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MODELING SYSTEMS-ON-A-CHIP AT THE TRANSACTION LEVEL IN SYSTEMC

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ABSTRACT

One of the characteristics of the problem which we are dealing with here is that we control neither the language (SystemC is defined by a consortium on which we have only little influence), nor the execution model (which is part of SystemC).A solution could have been to study the execution model of SystemC, to redefine it in terms of automata or another well-known formalism, and to work directly and only on this formalism. This paper first presents today's design flow, with the different levels of abstraction used to describe a chip. Also, this paper details the Transaction Level Modeling level of abstraction and present the way it is implemented in SystemC.

KEYWORDS: *Systemc, System-On-A-Chip, TLM, ELAB.*

INTRODUCTION

A System-on-a-Chip (SoC) integrates many components on the same chip: a processor, several memory components, one or several buses, and specific components like video or audio decoders. A growing part of the functionality is implemented in the software part. The development of the embedded software for such a dedicated hardware platform requires specific methods and tools. The embedded software can, of course, be executed on the physical chip; this approach is fast and perfectly realistic with respect to the final SoC.

However, this approach is not feasible for two main reasons: cost and time-to-market. If executing the software reveals a bug in the hardware, then it is prohibitively costly to correct it. In addition, the execution of software on real hardware offers no detailed debugging capabilities. Finally, because of time-to-market constraints, the embedded software should be ready and tested before the physical chip is delivered, to shorten the integration phase.

The solution is to develop abstract models of the real system, with just enough details to be able to simulate the embedded software. This level of abstraction is called Transaction level modeling (TLM). Since the TL model of a system is less detailed than the RTL description, the TL model can be available earlier. TL simulations are much faster than RTL simulations: the decoding of an image takes only a few seconds. These advantages are obtained at the price of precision loss. The most abstract TL models do not allow timing performance evaluation, in particular because the non-functional features, like pipelines, are not modeled. The level of abstraction of TL models implies that automatic synthesis of RTL descriptions from TL models is not possible. Consequently, TL models do not replace RTL descriptions; they are used earlier in the design cycle.

Quality and productivity constraints in the development tools for the design of embedded systems are increasing quickly. The physical capacity of chips can usually grow fast enough to satisfy those needs: The evolution of the number of transistors on a chip has been following Moore's law (growth of 50% per year) for decades, and should keep on following it for at least 10 years. But one of the design flow bottlenecks is the design productivity: with traditional techniques, it grows only by around 30% per year, leaving a gap, increasing by 20% per year between the capacity of the chips, and the amount of code the designers are able to write. This problem is often referred to as the design gap. New techniques have to be settled continuously to be able to fill in this gap.

THE SYSTEMC

SystemC is a C++ library used for the description of SoCs at different levels of abstraction, from cycle accurate to pure functional models. A TL model written in SystemC is based on an architecture, i.e., a set of parallel components and connections between them. Each component has typed connection ports, and its behavior is given by a set of communicating processes that can be programmed in full C++. For managing processes, SystemC provides a scheduler, and several synchronization mechanisms: the low-level events, the synchronous signals that trigger an event when their value changes, and higher level mechanisms.

When a SystemC model is simulated, first the static architecture is built by executing the so-called elaboration phase (ELAB), which creates components and connections. Then the scheduler starts running the processes of the components, according to the informal automaton of Fig. 1(a). A simulation of a SystemC model looks like a sequence of evaluation phases (EV). Signal update phases (UP) and time elapse phases (TE) separate them (see Fig. 1(b)).
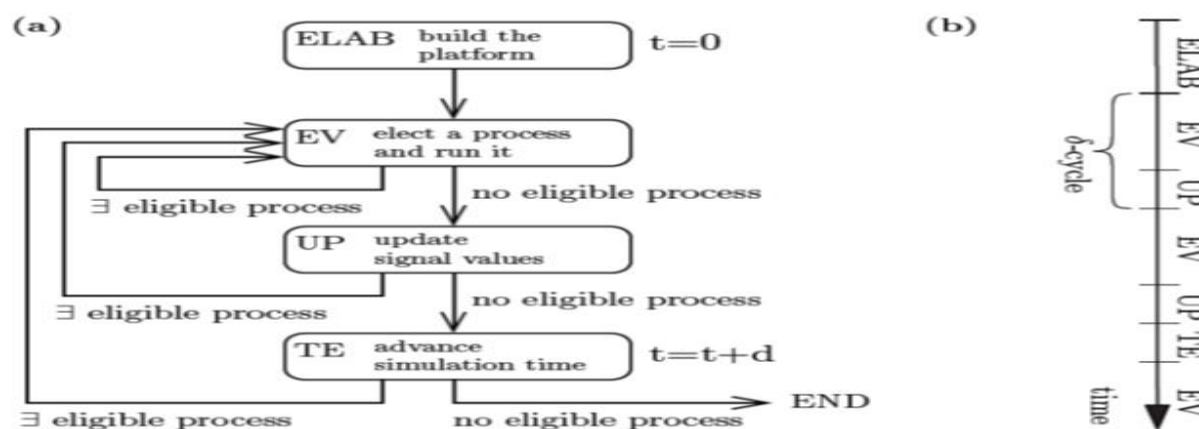
FIGURE 1(A) AUTOMATION OF THE SYSTEMC SCHEDULER; (B) DIAGRAM OF AN EXECUTION

