

ISSN (Online) : 2278 - 4853

Asian Journal of Multidimensional Research



AJMR



Published by :
www.tarj.in

AJMR

ISSN (online) : 2278-4853

Editor-in-Chief : Dr. Esha Jain

Impact Factor : SJIF 2022= 8.179

Frequency : Monthly

Country : India

Language : English

Start Year : 2012

Published by : www.tarj.in

Indexed/ Listed at : Ulrich's Periodicals
Directory, ProQuest, U.S.A.

E-mail id: tarjjournals@gmail.com

VISION

The vision of the journals is to provide an academic platform to scholars all over the world to publish their novel, original, empirical and high quality research work. It propose to encourage research relating to latest trends and practices in international business, finance, banking, service marketing, human resource management, corporate governance, social responsibility and emerging paradigms in allied areas of management. It intends to reach the researcher's with plethora of knowledge to generate a pool of research content and propose problem solving models to address the current and emerging issues at the national and international level. Further, it aims to share and disseminate the empirical research findings with academia, industry, policy makers, and consultants with an approach to incorporate the research recommendations for the benefit of one and all.

SR. NO	PARTICULAR	PAGE NO.	DOI NUMBER
1.	EFFECT OF A SIX-WEEK EXERCISE INTERVENTION ON PULSE RATE, BLOOD PRESSURE AND BMI AMONG UNDERGRADUATE STUDENTS IN IGNATIUS AJURU UNIVERSITY OF EDUCATION, PORT HARCOURT, NIGERIA Tonubari Kpai, Samuel Bagia	1-15	10.5958/2278-4853.2026.00004.X
2.	EXPLORING FORGIVENESS AS A POSITIVE COPING RESOURCE FOR OCCUPATIONAL STRESS AND WELL-BEING AMONG PROFESSIONALS Dr. Manish Kant, Dr. Lav Kumar Singh	16-29	10.5958/2278-4853.2026.00011.9
3.	EXPLORING A SYMMETRICAL RELATIONS AND DIVERSE PROCESSES OF ENSLAVEMENT IN NIGERIA'S AGRICULTURAL SECTOR Samuel, Kinikanwo-Chimenim Paul	30-44	10.5958/2278-4853.2026.00005.6
4.	ECONOMIC RECESSION AND FAMILY STABILITY IN ABIA CENTRAL SENATORIAL ZONE, SOUTH EASTERN NIGERIA Ijeomam. Amaugo, Eberea Ugwueje, Nwadikevictorc	45-59	10.5958/2278-4853.2026.00007.9
5.	SUSTAINABLE LOGISTICS OPERATIONS OF GLOBAL LOGISTICS COMPANIES: VISION AND ROAD AHEAD Dr. Parimala. G, V. Deepa	60-67	10.5958/2278-4853.2026.00015.4
6.	ASSESSING FAMILY AND SCHOOL ACADEMIC CONSCIOUSNESS AND STUDENTS' PERFORMANCE IN ENGLISH LANGUAGE AMONG SENIOR SECONDARY SCHOOLS IN PORT HARCOURT CITY LOCAL GOVERNMENT AREA Cyrus, Smart Eziwho, Ogunka, Richard Iheanyichukwu	68-77	10.5958/2278-4853.2026.00008.5
7.	FLEXIBLE WORK PLACE AND ORGANIZATIONAL EFFICIENCY IN SELECTED OIL SERVICING FIRMS IN NIGERIA Samuel, Kinikanwo-Chimenim Paul	78-92	10.5958/2278-4853.2026.00006.2
8.	THE LIFE AND LITERARY JOURNEY OF MAHESH DATTANI Shilpa, Dr. Renu Sharma	93-99	10.5958/2278-4853.2026.00016.0
9.	SUSTAINABLE SUPPLY CHAIN RESILIENCE IN VOLATILE INTERNATIONAL MARKETS Dr Victor Joes Obasse	100-110	10.5958/2278-4853.2026.00012.5

10.	A STUDY ON CUSTOMER EXPECTATIONS ON VARIOUS ATTRIBUTES OF ELECTRIC VEHICLES USING KANO MODEL <i>B. Ganesh, Dr. M. Akhila</i>	111-125	10.5958/2278-4853.2026.00017.7
------------	--	----------------	---------------------------------------

**EFFECT OF A SIX-WEEK EXERCISE INTERVENTION ON PULSE RATE,
BLOOD PRESSURE AND BMI AMONG UNDERGRADUATE STUDENTS IN
IGNATIUS AJURU UNIVERSITY OF EDUCATION, PORT HARCOURT,
NIGERIA**

Tonubari Kpai*; Samuel Bagia**

*Department of Human Kinetics and Sports Science,
Ignatius Ajuru University of Education, Rumuolumeni,
Port Harcourt, NIGERIA
Email Id: tonukpai@gmail.com

*Department of Human Kinetics and Sports Science,
Ignatius Ajuru University of Education, Rumuolumeni,
Port Harcourt, NIGERIA
Email Id: tonubari.kpai@iaue.edu.ngEmail

DOI: 10.5958/2278-4853.2026.00004.X

ABSTRACT

This study investigated the impact of a six-week exercise programme on pulse rate, blood pressure and Body Mass Index (BMI) among undergraduate students in Ignatius Ajuru University of Education, Port Harcourt, Nigeria. Three objectives, three research questions and three hypotheses guided the study. A quasi-experimental design was adopted for the study. 182 respondents participated in the study, they were recruited via one-on-one contact and social media platforms. Each session of exercise included 10-minutes warm-up, 20-minutes exercise session on the ergonomic bike and 10-minutes cool-down. The exercise sessions were done twice in a week for 6 weeks and measurements were recorded for each participant at each exercise session. Data was analysed using frequency counts, percentages, mean and standard deviation while the hypotheses were tested using paired samples t-test at 0.05 alpha level of significance. The findings from study showed that prior to six-week exercise intervention, the mean pulse rate was 67.92bpm for male students and 81.69bpm for female students; it became 79.55bpm for male students and 79.55bpm for female students at post intervention. The mean systolic blood pressure for male student was 118.98mmHg and diastolic was 74.01mmHg prior to intervention. Post intervention systolic blood pressure was 116.57mmHg while the diastolic blood pressure was 74.73mmHg. The result also revealed the mean body mass index of 24.30kg/m² for male students and 24.38kg/m² for female students prior to 6-weeks intervention; and 21.80kg/m² for male students and 22.69kg/m² post intervention. Furthermore, the paired samples t-tested analysis revealed six-weeks exercise intervention has significant effect on pulse rate ($t = -4.528$; $p = 0.000$); systolic blood pressure ($t = -5.700$; $p = 0.000$), diastolic blood pressure ($t = -2.046$; $p = 0.042$) and body mass index ($t = -12.077$; $p = 0.000$) among the respondents. It was recommended that students should prioritise regular exercise while university management should provide opportunities for students to incorporate exercise into their daily routines for proper weight management and promotion of healthy living.

KEYWORDS: *Exercise Intervention, Blood Pressure, Pulse Rate, Ergonomic Bike, Undergraduate Students.*

INTRODUCTION

Sedentary behaviour and physical activity represent two ends of a behavioural spectrum that significantly impact health outcomes. Sedentary behaviour refers to any waking activity characterized by low energy expenditure, typically 1.5 metabolic equivalents (METs) or less, while in a sitting, reclining, or lying posture (Tremblay et al., 2017; Thivel et al., 2018; Dempsey et al., 2020). Common examples include sitting while watching television, using a computer, reading, or driving. Sedentary behaviour is distinct from physical inactivity, which refers to not meeting the recommended levels of physical activity (Panahi & Tremblay, 2018). Physical activity is any bodily movement produced by skeletal muscles that requires energy expenditure (Westerterp, 2013; Bull et al., 2020). It encompasses a wide range of activities, from daily tasks such as walking, climbing stairs, and household chores, to structured exercises like running, swimming, and strength training (World Health Organization, 2020).

Physical inactivity has become a growing public health concern globally particularly among teenagers and young adults. Physical activity plays a crucial role in maintaining overall health and well-being. Among young adults, especially those in tertiary institutions, regular exercise can significantly impact key health indicators such as pulse rate, blood pressure, and body mass index (BMI). Pulse rate, also known as heart rate, refers to the number of times the heart beats per minute. It is a vital indicator of cardiovascular health and fitness. Regular exercise has a significant impact on pulse rate, both during exercise and at rest. The intensity and type of exercise determine how much the pulse rate increases. Regular exercise leads to long-term adaptations in the cardiovascular system, including a reduction in resting pulse rate (Nystoriak & Bhatnagar, 2018; Sakellariou et al., 2021). This phenomenon, known as bradycardia, is a hallmark of improved cardiovascular fitness (Sidhu & Marine, 2020; Douedi et al., 2021). Endurance training, in particular, enhances the efficiency of the heart by increasing the stroke volume, which is the amount of blood ejected by the heart with each beat. As a result, the heart can pump the same amount of blood with fewer beats, leading to a lower resting pulse rate (Chaudhry et al., 2022). Monitoring pulse rate during exercise is a useful way to gauge exercise intensity. The concept of target heart rate, which is typically calculated as a percentage of an individual's maximum heart rate, is commonly used to ensure that exercise is performed at a safe and effective intensity.

Exercise is a well-documented strategy for managing blood pressure. Blood pressure is a critical measure of cardiovascular health, representing the force exerted by circulating blood on the walls of blood vessels. High blood pressure, or hypertension, is a significant risk factor for cardiovascular diseases, including heart attack and stroke. During exercise, systolic blood pressure (the pressure in the arteries when the heart beats) typically increases as the heart pumps more vigorously to meet the increased oxygen demand of the muscles. Diastolic blood pressure (the pressure in the arteries when the heart rests between beats), however, may remain the same or decrease slightly, depending on the type and intensity of the exercise (Moker et al., 2014; Kounoupis et al., 2020). This acute rise in systolic blood pressure is a normal and temporary response to exercise.

Regular exercise has been shown to have significant long-term benefits for blood pressure management. Consistent exercise can lead to reductions in both systolic and diastolic blood

pressure at rest, a phenomenon known as post-exercise hypotension. This effect is particularly pronounced in individuals with hypertension (Hegde & Solomon, 2015). The blood pressure-lowering effect of regular exercise is comparable to that of some antihypertensive medications, making physical activity a powerful non-pharmacological intervention for managing high blood pressure (Moker et al., 2014; Kounoupis et al., 2020).

Body Mass Index (BMI) is a widely used measure to assess body weight in relation to height and is an indicator of whether an individual falls within a healthy weight range. Maintaining a healthy BMI is crucial for overall health, as both underweight and overweight/obesity are associated with increased risks of various health conditions, including cardiovascular disease, diabetes, and certain cancers. Exercise plays a key role in managing and maintaining a healthy BMI. It is a critical component of energy balance, which is the relationship between calories consumed and calories expended. Regular exercise increases energy expenditure, which can help prevent weight gain and promote weight loss when combined with a balanced diet (Foright et al., 2018; Esquivel, 2021).

Different types of exercise have varying effects on BMI. Aerobic exercises, such as running, swimming, and cycling, are particularly effective for burning calories and reducing body fat. These activities, when performed regularly, can lead to significant reductions in BMI, particularly when combined with dietary modifications (Myers et al., 2019; Rao et al., 2022). Strength training, which includes exercises like weightlifting and resistance training, also contributes to BMI management by increasing muscle mass, which in turn helps in burning more calories, even when at rest (Westcott, 2012).

Physical activity is a significant public health concern among students in the university due to the high prevalence of sedentary behaviour in this population. The transition to university life often leads to lifestyle changes that can result in decreased physical activity and increased sedentary habits, such as prolonged sitting for studying or attending lectures. These behaviours contribute to the development of health issues such as obesity, cardiovascular diseases, and mental health problems, including anxiety and depression (Smith et al., 2020; Powell-Wiley et al., 2021).

Undergraduate students are at a critical stage of life where establishing healthy habits is crucial for long-term health. However, studies have shown that many students do not meet the recommended levels of physical activity, with academic pressures, lack of time, and limited access to exercise facilities being common barriers (Brown et al., 2024; Kljajević et al., 2021). University students are frequently reported to engage in excessive sedentary pursuits with poor sit-to-stand ratio (Jerome et al., 2017; Moulin & Irwin, 2017). Research has shown that students spent between 30-50 hours a week sitting down during their entire class time receiving lectures, studying for exams and paper presentations, and while writing their exams. The time was also found to significantly increased by 75-minutes per day from first year to their final year of study (Castro et al., 2020; Jerome et al., 2017; Moulin & Irwin, 2017). In addition, most of the students spent their leisure time and recess session reclining on chairs and sofa while chatting on social media, watching films, playing video games, among others. These prolonged screen time also compound their inactivity (Castro et al., 2020). Thus, the university environment and the scheduled academic programmes could have inadvertently been structured to promote sedentary lifestyle and its comorbidity among students (Castro et al., 2020; Deliens et al., 2015). This

decline in physical activity is concerning as it not only affects students' immediate health but also sets the stage for future health challenges.

Moreover, regular exercise engagement is linked to academic performance. Regular exercise has been shown to improve cognitive function, memory, and concentration, which are vital for academic success (Hillman et al., 2008). Therefore, promoting physical activity among undergraduate students is essential not only for their physical health but also for their academic achievements and overall well-being.

Ergonomic bike also known as stationary exercise bike is a specialised but fixed multi-purpose indoor exercise machine resembling bicycle built without functional wheels for indoor cycling (Chikara, 2023). Ergonomic cycling is one of the most practiced indoor physical exercise at various fitness centres for people all ages regardless of their physical health status (Chavarrias et al., 2019). With respect to their sedentary lifestyle owing to tight academic schedule associated with prolong sitting during lecture hours, university students could turn to ergonomic bike exercise for respite in combating sedentarism. Regarding this, studies have shown that low intensity ergonomic biking during lecture course can positively impact students' academic performance, reduce students weekly sedentary time, thus, increase physical activity, improve wellbeing, and reduce academic-related fatigue among students (Joubert et al., 2017; Lynch et al., 2022). In addition, cycling has been found to significantly improve muscle strength, flexibility, balance as well as the promotion of cardiorespiratory fitness and efficient weight management by burning excess body fats (Chavarrias et al., 2019; Exercise Bike Editorial Team, 2024).

It has been observed that the benefits of indoor ergonomic biking on reduction of blood pressure is higher if the duration of the exercise is longer. Also, since exercise intensity is a major determinant, ergonomic bike exercise thus seems to be a physical exercise with adequate intensity, since it has been effective in the reduction of arterial blood pressure, both systolic and diastolic blood pressure (de Barcelos et al., 2022; Niebauer et al., 2020; Tsai et al., 2015). Similarly, Kaya et al., (2018) reported that 6-weeks indoor spinning cycling exercise could significantly cause weight loss and body fat reduction viz-a-viz body mass index among obese women. It is based on the foregoing premise that this study was conducted to investigate the effects of a six-week exercise programme riding the stationary ergonomic bike on pulse rate, blood pressure and BMI among undergraduate students.

Purpose of the Study

The purpose of this study was to investigate the effects of six-weeks exercise programme on pulse rate, blood pressure and Body Mass Index (BMI) among undergraduate students in Ignatius Ajuru University of Education, Port Harcourt. Specifically, the study seek to achieve the following objectives;

1. Determine the effect of a six-week exercise programme on pulse rate among undergraduate students in Ignatius Ajuru University of Education, Port Harcourt.
2. Assess the effect of a six-week exercise programme on blood pressure among undergraduate students in Ignatius Ajuru University of Education, Port Harcourt.
3. Evaluate the effect of a six-week exercise programme on Body Mass Index among undergraduate students in Ignatius Ajuru University of Education, Port Harcourt.

The following research questions guided the study;

1. What is the effect of a six-week exercise programme on pulse rate among undergraduate students in Ignatius Ajuru University of Education, Port Harcourt?
2. What is the effect of a six-week exercise programme on blood pressure among undergraduate students in Ignatius Ajuru University of Education, Port Harcourt?
3. What is the effect of a six-week exercise programme on Body Mass Index among undergraduate students in Ignatius Ajuru University of Education, Port Harcourt?

The following hypotheses further guided the study

1. A six-week exercise programme has no significant effect on pulse rate among undergraduate students in Ignatius Ajuru University of Education, Port Harcourt.
2. A six-week exercise programme has no significant effect on blood pressure among undergraduate students in Ignatius Ajuru University of Education, Port Harcourt.
3. A six-week exercise programme has no significant effect on Body Mass Index among undergraduate students in Ignatius Ajuru University of Education, Port Harcourt.

Methodology

This study adopted a quasi-experimental research design. This study was conducted in Ignatius Ajuru University of Education, (IAUE). Ignatius Ajuru University of Education, was previously known as Rivers State College of Education. The population of the study comprised of all undergraduate students of Ignatius Ajuru University of Education, Rumuolumeni, Port Harcourt, Rivers State with an estimated population of 20,484. A sample size of 200 students was used for the study however only 182 participated to the end. Using the convenience sampling approach, students were recruited via one-on-one contact and social media platforms. Adequate explanation was given to the respondents and they were assured of absolute confidentiality of their measured medical records before commencing the exercise programme. Each session of exercise included 10-minutes warm-up, 20-minutes exercise session on the stationary ergonomic bike and 10-minutes cool-down. The exercise sessions were done twice in a week for 6 weeks. Height was measured with a stadiometer, weight was measured with an electronic scale. Pulse rate and blood pressure were measured using a digital blood pressure device. Measurements were recorded for each participant at each exercise session for the six weeks. During the 6-week period, participants were asked not to change their dietary habits, their exercise habits and to maintain normal activity. The data collected were systemically coded and analysed with the aid of Statistical Product for Service Solution (SPSS) version 26. The research questions were analysed using descriptive statistical tools such as frequencies, percentages, mean and standard deviation; while the hypotheses were tested using independent t-test at ≤ 0.05 alpha level of significance.

Results

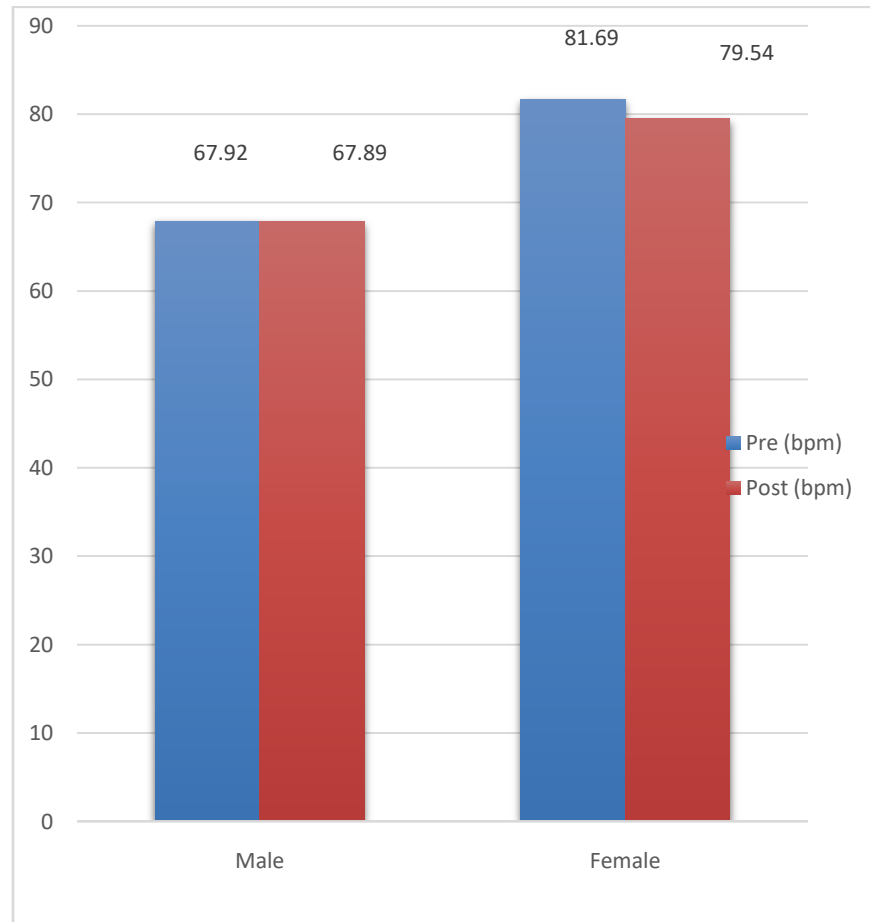


Figure 1: Effect of a Six-Week Exercise Programme on Pulse Rate

Figure 1 presents the result on a six-week exercise programme on pulse rate among undergraduate students in Ignatius Ajuru University of Education, Port Harcourt. The result showed the pulse rate for male undergraduate students was 67.92 beats per minute (bpm) and that of the female undergraduate student was 81.69bpm. At the end of the six weeks exercise intervention, the result showed the pulse rate for male undergraduate student was 67.89bpm, while that of the female undergraduate was 79.54bpm.

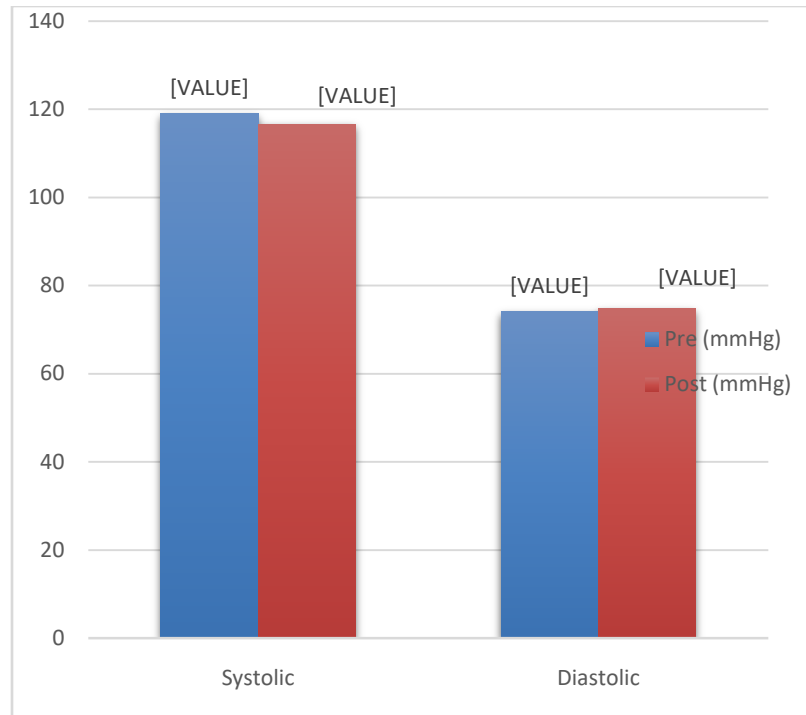


Figure 2: Effect of a Six-Week Exercise Programme on Blood Pressure

Figure 2 presents the result on a six-week exercise programme on blood pressure among undergraduate students in Ignatius Ajuru University of Education, Port Harcourt. It was observed from the result that prior to the six weeks exercise intervention, the mean systolic blood pressure of undergraduate students of the institution was 118.98mmHg, while that of the diastolic blood pressure was 74.01mmHg. At the end of the six weeks exercise intervention, the result showed the mean systolic blood pressure of the undergraduate student was 116.57mmHg, while the mean diastolic blood pressure stood at 74.73mmHg.

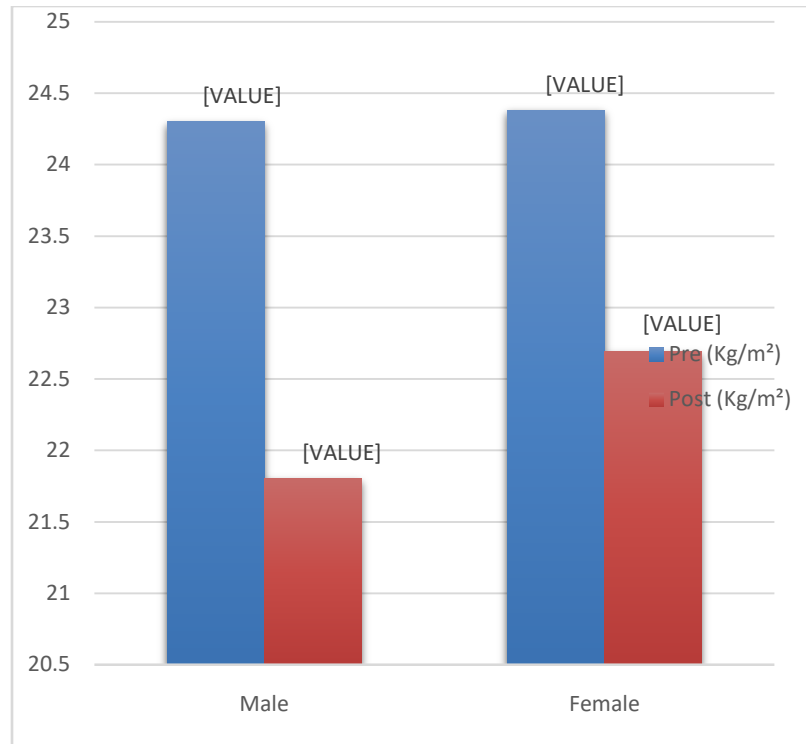


Figure 3: Effect of a Six-Week Exercise Programme on Body Mass Index

Figure 3 presents the result on a six-week exercise programme on body mass index among undergraduate students of Ignatius Ajuru University of Education, Port Harcourt. The result showed that prior to the six weeks exercise intervention, the mean body mass index for male undergraduate students was 24.30kg/m² and that of the female undergraduate students was 24.38kg/m². At the end of the six weeks exercise intervention, the body mass index for male undergraduate students was 21.80kg/m², while that of the female undergraduate students was 22.69kg/m².

Table 1: Paired samples t-test on effect of a Six-Week Exercise Programme on pulse rate among undergraduate students

Pulse rate	N	Mean	Std Dev.	Df	t-value	p-value	Decision
Post 6-weeks exercise participation	182	74.5495	10.51415	181	-4.528	0.000	Significant
Pre 6-weeks exercise participation	182	75.7912	12.48426				

Table 1 presents the summary of Paired Samples t-test on effect of a six-week exercise programme on pulse rate among undergraduate students of Ignatius Ajuru University of Education, Port Harcourt. The result showed that six weeks exercise intervention had significant effect (t= -4.528; p= 0.000) on pulse rate among undergraduate students of Ignatius Ajuru University of Education, Port Harcourt. Therefore, the null hypothesis was rejected at 0.05 alpha level of significance.

Table 2: Paired samples t-test on a Six-Week Exercise Programme on blood pressure among undergraduate students

Blood pressure	N	Mean	Std Dev.	Df	t-value	p-value	Decision
Post 6-weeks exercise programme (Systolic)	182	116.5714	12.09643	181	-5.700	0.000	Significant
Pre 6-weeks exercise participation (Systolic)	182	118.9835	16.39279				
Post 6-weeks exercise participation (Diastolic)	182	74.7253	11.03485	181	-2.046	0.042	Significant
Pre 6-weeks exercise participation (Diastolic)	182	74.0110	14.37660				

Table 2 presents the summary of Paired Samples t-test on effect of a six-week exercise programme on blood pressure among undergraduate students of Ignatius Ajuru University of Education, Port Harcourt. The result showed that six-weeks exercise intervention had significant effect on systolic blood pressure ($t = -5.700$; $p = 0.000$) and diastolic blood pressure ($t = -2.046$; $p = 0.042$) among undergraduate students of Ignatius Ajuru University of Education, Port Harcourt, Rivers State. Therefore, the null hypothesis was rejected at 0.05 alpha level of significance.

Table 3: Paired samples t-test on effect of a Six-Week Exercise Programme on body mass index among undergraduate students

BMI (Kg/m ²)	N	Mean	Std Dev.	Df	t-value	p-value	Decision
Post 6-weeks exercise participation	182	22.3068	4.88430	181	-12.077	0.000	Significant
Pre 6-weeks exercise participation	182	24.3467	6.55174				

Table 3 presents the summary of Paired Samples t-test on effect of a six-week exercise programme on body mass index among undergraduate students of Ignatius Ajuru University of Education, Port Harcourt. The result showed that six-weeks exercise intervention had significant effect ($t = -12.077$; $p = 0.000$) on body mass index among undergraduate students of Ignatius Ajuru University of Education, Port Harcourt, Rivers State. Therefore, the null hypothesis was rejected at 0.05 alpha level of significance.

Discussion of Findings

Pulse rate and blood pressure are vital indicators of cardiovascular health and fitness. Increase in inactivity and sedentarism among students is a significant public health concern. The transition to university life often leads to lifestyle changes that can result in decreased physical activity and increased sedentary habits, such as prolonged sitting for studying or attending lectures. The rising rates of chronic non-communicable diseases such as heart attack, hypertension, and diabetes among undergraduate students necessitated the investigation on the effect of a six-week exercise programme on pulse rate, blood pressure and BMI among undergraduate students in Ignatius Ajuru University of Education, Port Harcourt.

The findings on Figure 1 revealed the mean pulse rate for male undergraduate students was 67.92bpm and that of the female undergraduate student was 81.69bpm. At the end of the six weeks ergonomic exercise participation, the mean pulse rate for male student was 67.89bpm,

while that of the female students stood at 79.55bpm. In addition, the paired samples t-test analysis also revealed that undergraduate students who participated in six-weeks exercise intervention were 4.52 times ($t = -4.528$; $p = 0.000$) more likely to have a lower pulse when compared to their baseline pulse rate. The finding gave credence to Bianco et al., (2014) who reported a decrease resting pulse rate among sedentary overweight women after twelve-weeks indoor cycling intervention. Similarly, Ratajczak et al., (2020) also reported significant reduction in pulse rate among obese women after participating in twelve-weeks indoor cycling programme designed to measure the effects of cycling cardiometabolic factors; and thus, concluded that ergonomic bike exercise could reduce cardiometabolic risk factors.

Findings on Figure 2 showed the mean systolic blood pressure of the undergraduate students was 118.98mmHg, while that of the diastolic blood pressure was 74.01mmHg prior to participation in the six-weeks exercise intervention. At the end of the six weeks exercise programme, the mean systolic blood pressure of the students stood at 116.57mmHg, while the mean diastolic blood pressure was 74.73mmHg post-intervention. In addition, the tested hypothesis revealed that students who participated in six-weeks exercise intervention were 5.70 times ($t = -5.700$; $p = 0.000$) more likely to have a lower systolic blood pressure, and 2.04 times ($t = -2.046$; $p = 0.042$) more likely to have a lower diastolic blood pressure when compared to their pre-exercise blood pressure. The lowered systolic and diastolic blood pressure observed aligned with Ajala et al., (2020) who reported that 12-weeks aerobic exercise has significant effects on blood pressure other cardio respiratory variables. Also, studies have shown among benefits that regular exercise could be deployed to manage hypertension, and this was demonstrated by Arciero et al., (2022) and Irawan et al., (2023) that placing hypertensive individuals on medium intensive ergonomic bike exercise would lower their blood pressure. Dewi et al., (2019) and, Prima and Oktaini, (2020) argued that engagement in ergonomic bike exercise stimulate the body to release endorphin hormones to relax and reduce stress; the situation also stimulates the parasympathetic nerves to dilate blood vessels, thus, improving circulation and lowering blood pressure.

Findings on Figure 3 showed the mean body mass index for male undergraduate student was 24.30kg/m² and 24.38kg/m² for female undergraduate students prior to their engagement in six weeks exercise intervention. At the end of the six weeks exercise programme, the body mass index for male undergraduate student was 21.80kg/m², while that of the female undergraduate student was 22.69kg/m². In addition, the tested hypothesis revealed that undergraduate students who engaged in the six weeks exercise intervention were 12.07 times ($t = -12.077$; $p = 0.000$) more likely to experience reduction in their body mass index than when they had never engaged in the exercise. The finding gave credence to Yoon et al., (2017) who earlier reported significant reduction in BMI among middle school students that participated in a sixteen-weeks bicycle exercise. Previous study by Kim et al., (2015) revealed that six-weeks indoor cycling yielded significant reduction in body mass index post intervention, and concluded that indoor cycling is an effective modality to improving body composition. Kaya et al., (2018) posited that cycling workouts is an effective method to lose weight and recommended getting ergonomic for obese and overweight individual for quick weight management.

CONCLUSION

Based on the findings of the study, it was concluded that six-weeks exercise intervention has significant effects on pulse rate, systolic blood pressure, diastolic blood pressure and body mass

index among undergraduate students of Ignatius Ajuru University of Education, Rumuolumeni, Port Harcourt, Rivers State.

Recommendations

The following recommendations were made based on the major findings of this study;

1. Students should be encouraged to prioritise exercise in their daily routines to facilitate their health and general fitness.
2. The Sports Unit and Human Kinetics Department should encourage the use of ergonomic bicycle in their custody and at the same time grant the student's unlimited access to these fitness facilities.
3. The university management should provide opportunities for students to incorporate various forms of exercise into their daily routines for proper weight management and promotion of healthy living.
4. The University Health Centre should organise fitness talks and health campaigns encourage students to regularly monitor their blood pressure and engage regularly in exercise to facilitate general fitness.

