 13.** Rustamov KJ. Experimental Work of the Hydraulic Equipment of the Multi-Purpose Machine Mm-1. *International Journal of Recent Technology and Engineering*, 2019;8(4): 12032- 12036.
- 14.** Rustamov KJ. Technical solutions and experiment to create a multipurpose machine. *International Journal of Scientific and Technology Research*, 2020;9(3):2007–2013.

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## ESTABLISHMENT OF MEDICAL INSTITUTIONS IN FERGHANA DURING THE YEARS OF SOVIET POWER

**Hakimov Adkhambek\***

\*Teacher,  
Department of History of Uzbekistan,  
Fergana State University,  
Fergana, UZBEKISTAN  
Email Id: hakimov\_a@gmail.com

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### ABSTRACT

*The deterioration of the world's ecology, global warming, climate change, pandemic conditions require strong attention to health work. The World Health Organization is consistently implementing measures aimed at protecting the health of the population in various regions of the Earth, preventing epidemics, a wave of pandemics, developing and implementing a health program with governments, improving and protecting the health of the environment, protecting the health of mothers and children, training medical personnel, maintaining sanitary statistics, in particular, coordinating scientific and research work. This article is about the establishment of medical institutions in Fergana in the years of Soviet power.*

**KEYWORDS:** *Medicine, Reverse Health, Wellness, Population Health, Ecology.*

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### 1. INTRODUCTION

In Central Asia, a national-territorial boundary was established, with the establishment of the Uzbek SSR, under the influence of a number of factors, specific changes occurred in the socio-political processes in the country. The economic situation of Uzbekistan in comparison with other central republics, which were part of the union, was far behind, specializing mainly in the production of agricultural products. In particular, processes in the health sector, which is considered a component of the social sphere, experienced specific changes during this period.

The Soviet government first of all drew attention to the work on the protection of the health of the population in order to ensure production with a healthy labor force, proceeding from their own interests. The amount allocated to the sphere in Uzbekistan has increased in part. In 1927-1928, 14,415 thousand rubles were allocated to this sphere, 1928-1929 – 20,525 thousand rubles, 1932-1933 – 32,461 thousand rubles [1].

### 2. MAIN PART

In Uzbekistan, the number of hospitals in Fergana has increased. In particular, if there were 53 hospitals in Uzbekistan in 1925, then in 1928 their number increased by 91, treatment places increased from 2135 to 3995. In accordance with the first five-year plans announced by the Soviet authorities in Uzbekistan, the tasks that should be carried out in the field of medical services are defined. Treatment in the cities of the Republic from 1928 to 5548 from 1932 to

6180 units, from 98 to 141 units in outpatient clinics, from 35 to 56 units in women's and children's counsellors.

Despite the increase in the number of chifbons, some diseases are common among the population. In particular, in 1929, 23,7 percent of the rural population identified infectious diseases. 93 percent of infectious social diseases spread among the population accounted for syphilis, tuberculosis and malaria [2]. In the Republic, in particular in Fergana, in 1929-1930, positive work was carried out in the field of combating tuberculosis. For example, during this period, the work on the creation of sanatoriums for children with tuberculosis was much more animated.

And also in the years of Soviet power was one of the most dangerous and infectious social diseases – leprosy. Previously, in Central Asia, there was an unusual attitude to such a disease from ancient times, when the sick inadvertently taken from the village. They live in special villages, their connection with a healthy population is prohibited. Until 1933 year, that is, until the opening of the Karakalpakstan leprosy (leprosy), patients were sent from Uzbekistan to the colony on the territory of Kazakhstan. The first leprosy in Karakalpakstan was located 8 km from the center of the Karauzak district, in 1936 year there were 220 seats in this treatment center. Due to the fact that the work on the treatment of leprosy patients is not at the required level, there are not enough living conditions created in the colonies in which they live, and other similar factors, the life expectancy of patients has increased.

In the first years of Soviet rule, there were a number of difficulties in establishing the work of maternal and child institutions in Fergana. The work was carried out with difficulty in educating the local population on the requirements of simple sanitation and hygiene, especially due to the inadequacy of adequate sanitary education work among the population. For example, the next day mothers did not bring their children to the nursery, as a result of the fact that in the nursery they were taken by a nurse to the hairdresser by children whose hair was growing.

Well, the whole of Uz SSR, in particular Fergana Valley in the health sector, accurate statistics and registration work has not been carried out sufficiently. As a result, it was not possible to determine the exact number of cases of various diseases of the population, the birth rate, the incidence and mortality of mothers and children. The lack of adequate sanitary education was a serious obstacle to the development and improvement of the work on establishing the industry and protecting the health of the population.

In Uzbekistan, in Fergana, the material and technical base of medical institutions has been strengthened over the years. Treatment facilities were built on the basis of standard projects, providing facilities for medical workers and patients. Even, adapted to the specialties of medicine, he was equipped with equipment, furniture, soft and hard inventories. Many treatment facilities in almost major cities of Fergana have been built in new standards.

But if an in-depth analysis of the measures to strengthen the material and technical base of the sphere is carried out, the errors and omissions are clearly visible. In Soviet times, the policy carried out in the field of medical care was based on the administrative-command system of management, on the basis of which the interests of the center stood. Therefore, the natural conditions and climatic features of Uzbekistan were not taken into account in determining the prospects of the sphere. The development of the medical service sector is an ecstasy approach, the main criterion for assessing the system activities was measured by the increase in the number

of treatment facilities, the number of medical service personnel, the number of hospitals, polyclinics and ambulances. Although there was a loss to quality, the quantity indicator was succumbed to chase. The hospital and other treatment facilities have been placed in non-comfort, personalized buildings due to the effort of barely increasing the number of treatment facilities. In order to carry out the implementation of the plans set by the state, hospitals in hostels, residential buildings were created, which went along the path of additional writing. Due to the fact that hospitals were placed in adapted buildings, the possibility of using modern medical equipment and equipment was limited. [3]

The funds allocated to the work of medical services in most cases remained completely undeveloped. For example, in 1946 year in Uzbekistan more than 13 million rubles of the funds allocated to the sphere of medical services remained unused. This is especially evident in the construction of treatment facilities. Capital construction plans of the health sector in the Republic, including the Fergana region, were not permanently fulfilled. In 8 of 1949, the plan of capital construction of health institutions was fulfilled only 47 percent. During this period, it is planned to start the construction of a total of 51 objects, in practice only 32 objects began to work. Taking this situation into account, on September 23, 1949, the decision of the Council of Ministers of the USSR on the unsatisfactory condition of capital construction work of the Ministry of health of Uzbekistan was announced.

In 1949-1951, the plan for the construction of health institutions of Uzbekistan was almost not fully implemented. For example, the capital construction work planned to be completed in this area in the first half of this year is 5,2 per cent completed in the Namangan and Fergana regions [4]. In Andijan region, construction work in the healthcare sector, which should begin this year, was not carried out at all. For example, in 1951 in the Yangikurgun district of Namangan region, when the state of the material and technical base of the health system was analyzed, a number of shortcomings were noticed. In hospitals in the district, capital repair work was not carried out once during the years 1945 – 1951 [5].

### 3. DISCUSSIONS

In the 60-ies of the XX century, when the progress of the construction of health care facilities was compared with the scale of different Republican regions, in almost all regions, in most cases, various reasons were encountered and plans were agreed not to be fulfilled. The origin of such a condition was caused by a number of factors. In particular, since there are not enough project-estimate works to start construction work, the construction is not timely, the job of providing the facilities with the labor force is in an unsatisfactory state, the construction materials are not delivered on time, the shortcomings in the management work, as well as the shortage of material resources, etc.

In 1980, when 96278, 6 thousand people applied to the treatment centers of the Republic (1975), their number was 131350, 5 thousand, of which only 51328, 8 were rural residents. In Fergana region, the population's appeal to outpatient clinics increased from year to year. However, most of the applicants were on the account of the residents of the city. In the villages, outpatient services were 2 times behind than in the city. Because in the villages did not pay attention to the strengthening of the material and technical base of the treatment institutions. 80 percent of the FAPs in the Fergana region were operating in personalized buildings, with no amenities available. In 1980 from the state budget of Uzbekistan 687, 7 million. the ruble was spent on

health care [6]. In addition, the health sector was allocated funds from state, cooperative, trade union organizations, collective farms. The large amount of funds allocated for the sphere was spent mainly on stationary ones.

In 1981 year in Uzbekistan it was planned to spend 77530 thousand rubles for the construction of the health capital [7]. The government of the Republic seriously paid attention to the issue of capital construction in the health care system, this issue was discussed at the meetings of the compartments of Uzbekistan CC on May 18 and August 24, 1981. However, not only in Fergana, medical institutions in all regions were placed in adapted buildings, the condition of hospitals' laundry facilities, food warehouses and other additional buildings was not in demand. Because of the poor quality of the building materials allocated for health institutions, they were not used. A little slack has been attached to the work on the construction of buildings of existing treatment facilities on the basis of standard projects. Treatment facilities under construction in collective farms and amour of the regions were built mainly by way of sandal.

Although the plan to open treatment facilities in Uzbekistan is trying to fulfill the increase, it became known that there is a huge difference in the middle in comparison with the Union indicators of the cost of treatment places per capita. For example, if in 1940 the Union accounted for 41 treatment places for every 10 000 population, in 1990 it was 132.9. In Uzbekistan, this increased from 32[8] to 123.1 units. In turn, the number of hospital facilities also increased from year to year. For example, in 1940, 13472 hospitals were operating in the country, by 1956, their number was 24 105 units. In total, the number of treatment facilities of this type increased from 368 to 773 units in the provinces [9].

The main problem in improving the work of health institutions – was the lack of treatment places. For example, in 1952 year in Namangan City hospital more than 600 patients were given a refusal due to lack of treatment places[10]. According to the plan, only 75 out of 150 treatments were opened in Andijan regional city hospitals in 1953[11].

## 4. RESULTS

Since the 60-ies of the XX century, the work on strengthening the material and technical base of health institutions has been somewhat animated. For example, the amount allocated from the state budget to the health sector is 1966 year 16, 5 million. From the ruble 1970 year 24, 1 million. Increased by the ruble [12]. In Fergana region, certain measures were also taken to improve the medical care provided to the rural population, to improve its quality. For example, in 1967, 43 percent of Fergana and 49 percent of rural residents of Andijan were placed in the places of urban treatment institutions [13].

On July 5, 1968, the Soviet government adopted a resolution "On further measures to improve the development of health and medical science in the country" [14]. Some work has been carried out to ensure the implementation of the decision. In particular, treatment options have also been increased. In Uzbekistan during this period, 139 thousand treatment places, 1770 outpatient polyclinic institutions, 272 specialized dispensaries, 1176 pharmacies were functioning [15].

But in the Fergana Valley regions the area of treatment vacancies was incredibly small. For example, in the Fergana region of 1971 year instead of a single treatment came across an area of 2, 5 meters. This is according to the norm 6 kv.m. Should have been. Due to the lack of treatment space, the scope of hospitalization of patients in most cases did not reach 100 percent. For

example, in 1971 in Andijan City, Hospitalization of patients with internal diseases was only 55-60 per cent, 70 per cent of surgical and ear patients, 10-15 per cent of urological patients, 40-45 per cent of nerve patients [16]. The situation in the villages and districts was even worse.

Many areas of medicine have not been set off due to lack of treatment facilities. For example, until the middle of the 70-ies of the XX century in the Namangan region, the network of medicine in the field of heart (Cardiology) diseases was not well established. In the region, cardiology service for the population was carried out in the cardiology departments of the Namangan City Hospital No.2 with 40 seats and 30 seats in the Regional Hospital. Therefore, there was a decrease in the indicator of compliance with cardiology treatment places every 10 000 inhabitants, and not an increase from year to year. For example, in 1976, treatment vacancies in cardiology in every 10 000 population in the region fell from 0, 7 to 0, 6 in 1977 [17].

When treatment places are distributed in different specialties of medicine, it is known that the lack of treatment places mainly for women and children. For example, as a rule, 17.5 treatment places for women and babies should be suitable for every 10 000 population, and in practice this was 11.9 in 1980 in Uzbekistan. This condition was also observed in the treatment places allocated for skin-venous, psycho-nervous, eye diseases. The Ministry of health of Uzbekistan, the trade union of the Republic and the State Planning Committee jointly developed a joint program called "Health's" for 1986-90 years. This program included strengthening the material and technical base of the sphere, improving the activities of health institutions, expanding the activities of specialized areas of medical services, attracting attention to the diagnostic service, strengthening the scientific base of the work on prevention and treatment of diseases, activating sanitary education and hygiene education among the population, improving working conditions, maintaining the environment, improving the About 300 different activities were included in the program, which required sufficient attention, a lot of money from the organizations responsible for their implementation. 40 ministries and other state organizations were involved in the implementation of the program. The first section of the "Health's" program was called "future plans for strengthening the material and technical base of the health sector", which included expansion of the scale of capital construction of medical and pharmacy institutions, development of the educational and material base of higher and secondary specialized educational institutions in the medical sphere, improvement of students' living conditions. But such measures of the Soviets could not completely eliminate the problems in the field of health care, medical care, material procurement. For example, the work of providing treatment facilities with medical equipment was in an unsatisfactory state.