THE SYSTEMC SCHEDULER

The SystemC Language describes the scheduler algorithm. At the end of the elaboration phase ELAB, some processes are eligible, some others are waiting. During the evaluation phase EV, eligible processes are run inane unspecified order, non-preemptively, and explicitly suspend themselves when reaching a wait function. A process may wait for some time to elapse, or for an event to occur. While running, it may access shared variables and signals enable other processes by notifying events, or program delayed notifications.

An eligible process cannot become "waiting" without being executed. When there are no more eligible processes, signal values are updated (UP). Since there is no interaction between processes during the update phase, the order of the updates has no consequence. When there is still no eligible process at the end of an update phase, the scheduler lets time elapse (TE), and awakes the processes that have the earliest deadline. A notification of a SystemC event can be immediate, delayed or time-delayed. Processes can thus become eligible at any of the three steps EV, UP or TE.

In SystemC, the modules are instances of the class sc module. Each module may contain one or more processes. Communication internal to a module can be done in several ways (shared variables, events, etc.), but inter-module communication should be expressed with SystemC communication primitives: ports and channels.

A module contains ports, which are the interface to the external world. The ports of different modules are bound together with communication channels to enable communication. SystemC provides a set of communication interfaces such as sc_signal (synchronous signals), and abstract classes to let the user derive his own communication channels. In the pieces of code of Figures 2and 3 have two definitions of modules, one of which is instantiated twice. The model is represented graphically in Figure4.

The elaboration phase ends with a call to the function sc_start() that hands the control back to the SystemC kernel (line 70 in example). The last part of the execution is the simulation of the program's behavior. The SystemC kernel executes the processes one by one, according to the algorithm presented in Figure 5. Initially, all processes are eligible. Processes are ran one by one, non-preemptively, and explicitly suspend themselves when reaching a waiting instruction.

```
1.  #include "systemc.h"
2.  #include <iostream>
3.  #include <vector>
4.
5.  struct module1: public sc_module {
6.  sc_out<bool> port;
7.  boolm_val;
8.  void code1 () {
9.          if (m_val) {
10.                 port.write(true);
11.         }
12. }
13. SC_HAS_PROCESS (module1);
14. module1 (sc_module_name name, boolval)
15.         : sc_module (name), m_val (val) {
16.         // register "void code1 ()"
```

```
17.        // as an SC_THREAD (code1);
18.        SC_THREAD (code1);
19.    }
20. };
21.
22. struct module2 : public sc_module {
23. sc_in<bool> ports [2];
24. void code2 () {
25.        std::cout<< "module2.code2"
26.                <<std::end1;
27.        int x = ports[1].read();
28.        for (int i=0; i<2; i++) {
29.                sc_in<bool>& port – ports[i];
30.                if (port.read()) {
31.                        std::cout<< "module2.code2: exit"
32.                                <<std::end1;
33.                }
34.                wait ();              // wait with no argument.
35.                                // use static sensitivity list.
36.        }
37. }
38. SC_HAS_PROCESS (module2);
39. module2 (sc_module_name name)
40.        : sc_module (name) {
41.        // register "void code 2 ()"
42.        // as an SC_METHOD
43.        SC_METHOD (code2);
44.        don't_initialize ();
45.        //static sensitivity list for code2
46.        sensitive << ports [0];
47.        sensitive <<pors [1];
48. }
```

49. };