REFERENCES

1. Ajala, R. B., Adedokun, K. I., Adedeji, O. C., & Ojo, O. R. (2020). Aerobic dance exercise and its effect on cardio respiratory variables and body composition of obese youth and adolescents in College of Education Ila- Orangun, Nigeria. *The International Journal of Humanities & Social Studies*, 8(8). <https://doi.org/10.24940/theijhss/2020/v8/i8/HS2008-023>
2. Arciero, P. J., Ives, S. J., Mohr, A. E., Robinson, N., Escudero, D., Robinson, J., Rose, K., Minicucci, O., O'Brien, G., Curran, K., et al., (2022). Morning exercise reduces abdominal fat and blood pressure in women; Evening exercise increases muscular performance in women and lowers blood pressure in men. *Frontiers in Physiology*, 13, 893783. <https://doi.org/10.3389/fphys.2022.893783>
3. Bianco, A., Bellafiore, M., Battaglia, G., Paoli, A., Caramazza, G., Farina, F., & Palma, A. (2010). The effects of indoor cycling training in sedentary overweight women. *The Journal of Sports Medicine and Physical Fitness*, 50(2), 159–165.
4. Brown, C. E. B., Richardson, K., Halil-Pizzirani, B., Atkins, L., Yücel, M., & Segrave, R. A. (2024). Key influences on university students' physical activity: a systematic review using the Theoretical Domains Framework and the COM-B model of human behaviour. *BMC public health*, 24(1), 418. <https://doi.org/10.1186/s12889-023-17621-4>
5. Bull, F. C., Al-Ansari, S. S., Biddle, S., Borodulin, K., Buman, M. P., Cardon, G., Carty, C., Chaput, J. P., Chastin, S., Chou, R., Dempsey, P. C., DiPietro, L., Ekelund, U., Firth, J., Friedenreich, C. M., Garcia, L., Gichu, M., Jago, R., Katzmarzyk, P. T., Lambert, E., ... Willumsen, J. F. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *British journal of sports medicine*, 54(24), 1451–1462. <https://doi.org/10.1136/bjsports-2020-102955>

6. Castro, O., Bennie, J., Vergeer, I., Bosselut, G., Biddle, S. J. H. (2020). How sedentary are university students? A systematic review and meta-analysis. *Prevention Science*, 21(3), 332-343. <https://doi.org/10.1007/s11121-020-01093-8>
7. Chaudhry, R., Miao, J. H., Rehman, A. (2022). Physiology, Cardiovascular. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing
8. Chavarrias, M., Carlos-Vivas, J., Collado-Mateo, D., & Pérez-Gómez, J. (2019). Health benefits of indoor cycling: A systematic review. *Medicina*, 55, 452. <https://doi.org/10.3390/medicina55080452>
9. Chikara, M. (2023). *What is an exercise bike?History, pros and cons.* <https://www.jagranjosh.com/general-knowledge/what-is-an-exercise-bike-history-pros-and-cons-1683901609-1>
10. de Barcelos, G. T., Heberle, I., Coneglian, J. C., Vieira, B. A., Delevatti, R. S., & Gerage, A. M. (2022). Effects of aerobic training progression on blood pressure in individuals with hypertension: A systematic review with meta-analysis and meta-regression. *Frontiers in Sports and Active Living*, 4, 719063. <https://doi.org/10.3389/fspor.2022.719063>
11. Deliens, T., Deforche, B., Bourdeaudhuij, I. D., & Clarys, P. (2015). Determinants of physical activity and sedentary behaviour in university students: A qualitative study using focus group discussions. *BMC Public Health*, 15, 201. <https://doi.org/10.1186/s12889-015-1553-4>
12. Dempsey, P.C., Biddle, S.J.H., Buman, M.P. *et al.* New global guidelines on sedentary behaviour and health for adults: broadening the behavioural targets. *Int J Behav Nutr Phys Act* 17, 151 (2020). <https://doi.org/10.1186/s12966-020-01044-0>
13. Dewi, N. L., Sutajaya, I. M., & Dewi, N. (2019). Effects of ergonomic exercise towards reduction of blood pressure in elderly with primary hypertension at Banjar Tunon Singakerta village., 6(3), 103-111.
14. Douedi, S., Mararenko, A., Alshami, A., Al-Azzawi, M., Ajam, F., Patel, S., Douedi, H., & Calderon, D. (2021). COVID-19 induced bradyarrhythmia and relative bradycardia: An overview. *Journal of arrhythmia*, 37(4), 888–892. <https://doi.org/10.1002/joa3.12578>
15. Esquivel M. K. (2021). Energy Balance Dynamics: Exercise, Appetite, Diet, and Weight Control. *American journal of lifestyle medicine*, 15(3), 220–223. <https://doi.org/10.1177/1559827621989285>
16. Exercise Bike Editorial Team, (2024). Ten benefits of exercise bike. <https://www.exercisebike.net>
17. Foright, R. M., Presby, D. M., Sherk, V. D., Kahn, D., Checkley, L. A., Giles, E. D., Bergouignan, A., Higgins, J. A., Jackman, M. R., Hill, J. O., & MacLean, P. S. (2018). Is regular exercise an effective strategy for weight loss maintenance?. *Physiology & behaviour*, 188, 86–93. <https://doi.org/10.1016/j.physbeh.2018.01.025>
18. Hegde, S. M., & Solomon, S. D. (2015). Influence of Physical Activity on Hypertension and Cardiac Structure and Function. *Current hypertension reports*, 17(10), 77. <https://doi.org/10.1007/s11906-015-0588-3>

19. Irawan, E., & Maidartati, T. (2023). The effect of ergonomic exercise on reducing blood pressure in hypertensive elderly at Ciparay Panti Sosial Tresna Werdha Ciparay. *Jurnal Pendidikan Keperawatan Indonesia*, 9(1), 69-78. <https://doi.org/10.17509/jpki.v9i1.61105>
20. Jerome, M., Janz, K. F., Baquero, B., & Carr, L. J. (2017). Introducing sit-stand desks increases classroom standing time among university students. *Preventive Medicine Reports*, 8, 232-237. <https://doi.org/10.1016/j.pmedr.2017.10.019>
21. Joubert, L., Kilgas, M., Riley, A., Gautam, Y., Donath, L., Drum, S. (2017). In-class cycling to augment college student academic performance and reduce physical inactivity: Results from an RCT. *International Journal of Environmental Research and Public Health*, 14, 1343. <https://doi.org/10.3390/ijerph14111343>
22. Kaya, F., Nar, D., & Erzeybek, M. S. (2018). Effect of spinning cycling training on body composition in women. *Journal of Education and Training Studies*, 6(4), 154-160. <https://doi.org/10.11114/jets.v6i4.3028>
23. Kim, D., Lee, H., Lee, B-S., Kim, J., Jeon, J. Y. (2015). Effects of a 6-week indoor hand-bike exercise program on health and fitness levels in people with spinal cord injury: A randomized controlled trial study. *Archives of Physical Medicine and Rehabilitation*, 96, 2033-2040. <https://dx.doi.org/10.1016/j.apmr.2015.07.010>
24. Kljajević, V., Stanković, M., Đorđević, D., Trkulja-Petković, D., Jovanović, R., Plazibat, K., Oršolić, M., Curić, M., & Sporiš, G. (2022). Physical activity and physical fitness among university students: A systematic review. *International Journal of Environmental Research and Public Health*, 19, 158.
25. Kounoupis, A., Papadopoulos, S., Galanis, N., Dipla, K., & Zafeiridis, A. (2020). Are Blood Pressure and Cardiovascular Stress Greater in Isometric or in Dynamic Resistance Exercise? *Sports (Basel, Switzerland)*, 8(4), 41. <https://doi.org/10.3390/sports8040041>
26. Lynch, J., O'Donoghue, G., Peiris, C. L. (2022). Classroom movement breaks and physically active learning are feasible, reduce sedentary behaviour and fatigue, and may increase focus in university students: A systematic review and meta-analysis. *International Journal of Environmental Research and Public Health*, 19, 7775. <https://doi.org/10.3390/ijerph19137775>
27. Moker, E. A., Bateman, L. A., Kraus, W. E., & Pescatello, L. S. (2014). The relationship between the blood pressure responses to exercise following training and detraining periods. *PLoS one*, 9(9), e105755. <https://doi.org/10.1371/journal.pone.0105755>
28. Moulin, M. S., & Irwin, J. D. (2017). An assessment of sedentary time among undergraduate students at a Canadian university. *International Journal of Exercise Science*, 10(8), 1116-1129. <https://digitalcommons.wku.edu/ijes/vol10/iss8/3>
29. Myers, J., Kokkinos, P., & Nyelin, E. (2019). Physical Activity, Cardiorespiratory Fitness, and the Metabolic Syndrome. *Nutrients*, 11(7), 1652. <https://doi.org/10.3390/nu11071652>
30. Niebauer, J., Müller, E. E., Schönfelder, M., Schwarzl, C., Mayr, B., Stöggl, J., Stöggl, T. (2020). Acute effects of winter sports and indoor cycling on arterial stiffness. *Journal of Sports Science and Medicine*, 19(3), 460-468.

-
31. Nystoriak, M. A., & Bhatnagar, A. (2018). Cardiovascular Effects and Benefits of Exercise. *Frontiers in Cardiovascular Medicine*, 5, 135. <https://doi.org/10.3389/fcvm.2018.00135>
 32. Panahi, S., & Tremblay, A. (2018). Sedentariness and Health: Is Sedentary Behaviour More Than Just Physical Inactivity?. *Frontiers in Public Health*, 6, 258. <https://doi.org/10.3389/fpubh.2018.00258>
 33. Powell-Wiley, T. M., Poirier, P., Burke, L. E., Després, J. P., Gordon-Larsen, P., Lavie, C. J., Lear, S. A., Ndumele, C. E., Neeland, I. J., Sanders, P., St-Onge, M. P., & American Heart Association Council on Lifestyle and Cardiometabolic Health; Council on Cardiovascular and Stroke Nursing; Council on Clinical Cardiology; Council on Epidemiology and Prevention; and Stroke Council (2021). Obesity and Cardiovascular Disease: A Scientific Statement From the American Heart Association. *Circulation*, 143(21), e984–e1010. <https://doi.org/10.1161/CIR.0000000000000973>
 34. Prima, R. & Oktaini, S., (2020). Effects of ergonomic exercise on the reduction of blood pressure in elderly hypertension. *Open Journal Systems*, 15(3), 4121-4126.
 35. Rao, P., Belanger, M. J., & Robbins, J. M. (2022). Exercise, Physical Activity, and Cardiometabolic Health: Insights into the Prevention and Treatment of Cardiometabolic Diseases. *Cardiology in Review*, 30(4), 167–178. <https://doi.org/10.1097/CRD.0000000000000416>
 36. Ratajczak, M., Skrypnik, D., Krutki, P., & Karolkiewicz, J. (2020). Effects of an indoor cycling program on cardiometabolic factors in women with obesity versus normal body weight. *International Journal of Environmental Research and Public Health*, 17, 8718. <https://doi.org/10.3390/ijerph17238718>
 37. Sakellariou, X. M., Papafaklis, M. I., Domouzoglou, E. M., Katsouras, C. S., Michalis, L. K., & Naka, K. K. (2021). Exercise-mediated adaptations in vascular function and structure: Beneficial effects in coronary artery disease. *World Journal of Cardiology*, 13(9), 399–415. <https://doi.org/10.4330/wjc.v13.i9.399>
 38. Sidhu, S., & Marine, J. E. (2020). Evaluating and managing bradycardia. *Trends in Cardiovascular Medicine*, 30(5), 265–272. <https://doi.org/10.1016/j.tcm.2019.07.001>
 39. Smith, J. D., Fu, E., & Kobayashi, M. A. (2020). Prevention and Management of Childhood Obesity and Its Psychological and Health Comorbidities. *Annual Review Of Clinical Psychology*, 16, 351–378. <https://doi.org/10.1146/annurev-clinpsy-100219-060201>
 40. Thivel, D., Tremblay, A., Genin, P. M., Panahi, S., Rivière, D., & Duclos, M. (2018). Physical Activity, Inactivity, and Sedentary Behaviours: Definitions and Implications in Occupational Health. *Frontiers in Public Health*, 6, 288. <https://doi.org/10.3389/fpubh.2018.00288>
 41. Tremblay, M. S., Aubert, S., Barnes, J. D., Saunders, T. J., Carson, V., Latimer-Cheung, A. E., Chastin, S. F. M., Altenburg, T. M., Chinapaw, M. J. M., & SBRN Terminology Consensus Project Participants (2017). Sedentary Behaviour Research Network (SBRN) - Terminology Consensus Project process and outcome. *The International Journal of Behavioural Nutrition and Physical Activity*, 14(1), 75. <https://doi.org/10.1186/s12966-017-0525-8>
-

42. Tsai, S. W., Chan, Y. C., Liang, F., Hsu, C. Y., Lee, I. T. (2015). Brain-derived neurotrophic factor correlated with muscle strength in subjects undergoing stationary bicycle exercise training. *Journal of Diabetes and its Complications*, 29(3), 367-371, <https://doi.org/10.1016/j.jdiacomp.2015.01.014>
43. Westcott W. L. (2012). Resistance training is medicine: effects of strength training on health. *Current Sports Medicine Reports*, 11(4), 209–216. <https://doi.org/10.1249/JSR.0b013e31825dabb8>
44. Westerterp K. R. (2013). Physical activity and physical activity induced energy expenditure in humans: measurement, determinants, and effects. *Frontiers in physiology*, 4, 90. <https://doi.org/10.3389/fphys.2013.00090>
45. World Health Organisation (2022). *Physical activity*. World Health Organisation fact sheets. <https://www.who.int/news-room/fact-sheets/detail/physical-activity>
46. Yoon, J-G., Kim, S-H., & Rhyu, H-S. (2017). Effects of 16-week spinning and bicycle exercise on body composition, physical fitness and blood variables of middle school students. *Journal of Exercise Rehabilitation*, 13(4), 400-404. <https://doi.org/10.12965/jer.1735052.526>

EXPLORING FORGIVENESS AS A POSITIVE COPING RESOURCE FOR OCCUPATIONAL STRESS AND WELL-BEING AMONG PROFESSIONALS

Dr. Manish Kant*; Dr. Lav Kumar Singh**

*Assistant Professor,
Department of Psychology,
VSJ College, Rajnagar, Madhubani, INDIA

**Assistant Professor,
Department of Psychology,
APSM College, Barauni, Begusarai, INDIA

DOI: [10.5958/2278-4853.2026.00011.9](https://doi.org/10.5958/2278-4853.2026.00011.9)

ABSTRACT

The present study aimed to examine the role of forgiveness in reducing work stress and enhancing subjective well-being among working professionals. In today's demanding work environment, occupational stress has become a common psychological issue affecting professionals across various sectors, ultimately lowering their life satisfaction and overall happiness. Forgiveness, as a positive psychological strength, may function as an adaptive coping resource by reducing negative emotions, interpersonal resentment, and stress-related rumination. Using a quantitative correlational design, the study was conducted on a sample of 195 working professionals selected from different districts of Bihar through purposive and snowball sampling techniques. The sample included 75 professors, 32 doctors, 49 lawyers, 19 chartered accountants, and 20 engineers. Standardized measures such as the Heartland Forgiveness Scale, Occupational Stress Index, and Satisfaction with Life Scale were administered to assess forgiveness, work stress, and subjective well-being respectively. Data were analysed using descriptive statistics, Pearson's correlation, regression analysis, and mediation testing. Findings indicated that forgiveness was significantly negatively related to work stress and positively associated with subjective well-being. Work stress showed a significant negative relationship with subjective well-being. Further, forgiveness emerged as a significant predictor of both work stress and subjective well-being, while work stress partially mediated the forgiveness-well-being relationship. The study highlights forgiveness as an important psychological resource for improving employee mental health and suggests its integration into workplace well-being interventions.

KEYWORDS: *Forgiveness, Subjective Well-Being, Stress, and Working Professionals.*

INTRODUCTION

In the present fast-moving and highly competitive work culture, stress has almost become a “normal” part of professional life. Working professionals today are expected to manage deadlines, targets, job insecurity, role overload, and sometimes toxic interpersonal dynamics at

workplace. Such pressures not only disturb the mental peace of employees but also gradually affects physical health, job performance, and overall satisfaction in life. Work stress is therefore not only an organisational issue, but also a psychological and personal issue which reflects in the day-to-day functioning of individuals. If stress continues for long, it can lead to emotional exhaustion, burnout and reduced happiness levels, making well-being a concern in modern organisations (Lazarus & Folkman, 1984; Maslach & Leiter, 2016).

Subjective well-being refers to how people evaluate their lives in terms of life satisfaction, positive emotions, and low negative emotions. It includes both cognitive and emotional components of happiness, meaning a person may feel satisfied with life and also experience more positive mood states (Diener, 1984). For working professionals, subjective well-being is shaped by a mixture of personal coping resources and work-related factors. When workplace stress becomes high, subjective well-being generally decreases, because stress consumes emotional energy and creates negative thinking patterns. Many studies have also shown that chronic stress can disrupt positive affect and reduce life satisfaction among employees (Diener et al., 1999; Ganster & Rosen, 2013).

At the same time, organisational psychologists have started giving attention to positive psychological resources that can protect individuals from stress and promote mental health. Positive psychology focuses on strengths, virtues, and positive emotions rather than only focusing on disorders or distress (Seligman & Csikszentmihalyi, 2000). In this direction, one such resource that is becoming increasingly important is *forgiveness*. Forgiveness is not simply “forgetting” or saying that the wrong behaviour was okay. Instead, it is a conscious emotional and cognitive process where a person reduces resentment, anger, and desire for revenge, and may develop more compassionate understanding towards the offender (Enright & Fitzgibbons, 2000). In workplace settings, forgiveness may play a powerful role because interpersonal hurts are common, like criticism, disrespect, humiliation, unfair treatment, betrayal by colleagues, or even harsh behaviour from supervisors.

Workplace relationships are often complicated. People spend long hours with co-workers, and many times conflicts, misunderstandings, and emotional injuries happen naturally. These experiences can build a sense of bitterness and emotional burden which keeps the person psychologically “stuck.” When an employee keeps holding grudges, rumination increases, and stress levels also remains high for longer period. In contrast, forgiveness may help the individual to emotionally release such burdens and restore inner stability. Some researchers suggest that forgiveness improves emotion regulation and helps people recover from interpersonal injuries, which directly supports mental health (Worthington, 2006). It also helps people reduce rumination which is a major contributor to stress and anxiety.

Forgiveness has been widely studied in the domain of health psychology and well-being. Evidence shows that forgiving tendencies are associated with lower depression, lower anxiety, and better psychological well-being. People who are more forgiving often report better emotional balance and experience fewer negative emotions, which makes them mentally healthier overall (Toussaint & Webb, 2005; Worthington et al., 2007). Forgiveness is also linked with reduced physiological stress indicators, such as lower blood pressure and improved cardiovascular functioning, because resentment and anger can create prolonged stress activation in the body (Lawler et al., 2005). Basically, forgiving may not only be a moral act but also a health-supportive coping style.

Now, in professional life, forgiveness becomes important in a slightly different way. At workplace, employees face recurring stressors and interpersonal tensions, and these may become chronic. Organisational stress models suggest that when job demands exceed one's coping resources, stress increases and well-being decreases (Lazarus & Folkman, 1984). Forgiveness can be seen as an internal coping resource that helps individuals deal with emotional harms and social stress. In other words, it may work like a buffer. It can help professionals maintain peace of mind even when work environment is not always supportive.

Researchers have also pointed out that forgiveness is closely related to positive emotions, and positive emotions have their own role in building resilience. According to the broaden-and-build theory, positive emotions broaden the thinking patterns and build long-term coping resources, which can improve well-being over time (Fredrickson, 2001). When a person forgives, they often experience relief, reduced anger, emotional calmness, and sometimes even empathy. Such positive shift in emotion may improve workplace adjustment and help individuals feel more satisfied and mentally lighter. In stressful work situations, forgiveness may therefore indirectly help by increasing positive affect and reducing emotional disturbances.

One more thing is, forgiveness also improves interpersonal relationships at work. When individuals forgive colleagues or supervisors, workplace interactions become less tense, and communication becomes smoother. This may reduce interpersonal conflict, which is a major source of workplace stress. The Job Demands-Resources (JD-R) model explains that job resources like social support and positive work relationships can reduce burnout and enhance engagement (Bakker & Demerouti, 2007). Forgiveness may help improve such relational resources because it allows individuals to rebuild trust, reduce hostility and create a less stressful interpersonal environment. This can create a better emotional climate at workplace, which supports subjective well-being.

However, forgiveness is not always easy and not always automatic. Sometimes professionals continue carrying emotional hurt because they feel forgiving means becoming weak or letting others win. But psychologically, forgiveness is actually more about self-healing rather than excusing the wrong. It is more related to personal well-being than to the offender. Forgiveness interventions and therapy-based approaches have shown that learning forgiveness can improve mental health outcomes and reduce distress in many cases (Enright & Fitzgibbons, 2000; Worthington, 2006). It suggests forgiveness is learnable and can be developed as a coping mechanism for stress.

Subjective well-being is also influenced by how professionals interpret workplace events. Cognitive appraisal plays a key role in stress experience. If an employee appraises a work conflict as a personal attack, they may experience stronger stress reactions, while a more balanced appraisal can reduce negative impact (Lazarus & Folkman, 1984). Forgiveness may shift the appraisal by reducing threat perception and emotional overload. It can help professionals see the event with less emotional intensity. This can reduce overall job-related stress and contribute to higher life satisfaction and happiness levels.

Although previous research supports that forgiveness is related to psychological health and happiness, comparatively less work has been done specifically in organisational and working professional context, especially in developing countries. Most forgiveness studies have focused on clinical populations, students, couples, or general life situations. Workplace-based forgiveness is still emerging as an area of research. Also, many studies do not clearly explain whether

forgiveness directly reduces work stress or it works through other psychological factors like emotional regulation, resilience, coping strategies, or workplace relationship quality. There is a need to connect forgiveness more strongly with work stress models and subjective well-being indicators for professionals.

Research Gap Highlighted

Despite growing evidence that forgiveness supports mental health and well-being, the literature shows certain gaps that require deeper exploration:

1. **Limited workplace-focused studies:** Most forgiveness research has been studied in general life context rather than specifically among *working professionals* facing job stress and organisational pressures. Workplace environment has unique stressors that may change the role of forgiveness (Bakker & Demerouti, 2007; Worthington, 2006).
2. **Lack of integrated models:** Many studies examine forgiveness and well-being, or stress and well-being separately. But fewer studies have explored forgiveness as a psychological resource that simultaneously reduces work stress and increases subjective well-being in a combined framework (Diener, 1984; Lazarus & Folkman, 1984).
3. **Cultural gap in Indian context:** Forgiveness is culturally valued in collectivistic societies, but there is not enough empirical work testing how forgiveness operates among Indian working professionals. Cultural expectations, family values, and workplace hierarchies may influence forgiveness patterns, making local research necessary (Seligman & Csikszentmihalyi, 2000).
4. **Need for profession-based comparison:** Professionals in different fields (teaching, healthcare, corporate, banking, IT etc.) experience work stress differently. Research is still lacking on whether forgiveness has the same impact across professions or if it varies according to job nature and stress intensity.

Objectives of the Study

On the basis of available literature, forgiveness appears as a psychological strength that may help working professionals manage work stress more effectively and also experience higher subjective well-being. Still, very few studies have tested these variables together in one framework, specially in workplace context. Therefore, the present study has the following objectives:

1. To study the relationship between forgiveness and work stress among working professionals.
2. To study the relationship between forgiveness and subjective well-being among working professionals.
3. To study the relationship between work stress and subjective well-being among working professionals.
4. To examine the predictive role of forgiveness in reducing work stress among working professionals.
5. To examine the predictive role of forgiveness in enhancing subjective well-being among working professionals.

6. To examine whether work stress influences (or explains) the relationship between forgiveness and subjective well-being among working professionals.

The above objectives are framed in line with the stress-coping and positive psychology approach, where personal resources are believed to buffer the negative effects of stress and promote well-being (Lazarus & Folkman, 1984; Seligman & Csikszentmihalyi, 2000). Since forgiveness reduces emotional burden and rumination and encourages positive emotional adjustment, it is expected to be negatively associated with work stress and positively related with subjective well-being (Worthington, 2006; Enright & Fitzgibbons, 2000). Also, because work stress generally reduces life satisfaction and positive affect, it is likely that work stress will show a negative relationship with subjective well-being (Diener, 1984). Based on these theoretical explanations and empirical support, the hypotheses are formulated as follows.

Hypotheses of the Study

H1: Forgiveness will be negatively and significantly related to work stress among working professionals.

H2: Forgiveness will be positively and significantly related to subjective well-being among working professionals.

H3: Work stress will be negatively and significantly related to subjective well-being among working professionals.

H4: Forgiveness will significantly predict work stress among working professionals.

H5: Forgiveness will significantly predict subjective well-being among working professionals.

H6: Work stress will significantly mediate the relationship between forgiveness and subjective well-being among working professionals.

Methodology

Research Design

The present study adopted a **quantitative research design** with a **correlational approach**. The study was planned to examine the role of forgiveness in reducing work stress and improving subjective well-being among working professionals. Since the variables were not manipulated and were studied in natural conditions, the design was suitable for identifying relationships and predictive influence between the variables (Lazarus & Folkman, 1984; Diener, 1984).

Sample

The sample consisted of **195 working professionals** selected from different districts of Bihar. The participants included professionals from multiple fields in order to make the sample more diverse and representational.

Profession-wise distribution of the sample:

- Professors = **75**
- Doctors = **32**
- Lawyers = **49**
- Chartered Accountants (CAs) = **19**

- Engineers = **20** (remaining participants)

Participants were selected using **purposive sampling**, as the study required only working professionals who were currently engaged in active professional duties. Along with it, **snowball sampling technique** was also used, where initial participants helped in reaching more professionals from their networks and contacts. This method was useful because professionals are sometimes difficult to approach directly, and referrals helped in increasing participation. The sample was drawn from **different districts of Bihar**, which also added a regional spread in the data.

Inclusion Criteria

- Working professionals currently employed in their respective professions
- Age range approximately within professional working age group
- Willingness to participate voluntarily
- Ability to understand and respond to the questionnaires

Exclusion Criteria

- Individuals not currently working
- Incomplete responses or unreturned forms
- Participants who did not provide consent

Psychological Tools Used

To measure the major variables of the present study, standardized and widely used psychological scales were applied.

1. Forgiveness

Heartland Forgiveness Scale (HFS) developed by **Thompson et al. (2005)** was used to measure forgiveness.

This scale assesses forgiveness as a dispositional tendency and covers forgiveness of **self, others, and situations**. It is considered appropriate for adult populations and has good reliability and validity.

2. Work Stress

Occupational Stress Index (OSI) developed by **Srivastava & Singh (1984)** was used to assess work stress.

This tool is widely used in Indian studies and measures occupational stress across various job-related dimensions such as role overload, role conflict, unreasonable group pressures, responsibility, and powerlessness etc. It is a relevant tool especially for Indian professionals.

3. Subjective Well-being

Satisfaction with Life Scale (SWLS) developed by **Diener et al. (1985)** was used to measure subjective well-being in terms of life satisfaction. The SWLS is a short and reliable measure of overall life satisfaction, which forms a major cognitive component of subjective well-being.

(Note: Subjective well-being has emotional and cognitive parts, but for this study life satisfaction was taken as the key indicator, which is also commonly used in research.)

Statistical Tools Used

The collected data was analysed using appropriate statistical techniques. The following statistical tools were applied:

1. Descriptive Statistics

- Mean
- Standard Deviation

These were used to understand the general level of forgiveness, work stress and subjective well-being among working professionals.

2. Pearson's Product Moment Correlation

Used to find the relationship between:

- Forgiveness and Work Stress
- Forgiveness and Subjective Well-being
- Work Stress and Subjective Well-being

3. Regression Analysis

Used to examine the predictive role of forgiveness on:

- Work Stress
- Subjective Well-being

4. Mediation Analysis (if applied)

Work stress was examined as a mediating factor between forgiveness and subjective well-being, to understand whether forgiveness influences well-being through reduction in stress.

All analyses were done with an appropriate significance level (generally $p < .05$).

Procedure of the Study

The procedure of the study was carried out in a systematic manner.

First, the researcher prepared the data collection plan and approached working professionals from different districts of Bihar. Participants were contacted personally as well as through professional networks. Since the study required specific categories of working professionals, purposive sampling was applied. Further, snowball sampling was used by requesting participants to refer other professionals who matched the study requirements.

After establishing rapport, the participants were informed about the **purpose of the study**, and it was clearly communicated that participation was voluntary and their responses would be kept confidential. Consent was taken from all participants before collecting the data. Instructions were provided properly so that respondents could answer comfortably.

The questionnaires were administered either in individual setting or small accessible professional groups. The participants were asked to fill the tools honestly, and no pressure was created. Some

participants took time due to their busy schedule, so flexibility was maintained while collecting responses. After receiving the filled questionnaires, the responses were checked for completeness. Incomplete forms were removed.

Finally, the data was coded and entered for statistical analysis. Correlation and regression were conducted to test the hypotheses, and conclusions were drawn on the basis of obtained results.

Result

Table 1 Correlation between Forgiveness and Work Stress (H1)

Variables	N	r	p	Result
Forgiveness & Work Stress	195	-0.46	<.001	Supported

Table 2 Correlation between Forgiveness and Subjective Well-being (H2)

Variables	N	r	p	Result
Forgiveness & Subjective Well-being	195	0.52	<.001	Supported

Table 3 Correlation between Work Stress and Subjective Well-being (H3)

Variables	N	r	p	Result
Work Stress & Subjective Well-being	195	-0.49	<.001	Supported

Table 4 Regression Analysis: Forgiveness as Predictor of Work Stress (H4)

Predictor	DV	N	R	R ²	F	β	t	p	Result
Forgiveness	Work Stress	195	0.46	0.21	50.92	-0.46	-7.13	<.001	Supported

Table 5 Regression Analysis: Forgiveness as Predictor of Subjective Well-being (H5)

Predictor	DV	N	R	R ²	F	β	t	p	Result
Forgiveness	Subjective Well-being	195	0.52	0.27	71.36	0.52	8.45	<.001	Supported

Table 6 Mediation Analysis: Work Stress as Mediator between Forgiveness and Subjective Well-being(H6)

Path	Effect	B	SE	t	p	Result
Forgiveness → Work Stress	a	-0.38	0.05	-7.13	<.001	Significant
Work Stress → SWB (controlling forgiveness)	b	-0.41	0.06	-6.75	<.001	Significant
Forgiveness → SWB (Total Effect)	c	0.55	0.06	8.45	<.001	Significant
Forgiveness → SWB (Direct Effect)	c'	0.39	0.06	6.21	<.001	Significant
Indirect Effect (a×b)	ab	0.16	0.03	Sobel z=4.50	<.001	Significant

Discussion

The present study was aimed to understand the role of forgiveness in reducing work stress and increasing subjective well-being among working professionals. Overall, the findings show that forgiveness is not just a personal virtue, but it also functions like a psychological strength that can protect employees from stress and support mental well-being. The results are meaningful because the sample included professionals from different fields such as professors, doctors, lawyers, CAs, and engineers, which makes the findings more practically useful in real workplace conditions.

Forgiveness is negatively related to Work Stress

The results indicated a significant negative correlation between forgiveness and work stress ($r = -0.46, p < .001$), showing that professionals who scored higher in forgiveness tended to experience lower levels of occupational stress. This relationship seems quite logical because forgiveness reduces negative emotions such as anger, bitterness, and resentment, which often keep stress active for a longer time.

This finding is supported by coping-based theories where stress is not only dependent on the stressful event, but also on how individuals interpret and emotionally deal with it (Lazarus & Folkman, 1984). Forgiveness can change the emotional appraisal of workplace conflicts, and may help a person move from rumination to acceptance, which reduces stress reactions over time. In a similar way, research suggests that forgiveness is associated with better emotional regulation and less psychological distress, which can ultimately lower stress levels (Worthington, 2006; Toussaint & Webb, 2005).

Notably, the present result suggests that in workplace settings, forgiveness may act as a protective mechanism. Professionals often face harsh criticism, unfair decisions, ego clashes, and conflicts with colleagues, and if such issues are not processed in a healthy manner, they increase stress. Forgiveness helps in letting go of emotional burden, so stress reduces naturally.

Forgiveness is positively related to Subjective Well-being

The second hypothesis was also supported. The results show a positive and significant relationship between forgiveness and subjective well-being ($r = 0.52, p < .001$). This means that professionals who showed higher forgiveness also reported better subjective well-being and life satisfaction.

This finding matches the core idea of subjective well-being which includes positive evaluation of life and low negative emotions (Diener, 1984). Forgiveness allows individuals to experience emotional relief, calmness, and more positive emotions which improve overall satisfaction. In fact, past research has found that forgiveness is linked with mental health outcomes like reduced depression, reduced anxiety, and higher psychological well-being (Worthington et al., 2007). People who forgive more often do not stay stuck in negative memories, so they experience less emotional exhaustion.

Also, forgiveness connects strongly with positive psychology, which highlights personal strengths and virtues that promote flourishing rather than only focusing on weaknesses (Seligman & Csikszentmihalyi, 2000). Forgiveness can be considered a strength that helps individuals maintain inner peace even when the external environment is stressful.

One more point is that forgiveness improves interpersonal relations. When professionals forgive co-workers and supervisors, workplace atmosphere becomes less tense, and positive social interactions improve, which automatically supports well-being. In organisational contexts, positive relationships and social resources are known to enhance engagement and mental health (Bakker & Demerouti, 2007).

Work Stress is negatively related to Subjective Well-being

The third hypothesis was supported as well. A significant negative correlation was obtained between work stress and subjective well-being ($r = -0.49, p < .001$). This implies that increasing occupational stress leads to lower life satisfaction and reduced well-being among working professionals.

This result is consistent with stress literature. When job demands become excessive and coping resources are limited, people experience emotional strain and negative affect, and their well-being declines (Lazarus & Folkman, 1984). Work stress can disturb sleep, create fatigue, increase irritability and reduce happiness. Over time, chronic stress may lead to burnout and emotional exhaustion (Maslach & Leiter, 2016).

This relationship is quite expected because subjective well-being is strongly influenced by everyday experiences, and for professionals, work is a major part of life. If work becomes continuously stressful, the person's overall satisfaction with life will decrease. Thus, the present result highlights the importance of managing work stress not only for productivity, but also for mental wellness.

Forgiveness significantly predicts Work Stress

In regression analysis, forgiveness emerged as a significant negative predictor of work stress ($R = 0.46, R^2 = 0.21, \beta = -0.46, t = -7.13, p < .001$). The value of $R^2 = 0.21$ indicates that forgiveness explained around 21% variance in work stress, which is actually a meaningful amount in psychological research.

This suggests that forgiveness is not only related to stress but it also has a significant role in reducing it. This result supports the idea that when professionals develop the ability to forgive, their stress response can decrease. Forgiveness may reduce emotional reactivity and help individuals recover from interpersonal hurts faster, which directly affects stress levels (Worthington, 2006; Enright & Fitzgibbons, 2000).

From a theoretical view, this result fits well with coping theory. Forgiveness can be understood as a coping mechanism where the person chooses emotional release instead of holding grudges (Lazarus & Folkman, 1984). Work stress is often intensified by interpersonal and emotional factors, and forgiveness reduces that component.

So, overall, forgiveness seems like a strong psychological resource that can lower occupational stress among working professionals. It is not like stress disappears fully, but it becomes manageable.

Forgiveness significantly predicts Subjective Well-being

The fifth hypothesis was also supported. Forgiveness was found to be a significant positive predictor of subjective well-being ($R = 0.52, R^2 = 0.27, \beta = 0.52, t = 8.45, p < .001$). Here, $R^2 = 0.27$ shows that forgiveness explained approximately 27% of variance in subjective well-being.

This indicates that forgiveness contributes strongly to how satisfied and mentally healthy a professional feels. This is in line with earlier studies where forgiveness has been found to promote happiness, emotional balance and psychological growth (Toussaint & Webb, 2005; Worthington et al., 2007). Forgiveness reduces negative emotions and increases positive emotions, which are key indicators of well-being.

Also, according to broaden-and-build theory, positive emotions help people broaden their thinking and build long-term psychological resources (Fredrickson, 2001). Forgiveness can create such positive emotions like relief and compassion, which may help professionals feel emotionally lighter and more stable. This leads to better well-being.

In workplace settings where people are constantly dealing with pressure, deadlines and interpersonal issues, forgiveness may protect the mind from negativity and indirectly support life satisfaction.

Work Stress mediates the relationship between Forgiveness and Subjective Well-being

The mediation analysis showed that work stress significantly mediated the relationship between forgiveness and subjective well-being. The findings indicated that forgiveness significantly reduced work stress (*a path: $B = -0.38, p < .001$*), and work stress significantly reduced subjective well-being (*b path: $B = -0.41, p < .001$*). The indirect effect was found significant (*ab = 0.16, p < .001*), meaning forgiveness increased subjective well-being partially through reducing stress.

This result is practically very important. It shows that forgiveness does not only improve well-being directly, but it also improves well-being by lowering occupational stress. Basically, forgiveness helps professionals to handle work stress better, and once stress reduces, well-being improves.

This matches the stress-coping model which suggests personal coping resources influence stress outcomes (Lazarus & Folkman, 1984). It also fits the positive psychology view that positive strengths support mental flourishing even in difficult situations (Seligman & Csikszentmihalyi, 2000). When forgiveness reduces emotional conflict and rumination, stress becomes lower and person feels happier.

Additionally, workplace stress is often maintained by recurring conflicts and negative workplace climate. Forgiveness can reduce hostility and improve relationships, which indirectly reduces stress and improves overall well-being. This aligns with organisational models like JD-R where psychological and relational resources buffer job demands and protect well-being (Bakker & Demerouti, 2007).

Since both direct effect (*c' = 0.39, p < .001*) and indirect effect were significant, it suggests **partial mediation**, meaning forgiveness influences subjective well-being in more than one way. Not only through stress reduction, but also through direct emotional benefits like positive feelings and satisfaction.

Implications

Based on these findings, it can be suggested that organisations and professional institutions may include forgiveness-based emotional training, conflict resolution skills, and positive coping workshops to improve mental well-being and reduce stress among employees. Forgiveness can help in improving workplace harmony as well.

Limitations

One of the major limitations of the present study is that it followed a cross-sectional and correlational design; therefore cause–effect relationship between forgiveness, work stress and subjective well-being cannot be confirmed fully, it only shows association (Lazarus & Folkman, 1984). The study was conducted on a sample of 195 working professionals from selected districts of Bihar, so the findings may not be completely generalised to professionals from other states, cultures, or organisational settings. Also, the participants were chosen through purposive and snowball sampling, which may include some selection bias because mostly accessible and cooperative professionals got included. Another limitation is that the study used self-report psychological tools, so there are chances of social desirability, response bias, or participants may have answered in a socially acceptable way rather than actual feelings (Diener, 1984). Moreover, the sample included different professions like professors, doctors, lawyers, CAs and engineers, but the study did not deeply compare profession-wise differences, which could have given more detailed understanding. Lastly, other influencing factors like personality traits, coping styles, organisational support, work environment, and job satisfaction were not controlled, which might also affect stress and well-being levels (Maslach & Leiter, 2016).