## 5. CONCLUSION

Well, one of the most important conditions for improving the work of the medical service system was the strengthening of this material and technical base. However, work on the allocation of location to the sphere, the construction of buildings for treatment facilities, the reproduction of treatment places was carried out more on paper, in practice, the problems did not find their solution. At the end of the study of the state of the material and technical base of the sphere of medical services in the years of Soviet rule, it should be noted that in this period, large funds were allocated for the material supply of the sphere. As a result, it was created an opportunity to build simple medical institutions, hospitals specializing in one direction of medicine and outpatient polyclinics in regional and district centers and equip them with new medical equipment. However, although the funds allocated to the area are increased, but they are



disproportionate in their distribution, due to improper approaches, a number of treatment facilities have been adapted, forced to operate in buildings that do not have amenities. Reasonable expenditure of allocated funds is not carried out. In this regard has also given Soviets hastily approach.

**REFERENCES:**

1. Ахмедова РМ. Ўзбекистонда санаторий ва курорт муассасаларининг фаолияти (1925-1991 йй.) Тарих фанлари бўйича фалсафа доктори (Phd) диссертацияси автореферати. – Тошкент, 2020. 13-бет.
2. Соғлиқни сақлаш муассасалари ишини яхшилашга жиддий эътибор берайлик. Қизил Ўзбекистон, 1947, 23 июль.
3. Наманганвилояти Давлатархиви, 111-фонд, 1-рўйхат, 370-йиғма жилд, 13-варақ.
4. Наманганвилояти Давлатархиви, 111-фонд, 1-рўйхат, 296-йиғма жилд, 1-варақ.
5. Ўзбекистон миллий архиви. Р-837-фонд, 41-рўйхат, 5627-йиғма жилд, 135-136-варақ.
6. Ўзбекистон миллий архиви. Р-837-фонд, 41-рўйхат, 5627-йиғма жилд, 133-варақ.
7. Ўзбекистон миллий архиви. Р-837-фонд, 41-рўйхат, 5949-йиғма жилд, 17-варақ.
8. Наманганвилояти Давлатархиви, 111-фонд, 1-рўйхат, 370-йиғма жилд, 36-варақ.
9. Андижонвилояти Давлатархиви, 607-фонд, 1-рўйхат, 44-йиғма жилд, 42-варақ.
10. Андижонвилояти Давлатархиви, 607-фонд, 2-рўйхат, 258-йиғма жилд, 42-варақ.
11. Андижонвилояти Давлатархиви, 607-фонд, 2-рўйхат, 258-йиғма жилд, 337-варақ.
12. Андижонвилояти Давлатархиви, 607-фонд, 2-рўйхат, 3912-йиғма жилд, 73-варақ.
13. Ўзбекистон миллий архиви. Р-837-фонд, 41-рўйхат, 3912-йиғма жилд, 73-варақ.
14. Андижонвилояти Давлатархиви, 607-фонд, 2-рўйхат, 50-йиғма жилд, 124-варақ.
15. Наманганвилояти Давлатархиви, 111-фонд, 1-рўйхат, 1473-йиғма жилд, 8-варақ.
16. Асадов ДА. Республиканская программа Здоровья. Медицинский журнал Узбекистана. 1987;(4):3–4.
17. Abdurakhmonova, MM, Mirzayev MA, Karimov UU, Karimova GY. Information Culture and Ethical Education in the Globalization Century. The American Journal of Social Science and Education Innovations, 2021;3(03):384-388.

## THE USE OF MODERN TECHNOLOGIES IN STATISTICAL DATA COLLECTION

Muhabbatxon Mansurjon Qizi Tojiyeva\*; Axrorjon Axadjon Ugli Abdullayev\*\*

\*Teacher,  
Department of Digital Technologies,  
University of Kokand,  
Kokand, UZBEKISTAN

\*\*Student,  
University of Kokand,  
Kokand, UZBEKISTAN  
Email id: gulnozakarimova142@gmail.com

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### ABSTRACT

*This article describes statistical data, their types, methods of obtaining information, methods of statistical analysis of them, as well as questionnaires from the types of conducting statistical research. The issue of data collection and statistical analysis through online questionnaire was described in detail on the basis of vital issue.*

**KEYWORDS:** *Statistical Information, Quantitative Information, Qualitative Information, Experience, Observation, Questionnaire, Online Questionnaire.*

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### 6. INTRODUCTION

Today it is difficult to imagine our life without statistics. It would not be an exaggeration to say that statistics have penetrated every aspect of our lives. You know, when we look at my fields of medicine, economics, education, and more, through statistical data, our eyes are drawn to the statistics of changes in one word - shortcomings, growth and decrease rates in this area. For example, the comparison of higher education institutions in the scientific sphere and in the field of education at the Republican level today shows high indicators of which higher education institution, and some of which lag behind. Such data are being determined not only in the Republic, but also on a global scale, that is, the rating indicators of universities all over the world are being determined. Another example is the information to the patient of Covid-19, one of today's pressing problems that anyone can get through the internet. When we get these data, we come across statistics about the number of people directly affected, recovered and died as a result of the disease. By collecting statistical data, analyzing this data, classifying it and disseminating it to the public, the areas in which there are shortcomings are prominent, and as a result, measures were taken to eliminate the shortcomings in those areas. That is why issues such as the collection and analysis of statistical data are one of the pressing issues today. [1]

### 7. MAIN PART

Collecting statistical data means measuring the values of one or more variables by units in this sample. All data can be divided into two types of general Data, these are: quantitative data and qualitative data. Quantitative data is a naturally recorded quantitative data. Qualitative (or categorical) information is information that can be expressed through a natural number and divided into only categories that cannot be measured. [2]

To describe a statistical data, it is very important to know what type of data it is, that is, it is quantitative or categorical data. Data presentation and analysis depend on the type of data. There are many ways to analyze quantitative and categorical data, so far we are limited to the issue of data collection below. We learned that data can be divided into two types, quantitative or qualitative. The next issue is the issue of data collection [3]. In general, it is known that computers can be collected in different ways, but there are basically three types of Information Retrieval, these are:

1. From the published source;
2. From the experience done;
3. From observation research (for example, questionnaire).

Sometimes information on a topic that interests you can already be published in sources such as a book, a newspaper or a magazine. For example, you want to study and summarize the degree of divorce in 12 regions of Uzbekistan (that is, the number of divorces in 1000). You can find this data collection on the official website of the State Statistics Office of the Republic of Uzbekistan, which is published by the Government of Uzbekistan. Similarly, the number of inhabitants by Regions, the number of deaths, the number of births, etc. Statistical information about each region of Uzbekistan and the Republic of Karakalpakstan can be found on the official websites of the authorities. Any information about any higher education institution of Uzbekistan can be found on the official websites created by that higher education institution. At the moment, there are many different websites: education, news, forums, social networks, e-commerce sites (online stores), blogs, lends, etc. Any question you are interested in at a time when modern technology has developed (all over the world), relevant information can be easily found in books, magazines and articles from sources published on the Internet (world wide web), using phones or computers. [4]

The second way to collect data is by experience. The researcher has strict control over units (people, things or objects) in the process of experimentation. For example, medical research has studied the potential of aspirin in the prevention of heart attacks, which often occur. Volunteer doctors are divided into two groups: the treatment group and the control group. Each doctor in the treatment group received one aspirin daily for a year. And doctors in the control group do not take drugs. The researchers, however, are not doctors, they collected data on whether doctors and medication should be taken, whether or not to take the medication, and the health benefits in these cases should be under strict supervision, and a conclusion was drawn. In an uncontrolled experiment, much more data can be obtained than necessary, that is, information that is not necessary can also be obtained. Correctly developed experience allows you to collect the necessary data. [5]

Finally, observation research can be used to collect data. In observation, during the course of the study, the researcher will observe the variables that interest him in the natural location and

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records of the experimental units. For example, a child psychologist can monitor and record the level of aggressive behavior of fifth - graders playing on the school grounds. A similar zoologist can monitor and measure the weight of newborn calves. In contrast to the experiment conducted, in observation, the researcher does not attempt to control any aspect of the experimental units. [6]

The most common method of observational research is this survey method.

## 8. RESULTS AND DISCUSSION

Statistical research cannot be imagined without questionnaires and the necessary conclusions. Many of the types of questionnaires include for example: online questionnaires, anonymous questionnaires, offline questionnaires and others. We are now talking about online questionnaires. There are also several types of online surveys. An example of this is that we can bring together questionnaires coming from different social networks and Google forms questionnaires. The convenience of Google forms questionnaires is a priority. Because it is very easy to draw a statistical conclusion in the questionnaires prepared on Google forms. Below we will prepare a questionnaire on Google forms and get statistical information on it, consider the distribution of questionnaires and other issues. [7]

There are 2 different ways to prepare a questionnaire in Google forms:

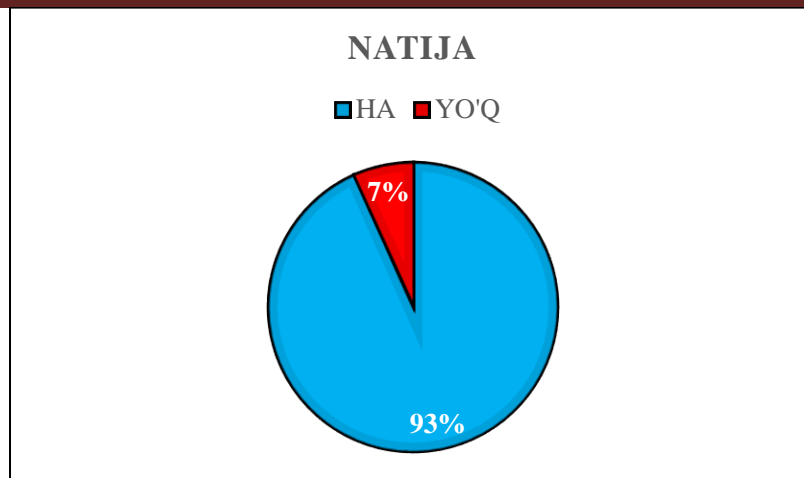
Method 1. On the computer, through Google forms, that is, this is entered into Google account, and from the Applications menu, a questionnaire is formed through the Forms item. This is attached to the questionnaire with the necessary questions and answers for selection. With the questionnaire ready, you will be given a link to the link to disperse it. Through this link, it is possible to distribute the questionnaire through social networks and get the desired results.

2-the method is to take a survey by mobile phone. That will install the Forms app application on the phone through the Play market and through this application will enter Google account and prepare a questionnaire. The mobile application also has its own convenience, but the questionnaire made on the computer turns out to be more qualitative. [8]

We also formed a voluntary questionnaire on the problem of unemployment among cocaine University students in Google Forms. This questionnaire was asked of university students whether they would like to work in their free time from their studies or not. In the questionnaire, the student was asked about the name and surname, how much they want to work and how much they want to receive a salary, the regions of residence, the course, the direction. We bring the results below.

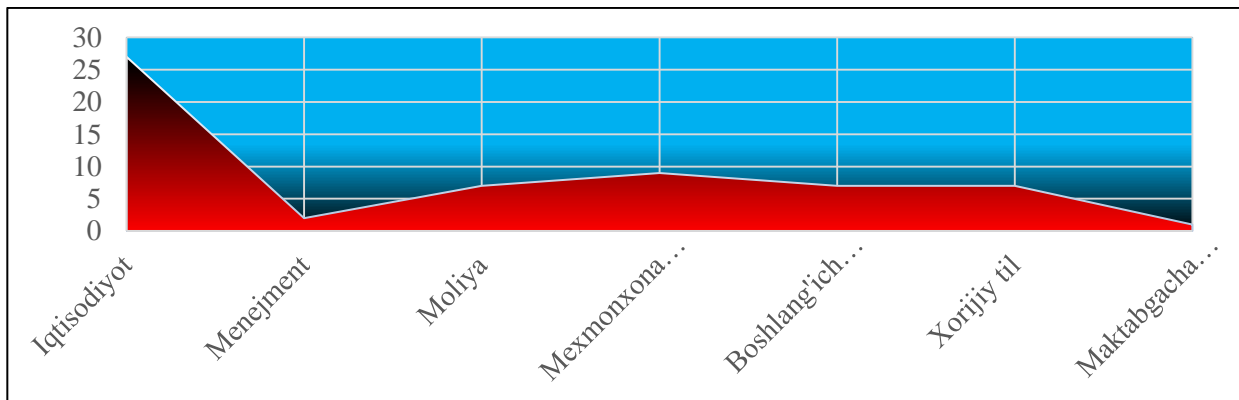
A total of 60 students participated in this survey. Of these, 37 were boys and the remaining 23 were girls. First of all, when asked about their desire to work in free time from their studies, a total of 60 out of 56 students confirmed their desire to work. This is 93% in statistical terms. In the second place, they were asked how many of them are studying in the first course. You can see the statistical diagram below:

### 1-TABLE



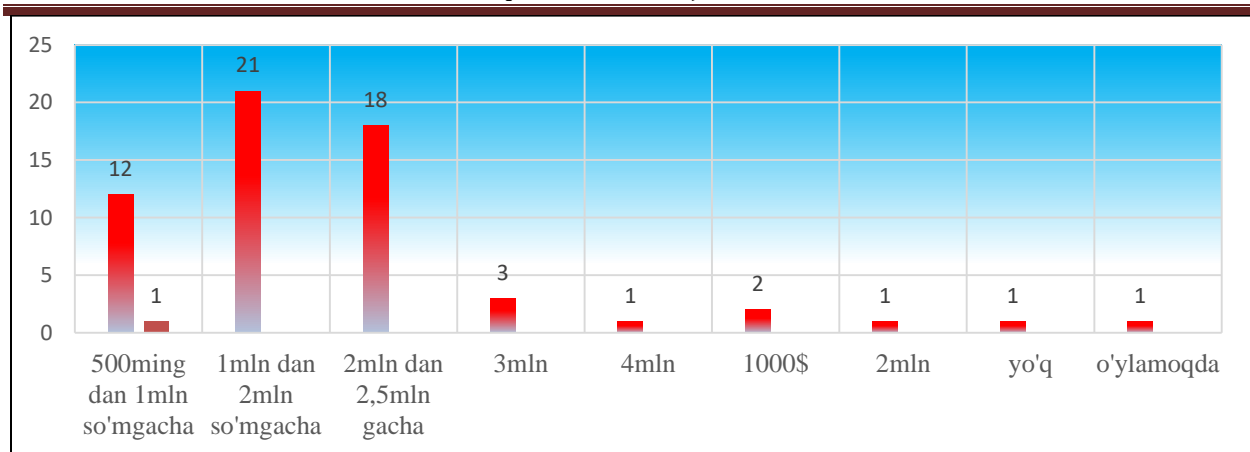
In this case, 36 out of 60 second-year students, 17 first-year students and 7 third-year students completed the questionnaire.