FIGURE 2: EXAMPLE OF SYSTEMC PROGRAM: DEFINITION OF MODULES

50. intsc_main (intargc, char ** argv) {

51. bool init1 = true;

52. bool init2 = true;

53. if (argc> 2) {

54.   init1 = !strcmp (argv[1], "true");

55.   init2 = !strcmp (argv[2], "true");

56. }

57. sc_signal<bool> signal1, singal2;

58. // instantiate modules

59. module1 * instance1_1 =

60.   new module1 ("instance1_1", init1);

61. module1 * instance1_2 =

62.   new module1("instance1_2", init2);

63. module2 * instance2 =

64.   new module2("instance2");

65. // connect the modules

66. instance1_1 ->port.bind(signal1);

67. instance1_2 ->port.bind(signal2);

68. instance2 -> ports[0].bind(signal1);

69. instance2 -> ports[1].bind(signal2);

70. sc_start(-1);

FIGURE 3: EXAMPLE OF SYSTEMC PROGRAM: MAIN FUNCTION
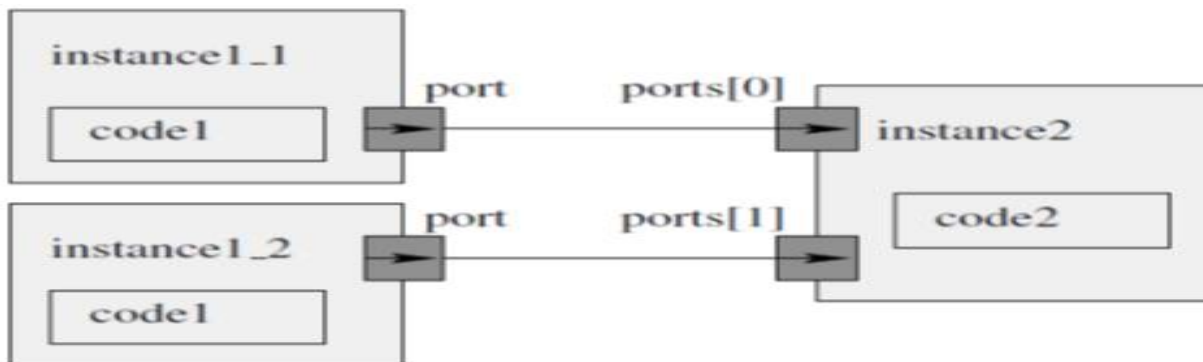
FIGURE 4: GRAPHICAL VIEW OF THE SYSTEMC PROGRAM

Note that this algorithm gives only the simpler cases. Uninitialized processes, instantaneous notification for example would add particular cases.

E: the set of eligible processes

S: a set of tuples (P, e) of sleeping processes

waiting for events

T: a set of tuples (P, t) of processes

associated with time events

F: a set of event or signal consequences:

(EV, e) or (SIG, s, v)

V: a set of tuples (s, v) for signal values

E:= {all processes, except those on which don't_initialize ( ) has been called.}

loop until the end of simulation

> while E ≠ ϕ one execution of this loop body is a δ-cycle
>
>> // the so-called evaluation phase:
>>
>> while E ≠ ϕ
>>
>>> P := one element in E; E := E – {P}
>>>
>>> run P, while filling F and reading signal values in V, until it stops;
>>>
>>>> if P emits an event e: F := F U {(EV, e)}
>>>>
>>>> if P writes a value v on a signal s: F := F- {(s, …)} U {(s, v)}
>>>
>>> if P stopped on a wait-time (t) T := T U {(P, t)}
>>>
>>> if P stopped on a wait-event S : = S U {(P, e)}
>>
>> end
>>
>> // the so called update phase:
>>
>> For each element f in F
>>
>>> if f = (EV, e) then
>>>
>>>> for each (P, e) in S: E := E U {P}; S := S – {(P, e)}
>>>
>>> if f = (SIG, s, v) then V := V – {(s, …)} U {(s, v)}
>>>
>>> F := F – f
>>
>> end
>
> end
>
> min = minimum value of the t_i's in the set T = {(P_i, t_i)}   // let time elapse:
>
> for each element x = (P_k, min) in T
>
>> T := T – {x}; E := E U {Pk}

end

end loop

FIGURE 5: THE SYSTEMC SCHEDULER ALGORITHM

This algorithm may appear strange to someone used to software scheduling. This idea actually comes from the RTL Hardware Description Languages. In the physical execution, the carry will propagate until all signals are stabilized. If the carry propagation is longer than the clock cycle, then the timing is incorrect. In a digital simulation, we do not have this notion of physical propagation, but the simulation semantics should be as close as possible to the physical behavior. If we execute the processes only once in a clock cycle, in an arbitrary order, then, the result will be dependent on the order of execution. If the least-significant bits are added first, then carry propagation will occur normally. If most-significant bits are added first, then the carry will be ignored.