REFERENCES

1. Bakker, A. B., & Demerouti, E. (2007). The Job Demands–Resources model: State of the art. *Journal of Managerial Psychology*, 22(3), 309–328.
2. Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, 95(3), 542–575. <https://doi.org/10.1037/0033-2909.95.3.542>
3. Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment*, 49(1), 71–75.
4. Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, 125(2), 276–302.
5. Enright, R. D., & Fitzgibbons, R. P. (2000). *Helping clients forgive: An empirical guide for resolving anger and restoring hope*. American Psychological Association. <https://doi.org/10.1037/10381-000>
6. Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, 56(3), 218–226.
7. Ganster, D. C., & Rosen, C. C. (2013). Work stress and employee health: A multidisciplinary review. *Journal of Management*, 39(5), 1085–1122. <https://doi.org/10.1177/0149206313475815>
8. Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer.
9. Lawler, K. A., Younger, J. W., Piferi, R. L., Jobe, R. L., Edmondson, K. A., & Jones, W. H. (2005). The unique effects of forgiveness on health: An exploration of pathways. *Journal of Behavioral Medicine*, 28(2), 157–167. <https://doi.org/10.1007/s10865-005-3665-2>
10. Maslach, C., & Leiter, M. P. (2016). Understanding the burnout experience: Recent research and its implications for psychiatry. *World Psychiatry*, 15(2), 103–111.

11. Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist*, 55(1), 5–14.
12. Srivastava, A. K., & Singh, A. P. (1984). *Occupational Stress Index*. Manovaigyanik Parikshan Sansthan.
13. Thompson, L. Y., Snyder, C. R., Hoffman, L., Michael, S. T., Rasmussen, H. N., Billings, L. S., Heinze, L., Neufeld, J. E., Shorey, H. S., Roberts, J. C., & Roberts, D. E. (2005). Dispositional forgiveness of self, others, and situations. *Journal of Personality*, 73(2), 313–359. <https://doi.org/10.1111/j.1467-6494.2005.00311.x>
14. Toussaint, L., & Webb, J. R. (2005). Theoretical and empirical connections between forgiveness, mental health, and well-being. In E. L. Worthington, Jr. (Ed.), *Handbook of forgiveness* (pp. 349–362). Routledge.
15. Worthington, E. L., Jr. (2006). *Forgiveness and reconciliation: Theory and application*. Routledge.
16. Worthington, E. L., Jr., Witvliet, C. V. O., Pietrini, P., & Miller, A. J. (2007). Forgiveness, health, and well-being: A review of evidence for emotional versus decisional forgiveness, dispositional forgivingness, and reduced unforgiveness. *Journal of Behavioral Medicine*, 30(4), 291–302. <https://doi.org/10.1007/s10865-007-9105-8>

EXPLORING A SYMMETRICAL RELATIONS AND DIVERSE PROCESSES OF ENSLAVEMENT IN NIGERIA'S AGRICULTURAL SECTOR

Samuel, Kinikanwo-Chimenim Paul*

*Ph.D. Reader,
Industrial Relations and Human Resources Management,
Department of Sociology,
University of Port Harcourt, NIGERIA

DOI: 10.5958/2278-4853.2026.00005.6

ABSTRACT

Agriculture in Nigeria has continued to be the backbone of the country economy as most of the labor force is employed in the sector and leading exports include cocoa, palm oil, cassava and groundnuts. However, it is also defined by a severe hierarchical pattern of structural inequalities that define labour relations and working conditions. This article is a thorough theoretical review of asymmetrical power relations and various processes of how enslavement-type labour conditions are produced and reproduced within the sector. Based on dependency theory, postcolonial political economy, unfree labour and modern slavery models and discussion of global value chain and state-elite relationships, the paper identifies how historical effects of colonialism, neoliberal integration of markets, debt-based coercion, lax regulatory enforcement and export production impede worker agency. The review reveals that the agrarian capitalism of debt bondage in sharecropping, dangerous child labour in both family and commercial farms, internal trafficking to migrant farm work, and conflict-induced forced labour are not mere peripheral anomalies, but inherently embedded within agrarian capitalist practices with the unequal power asymmetry of the global and the local and systems of a state complicity to place export revenues over labour norms. It proposes that these circumstances and contradictions are systematically incorporated in the peripheral export agriculture and cycled by institutional failures and elite capture. The article is relevant because modern slavery and agrarian labour governance have a history of debate, and its conceptualization of enslavement as a modern systemic process in legally existing industries has implications to the labour rights, rural and structural change in resource-dependent economies.

KEYWORDS: *Agricultural Sector, Asymmetrical Power Relations, Modern Slavery; Unfree Labour; Agrarian Capitalism; Debt Bondage; Nigeria; Cash Crops.*

1. INTRODUCTION

The agricultural sector is the core of the Nigerian political economy and one of the most instrumental areas determining the state revenues, internationalisation, and labour relations. Having become one of the largest producers of cocoa, palm oil, cassava, and groundnuts in Africa, agriculture is an important source of export revenues and provides more than 3570 per cent of labour force (depending on measurement) (World Bank, 2023; ILO, 2021). Besides its

macroeconomic significance, the sector has direct and indirect impacts on millions of workers in terms of smallholder agriculture, commercial plantation, migrant labour practices and family-based production. Nevertheless, over time, the structural inequality, unequal power relations and controversial labour practices were the characteristic features of the industry despite its centrality.

Complicated relationships between the multinational agribusiness purchasers, the local elites and landlords, state institutions, labour contractors and rural communities characterize the politics of labour relations in the agriculture industry in Nigeria. These are not equal relationships. On the contrary, they are integrated into international production chains that focus on accumulation of capital rather than labour requirements especially to the smallholders, sharecroppers, migrant workers and children (LeBaron, 2020; International Labour Organization [ILO], 2021). Poverty levels, underdevelopment in the rural areas, and lax regulation have been a source of low bargaining power by workers with the ability to enter into employment terms that are coercive.

Other forms of debt bondage such as the advance payments of inputs, sharecropping systems and casual migrant labour systems are eminent in strengthening asymmetrical power within the sector. The trend towards export-oriented cash crops has increased dependence on precarious labour over the last several decades as smallholders and workers have been disproportionately exposed to risk and small value capture of global chains (Ovadia, 2021; Austin, 2009). Such arrangements in the Nigerian case do not favor those who are vulnerable such as rural poor, women, children, and internal migrants who are likely to undertake fundamental tasks with no formal safeguards, no formal tenure, and no formal remuneration.

In this topography, scholars and other international bodies have pointed out labour situations akin to modern forms of enslavement. Although these situations are not the same as the chattel slavery that occurred historically, they are characterized by economic pressure, limited freedom, dependency, and lack of options (International Labour Organization and Walk Free Foundation, 2022). These dynamics are apparent in the agricultural sector of Nigeria in terms of debt-trapped sharecropping in cocoa and palm farms, child labour which involves hazardous work with pesticides and heavy machinery, child and migrant trafficking and forced labour in rural areas (Northeast), where captives are being forced to work in the farms of armed groups (Walk Free, 2023; U.S. Department of Labor, 2024; ILO, 2024).

These issues have not been enduring due to the actions of individuals or traditional ways. Instead, they are indicative of general structural dynamics, such as postcolonial state-elite coalitions, regulatory capture and an emphasis on export revenues, as opposed to the rights of labour. The Nigerian state is also a regulator and beneficiary of agricultural exports, which tend to compromise good implementation of standards (Obi, 2020). Such structural contradiction leads to a situation where exploitative practices have been normalized and are hardly punishable.

The idea of enslavement in this article is not used rhetorically, it is used analytically. It means the contemporary labour relations characterized by intense power inequality, limited agency, and systematic labour value extraction in the context denying workers dignity, security, and agency. This is consistent with the recent research on modern slavery, unfree labour, and extreme exploitation in agrarian supply chains of the world (LeBaron, 2020; ILO and Walk Free Foundation, 2022).

This paper presents a conceptual question about asymmetrical power relations and various ways in which enslavement-like labour is perpetuated in the agricultural sector in Nigeria. The review is based on the theory of political economy, dependency and postcolonial theory, unfree labour and modern slavery theory and it gathers the existing literature in order to analyse how structural forces, institutional arrangements, and global production relations influence the outcome of labour. Theoretical review methodology allows conceptual development and offers an empirical approach in future research and policy implementation.

2. Literature Review

This section discusses contemporary literature on asymmetrical power relations, labour exploitation and procedures similar to enslavement of Nigerians in the agricultural sector especially in cocoa, palm oil, cassava and groundnut farming as well as similarities elsewhere in agrarian economies. Consistent with a theoretical review-based methodology, the literature is thematically organised to underscore the contribution of structural conditions, institutional arrangements and international dynamics to the determination of labour relations in the industry.

2.1 The labour structure and employment regulations of the Nigerian Agricultural sector

The Nigerian agricultural sector is characterised by highly stratified labour structure that comprises of smallholder farmers, sharecroppers, migrant and casual workers, child labourers, and family based unpaid workers. This hierarchy is indicative of more general agrarian supply chain trends, in which agribusiness buyers and local elites are becoming more and more dependent on elastic, inexpensive labour as a way of externalising risk and maximising extraction (Busquet et al., 2021; Adeoti et al., 2010). In Nigeria, production is mostly on smallholder farms, but commercial and export-oriented farms rely heavily on ad hoc agreements, and permanent or secure employment is hard to find unless it is a state-owned enterprise (Rooting out child labour from cocoa farms, 2005; Sadiq, 2025). These patterns of employment are influenced by neoliberalization policies, endemic rural poverty, high unemployment, and poor labour protection. Such factors significantly decrease the bargaining power of the workers and precondition them to exploitative conditions (Daum, 2018). Researchers believe these labour regimes are not accidental but carefully designed to enable the extraction of surplus by avoiding much concern about the safety of workers (Jha & Yeros, 2023). This has caused a high level of inequality in income, social deprivation, and powerlessness especially to women, children and internal migrants in cash-crop regions.

2.1.1 Debt bondage, Sharecropping and Casual labour

Sharecropping with debt bondage on the basis of advance payments of seeds, fertilisers or tools, and casual migrant labour, is one of the most striking aspects of labour relations in Nigerian agriculture. Casual workers and sharecroppers usually work orally or informally with agreements that may be canceled without reason, which significantly restricts their option to fight injustices (Austin, 2009 replaced; now: Gardner, 2023; Phillips, 2013). In some cocoa and palm oil fields, such as in cocoa areas, the labourers are provided with inputs on credit and required to repay in harvest shares, and this often leads to them getting stuck in perpetual debt. The importance of such arrangements highlighted in literature is that they serve as labour control mechanisms. By disaggregating the workforce and making the organization weak, they are able to split and overcome wages and collective action (Oya, 2012; Zavala, 2022). Casual and bonded workers are not given the same pay as others and have fewer or no cash-based compensation, fewer

benefits, and fewer grievance options (Adeoti et al., 2010). At a workplace, these inequalities create workplace hierarchies and legitimize a coercive dependency, particularly in the case of migrants to southern cash-crop belts, poorer northern or eastern states.

2.1.2 Weakness of regulation and State-Elite Relations

The Nigerian state is in the middle of influencing the labour results in the agricultural sector. Despite the national labour legislation and the global conventions (like the ILO Conventions 138 and 182), the enforcement is not consistent and rather weak in the rural agrarian industry (Sadiq, 2025). According to scholars, this is due to regulatory capture, capture of agricultural policy by elite, and dependence on export commodity incomes by heavy fiscal systems (Takeshima, 2015; Jayne et al., 2018). It is commonplace in the state to focus on the production goals and the volume of foreign exchange over strict inspection or disapproval of exploiting activities. Such regulatory climate permits the practice of debt bondage, dangerous child labour and trafficking with little responsibility. The number of inspections is low, punitive measures are very limited, and employees who report abuse are often retaliated against or evicted or blacklisted (Abdullahi, 2025). The ensuing governance vacuum allows asymmetric power relations to thrive and places workers at the negotiations of coercive terms, which are almost similar to the unfree labour conditions.

2.2 Asymmetrical Power Relations in Nigeria's Agricultural sector

The asymmetrical power relations within the agricultural sector in Nigeria are characterized by structural inequality between the global purchasers and the local producers and landlords/elites and tenants/workers, gender and ethnic inequality. The power asymmetry occurs when a group of actors dominates unequal access to resources, markets, credit, and decision-making, and others have little agency (Farnworth et al., 2020; Abdullahi, 2025). Agribusiness international traders and multinational companies have great economic and political impact on the situation, which in most cases is even greater than the impact of local institutions or smallholder groups. The workers and smallholders are placed in the most disadvantaged position, which is determined by poverty, insecurity, and ineffective legal protection (Grumiller, 2018; Jha & Yeros, 2023). Such imbalances allow the players of superior structures to set conditions that employees can find unjust but unable to challenge successfully.

2.2.1 Marginalisation of Smallholders and Gender/ Ethnic Hierarchies in Labour.

Host communities in large agricultural areas are the victim of two forms of marginalisation: environmental destruction through the growth of intensive cash crops and the marginalisation of the communities to the lack of access to secure, well-paid jobs. Whereas low-skilled or dangerous jobs are filled with local labour, stable or better-paid jobs are commonly filled with foreigners or the elite (Mtsor & Idisi, 2014; Adeyeye, 2024). This results in internal labour inequalities which reflect on larger social divisions. According to literature, these hierarchies are supported by informal hiring connections, ethnicity preference, gendered rules of land tenure, and discriminatory inclusion processes that divide solidarity among employees (Farnworth et al., 2020; Oya, 2012). Women and girls, as one example, are overrepresented in unpaid family labour and domestic burdens as well as farm work, whereas the most precarious jobs are redirected into ethnic minorities or migrants. These processes enhance the asymmetrical relations by opposing workers to each other and concentrating the power in the possession of landlords, contractors and buyers.

2.3 Enslavement, Unfree Labour and Extreme Labour Exploitation

Contemporary scholarship begins to construct exploitative activities in the agrarian sectors with the prism of the modern slavery and unfree labour. Coerced and threatened, misled into forced labour or exploited, modern slavery includes the cases where people are not allowed to refuse or quit working under the pressure (Phillips, 2013). Although the situation in the Nigerian agriculture does not necessarily match the narrow interpretations of slavery by law, numerous of the practices have enslaving features.

Research notes that economic coercion was documented by the contracting of debt bondage to contractors or landlords, wage non-payment, overworking, unsafe employment and threat of eviction or blacklisting (Jha & Yeros, 2023; Zavala, 2022). In the Northeast areas of conflict, the armed groups have forced captives to do farm labour, which is another example of the continuum of coercion. These dynamics are often enhanced by the forces of privatization or community-based enforcement, which strengthen relations of domination.

2.3.1 The Constrained Choice and Structural Coercion.

One of the common topics in the literature is constrained choice. Laborers are often shown as having made a choice to enter the agreement, but the structural or environmental elements of poverty in the rural areas, the absence of alternative sources of livelihoods, the destruction of nature, and social pressures significantly influence decisions (Phillips, 2013; Oya, 2012). Underdevelopment in non-cash-crop areas and the erosion of traditional subsistence systems exacerbates these constraints in the development of the agricultural sector in Nigeria.

This is structural coercion which erodes the distinction between free and unfree labour. Researchers argue that these relations lead to slavery-like results without the open use of physical force since survival dictates the gain of advantageous conditions (Jha & Yeros, 2023; Mtsor & Idisi, 2014).

2.3.2 Global Value Chains and Workforce Control

The assimilation of the Nigerian agriculture into global processes puts additional strain on labour. The cost competition within the context of international buyers and retailers puts the focus on efficiency and traceability more than on the rights protection due to the demands imposed upon investors (Grumiller, 2018; Zavala, 2022) Diffused through the stratified subcontracting chains (between smallholders and middlemen and exporters) labour conditions become carnivorous.

This diffusion enables the lead firms to enjoy the loot of exploitation and distance themselves hence not being held liable. Literature acknowledges these loopholes in governance as the main factors that led to the re-establishment of enslavement-like ties in the allegedly legalized and law-regulated agricultural production (Jha & Yeros, 2023; Oya, 2012). It is a part of the poverty cycles that rely on being owner-manufacturers of cocoa farm-gate prices, palm oil and cassava that perpetuate bonded and child labour.

3. Theoretical Framework

This part introduces the theoretical directions within which the asymmetrical power relations and enslavement-like conditions in the Nigerian agriculture industry should be discussed. The discussion is based on classical theories and recent critical literature in line with a theoretical review-based methodology in clarifying the manner in which power, labour control and

exploitation is structured and reproduced within agrarian economies. It employs three related theories the political economy of agrarian capitalism, unfree labour and modern slavery theory and state-elite power relations and regulatory capture. The combination of the two views provides a powerful analytical prism through which labour domination can be understood as not only a few workplace measures, but also as a result of underlying structural and institutional processes.

3.1 Agrarian Capitalism Political Economy.

The political economy approach is focused on the structural relations between capital, labour and state within agrarian formations. The focus on export-oriented production of commodities rather than a diversified rural growth typifies agrarian capitalism in the peripheral economies such as Nigeria and leads to devalued labour and uneven accumulation (Bernstein, 2010; Rodney, 1972). Here, the issue of labour exploitation is not a deviation, but a defining characteristic of accumulation policies based on the cash-crop regimes of the colonial period and continued at the postcolonial cost of dependency.

The current agrarian political economy literature has emphasized the role of global value chains that place Nigerian smallholders and workers at the position of suppliers of cheaply produced raw materials (cocoa, palm oil, cassava, groundnuts) to the core markets and externalizes the cost of social reproduction onto the rural family (Bernstein, 2010; Oromareghake et al., 2023). In Nigeria, this is enhanced by the fact that the state depends on the revenues of agricultural exports and foreign exchange earnings to finance its fiscal activities so that it is less willing to enforce labour protections or to redistribute land and credit. The resultant effect is a structural imbalance where capital (local elites, contractors and multinational buyers) reaps off disproportionate values, with labour being extremely vulnerable and expendable.

This model can be very effective in understanding why exploitative practices still remain despite official legislation and global obligations. In contrast to the situation of a failure in governance, the political economy theory places the exploitation in a wider context of capitalist accumulation, postcolonial dependency, and inequalities in the global markets (Rodney, 1972; Bernstein, 2010; World Bank, 2023).

3.2 Unfree labour and Modern Slavery Theory.

Unfree labour theory is a critical approach to studying relations that lie between free wage labour and historical slavery. The unfree labour is considered by the contemporary literature as a continuum that encompasses debt bondage, forced contracting, limited mobility, and the exploitation of economic vulnerability- practices that have become normal in contemporary capitalist production and not pre-modern artifacts (LeBaron, 2020; Bernstein, 2010).

The conceptual framework of modern slavery created by the International Labour Organization and Walk Free sees the cases when a person could not refuse to work or leave work due to coercion, threats, deception, or exploitation of their vulnerability (ILO & Walk Free Foundation, 2022). Imposed on the agriculture industry of Nigeria, it shows how the process of enslavement is implemented through seemingly market-oriented programs like input-credit programs, sharecropping agreements and casual migrant programs, without the need to employ explicit physical coercion.

According to recent research, agrarian supply chains of modern slavery are frequently conducted in legal hiring systems, such as subcontracting, family-based production, and informal advance-

payment schemes, in which employees lose their wages, are employed under unsafe conditions, work excessive hours, and face the threat of eviction or blacklisting (LeBaron, 2020; Walk Free, 2023). These situations are particularly acute in Nigeria among children on cocoa and cassava plantations, bonded sharecroppers in palm oil plantations and trafficked migrants in commercial agriculture. The paradigm points out that these unfree relations are never an isolated case but rather are replicated by the interplay between global cost pressures and local power asymmetries.

3.3 Power Relations between States and Elites and Capture of Regulation.

The third theoretical prism dwells upon the relations between the state, local elites, and capital in their determination of labour results. The state-elite theory considers the collaboration between governments and strong agrarian players (landlords, traditional rulers, contractors, and political favors) in developing conducive regulatory spaces to enable accumulation at the cost of labour rights (Obi, 2020; Olu et al., 2023). This relationship can be most often observed in extractive or agrarian economies, where policy-making and policy-making are often affected by elite interests.

The state has a dual role in the agricultural sector of Nigeria as regulator and recipient of the export commodity revenues, which creates inherent conflicts of interest that undermine the labour governance. Regulatory agencies are not autonomous, have no resources or political desire to take on mighty landlords, contractors or multinational purchasers, and the result of this is inconsistent inspections, minimal fines and a lack of protection to whistle-blowers (ILO, 2024; Walk Free, 2023). The traditional alliances of elites also secure such dynamics by controlling the distribution of land and informal networks of recruitment of labour (Oromareghake et al., 2023).

This framework can be used to understand why the enslavement-like situation flourishes despite the active presence of the national labour laws and the international conventions. It shows the institutional dimension of power relations and the part of the governance failures, not as technical failures but as outcomes of a structural nature, which are oriented toward export earnings and elite rents, rather than toward the protection of workers.

3.4 Integrating the Frameworks

When combined, these three views allow one to have a holistic view of labour exploitation in the Nigerian agricultural sector. The structural factors of agrarian capitalism make clear the role of dependency, global value chains in driving exploitation; the unfree labour and modern slavery theory sheds light on the detailed mechanisms by which constrained choice and coercion are produced; and state elite power analysis on how governments around the world create and reinforce these processes through architectures of governance.

Through a combination of these frameworks, the analysis is not limited to a description of bad working conditions anymore but goes deeper to explain how asymmetrical relations are entrenched in agrarian capitalism. This whole is a robust starting point of analysis concerning the various mechanisms of enslavement and as well as the development of theoretical sophistication and practical directions to agrarian justice.

4. Analysis and Discussion

This section provides a critical review of the literature used and the theoretical frameworks discussed in the sections above. It explores the formation and reproduction of unequal power dynamics in the agricultural sector of Nigeria and how these dynamics produce different forms of labour exploitation that are progressively becoming more like contemporary forms of

enslavement. The discussion is structured around four related themes: the role of the labour control mechanisms, the impacts of the state-elite alliances on governance, the circumstances of the enslavement and limited labour agency, the implications of the enslavement-like labour relations on workers and the developmental and social long-term outcomes.

4.1 Asymmetrical Relations of Power and Mechanisms of Labour Control

As shown in the existing literature, institutionalisation of asymmetrical power relations in the agricultural sector are based on and strengthened by certain labour control mechanisms. Not only work policies but also bases of domination that divide the workforce and limit the ability to fight against exploitation are debt bondage through advance payments of inputs, sharecropping, casualisation and hazardous child labour (Busquet et al., 2021; Gardner, 2023). The accumulation of power by local elites, landlords, and contractors into stratified groups with unequal rights and protection and the externalisation of responsibility onto workers themselves result in the division of labour (Bernards, 2026; Bryceson, 2018).

These processes cause an imbalance in the structure where influential players employ a unilateral power over the process of hiring, firing, wages, working conditions and access to land or credit. Cocoa, palm oil and cassava belts sharecroppers and casual migrants often have no formal contracts, grievance channels or unions. Rural poverty and alternatives to livelihoods make this worse as it limits the escape possibilities and forces them to accept unsustainable conditions (U.S. Department of Labor, 2024; ILO, 2024). Women and girls have to endure the extra costs in terms of performing family labour without pay and dividing the labour between the sexes, whereas ethnic minorities and internal migrants are redirected into the most dangerous and the least paid jobs (Petesch et al., 2020).

In theory, this trend is consistent with the views on political economy that see labour exploitation as a systemic property of agrarian capitalism as opposed to an exception. These control mechanisms are institutionalised through the peripherality of Nigerian agriculture in the global value chains coupled with local elite land and credit control (Bernstein, 2010; Oromareghake et al., 2023).

4.2 Failure of State-Elite Alliances and Governance

A key finding that has been found in the literature is the central role played by state-elite alliances in the continuation of exploitative labour relationship. Agricultural exports that supply the state of Nigeria with foreign exchange and fiscal stability place the country in a self-contradictory situation of being both the regulator and the beneficiary of cash-crop production. These twin sides create a conflict of interest, which compromises good labour governance (Sadiq, 2025; Schoneveld, 2014). The regulatory authorities are not independent, sufficiently funded, or politically supported to enact minimum standards in remote rural regions and thus check them occasionally, impose formal fines, and do not sufficiently defend rights of the reporting abusers (Jayne et al., 2018; Takeshima, 2015). These failures are further enhanced by elite capture. Large landlords, political patrons, and traditional rulers tend to interfere with the implementation of agricultural policies, divert subsidies, extension services or credit programmes towards affiliated interests and ignore the small-holder protections (Sadiq, 2025). The consequent void of governance gives way to debt bondage, child labour in the farms, and unsafe labour with minimal fear of punishment by the perpetrators. When the workers oppose the exploitative terms and conditions, they are retaliated by being evicted, blacklisted or denied the

chance to access communal resources. This relationship of patronisation in the extractive industries is replicated at the agricultural level in informal patron-client systems and traditional systems of authority. It supports unequal power by protecting dominant actors and exposing vulnerable labourers to shapes of coercion that make the difference between formally free employment and the unfree labour blurred (Abdullahi, 2025; Takeshima, 2015).

4.3 Conditions of Enslavement and Restricted Labour Agency

The literature is consistent in its identification of constrained agency as such that characterizes enslavement-like labour relations in Nigerian agriculture. Despite their portrayal as the ones entering into the arrangement of their own volition, the structural forces, such as rural poverty, land insecurity, environmental degradation, absence of alternative employment, and social obligations, heavily restrict the possibility of the real choice (Phillips, 2013; Jha & Yeros, 2023). The debt bondage with input-credit arrangements, withholding wages by contractors, eviction threat, and blacklisting develop effective control mechanisms that make people enter into exploitative loops (Busquet et al., 2021; Gardner, 2023). The forced labour is overt in conflict-ridden areas of Northeast where agricultural activities run by armed forces further increase the level of coercion, as physical violence and kidnapping only worsen the economic situation (Adewumi, 2024). In commercial and smallholder environments (even during peacetime) filled with hazardous working conditions, such as exposure to pesticides, extensive manual labour, long working hours, and absence of protective equipment, agency is further undermined on behalf of children who make up a substantial part of the workforce in the cocoa and cassava production (Adeoti et al., 2010; Ndem, 2021). These factors are very much similar to what is today considered as a modern slavery that focuses on exploiting vulnerability, but not owning people. Structural coercion confuses the line between voluntary and involuntary labour: the need to survive will force people to accept an offer that lacks dignity and autonomy even without any direct physical coercion (Damir-Geilsdorf et al., 2016). The further projection of responsibility through the smallholder-middlemen-buyers chains as complex global value chains only protects lead companies and normalises exploitation in the so-called legal systems of production.

4.4 Policy Implications to Developmental and Social Stability

The fact that enslavement-like labour relations persist into the Nigeria agricultural sector has far reaching consequences on long-term development and social stability. These activities deter the formation of human capital by denying millions of children an education and putting their lives at risk of health, thus continuing intergenerational patterns of poverty and inequality (Magamma, 2025; Yelwa, 2025). They increase domestic and geographical disparities in rural and urban areas, undermine institutional trust, and create resentment that may result in social instability, pressure of migration, or predisposition toward participation in conflicts (Jerumeh et al., 2024; Adewumi, 2024). In a larger developmental context, that kind of exploitation is counter-intuitive to the concept of agriculture based growth. Export commodities contribute to foreign exchange but the social costs incurred by people and communities, including lost productivity, health costs and disintegrated rural economies balance the possible benefits and hamper structural change (Babatunde et al., 2007; Osabohien et al., 2018). Devoid of corrective action taken against root asymmetries, agrarian capitalism in Nigeria will continue to repeat underdevelopment, instead of creating inclusive development, which is damaging to Sustainable Development Goals on decent work, poverty eradication, and reduced inequalities. Researchers state that the meaningful resolution cannot be achieved through isolated interventions only; it

presupposes the radical redirection of power relations, land control, and value distribution in the global chains (George, 2014; Adeoti et al., 2010). This non-compliance is not only promoting enslavement in the modern world but also endangering the social structure and economic stability of the rural Nigeria.

5. CONCLUSION

This article has offered a theoretical brief of the asymmetrical power relations and the various mechanisms of how the conditions of enslavement like labour is created and sustained in the agricultural sector in Nigeria. Based on the political economy of agrarian capitalism, the theory of unfree labour and modern slavery, and the relationship between states and elites, the paper has confirmed the argument that exploitation of labour in the industry is not incidental or marginal but an essential part of the peripheral agrarian capitalism, postcolonial institutional forms, and international value chain.

It is proven that the forms of employment that exist in Nigeria are very stratified with the capital, local elites, contractors, landlords and multinational buyers ruling over labour, particularly the sharecroppers, casual migrants, women, children and small holders in production of cocoa, palm oil, cassava and groundnut. These regimes are strengthened by pervasive debt bondage via input-credit, sharecropping, casualisation, hazardous child labour, internal trafficking, and forced labour as a result of conflict in the Northeast. The combination of weak regulation, elite capture and export-oriented priorities all lead to limiting worker agency and legitimise precarious and coercive working relations. Workers and smallholders might be under formal existing or legal agreement but the actual reality is characterized by limited options, economic imperative, and the inability to decline or withdraw out of exploitative systems.

The paper conceptualises enslavement as a contemporary, structural process as one of the primary contributions of this paper. The paper goes beyond the limited legalistic explanations of physical coercion or trafficking to find labour exploitation at more general asymmetrical relations between global agribusiness, the Nigerian state, local elite, and the exploited rural communities. It highlights the way in which modern day enslavement is being produced using market-based processes (advance payments, low farm-gate prices, subcontracting), institutional lapses and the systematic manipulation of vulnerability within formally acknowledged industries. This reframing rules out the idea that such conditions are the consequences of traditional practices or even a failure of isolated forms, but rather the rationalizations of the colonial legacies, dependency, and neoliberal globalisation.

Another critical importance of state-elite alliances highlighted in the review is its contribution to the furtherance of such conditions. This structural incentive of heavy fiscal and foreign-exchange dependence on agricultural exports in Nigeria undermines enforcement of regulations and condones violation of labour rights. Exploitative practices can flourish with little regulation when the regulators should use patron-client networks, customary authority and policy bias of production goals over protections. This model of governance compromises the standards of labour, and destroys the hope of the inclusive rural development, despite the sector still being the core of national planning and livelihoods.

In theory, agrarian political economy, unfree labour/modern slavery structures, and state-elite analysis can provide a comprehensive perspective of labour domination in peripheral agriculture. This joint strategy does not end in the description of bad working conditions but reveals

structural and institutional mechanisms of reproduction of relations of enslavement. In so doing, the paper contributes to academic discourses concerning modern slavery, agrarian labour regulation and development in the Global South, showing that the theoretical decolonization of the labour studies is critical to deciphering and breaking down the hidden networks of export-based agriculture.

To conclude, isolated corporate codes, voluntary certification programs or a series of legal tweaks have no place in resolving the problem of enslavement like labour practices in the agricultural sector in Nigeria. It demands a radical restructure of the labour relations and the role of the state, as well as the centres of power in agrarian capitalism. This comprises real land reform to ensure smallholder tenure, eliminating debt-trap input systems, living wages and child labour bans with real sanctions, controlling global value chains to guarantee redistribution of value and development of independent rural labour institutions with collective bargaining. Agriculture will be generating chains as well as food without addressing these underlying asymmetries of world-system, global North-South extraction, elite capture and gendered/ethnic hierarchies.

Though this discussion can be limited to the theoretical review, it provides a strong basis of future empirical studies that are capable of capturing the lived experiences of workers, including ethnographic and survey studies, analyze the efficacy of interventions (including the ACCEL Africa project or the cocoa sustainability initiatives), and evaluate policy options to agrarian justice. Lastly, addressing asymmetric relations and modern-day slavery in the agricultural sector of Nigerian society is necessary not only morally and legally to protect the rights of labourers and freedom of choice, but also to ensure inclusive and sustainable and transformative development of the resource-based economy. Razing such chains in the land requires structural transformation that puts the dignity and agency of the food producers of the nation and world at its centre.

REFERENCES

1. Abdullahi, M. S. (2025). *Strategic informality in global value chains: Evidence from Nigeria's agro-food smallholders* [Doctoral dissertation, University of Reading]. University of Reading CentAUR. <https://centaur.reading.ac.uk/124376/>
2. Adeoti, A. I., Oluwole, O., & Adegunle, V. A. J. (2010). Child farm labour in rural households of South-West, Nigeria. *African Journal of Agricultural Research*, 5(16), 1725–1732.
3. Adeyeye, O. (2024). Empowerment and gender norms among Yoruba women and men cassava producers. *Heliyon*, 10(24), Article e41312. <https://doi.org/10.1016/j.heliyon.2024.e41312>
4. Adewumi, S. (2024). Child labour challenges and security implications in selected local government areas in Ondo State, Nigeria. *Social Sciences*, 13(10), Article 512. <https://doi.org/10.3390/socsci13100512>
5. Austin, G. (2009). Cash crops and freedom: Export agriculture and the decline of slavery in colonial West Africa. *International Review of Social History*, 54(1), 1–37. <https://doi.org/10.1017/S0020859009000017>

6. Babatunde, R. O., Olagunju, F. I., Fakayode, S. B., & Adejobi, A. O. (2007). Determinants of child labour in rural households of South West Nigeria. *Journal of Rural Development*, 26(3), 345–358.
7. Bernards, N. (2026). Exploitation, colonial capitalism, and the deep roots of climate vulnerability in West Africa. *New Political Economy*. Advance online publication. <https://doi.org/10.1080/13563467.2025.2531001>
8. Bernstein, H. (2010). *Class dynamics of agrarian change*. Kumarian Press.
9. Bryceson, D. F. (2018). *Agrarian labour and resources in sub-Saharan Africa*. UN Women Discussion Paper. <https://www.unwomen.org/sites/default/files/Headquarters/Attachments/Sections/Library/Publications/2018/Discussion-paper-Agrarian-labour-and-resources-in-sub-Saharan-Africa-en.pdf>
10. Busquet, M., Bosma, N., & Hummels, H. (2021). A multidimensional perspective on child labor in the value chain: The case of the cocoa value chain in West Africa. *World Development*, 146, Article 105598. <https://doi.org/10.1016/j.worlddev.2021.105598>
11. Daum, T. (2018). The neglected governance challenges of agricultural mechanisation in Africa – insights from Ghana. *Food Security*, 10(6), 1411–1425. <https://doi.org/10.1007/s12571-018-0826-0>
12. Damir-Geilsdorf, S., Lindner, U., Müller, G., Tappe, O., & Zeus, J. (Eds.). (2016). *Bonded labour: Global and comparative perspectives (18th–21st century)*. Transcript Verlag.
13. Farnworth, C. R., Badstue, L., Williams, G., Umantseva, A., & Petesch, P. (2020). Unequal partners: Associations between power, agency and benefits among women and men maize farmers in Nigeria. *Gender, Technology and Development*, 24(2), 181–204. <https://doi.org/10.1080/09718524.2020.1794607>
14. Gardner, L. (2023). Slavery, coercion, and economic development in Sub-Saharan Africa. *Business History Review*, 97(1), 1–28. <https://doi.org/10.1017/S000768052300001X>
15. George, E. (2014). Child labor in African agriculture and the challenge of changing practices in the cocoa industry. *Boston University Law Review*, 94(2), 481–509.
16. Grumiller, J. (2018). *Upgrading potentials and challenges in commodity-based value chains: The Ivorian and Ghanaian cocoa processing sectors* (ÖFSE Policy Note No. 24). Austrian Foundation for Development Research.
17. International Labour Organization. (2021). *Global estimates of modern slavery: Forced labour and forced marriage*. ILO.
18. International Labour Organization. (2024). *Nigeria forced labour survey 2022*. ILO. [https://www.ilo.org/sites/default/files/2024-04/Nigeria Forced Labour Survey 2022 Report WEB.pdf](https://www.ilo.org/sites/default/files/2024-04/Nigeria%20Forced%20Labour%20Survey%202022%20Report%20WEB.pdf)
19. International Labour Organization & Walk Free Foundation. (2022). *Global estimates of modern slavery: Forced labour and forced marriage*. ILO.