**2-Table**



Through the diagram above, you can see the results of their directions in the questionnaire 27 students of the economic direction, 9 students of the direction of tourism and hotel management, 7 students of the direction of foreign education, primary education and finance, 2 students of the direction of management and 1 student of the direction of preschool education took part.

**3-Table**



According to the chart above, the results of how many salaries they want showed that 35% of the students recorded the amount from 1mln sum to 2mln sum, 30% students recorded the monthly salary from 2mln sum to 2.5 million sum, 20% students recorded the monthly salary from 500 thousand sum to 1mln sum, and the remaining 15% students.

## 9. CONCLUSION.

In conclusion, we received such statistical data from this voluntary questionnaire that many students are dissatisfied with their material condition. But in fact, there should not be any other work of students other than reading. Because the knowledge that students get when they work while they study may not go far either. Or if they work in a job that is suitable for their own direction.

Above is the statistical results of the questionnaire we prepared by ourselves and the conclusion we worried you. Further inquiries can also be made in the form of personal conversations and interviews. Although personal requests are more expensive, they may be needed when it is necessary to collect more complex information than mail or phone requests. The positive side of conducting an online survey is that at the same time a large amount of information can be obtained. Today's information flow is the most effective way to collect information through online questionnaires at a time when modern technology has developed. Thus, we gave information about the types of statistical data, the methods of obtaining information, and the types of questionnaire and how to formulate it, what kind of statistical conclusion can be drawn from it.

## REFERENCES:

1. McClave J, Sincich T. Statistics. 14<sup>th</sup> ed. 2018. p. 900
2. Mulaydinov F, Rakhmatov U, Gafurov M. Enterprise's sales volume prediction with seasonal sales trend on the basis of time series analysis. International journal for advanced research in science & technology. 2020;10(7):33-37.
3. Karimov UU, Karimova GY. The Importance of Innovative Technologies in Achieving Educational Effectiveness. Журнал Естественных Наук, 2021;1(1).



4. Tokhirov R, Rahmonov N. Technologies of using local networks efficiently. Asian Journal Of Multidimensional Research, 2021;10(6):250-254.
5. Yuldashov I, Goynazarov G. A need to improve the institutional system for increasing the social activity of young people at the stage of development. Интернаука, 2021;(12-3):18-19.
6. Ganiyev BS. Innovative (entrepreneurial) activity of women at a new stage of development of our society. Scientific Bulletin of Namangan State University, 2019;1(11):122-129.
7. Usmanov N, Ganiev BS, Karimova GY. The philosophical basis for the formation of spiritual maturity among young people. Oriental Journal of Social Sciences, 2021;33-37.
8. Karimov U, Abdurakhmon A. Innovative Information Technology in Education. Форуммолодыхученых, 2017;(5):9-12.

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## QOZIKHONA AND RELIGIOUS RULE IN KHIVA KHANATE IN THE BEGINNING OF XIX-XX CENTURIES

**S. Khusanov\***

\*Teacher

Department of History of Uzbekistan,  
Fergana State University,  
Fergana, UZBEKISTAN  
Email id: khusanov.s@gmail.com

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### ABSTRACT

*Khiva Khanate is one of the important states in the history of Uzbek statehood. The political life of the Khiva Khanate, the order of its administrative management, the rank, career and positions in practice, the functions of its owners can become an important scientific research object. These problems were studied by scientists and researchers in different periods. But there are a lot of puzzles and problems in this direction. This article examines the system of qozikhona and religious Management in the Khiva Khanate at the beginning of the XIX – XX centuries, which directly affects the political processes of the Khiva Khanate. It provides a close support in enlightening the political, economic, social and cultural life of Khiva Khanate, religious and local government system.*

**KEYWORDS:** *Shaykh Al-Islom, Qozi, Qozi Kalon, Qozi Askar, Dor Al-Qazo, Alam, Mufti, Rais, Mutavalli, Muazzin, Mudarris, Okhun, Imom, Oqsoqol, Kadkhudo, Eshon.*

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### 10. INTRODUCTION

The issues of qozikhona and religious management are being investigated in the Khanate for the first time and the information on the subject is provided by the historians of Khiva and X.Vamberi, P.P.Ivanov, A.Baltabaev, Y.Gulomov, M.Yoldoshev, A.Abdurasulov, and S.Saburova it is illuminated on the basis of the works.

### MAIN PART

It is known that in Khiva Khanate, the Islamic religion was an ideological foundation in the rule of the state. The laws are valid on the basis of the order of the scoundrel. Islamic law, that is, among the positions of the departments of honor, included qozi al-quzzot, qozi Kalon, qozi askar, alam, mufti. The position of the senior official belongs to Sheikh al-Islam. Sheikh al-Islam (Arabic) is an Islamic pillar, the head of all Islamic organizations in a particular country – the title of representative of the supreme religion. In the Central Asian khanates and other states, Sheikh al-Islam was considered the highest religious position and was assigned to him by the ulama Rohani, a Sayyid and a master.

In Khanate, Sheikh al-Islam was the highest ranking person. He gives control over the precise fulfillment of religious rites [1]. Sheikh al-Islam had the right to sit on the right side of the Khan [2]. Mudarris, diggers and other officials were sitting on the macro side of the Khan. Qozi (Arabic) - denotes the meaning of the judge, the executor. Qozi in the curse – judge. Official acting as a solution to legal cases. He also carried out works related to the guardianship, the fulfillment of the will, the distribution of inheritance. Foundation works are also under the supervision of the judge. The judge of the judges was strict and it was possible to appeal only to the ruler, Khan, over their decisions. Qozi Kalon was the highest-ranking qozi, who controlled all the qozi in the Khanate.

Qozi Kalon (Arabic, Persian) - the head, chairman of all the rulers, pious and mullahs in the Central Asian khanates, as the chief judge, ruled both religious and judicial affairs. As in all Muslim countries, in Khiva Khanate, the issues of law are related to religion, and the chairman of law and the army administration, Qozi Kalon, was considered. The qozi Kalon was engaged in the appeals, complaints of citizens. The criminal works, which required a higher punishment, were far from his duty and saw these works as Khan himself [3]. In Hijri 1240 (1824-1825), the daughter was 11 Navkar of Kalan [4].

At the official reception of Qozi Kalon, the Khan was on the first place on the right side, while the Qozi soldier was on the second [5]. Qozi urdu or qozi askar (Arabic, Turkish) is a judge of military service. The law in the army is in control of the rules, solving Sharia issues. In some cases, the judge also accepted to see non-military discussions in accordance with the request of the soldier (military judge). When Khan went on a trip, the judge accompanied the soldier and personally informed him about the work related to his task [6].

In the regional centers there was a regional judge, and the name of the court was Dor al-qazo. Alam (Arabic) is considered the head of muftids and is a religious and qozikhona title. It is given to scientists who are mature in the science of sharia. Its task is to check the compatibility with the original of the narrations of Honor presented in the fatwas and to seal them. Alam was also obliged to teach in madrasahs. According to archival documents, in 1256 (1840-1841), Hijri went to Russia as an ambassador [7]. Alam is sitting on the drawing board on the right side of the Khan [8].

Mufti (Arabic) is a fatwa-giving, high-ranking religious lawyer. The mufti had the right to interpret, interpret religious legal issues. In Muslim countries of the East, muftlik was considered an official post appointed by the government. Muftis was considered to be the lawyers of the veterans, and they had to take part in the case, draw up a judgment, seal the documents to confirm the correctness of the narration. All the muftis had places on the macro side of the Khan. Mufti rais is on the fourth place on the right side of the Khan. Mudarris also participated in the meetings attended by muftis. The head muftilar was 7 in Khiva [9]. In the next step of mufti, the chairmen stood.

Rais (Arabic) - a career existing in the first quarter of the twentieth century in the khanates of Central Asia. The chairman was sometimes called also needy.utavalli (Arabic) is a minister of the Ministry of Finance, engaged in charitable and charitable work in religious institutions. The trustee is an official who is the owner of the foundation, controlling the income coming from the property, taqsimlash, paying salaries to leases, landlords and mudarris. Did not interfere in the educational work. In the archives of Khiva Khans, the activities of the trustees on the lands of the foundation are very clearly shown [10].

Abulghozi Bahodirkhon has allocated a place for the mutavalli from his side. But there were two trustees, according to the list in the Khon Palace in the third quarter of the XIX century. They were the custodians of the two largest madrasahs in Khiva, who later went to the palace service. The reason for the large incomes from the lands of the trustees' guard foundation was the appointment of Khan seeds to these careers. Because they were relatives to the Khan, they took a seat near the ruler to sit there closer than Sheikh al-Islam [11]. Mudarris (Arabic) - teacher of madrasa. He taught certain theology subjects. In madrasah and religious universities in the countries of the present East, not only religious sciences, but also lecturers from secular sciences are also called mudarris. Okhun /Okhund (Arabic) – denotes the meaning of a vowel, a speaker, a propagandist of religion, a mullah, a teacher. In large madrasahs there was a large number of okhuns. For example, the Ollakulikhan madrasah served seven columns and two muazzins. Mudarris and okhuns received salaries from the foundation of Madrasah, which they had taught, and madrasah also gave them a kennel.

In general, in the territory of Khiva Khanate there were 120 madrasahs, 63 qorikhona, 1636 mosques, graves of more than 200 "saints" and 25500 printers (eshon, mulla, ohun, mufti, etc.) at the end of the XIX – beginning of the XX century. If we take into account the data of the archive documents belonging to 1909 year, then in the territory of the Khanate there were 1500 madrasahs-schools, in which 45000 students studied.

With the construction of madrasahs, Khan or madrasah partner allocated to them special foundation lands, sealed and legalized by the judge of all property. In the Khanate, completely religious institutions were engaged in education. They were considered the only center of total spiritual life.

It is known that the institution receiving knowledge is madrasahs.

## 11. DISCUSSION AND RESULTS

The name of 26 madrasahs in the Khanate was mentioned in the information of Abdulla Boltabayev[15]. According to him, in the XIX century, the structure of Khiva madrasahs was unique, in each cell there lived 2 students. All the hujras doors are directed to the courtyard, in each cell there is an oven. Living conditions are relatively well established. The management of each madrasa is structured as follows: the madrasa was a mutavalli, a muazzin, an okhun or a

mudarris (teacher), a janitor, a hairdresser and a meshkobchi(waterman).Muazzin (Arabic) is a person who calls for prayer in mosques and madrasahs.

Information on the local administrations of the Khanate, their structure has become one of the most difficult issues. However as a result of the study of the archive of M.Yoldoshev and P.P.Ivanov's Khiva Khans were divided into valuable materials. The S-699 and 74-th notes of taxation are important in providing information on the administrative territorial division of the entire Khanate, as well as exposing the location of some mosques and their importance in local government. According to this information, we know that there were 1183 mosques in the Khanate.

In Khiva Khanate, the foundation lands allocated for mosques and madrasahs also took a special place. The revenue from these lands was spent by the scribes for the expenses of mosques and madrasahs.Since the property of the foundation is free of state control, the income from it was the sole discretion of the foundation.The property of the foundation was not subject to state taxes. The profit from it was spent according to the instruction of mutavalli – specially appointed to the post of inspector of the income foundation.Some important state affairs were carried out by mosques in Khiva Khanate.Each neighborhood has its own mosque, these mosques are built at the expense of the local population. And the name of the mosque is called the neighborhood in which it is located or the name of the person who built it.The imam of the mosque was appointed by the Qozi Kalon (Chief Judge).

In the community of the mosque, the government is in the hands of the elders or cadets, they are appointed from the richest landowners.Oqsoqol (Turkish) is an old man, a mustache. The great leader, symbolizes the meanings of the figure. The khاناتes were the elders, officials and dignitaries, and the management of the neighborhood was under their charge.The oqsoqols were elected from the righteous, hulk, authoritative people of the neighborhood and approved by the Khan, and the Qozi Kalon gave him a label. The oqsoqol had the right to count before the authorities on behalf of the neighborhood, to resolve mutual disputes, small local issues (mitigation of punishment, guaranteeing, organization of weddings and ceremonies). They contributed all the decrees of the Khanate to the community of the people and collected taxes. For these services, the elders did not receive a service fee from the inn.Kadkhudo (Persian) - means village elder, chief, leader. The position of seed-growing, which existed in the Khiva Khanate in the last Middle Ages.