One solution is to statically check the causal dependencies and compute an order of execution that will respect the causal dependencies (this is the approach followed by synchronous languages such as LUSTRE or ESTEREL. The other approach, followed by the standard HDLs and SystemC, is to reschedule the execution of each process until the signals get stabilized. Most actions (sc_signal value update for example, the notify() function in SystemC being a notable exception) are actually taken into account after all the scheduled process have finished their execution. If those actions wake up other processes, then, those processes will be executed during the next cycle.

THE TLM LIBRARY

In a TL model, all communications between components are done by transactions, which are implemented by function calls. When a process in a component I (initiator) wants to communicate with another component T (target), it calls method of one initiator port of I. The initiator port forwards the function call toits associated target port on T, which is linked to the code that implements this method. The initiator process continues when the function call returns. It does not yield back to the scheduler, allowing for atomic sequences of transactions.
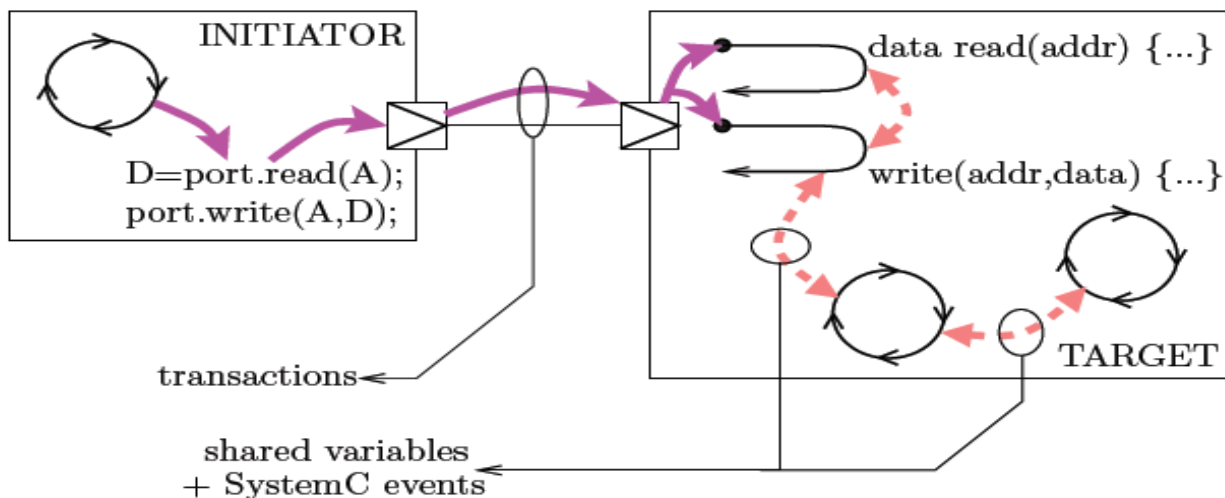

FIGURE6: COMMUNICATIONS IN TL MODELS

In Figure 6, circles with arrows represent processes; large plain arrows represent the function calls (transactions); dashed arrows represent communications between processes.

THE SYSTEM-ON-A-CHIP DESIGN FLOW

One of the past technological revolutions in the hardware domain has been the introduction of the Register Transfer Level (RTL) to replace the gate-level as an entry point for the design flow. The gate-level description uses only the simple logic operators (and, or, not, . . .) to describe the design, whereas the RTLlevel allows the notion of register (one-word memory), and a data-flow description of the transfers between registers at each clock cycle. Since the translation between RTL and gate-level descriptions can be done automatically and efficiently, the gate-level description is today mainly an intermediate representation synthesized from the RTL code, used for the chip manufacturing.

A. HARDWARE – SOFTWARE PARTITIONING

Raising the abstraction level above the gate-level has been a real progress, but is not sufficient to fill in today's design gap. It is necessary to maximize the reusability of the chip components, usually called Intellectual Properties (IPs). This can be achieved by using software components instead of Application Specific Integrated Circuits (ASIC).Software components can be easily reused, modified at all steps of the design flow. On the other hand, they are much less efficient both in terms of computation time and in terms of power consumption.