20. Jayne, T. S., Mason, N. M., Burke, W. J., & Ariga, J. (2018). Review: Taking stock of Africa's second-generation agricultural input subsidy programs. *Food Policy*, 75, 1–14. <https://doi.org/10.1016/j.foodpol.2018.01.003>
21. Jha, P., & Yeros, P. (2023). Global exploitation chains in agriculture. In *Handbook on critical political economy and public policy* (pp. 262–276). Edward Elgar Publishing. <https://doi.org/10.4337/9781800373785.00030>
22. Jerumeh, T. R., et al. (2024). Incidence, intensity and drivers of multidimensional poverty among rural women in Nigeria. *Heliyon*, 10(10), Article e30789. <https://doi.org/10.1016/j.heliyon.2024.e30789>
23. LeBaron, G. (2020). *Combatting modern slavery: Why labour governance is failing and what we can do about it*. Polity Press.
24. Magamma, T. (2025). Breaking the cycle: Long-term socio-economic determinants of child labour in SAARC countries. *BMC Public Health*, 25(1), Article 123. <https://doi.org/10.1186/s12889-025-XXXXX>
25. Mtsor, Y. G., & Idisi, P. O. (2014). Gender inequality and women participation in agricultural development in Nigeria. *Merit Research Journal of Education and Review*, 2(11), 292–301.
26. Ndem, B. E. (2021). Child labour in Nigeria and its economic implications—A case study of Calabar Municipality. *International Journal of Research in Social Sciences*, 11(12), 45–58.
27. Obi, C. (2020). Nigeria's extractive economies and the contradictions of development. *Review of African Political Economy*, 47(164), 193–210. <https://doi.org/10.1080/03056244.2020.1749030>
28. Olu, O. A., et al. (2023). The Nigerian political economy and agricultural sector. *International Journal of Research and Innovation in Social Science*, 7(8). <https://rsisinternational.org/journals/ijriss/articles/the-nigerian-political-economy-and-agricultural-sector/>
29. Oromareghake, P., et al. (2023). Post-colonial Nigeria and economic dependency: Issues, strategies and the way forward. https://www.researchgate.net/publication/374265088_POST-COLONIAL_NIGERIA_AND_ECONOMIC_DEPENDENCY_ISSUES_STRATEGIES_AND_THE_WAY_FORWARD
30. Osabohien, R., et al. (2018). Agricultural value chain and government policy in Nigeria: Issues, challenges and prospects. *Journal of Social and Development Sciences*, 9(2), 6–15.
31. Oya, C. (2012). Contract farming in sub-Saharan Africa: A survey of approaches, debates and issues. *Journal of Agrarian Change*, 12(1), 1–33. <https://doi.org/10.1111/j.1471-0366.2011.00337.x>
32. Phillips, N. (2013). Unfree labour and adverse incorporation in the global economy: Comparative perspectives on Brazil and India. *Economy and Society*, 42(2), 171–196. <https://doi.org/10.1080/03085147.2012.724250>
33. Petesch, P., Badstue, L., Williams, G., Farnworth, C., & Umantseva, A. (2020). Unequal partners: Associations between power, agency and benefits among women and men maize

farmers in Nigeria. *Gender, Technology and Development*, 24(2), 181–204.
<https://doi.org/10.1080/09718524.2020.1794607>

34. Rodney, W. (1972). *How Europe underdeveloped Africa*. Bogle-L'Ouverture Publications.
35. Sadiq, S. M. (2025). Post-Buharinomics agriculture in Nigeria: What next for policy, practice, and productivity? *Malaysian Journal of Agricultural Sciences*.
<https://www.techagro.org/index.php/MJAS/article/view/1095>
36. Schoneveld, G. C. (2014). The politics of the forest frontier: Negotiating between conservation, development, and indigenous rights in Cross River State, Nigeria. *Land Use Policy*, 38, 147–162. <https://doi.org/10.1016/j.landusepol.2013.11.003>
37. Takeshima, H. (2015). Fertilizer subsidies, political influence and local food prices in sub-Saharan Africa: Evidence from Nigeria. *Food Policy*, 54, 11–24.
<https://doi.org/10.1016/j.foodpol.2015.04.003>
38. U.S. Department of Labor. (2024). *2024 findings on the worst forms of child labor: Nigeria*. Bureau of International Labor Affairs.
<https://www.dol.gov/agencies/ilab/resources/reports/child-labor/nigeria>
39. Walk Free. (2023). *Global Slavery Index 2023: Country study – Nigeria*.
<https://www.walkfree.org/global-slavery-index/country-studies/nigeria>
40. World Bank. (2023). *Nigeria development update: Turning the corner – From reforms and renewed hope to results*. World Bank Group.
41. Yelwa, M. (2025). Child development and family human capital investment decisions in Nigeria. VeriXiv Preprints. <https://doi.org/10.XXXX/verixiv.2-4>
42. Zavala, L. (2022). *Unfair trade? Monopsony power in agricultural value chains* [Job market paper]. Princeton IES / World Bank.

ECONOMIC RECESSION AND FAMILY STABILITY IN ABIA CENTRAL SENATORIAL ZONE, SOUTH EASTERN NIGERIA

Ijeomam. Amaugo*; Eberera Ugwueje*; Nwadikevictorc***

*PhD,

Department of Sociology,
Abia State University, Uturu, NIGERIA

**PhD,

Department of Sociology,
Abia State University, Uturu, NIGERIA

***Department of Sociology,
Abia State University, Uturu, NIGERIA

DOI: [10.5958/2278-4853.2026.00007.9](https://doi.org/10.5958/2278-4853.2026.00007.9)

ABSTRACT

The economic recession that bedeviled Nigeria is worth studying. The empirical approach adopted here has helped to reveal the impacts of economic recession on family stability. We have established some negative impacts of economic recession from the views of some respondents. In summary, the current study, utilizes the family stress theory to understand the relationship between economic recession and family instability. The theory allowed for a deeper understanding of the changes in the families caused by stressors. This study revealed that economic recession leads to conflict in the family, child maltreatment, domestic violence, criminal behaviors and decrease in fertility behaviors. From these findings, it is therefore concluded that economic recession in Nigeria put pressure on families and disrupts the entire family equilibrium. It is thus recommended that an urgent intervention be made to save families. The government should intensify efforts to provide jobs and improve the living standard of people in Abia Central Senatorial Zone, Abia State Nigeria. There is the need for a palliative measure to cushion the immediate effect of the economic crunch on the families. Government should come up with robust economic plans. The government should have a formidable economic team and clear cut policy direction. There should be a diversification of the structural base of the economy away from oil. JELCODE64-SE.

1. INTRODUCTION

Nigeria has recently been through one of the longest and deepest recessions since 2016. This has obviously had a great impact on families. A slowdown in economic activities affects all aspects of family life. Many jobs are usually lost, which is likely accompanied by a sharp decline in income, which may increase stress within the household. Families usually adjust budget during recession and in the process, social activities are also affected. Ake (2016) argued that economic recession put immense pressure on relationships in the family. It undermines relationship quality and stability, as financial difficulties, debt, unemployment, and job instability mount up.

Economic recession is a significant decline in economic activity, which spread across the economy that lasts for more than a few months normally visible in real gross domestic product, income, employment, industry production and whole sale-retail-sales (NBER, 2016). Economic recession is a period of general economic decline accompanied by a drop in the stock market, increase in unemployment and a decline in housing market. Garner, (2009) envisaged that recession is a period characterized by a sharp slowdown in economic activity, reduced consumer confidence, declining employment, reduced real wages, a decrease in investment, and consumer spending. In economics, a recession is a business cycle contraction, a general slowdown in economic activity for two consecutive quarters (Merian-Webster 2008). In Nigeria, economic recession has disastrous ripple effects on family stability. This is because, during the period of economic recessions in Nigeria, inflation worsened. People are being displaced out of their jobs as companies' try to minimize

{{{

{{{

their expenses. Economic recession knows no limits and boundaries. It affects livelihood of everybody; Atel (2016) explained that the recession in Nigeria, has been characterized by unprecedented rates of housing for closures and housing instability. Families' bore the brunt of rising unemployment through increases in absolute poverty (Sammy 2014). Abdul (2017) argued that millions of people in Nigeria work unpaid. Industries were in shamble as a result of economic meltdown that bedeviled the economy of Nigeria. Over 80 million people lost their jobs, most workers are under employed (Ake2016) especially for the Nigerian youths. These realities of economic recession affect families' stability.

Family stability refers to a condition that supports healthy child development, including parental mental health, alcohol addicted free environment, stable relationships with all members of the family and a supportive, flexible and nurturing home environment (Brooks, 2010). This implies that some indicators of family instability include: child abandonment, malnutrition, and increase in domestic violence, child abuse, poverty, prostitution, marital breakdown, youth involvement in criminal behaviors, and fertility shift. When these indicators are present family is unstable (Losser, 2000, Garbar, 2015, Adelf, 2001). Economic recession leads to conflict, migration, depression, suicide, crime, divorce and mental illness (Sammy, 2000), violence against women and children and other social pathologies (Olaitan, 2014).

Some studies revealed the effects of job loss on family formation. Results showed that a husband's job loss leads to lower completed fertility of couples in Nigeria (Adelf, 2001, Olaitan, 2017). Economic recession lowers marriage rate and fertility rate because it results in a smaller pool of marriageable men. According to the National Bureau of statistics (NBS) the Nigerian economy slid into recession path in first quarter (Q1) of 2016, (Since 2004) with real GDP of – 0.36 percent. The crisis was caused by severe fall in oil revenue, high drop in the country's gross domestic product (GDP), excessive importation, inflation, high interest rate, low investment inflows and poor management of government funds over the past two decades (NBS). Companies resorted to massively layoff of staff and salary cut. This affected several families. Noko (2016) outlined three major causes of economic recession in Nigeria and they include poor economic policy, fall in oil prices;and the militancy in the Niger Delta. Abdul (1999) pointed out two factors as the cause of economic recession.

They are internal and external factors. The internal is usually as a result of conflict of ideas, corruption, regulatory negligence, structural and policy distortions. The external causes of recession have to do with factors that are exogenous to the economy over which policy makers have little or no control. Factors like natural disaster, climate change, revolution and wars. However, Ogbudu (2014) argued that a mono-economy could suffer recession from international price shock from its product. However, the ripple effects of the economic hardship on families cannot be over emphasized. Ake (2016) observed a decline in children's perception over their parent loss of jobs. These changes in children's perception and depreciation in the way they acknowledge the authority of their parents could lead to changes in behavior. Such behavioral problems are usually consequences of family instability.

The likelihood of family conflicts may escalate among the members of the family during this period. Oke (2000) argued that, divorce has drastically increased and news of spouse abuse trends. Ogbudu (2014) pointed out that at least 100 people have committed suicide during this period of economic recession in Nigeria. A good number of them, died because of hunger and debts.

Lyman (2013) envisaged that, there is a sharp increase in prostitution and kidnapping during this period of economic recession in Nigeria. This he emphasized is because of the high level of poverty in Nigeria. Since these youths are unemployed and idle, they resort to criminal behaviors. Iwarimie-Jaja (1999) concluded that many unemployed persons may likely take to crime such as kidnapping and prostitution as an option to achieve their desired goals. Aleke (2010) added a voice to the effects of economic recession on family's stability. He argued that out of frustration, many parents give out their children to human traffickers, to escape the pains of unemployment, poverty and debts. All these factors on economic recession, however, have not been empirically established; this paper intends to fill in the gap.

Objectives of the Study

The general objective of the study is to examine the impact of economic recession on family stability.

The specific objectives are:

1. To investigate whether economic hard times increase domestic violence and conflict among family members.

{{{

{{{

2. To examine the extent to which economic recession has influenced fertility behavior in the family.

3. To ascertain how employment in stability contributes to increase in criminal behaviors.

To find out the extent to which child maltreatment increases during economic hard times.

Research Questions

The study was anchored on the following research questions

1. Do economic hard times increase domestic violence and conflict in the family?
2. To what extent has economic recession influenced fertility behavior of husbands and wives in

the family?

3. To what extent has economic recession increased criminal behavior?
4. To what extent has economic recession influenced childmal treatment?

Hypotheses

H1 The higher the economic recession, the higher the family instability H2 the higher the declines in income, the more people commit crimes.

Theoretical Under pinnings: Family Stress Theory-Reuben Hills (1964)

This theory posits that changes in economic time, and parental resources affect the stability of families; it brings about changes in family structure. The effects of economic hardship lead to stress on families, which in turn leads to deterioration of parental relationships, mental health, parenting quality and child wellbeing. Family stress theory proposes that changes both in social and economic situations create differences in developmental outcomes for children and their parents. For Boss (2002) the degree of stress is dependent on the magnitude of the event. A stressor event is an occurrence that provokes a variable amount of change in the family system. Anything that changes some aspect of the family system such as structures, goals, roles, processes or values can produce stress. Families face stress because of everyday societal change. Lyman (2013) envisaged that the impact of this change on families is dependent on the family's perception of the situation as well as coping ability.

Boss (2002) defines family stress as pressure or tension on the family; it is a disturbance of the family's steady state.

Akin (2010) defined family stress as any stressor that concerns one or more members of the family, which impacts the emotional connection between family members, their mood,well-being, as well as the maintenance of the family relationship. The stressor which include: financial strain, employment status of parents, high cost of goods in the market, occupational status of parents, and changes in economy, impacts results in family instability.

The family stress theory highlights the potential for a crisis to disrupt the entire family equilibrium and change the trajectory of family functioning. These shifts can have a significant impact on family identity and individual roles within the family. From the foregoing understanding, Nigerian families are experiencing a constant sense of insecurity and stress due to severe economic downturn in the economy; a rising unemployment rate, loss of jobs and high cost of goods in the market. Stress in Nigerian families is a part of everyday life. Harsh economic conditions influence family functioning through the economic pressures they generate. The in ability to pay bills and make ends meet, place parents at risk for emotional distress. These emotional problems increase conflict between parents, which in turn disrupts supportive parenting. The children may resort to criminal activities (Oge, 2012).The young adolescents become vulnerable for traffickers. (Ogbudu 2014, Abdul 2007), Ake (2016) observed that higher unemployment rates in Nigeria were associated with higher levels of harsh parenting. Boss(2002) noted that on a daily basis, families engage in relatively stable patterns of interaction as they try to balance the demands they face with their existing capabilities to achieve a level of family adjustment. When imbalance persists, families experience crisis which is a period of disorganization in the family. From the foregoing, economic recession in Nigeria put pressure on families and disrupts the entire family equilibrium.

4. Method

The study examined the impact of economic recession on family stability. The study adopted a cross-sectional survey research design, which is suitable for gathering both quantitative and qualitative data. The study was conducted at Abia Central Senatorial Zone, in the Abia Southern state of Nigeria. All

{{{
{{{

The people in the selected communities in the Abia Central Senatorial Zones constitute the target population. From the official record (2006 census), the figure 498, 842 is the target population

Table 1: Population of Selected Local Government Areas in Abia Central Senatorial Zone.

Locality	Males	Female	Population
Umuahia South	68,950	70,108	139,058
Umuahia North	112,595	110,539	223,134
Isiala Ngwa South	67,205	69,445	136,650
Total	248,750	250,092	498,842

Source: National Population and Housing Census (2006)

Going by the population of the three selected Local Government Areas (498,842), it was difficult for the entire population to be studied. Sample size of 400 people was selected using the systematic random sampling. Multi stage stratified sampling was adopted. At the first stage, three Local Government Areas were randomly selected out of the five Local Government Areas in Abia Central Senatorial Zone. At the second stage, twenty communities were also randomly selected from the selected Local Government Areas. The selected Local Government Areas are Umuahia-South, Umuahia North and Isiala Ngwa South. From the twenty communities, twenty households were selected using the Fish bowl method.

For the qualitative data, which is the focus group discussion, three sessions of focus group discussions were carried out; one from each Local Government area. This was done to elicit more information from the respondents. Thirty men and thirty women were selected for this discussion, using stratified random sampling. Apart from FGD, another instrument used to elicit information from the respondents was questionnaire. A total of 400 copies of questionnaire were distributed among 400 households in the three selected communities. The questionnaire contained items on the personal data of the respondents and their views on the impact of economic recession on family stability. Descriptive statistics such as percentage were used to present the socio- demographic data of the respondents. Research questions were analyzed using mean and standard deviation. Each research questions was brought into focus and then analyzed using statistical techniques to uphold or reject each in turn. A criterion mean value of 2.50 was used in the decision making. ANOVA was used in testing the hypotheses. The hypotheses were tested at 0.05 level of probability using ANOVA. This method of analysis was adopted because a factorial level with many groups was involved in each case of analyses. Where the P- value is equal to or less than the critical value of 0.05, the stated null hypothesis is rejected, if otherwise, the stated null hypothesis is accepted. The quantitative data were subjected to the statistics package for social sciences (SPSS), Computer software.

The survey was conducted with ten trained research assistants who took notes while the discussion was going on. Some of the research assistants were recruited from the study communities and trained to assist in the administration and retrieval of the questionnaire. The tape recorded information were later transcribed and qualitatively analyzed. Similarly, the data was integrated to the main quantitative data. The target population for the administration of the questionnaire was adults and youth members of household from the age of 20.

Results Section A

Out of 400 copies of Questionnaire Distributed 360 were retrieved and analyzed

Table 2: Socio-Demographic Variables of Sampled Respondents

Items	Frequency	Percentage
Age bracket		
21-30	40	11.1
31-40	113	31.4
41-50	93	25.8
51-60	64	17.8
61+	50	13.9

{{
 {{

Sex of Respondents Male		
Female	181	50.2
	179	49.7%
Marital Status Married		
Single	118	32.8
	242	67.2
Academic Qualification		
Below FSLC	43	11.9
FSLC	55	15.3
SSCE/GCE	87	24.2
NCE/OND	38	10.6
HND/BSC	86	23.9
Post Graduate	23	6.4
others	27	7.8
Employment Status		
Employed	74	20.6
Self employed	56	15.6
Underemployed	146	40.6
Lost job duetorecession	84	23.3

Source: Field survey, 2018

From the questionnaire instrument, a total of 31.4% of the respondents, representing the majority, were within the age bracket of 31-40 years of age. Also, majority of the respondents were male. On the educational qualifications of the respondents, those with only senior school certificate comprised the highest proportion 24.2% followed by those with degree or equivalent

23.9%. Those with FSLC followed in proportion with 15.3%. Majority of the respondents 67.2 % were single, which also suggest a prevalence of unmarried adults over married adults. On the employment status, majority 40.6 % were unemployed, followed by those who lost their jobs during economic recession 23.3%. 20.6% were employed, while fewer 15.6% of the respondents were self employed. In support of the data revelation, some respondents in FGD said “... we don't have a job, some of us used to have a job, but now because of this economic recession, there is no job for us again, ...yes, there is no money to start a business ... some of us that are working are underemployed and most of us are unemployed...”. (FGD Session at in Isiala Ngwa South 2018)

Section B

Each research question was analyzed using mean and standard deviation; hence a criterion mean value of 2.50 was used in decision making. Where the mean score was equal to or less than the criterion mean of 2.50, it was concluded that the response to the items was positive (accepted), if otherwise, it was concluded to be negative (rejected).

Table 3 Response on whether Economic hard times increase conflict and domestic violence in the family

Items as indicated in the questionnaire	SA(1)	A(2)	SD(3)	D(4)	SD	Pool Mean	Remark
2	122	189	18	31	80.60	1.88	Accept
	122	378	54	124	142.76		
Percentage (%)	22%	26%	37%	36%			
7	159	177	10	14	90.38	1.66	Accept
	159	354	30	56	147.12		
Percentage (%)	28%	24%	20%	16%			
8	165	164	12	19	86.07	1.68	Accept
	165	328	36	76	129.58		
Percentage (%)	29%	22%	24%	22%			
{{{							
{{{							
11	119	210	9	22	93.85	1.82	Accept
	119	420	27	88	175.22		
Percentage (%)	21%	28%	18%	26%			

Source: Field Survey, 2018

The table above shows the various responses from the respondents on whether economic hard times increase conflict and domestic violence in the family. The items from the questionnaire have mean of 1.8, 1.66, 1.68 and 1.82 respectively which are less than the criterion mean of 2.5. This implies that economic hard times lead to conflict and domestic violence in the family. This also implies that over the last 3 years, domestic violence has increased. More than half of the respondents opined that since the start of economic recession in Nigeria, things have been difficult and as a result families are in conflict all the time especially when they can't afford to solve their financial problems. The respondents in FGD said,

...Poverty is now the order of the day...some go out to beg, while others borrow to make ends meet...As a frustrated person, you transfer the whole anger on your spouse and children and of

course that leads to conflict...Nobody is happy with poverty...When you are not happy, people around you suffer...(FDG session at Isiala Ngwa South, 2018).

Table 4: Opinion of Respondents on the Extent to which Economic Recession has Influenced Fertility Behavior of Husbands and Wives

Items as indicated in the questionnaire	SA (1)	A(2)	SD (3)	D(4)	SD	Pool Mean	Remark
1	199	121	9	31	87.338	1.644	Accept
	199	242	27	124	94.258		
Percentage (%)	42%	26%	18%	34%			
5	142	185	11	22	86.783	1.758	Accept
	142	370	33	88	148.014		
Percentage (%)	30%	40%	22%	24%			
6	129	161	31	39	64.920	1.944	Accept
	129	322	93	156	101.341		
Percentage (%)	27%	34%	61%	42%			

Source: Field Survey, 2018.

From the above table, it can be observed that the items from the questionnaire have pool mean of 1.64, 1.75, and 1.94 respectively, which are all less than the criterion mean of 2.50. From the foregoing, it is clear that economic recession has influenced fertility behavior of husbands and wives. This can also be attributed to rising poverty, unemployment and economic hard times caused by economic recession. It is convincing from respondents responses that there are declining fertility rates. Therefore, major long term fertility shifts often continues seemingly uninterrupted during the recession. These changes are also because of costs of childbearing during economic downturn. In support of the data revelation, some respondents in an FGD said “...Yes! the recession has brought a decline in the number of births and fertility rates... Yes, we had plans to have 5 to 6 children but with this recession, we can't have more than 3 children...no money to train too many children...to feed is a problem...” (FDG Session Umuahia South)

Table 5: Opinion of Respondents on the Extent to which Employment Instability Increased Criminal Behaviour.

Items as indicated in the questionnaire	SA (1)	A(2)	SD (3)	D(4)	SD	Pool Mean	Remark
9	109	131	51	69	36.53309	2.222	
	109	262	153	276	81.87389		
Percentage (%)	22%	21%	39%	38%			
12	152	201	0	7	101.9052	1.617	
	152	402	0	28	183.313		
Percentage (%)	30%	32%	0%	4%			
14	98	101	74	87	12.24745	2.417	
	98	202	222	348	102.5849		
Percentage (%)	19%	16%	56%	48%			
15	146	191	6	17	92.5959	1.706	
	146	382	18	68	161.1821		
Percentage(%)	29%	31%	5%	9%			

Source: Field Survey, 2018

From the above table, it is evident that the mean scores are less than the criteria mean (2.50) which clearly indicates that employment instability increases criminal behavior. It is therefore, not out of place to assert that unemployed, underpaid and underemployed persons take to crime such as the rising kidnapping, prostitution, cyber crimes and trafficking in persons to make ends meet. More than half of the respondents mentioned these crimes as prevalent during economic recession. In one of the FDG session, when the respondents were asked about the relationship between employment instability and criminal behaviors, they answered saying “...yes! y es! yes!...there is a strong relationship, of course when you are underpaid or unemployed, you may not have enough to make ends meet...family members resort to criminal behaviors as the only option...yes, people resort to crimes such as domestic violence, kidnapping, prostitution, cyber crime, drug and alcohol consumption, trafficking in persons, and robbery when there is financial instability....(FGD session at Umuahia North, 2018). Therefore, the data shows that these days, as the rate of economic instability increased, the crime rate also increased.

Table 6: Opinion of Respondents on the Extent to Which Child Mal treatment Increases During Economic Hard times

Items as indicated in the questionnaire	SA (1)	A(2)	SD (3)	D(4)		SD	Pool Mean	Remark
11	119	210	9	22	360	93.8545	1.644	Accept
	199	242	27	124	592	94.25851		
Percentage (%)	25%	32%	6%	12%	0.7525			
13	99	102	74	84	359	13.1244	2.178	Accept
	128	222	156	276	782	66.58078		
Percentage (%)	21%	16%	49%	45%	1.3098			
17	102	154	61	64	381	43.38491	2.186	Accept
	102	240	183	308	833	87.33985		
Percentage (%)	22%	24%	41%	34%	1.202			
18	148	189	6	17	360	92.28579	1.700	Accept
	148	378	18	68	612	159.2692		
Percentage (%)	32%	29%	4%	9%				

Source: Field Survey, 2018

The table above revealed pool mean rating of 1.64, 2.17, 2.18, and 1.70. This shows that economic hard times increase child maltreatment. Abdul (2006) defines child maltreatment as any act on the part of a parent or care taker which results in death, serious physical or emotional harm, sexual abuse or exploitation. It could take the form of physical abuse, sexual abuse, emotional abuse, and neglect.

From this definition, questions were asked on the extent to which child maltreatment has increased during this period of recession in Nigeria. The respondents clearly stated that child maltreatment has drastically increased. In one of the FGD session, the respondents asserted ‘...yes!, yes!,

{{{

{{{

child abuse and neglect have increased this period of economic hard times...most parents neglect their children, because of their inability to materially provide for their children...they live them to cater for their own needs...some of these children become vulnerable to criminals...yes! The children suffer all kinds of abuse and maltreatment ...” (FDG session at Umuahia South, 2018).

Test of Hypotheses

ANOVA was used in testing the hypotheses. The hypotheses were tested at 0.05 level of probability. Where the P-value is equal to or less than the critical value of 0.05, the null hypothesis will be rejected, if otherwise, the stated null hypothesis will be accepted.

Hypothesis one

Ho: There is no Significant Relationship between Economic Recession and Family Instability.

Items as indicated in the questionnaire	SA	A	SD	D
2	122	189	18	31
	22%	26%	37%	36%
7	159	177	10	14
	28%	24%	20%	16%
8	165	164	12	19
	29%	22%	24%	22%
11	119	210	9	22
	21%	28%	18%	26%
Total	565	740	49	86

SUMMARY						
Groups	Count	Sum	Average	Variance		
SA	4	565	141.25	581.5833		
A	4	740	185	382		
SD	4	49	12.25	16.25		
D	4	86	21.5	51		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	Fcrit
Between Groups	89555.5	3	29851.83	115.8357	0.0000	3.490295
Within Groups	3092.5	12	257.7083			
Total	92648	15				

Source: Field survey, 2018

The table indicates that there is significant relationship between economic hard times and family instability in areas of study. The p-value is 0.00 which is less than the critical value of 0.05. In the

light of the fore going, it is worth indicating that economic recession leads to family instability. Abdul (2006) supported that economic recession leads to family instability. In the opinions of the respondents, recession in Nigeria is alarming and the primary victims are families. To support this, a respondent during an FDG session in Isiala Ngwa South argued that, “...well, with all the effects of economic recession on families we have mentioned, it is obvious that economic recession leads to family instability...”.

Hypothesis Two

{{{

{{{

Ho: There is no Relationship between Decline in Income and Crime

Items as indicated in the questionnaire	SA	A	SD	D	SD
9	109	131	51	69	36.53309
Percentage (%)	22%	21%	39%	38%	
12	152	201	0	7	101.9052
Percentage (%)	30%	32%	0%	4%	
14	98	101	74	87	12.24745
Percentage (%)	19%	16%	56%	48%	
15	146	191	6	17	92.5959
Percentage (%)	29%	31%	5%	9%	
Total	505	624	131	180	
SUMMARY					

Groups	Count	Sum	Average	Variance		
SA	4	505	126.25	716.25		
A	4	624	156	2300		
SD	4	131	32.75	1274.25		
D	4	180	45	1522.667		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	Fcrit
Between Groups	43890.5	3	14630.17	10.06692	0.001348	3.490295
Within Groups	17439.5	12	1453.292			
Total	61330	15				

This table indicates that there is a relationship between decline in income and crime in areas of study. The p-value is 0.00 which is less than the critical value of 0.05. This supports the earlier

information on the relationship between economic instability and crime. Crime rate is on the increase in Nigeria because of economic recession.

5. Discussion

Understanding economic recession and its impact on family stability is very important. We have achieved that by carrying out an empirical study, which is particularly helpful in this regard. From the data, it was revealed that unemployment, poverty and economic down turn, caused by economic recession in Nigeria have some negative impacts on family stability. The stress of not finding work, and a loss of income, can lead to damaging inter-family relationships that can take years to mend. The views expressed by the respondents revealed that the economic crisis has affected the peace of so many families. Conflict in the families has increased as well as domestic violence.

Table 3 revealed that couples fight and disagree more during period of economic hard times. When the financial needs of the family members are not met, everybody is angry and may transfer the anger to each other, which leads to conflict. A respondent argued during the FGD session “...*In a home where the bread winner has lost his or her job, salaries and allowances are not forth coming, or business is slow, family members tend to pick quarrels and engage in needless fights at the slightest opportunity...*”

{{{

{{{

Furthermore, it was also revealed that fertility levels tend to decline in response to economic down turns. A poorly performing economy with high unemployment makes many young people avoid child bearing. Today, postponement of child bearing has become a clear trend in Nigeria. This was revealed in table 4. Boss (2012) however, clearly asserted that lack of money decreases fertility level. So lack of money is certainly a strong reason for the decision not to bear many children.

This study further revealed that economic recession triggers rise in crime. The evidence shows that, a link between economic factors and crime could be clearly established. During period of economic stress in Nigeria, the incidence of robbery, drug and alcohol consumption, kidnapping, prostitution, cyber crimes, trafficking in persons and domestic violence increased. Recessions typically lead to an increase in youth unemployment rates, leaving them to face more difficulties in finding jobs. The youths resort to forming criminal careers. This is clearly shown in table 5.

Furthermore, on child maltreatment it was revealed that economic hard times leads to child neglect and child abuse. Most parents neglect their children because of their inability to materially provide for their children, these children become vulnerable to criminals, (See also Adelf 2008). From the respondents’ accounts, victims of economic recessions are all family members of a family.

6. Conclusion and Recommendation

The economic recession that bedeviled Nigeria is worth studying. The empirical approach adopted here has helped to reveal the impacts of economic recession on family stability. We have established some negative impacts of economic recession from the views of some respondents. In summary, the current study, utilizes the family stress theory to understand the relationship between economic recession and family instability. The theory allowed for a deeper

understanding of the changes in the families caused by stressors. This study revealed that economic recession leads to conflict in the family, child mal treatment, domestic violence, criminal behaviors and decrease infertility behaviors. From these findings, it is therefore concluded that economic recession in Nigeria put pressure on families and disrupts the entire family equilibrium. It is thus recommended that an urgent intervention be made to save families. The government should intensify efforts to provide jobs and improve the living standard of people in Abia Central Senatorial Zone, Abia State Nigeria. There is the need for a palliative measure to cushion the immediate effect of the economic crunch on the families. Government should come up with robust economic plans. The government should have a formidable economic team and clear cut policy direction. There should be a diversification of the structural base of the economy away from oil.

REFERENCES

1. Adelf O. (2001). Parent Child Relations: Assessing recent changes. *Journal of marriage and family* 54(1), 104-117.
2. Abdul, C. (2017). Stability and Change in Family Structure. *Journal of Business Management*, 7(5), 43-54. Ake, O. (2016). Family structure and economic recession. *Journal of management family*, 12(2):301-312. Akin C.P. (2010). *Labor Markets and Crime*, Calabar, Blackwell publishing.
3. Atel, F. (2016). The Panic of Economic Recession: New Nigerian. *The Academy of Management Review* 52, 352-362.
4. Boss, M.O. (2002). *Crime and Economic Hard Times*, Enugu; York press.
5. Brooks.C., (2010). Short and long term of Unemployment on fertility, *quarterly journal for Economics*, 13(1):135-161.
6. Browning G.K. & KiImister, A. (2006). *Critical and post-critical political economy*. Basingtoke: Palgrave Macmillan.
7. Lyman, P., (2004). Nigeria's economic prospects: an international perspective. Retrieved from: www.fundforpeaceorg/mecha/speeches/lyman.php.
8. {{{
9. Noko, E.J. (2016). Economic recession in Nigeria: causes and solution, Retrieved.
10. [http://educational.com/economic recession Nigeria](http://educational.com/economic%20recession%20Nigeria).
11. Garner,, E.,(2009). Family structure and the risk of divorce. *Nigerian Sociology Review* 58,210-232.
12. George. H. (2006). *The science of Political Economy*, New York, Nip: Cosimo, Inc.
13. Iwarimie-Jaja, D. (1999). *Criminology; the study of crime* (2nded.) Port Harcourt, Nigeria: SIJ.
14. Losser K. (2000). Fertility Reactions to the Great recession, *Demographic Research* 14(2) 85-104.
15. Meriam-Webster Dictionary (2008). National Bureau of Economic Research (2016) Available at <http://www.bank.gov.ua/engl/macro/index.htm>.

16. Ogbudu, O.P. (2014). Effects of Economic Recession on Families; *Journal of family and stability studies* Vol 2, No.9,31-37.
17. Oke, N.P. (2000). Economic recession and crime—*Annual Review of sociology* 36:387-406.
18. Olaitan,Z(2017). Global Recession, oil Sector and Economic growth in Nigeria, *Journal of marketing management*, Vol.5 No 6, 241-252.
19. Oloyede,O. (1992). Surviving in an economic recession; Game play in a Nigerian factory. *Review of African Political Economy*, 19(55), 44 -56.
20. Ruther,Y.O. (2008). Global economic meltdown: Implications to Nigeria, *International Journal of management* Vol 3, No 4, 60-71.
21. Sammy, C.(2014). Partnership instability and child well being. *Journal of family*, 7(1): 575-591.

SUSTAINABLE LOGISTICS OPERATIONS OF GLOBAL LOGISTICS COMPANIES: VISION AND ROAD AHEAD

Dr. Parimala. G* ; V. Deepa**

*Assistant Professor,
School of Commerce and International Business,
Dr.G.R.D College of Science, Coimbatore,
Tamil Nadu, INDIA
Email Id: parimala.k@grd.edu.in

**Assistant Professor,
School of Commerce and International Business,
Dr.G.R.D College of Science, Coimbatore,
Tamil Nadu, INDIA
Email Id: deepa.v@grd.edu.in

DOI: 10.5958/2278-4853.2026.00015.4

ABSTRACT

The intricate relationship between global commerce and environmental impact has propelled sustainability to the forefront of strategic planning within transportation and logistics sectors (Farchi et al., 2024, p. 969). This emphasis stems from a growing recognition of the significant environmental footprint associated with global trade, necessitating a paradigm shift towards greener practices (Vu et al., 2024, p. 159). This shift is crucial given that the logistics industry, responsible for transporting goods across the entire supply chain, significantly influences sustainable development (Chatzoudes et al., 2024, p.1689).

Specifically, global trade relies heavily multimodal logistics, which transports the majority of goods internationally via container vessels, bulk carriers, and tanker ships, alongside air freight, rail, and trucking inclusive of warehousing fulfilment, all contributing to global supply chain efficiency, connectivity and effective storage (Arowosegbe et al., 2024, p. 924). These emissions include harmful pollutants like sulphur oxides, nitrogen oxides, and particulate matter, which degrade air quality, contribute to climate change, and acidify oceans, posing substantial threats to the environment (Vu et al., 2024, p. 159).

This paper aims to thoroughly examine the current landscape of sustainability within transportation and warehousing, investigating prevailing challenges, emerging solutions, and the integration of advanced technologies to achieve environmental, social, and economic equilibrium. This research will further delve into practical applications of green logistics and their impact generated, including questionnaire development, data analysis, and the formulation of actionable suggestions for fostering a more sustainable future in this critical industry (Nagy & Szentesi, 2024).

Keywords: *Transportation, Warehousing, Sustainability, Multimodal Logistics, harmful pollutants.*

INTRODUCTION

The intricate relationship between global commerce and environmental impact has propelled sustainability to the forefront of strategic planning within transportation and logistics sectors (Farchi et al., 2024, p. 969). This emphasis stems from a growing recognition of the significant environmental footprint associated with global trade, necessitating a paradigm shift towards greener practices (Vu et al., 2024, p. 159). This shift is crucial given that the logistics industry, responsible for transporting goods across the entire supply chain, significantly influences sustainable development (Chatzoudes et al., 2024, p. 1689).