Eshon (Persian) - the honorary title of the saints and the religious leaders in the Sufi stream, the original meaning of which means "they". Eshons was considered the head, coach of the Muslim community. In the middle ages, instead of their names, the words "eshon", sometimes "pir", were used when referring to the leaders of the Sufi stream.Under the influence of the Khiva government, a peculiar school of veterans of shariacame into being. The scrapers of this tradition were in competition with the biys. The diggers were appointed by the Khans.

## 12. CONCLUSION

In conclusion, we can say that in the XIX century in the Khiva Khanate there was an excellent system of local government. The territory of all, where the peoples of the country live, is administratively divided into provinces, cities and mosques. If the governors and non-governors of the regions were appointed by the Khan, then the mosques and villages were governed by the richest and most influential imams and oqsoqols. In the XIX century, in the Khiva Khanate, along with the Central government, local government offices, which were put in order for a while within the framework of districts and mosques, were also decided. The method of judicial (qozi) offices (from the supreme court to the local courts) was established in accordance with the rule of subordination of lower posts to higher offices. Judicial affairs are governed by the laws of the sharia.

## REFERENCES:

1. Каримов У, Хакимова Д, Тулкинов З. Задачи Построения Гражданского Общества. Теория И Практика Современной Науки, 2018;(10):193-195.
2. Karimov U, Ergasheva D. Educational Issues in the Period of Amir Temur and Temurids. Теория и практика современной науки, 2020 (5):18-20.
3. Karimov UU, Karimova GY. The Importance Of Innovative Technologies In Achieving Educational Effectiveness. Журнал Естественных Наук, 2021;1(1).
4. Рафикова ДК, Каримова ГЙ. Ёшларни Ижтимоий Фаоллигини Оширишда Кадриятларнинг Аҳамияти. Перекрёсток Культуры, 2020;2(1).
5. Abdurakhmonova MM, Ugli Mirzayev MA, Karimov UU, Karimova GY. Information Culture and Ethical Education in the Globalization Century. The American Journal Of Social Science And Education Innovations, 2021;3(03):384-388.
6. Usmanov N, Ganiev BS, Karimova GY. The Philosophical Basis for the Formation of Spiritual Maturity among Young People. Oriental Journal of Social Sciences, 2021;33-37.
7. Bozarov DM, Karimova GY. Role of the Self-Organization Model in Complex Social Systems. Oriental Journal of Social Sciences, 2021;1-9.
8. Yuldashev F, Yuldasheva N. The Role of Communication Skills and Improving These Skills in Teaching. Scientific Bulletin of Namangan State University, 2019;1(2):262-266.
9. Abdurakhmanovich Y F. (2016). Humanity and Happiness-A Vital Factor in the Independent Life of the Young Generation. Epra International Journal of Multidisciplinary Research, 2020;6(1):252-255.
10. Yuldashov I, Goyazarov G. A Need to Improve the Institutional System for Increasing the Social Activity of Young People at the Stage of Development. Интернаука, 2021;(12-3):18-19.



- 11.** Yuldashev IA. Pedagogical Bases of Formation of Social Activity in Pedagogical Sciences. Теория И Практика Современной Науки, 2020;(5):67-69.

## DEVELOPMENT OF RELATIONS BETWEEN THE STATE AND RELIGION IN UZBEKISTAN

Tashbaeva Gulnoza Yusupovna\*

\*Senior Lecturer,  
Department of Social Science,  
Namangan Engineering-Construction Institute,  
Namangan, UZBEKISTAN  
Email Id: g\_tashbaeva@umail.uz

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### ABSTRACT

*This article discusses the development of the relationship between the state and religion in Uzbekistan. In recent years, Uzbekistan has implemented large-scale reforms in the field of religion, which embody new approaches and principles of state religious policy in the country and in this regard, the role of state policy in ensuring interreligious and interethnic peace and harmony in society is shown, as well as the conditions created by the state for conducting interfaith dialogue and observing the rights and freedoms of religion of citizens.*

**KEYWORDS:***Democratic, Legal State, State Policy, Freedom Of Conscience, Cooperation, Religious Organizations, The Relationship Between The State And Religion, State-Confessional Relations, Religious Life, Spiritual Needs, Religious Values, National Traditions And Customs.*

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### 13. INTRODUCTION

The most important definition of the formation of the foundations of a democratic rule of law and civil society is the attitude to religion. Since the first days of independence, the task of reviving the millennial spiritual and cultural heritage of the people, including strengthening the role of the religious factor in the life of society, has been set at the level of state policy in Uzbekistan. At the same time, special importance was attached to the establishment of civilized relations between the state and religion. At the same time, special importance was attached to the establishment of civilized relations between the state and religion. The state has embarked on the organization of interaction and fruitful cooperation with religious associations in various spheres of public life, especially those where the spiritual and moral factor is of great importance. [1]

In modern society, the guarantor of the balance of interests in public relations is an active dialogue between the state and leading faiths based on mutual respect and partnership. That is why the issue of improving and developing state-religious relations in a secular state remains invariably relevant. It is a well-known fact that state-confessional and interfaith relations are an important component of society in any democratic state. The State promotes the establishment of relations of tolerance and respect between citizens who profess religion and do not profess it, religious organizations of various faiths, as well as between their followers. [2].

State-confessional relations are the interaction of the state and religious associations in order to realize their interests and strategies, manifested in various forms (partnership, cooperation, dialogue, indifference, domination and subordination, rivalry, confrontation, conflict) and regulated by the legal religious policy of the state [3]. State-confessional relations are formed as a result of a social compromise between the subjects of these relations, parts of society with different, sometimes alternative religious and ideological beliefs and corresponding social practices. The State is called upon to play the role of mediator and guarantor in achieving such a compromise and maintain a balance of interests of the individual, society and the state. [4].

In the new Uzbekistan, freedom of conscience and interfaith relations are the fundamental principle of the life of society. The issues of protection of human rights and freedoms, security, interreligious and interfaith harmony have become the main content of the new political course. The Republic of Uzbekistan, already in the preamble of the Constitution, declared its commitment to the ideas of human rights and sovereignty of the country, and also, based on the historical experience of the development of Uzbek statehood, recognizing the priority of universally recognized norms of international law, providing for the task of creating a humane democratic rule of law, set itself the goal of ensuring civil peace and national accord. With the development of information and communication technologies in modern Uzbek society, where the investment climate is improving, attracting investors from all over the world, with the expansion of the atmosphere of interfaith dialogue, a number of threats also arise. In this process, self-awareness, preservation of interethnic harmony, ensuring harmony of national and universal values, as well as further stabilization of the atmosphere of religious tolerance becomes a vital task. However, it is indisputable that the full implementation of these guarantees can only be achieved by a highly developed democratic rule of law state and civil society, based on the high consciousness of citizens, humane trust, respect and consent of all its social strata, political movements and religious denominations [5].

Historically, our state is multinational. Uzbekistan is home to representatives of many nationalities who are traditionally identified with various faiths (Russians - Orthodox, Armenians - Gregorians, Germans - Lutherans, Jews - Jews, etc.). They are united not only by territory, state, economic and social interests, but also by many common features in origin, language, culture, traditions and customs. In addition, there are many similarities in their religious teachings and values. Representatives of different nationalities and faiths living in our country have equal rights guaranteed by the Constitution, consider Uzbekistan their multinational and multi-confessional common home, united by a common goal of building a democratic, rule-of-law state, a strong civil society. Making up the people of Uzbekistan, they all strive to live in mutual respect and trust, carefully preserve the main achievements of our independence - peace, social harmony and stability.

Currently, there are 2,276 religious organizations operating in the republic, including 183 non-Islamic religious organizations, of which 8 Jewish communities, 6 bahai communities and one

each "Jehovah's Witnesses", a Hare Krishna society, a Buddhist temple, as well as an interfaith Bible society and others representing 16 different faiths. In recent years, such religious organizations have been registered in the republic as the Pentecostal Church "Light to the World", the Church of Evangelical Christians "Sun Bogym" in the Tashkent region, the Church of Evangelical Christians Baptists in the Khorezm region, the Kokand Church of Evangelical Christians (Pentecostals) "Revival", the Tashkent Church of Full Gospel Christians "Logos", the church "Revival" in Navoi region, the church "Faith" in the Samarkand region, the Church of Evangelical Christians Baptists in Gulistan and the church evangelical Christians "House of Bread" in Jizzakh.

There are also the Directorate of Muslims of Uzbekistan, the Muslim Council of Karakalpakstan, the Tashkent Islamic Institute, 10 madrasas, the Central Asian Metropolitan District (which unites the Tashkent, Bishkek and Dushanbe dioceses) of the Russian Orthodox Church, 1 Orthodox and 1 Protestant seminary. It should be noted that religious policy in Uzbekistan is based on the principles of the secular nature of the state, tolerable and equal treatment of all religions.

An important feature of the religious life of modern Uzbekistan is the inadmissibility of establishing advantages or restrictions for one religion or denomination in relation to others. The State promotes mutual tolerance and respect between citizens who profess different religions and those who do not profess them, between religious organizations of different faiths, does not allow religious fundamentalism and extremism, actions aimed at contrasting and aggravating relations, inciting hostility between different faiths [6].

In its relations with religion, the state, being secular, adheres to the following principles:

**Respect for the religious feelings of believers;**

**Recognition of religious beliefs as a private matter of citizens or their associations;**

**Guarantee of equal rights and inadmissibility of persecution of citizens who profess religious views and those who do not profess them;**

**The need to seek a dialogue with various religious associations to use their capabilities in the cause of spiritual revival, the affirmation of universal moral values;**

**Recognition of the inadmissibility of using religion for destructive purposes [7].**

In order to purposefully implement modern religious policy, a special Committee on Religious Affairs was established under the Cabinet of Ministers by Presidential Decree of March 7, 1992. The Committee on Religious Affairs under the Cabinet of Ministers of the Republic of Uzbekistan is a public administration body authorized to solve tasks in the field of ensuring the rights of everyone to freedom of conscience and religion, equality of citizens, regardless of their attitude to religion, as well as regulating relations related to the activities of religious organizations, which was established in accordance with the Decree of the President of the

Republic of Uzbekistan "On the formation of the Committee on Religious Affairs under the Cabinet of Ministers of the Republic of Uzbekistan" dated March 7, 1992. The Committee on Religious Affairs in its activities is guided by the Constitution and laws of the Republic of Uzbekistan, resolutions and other acts of the OliyMajlis of the Republic of Uzbekistan, decrees, resolutions and orders of the President of the Republic of Uzbekistan, resolutions and orders of the Cabinet of Ministers of the Republic of Uzbekistan, as well as its Regulations.

The Committee on Religious Affairs carries out its activities in cooperation with other public administration bodies, local public authorities, public associations and other organizations. For close cooperation with religious organizations, assistance in carrying out activities to various religious denominations, joint development of proposals and measures to ensure interreligious and interethnic peace and harmony in society, development of a culture of interfaith communication, a Council for Religious Affairs has been formed under the Committee on Religious Affairs, which includes leaders of the most representative religious denominations in the republic.

The Council for Religious Affairs carries out its activities within the framework of social partnership of state bodies with religious organizations to solve urgent problems in the field of religion and strengthen the principles of religious generosity in society. The Government of the renewing Uzbekistan paid close attention to the formation of an effective regulatory framework regulating issues of freedom of conscience and the activities of religious organizations. At the same time, the content and legislative foundations of confessional policy from the first steps of sovereign development began to be based on international principles of humanitarian law.

Uzbekistan consistently and strictly fulfills its international obligations in the field of ensuring religious freedoms within the framework of international human rights treaties. To date, Uzbekistan has joined more than 70 major international documents in the field of ensuring religious freedoms. The right to freedom of conscience and religion is enshrined in many international declarations and treaties in the field of human rights, to which the Republic of Uzbekistan has also acceded. For example, these include the Universal Declaration of Human Rights (1948), the International Covenant on Economic, Social and Cultural Rights and the International Covenant on Civil and Political Rights (1966), the Declaration on the Elimination of All Forms of Intolerance and Discrimination Based on Religion or Belief (1981), etc., in which the norms concerning the freedom of citizens to profess religion, as well as the rights of religious organizations, are set out in the most detail. Uzbekistan, which has ratified these international legal actions, has assumed obligations to strictly comply with them.

On December 12, 2018, the UN General Assembly at its plenary session unanimously adopted a special resolution "Education and religious tolerance". The document, the draft of which was developed by Uzbekistan, was adopted by consensus among all 193 UN member states. 51 states became its co-authors. The adoption of the resolution "Education and Religious Tolerance" was

the practical implementation of the initiative of President ShavkatMirziyoyev, put forward from the rostrum of the 72nd session of the UN General Assembly in September 2017.

The resolution adopted on the initiative of Uzbekistan emphasizes the important role of promoting education, peace, human rights, tolerance and friendship, and also recognizes the importance of integration, mutual respect, protection of human rights, tolerance and mutual understanding in the name of strengthening security and peace on the planet.