Therefore, designers need to find the compromise between software and hardware: implement the performance-critical operations using dedicated hardware components, and the non-critical parts using software. Deciding which feature will be implemented in software and which one will be implemented in hardware is called hardware/software partitioning. The result is a mixture of software and hardware, intermediate between general purpose CPU and ASIC and containing several components executing in parallel. It is called a System-on-a-Chip.

Since one of the main tasks of the embedded software is to program the hardware components, the software, or at least its low-level layers, will be highly hardware-dependent, and will not run unmodified on a standard computer. There are mainly two ways to execute such software: 1) execute it on the physical chip, and 2) execute it on a simulator.

The first option is not acceptable during the development because of time-to-market constraints: the software needs to be finished and validated a few weeks after the chip comes out of the factory. Furthermore, developing embedded software can help in finding bugs in the hardware, and the cost of a bug discovered on the physical chip is several orders of magnitude higher than a bug found before manufacturing the first chip: the first step of the manufacturing is to build the mask that will be used for the lithography of all chips.

The trivial way to simulate the hardware part of the chip is to use the RTL description. Unfortunately, due to the highly parallel nature of hardware, simulation of a large RTL design is extremely slow. It is possible to replace some components of an RTL simulation by a simulator, typically written in C, to increase the simulation speed. A common technique is to replace the processor by an instruction set simulator (ISS), and the memory by a simple array. This technique, mixing behavioral and RTL components is called co-simulation.