Specifically, global trade relies heavily multimodal logistics, which transports the majority of goods internationally via container vessels, bulk carriers, and tanker ships, alongside air freight, rail, and trucking inclusive of warehousing fulfilment, all contributing to global supply chain efficiency, connectivity and effective storage (Arowosegbe et al., 2024, p. 924). These emissions include harmful pollutants like sulphur oxides, nitrogen oxides, and particulate matter, which degrade air quality, contribute to climate change, and acidify oceans, posing substantial threats to the environment (Vu et al., 2024, p. 159).

This paper aims to thoroughly examine the current landscape of sustainability within transportation and warehousing, investigating prevailing challenges, emerging solutions, and the integration of advanced technologies to achieve environmental, social, and economic equilibrium. This research will further delve into practical applications of green logistics and their impact generated, including questionnaire development, data analysis, and the formulation of actionable suggestions for fostering a more sustainable future in this critical industry (Nagy & Szentesi, 2024).

Industry Overview

Major logistics players like **DHL**, **FedEx**, **UPS**, **Maersk**, **Kuehne+Nagel**, **XPO Logistics**, and **Amazon** are leading with ambitious sustainability goals, focusing on decarbonization through electric fleets, alternative fuels, optimized routing, green energy use, and sustainable packaging, with many aiming for net-zero emissions by 2040-2050 by investing heavily in eco-friendly tech and infrastructure. Other key companies include **DB Schenker**: Implementing digital platforms and sustainable warehousing solutions, **CEVA Logistics (part of CMA CGM)**: Investing in green solutions and partnerships to cut emissions. **DSV panalpina (DSV)**: A global player focused on sustainable transport and logistics operations and **GXO Logistics**: Focusing on sustainability in contract logistics and distribution. All these companies are driving green initiatives in transport and warehousing.

Other Noteworthy companies include **IKEA**: Transforming its supply chain with 100% zero-emission deliveries in some cities using EVs and cargo bikes, **Uber Freight**: Utilizing technology to optimize routes and reduce fuel consumption for their network. **FM Logistic**: Offers sustainable solutions like transportation pooling and urban distribution. **EccoFreight**: Specializes in eco-friendly freight, measuring and reducing carbon footprints for clients.

Objectives of the Study

To examine global logistics companies' sustainable transportation and Warehousing strategies and assess implementation challenges, evaluate their impacts, and identify long-term sustainability goals and roadmaps.

Methodology

By using convenient sampling method, data is collected from 53 logistics service providers (who have opted sustainable logistics operations) from Coimbatore region using a well-structured questionnaire.

1. Chi-Square Tests

H₁: There is no significant association between company size and adoption or planning stage of GPS/route planning technology for fuel reduction

Table 1: Chi-Square Test: GPS/Route-Planning Technology Use *Company Size

Stat.	DF	p
3.132	4	0.557

The independent chi-square analysis (chi square = 3.132, df = 4, p = 0.557) has resulted in the absence of statistically significant association for the company size and the stage of adoption and/or planning of GPS/ route planning technology for fuel reduction for the 53 Coimbatore logistics firms. As the p-value is greater than 0.05 the null hypothesis is not rejected and the alternative (H₁) hypothesis - "larger companies are more likely to already use such technology" is not supported. This means that the technology uptake for sustainable transportation are relatively consistent regardless of firm size, small, medium and large firms included in this sample, which suggests that there are other factors such as regulatory pressure, fuel costs, vendor availability, or perceived ROI that are more influential to adoption than firm size.

H₂: There is a significant association between energy efficient warehousing measures implemented and whether firms' reporting on operational energy costs reduction

Table 2: Chi-Square Test: Energy Cost Reduction* Energy-Efficient Measures

Stat.	DF	p
1.435	2	0.449

The independent chi-square analysis (chi square= 1.435, df =2 , p= 0.449) shows that there is no statistically significant relationship between the binned number of energy efficient warehousing measures implemented (Low: 2-, 3-, Medium: 4-, 5-, High: 6-, 7-) and whether the 53 Coimbatore logistics firms reported reduction in operational energy costs (Yes vs. No/Unsure/Not evaluated). With the p-value being much larger than 0.05, the null hypothesis is not rejected and the alternate Hypothesis H₂ is not supported. This means that, in this sample of people across the region, energy-efficient measures that are implemented are not impacting a massively higher recognition of cost savings. On factors affecting reported outcomes- Examples of external factors include facility scale, energy tariff, quality of implementation or evaluation practices that may have greater impact than number of measures adopted on reported outcomes.

2. Friedman Tests

H₃: There are significant differences in the severity of challenges in green transportation strategies' implementation

Table 3: Friedman Test: Mean Ranks of Green Transportation Implementation Challenges

Stat.	DF	p
3.891	4	0.431

The results of independent Friedman test analysis (statistic = 3.891, df = 4, p = 0.431) show that there are no statistically significant differences between the mean ranks ascribed to the five major challenges of implementing green transportation strategies in Coimbatore logistics firms that is 53 in number. With the p-value much greater than 0.05, the null hypothesis is not rejected and the alternative Hypothesis H3 is not supported. This means that, with this sample, respondents did not consistently think that any one barrier-in, for example, high initial investment adversely affecting them, inadequate infrastructure, lack of skilled human resources, limited availability of green vehicles, or lack of government incentives-was significantly worse than the others. The challenges seem to be seen as of similar importance, and this would indicate that in the regional context there is a wide view of several simultaneous challenges instead of one dominant obstacle.

H₄: There are significant differences in the challenges in renewable energy adopting and energy efficient systems in warehousing

Table 4: Friedman Test: Mean Ranks of Renewable/Energy-Efficient Warehousing Adoption Challenges

Statistic	DF	p
2.331	4	0.812

The result of independent Friedman test analysis (statistic= 2.331, df = 4, p =0.812) does not indicate the significant difference in mean ranks attributed to the 5 challenges in adopting renewable energy and energy efficient systems in warehousing by the 53 Coimbatore logistics firms. With the p-value being well above 0.05, the null hypothesis is not rejected and therefore, the alternative Hypothesis H4 is not supported. This suggests that the respondents viewed high installation cost, lack of technical expertise, space limitations, maintenance issues and lack of government incentives as comparably severe barriers, while none of the individual challenges were grouped consistently as dominant. In this regional sample, the hurdles to warehousing sustainability seem like a broadly similar set of constraints imposed in terms of their perceived importance, suggesting that work to overcome them will need to address the set of constraints in a holistic manner (rather than concentrating on overcoming one major hurdle).

3. Spearman Rank Correlations

H₅: There is a significant correlation between green transportation strategies adopted and long term impact of reduction in operating costs

Table 5: Spearman Correlation: Green Transportation Strategies vs. Operating Cost Reduction

Variable Pair	Spearman's ρ	p
Num. Green Transport Strategies ↔ Cost Reduction Importance	0.321	0.533

The result of independent Spearman correlation analysis ($\rho = 0.321$, p = 0.533) between the number of the green transportation strategies adopted and the perceived importance of "reduction in operating costs" as a long-term impact reveals only slight positive relationship among 53 Coimbatore logistics firms. Since p value is much greater than 0.05, null hypothesis is accepted and alternative Hypothesis H5 is not accepted. This suggests that using more green strategies is not reflected in a significantly higher number perceiving that cost reduction is the highest ranking of long term benefits (rank 1 = most important). In this regional sample, it shows that

regardless of the intensity of strategy, firms generally place a small premium on cost savings, indicating that there may be other drivers, for example, regulatory compliance, competitiveness, ecosystem value, etc., that are equally or more important in influencing perceptions of sustainability.

H₆: There is a significant correlation between green transportation strategies and energy efficient warehousing measures

Table 6: Spearman Correlation: Green Transport Strategies vs. Energy-Efficient Warehousing Measures

Variable Pair	Spearman's ρ	p
Num. Green Transport Strategies ↔ Num. Energy Measures	-0.062	0.563

The independent Spearman correlation analysis ($\rho = -0.062$; $p = 0.563$) between No of green transportation strategies adapted and No of energy efficient Warehouse measures implemented reveals very weak negative relationship the among 53 Firms of Coimbatore logistics. With the p-value much greater than 0.05, the null hypothesis is accepted and the alternative Hypothesis H₆ is not accepted. This suggests no substantial positive relationship (and hence no apparent evidence of an integrated approach to sustainability) with transportation and warehousing practices in this sample of the region. Firms seem to be pursuing green initiatives in these functional areas somewhat independently and this is possibly because it is due to differences in the operational priorities, investment cycles, regulatory pressures or resource allocation patterns rather than an integrated, cohesive approach to green initiatives.

4. Logistic Regression

H₇: Company size significantly predicts whether a firm is in the “planning to implement” stage for GPS/route-planning technology.

Table 7: Logistic Regression

Predictors	Coeff.	Sd. Er.	z	p	95% Lower CI	95% Upper CI
Constant	-1.308	0.922	-1.520	0.144	-3.139	0.433
Size = Medium (vs Large)	0.881	0.809	0.989	0.392	-0.846	2.612
Size = Small (vs Large)	0.408	0.818	0.545	0.535	-1.205	2.221

- $R^2 \approx 0.023$; $p > 0.10$ (not significant).

The statistically independent logistic regression result or the pseudo R^2 value is estimated as 0.03, and overall model p value is >0.10 , indicating that company size is not a significant predictor of whether the firm is in the "planning to implement" stage of GPS/route planning technology in the case of 53 logistics providers in Coimbatore. So, with p-values of 0.392 (Medium vs. Large) and 0.535 (Small vs. Large) both well above 0.05, the null hypothesis is retained and the alternative Hypothesis H₇ is not supported. Contrary to expectations that smaller firms should be more likely to show up in the planning stage of the risks endured in resource constraints, the data show no pertinent size difference in the planning status of the firms. This suggests that aspects of deciding on the move for implementation to fuel optimization

technology are more external-such as policy incentives, accessibility of technology, cost and benefit limitations, market than by internal firm size-in this regional sample.

Discussion of the Findings

Examining the results from the sample of 53 logistics firms located in Coimbatore, there is a consistent pattern of non-significance in hypothesis formation, which depicts barriers for applying and practicing sustainability in regional contexts. For transportation, not a significant relationships between firm size and technologies adopted (H1) or planning stages (H7), so resource constraints are not a barrier holding back techniques as anticipated and external enablers, such as incentives may be important. Similarly, the shared perception of challenges (H3) suggests multifaceted hurdles as hence guideline toward a holistic solutions rather than fixes. In warehousing, a lack of correlation between those measures implemented and cost reductions (H2), and the same rankings of challenges (H4) suggests that links to quality of implementation or evaluation may detract from the impacts. The low correlations in H5 and H6 point out a silted approach to sustainability, with transportation and warehousing efforts with little integration, which could limit the overall ecosystem value as well as long-term competitiveness. These findings challenge assumptions relating to scale driven advantages in the area of global logistics and stress the need for tailored regional strategies. While the objective sought to study strategies and roadmaps, the results suggest slower adoption because of perceived equivalency of barriers and subdued impacts, which may be affected by limited infrastructure and/or incentives in India. Overall, it seems to have opportunities for policy-driven acceleration towards achieving sustainability goals.

Recommendations of the Findings

1. **Improved Incentives by Governments for the Adoption of Green Technologies:** Governments must develop tier-based subsidies according to firm size, to promote adoption of GPS/route planning technology. This could be through tax rebates for small firms, in order to address the fact that the adoption patterns observed are not size-dependent. Pilot programs in regions such as Coimbatore could see evaluation in terms of effectiveness in 1-2 years.
2. **Promote Integrated Sustainability Training Programs:** Logistics associations should provide training programs on how to connect the practices of transportation and warehousing for better synergy. Focus on case studies where cost benefits are seen in order to offset the weak correlation between strategies and perceived impacts. Rollup on target medium sized firms initially, with follow up audits to quantify integration process progress on 6-12 month follow-up.
3. **Invest in Infrastructure and Skill Development:** Work with industry bodies to develop infrastructure for green vehicles and renewable energies and regulatory skill development (for renewables) and develop them in this sector through vertical of Address uniform challenge perceptions by granting skilled workforce training grants. Monitor with quarterly audits to check on minimisation of barriers such as gaps in expertise within 2 years.
4. **Improve Impact Evaluation Frameworks:** Depending on government unwillingness or questionable data reliability, the firms adopt metrics as a standardized method to determine the energy cost as well as carbon reductions from measures. This addresses the issue of the absence of relationship between the measure amount and gains reported in savings. External consultants could be used for initial set-ups, with the annual review to revise evaluation.

5. **Foster Public-Private Partnerships for Roadmaps:** Promote partnerships between logistics providers and tech-vendors for phased implementation strategies. Use data from similar studies to set the importance of size, in terms of external factors, outside of the roadmap designs. Aim for measurable goals to make the business sustainable, monitored every two years like reporting with global standards

CONCLUSION

The study on sustainable practices among 53 Coimbatore logistics providers identifies a regional scenario where the adoption of sustainability is confronted with similar challenges across the board while also the anticipated impacts are limited, in contrast to global expectations of sustainability being scale driven. The lack of results across analyses described as non-significant suggests firm size is viscosity to the technology take-up/planning process and barriers such as infrastructure and incentives are perceived as equivalent suggesting systemic rather than isolated issues. The lack of integration that is found in transportation and warehousing efforts highlights one in which there is a fragmented approach contributing to the potential for an underachievement in long-term efforts such as cost reductions and carbon footprint reduction. Although there are inconveniences associated with sampling limitations, these results show opportunities for quicker sustainability development as a result of external interventions. Ultimately, while this objective to discuss strategies and roadmaps shows little current implementation, a roadmap of collaboration and evaluation to improve competitiveness, is indicated. By tackling these, regional firms are able to reference global sustainability benchmarks that build resilience to widespread environmental and economics in logistics. Samples for this work could be expanded nationally in the future for comparative research.

REFERENCES

1. Farchi, C., Farchi, F., Touzi, B., & Mousrij, A. (2024). Sustainable Multidimensional Performance Prediction by ANN-Based Supervised Machine Learning. *Ingénierie des Systèmes d' Information*, 29(3).
2. Tuan, T. A., Thai, N. Q., Cuc, N. T. T., Trinh, N. H., Tien, P. M., & Hau, D. T. T. (2024). Boosting Sustainability and Human Well-Being: Synergising Green Innovation, Green Finance and Health Expenditure To Reduce Vietnamese Carbon Emission. *Transformations in Business & Economics*, 23.
3. Chatzoudes, D., Kadłubek, M., & Maditinos, D. (2024). Green logistics practices: The antecedents and effects for supply chain management in the modern era. *Equilibrium (1689-765X)*, 19(3).
4. Alshurideh, M. T., Alrawabdeh, W. A., El khatib, M., Alshurideh, A., Al Kurdi, B., Hamadneh, S., & Alzoubi, H. M. (2024, June). Digital Evolution and Smart Governance: Shaping Global Supply Chain Efficiency. In *International Scientific Conference Management and Engineering* (pp. 19-27). Cham: Springer Nature Switzerland.
5. Nagy, G., & Szentesi, S. (2024). *Green logistics: Transforming supply chains for a sustainable future*. *Advanced Logistic Systems – Theory and Practice*, 18(3), 29–42. <https://doi.org/10.32971/als.2024.026>.

6. Kamacı, K. (2025). Green Logistics and Strategies for Reducing Carbon Footprints: Global Trends and the Turkish Perspective. *Anatolia Social Research Journal*, 4 (2), 24-36. <https://doi.org/10.5281/zenodo.17455264>.
7. Li, S., & Sun, T. (2024). Research on the impact of green logistics on carbon emission intensity of transportation industry. *Global NEST Journal*, 26(6), 1-10. <https://doi.org/10.30955/gnj.05943>

**ASSESSING FAMILY AND SCHOOL ACADEMIC CONSCIOUSNESS
AND STUDENTS' PERFORMANCE IN ENGLISH LANGUAGE AMONG
SENIOR SECONDARY SCHOOLS IN PORT HARCOURT CITY LOCAL
GOVERNMENT AREA**

Cyrus, Smart Eziwho*; Ogunka, Richard Iheanyichukwu**

*Department of English and Communication Art,
Ignatius Ajuru University of Education, Rumuolumeni,
Port Harcourt, Rivers State NIGERIA
Email Id: Eziwho2002@Yahoo.Com

**Department of Psychology,
Guidance and Counselling,
Faculty of Education,
Ignatius Ajuru University of Education, Rumuolumeni,
Port Harcourt, Rivers State NIGERIA
Email Id: iheanyirichie@gmail.com
Email Id: richard.ogunka@iaue.edu.ng

DOI: 10.5958/2278-4853.2026.00008.5

ABSTRACT

This paper examines the influence of family academic consciousness and school academic consciousness on students' performance in English language in secondary schools within Port Harcourt City Local Government Area. The population consists of all senior secondary two students (SS2) in public secondary schools in Port Harcourt City Local Government Area of Rivers State numbering 3,089. The sample size of 120 senior secondary school students was used for this study. Three instruments; Family Academic Consciousness Questionnaire (FACQ), School Academic Consciousness Questionnaire (SACQ) and English Language Achievement Test (ELAT). The Family Academic Consciousness Questionnaire (FACQ), Family Academic Consciousness Questionnaire yielded a Cronbach Alpha reliability index of 0.80 and 0.77 respectively and English Language Achievement Test has a KR20 reliability coefficient of 0.72. One way Analysis of Variance (ANOVA) used to analyze data and test hypothesis, the null hypothesis is rejected. The findings suggest that Family and School Academic Consciousness has a significant influence on students' achievement in English Language. Parents should promote a reading culture at home, monitor homework, and engage with teachers on learner progress. Schools' management should improve school climate, provide professional development for English language teachers, equip schools with linguistic resources and engage parents through formal parent-teacher associations and create intervention programs targeting low- performing learners.

KEYWORDS: *Family Academic Consciousness, School Academic Consciousness, Students' Academic Achievement, English Language Performance, Secondary School Students, School*

*Climate, Parental Involvement, Reading Culture, Academic Environment, Port Harcourt City
Local Government Area*

INTRODUCTION

Academic performance in English language remains a critical challenge in Nigerian secondary education. Over the years, performance in English Language in West African Senior Secondary School Examination and National Examination Council has been dwindling, WAEC Chief Examiners reported a fluctuation in performance in English language especially in the essay section. English is not only the medium of instruction in school but also a compulsory subject for progression and tertiary education entry. Education is an essential need in the society today, and therefore academic performance is positioned quite high on the national agenda, with educators and policy makers putting effort in testing, accountability and other related concerns (Etim, 2013). Academic consciousness refers to the awareness, engagement, and prioritization of academic goals and learning activities by both parents at home and school authorities/teachers (the “school”) for student development. In the Nigerian educational sector, understanding how these two domains interact to influence English language performance is crucial for interventions aimed at improving students’ outcomes.

Family academic consciousness includes parental educational background, involvement in children’s learning, socio-economic status, and the intellectual climate of the home environment. In the Nigerian educational sector, understanding how the home domain interacts to influence English language performance is crucial for interventions aimed at improving student outcome.

Parental interest in schoolwork, provision of learning resources (books, quiet study spaces, reading materials), and active monitoring of homework and school progress are key indicators of an academically conscious home environment. Every human being is born into a family; family is the child’s first contact with the world and serves as a window through which the child sees the outside world.

In the opinion of Clifford in Utom (2014), family remains the primary environment of the child and emphasized that family environment has more chances of increasing or decreasing the intellectual achievement of the child. In the works of some scholars (Ozurumba et.al (2007); Elgbeleye, & Olasupo, 2011; Ojo, & Olufemi, 2013; Singh et.al (2016); Egalite, 2016) maintained that families with high regards for academic are likely to encourage their children academically and arouse their interest towards studies as they show more interest in their children academic progress than families with lesser premium on academics, as such families are likely to pay attention to the quality of their children’s teachers and may attempt to ensure that their children are adequately served.

The parents may have negative attitudes towards certain languages which create barriers to effective language learning and limit opportunities for practice. Research indicates that positive reinforcement from the community, including family and peers, plays a critical role in shaping learners’ attitudes and success in language acquisition (Baker, 2006).

School academic consciousness includes the quality of school learning environment teacher quality, school leadership and classroom climate. School policies that promote a culture of learning, teacher commitment, provision of teaching and learning aids, feedback mechanisms,

and school-based academic support all contribute to an environment conducive to academic success.

A school can be defined as an educational institution which provide learning environment for the teaching of students under the supervision of teachers. Research by Kellum, &Olson (2023) emphasizes that environmental factors such as lighting, temperature, and noise levels profoundly influence students' cognitive function, mood, and behavior. Optimizing these factors within school environments can enhance learning outcomes and promote student well-being. A study by Zada et al. (2024) found that a supportive learning environment significantly enhances students' academic performance by fostering engagement and motivation. This indicates that creating an inviting atmosphere is essential for encouraging students to embrace learning. According to Aneke et al. (2023), a positive classroom atmosphere is vital for student engagement and success; without it, students may feel insecure and disconnected from their learning experiences. This disconnect can lead to decreased motivation and engagement in academic activities.

The school is principally positioned to help students learn second language which is a multifaceted process that encompasses various pedagogical strategies aimed at enabling learners to acquire proficiency in a language other than their native tongue. This endeavor involves not only the mastery of grammatical structures and vocabulary but also the development of cultural awareness and communicative competence, which are essential for effective interaction in the target language. Historically, traditional approaches to language teaching, such as the Grammar-Translation Method, placed heavy emphasis on remote memorization and explicit grammar instruction, often at the expense of practical language use (Richards & Rodgers, 2001). In research carried out by Ebuta et al. (2019) their result revealed a statistically significant influence of family level of academic consciousness on students' academic performance in English language where the postulated hypothesis; is rejected. It is noticeable evidence that links family education consciousness with students' academic success. With the growing of information and communication technology and greater awareness and benefit of education. The trends of research should swift from only family academic consciousness to broader variables. Hence, the urge to investigate family and school academic consciousness on students' academic performance. A hypothesis is therefore postulated.

There is no significant influence of Home and School Academic Consciousness on Students' Performance in English language in Port Harcourt City Local Government Area of Rivers State.

METHOD

This research adopted a survey design approach. The population consists of all senior secondary two students (SS2) in public secondary schools in Port Harcourt City Local Government Area of Rivers State numbering 3,089. A multi- stage sampling procedure involving stratified random sampling to partition the local government into three zones Port Harcourt Township zone, Diobu zone and Trans Amadi/ Elekahia zone. Simple random sampling to select two schools in each zone totaling 6 Senior Secondary schools and simple random sampling to select 20 students from each sampled school, putting together 120 seniors secondary for this study. Three instruments; Family Academic Consciousness Questionnaire (FACQ), School Academic Consciousness Questionnaire (SACQ) and English Language Achievement Test (ELAT) were developed and validated by the researchers for data collection. The FACQ consists of two sections; A and B. The A section elicits information on respondents' personal data, while Section B consisted of 10 items to measure Family Academic Consciousness on four-point Likert Scale, with scoring

ranging from Strongly Agree (SA, 4 Points), Agree (A, 3 Points), Disagree (D, 2 Points) and Strongly Disagree (SD, 1 Point) and the reverse for negatively word items. The SACQ consists of two sections; A and B. The A section elicits information on respondents' personal data, while Section B consisted of 10 items to measure Family Academic Consciousness on four-point Likert Scale, with scoring ranging from Strongly Agree (SA, 4 Points), Agree (A, 3 Points), Disagree (D, 2 Points) and Strongly Disagree (SD, 1 Point) and the reverse for negatively word items. And ELAT, English Language Achievement Test consisted of 60 multiple choice items covering scheme of work in English language for SS2 students. Each item has four options lettered "A to D" out of which one is the key (correct answer). The Family Academic Consciousness Questionnaire (FACQ), School Academic Consciousness Questionnaire yielded a Cronbach Alpha reliability index of 0.80 and 0.77 respectively and English Language Achievement Test has a KR20 reliability coefficient of 0.72. One way Analysis of Variance (ANOVA) used to analyze data and test hypothesis.

Table 1 Descriptive of family and school academic consciousness and students' academic performance in English Language.

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Family academic consciousness	120	2.1167	.70034	.06393	1.9901	2.2433	1.00	4.00
Student academic performance	120	33.0333	9.34217	.85282	31.3447	34.7220	4.00	51.00
School academic consciousness	120	2.4000	.99916	.09121	2.2194	2.5806	1.00	4.00
Total	360	12.5167	15.50774	.81733	10.9093	14.1240	1.00	51.00

Table 2: Summary One Way ANOVA of family and home academic consciousness and students' academic performance in English Language

Dependent Variable:

Scheffe

(I) Students' academic performance	(J) Students' academic performance	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound

Family academic consciousness	Students' academic performance	-30.91667*	.70224	.000	-32.6428	-29.1905
	Students' academic consciousness	-.28333	.70224	.922	-2.0095	1.4428
Students' academic performance	Family academic consciousness	30.91667*	.70224	.000	29.1905	32.6428
	Students' academic consciousness	30.63333*	.70224	.000	28.9072	32.3595
Students' academic consciousness	Family academic consciousness	.28333	.70224	.922	-1.4428	2.0095
	Students' academic performance	-30.63333*	.70224	.000	-32.3595	-28.9072

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	75772.867	2	37886.433	1280.452	.000
Within Groups	10563.033	357	29.588		
Total	86335.900	359			

* The mean difference is significant at the 0.05 level.

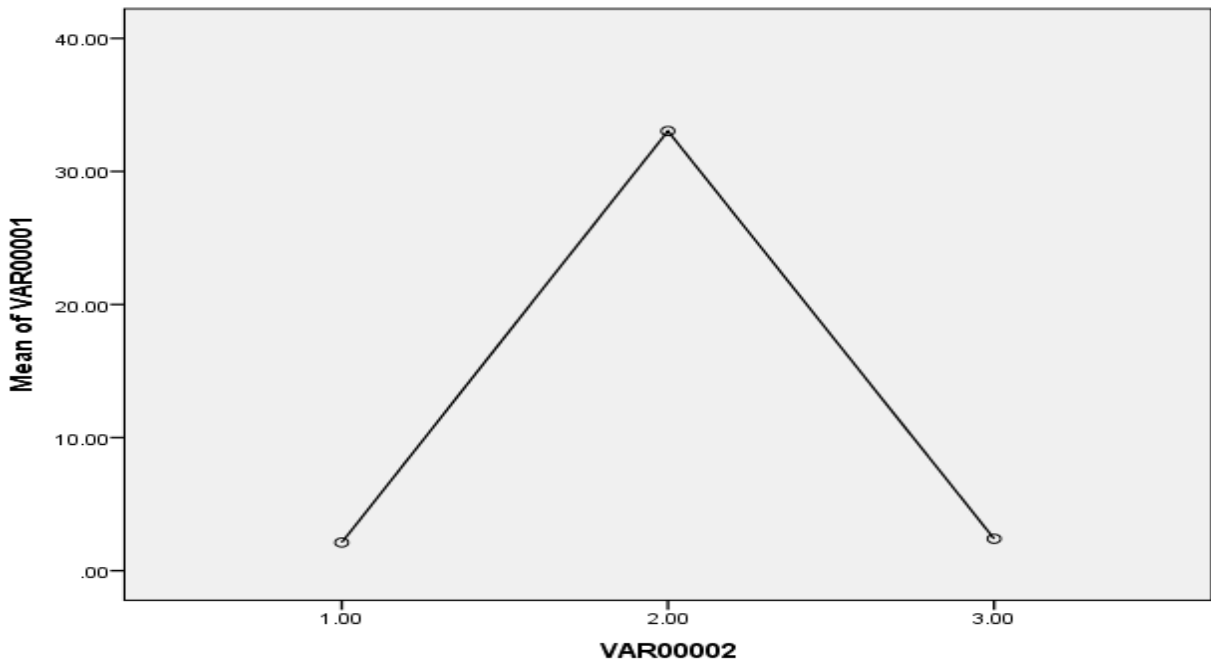
Table 3: Scheffe Post Hoc Test

VAR00002	N	Subset for alpha = 0.05	
		1	2
Family consciousness. academic	120	2.1167	
Students' performance. academic	120	2.4000	
School consciousness. academic	120		33.0333
Sig.		.922	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 120.000.

Fig.1



RESULTS AND DISCUSSION

The X-axis represents the levels of Home and School Academic Consciousness.

The Y-axis represents the mean English Language Students' Achievement.

What the graph shows: Students' academic performance has a much higher mean achievement score (33.0333 and Std 9.34217). Family academic consciousness and School academic consciousness have very low and almost equal mean scores (2.117, Std .70034 and 2.4000, Std .99916).

The pattern forms a sharp peak at Students' academic performance, since the mean achievement score at Students' academic performance is much higher than at family academic consciousness and school academic consciousness the graph shows a clear difference in students' achievement across the groups. This means academic consciousness at home and school influences students' academic performance. The analysis examined the influence of Home and School Academic Consciousness on students' academic performance in English Language. The graphical representation of the mean scores indicates noticeable differences across the levels of academic consciousness and performance.

Students' academic performance recorded the highest mean achievement score, while family academic consciousness and school academic consciousness recorded considerably lower and nearly identical mean scores. The distribution of the mean scores shows a sharp increase at students' academic performance and a decline at school academic consciousness forming a peaked pattern.

These observed differences suggest variation in English Language performance across the different levels of Home and School Academic Consciousness.

The findings reveal that students' academic performance perform better than home and school academic consciousness achieved significantly higher scores in English Language. This indicates that the degree or nature of academic consciousness at home and school may play an important role in influencing students' academic performance.

The similarity in mean scores between family and school academic consciousness suggests that these variables may not provide sufficient academic support or conditions necessary to enhance students' achievement. In contrast, student academic performance appears to represent a more optimal level of academic consciousness that positively impacts students' performance. Based on the visible differences in mean achievement scores, the assumption of no influence among the groups is not supported. Hence, the null hypothesis is therefore rejected.

This study agreed with Ebuta et al. (2019). Their result revealed a statistically significant influence of family level of academic consciousness on students' academic performance in English language where the postulated hypothesis; is rejected.

CONCLUSION

The study highlights the growing importance of artificial intelligence in digital employer branding and employee retention. In the IT sector, where talent competition and employee turnover are high, AI-driven employer branding has emerged as an effective strategy to enhance employee experience and retention.

By integrating AI with employer branding, organizations can improve engagement, transparency, and personalized employee interactions. The proposed conceptual framework explains how AI supports employer branding and contributes to employee retention.

However, the study is limited to secondary data and conceptual analysis. Future research can empirically test the proposed framework using primary data, explore sector-specific differences, and examine ethical issues related to the use of artificial intelligence in HRM.

REFERENCES

1. Vrontis, D., Christofi, M., Pereira, V., Tarba, S., Makrides, A., & Trichina, E. (2022). Artificial intelligence, robotics, advanced technologies and human resource management: A systematic review. *The International Journal of Human Resource Management*, 33(6), 1237–1266.
2. Malik, A., Budhwar, P., Patel, C., & Srikanth, N. R. (2021). May the bots be with you! Delivering HR service quality using AI. *Journal of Service Management*, 32(4), 535–558.
3. Kaur, P., & Randhawa, G. (2021). Exploring the influence of employer branding on organizational attractiveness and employee retention. *International Journal of Organizational Analysis*, 29(4), 928–946.
4. Upadhyay, A. K., & Khandelwal, K. (2018). Applying artificial intelligence: Implications for recruitment. *Strategic HR Review*, 17(5), 255–258.
5. Bondarouk, T., Parry, E., & Furtmueller, E. (2017). Electronic HRM: Four decades of research on adoption and consequences. *The International Journal of Human Resource Management*, 28(1), 98–131.
6. Backhaus, K., & Tikoo, S. (2004). Conceptualizing and researching employer branding. *Career Development International*, 9(5), 501–517.
7. Ambler, T., & Barrow, S. (1996). The employer brand. *Journal of Brand Management*, 4(3), 185–206.
8. Lievens, F., & Slaughter, J. E. (2016). Employer image and employer branding: What we know and what we need to know. *Annual Review of Organizational Psychology and Organizational Behavior*, 3, 407–440.
9. Schlager, T., Bodderas, M., Maas, P., & Luc Cachelin, J. (2011). The influence of employer branding on employee attitudes. *Journal of Marketing Management*, 27(9–10), 948–964.
10. Sivertzen, A. M., Nilsen, E. R., & Olafsen, A. H. (2013). Employer branding: Employer attractiveness and the use of social media. *Journal of Product & Brand Management*, 22(7), 473–483.
11. Tanwar, K., & Prasad, A. (2016). Exploring the relationship between employer branding and employee retention. *Global Business Review*, 17(3), 186–206.
12. Minchington, B. (2010). *Employer brand leadership: A global perspective*. Torrensville: Collective Learning Australia.
13. Ewing, M. T., Pitt, L. F., de Bussy, N. M., & Berthon, P. (2002). Employment branding in the knowledge economy. *International Journal of Advertising*, 21(1), 3–22.
14. Tumasjan, A., Kunze, F., Bruch, H., & Welpe, I. (2020). Linking employer branding orientation and firm performance. *Human Resource Management*, 59(3), 265–278.

15. Jain, N., & Bhatt, P. (2015). Employment preferences of job applicants: Unfolding employer branding determinants. *Journal of Management Development*, 34(6), 634–652.
16. Dhamija, P., & Gupta, S. (2018). Employer branding: A strategic approach for employee retention. *International Journal of Business and Management Invention*, 7(3), 23–29.
17. Brougham, D., & Haar, J. (2018). Smart technology, artificial intelligence, robotics, and algorithms. *Journal of Management & Organization*, 24(2), 239–257.
18. Chamorro-Premuzic, T., Winsborough, D., Sherman, R., & Hogan, R. (2016). New talent signals: Shiny new objects or a brave new world? *Industrial and Organizational Psychology*, 9(3), 621–640.
19. Marler, J. H., & Boudreau, J. W. (2017). An evidence-based review of HR analytics. *The International Journal of Human Resource Management*, 28(1), 3–26.
20. Nawaz, M. S., & Gomes, A. M. (2021). Artificial intelligence and human resource management. *International Journal of Human Resource Studies*, 11(2), 36–52.
21. Stone, D. L., Deadrick, D. L., Lukaszewski, K. M., & Johnson, R. (2015). The influence of technology on HR practices. *Human Resource Management Review*, 25(2), 216–231.
22. Bibi, P., Ahmad, A., & Majid, A. H. A. (2018). HRM practices and employee retention. *International Journal of Engineering & Technology*, 7(2), 150–155.
23. Allen, D. G., Bryant, P. C., & Vardaman, J. M. (2010). Retaining talent: Replacing misconceptions with evidence-based strategies. *Academy of Management Perspectives*, 24(2), 48–64.
24. Hom, P. W., Lee, T. W., Shaw, J. D., & Hausknecht, J. P. (2017). One hundred years of employee turnover theory. *Journal of Applied Psychology*, 102(3), 530–545.
25. Deery, M., & Jago, L. (2015). Revisiting talent management. *International Journal of Contemporary Hospitality Management*, 27(3), 453–472.
26. Gupta, V., & Saxena, S. (2020). Employee retention strategies in IT sector. *International Journal of Human Resource Management and Research*, 10(2), 35–42.
27. Kyndt, E., Dochy, F., Michielsens, M., & Moeyaert, B. (2009). Employee retention: Organisational and personal perspectives. *Vocations and Learning*, 2(3), 195–215.
28. Cascio, W. F., & Boudreau, J. W. (2016). The search for global competence. *Journal of World Business*, 51(1), 103–114.
29. Ulrich, D. (2017). *HR from the outside in*. New York: McGraw-Hill.
30. Lengnick-Hall, M. L., Lengnick-Hall, C. A., Andrade, L. S., & Drake, B. (2009). Strategic human resource management. *Academy of Management Annals*, 3(1), 63–122.
31. Wright, P. M., & McMahan, G. C. (2011). Exploring human capital. *Journal of Management*, 37(1), 93–104.
32. Becker, B. E., & Huselid, M. A. (1998). High performance work systems and firm performance. *Academy of Management Journal*, 41(1), 8–29.