The main provisions of the state policy in the field of state-religious relations are presented in a number of documents of authorities and management. Uzbekistan has already adopted more than 50 legislative acts and 25 practical decisions in the field of religion. The relations of the state with religious associations are regulated by normative legal norms, among which the supremacy belongs to the Constitution of the Republic of Uzbekistan. Articles 31, 57 and 61 of the basic law define the main directions of interaction between the State and religion in the country and in accordance with which several key principles can be identified:

1. Freedom of conscience is guaranteed for all. Everyone has the right to profess any religion or not to profess any. The forced imposition of religious views is unacceptable.
2. It is prohibited to create and operate political parties, as well as other public associations aimed at forcibly changing the constitutional system, opposing the sovereignty, integrity and security of the republic, the constitutional rights and freedoms of its citizens, propagandizing war, social, national, racial and religious enmity, encroaching on the health and morality of the people. As well as paramilitary associations, political parties on national and religious grounds. The creation of secret societies and associations is prohibited.
3. Religious organizations and associations are separated from the State and are equal before the law. The state does not interfere in the activities of religious associations [1, p. 22].

Over the years of independence, issues of protection of human rights and freedoms, the relationship between the state and religion, interethnic relations have been specifically reflected in the Laws "On Freedom of Conscience and Religious Organizations" (1991, 1998 and 2021), "On Citizenship", "On Property", "On Alternative Service", "On Education", "On guarantees of the activities of non-governmental non-profit organizations", in Civil, Family Codes and other legislative documents. In 2017-2019, resolutions of the President of the Republic of Uzbekistan "On measures to improve the activities of the Committee on Religious Affairs under the Cabinet of Ministers of the Republic of Uzbekistan", "On additional measures to improve the activities of the religious and educational sphere", Decree "On measures to radically improve activities in the religious and educational sphere for religious organizations) were adopted.

Minor changes and additions were made to the updated Law "On Freedom of Conscience and Religious Organizations" dated July 6, 2021. Taking into account the traditions, customs and values that have historically developed in our country, the Law reflects the recommendations of experts from our partners, such authoritative international organizations as the Venice Commission of the Council of Europe, the Bureau for Democratic Institutions and Human Rights



of the Organization for Security and Co-operation in Europe. A number of important innovations and clarifications of law enforcement practice, previously absent in previous editions, were introduced into this document. These innovations are reflected in the following:

1. The procedure for registration and termination of the activities of religious organizations is simplified.
2. The professional status of religious education is officially recognized, and the right of citizens of the Republic of Uzbekistan to secular education is guaranteed, regardless of their attitude to religion.
3. The provision of services related to the state registration of a religious organization is being implemented entirely in electronic form without the human factor.
4. Due to the absence of a legal definition of the concept of "religious attire" in the current acts of legislation, a ban on appearing in public places in religious attire is excluded from the legislation.
5. The procedure for obtaining the consent of mahalla citizens' gatherings required for the establishment of a religious organization is canceled. Thus, the initiators of the creation of a religious organization are exempt from collecting unnecessary documents.
6. The law establishes the procedure for the production, import and distribution of materials of religious content.
7. Also, the main priorities in the sphere of ensuring freedom of conscience, defined by Law, provide for strengthening peace and harmony between faiths, guaranteeing a secular state structure, as well as countering through education the implantation of alien ideas into the minds and hearts of people.

They, in accordance with international legal standards, determine that everyone has the right to freedom of thought, conscience and religion; regulate the mechanism for the implementation of this right; form the principles of the relationship of the secular state with religious associations. Such a legal framework enshrines the rights and freedoms of citizens: individually or on a group basis to profess a particular faith, perform divine services, religious rites and rituals, create religious societies, educational institutions, mosques, churches, synagogues, monasteries, make pilgrimages to holy places and much more.

In recent years, Uzbekistan has implemented large-scale reforms in the field of religion, which embody new approaches and principles of state religious policy in the country. Considerable work has been done to preserve interreligious and interfaith harmony, increase legal awareness and legal culture in society. Religious organizations are provided with ample opportunities for full-fledged activities. Equal legal conditions have been created in the country for the activities of all religious organizations, regardless of their confessional affiliation and organizational level. Religious organizations have the right to own the territory, publish literature, train their religious ministers, and organize pilgrimages to sacred places. Christian holidays Easter and Christmas, Jewish Passover, Purim and Hanukkah are held in a solemn atmosphere in accordance with the

rituals. Representatives of various faiths congratulate each other on holidays, take part in festive events. Mosques and madrasahs, churches and synagogues were returned to believers. The architectural and written heritage of Islamic, Christian and other religions has been restored. The construction of mosques, churches and houses of prayer, as well as their registration, is carried out in cooperation with local government, citizens' self-government bodies and justice bodies of the republic.

To meet the spiritual needs of society, a large number of religious literature of various orientations is published annually. To fully cover the religious life of Uzbekistan, a number of newspapers and magazines are published, including the newspapers "Islom Nuri", "Word of Life", magazines "Hidoyat", "East from Above", etc. Over the years of independence, the Koran, a collection of Hadiths, 16 books of the Old Testament and the entire New Testament, the life stories of the prophets have been translated into Uzbek and published in mass circulation. In December 2004, the Office of Muslims of Uzbekistan jointly with the Republican Society of the Blind held a presentation of the Holy Quran printed in Braille. Uzbekistan has become the third country in the world to carry out this good deed.

During the years of independence, Uzbekistan has achieved tremendous success in preserving national traditions and customs, perpetuating the memory of great ancestors, and improving sacred burial sites. These include creative work on the improvement of such places of worship as Imam Bukhari and Imam Moturidi complexes in Samarkand, Abdulkholik Gijduvani and Bahauddin Naqshband complexes, Minorai Kalon and Machiti Kalon mosques in Bukhara, monuments of Ahmad Fargoni and Burkhoniddin Marginoni in Ferghana, Hakim Termizi and Imam Termezi in Surkhandarya, historical Ichan-Kala complexes in Khiva, Dorut-tilovat in Shakhrisabz, Odina and Cook gumbaz in Karshi, Zangiota in Tashkent region, the mausoleum of Kosim-sheikh in the city of Karmana.

In the republic, an important place is given to the need to study religious values as an integral part of the national cultural heritage. An important component of the reform process in the religious and educational spheres was the creation of the Center of Islamic Civilization, as well as the international research centers of Imam Bukhari and Imam Termizi. Five scientific schools specializing in the study of kalam, hadith, fiqh, aqida and tasawwuf have been opened in the regions.

Changes in the state policy regarding religion, as well as fundamental changes in the educational sphere, have made it possible to solve a wide range of issues related to the improvement of the religious education system in Uzbekistan. Tashkent Islamic University under the Cabinet of Ministers of the Republic of Uzbekistan was opened by Presidential Decree to train highly qualified personnel in the religious sphere. An important result of the reforms was the establishment of the International Islamic Academy of Uzbekistan in 2018. The Ziyos media center has been established at the International Islamic Academy of Uzbekistan, which is defined as the main media structure providing propaganda of the religious and scientific heritage of

ancestors, bringing to the public the true humanistic purpose of religion and news in religious and educational life.

The Presidential Decree of August 28, 2006 established a Public Council for the organization and holding of annual events "Hajj" and "Umrah". The main tasks and priorities of the Public Council are the organization of coordination and effective interaction of ministries and departments, local authorities, public organizations for the preparation and conduct of the pilgrimage "Hajj" and "Umrah", ensuring control over compliance with the established security requirements and legal provisions in this area.

The announcement by the international Islamic organization AISESCO in 2007 of Tashkent as the capital of Islamic culture was a great cultural event in the life of our state. Tashkent was awarded this honorary title for outstanding services to the world of Islamic culture and science, for the preservation of monuments and for further enriching the Islamic heritage. The Uzbek authorities are focusing on establishing a constructive dialogue and cooperation with international organizations and experts in the religious sphere. During the visits to Uzbekistan of the UN High Commissioner for Human Rights Zeid Raad Al-Husseini (May 2017) and the OSCE High Commissioner for National Minorities Lamberto Zannier (April 2018), the current state of affairs was discussed, the reforms in our country were highly appreciated, it was noted that Uzbekistan pays special attention to ensuring interethnic harmony and religious tolerance, strengthening friendship between representatives of various nations and nationalities.

In general, it can be concluded that the state policy pursued in the Republic of Uzbekistan in the religious sphere corresponds to the spirit of the Declaration of Human Rights adopted by the UN General Assembly on December 10, 1948 and other international documents on ensuring freedom of conscience. In order to ensure freedom of conscience, Uzbekistan fully fulfills all its international obligations. The Republic has submitted more than 30 national reports on six major international treaties to specialized UN bodies. Today, stability, interreligious and interethnic unity and respect for the rights and freedoms of religion of citizens remain on the territory of the Republic of Uzbekistan. The absence of conflicts on confessional grounds allows us to draw a conclusion about the effectiveness of the developed state policy, the effectiveness of its legislative initiatives. The State policy in the sphere of religion, aimed at strengthening inter-confessional dialogue and religious tolerance in society, is an important guarantee of stability and prosperity of society and the state.

## REFERENCES:

1. Isamidinov M. The history of emergence of Sughd Cities. EPRA International Journal of Research and Development. 2020;5(10):125–128.
2. Mirsoatova ST. New data on the late paleolithic of the Fergana valley. Евразийский союз ученых. 2020;10 (79/4):25–29.

3. Farmanova GK. The role of the geographic environment and climatic conditions in the formation of economic-cultural type of population when during ancient and antic period. *ACADEMICIA: An International Multidisciplinary Research Journal*. 2020;10(11):1612–1622.
4. Rakhmatillayev H. Ethnodynamics of the city population of the Fergana valley of the first half of the XX century. *EPRA International Journal of Research and Development*. 2020;5(5):532–535.
5. Arslonzoda R. Memoirs as asourse on the history of Uzbekistan in the second half of the 19th – early 20th centuries. *EPRA International Journal of Research and Development*. 2020;5(10):119–124.
6. Mahmudov O. The beginning of the European renaissance. *ERPA International Journal of Research and Development*. 2020;5(7):104–108.
7. Yuldashev S. Visit of chinese ambassador dung wan to Fergana. *The history of the Fergana valley in new researches*. Fergana, 2021. pp.123–131.

## COMMUNITY DEVELOPMENT AND NATIONAL IDEA

**Qurambaev Alisher Makhsudovich\***

\*Lecturer,  
Bukhara University of Uzbekistan  
Bukhara City, Uzbekistan  
Email id: [qurambaev.a@gmail.com](mailto:qurambaev.a@gmail.com)

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### ABSTRACT

*The main objective of this topic is to enlighten the importance of the national idea in the development of society and its role in the development of the spirituality of the population especially the youth. After all, civil society can be restored with the help of citizens with a high level of ideological consciousness and spirituality. Even today, youth activity plays an important role in various countries experiencing socio-political changes and, more precisely, civil society is recovering.*

**KEYWORDS:** *Society, Ideology, Upbringing, Youth, Civil Society, Idea, Ideological Upbringing.*

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### 14. INTRODUCTION

The national idea is of particular importance in the perception of the characteristics, worldview, a corresponding vision, lifestyle, and national consciousness, self-realization of each person or person. The national idea is manifested in respect of traditions, history, native language, culture, attitude, spirituality, devotion to patriotism, feelings of nationalism and honor, dignity of the nation. It is an urgent issue for citizens to avoid alien and alien, harmful ideas that contradict the national idea, to respond to it with anti-thought, anti-idea, anti-ignorance enlightenment, to form an immune system that is constantly ready for it. The main purpose of the national idea, which is aimed at the great creative work facing the country, is to ensure that people achieve a free and prosperous life, build a free and prosperous path for everyone. The national idea also performs a number of scientific, educational and practical tasks, making it possible to know, analyze and evaluate events. The national idea creates conditions for the full realization of the talent and potential of each nation's representative and mobilizes him for such noble goals as the prosperity of Homeland, the peace of the country and the welfare of the people. Indeed, this issue is an incredibly topical issue. First President of our country I.A.Karimov's articles, especially in an interview with ErkinAgzamov, editor-in-chief of the magazine "Tafakkur", the issue of national ideology was discussed as a main topic. In this conversation, the essence of ideology, its main tasks, the consequences of totalitarian ideology, ideological processes around the world, the fact that the ideological Polygon is dangerous from any military polygons, the characteristics of national ideology and its role in the development of society, the causes of the ideological gap, the ideological immune system and its role in ensuring the stability of society, ways The role and importance of our scientific and spiritual heritage in the formation of our national idea is enormous. In general, any noble idea leads Society, a certain nation towards progress, serves

goodness. “It is natural that any idea is aimed at a specific goal, and ideology can serve provisions in this direction. The functions and functions inherent in them are also important in this field of activity. Historically, any ideology has a specific purpose-provisions. It is this goal that the provisions set out the basic principles and priorities for achieving the ultimate results in this regard.” [1]

The National idea manifests itself as a national factor that promotes the socio-political development of every society. At all stages of society, our ancestors have integrated ideas that inspire the vision of members of society to goodness and creativity. For example, the ideological conception of the religion of Zarathustra in the book Avesto – the principle of “noble thought, noble word and noble deed” is a vivid proof of this. The ideas that arose in the Middle Ages were part of the culture of that time and were expressed in the teachings of our great-grandfathers, which greatly influenced the Islamic religion, Eastern philosophy and world civilization. It is known that Islamic ideas are formed as the basis of the teachings of the Qur'an in Karim and Hadiths, and they are expressed in Islamic laws, requirements of faith, legal and moral norms. In the understanding of such ideas, the work “Sahihi Bukhari”, which is recognized as one of the main books after the Quran Karim, is of great importance. In it, the interpretation of the main ideas of Islamic doctrine is expressed. [2]