Figure 7shows the simulation time we get on the same computation with those different techniques.
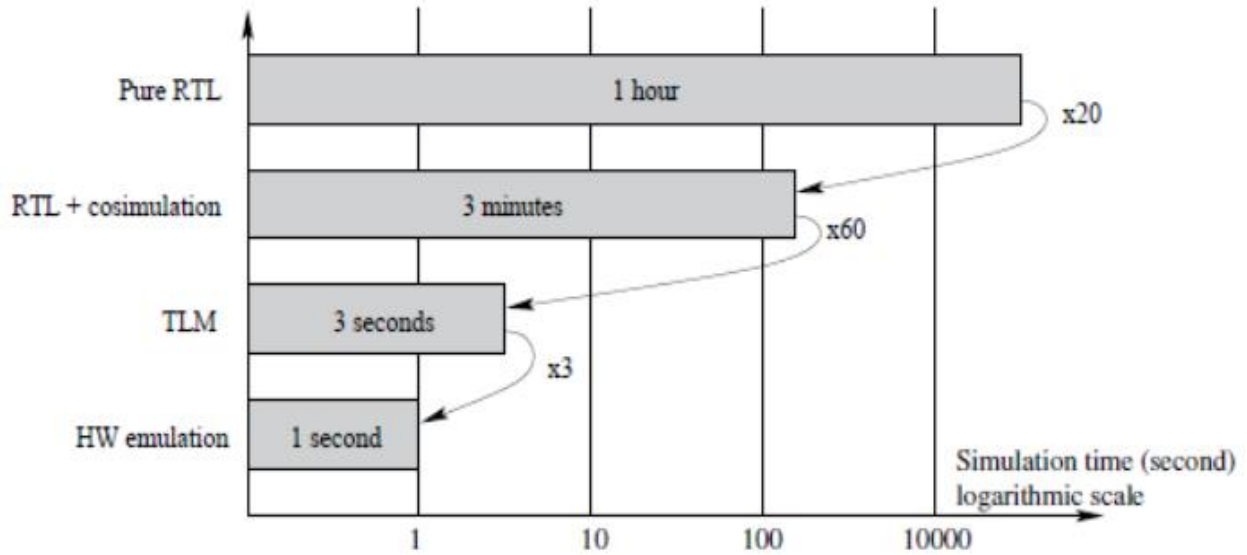
FIGURE 7: SIMULATION TIME FOR THE ENCODING + DECODING OF ONE IMAGE IN A MPEG4 CODEC
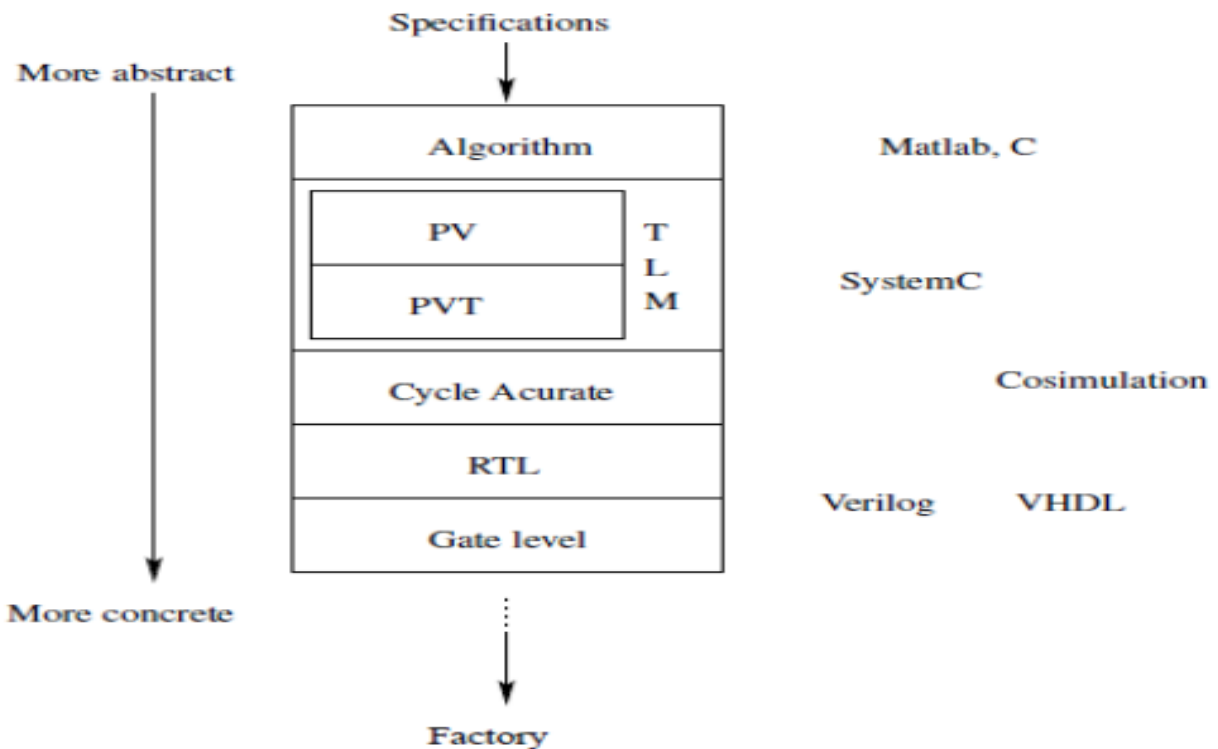
FIGURE 8: ILLUSTRATION OF THE DIFFERENT LEVELS OF ABSTRACTIONS

B. DIFFERENT LEVELS OF ABSTRACTION

Ideally, the design flow should start by the highest level, and refine, either automatically or manually to the lowest level. Figure 8illustrate the relationship between the different levels of abstraction. On the left are the levels of abstractions and on the right are examples of commonly

used technologies at this level of abstraction. On this picture, the ideal design flow starts from the top and refines to the bottom.

The distinction between those levels of abstraction is widely (but not quite universally) accepted. Of course, some intermediate levels can be added.

I. ALGORITHM

The highest level (below the specification) is the algorithm. For multimedia devices, at least part of the algorithm is provided by a norm, and reference implementations often exist. Algorithms are usually designed in high level programming languages, such as MatlabTM, or in C. At this level, the notion of software or hardware components does not exist, and the notion of parallelism is not yet taken into account.

II. PROGRAMMER VIEW: PV

Then comes the Transaction Level Model, which actually splits into two flavors: the Programmer View (PV), and the Programmer View plus Timing (PVT). At this level, the chip is modeled as a platform made of several modules. Each module shows to the external world all its functionalities, and only its functionalities. The timing aspects, for example, are not yet taken into account.

Communication between modules is done through a model of interconnect (the inter connect itself is the set of channels existing on the chip), made of one or several communication channels, whose role is to route a piece of data from a module to another one. This exchange of data is called a transaction. At this level, the size of a transaction is not necessarily related to the data-width of the bus. For an image processing algorithm, for example, the PV model can decide to transmit the data line by line, block by block, or even image by image.