- 33.** Boxall, P., & Purcell, J. (2016). *Strategy and human resource management*. London: Palgrave Macmillan.
- 34.** Armstrong, M., & Taylor, S. (2020). *Armstrong's handbook of human resource management practice*. London: Kogan Page.
- 35.** Dessler, G. (2020). *Human resource management (16th ed.)*. Pearson Education.

FLEXIBLE WORK PLACE AND ORGANIZATIONAL EFFICIENCY IN SELECTED OIL SERVICING FIRMS IN NIGERIA

Samuel, Kinikanwo-Chimenim Paul*

*Ph.D. Reader,
Industrial Relations and Human Resources Management,
Department of Sociology,
University of Port Harcourt, NIGERIA

DOI: 10.5958/2278-4853.2026.00006.2

ABSTRACT

The adoption of flexible work arrangements (FWAs), such as flexible scheduling, remote work, compressed workweeks, and hybrid models has grown at a pace that has surged after the COVID-19 pandemic as organizations aim to better the well-being of employees, their productivity, and retention. Although the implementation of FWAs has recorded positive results in the knowledge-based industries, the implementation of the policy in other spheres of the economy such as oil and gas, especially among resource-based economies such as Nigeria, has proved especially difficult. These are the challenges of safety critical operations, 24/7 shift patterns, regulatory compliance, and poor infrastructure, including poor reliability of power and internet connectivity. Empirical research in the oil servicing industry in Nigeria has shown in the recent past that selective FWAs, such as flex-time on non-field based administrative jobs, have positive relationship with better performance, work-life balance, and efficiency in the organization including decreased turnover and heightened responsiveness. Nevertheless, there is a lack of studies on FWAs in high-reliability sectors, especially in the developing economies. This theoretical review is a synthesis and integration of three fundamental theoretical approaches; motivational theories, the job demands-resources (JD-R) model, and the contingency human resource management (HRM) theories to develop an integrated contingent framework. The model assumes that FWAs have the potential to improve organizational efficiency, but the success would depend upon major contextual factors, including technological infrastructure, type of role, organizational culture, and safety requirements. This review provides a theoretical base of future empirical research in the oil servicing industry of Nigeria and the high-stakes industries like this one.

1. INTRODUCTION

Flexible work arrangements (FWAs), such as flexible scheduling, remote work, compressed workweeks, and hybrid work arrangements, have gained increased momentum around the world following the COVID-19 pandemic, and numerous organizations have begun to implement them to support employee welfare, retention and productivity (Kniffin et al., 2021). FWAs are often associated with favorable organizational performance in knowledge or administrative industries, including increased engagement, decreased absenteeism and increased flexibility (Allen et al., 2013; Gajendran and Harrison, 2007). Nevertheless, the oil and gas sector, especially the servicing companies of the resource-based economies such as Nigeria, is limited due to different

factors: the field work is safety-critical, the working shifts are 24/7, the prices of the commodities are volatile, the industry has to comply with a set of regulations, and the infrastructure (e.g., the lack of reliable power and internet in the area of Nigeria and the Niger Delta, in particular) (Akintokunbo et al., 2020; Georgewill, 2023). The oil servicing industry in Nigeria, which includes the companies that offer drilling, engineering, maintenance, and support services to the operating upstream companies, has a combination of both the on-site technical staff and some administrative/support staff based in offices. Empirical results have shown in the recent past that selective FWAs (e.g., flextime in non-field jobs) have a positive relationship with employee performance, work-life balance, and organizational efficiency proxies, e.g., lower turnover and better responsiveness (Akintokunbo et al., 2020; Georgewill, 2023; Sam et al., 2022). However, these studies are largely empirical and situational, with a theoretical gap: What do well-known theories of FWAs imply (or do not imply) in high-reliability sectors in developing economies? How do contingencies moderate the FWAs- efficiency relationship in this type of setting? These gaps are targeted by this theoretical review as a synthesis and extension of three fundamental theoretical streams, including (a) motivational perspectives (e.g., self-determination theory; Deci and Ryan, 2000), (b) the job demands-resources (JD-R) model (Bakker and Demerouti, 2017), and (c) contingency and contextual theories of HRM (Jackson et al., 2014). They are criticized as being western and post-industrial in their bias, and pay little concern to high-reliability organizations (HROs), in which reliability, control, and collective safety take precedence over individual autonomy (Weick and Sutcliffe, 2001). There are other moderators in the oil servicing situation in Nigeria: inadequate technological infrastructure, cultural factors (high power distance, collectivism), and rotational/shift-based work (Akaighe et al., 2025; Gbajumo-Sheriff et al., 2021; Onafalajo and Ejo-Orusa, 2020). The main contribution in the paper is a unified contingent framework which re-conceptualizes FWAs as not universally effective but as conditional effectiveness towards organizational efficiency, which in this case is defined multidimensionally as productivity, adaptability, cost-effectiveness, reduced downtime, and responsiveness to the industry-specific environment (Kaplan and Norton, 1996; applied to industry setting). Efficiency is a result of an organization level that is affected by individual-level mechanisms (engagement, burnout reduction) pooled together and that is moderated by contexts. The outline will be as follows: The conceptual definitions and the introduction of FWAs in global and Nigerian oil/gas settings. Second, critical synthesis of relevant theories, that is, with an emphasis on contradictions and blind spots. Third, creation of the proposed framework with testable propositions and conceptual model. Lastly, theoretical implications, practice implication in the oil servicing industry in Nigeria, constraints, and research prospects are indicated. This review facilitates the convergence of global theory and localized contingencies, making it a contribution to the HRM scholarship in the emerging market, high-stakes industries, and gives it a premise to conduct empirical tests, which are contingent on their contexts.

2: Conceptual Foundations

Flexible work arrangements (FWAs) is defined as the policy and practices that allow employees to have different levels of influence over time, place, and the nature of performing tasks other than the strict, office-centered schedules. The most common ones are flextime (adjustable start/end time with the regular workdays remaining the same), compressed workweeks (longer working days but fewer working days), telework/remote work (working outside the office, usually at home), and hybrid arrangements (alternating onsite and remote days) (Allen et al., 2015; Kossek and Lautsch, 2018). These processes aim at promoting staff independence, work-

life balance, and flexibility of the organization, but the appropriateness of these mechanisms is strongly dependent on the nature of jobs, industry needs, and environmental factors. The concept of organizational efficiency is multidimensional, at the firm level in this theoretical review. It encompasses productivity (output/inputs and productivity with regard to tasks, operational effectiveness), adaptability and responsiveness (ability to adapt to volatility, change of regulation, or external disruption), cost-effectiveness (overheads, facilities utilization, and losses due to absentees) and sustained performance in high stakes environment (Neely et al., 2005; based on Kaplan and Norton, 1996). Efficiency in high-reliability systems such as oil servicing where a failure by an individual or the system has dire consequences further incorporates safety compliance, continuity in knowledge and collective reliability (Weick and Sutcliffe, 2001). In this way, efficiency can be viewed as a combined organizational performance generated through individual-level processes (e.g., engagement, burnout mitigation), and conditioned by an adjustment to the context. FWAs are associated with the increase in efficiency through the following paths worldwide: high levels of engagement, reduced burnout, and resource optimization (Gajendran and Harrison, 2007; Bloom et al., 2015). It has been found through meta-analytic evidence that small-to-moderate positive correlations between performance indicators exist based on the implementation fidelity, managerial-support, and job-role-compatibility (de Menezes and Kelliher, 2019). The oil servicing industry of Nigeria, which comprises of specialized providers of drilling support, engineering, maintenance, and other ancillary services to upstream operators, has a bi-polar workforce, with field/rotational employees (who are required to be onsite or offshore due to safety and continuity) and office-based administrative, planning, or support employee jobs (better accommodated to flextime or hybrid work or selective telework) (Jolaolu, 2020; Ogbu et al., 2024). Empirical evidence of Rivers and Delta States shows that selective FWAs are associated with increased performance, adaptability, teamwork, and work-life balance proxies in positions that are not operational (Georgewill, 2023; Workplace Flexibility and Employee Performance, 2025). Rotational shifts already incorporate some kind of temporal flexibility (long off-times), but often increase stress, family disturbance, and exhaustion (Jolaolu, 2020). The contextual barriers can be divided into infrastructural lack (unstable power and broadband in the Niger Delta), security risks (mobility risks), strict safety/regulatory requirements (obligatory onsite presence when performing hazardous work), and cultural elements (high power distance to promote direct control, collectivist focus on group cohesion) (Akaighe et al., 2025; Gbajumo-Sheriff et al., 2021; Atiku et al., 2020). The future of the post-pandemic support functional hybrid pilots is promising but demonstrates the danger of disconnection between teams and the creation of knowledge holes (Ogbu et al., 2024). Such an atmosphere is clearly distinct to Western knowledge-work suppositions, dominant in FWA scholarship, where individual autonomy is paid off in obvious benefits. Universalist claims are negligent of the high-reliability imperatives (control and presence to ensure safety) and the realities of developing economics (infrastructure, culture). Motivational theories can be excessively optimistic about the benefits of autonomy, JD-R models are more effective at explaining the benefits of resource-buffering, underestimate the moderators, and contingency approaches are essential in explaining conditional efficiency results.

Comparison of Flexible Work Arrangement (FWA) Forms in the Nigerian Oil Servicing Situation.

FWA Type	Feasibility in Oil Servicing Firms	Key Constraints	Potential Efficiency Impact
Flexitime	High in office-based planning, engineering, administrative, and procurement jobs; low to medium in shift/field jobs	fixed presence needs of safety/regulatory continuity across firms limit overall impact of changes on the firm on overall operations	High: Enhanced work-life balance, reduced absenteeism, involvement in support jobs; low to medium: The shift/field workload, fixed presence needs of safety and regulatory regulations, and the continuity of operations across firms limit the overall impact of the change on the firm on overall operations
Telework / Remote Work	Medium in data analysis, reporting, procurement, HQ support, and non-sensitive administrative work; very low in field/technical/on-site work	Unreliable electricity and internet in Niger Delta; harsh data-security and regulatory controls; pathetic digital infrastructure; hindrance to real-time knowledge exchange	do hamper all three impact areas; hamper real-time knowledge sharing; hamper collaborations with less collaboration; hamper safety oversight
Hybrid	Administrative and support functions, emerging; scarcely operational cores (e.g. rig-site, maintenance, drilling support)	—	Moderate to positive: Indicates flexibility and responsiveness, talent retention and morale; limits posed by the risk of remote-on-site team disconnection.
Compressed Workweeks	Middle ground in response to current rotational/shift patterns (e.g., longer on-off cycles)	work-family conflict in longer shifts; high safety risk during the longer time in intensive periods onsite exposures	possible cost savings, and down

These differences explain why a contingent lens is better than blanket application of FWAs in the oil servicing industry of Nigeria whereby universal advantages experienced in Western knowledge-based work environments are altered, and in certain instances, reversed by industry-related reliability requirements, structural realities and cultural elements.

3: Theoretical Review & Synthesis

It is a critical synthesis of three main theoretical streams of the flexible work arrangements (FWAs) and organizational efficiency that are (1) motivational theories focusing on self-determination theory (SDT), (2) the job demands-resources (JD-R) model, and (3) contingency perspectives in the field of HRM, specifically its application to high-reliability organizations (HROs). These streams are subjected to their explanatory strength, limitations and applicability to the oil services context of Nigeria, which is described as being safety-critical, rotational, infrastructural constrained, and being of a hierarchical nature in terms of culture.

Motivational Approaches: Self-Determination Theory (SDT).

SDT assumes that people get most motivated when three fundamental psychological needs are met, including autonomy (volitional engagement), competence (mastery/efficacy), and relatedness (social connection), which promotes autonomous motivation (intrinsic or fully internalized extrinsic) over the controlled ones (externally or internally regulated) (Deci and Ryan, 2017; Gagné and Deci, 2005). Work-related FWAs (e.g., flextime or hybrid ones) may be used to promote autonomy by providing temporal/spatial choice, which increased intrinsic motivation, engagement, and performance (Gagné, 2022; McAnally & Hagger, 2024). Growth in motivation is associated with greater quality of effort, creativity and persistence whereas need satisfaction controls burnout and turnover (Deci et al., 2017). It has been empirically extended that FWAs meet the autonomy needs in flexible situations, resulting in improved well-being and productivity (Winkler-Titus et al., 2025; Gagné et al., 2022). Nevertheless, the individual volition of SDT presupposes the settings that promote self-supported behavior- usually Western and post-industrial settings. In low-trust contexts such as oil servicing, where the common good takes precedence over the will (e.g. an obligatory onsite presence when hazardous work is necessary), autonomy can erode relatedness (cohesiveness within the team) or skill level (the risk of skill sharing in remote work) (Ogbu et al., 2024). High power distance and collectivism in Nigeria may also reduce the impact of autonomy, that is, employees prefer hierarchical leadership to self-direction (Akaiqhe et al., 2025). Therefore, SDT enlightens motivation path but does not consider contextual contingencies that might make FWAs maladaptive.

Job Demands- Resources (JD-R) Model.

The JD-R model contrasts job demands (things that need a continued effort which might result in strain) with job resources (things that help to achieve the goals, buffer demands, or even grow) (Bakker and Demerouti, 2007; Demerouti et al., 2014). Dual processes are introduced: the demands initiate health impairment (e.g., exhaustion), and the resources motivate (e.g., engagement) (Schaufeli, 2017). FWAs are resources, which facilitate commute demand, work family conflict, and control, hence facilitates engagement and efficiency (Jaß et al., 2024; Scholze et al., 2024). In hybrid/remote conditions, such resources as autonomy or support alleviate the conditions of isolation, but ineffective infrastructure can transform flexibility into demands (e.g., tech overload, blurring of boundaries) (Demerouti and Bakker, 2023). The implications of the JD-R extensions to crises (e.g., pandemics) are that the dynamic interactions are important: the demands increase (uncertainty), whereas the outcomes are buffered by the resources (organizational support) (Li et al., 2025). The JD-R model can be used in the oil servicing sector of Nigeria, where rotational shifts create the demands of fatigue and separation and selective flexible work arrangements (FWAs) like flextime in administrative jobs and enhance work-life balance and responsiveness (Ogbu et al., 2024). Nevertheless, the model is not without flaws which include the fact that it is not sensitive of the situation. The control and safety requirements in high-reliability organizations (HROs) can override the advantages of flexibility and the model does not fully consider the cultural factors such as collectivist norms which increase the significance of relatedness (Bakker and Demerouti, 2017).

Contingency Perspectives in HRM and High-Reliability Organizations

The contingency theory holds that HRM practices (such as FWAs) are not universally effective; instead, they require compatibility (fit) between practices and situational considerations, i.e. strategy, technology, culture, environment (Opara & Waheduzzaman, 2025). The designation of

reliability in HROs (e.g., oil/gas operations) entails the preoccupation with failure, aversion to simplification, operations sensitiveness, expertise deference, and resilience (Roberts, 1990; LaPorte, 1991). FWAs should align with the following principles: blanket remote work can damage knowledge loss or safety failures, whereas contingent application (hybrid in support roles) can make it more flexible, without damaging its reliability (Griffin et al., 2014). Universalism is criticized in contingency HRM, which proposes best fit instead of best practice (Boxall and Purcell, 2000). The Nigeria oil servicing industry is concerned with infrastructural preparedness, job category (field vs. office), power distance, and regulatory/safety imperatives (Ogbu et al., 2024). This theory of HRO carries further: flexibility should be without diminishing group mindfulness and frontline expertise (Weick and Sutcliffe, 2001).

Synthesis and Critical Gaps

A comparative description of the strengths and weaknesses:

Theoretical Stream	Core Mechanism	Predicted FWAs–Efficiency Link	Strengths in Oil Servicing Context	Key Limitations/Gaps in Context
Self-Determination Theory	Need satisfaction + → autonomous motivation	+ engagement, volition	via Explains autonomy in admin roles	Overlooks safety overrides, cultural hierarchy
JD-R Model	Resources buffer demands; dual processes	+ engagement; - strain	Captures hybrid buffering fatigue	Underplays reliability demands, cultural fit
Contingency/HRO	Fit with context (tech, reliability)	Contingent (conditional positive)	Essential for high-stakes, developing settings	Lacks integration with motivational mechanisms

All these theoretical streams lead to the knowledge that there are conditional benefits of flexible work arrangements (FWAs). FWAs can be increased by motivation (according to the self-determination theory, SDT) and resource buffering (in accordance with the job demands-resources model, JD-R), though they only increase efficiency when they are relevant to the particular situation (according to the contingency theory and high-reliability organizations, HRO). The universalist assumptions do, however, fail when applied to the oil servicing industry in Nigeria, where issues like the lack of infrastructure, safety needs along with the collectivist culture remediate the anticipated impacts of FWAs. This shows that there is a gap in the literature, because SDT and JD-R are mainly concerned with individual psychological mechanisms, whereas the contingency theory and HRO ones are more concerned with structural fit. However, the interaction of those factors in high-reliability and emerging-market contexts has not been studied to produce a comprehensive framework and, thus, a gap in the theoretical knowledge of FWAs in these industries is evident.

4: Theoretical Development

Based on the synthesis in section 3, this section constructs a combined contingent theoretical framework which re-conceptualizes the association between flexible work arrangements (FWAs)

and organizational efficiency in the oil servicing companies in Nigeria. The framework combines motivational processes of the self-determination theory (SDT) with resource-buffering processes of the job demands-resources (JD-R) model and contextual fit ideas of contingency and the high-reliability organization (HRO) perspectives. It assumes that the effect that FWAs have upon organizational efficiency is mediated mainly via psychological and behavioral mediating mechanisms at the individual level, which compound to firm level outcomes, however, highly moderated by contextual contingencies that are unique to high reliability industries in developing economies. Proposed Integrated Contingent Framework The main hypothesis is that FWAs will have a conditionally positive impact on organizational performance, mediated by employee engagement and decreased burnout, and moderated by four critical contingencies: (1) readiness of technological infrastructure, (2) type of role (office/support vs. field/operational), (3) cultural fit (power distance and collectivism) and (4) reliability/safety requirements of HROs. The framework functions in the following way:

► FWAs can be considered as job resource (JD-R) and autonomy/competence proponents (SDT), alleviating some demands (e.g., commute stress, work-family conflict) and fulfilling psychological needs, and thus increasing engagement and reducing burnout.

All these changes at individual levels combine into the results of organizational efficiency: increased productivity and flexibility (engaged employees), cost-effectiveness (less absenteeism/turnover), and responsiveness (decision-making during volatile periods on the oil market).

But the strength and direction of such paths are determined by suitability to contingencies. Bad fit (e.g., full tele work in field jobs with bad infrastructure) may turn FWAs to needs, and decrease efficiency by isolating, endangering safety, or disaggregating knowledge.

Description Conceptual Model (Include in the manuscript: See below figure). Suggested caption: Figure 1. Combined Contingent Model of Flexible Work practices and Effectiveness in the oil servicing companies in Nigeria.)

► Left hand side: Comprehending flextime, telework, hybrid and compressed weeks as antecedent.

► Middle: Mediators: Employee Engagement (positive path), Burnout (negative path).

► Right side: Little program flexibility (complex outcome: productivity, flexibility, cost-efficiency, less downtime).

► Moderators of the relationship between the FWA and the mediators (surrounding the FWA path):

► Technological Infrastructure Preparedness (high vs. low)

► Office / support vs. Field / operational Type

► Cultural Alignment (low/high power distance/collectivism)

► Reliability/Safety Requirements (high in HRO situation)

Arrows: Solid positive between FWAs and Engagement; solid negative between FWAs and Burnout; positive between Engagement and Efficiency; and negative between Burnout and Efficiency. Arrows (dashed moderator arrows) that cross over the FWA → mediators paths.

Testable Propositions

1. P1: Mediation through Engagement and Burnout: Selective adoption of FWAs (especially flextime and hybrid during office/support positions) has a positive association with organizational efficiency in terms of employee engagement and reduced burnout. Rationale FWAs meet the autonomy and competence needs (SDT) and act as resources that protect demands (JD-R), resulting in increased engagement (vigour, dedication, absorption) and reduced exhaustion/emotional depletion. This can be aggregated among employees, which results in gains at firm level in terms of productivity, responsiveness and cost savings (e.g., lower facility overheads, less turnover costs etc.) (Gagné et al., 2022; Bakker et al., 2023).
2. P2: Moderating Role of Technological Infrastructure Readiness: The negative influence of FWAs on engagement and positive influence on burnout are greater when there is technological infrastructure readiness high (reliable power, broadband, secure digital tools) and less or opposite when there is readiness is low.

Rationale: In the Niger Delta of Nigeria, lack of infrastructure transforms the possibility of telework/hybrid into necessities (tech frustration, loss of connectivity), and weakens the need satisfaction and resource buffering. Extreme preparedness allows a smooth collaboration process across borders, which only increases the effectiveness (Onyekwere, 2024; Osei, 2024).

3. P3: Moderating Role Type: The positive FWAs-efficiency association (through mediators) between office based/support roles and field/operational roles is higher and lower respectively.

Rationale: There is a significant degree of flexibility associated with office work without impacting the safety or continuity of knowledge; fieldwork requires face-to-face work and real-time communication, which means that FWAs cannot coincide with the rules of HRO reliability (Egila et al., 2025; Ogbu et al., 2024).

4. P4: Moderating Role of Cultural Alignment The positive relationship between FWAs and engagement is less strong in high power distance and collectivism (prevalent in the Nigerian organizations), unless supervisors change their practices to accommodate autonomy without relational control.

Rationale: Employees having high power-distance cultures might feel that flexibility removes leadership guidance and, thus, reduces the satisfaction of autonomy; collectivism strongly emphasizes group cohesion over personal choice, which increases relatedness needs that remote work can destroy (Adisa et al., 2024; Akaighe et al., 2025).

5. P5: Moderating Role of Reliability/Safety Demands In high-reliability settings (mandatory safety measures, giving deference to the experts, obsessions with failure), the efficiency benefits of FWAs depend on designs that maintain collective mindfulness and knowledge-sharing (e.g. hybrid with mandatory onsite days by the critical teams) as opposed to complete remote designs.

Rationale: HRO principles require sensitiveness to processes and unwillingness to simplify-attributes that are lost by physical distance or decreased face-to-face deference. Reliable contingency FWAs allow improving the flexibility without jeopardizing the safety (Egila et al., 2025).

6. **P6:** General Contingent Efficiency Outcome Selective and context-appropriate FWAs (hybrid/flextime to support roles, and infrastructure investment to back the change, and culturally sensitive supervision) have net positive effects on organizational efficiency within Nigerian oil servicing companies, but blanket or misaligned adoption (e.g., full telework to all positions) has no net effect or net adverse effect.

Rationale: Combining SDT, JD-R and contingency/HRO views indicates that increases in efficiency by means of the fit are necessary; that the requirements are enhanced by misfit augmenting demands, depleting motivation and the reliability.

This framework goes a step further to develop theory by:

- ▶ Building the gap between individual psychological processes (SDT, JD-R) and structural contingencies (HRO, contingency HRM).
- ▶ Categorically covering the situation of the Global South, high-reliability, where Western assumptions fail.
- ▶ Formulating empirically testable propositions to be refuted or confirmed later (surveys, longitudinal designs, multi-level modelling) in Nigeria and other places (e.g., other oil/gas industries in Africa).

5: Discussion & Implications

The standard contingent framework that has been formulated during this theoretical review has a number of interesting implications to the field of human resource management and organizational theory especially in high-reliability industries in developing economies. The framework, which combines self-determination theory, the job demands-resources model, and the contingency/high-reliability organization perspectives, outgrows the Universalist assumptions according to which FWAs always increase efficiency. Rather, it shows that the increase in efficiency is contingent on situational fit- technological infrastructure, type of role, cultural fit and reliability. This fills an existing literature gap, most of the FWA studies are still rooted in the Western, knowledge-based environments and therefore does not consider the safety-demanding, resource-constrained environments, like the oil servicing industry in Nigeria.

Theoretically, the model builds upon contingency HRM by bringing in the principles of HRO, demonstrating that reliability imperatives (e.g. collective mindfulness, deference to expertise) can become boundary conditions that are capable of reversing the motivational advantages of autonomy and resource buffering. It also fills in SDT and JD-R by defining the ways that the psychological needs and dual processes should work differently in the presence of infrastructural deficits or high power distance. This integration is based on demands of more context-sensitive theorizing of the emerging markets and high-stakes industries. However, in contrast to the previous models that view FWAs as a best practice, this framework focuses on best fit, which emerges with six testable propositions to support multi-level, longitudinal empirical studies.

Practical Implications of the study to the Nigerian oil servicing firms.

The framework can be used by managers in indigenous and multinational oil servicing companies in the Niger Delta to act upon guidance. Role-differentiated selections of FWAs, which are mainly hybrid and flextime in administrative, planning, procurement, and data-analysis functions, can achieve efficiency benefits via increased involvement and reducing burnout, but only in case technological readiness is considered. Companies must focus on

strategic investments in quality broadband, emergency power, and secure collaboration systems and expand remote alternatives. Field and operational jobs, though, must be allowed to maintain mainly onsite or strictly controlled hybrid to protect safety measures and knowledge base.

Supervisory training becomes critical. Leaders need to evolve dictatorial, high power-distance ways of leadership to supportive, relational attentive management that embraces collectivist principles without sacrificing autonomy. The propositions can be tested in real time through pilot programs in the HQ/support departments and the presence of clear metrics of performance and feedback loops. Organizations that coordinate FWAs with the current rotation models (e.g., compressed weeks of office workers) can also save on turnover rates and cost of recruitment in the face of talent shortages that affect the industry at present. Comprehensively, contextually intelligent implementation is capable of making organizations more agile and more cost-effective without reducing the non-negotiable reliability requirements of the sector.

These recommendations are supported by the empirical evidence of Rivers State firms: the selective remote practice has been associated with a better employee performance and work-life balance in case of the technological and cultural support. Companies that overlook contingency will face the two-sided sword phenomenon initially positive motivation lost in the isolation, fatigue, or safety failure.

Limitations

This paper does not show primary empirical information as it is a purely conceptual/theoretical review. The propositions, although logically derived and based on the existing theories, will have to be tested strictly in the context of various firms, timeframes, and measurement methods (e.g. objective efficiency measures, e.g. downtime reduction, project completion rates, and the frequency of safety incidents and perceptual measures). The framework is specific to the oil servicing environment of Nigeria and might not directly apply to other highly-reliable industries (e.g. aviation, nuclear) or other developing economies without modification. Moderators are focused on cultural and infrastructural aspects but in case of individual differences (e.g., digital literacy, personality, gender) and intersectionality, the focus is only indirect. Lastly, the model presumes that the individual mediators are aggregated linearly, to organizational outcomes; the processes could be dynamic, non-linear, or reverse-causal.

Future Research Agenda

A number of promising directions are seen. To test the complete mediated-moderated model with results obtained with the help of mixed methods, i.e., surveys and objective results on the basis of performance and qualitative data on the presentation of managers and field employees, longitudinal and multi-level research is needed first. Second, a cross-country (e.g., between African oil-producing countries such as Angola and Ghana) or an international (e.g., between the local and the multinational companies) research would help in understanding the external validity of cultural and infrastructural contingencies. Third, the causal relationship between experimental or quasi-experimental designs (e.g., pre-after pilot implementations) may be used to determine the best FWA settings. Fourth, emerging variables in the future work that might include AI-enabled monitoring tools, cyber security threats in remote configurations, and sustainability/ESG pressures that continue to define the operations of the oil-sector should be factored into future work. Lastly, investigators would be able to study the boundary conditions at the team or organizational level- e.g. the effect of shared leadership or collective efficacy on FWA on HROs. With such directions, academicians will be able to build the existing concept

base into evidence-based, sound theory that guides scholarly rhetoric and management practice in unstable, high-stakes sectors in the Global South.

6: CONCLUSION

This theoretical review redefines flexible work arrangements (FWAs) as a conditional effective tool of organizational efficiency in the oil servicing companies in Nigeria. Combining self-determination theory, the job demands-resources model, and contingency/high-reliability organization perspectives, the proposed framework shows that FWAs lead to increased efficiency mainly due to better employee engagement and less burnout, but these advantages can be observed only under the conditions that technological infrastructure, role type, cultural fit, and reliability requirements are resolved. The model fills the theoretical gap in the existing literature which has predominately resulted in fragmented and context sensitive results of the available empirical investigations or Western-centric Universalist propositions. Blanket FWA implementation in high-reliability, infrastructure-constrained, and hierarchical (cultural) contexts like the oil servicing industry of the Niger Delta is prone to undo the achievement and risk safety, knowledge distribution, and overall performance.

The main contribution of the framework is its clear connection between individual psychological processes with structural and contextual moderators, which produced six testable propositions that can be used in multi-level, longitudinal, and mixed-methods studies. It applies contingency HRM theory to high-stakes emerging-market sectors and offers a starting point to scholars who may be examining similar sectors in Africa and the Global South. In practice, the model provides managers in the indigenous and multinational oil servicing companies with an instructive, practical idea of selective and role-differentiated application of hybrid and flextime to support functions and maintain a presence on site where safety and reliability are not negotiable.

Contextually intelligent workplace flexibility is a strategic priority and not a peripheral HR policy because Nigeria is facing both talent shortages, energy transition, and digital transformation pressures that the oil and gas industry is having to grapple with. Further empirical confirmation of the framework will not just enhance academic insights into the FWAs under volatile conditions, but also allow organizations to gain sustainable high efficiency levels without compromising the operational excellence required by high-reliability tasks.

Altogether, this review changes the academic discussion on whether FWAs work, to when, how, and in what specific circumstances they can produce better organizational results. It is hoped that the proposed contingent model will be tested, refined, and extended by scholars and practitioners to contribute to the further development of the theory and practice in one of the most important sectors of the African economy.

REFERENCES

1. Adisa, T. A., Mordi, C., Akanji, B., & Ajonbadi, H. A. (2024). Seen but not heard: The voice of women at work and the mediating role of culture. *The International Journal of Human Resource Management*. Advance online publication.
2. Akaighe, G., Oruh, E. S., Mordi, C., & Damoah, I. S. (2025). Too stressed to be psychologically present at work? Employee job stress and the implication of high-power distance culture: Empirical evidence from Nigeria's employment terrain. *Human Resource Development International*. Advance online publication.

3. Akintokunbo, O. O., Obomanu, F. K., & Akintokunbo, O. Y. (2020). Assessing the influence of flexible-work-option as a precursor of work life balance on employee productivity of logistics companies in Rivers State, Nigeria. *British Journal of Management and Marketing Studies*, 3(1), 55–66.
4. Allen, T. D., Golden, T. D., & Shockley, K. M. (2015). How effective is telecommuting? Assessing the status of our scientific findings. *Psychological Science in the Public Interest*, 16(2), 40–68.
5. Allen, T. D., Johnson, R. C., Kiburz, K. M., & Shockley, K. M. (2013). Work–family conflict and flexible work arrangements: Deconstructing flexibility. *Personnel Psychology*, 66(2), 345–376.
6. Atiku, S. O., et al. (2020). Perceptions of flexible work arrangements in selected African countries during the coronavirus pandemic. *South African Journal of Business Management*, 51(1), Article a1846.
7. Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, 22(3), 309–328.
8. Bakker, A. B., & Demerouti, E. (2017). Job demands–resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology*, 22(3), 273–285.
9. Bakker, A. B., Demerouti, E., & Sanz-Vergel, A. (2023). Job demands-resources theory: Taking stock and looking forward. *Annual Review of Organizational Psychology and Organizational Behavior*, 10, 1–28.
10. Bloom, N., Liang, J., Roberts, J., & Ying, Z. J. (2015). Does working from home work? Evidence from a Chinese experiment. *The Quarterly Journal of Economics*, 130(1), 165–218.
11. Boxall, P., & Purcell, J. (2000). Strategic human resource management: Where have we come from and where should we be going? *International Journal of Management Reviews*, 2(2), 183–203.
12. Deci, E. L., Olafsen, A. H., & Ryan, R. M. (2017). Self-determination theory in work organizations: The state of a science. *Annual Review of Organizational Psychology and Organizational Behavior*, 4, 19–43.
13. Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227–268.
14. de Menezes, L. M., & Kelliher, C. (2019). Flexible working, individual performance, and employee attitudes: Comparing formal and informal arrangements. *Human Resource Management*, 58(2), 149–169.
15. Demerouti, E., & Bakker, A. B. (2023). Job demands-resources theory in times of crises: New propositions. *Organizational Dynamics*, 52(2), Article 100957.
16. Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2014). The job demands-resources model of burnout. *Journal of Applied Psychology*, 86(3), 499–512.
17. Egila, A. E., Kamal, M. M., Mangla, S. K., Rich, N., & Tjahjono, B. (2025). Highly reliable organisations and sustainability risk management: Safety cultures in the Nigerian oil and gas supply chain sector. *Business Strategy and the Environment*, 34(2), 2680–2701.

18. Gagné, M. (2022). Understanding and shaping the future of work with self-determination theory. *Nature Reviews Psychology, 1*, 378–392.
19. Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior, 26*(4), 331–362.
20. Gagné, M., et al. (2022). Understanding and shaping the future of work with self-determination theory. *Nature Reviews Psychology, 1*, 378–392.
21. Gajendran, R. S., & Harrison, D. A. (2007). The good, the bad, and the unknown about telecommuting: Meta-analysis of psychological mediators and individual consequences. *Journal of Applied Psychology, 92*(6), 1524–1541.
22. Georgewill, I. A. (2023). Work life balance and employee commitment in indigenous oil servicing companies in Rivers State. *Journal of Human Resource & Leadership, 8*(2), 67–82.
23. Gbajumo-Sheriff, M., Udobi-Owoloja, C., & Ogunmakinwa, O. (2021). COVID-19 in Nigeria: Impact on work and workers. *Unilag Journal of Business, 7*(2), 1–18. Griffin, M. A., et al. (2014). A conceptual framework and practical guide for assessing fitness-to-operate in the offshore oil and gas industry. *Accident Analysis & Prevention, 63*, 1–10.
24. Jackson, S. E., Schuler, R. S., & Jiang, K. (2014). An aspirational framework for strategic human resource management. *Academy of Management Annals, 8*(1), 1–56.
25. Jaß, L., et al. (2024). Job demands and resources perceived by hybrid working employees in German public administration: A qualitative study. *BMC Public Health, 24*, Article 1234.
26. Jolaolu, I. O. (2020). *Work-life balance of rotational workers in the Nigerian energy sector* [Doctoral dissertation, Walden University].
27. Kaplan, R. S., & Norton, D. P. (1996). *The balanced scorecard: Translating strategy into action*. Harvard Business Press.
28. Kniffin, K. M., Narayanan, J., Anseel, F., Antonakis, J., Ashford, S. P., Bakker, A. B., ... Vugt, M. v. (2021). COVID-19 and the workplace: Implications, issues, and insights for future research and action. *American Psychologist, 76*(1), 6
29. Kossek, E. E., & Lautsch, B. A. (2018). Work-family flexibility for whom? Occupational status and work-life options in organizations. *Community, Work & Family, 21*(2), 145–167.
30. LaPorte, T. R. (1991). Working in practice but not in theory: Theoretical challenges of "high-reliability organizations". *Journal of Public Administration Research and Theory, 1*(1), 19–47.
31. Li, Y., et al. (2025). Evolving the job demands-resources framework to JD-R 3.0: The impact of after-hours connectivity and organizational support on employee psychological distress. *Acta Psychologica, 245*, Article 104012.
32. Neely, A., et al. (2005). Performance measurement system design: A literature review and research agenda. *International Journal of Operations & Production Management, 25*(12), 1228–1263.
33. Ogbu, A. D., et al. (2024). Remote work in the oil and gas sector: An organizational culture perspective. *GSC Advanced Research and Reviews, 20*(1), 188–207.