“Uniting the people towards great future and glorious goals, urging every citizen, regardless of nationality, language and religion, to live with constant sense of responsibility for the happiness of the only Homeland, achieving worthy national values and traditions, educating highly qualified and perfect people, encouraging them to creative work, turning the sacrifice for this holy ground into a life criterion is the main [3]

National independence of the Republic of Uzbekistan great in economic, socio-political, spiritual and ideological spheres of life has led to change. The reforms carried out in Uzbekistan in the spheres of economic, socio-political and spiritual life are interrelated and these changes and processes are reflected in national ideas and ideology. The importance and necessity of the national idea for the economy is expressed in the following thoughts of the president of the Republic of Uzbekistan ShavkatMirziyoyev: “from this point of view, the formation of the state's innovative renewal program, the training of the personnel of the new generation, the class of new investors, which effectively uses innovation and investment of to do this, we need a strong national idea, a national program on technological development and modernization of the domestic market of Uzbekistan “ [4]

The practical significance of the issue of the National idea for our country today is that we are experiencing a period of building a new society, independent democratic development. It is at this time that different views can be formed that protect the interests of different layers of the population. In such circumstances, it is simply impossible for the nation and society to go retail. Otherwise, political, legal and economic reforms will lose their importance and there will be a lot of independence. The national idea plays an important role in strengthening the foundations of free, legal-democratic, civil society in our country, integrating the national idea into the minds of the members of our society, paying attention to the promotion of values defined as the priority



directions in the national idea and the “strategy of action”, ensuring that our people realize the national identity and as you know, the idea, that is, the goal, in most cases, walks ahead of practice. First, a certain idea is put forward as a common goal of members of society, and then practical activity begins to fulfill this goal. In this regard, the national idea serves as an important factor in ensuring social development and stability by realizing ourselves. [5]

“In our basic law, social life develops on the basis of a variety of political institutions, ideologies and opinions. No ideology can rise to the status of state ideology. This constitutional rule sets before us the task of creating the ideology of national independence. The ideology of national independence based on ancient traditions, customs, language, religion, spirituality of our people, confidence in the future, feelings of kindness, moderation, patience, Justice, enlightenment let us never forget that it should serve to penetrate into our minds " [6] From the above points of view, we also see that the idea, ideology is of crucial importance to the nation and that it is important to solve it correctly, even on a constitutional basis.

It is known that today we have a free and free, fair and humane society in our country we will restore, says the president of the Republic of Uzbekistan ShavkatMirziyoyev. In this regard, first of all, to respect the honest work of our people, to appreciate their dignity is our main goal. Today, in the life of our society, such an attitude towards a person has found a firm decision. That is why our country is making great strides and these achievements have aroused the enthusiasm and enthusiasm of the world community. On the basis of such positive changes, the worldview and consciousness of our people are rising. Their attitude to life, to Labor, is radically changing. Their confidence in their strength and capabilities, tomorrow, is strengthening. [7]

## REFERENCES:

1. Turdiyev B. The development of democratic society and spiritual renewal in the views of eastern and western thinkers. *Общество и инновации*. 2020;1(1):710-717.
2. Sobirovich TB. The development of democratic society and spiritual renewal in the views of Eastern and Western thinkers. *International journal of advanced research and review*. 2020;5(10):60-65.
3. Ergashev I, Farxodjonova N. Integration of national culture in the process of globalization. *Journal of Critical Reviews*. 2020;7(2):477-479.
4. Farxodjonqizi FN, Dilshodjonugli NS. Innovative processes and trends in the educational process in Uzbekistan. *Academicia: An International Multidisciplinary Research Journal*. 2020;10(4):621-626.
5. Sobirovich TB. The Strategy of Cultural Development in Central Asia during Amir Temur and the Temurids Dynasty. *Int. J. Sci. Res. in Multidisciplinary Studies*. 2021;7(3): 75-77

6. Sobirovich TB. The Strategy of Cultural Development in Central Asia during Amir Temur and Temurids Dynasty Reign. Irish Interdisciplinary Journal of Science & Research (IIJSR). 2021;5(1):18-22.
7. Turdiyev BS. The role of national harmony in the strategy of spiritual renewal. Scientific Bulletin of Namangan State University. 2019;1(6):229-233.

## ABOUT THE SOCIO-PHILOSOPHICAL VIEWS OF ABU ALI IBN SINA

**Nunnanova Gulzoda Bekpulatovna\***

\*Teacher,  
Department of National Ideology,  
Fundamentals of Spirituality and Legal Education,  
Navoi State Pedagogical Institute,  
Navoi, UZBEKISTAN  
Email id: [g.nunnanova77@mail.ru](mailto:g.nunnanova77@mail.ru)

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### ABSTRACT

*This article focuses on the socio-philosophical views of the encyclopedic scientist Abu Ali ibn Sina, in particular on the originality of philosophical considerations in the work “Hayy ibn Yaqzon”. Also in the interpretation of Ibn Sina an analysis of the issues of morality and friendship is presented. It is known that the issues of spiritual perfection of human nature, moral qualities have become relevant in every period of human history. Of course, the reality of the period in which we live is no exception. In the period of Central Asia Awakening, such issues as the pursuit of worldly knowledge, the perception of the mind as a criterion in cognition, the increased role of Science in research, as well as love for a person, the disclosure of his moral qualities, qualities, the spiritual maturity of a person, have been thoroughly analyzed, rare works have arisen.*

**KEYWORDS:** *Man And His Spiritual Perfection, Intelligence, Science And Its Appropriation, Enlightenment, The Importance Of The Science Of Logic, The System Of The Universe, The Levels Of Human Knowledge, The Foundation Of The World, Four Elements.*

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### 15. INTRODUCTION

“The pursuit of beauty and moral perfection is a feature inherent in the human being.” In fact, having this level of quality given to man by the great philosopher and wise man Abu Ali ibn Sina, moral perfection is only a process inherent in the human race. But a person does not come into the world with the necessary qualities and characteristics, ready-made qualities that meet the requirements of society. Such features and adjectives are formed in a certain social space, under the influence of ancestral traditions, mutual social relations, values and education. Therefore, from the masterpieces of spiritual heritage that have reached us, it is known that the issues of spiritual perfection of human nature, moral qualities have become relevant in every period of human history. Of course, the reality of the period in which we live is no exception. In the period of Central Asia Awakening, such issues as the pursuit of worldly knowledge, the perception of the mind as a criterion in cognition, the increased role of Science in research, as well as love for a person, the disclosure of his moral qualities, qualities, the spiritual maturity of a person, have been thoroughly analyzed, rare works have arisen. [1]

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The scientific and spiritual heritage of Abu Ali ibn Sina is invaluable not only in Central Asian culture, but also in world civilization. The scientific-theoretical views, scientific ideas, scientific methods used in practice had a significant impact on the progress of Science in his works on philosophy, logic, medicine, astronomy, natural science, morality, education and other sciences of Ibn Sina, who was praised as the “leader of scientists” in his time. Ibn Sina's works “Tibbqonuni”, “Donishnoma”, “Risolaitadbirimanzil”, “Kitob an-najot”, o’sakkizjildlik “Kitob ash-Shifo”, “Ishoratva-t-tanbihot”, “Ruhhaqidakitob”, “Qurozaitabiat”, “Kitob an-insof” and a number of others have attracted the attention of researchers to this day. Moral and educational issues play an important role in the great spiritual heritage of Ibn Sina that has reached us. In particular, the works expressing the moral views of the scientist include the story of “Nafshaqidarisola”, “Axloqhaqidarisola”, “Insofhaqidarisola”, “Ishqhaqidarisola”, “Salomon valbsol”, as well as “Risolaitadbirimanzil”. As mentioned above in these pamphlets, it is noted that a number of moral and educational norms, such as the social environment, the spiritual influence of other people, Family, Education, are the main determining factors in the formation of human morality. [2]

The creator of high moral values, which have arisen throughout the development of society within the framework of universal character, a certain elat, people, nation, is man himself. With the same moral qualities, the degree of possession of reason, the life of people is fundamentally different from the way of living other living things in nature. The presence of morality in a person has the basis of socialism. Ibn Sina in the treatise “Tadbirimanzil” emphasizes the idea that human nature will not be morality or dirt from time immemorial, that is, these qualities will not exist as long as they were born in human urine. [3]

In the moral views of Ibn Sina, there is a deep love for the human race and for all mankind, as well as humanism in means. The scientist correctly put the question of the interdependence of the all-round: mental, spiritual and physiological development of man in his time, about what ways to achieve well results in this regard, and made reasoning. First of all, Ibn Sina notes that man is the owner of intelligence, that the inner world of man is necessary with the karam of Allah. The necessity of rational and moral perfection in man is that, according to Ibn Sina, “a person with these qualities will have the knowledge to distinguish good from evil “evil”, and maturity “rashad” from false “misguided”. “It is this universe that is based on the potential of the mind, perception and consciousness of man, without knowing the inner essence of things and phenomena in the universe in which he lives, operates, but relying on his acquired knowledge that changes it, develops it. The theoretical knowledge in humans has benefited from this. But to have moral maturity, only theoretical knowledge is not enough. At the same time, if the acquired knowledge is manifested in the unity of words and actions, if the vices of human behavior and actions are observed, then a person experiences a literal spiritual perfection. Unfortunately we cannot always see this balance in life. Abu Ali ibn Sina also analyzes the categories of morality such as good and evil, happiness and sorrow, hatred, envy, soul, while praising justice, wisdom, humility, knowledge, morality, friendship, courage as the most important moral qualities. [4]

The fact that a person acquires these qualities is useful not only for him, but also for other people around him, as well as for society, says the scientist. In the philosophical story of Ibn Sina called

“Risalat at-Tair”: “O friends! Open the truth and follow the right path. Open the veil of the heart so that you can learn from each other and find perfection” encourages people to be fair, humble and united in their language. At the same time, in this philosophical story, which is narrated from the language of birds, and in fact is based on the analysis of human relations, one should be aware that being jealous, insincere and insincere is a bad omen. “O friends! Just as the hedgehogs pull the head into it, you also pull the head inside. Expose your boots” and take your looks inside” if people see not only their appearance, but also their inner world, care says it would be a smarter and more accurate job. Also, Ibn Sina analyzes the categories of friendship, harmony, trust in the”Treatise of time ” and gives interesting advice on how a person should choose a friend for himself, what kind of people should not be taken as friends. “If friendship is looked upon as a need for trade, if it is not necessary to look at a friend in the not necessary, and leave, what friendship has become now!”.The philosopher, who considers friendship insincere, which he does not remember at another time, remembering only when it is necessary “after all, there are also compassionate friends with whom God himself has approached! They look at the truth with reason; there will be no doubt in their hearts. [5]

All of them are unbiased friends of each other, harmonious, they are united by such noble friendship that” a person recognizes the existence of true friendship. In the work” event location” Ibn Sina says to everyone that whether he works in a certain position or is a member of an ordinary society, he must necessarily be intelligent, sincere and sincere friend. According to Ibn Sina, the real friend of man should be a mirror for him, he should tell about the shortcomings in his behavior, shortcomings in his behavior.”

If a true friend does not say the minor observed defects in you in his time, they can go to the appearance of a difficult habit of abandoning, turning into a big drawback from time to time.” How many PU ideas. The aspects analyzed in the views are the most important signs that cause stability in social relations between the two countries in society, in different social groups, in a wide range of international, state-wide relations. In this regard, Ibn Sina's work “Hayy ibn Yaqzon”(the Awake son alive), which covers the analysis of important philosophical problems: Man and his spiritual perfection, Intelligence, Science and its appropriation, enlightenment, the importance of the science of logic, the universe system, the levels of human knowledge, the basis of the world, four elements, the substantive issues, is also of particular importance. The reason is that in the game there is a specific way of covering philosophical issues.

Since the style of writing the story of the scientist “Hayy ibn Yaqzon” is heavy, understanding is a work that is considered difficult. Because Ibn Sina uses symbolic gestures in analyzing philosophical issues in his work. In order to correctly perceive the philosophical views in the work, however, a special classification of the work is required from the learner. Below we find it necessary to explain how philosophical issues were analyzed in the story” Hayy ibn Yaqzon "as much as possible.The philosophical observations expressed in this story are explained in the language of the mind-Hayy ibn Yaqzon, that is, the person who went on a trip met Hayy ibn

Yaqzon and was enlightened in the form of an intense conversation with him. The very beginning of the conversation begins with the controversial thoughts about the person and his behavior, the actual subject of philosophy. Ibn Sina tries to reveal in the game the character of man, emphasizing the existence of positive powers and levels inherent in him: malice, cruelty, envy, theft and deceit, which, in addition to spirituality, knowledge, understanding, reason, contemplation, morality, does not allow a person to emerge from his sphere of influence and abilities in it. The human character is taken in the game as "companions". These thoughts can be seen in the answers Hayy ibn Yaqzon told The Inquirer: "these factors that do not separate from you in your opinion are bad habits (negative habits in a person, illusions). You cannot easily get rid of them, they will knock you out of the way.