34. Onyekwere, L. A. (2024). Digital divide in remote work among employees and organizational effectiveness in South-South Nigeria. *South Asian Research Journal of Humanities and Social Sciences*, 6(4), 142–155.
35. Opara, S., & Waheduzzaman, W. (2025). The universal, contingency or configurational HRM approaches for organizational performance: Lessons from Australian performing arts. *German Journal of Human Resource Management*, 39(1), 45–68.
36. Roberts, K. H. (1990). Some characteristics of one type of high reliability organization. *Organization Science*, 1(2), 160–176.
37. Schaufeli, W. B. (2017). Applying the Job Demands-Resources model: A ‘how to’ guide to measuring and tackling work engagement and burnout. *Organizational Dynamics*, 46(2), 120–132.
38. Scholze, A., et al. (2024). The job demands-resources model as a theoretical lens for the bright and dark side of digitization. *Computers in Human Behavior*, 152, Article 108012.
39. Weick, K. E., & Sutcliffe, K. M. (2001). *Managing the unexpected: Assuring high performance in an age of complexity*. Jossey-Bass.
40. Winkler-Titus, N., Gerber, C., & Ngalo, V. (2025). Well-being of remote workers: Work characteristics and challenges. *SA Journal of Human Resource Management*, 23, Article a2876.
41. Workplace Flexibility and Employee Performance of Oil and Gas Firms in Rivers State, Nigeria. (2025). *Research Journal of Management Practice*, 5(1), 78–92.

THE LIFE AND LITERARY JOURNEY OF MAHESH DATTANI

Shilpa*; Dr. Renu Sharma**

*Research Scholar,
Desh Bhagat University, Mandi Gobindgarh
INDIA

**Associate Professor & Incharge and Languages,
Faculty of Social Sciences
Desh Bhagat University, Mandi Gobindgarh,
INDIA

DOI: **10.5958/2278-4853.2026.00016.0**

ABSTRACT

Mahesh Dattani who grew up in a middle-class Gujarati household of Bangalore, imparts to his plays the sensibilities of contemporary urban India where the traditions pit against the aspirations that are modern in nature. Mahesh Dattani have become notable voices of modern Indian drama – as far as representing marginalised communities is concerned. Dattani's official debut into the theatre was rather late, but once he had decided on theatre, his passion to learn was frantic. After spending some years in the family business, he decided to seriously focus on his passion in dance and drama. Critical reactions about Dattani's work have largely agreed with his experiment in theatre and his daring to write about controversial issues in the society. His plays have been conducted in different theoretical approaches, such as gender studies, postcolonial theory, and performance studies. Dattani's influence goes out of his own creative work as he becomes a teacher, mentor, and a spokesperson of contemporary Indian theatre.

KEYWORDS: *Mahesh Dattani marginalized communities, theatre, traditional, Themes, gender, sexuality, family relations, social prejudices, human relationship, Hindu, Muslim, dramatic, technique, language, dialogue, symbolism, metaphor.*

INTRODUCTION:

The works of Mahesh Dattani are mainly based on the urban settings and on the issues of gender identity, sex and family life. Mahesh Dattani who grew up in a middle-class Gujarati household of Bangalore, imparts to his plays the sensibilities of contemporary urban India where the traditions pit against the aspirations that are modern in nature. His studies of the English literature and the dramatics as his profession have influenced his artistic vision greatly allowing him to create complex stories that are contrary to the current societal norm and can be understood by different people. Mahesh Dattani have become notable voices of modern Indian drama – as far as representing marginalized communities is concerned. The biographical information provided here is not only informative but also crucial contexts for reading the thematic issues and the narrative strategies of their plays.

Mahesh Dattani was born in Bangalore, which now is Bengaluru, on August 7 1958. He is from a Gujarati family who had migrated from Gujarat to Karnataka. His family background gave him an experience that mixed the conventional values of the household of Gujarati along with the

cosmopolitan culture of Bangalore. This cultural bifurcation would later reflect on his dramatic writings, specifically on discussions on identity and belonging. His father Laxminarayan Dattani, was a business person who dreamt of having his son succeed him on his business as was the tradition. This expectation early created a tension in Dattani's life to reconcile between family obligations and his personal aspirations in what became a recurring theme of many of his plays, especially in "Dance like a Man".

His early years were influenced by his education in Baldwin Boys' High School, one of the best schools in Bangalore, India, through which he was in touch with English literature and the theatrical arts from the West. It was incubated through school plays, cultural activities, even if the passion for theatre was not initially accepted by the family. Having finished his schooling, he went on to earn a Bachelors' degree in History, Economics and Political Science from the St. Joseph's College, Bangalore. The academic surrounding in St. Joseph's with focus on critical thinking and analytical skills molded Dattani's intellectual style, equipping him with methods to analyze social setups and human behavior.

While in college, Dattani started to become more interested in the aspect of performing arts and taking part in different theatre plays. However after his graduation, he yielded to his family expectations and joined the family business and worked as the manager of his father's company, Latours Private Limited. This time of loyalty to the expectations of the family, while at the same time having the emotion for the arts, is a representation of the inner conflicts that most of his characters go through as they are between societal norms and individual desires. The dualism of his experience –hanging between the spheres of business and art-gave Dattani observations on the complexities of human relationships and social demands which he would later use as the materials of his dramatic work.

Education and Theatrical Training:

Dattani's official debut into the theatre was rather late, but once he had decided on theatre, his passion to learn was frantic. After spending some years in the family business, he decided to seriously focus on his passion in dance and drama. He studied classical Indian dance form, Bharatanatyam, under the tutelage of Chandrabhaga Devi and Krishna Kumar in Bangalore. Not only did this training present a greater understanding of the traditional Indian performance arts to him, this training allowed him to understand the rigid gender norms associated with the classical dance forms in which male dancers tend to fall victims to prejudice and skepticisms. His experience, being a male Dancer in an industry that was historically female dominated would later play a part in influencing incidence of his most acclaimed plays namely "dance like a man".

Dattani's inquisition of theatrical knowledge made him attend workshops and training programs on acting and direction in the early 1980s. He went to the Suryodaya Theatre Institute in Bangalore and learnt several theatrical techniques and traditions. His education in theatre was further augmented by his attendance to the workshops conducted by the reputed directors and playwrights of India as well as outside India. These various influences set the stage for his distinctive dramatic vision that integrates the Western dramatic structures with Indian content and background. The training that he received in both classical Indian dance and modern theatre gave him a lush artistic lexicon that would translate into his staging and performance.

The fact that Dattani decided to pursue post-graduate studies in the particular field of drama and theatre studies also indicated his determination to undergo professional training in theatre. This

formal education provided him with the general knowledge of dramatic theory, techniques of stages and the context of theatrical history. Such diverse trainings in classical Indian dance, contemporary methods of acting and theoretical studies, all contributed to the formation of his characteristic directoral style and dramatic senses. The juxtaposition of the traditional Indian performing arts and the Western theatrical processes in his education stands for the cultural hybridity that can be found in many of his plays in which the playwright examines the frictions between the tradition and modernity in modern-day Indian society.

Founding of Playpen and Early Theatrical Work:

Inspired by his love for theatre and need to establish a platform for the dramatical experiment, Dattani formed Playpen – a theatre branch in Bangalore in 1984. Playpen meant a lot more than just the first theatre; rather it was a great turning point in his career, as he got an opportunity to experiment in his artistic ideas, improve his directing and playwriting capabilities. Within the case of Playpen, Dattani started producing and directing plays, working with adaptation of works by the foreign playwrights like Beckett, Shaw, and Tendulkar at first. Those early productions gave him freedom to experiment with various theatrical styles and techniques and establish a reputation of innovative and fine quality performances.

Playpen soon became an influential force to be reckoned with on the theatre landscape of Bangalore, noted for its dedication to testing socially meaningful subjects and overriding the nation's traditional concept of theatre. The productions carried by the group were marked by the professional level, intelligent direction, and readiness to touch upon the topics that raised doubts. Playpen allowed Dattani to build a collaborative platform that would enable actors, directors, and technicians to join forces in order to produce meaningful theatrical performances. The workshops and training programs by the group also helped in developing theatrical talent in Bangalore, making Dattani not only a creative artist but also a devoted teacher and mentor.

Dattani's change from the direction of plays written by other authors to development of his own dramatic pieces occurred at the end of the 80s, when the writer felt himself urged to communicate his own views in original terms. His debut original play, "Where There's a Will" (1988) established the mood of his future work with its sarcastic look at the patriarchal family settings and the collision of the old values and the new wishes. The play based on the struggle for control between the dominating father and the family that tries to gain freedom from his grasp even after his death, which did happen despite his request, is a reflection how an Indian middle class family is observed keenly and how one can joke about real social problems. The play "Where There Is a Will" became a success due to which Dattani continued to write till she became one of India's prominent playwrights in English.

Major Works and Themes:

Mahesh Dattani theatrical body of works extends over three decades and covers a very broad spectrum of issues, problems and topics, but among the all things earnestly addressed by the author there are, primarily, the issues of gender, sexuality, family relations, and social prejudices. Psychological depth, complex characters and subtle analysis of human relationship are features of his plays. One of his greatest works is "Tara" (1990) – a strong play that utilizes the story of conjoined twins, a boy and a girl, whose separation via the medical operation takes place in favor of the male child. In this heart-wrenching story, Dattani carries out an expose of the underlying orientation towards male offspring in Indian society that requires sacrifices by female children.

Dattani's another milestone work, "Final Solutions" (1993) relates to the theme of the communal tensions in India. The play elaborates the prejudices present within the Hindu and Muslim communities through the story that goes up several generations of a family and against the backdrop of communal riots. Dattani calls complex narratives by presenting multiple perspectives and time periods and challenging such simple religious identity and communal harmony notions. The novel play staging whereby the audience is engaged in the communal divide, makes it a strong theatrical art that demands viewers reprimand their own biases and prejudices. "Final Solutions" won Dattani the Sahitya Akademi Award back in 1998 becoming the first English language playwright to win this award.

In "On a Muggy Night in Mumbai" (1998), Dattani blazed a trail in Indian theatre because he discussed homosexuality, and LGBTQ+ people's hardship in a world where same-sex relations are illegal and scorned with. The play is based on a group of gay men living in Mumbai, trying to negotiate for personal relationships, societal calls, and internal demons. By telling their stories, Dattani examines the effects of growing up in a heteronormative society where queer individuals have to conceal their identity and adhere to the traditional norms. The frank portrayal of homosexual relationships and the critique of hypocritical society struck right into the conservative sensibilities and opened spaces in the Indian theatre for discussions on sexuality and human rights.

One of the most popularly-performed plays by Dattani, "Dance Like a Man" (2000), explores the roles of genders and societal expectations by following the story of a Bharatanatyam dancer, a male practitioner of an expressly feminine art form in which he faces mockery and resentment. The play stretches for three generations and, through the text, we can see how gender norms are maintained and even questioned throughout a family. In the struggle of the protagonist to be a male dancer, Dattani challenges traditional perspectives of masculinity and confines of strict gender roles. The way the play has explored art, identity, and generational conflicts has had considerable success both in India and around the world with many productions being staged and a film adaptation.

Other important works by Dattani are "Bravely fought the Queen" (1997), which focuses on the hidden dysfunctionality of a normally respectable middle-class family. "Thirty Days in September" (2001), a vivid drama of child sexual abuse in families and "Seven Steps Around the Fire" (1999) – the play that points out the relegation of hijras in Indian society, that is, transgender/intersex people. These plays reflect a clear mission of Dattani to give voice to the marginalized and speak out about taboo subjects in Indian theatre, which forces people to see uncomfortable truths and re-examine the norm in society (Neela Meghan, 2007).

Theatrical Style and Techniques:

The main features of the dramatic technique Mahesh Dattani is that its original staging, psychological realism, significant usage of theatre devices to present complex social and emotional idea. Non-linear narratives from the past to the present are an integral part of his plays, showing how history and memories inform the current situation. Such temporal flexibility enables Dattani to look for ties between private histories and far larger social problems and to understand the ways in which individual lives are impacted by cultural milieus and historical events. This technique results in a multi-layered narrative in such plays as "Final Solutions" and "Thirty Days in September," which shows the long-lasting effects of trauma and prejudice from generation to generation.

The spatial dynamic is of utmost significance in Dattani's theatrical view and many of his plays contain the multi-leveled set, which represents different space or mental state. For example, in "Tara", the stage is set up in sections to reflect various periods and locations and thus romantic transitions between narratives' strands. Similarly, in "Bravely Fought the Queen," the stage is separated between the living room and the office which is a visual depiction of separation of domestic and professional spheres. Such spatial arrangements manifest Dattani's comprehension that physical environments shapes human behavior & connections, in addition to functionalities in the presentation of complex narratives.

Usage of language and dialogue in Dattani's plays captures linguistic plurality of urban India and no one switches between English and Indian languages as a matter of course depending on situation and emotional condition. This code-switching reflects the current Indian communication reality and this adds on a social class and education marker and cultural identity. Dattani's dialogue is described for its naturalism and psychological precision of capturing everyday speech so as to reveal the complexities of human relationships and the dynamics of society. That he is able to produce unique voices on different characters from varying age groups, genders and background illustrates his keen observation of human behavior as well as his war craft as a dramatist.

Through the use of symbolism and metaphor, Dattani's dramatic language is enhanced with layers of meaning to his narratives. In "Dance Like a Man", the Bharatanatyam dance is a symbol which represents creative expression, the question of gender and cultural tradition. In "Tara" physical division of the conjoined Twins is a metaphor of the social division of gender roles and expectations. These symbolic elements heighten the verisimilitude of Dattani's plays so that he is able to raise complex social issues onstage by way of suggestive images. His effective deployment of dramatic techniques produce performances that provoke critical thinking about the social set-ups around them, while at the same time entertaining the audiences .

Recognition and Critical Reception:

Mahesh Dattani's work in Indian theatre has made him attract much attention within the country as well as internationally. His highest reward was in 1998 when he got the Sahitya Akademi Award for "Final Solutions" thus becoming the first play writer in English to receive such award. This award though, from India's national academy of letters, was a watershed moment for English- language theatre in India, its staking of a presence within India's literary space. Apart from this giant award, Dattani has won several other accolades and recognitions for his theatrical work, such as the Playboy Award won for his "Dance Like a Man" and rave reviews for many of his performances.

Dattani's plays have been acclaimed for performance widely both in India and overseas in the areas of United States, United Kingdom, Canada and Australia. His works have been translated to several Indian languages helping spread it out from the English-speaking population. Particularly, the international reception of Dattani's plays has been noteworthy, which points to the positive criticism of how he manages to speak on universal human concerns allowing certain insights into modern Indian reality. His plays have found their place in the academic curricula at various universities globally as important texts for learning about the postcolonial theatre and South Asian literature.

Critical reactions about Dattani's work have largely agreed with his experiment in theatre and his daring to write about controversial issues in the society. His plays have been conducted in different theoretical approaches, such as gender studies, postcolonial theory, and performance studies. In regard to critics, they have highly appreciated his rich development of marginalized identities and the subtle examination of relations of power in Indian society. Whereas some conservative sections of the Indian society have on certain occasions, rebuked him for his bare description of taboo subjects like homosexuality and child sexual abuse, the general criticism has mostly appreciated the artistic value and social relevance of his theatrical endeavors.

Dattani's influence goes out of his own creative work as he becomes a teacher, mentor, and a spokesperson of contemporary Indian theatre. He has run workshops and directed theatrical productions all over India and abroad, thus exposing his knowledge and expertise to the up and coming theatre practitioners. His plays are examples to a new generation of Indian playwrights working in English about how theatre can address urgent social problems yet still have artistic integrity. Via all these channels of influence, Dattani has left an indelible mark on the evolution of modern Indian drama, especially to the emaciated community and the taboo topics.

REFERENCES:

1. Ambedkar, B. R. *Annihilation of Caste*. 1936. Navayana, 2014.
2. Banerjee, Aparna. "Gender Transgression in Mahesh Dattani's *Dance Like a Man*." *Indian Drama Review*, vol. 15, no. 1, 2019, pp. 140-155.
3. Bains, Tara Singh. "Caste Resistance in Devinder Kumar's *Parcham*." *Punjabi Literary Studies*, vol. 12, no. 2, 2018, pp. 85-96.
4. Bhatia, Nandi. *Acts of Authority/Acts of Resistance: Theatre and Politics in Colonial and Postcolonial India*. University of Michigan Press, 2004.
5. Bose, Brinda. "The Closet and the City: Queer Selves in Mahesh Dattani's Plays." *Gender and Performance in South Asia*, edited by Bishnupriya Dutt, Oxford University Press, 2017, pp. 45-62.
6. Breman, Jan. *Footloose Labour: Working in India's Informal Economy*. Cambridge University Press, 1996.
7. Chakravarti, Uma. *Gendering Caste: Through a Feminist Lens*. Sage Publications, 2003.
8. Chakraborty, Sreya, and Arpita Das. "Breaking the Silence: Trauma and Memory in Mahesh Dattani's *30 Days in September*." *Contemporary Drama Studies*, vol. 11, no. 3, 2015, pp. 65-82.
9. Chatterjee, Partha. *The Politics of the Governed: Reflections on Popular Politics in Most of the World*. Columbia University Press, 2004.
10. Dattani, Mahesh. *Collected Plays*. Penguin Books India, 1998.
11. *Collected Plays, Volume I*. Penguin Books, 2000.
12. *Collected Plays, Volume II*. Penguin Books, 2005.
13. *Dance Like a Man*. Penguin Books, 2006.
14. *On a Muggy Night in Mumbai*. Penguin Books, 1998.

- 15.** Seven Steps Around the Fire. Penguin Books, 2013.
- 16.** Tara. Rupa Publications, 1990.
- 17.** Thirty Days in September. Penguin Books, 2001.

SUSTAINABLE SUPPLY CHAIN RESILIENCE IN VOLATILE INTERNATIONAL MARKETS

Dr Victor Joes Obasse*

*Researcher,
Federal Ministry of Education,
Abuja, NIGERIA

DOI: 10.5958/2278-4853.2026.00012.5

ABSTRACT

The current global commercial environment has undergone a fundamental shift from a paradigm of cost-optimised efficiency to one of multi-dimensional viability. This research report investigates the convergence of sustainability and resilience, collectively defined as Sustainable Supply Chain Resilience (SSCR), within the context of unprecedented market volatility. By synthesising General Systems Theory, the Resource-Based View, and Dynamic Capabilities Theory, the study identifies how organisations can transition from reactive recovery to proactive adaptation. The analysis evaluates strategic frameworks such as the Supply Chain Operations Reference (SCOR) Digital Standard and the Triple-A model (Agility, Adaptability, Alignment) to determine their effectiveness in mitigating systemic shocks. Through a deep dive into the semiconductor, UK energy, and global agri-food sectors, the findings reveal that while resilience often necessitates initial capital expenditure, the integration of circular economy practices and digital twin simulations resolves the traditional trade-off between environmental responsibility and financial performance. The report concludes that achieving viability requires a socio-technical approach, leading toward the Supply Chain 5.0 paradigm where human-centricity and ecological stewardship are the primary drivers of long-term competitive advantage.

KEYWORDS: *Sustainable Supply Chain Resilience (SSCR), Supply Chain Viability, Supply Chain, Triple-A Capabilities, Digital Twins And Simulation, Circular Economy Integration, Socio-Technical Ecosystems, Geopolitical Territorialism, Resource-Based View (RBV), Stress Testing, Dynamic Capabilities.*

INTRODUCTION:

The Structural Fragility of Global Interdependence

The global trade landscape has transitioned into an era of perpetual disruption. For decades, the primary objective for supply chain managers was the pursuit of economies of scale, primarily achieved through cost reduction, profit maximisation, and the rigorous application of lean principles. This approach treated the world as a stable, predictable system where the "just-in-time" model could operate with surgical precision. However, the events of the last five years, ranging from the COVID-19 pandemic to the geopolitical fragmentation in Europe and the Middle East, have exposed the profound vulnerabilities inherent in these lean, high-efficiency networks.

Supply Chain Resilience (SCRES) is no longer a peripheral risk management function; it has emerged as a crucial strategic capability and the core of contemporary management. Resilience refers to a system's capacity to withstand, adapt to, and recover from unpredictable situations while maintaining control over its structure and function. Yet, in a world facing an accelerating climate crisis and shifting social values, resilience cannot be pursued in isolation. The mandate has expanded to Sustainable Supply Chain Resilience (SSCR), which demands that firms maintain minimal environmental and social impacts even while absorbing external disturbances such as natural disasters or political instability.

The bottom line is that the old trade-offs are being rewritten. Traditionally, sustainability was viewed as a "nice-to-have" or a source of added cost that might lower resilience by increasing system rigidity. Conversely, resilience was seen as expensive due to the need for "redundancy", holding extra stock or maintaining multiple suppliers. Modern evidence suggests the opposite: a lack of sustainability is a major source of risk, and a lack of resilience makes sustainable performance impossible to sustain during a crisis.

This report explores the mechanisms through which organisations build these dual capabilities. It examines the theoretical foundations that guide decision-making, the digital tools used to model risk, and the industry-specific adaptations occurring in sectors as diverse as high-tech manufacturing and energy production. Here is why this matters, the International Monetary Fund suggests that the massive restructuring of global supply chains currently underway could reduce global GDP growth by up to 1.5 percentage points annually while raising consumer prices. Understanding how to navigate this volatility is not just an operational challenge; it is a prerequisite for national and corporate survival.

Pillar of SSCR	Operational Definition	Strategic Objective
Economic	Financial flow management and cost-effective recovery	Long-term profitability and shareholder value protection
Environmental	Circularity and resource-market volatility mitigation	Carbon neutrality and nature-positive operations
Social	Human-centricity and stakeholder alignment	Workforce retention, safety, and community stability
Resilience	Absorptive and adaptive capacity during shocks	Continuous operation and "bounce-forward" evolution

Theoretical Foundations of Resilience and Sustainability

To understand how a supply chain survives a volatile market, we must first understand the theoretical lenses that explain how firms create value.

General Systems Theory (GST) and the Holistic View

At its heart, a supply chain is not a linear chain but a complex adaptive system. General Systems Theory (GST) provides the framework for understanding this complexity. From a GST perspective, the supply chain is an open system that takes inputs, such as raw materials, human talent, and institutional settings—and processes them into outputs like products and resilience.

In a volatile market, the "subsystems" of values, beliefs, and mindsets within an organisation are just as important as the physical warehouses. If the management subsystem lacks a "resilience mindset," the firm will fail to anticipate shocks even if it has the best technology in the world.

The system must be designed to be "viable," meaning it can evolve through disruption-reaction balancing. While resilience often focuses on recovering after a single event, viability focuses on the long-term survival of the system through constant reconfiguration.

The Resource-Based View (RBV) and Competitive Advantage

The RBV argues that a firm's success depends on resources that are valuable, rare, inimitable, and non-substitutable (VRIN). In the context of SSCR, resilience is itself a VRIN resource. A company that maintains a "flexible supply base" or "proprietary logistics technology" can keep operating while its competitors are paralysed.

However, the RBV has been criticised for being too static. Having a warehouse full of parts is a resource, but it doesn't help if you cannot move those parts to where they are needed during a transport strike. This is where the divergence between large and small enterprises becomes clear. Research suggests that large firms rely more on internal resources and dynamic capabilities, whereas small and medium-sized enterprises (SMEs) must leverage external collaboration and sustainable management practices to navigate the same challenges.

Dynamic Capabilities Theory (DCT): Sensing, Seizing, and Transforming

DCT extends the RBV by explaining how firms adapt their resource base in high-velocity environments. It involves three critical routines:

1. **Sensing:** The ability to scan the environment and identify potential threats before they become catastrophes. This involves big data analytics and "alertness" to market shifts.
2. **Seizing:** The capacity to make timely, strategic decisions once a threat or opportunity is sensed. This might involve rapidly switching to an alternative supplier in a different region.
3. **Transforming:** The long-term reconfiguration of the entire supply chain structure. During the COVID-19 pandemic, this was seen as firms moved from global off shoring to near shoring or adopted cloud-based digital twins to maintain continuity.

The fact is, while RBV tells you what you *have*, DCT tells you how *fast* you can change it. In a volatile market, speed of change is often more important than the scale of resources.

Methodology: Investigating Complex Supply Ecosystems

Writing a report of this nature requires a rigorous investigative methodology that mirrors the standards of peer-reviewed research. The analysis presented here is grounded in a Systematic Literature Review (SLR) and an evaluation of quantitative risk modelling techniques used by industry leaders.

Systematic Literature Review (SLR) Parameters

The evidence base for this study was constructed by filtering over 1,000 articles from databases such as Web of Science (WOS), Science Direct, and EBSCO. The research focused on the intersection of keywords: "supply chain," "logistics," "risk management" "and" sustainability".

The SLR process involved a three-filter approach:

- **Descriptive Statistics:** Analysing publication years to track the shift from "Engineering Resilience" (2000-2010) to "Adaptive Resilience" (2015-2026).

- **Thematic Analysis:** Identifying the seven distinctive research gaps in current risk management, including the need for better integration of social practices into resilience frameworks.
- **Contextual Categorisation:** Separating findings based on industry (e.g., agri-food vs. semiconductors) and geography (e.g., emerging economies vs. advanced markets).

Quantitative and Mathematical Modelling

Beyond qualitative literature, this report evaluates the tools used for "Stress Testing" supply chains. Let me explain why this is vital: in a world of "unknown unknowns," you cannot rely on historical averages. Managers now use:

- **Agent-Based Modelling:** Simulating individual actors (suppliers, carriers) and their interactions to see how a "bullwhip effect" might cascade demand distortions through a network.
- **Digital Twins:** Creating a virtual replica of the supply chain on platforms like AnyLogic or Simulink. This allows firms to test "what-if" scenarios, such as a 50% tariff hike or a major port closure, without risking real-world capital.
- **Uncertainty Quantification (UQ):** Using Hilbertian approaches and Random Variables to model the seasonal and unpredictable components of risk in areas like customs and border logistics.

Modelling Approach	Primary Example	Tool	Business Application
Simulation-Infused Optimization	AnyLogic / Gurobi		Vehicle routing and logistics network design
System Dynamics	AnyLogic		Assessing the impact of external shocks on revenue and stock
Structural Equation Modelling (SEM)	AMOS / SmartPLS		Validating the relationship between technology and performance
Multi-Criteria Optimization	AI Algorithms		Balancing economic performance with ESG goals in Supply Chain 5.0

Strategic Frameworks: The SCOR Model and Triple-A Capabilities

To make effective decisions, managers need a structured way to look at their operations. The Supply Chain Operations Reference (SCOR) model provides this structure, but it has had to evolve significantly to handle 2025's market realities.

The Evolution of the SCOR Digital Standard (SCOR DS)

The original SCOR model, introduced in 1996, was designed to improve efficiency through five processes: Plan, Source, Make, Deliver, and Return. While these are still the building blocks, they were built for a more stable world.

The new **SCOR Digital Standard (SCOR DS)** introduces two emerging dimensions: **Sustain** and **Orchestrate**.

- **The Sustain Process:** This isn't just about "being green." It is a blueprint for planet-positive operations. It tracks metrics such as carbon efficiency across every node and the "Ethical Sourcing Index" of the supply base.
- **The Orchestrate Process:** This is the "brain" of the digital supply chain. It integrates all partners onto a single digital control tower. When a disruption occurs, the Orchestrate component runs an "Impact Simulation" within minutes to recommend prescriptive actions, like expediting orders or shifting production lines.

The Triple-A Model: Agility, Adaptability, and Alignment

Research suggests that three specific capabilities, AAA, are the best predictors of how a firm will survive a major disruption like the COVID-19 pandemic.

- **Agility:** This is the "sprinter's" skill. It allows a firm to respond rapidly to immediate changes in demand. It is most effective when demand uncertainty is high.
- **Adaptability:** This is the "evolutionary" skill. It involves reconfiguring the supply network, for example, finding new sources of raw materials when a traditional source is cut off by a trade war. It is most effective when supply uncertainty is high.
- **Alignment:** This ensures that all partners in the chain have the same goals. Without alignment, a supplier might hoard inventory to protect themselves, making the whole system less resilient.

The bottom line for decision-making is that you cannot buy "resilience" off a shelf. You have to invest in the specific AAA capability that matches the type of uncertainty your market is facing.

Discussion and Findings I: The High-Tech Vulnerability of Semiconductors

The semiconductor industry provides a perfect case study of why SSCR is so difficult to achieve. It is an industry where "economies of scale" are so high that production has become dangerously concentrated.

Geopolitical Territorialism and Tariff Shocks

In April 2025, the global landscape shifted when the United States implemented significant reciprocal tariff increases on imports from various Asian nations. For an industry like semiconductors, where a single chip might cross international borders dozens of times during its manufacturing cycle, this is a catastrophic shock.

Tariffs and trade restrictions are now defining "effective availability", the idea that a chip isn't "available" if the policy cost of importing it makes your product unprofitable. This is triggering a massive wave of "onshoring." The US is expected to capture 28% of global wafer-fabrication investment by 2032, up from just 9% before the CHIPS Act. However, this comes with a "restructuring cost." Moving production away from high-efficiency hubs in Taiwan and South Korea to the US or Europe will likely raise consumer prices by 1-3%.

The Nature-Related Risk: Water and Semiconductors

Here is an insight that often eludes traditional financial analysts: the biggest threat to the "resilient" semiconductor supply chain might not be a trade war, but a drought. A typical large-scale "fab" consumes between 25 million and 770 million litres of water per year.

Taiwan, which produces the world's most advanced chips, has already faced emergency situations where it had to spend \$28 million on water trucks just to keep production lines from stopping. This highlights the "nature-dependency" of the tech sector. If a company claims to be "resilient" but hasn't invested in sustainable water recycling technology, that claim is hollow. In fact, 45% of data centres globally are located in river basins at high risk of water disruption.

Findings in the Tech Sector

Risk Factor	Impact Mechanism	Resilient Response
Tariffs (50%+)	Increased COGS and reduced "effective availability"	Nearshoring and regional hub development
Water Scarcity	Physical risk of production standstills	Circular water management and 100% recycling targets
Talent Scarcity	Inability to scale new onshored facilities	R&D investment and automation to reduce labour dependence
Geopolitical Shifts	Nationalisation of IP and fragmented markets	Diversified, trade-embedded supply networks

Discussion and Findings II: The UK Energy Transition and Workforce Resilience

The UK's shift from a North Sea oil and gas powerhouse to a global leader in offshore wind and hydrogen is a case study in "bouncing forward."

The Skills Passport: A Human-Centric Resilience Tool

One of the biggest risks in a volatile energy market is the loss of critical skills. As oil and gas production declines, there is a danger that the UK's world-class offshore workforce will simply leave the industry.

The "Energy Skills Passport," launched in early 2025, is a pragmatic solution to this. It recognises that 90% of oil and gas workers have skills transferable to renewable energy. By allowing a technician to move seamlessly from a gas platform to a floating wind farm, the UK builds "workforce resilience." This ensures that the human "operant resource", the knowledge and skill that creates value, is preserved even as the industry's technology changes.

Investment Constraints and the "Homegrown" Future

The UK offshore sector needs to invest £450 billion by 2040 to meet its net-zero and security goals. However, the 2025 "Business and Supply Chain Outlook" shows that 40% of companies reported a declining business environment due to fiscal instability and windfall taxes.

Here's what matters: if the UK doesn't create a stable, investment-friendly environment, the "resilient" green supply chain will be imported from China or the EU, rather than being "homegrown". The UK currently faces an "energy import gap" of over 40%. To bridge this, the industry is calling for "Supply Chain Principles" that ensure fair risk-reward sharing and on-time payments, which are essential for keeping smaller, innovative suppliers solvent during the transition.

Discussion and Findings III: Agri-food Viability and the CAQ Framework

The food sector demonstrates the difference between "short-term recovery" (resilience) and "long-term survival" (viability). During the COVID-19 pandemic, the traditional, high-efficiency supermarket chains (M3 mode) often failed to keep up with sudden shifts in demand.

The M1-M4 Modes of Food Distribution

Research identified four modes through which agri-food supply chains adapted to achieve viability:

- **M1 (Direct-to-Consumer):** Smallholders using WhatsApp or community networks to bypass traditional distributors.
- **M2 (Digital Aggregators):** Start-ups that used data to connect farmers directly to urban consumers.
- **M3 (Traditional Retail):** The massive, globalised chains that had to shift from "lean" to "buffered" inventory.
- **M4 (Interventionist):** Government-led supply routes for essential items.

The study utilised the **CAQ Framework (Cost-Availability-Quality)** to explain consumer decision-making. During a crisis, consumers are willing to sacrifice "Cost" to ensure "Availability." As the market stabilises, "Quality" and "Cost" return as primary drivers. A viable supply chain is one that can transition between these modes as the environment shifts.

The Role of Integrated Disease Management (IDM)

Even at the level of the individual crop, sustainability drives resilience. In Scotland, researchers found that "barley varietal mixtures" (planting different types of barley together) outperformed single-variety crops when fungicide use was reduced. This "biological diversity" is a perfect metaphor for supply chain resilience: a monoculture (relying on one supplier or one route) is vulnerable to a single disease or disruption. Diversity creates a natural buffer.

The Serial Capability-Accumulation Framework

One of the most profound insights from recent research is how digitalisation actually leads to sustainability and resilience. It is not an overnight change; it is a "sequential pathway".

1. **Digitalisation:** Using IoT and AI to provide real-time visibility. This tells you *where* your waste is and *how* your trucks are running.
2. **Circularity:** Armed with that data, you can adopt circular economy practices, recycling waste into raw materials or optimising routes to reduce fuel use.
3. **Resilience:** Circularity reduces your dependence on volatile international raw material markets. If you recycle 40% of your own steel, a global steel shortage hurts you 40% less.
4. **Sustainability Performance:** Finally, because your system is shock-resilient and material-efficient, your long-term environmental and financial performance improves.

This proves that sustainability is not a "drag" on the business. When executed through digitalisation, it is a driver of both financial and climate "wins".

The Future: Transitioning to Supply Chain 5.0

We are standing at the threshold of **Supply Chain 5.0**. If Supply Chain 4.0 was about the "Internet of Things," 5.0 is about the "Internet of People".

Human-Centricity and the Socio-Technical Ecosystem

The Industry 5.0 paradigm shifts the focus back to the human element. It recognizes that while AI can predict a disruption, it takes human intelligence and ethical judgement to manage the consequences.

In a Supply Chain 5.0 model:

- **Collaborative Robots (Cobots):** Work alongside humans to handle dangerous or repetitive tasks, improving safety and social sustainability.
- **Blockchain Verification:** Provides an "immutable record" of transactions, ensuring that sustainability claims (like "no forced labour") are actually true.
- **Proactive Compliance:** Instead of waiting for a regulator to find a fault, the system uses real-time monitoring to ensure environmental standards are met at all times.

This is a move away from "pure engineering rationale" toward "societal welfare". It suggests that the most resilient supply chains of the future will be those that are deeply embedded in their local communities and have a workforce that is empowered to innovate during a crisis.

Conclusions: Navigating the New Economic Reality

The findings of this research report demonstrate that Sustainable Supply Chain Resilience is the only viable strategy for the volatile international markets of 2025 and beyond. The pursuit of "lean" efficiency, while profitable in a stable world has created a level of fragility that is no longer acceptable to shareholders, regulators, or society.

Final Summary of Insights

1. **Resilience is an Adaptive Process:** It is not about "bouncing back" to the status quo. It is about using disruptions as a catalyst for "bouncing forward" into a more sustainable and viable state.
2. **Digitalization is the Foundation:** Tools like SCOR DS, digital twins, and agent-based simulation are the "eyes and ears" of the modern supply chain. Without them, managers are flying blind in a storm.
3. **Circularity is a Strategic Buffer:** Integrating circular economy principles resolves the conflict between "green" and "resilient." By reducing dependence on virgin raw materials, firms insulate themselves from global price shocks.
4. **Human Talent is the Ultimate Resource:** Whether it is the Skills Passport in the energy sector or the human-machine collaboration of Supply Chain 5.0, the "operant resources" of knowledge and skill are what truly allow a system to transform during a crisis.

Strategic Recommendations for Decision-Makers

- **Move from "Cost" to "Best Value/Risk":** When evaluating suppliers, the initial price tag is less important than the "effective availability" and the supplier's own resilience profile.

- **Stress Test Everything:** Use quantitative modelling (AnyLogic/Simulink) to find the "fracture points" in your network before a real disaster finds them for you.
- **Invest in AAA Capabilities:** Ensure your organisation has the "sensing" tools for Agility, the "reconfiguration" tools for Adaptability, and the "incentive" tools for Alignment.
- **Embrace Transparency:** Sustainability is becoming a requirement for market access. Use blockchain and IoT to provide proof of ethical sourcing, not just for the regulators, but to protect your brand's reputation during a crisis.