From their plot, you can be saved by honesty and purity." When Ibn Sina says "companions", he refers to the negative Fe' Al-Atwar in Man and states that it is necessary for a person to give up such indecent "companions". Indeed, man and his spiritual perfection are considered the most ancient question of philosophy. In every society that exists in a certain space and time, striving for perfection, the upbringing of a person who is able to meet the spiritual, social, educational goals and requirements inherent in his time has become the most relevant topic. The period in which Ibn Sina lived is of course no exception. The formation of Fe in Man, positive qualities or negative vices, depends on what kind of social environment a person has grown up, the level of education and a number of other factors. Proceeding from these norms, someone is positive, someone has the advantage of negative aspects.

Thus, since a person is superior to an animal by his intellect, he must certainly fight against the defects in himself, without waiting for the evil vices to destroy him. This struggle requires patience from a person. In the game, the way a person struggles with his own vices is interpreted from the language of Hayy ibn Yaqzon as follows: "Now you walk yourself high out of them (that is, from the "fellow"). Let your judgment prevail over their judgment, do not let your helm be a grip on their hands, a guide to you. Good event support, try to come to the top. Then surely thou hast guided them on the right way. So, in the opinion of the scientist, a person who has fallen into the swirl of bad deeds must seriously try to save himself from them with intelligence and ingenuity.

## REFERENCES:

1. Turdiyev BS. The role of national harmony in the strategy of spiritual renewal. Scientific Bulletin of Namangan State University. 2019;1(6):229-233.
2. Sobirovich TB. Strategy of Renewal of National Spirituality of Uzbekistan. International Journal on Integrated Education. 2020;3(8):122-126.
3. Sobirovich TB, Murodogli IS. The strategy for the implementation of the modern governance system in Uzbekistan. ACADEMICIA: An International Multidisciplinary Research Journal. 2020;10(5):741-748.



4. Turdiev BS, Yuldashev BT. The Issue Of Avoiding Crimes Among Youngsters In Uzbekistan. Экономикаи социум. 2019;1(1):119-122.
5. Farxodjonova NF. Relation to National Culture in the Condition Spiritual Renew Of Society in the Republic Of Uzbekistan. Мировая наука. 2018;(6):14-17.

## DEVELOPMENT OF FARMLAND MANAGEMENT IN THE REGIONS OF UZBEKISTAN: PROBLEMS AND SOLUTIONS

**Nodira Kulieva Murodova\***

\*Professor,  
Doctor of Economic Sciences,  
Navoi State Pedagogical Institute,  
UZBEKISTAN

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### ABSTRACT

*The authors consider a scientific approach to solving existing problems in the field of personal subsidiary plots, its history and modernity, as well as its phenomenon in the conditions of a market economy in Uzbekistan. The issue of land law has become relevant at all times. The scientific opinions of representatives of physiocratic education in the history of economic education are an obvious example of this, including F. In the concept of Jin, by "natural order" the scientist understands private ownership of land, which appears when the natural order speaks, and becomes more and more fortified. It supports the development of economic entities on a free and competitive basis, limiting state intervention in the economy.*

**KEYWORDS:** *Ownership, Use, Disposal Of Land By Citizens Of The Republic. Private Farm, Small Commodity Household, Cooperation, Modern, Innovative Technologies, Modern Infrastructure.*

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### INTRODUCTION

According to world statistics, absolute population growth, in particular, "as a result of an increase in the world population to 10 billion people by 2050, providing the population with quality food, intensive cultivation of raw materials in the agricultural sector, improving the territorial structure of food production industries, improving the use of this, in turn, plays a special role in the conditions of a market economy, the attitude of citizens to land ownership, land use, land disposal in ensuring the country's food security.

The issue of land law has become relevant at all times. The scientific opinions of representatives of physiocratic education in the history of economic education are an obvious example of this, including F. In the concept of Jin, by "natural order" the scientist understands private ownership of land, which appears when the natural order speaks, and becomes more and more fortified. It supports the development of economic entities on a free and competitive basis, limiting state intervention in the economy. These relationships are F. It Ken regarded them not as historical, but as eternal laws. Ulugmutafakkir A. Navoi also expressed the following views on the peasant of his time and his role in production: "the peasant who distributes grain is the one who opens the way to food by dividing the land." [1]

It is worth noting that in 1917, in order to regulate land relations in the Turkestan region before the Soviet Revolution (in 1873), Governor-General Kaufman proposed several measures for his "rules on the management of the territory of Turkestan". The main thing is that at that time irrigated lands were transferred to the land population in permanent possession from generation to generation, as a whole as private property, the use of land and water, the forms of which were determined by their inhabitants of the same place. This eventually led to the development of a farm-yard form of land use, the creation of conditions for the free sale and purchase of land, which in practice led to the development of small commodity farms.

In order to revise the amount of land taxes, a Land Tax Commission was established in 1888. The lands began to be drawn on the map. And the victory of the revolution on October 25, 1917 led to a radical change in land relations. The decree "On Land" was adopted and the relations of private ownership of land (1924) were abolished. The main principle of the decree was the confiscation of all lands. In accordance with the decree on land, it was forbidden to lease land and introduce wage labor. As a result, he made changes in the relationship between land use and its disposal.

Since 1990, in Uzbekistan, in order to increase the efficiency of land use and obtain an additional source of income, farmers began to allocate land plots on an organizational basis. Up to 0.25 hectares of land were allocated to each family for the maintenance of the "personal assistant farm" (farm). In 1993-1300 thousand hectares of land were transferred to farmers. However, in 1988, 4349.3 ming.ga the area of 125.3 thousand hectares (2.8%) of the sown area falls on personal subsidiary farms of the population.

A personal subsidiary farm is understood as a family farm that is engaged in the cultivation of agricultural and livestock products for family needs based on the personal labor of family members on farmland, as well as the sale of more than the family needs in peasant markets based on part of the plots provided for the construction of a house on land, farmland is also a participant in market relations, that is, it is considered a small commodity economy. This is an important link in the chain of the process of social reproduction. At the time of the former Soviet Union, without due attention to this issue, it was recognized that this form of economic activity was mainly natural in nature. In other words, it was considered by him as a system of "production - distribution-consumption". The problem of staff turnover was ignored.

When it comes to the role, it should be noted that the famous economist, sociologist A.V. The study of the scientific heritage of Chayanov (1888-1937) on farmland of the 30s of the last century remains relevant today. A.V.Chayanov put forward the idea of creating family farms, (against collusion). According to the scientist, "the joining of small peasant farms to cooperation on the basis of voluntarism is a more effective development of commodity-money relations." Bunda suggested that the cooperation should be organized vertically, i.e. production, storage, processing, sale, purchase, maintenance, selection and selection work" [2].

Thanks to independence, 0.06 hectares of land were sold for personal subsidiary farms, as well as for business activities to legal entities and individuals, land plots with an area of up to 1 ha and 1 ha were provided only on a competitive basis. [3]

Message of the President of the Republic of S.Mirziyoyev to the Supreme Assembly in 2020 on January 24 means "poverty reduction - it means the awakening of the entrepreneurial spirit among the population, the full realization of the inner strength and potential of a person, the

implementation of a comprehensive economic and social policy to create new jobs. ...Also, from the comments [4], we can learn that in 22 rural districts of the Fergana Valley, we must gradually introduce positive experience, which has begun to form modern business and business skills among the population in all regions." Today, in practice, the fact that the population of the valley effectively uses agricultural land indicates that special attention is paid to the issue of household development.

The institutional framework for the development of agricultural land in Uzbekistan is sufficient. In particular, in order to ensure the implementation of the Decree of the President of the Republic of Uzbekistan dated October 9, 2017 "On measures to protect the rights and legitimate interests of farmers, peasant farms and landowners radically improving the system of efficient use of agricultural land" No. PF-5199: the President of the Republic of Uzbekistan signed a decree "On additional measures In accordance with the decision, special attention was paid to the creation of Farm Service LLC, the main task of which in all rural districts is to provide practical assistance in the cultivation and sale of agricultural products to farmers, farms and landowners through the following.

In 2017-2021, in the strategy of actions on five priority areas of development of the Republic of Uzbekistan:

- "Practical assistance in the production of light construction greenhouses, small poultry farming, fish farming, bee farms, and other highly efficient and highly profitable products using alternative sources of electricity in households and farms;
- Promotion and dissemination of modern technologies and experience of effective and rational use of personal subsidiary farms "requires serious attention". [5]

As a result, in recent years, additional incomes of families have increased significantly due to the efficient use of farmland. The level of saturation with products of local markets has increased significantly, especially as a result of the organization of cultivation of tomatoes, cucumbers, greens, lemons and other crops, poultry breeding in greenhouses restored by the population. Today, 95-99 percent of fruits and vegetables, melons, meat, milk and dairy products are supplied to the market from private farms.

The analysis shows that, despite the results achieved, there are a number of problems and shortcomings in the introduction of market niches in this system of targeted and efficient use of farmland, in particular:

- The efficiency of using almost half a million agricultural lands at the disposal of the population remains low. It is difficult to radically change the attitude of landowners to unused land;
- the effective use of agricultural land plots is carried out systematically and regularly by local authorities and self-government bodies of citizens or is seasonal;
- Modern infrastructure for various agrochemical services, veterinary medicine, irrigation and reclamation works has not been created for farms. The system activity of LLC "Farmland Service" is ineffective;
- Lack of modern knowledge and skills of the population in the field of land use, etc.

In our opinion, in order to ensure the efficiency of landowners in the use of agricultural land and ultimately radically change their relationship with an increase in their income, we consider it appropriate to implement the following proposals:

- It is necessary to develop local market relations by joining cooperatives, taking into account the directions based on the voluntary nature of farms. This requires further improvement of the regulatory framework;
- It is necessary to increase the responsibility of landowners for land use, to establish parliamentary, representative and public control, as well as to carry out regular monitoring by citizens' self-government bodies, in particular;
- Taking into account the material nature of citizens' self-government bodies, it is desirable to join a state union that exercises control over farmland;
- To demonstrate that agricultural land is an important type of economic and social activity for the population, especially among the rural population, as an example of exemplary farms, as a result of the widespread and regular promotion of modern technologies in this area.

## **REFERENCES:**

1. Razzakov A. The history of economic doctrine. T.: Economics-Finance, 2007. 58 p.
2. Chayanov A. Fundamentals of the idea and forms of organization of peasant cooperation. Selected works, M.: Economics, 1989.
3. Resolution of the Cabinet of Ministers of October 7, 2015 No. 285. Retrieve from [https://cis-legislation.com/docs\\_list.fwx?countryid=011&page=16](https://cis-legislation.com/docs_list.fwx?countryid=011&page=16)
4. Mirziyoyev S. Appeal to the Oliy Majlis of the Republic of Uzbekistan, 2020. Retrieve from <https://president.uz/en/lists/view/4057>
5. Decree of the President of the Republic of Uzbekistan dated February 7, 2017 No. PF-4947 "On the Strategy of Actions for the Further Development of the Republic of Uzbekistan".

## HISTORY OF REFORMS IN HIGHER EDUCATION SYSTEM IN NEW UZBEKISTAN

**Komolova Farida Qodirjonovna\***

\*Teacher,  
Andijan Institute of Agriculture and Agro Technologies,  
Andijan, UZBEKISTAN  
Email id: f.komolova@gmail.com

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### ABSTRACT

*In recent years, radical reforms have been carried out in our country, a wide range of updates and initiatives have been launched to radically renew public administration, modernize the social sphere and economic sectors. The full introduction of them into life created a huge need for highly qualified and competitive professional personnel, capable of taking on the responsibility of social development, patriotic, capable of independent decision-making, promising and promising. This need was primarily the impetus for the beginning of radical reforms in the educational sphere of society.*

**KEYWORDS:** *Education, Upbringing, Pedagogical Activity, Need, Modernization, Innovation, Technology.*

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### INTRODUCTION

As we know, large-scale reforms are being carried out in every sphere in our country today. In turn, a significant part of these reforms is organized by the reforms carried out in the educational system. In recent years, practical work has been carried out on the organization of all stages of education on the basis of modern requirements. In particular, reforms and practical measures in the education system are organized in the following directions:

- 1) In the field of preschool education;
- 2) General secondary and secondary special education;
- 3) Higher education;
- 4) Post-higher education;
- 5) Retraining of personnel and improving their skills.

In 2017-2021, the strategy of action on the five priority directions of development of the Republic of Uzbekistan has become the most important program document that determines the priority directions of state policy in the medium term. In accordance with this document, a number of reforms are also carried out in the field of Education. The main attention is paid to the reform of the educational system on the basis of dialogue with the people and advanced foreign experience.



In the following years, a number of decrees and decisions on the organization and modernization of all stages of education on the basis of modern requirements were adopted.

In particular, one of the most important documents adopted in the education system was the adoption of the law "On education" in the new edition. According to this law, the main printing materials in the field of education, the educational system, types and forms are clearly defined.

Also, according to the law, the state Higher Education, Secondary special, professional educational institutions and their branches, as well as higher, secondary special, professional educational organizations with the participation of the state, and their branches have been established by the decisions of the president or the government. It was established that the establishment of non-state educational institutions was carried out by their founders. The license to non-state educational organizations has been issued by the state agency for quality control of education. 1997 year with the law of the tithes

On August 29, the laws "On education" and "On the national program of Personnel Training" lost their strength.