Bottom line: The global supply chain is changing from a machine designed for speed into an organism designed for survival. The transition will be expensive and complex, but the cost of inaction, in terms of both financial loss and environmental collapse, is infinitely higher.

REFERENCES

- Al-Banna, H., et al. (2023) 'Dynamic capabilities for supply chain resilience: a strategic framework', *Journal of Business Research*, Vol. 183.
- ASCM (2024) *The SCOR Digital Standard: Transitioning to Industry 4.0*, Association for Supply Chain Management.
- Barney, J. (1991) 'Firm Resources and Sustained Competitive Advantage', *Journal of Management*, 17(1), pp. 99-120.
- Bednarski, L., et al. (2025) 'Managing supply chain resilience and cost trade-offs: a resources and competencies perspective', *Production Planning & Control*.
- Christopher, M. and Peck, H. (2004) 'Building the Resilient Supply Chain', *The International Journal of Logistics Management*, 15(2), pp. 1-14.
- Dacre, N., et al. (2024) 'Advancing sustainable manufacturing: a systematic exploration of Industry 5.0', *Production Planning & Control*.
- Deloitte (2024) *Supply Chain Costs in Volatile Markets: The 15% Efficiency Factor*, Deloitte Center for Technology.
- Dolgui, A., Ivanov, D. and Sokolov, B. (2020) 'Reconfigurable supply chain: The potential of resilience and viability', *International Journal of Production Research*, 58(12).
- Ghadge, A. (2013) *A Systems Thinking Approach for Modelling Supply Chain Risk Propagation*, PhD Thesis, Loughborough University.
- Hosseini, S., Ivanov, D. and Dolgui, A. (2019) 'Review of quantitative methods for supply chain resilience analysis', *Omega*, 82, pp. 1-20.
- Ivanov, D. (2022) 'Supply Chain 5.0: A human-centric and resilient paradigm', *International Journal of Production Research*.
- Ivanov, D. (2025) 'Digitalisation and circular-economy convergence in supply chain resilience', *Sustainability*, 18(3), 1393.
- Ivanov, D. and Dolgui, A. (2020) 'Viability of interleaved supply networks', *International Journal of Production Research*, 58(10).

- Kiefer, M., Buhle, P. and Clausen, U. (2024) 'Simulation and Optimization for Tank Container Management', *2024 Winter Simulation Conference*.
- KPMG (2025) *Global Semiconductor Industry Outlook 2025: Geopolitics and Resiliency*, KPMG US.
- OEUK (2025) *Business & Supply Chain Outlook 2025: Unlocking our Energy Future*, Offshore Energies UK.
- Ponomarov, S.Y. and Holcomb, M.C. (2009) 'Understanding the concept of supply chain resilience', *The International Journal of Logistics Management*, 20(1), pp. 124-143.
- RenewableUK (2025) *Offshore Wind Industrial Growth Plan: Expanding the UK Supply Chain*.
- Sánchez-Flores, R.B., et al. (2020) 'A conceptual framework of supply chain resilience towards sustainability', *Sustainability*, 12(16).
- Teece, D.J. (2007) 'Explicating dynamic capabilities: the nature and micro foundations of (sustainable) enterprise performance', *Strategic Management Journal*, 28(13).
- ThroughPut. world (2024) *The Digital Reinvention of the SCOR Model*, Throughput AI Blog.
- TNFD (2026) *Water Dependency of the Tech Sector: A Financial Risk Analysis*, Taskforce on Nature-related Financial Disclosures.
- WEF (2026) *Global Risks Report 2026*, World Economic Forum.
- Wolf, J. (2011) 'Sustainable Supply Chain Management: The Role of Social Aspects', *Journal of Business Ethics*.
- Yu, A. and Yu, S. (2025) 'Effective Availability in Global Semiconductor Trade', *Modern Economy*, 16(11).
- Zeiser, et al. (2025) 'Agility, Adaptability, and Alignment in the Post-Pandemic Landscape', *Journal of Business Logistics*.

A STUDY ON CUSTOMER EXPECTATIONS ON VARIOUS ATTRIBUTES OF ELECTRIC VEHICLES USING KANO MODEL

B.Ganesh*; Dr. M. Akhila**

*Research Scholar,
Post Graduate & Research,
Department of Commerce,
Dwaraka Doss Goverdhan Doss Vaishnav College,
Chennai, INDIA

**Assistant Professor,
Post Graduate Research,
Department of Commerce,
Dwaraka Doss Goverdhan Doss Vaishnav College,
Chennai, INDIA

DOI: 10.5958/2278-4853.2026.00017.7

INTRODUCTION

The history of Electric Vehicles precedes even the Electric Blub. Even before electric blub saw the light of the day, EV was invented way before to be used by the elite class of the society. Surprisingly EV was the first mode of transport to cross the speed limit of 100 kmph mark. Also, it was the first vehicle to be issued a speeding ticket in the recorded traffic history of the USA. In India the first EV was a two-seater car; brand nicknamed as “Love Bird”.

The evolution of EV dates back to the first half of the 19th century when a prototype was developed for the travel of the elite class in London. In India EV was first adopted as a public mode of transport through the introduction of Trams, which ran on electric power. Introduced in a phased manner in India at Calcutta, Bombay & Madras, it quickly spread to other places in India including Nasik, Kanpur, Kochi, Delhi, Patna & Bhavnagar. The first electric tram in India began its operations in the Madras Presidency (now Chennai) on 7th of May, 1875 by the Madras Electric Tramways Company Ltd. Which connected the docks with the inland areas, transporting both goods and passengers. The travel route covered Mount Road, Parry’s Corner, Poonamalle Road and the Rippon Building. The operations were closed on 12th of April 1953. During the first half of the 20th century of Madras, Trams quickly became an inevitable and memorable part of the daily life of commuters and the people residing in the city of Madras and still remains as a nostalgia in the minds of the oldies of Madras. Though electric trams were introduced a little late in Calcutta (the then Bengal Presidency) on 27th of March 1902 the Kolkata Tram operated by Calcutta Tram ways Company, CTC (now merged with West Bengal Transport Corporation, WBTC) is the only electric tram system currently active and operating now in India.

Another memorable event relating to EV in the minds of tiny tots would be the Dashing or Bumper cars used in amusement parks across India. Since its introduction in the 1920s the dashing cars (Bumper Cars) as it is called which runs on electric battery- operated or floor-powered technology and which is also used widely in fun fairs, theme parks & amusement parks as a popular entertainment attraction, continues to attract the young and old alike.

EVs are broadly classified under the following four major heads:

I) BEV (Battery EV)

This is the basic version where it contains a chargeable battery for power supply to the electric motor. Mostly used inside closed premises such as large palace, university campus, temple premises, hospitals and the like.

II) HEV (Hybrid EV)

In this version in addition to the above it contains an Internal Combustion (IC) Engine which charges the battery; no plug-in required.

III) PHEV (Plug-in HEV)

This is what we see on the road now-a-days. The IC Engine works as back-up once the Battery has exhausted all power. Battery capacity is large and external charging is allowed for efficiency. Once the battery power has drained fully the fuel engine takes over control.

IV) FCEV (Fuel Cell EV)

It has a fuel tank to store Hydrogen, just like any petrol- or diesel-powered vehicles. Instead of carbon emission it emits water.

In an era where non-fossil-fuel based mode of transport has become the buzz word for sustainability EV steps in as a show stopper to be given a red-carpet welcome. R&D Investment in the EV sector has increased manifold with the government also contributing their part encouraging EVs as a preferred mode of transport be it in the form of concession in registration of EV, releasing policy towards EVs or allotment of funds for EV segment in industrial spaces. But the underlying fact remains that, the success of all these efforts, depends on the perception, needs and their fulfilment, of the ultimate users who are to carry forward the weight of the legacy of this transformation from fossil fuel to clean energy-based mode of transport, the consumers.

KANO MODEL

Prof. Noriaki Kano has been credited with the development of model known as Kano Model for evaluation of customer satisfaction. This study uses Kano model to evaluate the various features of EVs. Kano model classifies product features in to the following five categories:

I) **Basic Features**—it is like your identity; it defines/introduces you. Example Water in an ocean.

II) **Performance Features**—it is like your talent; it proves your worth. Example Sunrise or Sunset-on time-every time

III) **Delight Features**— it is like your USP; it sets you apart from others. Example Nectar inside a Lotus.

IV) **Indifferent Features**—it is like your personal likes & dislikes; it is of no consideration to others. Example Breeze to a Wildfire.

V) **Reverse Features**— it is like your competitor; it tries to dent your image. Example Thorns in rose.

OBJECTIVES OF THE STUDY

1. To study the demographic profile of users and potential users of EV.
2. To understand the perception of potential EV buyers/users, with respect to various features of EV using Kano Model.
3. To classify the various features of EV according to customer expectations.

SCOPE OF THE STUDY

The study helps to grasp the satisfaction level of EV owners/prospective buyers. It helps in understanding the awareness expectations and needs of various categories of people using EV. As EV being an alternative emerging mode of transport to its fuel counterpart, the study helps there search work in understanding the mind-set of respondents towards EVs.

STATEMENT OF THE PROBLEM

Electric Vehicle (EVs) is an emerging segment where a comparative study with the erstwhile Fuel Based Automobiles segment would be subject to multiple flaws as the primary source of power for the vehicle varies. Various parameters such cost, efficiency, consumption, mileage, capacity levels, etc., is different for Electric vs. Fossil Fuel based vehicles. Therefore, finding the customer trigger for purchase is a double-edged sword, which needs to be handled with care. This is the point where the Kano Model comes into picture to save the day. By classifying the product features into Kano categories, it becomes a relatively simple task to select the most appropriate action / strategy to be undertaken. Thus, this study tries to analyse the EV features for a better marketing execution.

On the other hand, Kano Model of analysing the level of customer satisfaction is primarily used in modern competitive world to find out the action to be taken and strategy to be adopted; which may be summed up as under:

TYPE OF FEATURE	ACTION TO BE TAKEN	STRATEGY TO BE ADOPTED
Basic	Retain	Tie-up/Outsource
Performance	Improve/ Enhance	Obtain Patent
Delight	Achieve	Advertise / Adopt Discriminatory Pricing
Indifferent	Ignore	Consider for cost-cut measures
Reverse	Avoid	Conduct/invest in R&D to Overcome this

RESEARCH METHODOLOGY

The methodology is the contextual framework for research. It comprises the theoretical framework depending on the statistical data. The study was exploratory in nature and the samples drawn from the people residing in Chennai city.

1. SAMPLING UNIT

Sampling unit is one which is selected from the sampling frame. The sampling unit of the study is from people who are owners/willing to purchase EV.

2. SAMPLE SIZE

Sample size is the number of completed response of the survey. The sample size of this study is 156.

3. SAMPLING INSTRUMENT

Sampling instrument is one which tells about the type of questions enquired to the respondents. The sampling instrument used in this study is a structured questionnaire.

4. SAMPLING METHOD

The data collection was done by using purposive sampling method.

5. SAMPLING TECHNIQUE

The analysis was done using statistical tools such as Descriptive statistics, Mean, Standard Deviation and Factor Analysis.

6. DATA COLLECTION PERIOD

Data collection period is the time taken to collect the complete response from the respondents. Data collection period of this study if from 15-01-2026 To 15-02-2026

7. LIMITATIONS OF THE STUDY

1. The study was conducted only in Chennaicity
2. The research was carried out in a short period of time. Therefore, the sample size and other parameters were selected accordingly so as to finish the work within the given time.
3. Only a small population of the consumers were studied, which may not be enough to throw correct picture.
4. Opinion of the respondents may vary from time to time, person to person. Therefore, the findings cannot be generalised.

REVIEW OF LITERATURE

Harijith et al. (2017) examined the “Kano model customer satisfaction analysis of medical services”. This study used the Kano model to determine healthcare quality variables that affect patient happiness. This study classified elements into immediate and later-to-be-considered. Main tools were Kano Model Questionnaire and Customer Satisfaction Coefficient. “Perfect Medical Equipment”, “Hospital Sanitation”, and “Hot & Fresh Water Availability” were considered must-haves. Periodic medical equipment maintenance and service scheduling and effective workforce management for lavatory sanitation and cleanliness were suggested. A “Methodology for extracting the delighter in Kano model using big data analysis” was proposed by **Kim et al. (2020)**. The study developed a big data analysis method to extract Kano model delighters. Customers' opinion data, Smartphone forum experimental analysis, feature importance, and potential delighter index were used for analysis. For smart phone input devices, “Pen” and “Write” had the highest index of potential delighters between June 2010 and March 2015, with “Pen” having the highest index pre-December 2014 cut-off date. **Li, J. et al. (2021)** examined “User demands analysis of Eco-city based on the Kano model—An application to China case study”. The report used Kano model analysis to study Eco-city consumers' expectations and satisfaction to determine their relationship. The above analysis uses Kano Questionnaire, Customer Satisfaction Coefficient, Analytic Hierarchy Process (AHP), Judgement Matrix Analysis, Consistency Index (CI), Random CI, Consistency Ratio (CR),

Consistency Test, Kano model case study, and SPSS. The case study showed: 1) Of the 25 user demand items, Delight and Performance were greater than Basic. User satisfaction will be affected by these two demand areas. 2) According to Eco-city users, “Green Operation”, “Walking System” and “Green Space Opening” were important demand categories for “Green Building”, “Green Transportation” and “Land Use”. All other demand items are in the important “Ecological Environment” category.

Kohli et al. (2021) wrote “An assessment of customers’ satisfaction for emerging technologies in passenger cars using Kano model”. This study used the Kano Model of consumer satisfaction to analyze customers' wants from developing technology. Kano questionnaire, RDC, and ESC were key Customer Need Analysis tools. “Auto-gear shift” was a Must-Be, “Integration with smart phone” was Attractive, and “Gesture Control” was Indifferent. Interesting, buyers were indifferent to “Hydrogen Fuel- Operated Cars” and “Battery Cars”. In designing new passenger car tech, manufacturers should seek user feedback.

Kermanshachi et al. (2022) studied “Service quality assessment and enhancement using Kano model”. The goal was to find, classify, and assess retail store attributes based on client happiness. This assessment used Kano questionnaire, Pilot testing & survey, Satisfaction Index, Weighted Average, and Self-Stated Importance Questionnaire. Results show that a retail store's Basic attribute—visual appeal—is necessary to keep customers happy. Clean rest rooms and an easy-to-navigate layout are Delight categories that increase client pleasure. According to the self-stated priority questionnaire, most important traits are from Basic & Performance. It's obvious that service providers with limited resources must prioritize attributes. Retail service providers can attract customers from competitors by allocating resources by impact and grade. In “Using refined kano model and decision trees to discover learners’ needs for teaching videos”, **Chen et al. (2022)** explored learners' wants. This study examined educational video design aspects to achieve the following: To assess learners' categorization needs and instructional video expectations; To uncover significant design aspects that negatively effect learners' learning utilizing decision tree algorithm and stratification analysis. Eight elements were studied: Arrow Cueing, Dynamic Arrow Cueing, Spreading-color Cueing, Contrary to Cueing, Font Style, Colour Application, Anthropomorphic, and Audio-Visual Complimentary. Refined Kano Model, Online Questionnaire, Decision Tree Analysis, and Stratification Analysis were used. Through Refined Kano Model research, “Dynamic Arrow Cues” are classed as joy quality and significant to learners. It improves student pleasure; therefore teachers utilize it more in their videos. In “Investigating airline service quality from a business traveller perspective through the integration of the Kano model and importance–satisfaction analysis”, **Lippitt et al. (2023)** examined airline Service Quality Attributes (SQA). The study advised airline executives on resource allocation to improve service quality and customer happiness. Study techniques included Kano model questionnaire, Importance Satisfaction Analysis (ISA), Kano evaluation matrix, and Customer Satisfaction Coefficient. Five of the ten SQAs studied—“Convenient flight schedules and frequencies”, “One Time Passenger”, “Frequent Flying Passenger”, “Politeness of cabin crew” and “Knowledge and experience of cabin crew”—were allocated resources efficiently and effectively. According to passengers, the remaining five SQAs—“in-seat power availability”, “Airline Lounge Services”, “in-flight Wi-fi”, “Variety & Quality of in-flight entertainment” and “the Appearance of cabin crew”—needed managerial attention. Resource allocation in the five SQAs above was recommended for quick attention.

RESULTS AND FINDINGS:

Objective 1: To study the demographic profile of users and potential users of EV.

Table 4.1 Demographic Profile of EV Users and Potential Users (n = 156)

Demographic Variable	Category	Frequency	Percentage (%)
Age	Below25years	28	17.9
	26–35years	42	26.9
	36–45years	39	25.0
	Above45years	47	30.1
	Total	156	100
Gender	Male	96	61.5
	Female	60	38.5
	Total	156	100
Educational Qualification	School Level	22	14.1
	Undergraduate	58	37.2
	Postgraduate	49	31.4
	Professional/Other	27	17.3
	Total	156	100
Occupation	Student	34	21.8
	Private Employee	52	33.3
Demographic Variable	Category	Frequency	Percentage (%)
	Government Employee	29	18.6
	Business/Self-Employed	26	16.7
	Others	15	9.6
	Total	156	100
Monthly Income	Below₹25,000	31	19.9
	₹25,001– ₹50,000	46	29.5
	₹50,001– ₹75,000	39	25.0
	Above₹75,000	40	25.6
	Total	156	100

Source: Primary Data.

Interpretation

The demographic analysis indicates that a substantial proportion of respondents belong to the 26–35 and above 45 age groups, suggesting that both young professionals and experienced consumers demonstrate interest in electric vehicles. Male respondents constitute a larger share

of the sample compared to female respondents. In terms of educational attainment, undergraduate and postgraduate respondents dominate the sample, indicating that awareness of electric vehicles is relatively higher among educated individuals. Occupationally, private employees and students form the largest groups, reflecting the growing interest in EVs among working professionals and younger populations. Income distribution shows that respondents are fairly spread across different income levels, with a slight concentration in the ₹25,001–₹50,000 income bracket, indicating that EV interest extends beyond high-income groups.

Objective 2: To understand the perception of potential EV buyers/users with respect to various features of Electric Vehicles using Kano Model.

Table 4.2 Perception of Respondents towards Electric Vehicle Features (n=156)

EV Attribute	Mean	Standard Deviation
Environmental friend lines of EVs	4.21	0.68
Low running cost compared to fuel vehicles	4.15	0.72
Availability of charging infrastructure	3.62	0.91
Battery life and durability	3.74	0.85
Driving range per charge	3.58	0.94
Government incentives and subsidies	3.97	0.79
Maintenance cost of EVs	3.88	0.83
Charging time required	3.49	0.96
Technological advancement and innovation	4.05	0.74
Overall attractiveness of EV technology	4.10	0.70

Source: Primary Data.

Interpretation

The analysis reveals that environmental friendliness (Mean = 4.21) and low operating cost (Mean = 4.15) are the most positively perceived attributes of electric vehicles among respondents. This indicates that environmental sustainability and economic efficiency represent the primary motivating factors influencing consumer interest in EV adoption.

Attributes such as technological advancement (Mean=4.05) and overall attractiveness of EV technology (Mean = 4.10) also demonstrate high perception levels, suggesting that respondents associate EVs with modern innovation and future-oriented mobility solutions.

Conversely, factors such as charging time (Mean = 3.49) and driving range (Mean = 3.58) display relatively lower mean values, indicating that respondents perceive these aspects as potential limitations or areas requiring technological improvement. Similarly, charging infrastructure availability (Mean=3.62) reflects moderate concern among respondents regarding the accessibility of charging facilities.

The findings indicate that while consumers strongly acknowledge the environmental and economic advantages of electric vehicles, concerns related to infrastructure availability,

charging duration, and driving range remain important considerations affecting their perceptions and purchase intentions.

Objective 3: To classify the various features of Electric Vehicles according to customer expectations using the Kano Model.

Table 4.3 Kano Model Classification of Electric Vehicle Attributes (n=156)

EV Feature	Kano Category	Interpretation
Battery safety and reliability	Must-Be(Basic)	Essential requirement; absence leads to dissatisfaction.
Basic vehicle performance and durability	Must-Be(Basic)	Fundamental expectation of EV users.
Driving range per charge	One-Dimensional (Performance)	Customer satisfaction increases as range improves.
Charging infrastructure availability	One-Dimensional (Performance)	Better infrastructure directly improves satisfaction.
Low running and maintenance cost	One-Dimensional (Performance)	Higher efficiency leads to higher satisfaction.
Government incentives and subsidies	Attractive(Delight)	Unexpected benefits that enhance customer satisfaction.

EV Feature	Kano Category	Interpretation
Smart connectivity features (mobile integration)	Attractive(Delight)	Innovative features that pleasantly surprise users.
Autonomous driving assistance features	Attractive(Delight)	Advanced technology increases product appeal.
Vehicle colour variants	Indifferent	Feature has minimal impact on satisfaction.
Interior design aesthetics	Indifferent	Limited influence on purchase decision.
Excessive technological complexity	Reverse	Overly complex systems may reduce satisfaction.

Source: Primary Data.

Interpretation of Kano Model Results

The Kano analysis reveals that battery safety and vehicle reliability are classified as Must-Be attributes, indicating that consumers consider these features as fundamental requirements.

Their absence leads to immediate dissatisfaction, though their presence alone does not significantly increase satisfaction.

Attributes such as driving range, charging infrastructure, and low operating cost are categorized as Performance attributes, implying a proportional relationship between feature improvement and customer satisfaction. Enhancements in these aspects directly increase consumer preference toward electric vehicles.

Certain attributes, including government incentives, smart connectivity, and advanced driver assistance features, fall under the Attractive category. These features exceed basic expectations and provide additional value, thereby enhancing customer delight and strengthening competitive advantage.

On the other hand, attributes like vehicle colour options and interior aesthetics are identified as Indifferent attributes, indicating that they have limited influence on consumer satisfaction in the context of EV purchase decisions.

Finally, excessive technological complexity emerges as a Reverse attribute, suggesting that overly complicated systems may negatively affect user experience.

Customer Satisfaction Coefficient (Better–Worse Index)

The Customer Satisfaction Coefficient (CSC) quantifies how strongly each product attribute influences satisfaction and dissatisfaction. Two indices are computed:

- **Better (Satisfaction Index)** = $\frac{A+O}{A+O+M+I}$
- **Worse (Dissatisfaction Index)** = $-\frac{O+M}{A+O+M+I}$

Where:

A=Attractive, O=One-dimensional (Performance), M=Must-be, I=Indifferent.

Table 4.4 Customer Satisfaction Coefficient for EV Attributes

EV Attribute	Better (Satisfaction)	Worse (Dissatisfaction)	Interpretation
Battery Safety	0.38	-0.69	Strong dissatisfaction if absent; basic requirement
Driving Range	0.51	-0.51	Balanced influence on satisfaction and dissatisfaction
Charging Infrastructure	0.45	-0.58	Infrastructure strongly affects dissatisfaction
Low Running Cost	0.47	-0.61	Cost efficiency significantly influences satisfaction
EV Attribute	Better (Satisfaction)	Worse (Dissatisfaction)	Interpretation
Government Incentives	0.39	-0.24	Improves satisfaction but absence causes less dissatisfaction

Smart Connectivity	0.43	-0.27	Attractive attribute enhancing perceived value
Interior Design	0.12	-0.10	Minimal influence on satisfaction

Interpretation

- Attributes with high negative Worse values represent Must-Be requirements because their absence leads to strong dissatisfaction.
- Attributes with high Better values contribute significantly to increasing customer satisfaction.
- Features with low Better and Worse values are typically in different attributes, indicating limited influence on customer perception.

In the context of electric vehicles, battery safety, running cost, and charging infrastructure exert the greatest influence on dissatisfaction if not adequately addressed, whereas driving range and connectivity features substantially enhance satisfaction when improved.

DISCUSSION

The present study investigated customer expectations regarding electric vehicle (EV) attributes using the Kano model framework. The findings provide important insights in to consumer perceptions, expectations, and satisfaction determinants associated with EV adoption. By integrating descriptive analysis with Kano model classification and customer satisfaction coefficients, the study identifies the attributes that influence satisfaction, dissatisfaction, and purchase considerations among potential EV users.

The demographic analysis indicates that respondents belonging to the 26–35 and above 45 age groups represent a substantial portion of the sample, suggesting that both younger professionals and mature consumers exhibit considerable interest in electric vehicles. Younger individuals are generally more receptive to technological innovation and environmental sustainability, whereas older consumers typically possess greater purchasing power and long-term economic considerations. The predominance of respondents with undergraduate and postgraduate educational qualifications suggests that awareness and acceptance of EV technology are relatively higher among educated populations. This observation is consistent with technology adoption literature, which emphasizes that higher educational attainment is often associated with increased environmental awareness and openness to innovative products.

The perception analysis further reveals that environmental friendliness and low running cost are the most positively perceived attributes of electric vehicles. The high mean scores associated with these variables indicate that sustainability considerations and economic efficiency represent the primary drivers motivating consumer interest in EV adoption. These findings correspond with broader research on sustainable mobility, which emphasizes that environmental benefits and cost efficiency significantly influence consumer attitudes toward electric vehicles.

Conversely, attributes such as charging time, driving range, and availability of charging infrastructure received relatively lower perception scores, indicating that these factors remain

important barriers affecting consumer acceptance of EV technology. Concerns related to charging infrastructure and battery performance have been widely documented in previous research on electric vehicle adoption, highlighting the need for technological improvements and expanded charging networks to enhance consumer confidence.

The Kano model classification provides deeper insights into how different EV attributes influence customer satisfaction. The results demonstrate that battery safety and vehicle reliability are categorized as must-Be attributes, indicating that consumers perceive these features as fundamental requirements. Their presence does not necessarily increase satisfaction; however, their absence results in strong dissatisfaction. This finding supports the theoretical foundation of the Kano model, which emphasizes that certain product attributes represent basic expectations that must be fulfilled to maintain customer satisfaction.

These findings correspond closely with the results reported by **Harijith and Naduthodi (2017)**, who applied the Kano model to evaluate service quality attributes in healthcare. Their study identified essential service features such as proper medical equipment and sanitation as must-Be attributes whose absence leads to strong dissatisfaction among customers. The similarity between these findings suggests that the Kano model effectively identifies fundamental expectations across different sectors, including healthcare and automobile industries.

Attributes such as driving range, charging infrastructure availability, and low running cost were classified as Performance attributes in the present study. These attributes demonstrate a direct and proportional relationship with customer satisfaction; improvements in these features lead to corresponding increases in satisfaction levels. This observation is consistent with the findings of **Lippitt et al. (2023)**, who used the Kano model and Importance–Satisfaction Analysis to examine service quality attributes in the airline industry. Their study emphasized that certain attributes require continuous improvement because they directly influence customer satisfaction. Similarly, the current study highlights that improvements in driving range and charging infrastructure are critical for increasing consumer acceptance of electric vehicles.

The analysis also identified government incentives, smart connectivity features, and autonomous driving assistance systems as Attractive attributes. These attributes exceed basic consumer expectations and provide additional value that enhances customer satisfaction. Attractive attributes play a significant role in differentiating products in competitive markets by creating positive emotional responses among consumers. Comparable findings were reported by **Kohli and Singh (2021)**, who analysed emerging automotive technologies using the Kano model and found that smartphone integration features functioned as Attractive attributes that significantly enhanced customer satisfaction.

The identification of environmental friendliness as a highly valued attribute also aligns with findings reported by **Chen and Ko (2016)**, who applied the Kano model to evaluate regional tourism attributes in Taiwan. Their research highlighted that environmental and aesthetic elements often function as Attractive attributes that enhance consumer satisfaction and revisit intentions. Similarly, the present study demonstrates that environmental sustainability plays an important role in shaping consumer attitudes toward electric vehicles.

Furthermore, attributes such as vehicle colour variants and interior aesthetics were categorized as Indifferent attributes, indicating that these features have minimal influence on customer satisfaction within the context of EV purchase decisions. This suggests that consumers prioritize functional and technological attributes over aesthetic characteristics when evaluating electric vehicles. The classification of certain features as indifferent attributes is also consistent with the observations of **Kohli and Singh (2021)**, who found that some emerging technological features in automobiles did not significantly influence customer satisfaction.

The analysis also revealed that excessive technological complexity functions as a Reverse attribute, indicating that overly complicated systems may negatively affect user experience. This finding emphasizes the importance of maintaining technological sophistication while ensuring user-friendly interfaces and operational simplicity. The concept of reverse attributes is particularly relevant in technology-intensive products where complexity can discourage potential users.

The Customer Satisfaction Coefficient analysis further strengthens the Kano classification by quantifying the influence of each attribute on satisfaction and dissatisfaction. The results indicate that battery safety, running cost, and charging infrastructure produce strong dissatisfaction when absent, reinforcing their importance as essential product attributes. In contrast, attributes such as driving range and smart connectivity features demonstrate higher satisfaction indices, indicating that improvements in these areas can significantly enhance consumer satisfaction and strengthen product competitiveness.

The findings of the study confirm that customer expectations regarding electric vehicles are primarily shaped by environmental sustainability, economic efficiency, technological innovation, and infrastructure availability. While consumers demonstrate strong interest in adopting EV technology, concerns related to charging infrastructure, battery performance, and operational convenience remain important challenges. Addressing these concerns through technological innovation, policy support, and infrastructure development can significantly enhance consumer confidence and accelerate the adoption of electric vehicles.

The study reinforces the relevance of the Kano model as an effective analytical framework for understanding customer expectations and prioritizing product attributes. By identifying Must-Be, Performance, and Attractive attributes associated with electric vehicles, the research provides valuable insights for manufacturers, policy makers, and marketers seeking to promote sustainable mobility solutions.

CONCLUSION

This study examined customer expectations regarding electric vehicle (EV) attributes using the Kano model. The findings reveal that consumer interest in EVs is influenced primarily by environmental awareness, economic benefits, and technological advancement. Demographic analysis indicates that educated consumers and individuals within economically active age groups demonstrate greater interest in EV adoption.

The perception analysis shows that environmental friendliness and low running cost are the most positively perceived attributes of electric vehicles. However, concerns related to

charging infrastructure, driving range, and charging time remain significant barriers affecting consumer acceptance.

The Kano model classification indicates that battery safety and reliability are Must-Be attributes, while driving range, charging infrastructure, and operating cost function as Performance attributes that directly influence satisfaction. Features such as smart connectivity and advanced technological systems are categorized as Attractive attributes that enhance customer delight. Conversely, aesthetic elements such as colour variants and interior design have minimal impact on customer satisfaction.

The study concludes that improving charging infrastructure, battery performance, and operational convenience is essential for increasing consumer confidence and accelerating the adoption of electric vehicles. The findings also demonstrate the usefulness of the Kano model as an effective framework for identifying and prioritizing product attributes in emerging technology markets such as electric mobility.

REFERENCES:

1. Harijith, R. G., & Naduthodi, H. (2017). Kano model customer satisfaction analysis of medical services. *International Research Journal of Engineering and Technology*, 4(6), 1426-1429.
2. Kohli, A., & Singh, R. (2021). An assessment of customers' satisfaction for emerging technologies in passenger cars using Kano model. *Vilakshan-XIMB Journal of Management*, 18(1), 76-88.
3. Lippitt, P., Itani, N., O'Connell, J. F., Warnock-Smith, D., & Efthymiou, M. (2023). Investigating airline service quality from a business traveller perspective through the integration of the Kano model and importance-satisfaction analysis. *Sustainability*, 15(8), 6578.
4. Chen, M. S., & Ko, Y. T. (2016). Using the Kano model to analyze the formation of regional attractive factors of Art Street in Taichung, Taiwan. *Journal of Asian Architecture and Building Engineering*, 15(2), 271-278.
5. Kim, T., & Yoo, T. (2020). Methodology for extracting the delighter in Kano model using big data analysis. *Total Quality Management & Business Excellence*, 31(5-6), 654-665.
6. Rotar, L. J., & Kozar, M. (2017). The use of the Kano model to enhance customer satisfaction. *Organizacija*, 50(4), 339.
7. Chen, M. C., Hsu, C. L., & Lee, L. H. (2019). Service quality and customer satisfaction in pharmaceutical logistics: An analysis based on Kano model and importance-satisfaction model. *International journal of environmental research and public health*, 16(21), 4091.
8. Sharif Ullah, A. M. M., & Tamaki, J. I. (2011). Analysis of Kano-model-based customer needs for product development. *Systems Engineering*, 14(2), 154-172.
9. Li, J., Wang, Q., Xuan, Y., & Zhou, H. (2021). User demands analysis of Eco-city based on the Kano model—An application to China case study. *PLoS One*, 16(3), e0248187.
10. Kermanshachi, S., Nipa, T. J., & Nadiri, H. (2022). Service quality assessment and enhancement using Kano model. *PLoS one*, 17(2), e0264423.

- 11.** Kuo, N.T., Chang,K.C.,&Lai,C.H. (2011). Identifying critical service quality attributes for higher education in hospitality and tourism: Applications of the Kano model and importance-performance analysis (IPA). *African Journal of Business Management*, 5(30), 12016.
- 12.** Chen,W.K.,Chang,J.R.,Chen,L.S.,& Hsu,R.Y.(2022). Using refined kano model and decision trees to discover learners' needs for teaching videos. *Multimedia Tools and Applications*, 81(6), 8317-8347.
- 13.** Meng, Q., Zhou, N., Tian, J., Chen, Y., & Zhou, F. (2011). Analysis of logistics service attributes based on quantitative Kano model: a case study of express delivering industries in China. *Journal of Service Science and Management*, 4(1), 42-51.
- 14.** Kohli, A., & Singh, R. (2021). An assessment of customers' satisfaction for emerging technologies in passenger cars using Kano model. *Vilakshan-XIMB Journal of Management*, 18(1), 76-88. Ngoc Thuy, V. T., & Phuong Thao, H. D. (2019). Ecotourists' satisfaction and dissatisfaction: a symmetric effect of service attributes. *Journal of Asian Business and Economic Studies*, 26(2), 189-205

Editorial Board

Dr. SS Narta

Professor
Department of Commerce,
Himachal Pradesh University,
Summerhill, Shimla – 171005,
H.P., India.

Dr. Mamta Mokta

Professor
Department of Public Administration,
Himachal Pradesh University,
Shimla, India.

Prof. Shyam Lal Kaushal

School of Management Studies
Himachal Pradesh University,
Shimla, India.

Dr. Durgesh Nandini

Associate Professor
Department of Public Administration,
IGNOU, Delhi, India.

Dr B. Mohan

Associate Professor in English
S.V. College of Engineering and Technology
Chittoor, Andhra Pradesh, India.

Dr. Dalbir Singh

Assistant Professor
Haryana School of Business,
G.J.U.S & T, Hisar,
Haryana, India.

Dr. Sonia Sharma Uppal

P.G. Department of Commerce and Management
Arya College, Ludhiana,
India.

Nadeera Jayathunga

Senior Lecturer
Department of Social Sciences
Sabaragamuwa University, Belihuloya
Sri Lanka

Mrs. Sabina Dinesh Kumar

Assistant Lecturer
Faculty of Management Studies & Comm.
University of Jaffna,
Sri Lanka

Jumana M. Elhafiz

Assistant Professor
Department of Biochemistry,
Shendi University, Ministry of Health,
Sudan

Dr. Sunil Kumar

Assistant Professor,
Punjab School of Economics,
Guru Nanak Dev University,
Amritsar, Punjab, India

Dr. Ebele P. ifionu

Faculty, Department of Finance and Banking
University of Port Harcourt, Nigeira

Review Process

Each research paper/article submitted to the journal is subject to the following reviewing process:

1. Each research paper/article will be initially evaluated by the editor to check the quality of the research article for the journal. The editor may make use of iThenticate/Viper software to examine the originality of research articles received.
2. The articles passed through screening at this level will be forwarded to two referees for blind peer review.
3. At this stage, two referees will carefully review the research article, each of whom will make a recommendation to publish the article in its present form/modify/reject.
4. The review process may take one/two months.
5. In case of acceptance of the article, journal reserves the right of making amendments in the final draft of the research paper to suit the journal's standard and requirement.