Accordingly, we can say that the adoption and implementation of this law became one of the most important documents adopted in the field of Education.

Our President Sh.M. Mirziyoyev [1] noted, "the more educated our children come out of school, the faster the economy networks based on high technologies develop, the more social problems they are able to solve. Therefore, if I say that the threshold of the new Uzbekistan begins with the school, I think that all our people will support this idea."

In addition, a certain part of the reforms carried out in the field of education, of course, are reforms in the higher education system.

In particular, the priority directions of the systematic reform of higher education in the Republic of Uzbekistan, raising the process of training highly qualified personnel who think independently to a qualitatively new level, modernization of Higher Education, the concept of development of the higher education system of the Republic of Uzbekistan until 2030, approved by the decree of the president of the Republic of Uzbekistan dated October 8, 2019 PD-5847 for the purpose of development of social and economic sectors based on advanced educational technologies, serves as for new reforms in this area.

It is no secret to anyone that today the world-famous institutions of higher education are considered major centers of science. Today, new universities, branches of the world's leading universities are being established. The following indicators confirm that there are fundamental changes in the higher education system: 64 new higher education institutions have been established in our country in the last 5 years and their number has reached 141 units. The quota for admission was exceeded 3 times. Now the level of coverage of graduate youth with higher education has increased from 9 percent in 2016 to 28 percent. In the near future, it is planned to increase this figure by 50-60 percent. This means that improving the quality of Education will become our goal and honorable duty. [2]

On the basis of the system of public-private partnership, the activities of non-governmental higher education institutions are launched. Having studied the opinion of the population, we have restored the forms of correspondence and evening education, the quotas of admission are being

increased. Although the level of coverage of school graduates in higher education has reached 9 percent in 2016 year from 25 percent in 2020 year, we need to push these things further.

It was created to ensure the professional development and internship of professors and teachers in higher education and research institutions abroad. On average, it has increased by 2,5 times compared to 2018 year. Since this year, 10 higher educational institutions have been transferred to the self-financing system.

At present, in order to fulfill the tasks assigned to higher education institutions (universities), they are required to be literally independent, all types of subordination are abolished. All HESs must be reorganized in the form of a non-profit organization (NPO). Their leaders can be elected by the same HES team for a certain period, for example, up to 4 years. [3]

It is necessary to create the same legal basis and conditions for the activity of all HESs. Improve their material technical base light on the beam, of course, but we must achieve the creation of a system for the sustainable development of HESs. Then in our universities there is an increase in the possibility of providing specialists suitable for the socio-economic needs of the society.

It is natural that the question arises: what will be the role of the Ministry of Higher and secondary special education (MHSSE)? The ministry should provide methodical assistance to this transformation of HESs, for example, the development of a model charter of HESs in the form of NPOs. At the end of the transformation, the ministry is also reorganized in the form of NPOs, which can be assigned the task of accreditation and attestation of HESs.

Great attention is paid to attracting foreign investors to Uzbekistan. In fact, it should be remembered that HESs are also a good source of investment.

Let's take an approximate calculation. According to UNESCO statistics, in 2017 there were 34990 students who went to study abroad from Uzbekistan. If we round it up to 35 thousand, then the average tuition abroad goes 7 thousand dollars, another 5 thousand dollars to live, it means that in one year 420.000.000 (four hundred and twenty million) US dollars will go out of Uzbekistan, if we multiply this by 4 more years 1.680.000.000 (one billion six hundred and eighty million) US dollars.

As a solution to this, it is necessary to introduce the above proposals with intensity. If similar funds are attracted and directed correctly, then the HESs in our country can also be accessed from the world ratings, and the transformation into real innovation centers is nothing.

As noted above, the state should create equal conditions for the organization and operation of new HESs in the form of NPOs. If necessary, it would be expedient to adopt a state program on this issue. [4]

In this regard, the practice of organizing private universities in the form of a limited liability society (LLC), which is currently being established, does not correspond to the characteristics of the higher education system. The reason for this is the following.

LLC is a type of commercial organizations. Their goal is to generate revenue and distribute it among the founders they organize. And the HES is not a place where you can earn and share.

Therefore, their structure in the form of NPOs is desirable. Because the money generated by NPOs in the form of NPOs is used to develop their activities and pay salaries to professors and

other needs. According to the current legislation, NPOs can also engage in entrepreneurial activities, only the income received in them is not allowed among the founders — this corresponds to the purpose of the ICC.

Also, the adoption of a separate government decision on each private HES, giving different preferences, the practice of establishing activities also does not lead to good results. Because the higher education system must also have a healthy competitive environment. As noted above, it is necessary to create the same conditions – the only legal basis for the functioning of all HESs.

In this regard, we will touch on the issue of the establishment of branches of foreign universities. International cooperation is good, but we must pay attention to the development of our existing HESs and achieve the creation of national brands. Currently, there are mainly Uzbek professors and teachers in these branches.

It is wrong to wait that foreign specialists will come and solve our problems, we must try to solve them step by step through our own knowledge and hard work. If our local HESs develop, it is possible to hire and use a foreign professor at any time.

It is no secret to anyone that now our HESs do not fully cover applicants who want to enter the study. Many of our young people are going to study at foreign universities.

Work is also being carried out at the school on passing the final exams and passing the OT entrance exams as a single. Such a system was introduced in many countries, including Great Britain, Russia, etc. Of course, it is natural that a certain challenge is born in the introduction of such a system in US. Today, we have not aimed at a complete analysis of this issue.

If the above proposed measures are implemented, the chances of the HESs to cover the entrants will increase even more, and gradually the quotas for admission to the HESs will increase, and the coverage of all entrants can be achieved. [5]

When applying for a foreign experience, a person who wants to study will be accepted by any university anyway. Students can successfully complete a certain part of the university by qualifying during their studies. We also need to introduce such a program so that graduates of our universities can also qualify and become qualified specialists.

Even with the transition to the credit system, many issues are rising, the following approach is offered to solve them.

This does not give the expected result of mechanically converting previous training plans into a credit system. Subjects should be sharply reduced, and they should not exceed 4 in one semester. In addition, it is necessary to adapt the disciplines of specialization to multiply, deeper transition.

Giving students the opportunity to choose subjects is also the right approach. Let him decide for himself which subjects to read and what direction to choose. Also, to some extent, the subjects are not adapted to the professor, it is worthwhile to be taught on the basis of the desire of students.

Let the writing of Graduation qualification work also be on a competitive basis. If the student does not want to write it, let him study by choosing 2 other subjects instead. He can choose a GQW if he plans to do scientific work in the future.

As far as practice is concerned, our HESs spend a lot of resources on its organization. Proceeding from foreign experience, the practice should also be voluntary. Let the nouns do not overdo it with them. If the student is going to practice, let him find it himself and go through the summer holidays.

Due to the nature of science, it is necessary to revise the practice of conducting classes as lectures and seminars/practical views. In the workshop, the student should avoid questioning each lesson. For example, in England, practical training is conducted as a continuation of the lecture and the students are not evaluated, during the semester they are given 1-2 written assignments and the final exam is held. In this method, the overall assessment of the student in science comes out. This approach gives students the opportunity to develop their independent thinking and analysis skills, resulting in the development of a good specialist.

The load on the teachers should also be revised and not more than 2-3 subjects. Then there will be an opportunity to teach in depth and qualitatively the subjects of specialization. At the moment, the teacher has to conduct classes in many disciplines to complete the load. As a result, his work on himself, his conduct of qualitative scientific work, his formation as a specialist with deep knowledge within the framework of any science is limited.

In the transition to the credit system, all normative legal documents adopted in the field of higher education should be inventoried and appropriate additions and changes should be developed by MHSSE. If this work is not carried out, many inconsistencies may arise.

For example, is an exemplary science program structured, which is approved by MHSSE after switching to a credit system? What is the purpose of such a form of science program in the current conditions? The program of science abroad is taken from the textbook published by the teacher on this subject and given to the students. There are no special requirements and milestones abroad in this regard. Therefore, they are flexible to the higher education market and offer new directions and courses.

Another issue is that during attestation and accreditation students are asked for textbooks at the universities. Where does such a criterion come from and what is its significance? In the US, all students buy textbooks themselves, while the university has created the opportunity to use online resources for free. Of these, no one requires the level of student's textbook supply. At a time when online resources are currently under development, this criterion is absolutely inappropriate.

The following method is used in the organization of training through various platforms, which will bring convenience to both the learning process and the teacher and the student. That is, when conducting seminars / practical classes in a different format, the teacher gives the students an explanation on the materials placed on the lecture or platform, passes a lesson in the form of a question-answer and does not evaluate the students. Assessment in science it is possible to give 2-3 written assignments during the semester, depending on the nature of the science, this can be assessed to 30-40 points, and the remaining points can be postponed to the final written exam.

It may give birth to the idea that although it remains easy to read in it. No, not at all, this place requires the teacher to spend more time on the tasks that are set up to assess the knowledge of the students and develop it qualitatively. Assignments should be aimed at developing independent thinking and critical analysis skills in students.

In such circumstances, students may experience situations where they can move from one another and find assignments. But we need to explain to the students that plagiarism works, if necessary, by writing a receipt, we must warn them that measures can be taken for this act, from the ranks of students to the exclusion. Universities abroad work in the same way.

We're called international experience, international standards, but we go our own way. It is possible to get a doctor's degree after a master's degree abroad. At us a certain time such a system was introduced, but it has changed again, now it is possible to get a degree of a doctor of philosophy, then a doctor of science after a master's degree. To me foreign professors have applied as much as why a doctor's degree in Uzbekistan should be taken twice.

If this is aimed at improving the quality of scientific work, this can be solved by introducing other disciplines. If writing a scientific work at US takes about 30 percent of your time, the remaining 70 percent will be spent on organizational work and going through different stages. Should those who do scientific work agree with my opinion?!

Evaluated by the head of the researcher's scientific work abroad, internal and external reviewers, the scientific degree is publicly defenseless, will be awarded by the University.

At us too it would be desirable if the responsibility of scientific leaders and reviewers on the quality of scientific work decreases, and if increased. For example, if it is determined that the quality of the researcher's work is not good, without giving him a degree, his academic supervisor should be deprived of the right to lead other academic work. The same rule applies to both internal and external reviewers.

Now the requirement for the application of the results of scientific work is a separate topic. So why should a researcher who is doing scientific work in the legal field run to the ministries, departments and the Supreme Assembly and apply my scientific result?! How correctly to put such a task on the neck of the researcher?! How is the importance of this requirement in improving the quality of scientific work?

The task of the researcher is to research a topic and develop the substantiated scientific (practical) conclusions, while their application to practice is not included in the task. For example, suppose a researcher conducted a research on a new topic in the legal field, introduced his proposals to the ministry, the office and the Supreme Assembly. Even if I could give myself an example, I defended my scientific work on media in 2008 year. I also sent my proposals to the Oliy Majlis, but the law on media in Uzbekistan was adopted in 2018. This means that I would have to wait 10 years for the implementation of my research results on the current demand. So do not draw conclusions on this matter yourself.

Now, this demand is taking a lot of researchers ' time and leaving them out of their main job. How correctly to put such a request on them?

Now, when we come to print scientific papers, at the same time, the work, approved by the Higher Attestation Commission (OAK), is required to be published in scientific journals abroad. Think of one, which state keeps doing so? Can you imagine, for example, that France requires its researcher to publish his work in the Uzbek language, and again in magazines that come out in Uzbekistan?

First of all, is the scientific work done in Uzbekistan not to be recognized by the scientific community here? Why should we prepare our scientific papers for foreigners, translate them into their language, pay money on publish them in their journals?! It does not leave me calm in the same question Series. This is a completely different situation if the researcher voluntarily publishes his article for acquaintance abroad.

Therefore, instead of the scientific journals those are being published in our own better for researchers to create relaxation?! If there is a need, it is possible to invite foreign specialists to the membership of the editorial board of these magazines.

No matter what area it is in, our current system of professional development is ineffective. How correctly to spend so much money on this area by the state, to take away the monthly time of employees? Again, if we turn to foreign experience, then in them this process is also conducted in a different way, that is, conferences, trainings and short courses offered by universities. The main thing is that no one is obliged to take part in them, each employee participates if he has time and within His Own Interests.

So, From The Foregoing, We Can Conclude That The Reforms In The Field Of Education Today Are No More Than Reforms In Other Areas With Their Relevance And Practical Significance. Because The Continuation Of The Reforms In This Sphere On A Wider Scale Is A Period Demand.

## REFERENCES:

1. Mirziyoyev ShM. The Rule Of Law And The Maintenance Of Human Interests-The Guarantee Of The Development Of The Country And The Prosperity Of The People. Tashkent: Uzbekistan, 2017. 45p.
2. Kodirjonovna KF. Innovative Approach to Modernization of Agriculture in Uzbekistan. Central Asian Journal of Theoretical & Applied Sciences. 2021;2(6):109-113.
3. Farxodjonova NF. Modernization and Globalization as Historical Stages of Human Integration. Теория И Практика Современной Науки. 2018;(3):16-19.
4. Numonjonov SD. Innovative Methods of Professional Training. ISJ Theoretical & Applied Science, 2020;01 (81):747-750.
5. Farxodjonqizi FN, Dilshodjonugli NS. Innovative processes and trends in the educational process in Uzbekistan. ACADEMICIA: An International Multidisciplinary Research Journal. 2020;10(4):621-626.



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