An important part of the PV level is the system synchronization. At this level of abstraction, we haven real notion of timing, so the system is mostly asynchronous. A set of independent processes could hardly give a consistent behavior. For example, when a process needs a piece of data that is the output of another process, we have to ensure that the value will be produced before being used. The communication channels are not only useful to transmit data from one module to another, but can also be used for the system synchronization. Some channels can also be dedicated to synchronization and transmit no data. This is the case for the model of an interrupt signal. It can be modeled as a Boolean signal (we will observe the edges of the value, but not the value itself), or even a channel without value.

At this level of abstraction, the model contains all the necessary and only the necessary information Torun the embedded software. The organization of the program is completely different from the one of the algorithmic level. The first partitioning is done, the algorithms are parallelized, even if the decision of implementing some blocks in hardware or software is not necessarily taken. Some tools can help taking partitioning decisions, and some code can be reused, but an automatic translation from the algorithm level to the PV level cannot exist.

III. PROGRAMMER VIEW PLUS TIMING: PVT

While TLM was originally created to ease the development of embedded software, it also proved to be useful for preliminary performance analysis. Since the TLM model contains less details than the RTL, it can be written faster (it is usually admitted that a PV model can be written ten times faster than its RTLequivalent), and should be available earlier than the RTL in the life cycle of a

chip. It is therefore reasonable to use it to take decisions about the RTL design (identify the bottlenecks; dimension the modules and communication channels).

Unfortunately, the PV level does not contain the timing information necessary to perform such analysis.

It is therefore necessary to enrich the PV model with timing information, with some constraints: The functionality of the PV model must not be modified, and the effort to write the PVT model based on thePV model must be as low as possible, and in particular, lower than the effort to write a PVT model from scratch.

At this level, the architecture of the model must correspond to the one of the actual platform. Each data-transfer in the RTL model must correspond to a transaction of the same size in the PVT model. By adding timing information on each data treatment or transfer, we get a good approximation of the timing of the platform. Ideally, it should be cycle-count accurate (one knows how long a transaction takes), but not cycle-accurate (one doesn't know exactly what happens at a given clock cycle).

IV. CYCLE-ACCURATE: CA

A cycle-accurate model describes what happens at each clock cycle. It can still abstract some details, but needs to be aware of the micro-architecture of each component (for example, a model of a processor needs to model the pipeline tube cycle-accurate).

V. REGISTER TRANSFER LEVEL: RTL

It is the first level of abstraction to be precise enough to be synthesizable automatically and efficiently. It is bit-accurate, cycle-accurate, and describes all the internal details of each component. Designs at this level of abstraction are usually implemented dusing the VHDL (Very large scale integrated circuits Hardware Description Language) or Verilog language.

VI. GATE LEVEL, BACK-END

The design flow from the RTL design to the factory is well established. The gate-level net list is automatically generated from the RTL, then comes placement and routing to transform the net list into a two-dimensional view, that will be used to draw the lithography mask to be sent to the factory. Synthesis from RTL to gate level is possible efficiently, and is a well-established methodology.

SYSTEMC AND THE TLM API

A. NEED FOR A NEW "LANGUAGE"

TLM level of abstraction, to be applicable in practice, we need a way to write and execute such models. The main technical requirements are the following:

Efficient simulation: The main reason to write TLM models instead of RTL models is to gain several orders of magnitude in terms of simulation speed.

Modular design and code reuse: Classical software paradigms such as generosity, support for abstract data-type or object oriented programming can be helpful at this level.

Parallel execution semantics: The components must execute their behavior in parallel, synchronize themselves, and communicate together. Additionally, one can require interfacing with standard Hardware Description Language (HDL) languages (VHDL, Verilog), easy debugging, and

powerful tools for visualizing execution traces. It is more than desirable to build the TLM technologies on open standards for several reasons. Furthermore, the code reuse objective can only be achieved if the modules to be reused are compatible. This means the technology has to be supported by all the IP providers, which is unlikely to happen for a proprietary technology.

A number of other approaches have been proposed for the description of heterogeneous hardware/software systems with an emphasis on formal analysis. In this type of approach, the definition of the description language is part of the game. The language can be defined formally, and tailored to allow easy connections to validation tools.

The need for efficient simulation and the preference for well-known languages lead to consider a Cbased, or C++-based approach. Although oriented towards the promotion of a commercial tool, gives a good overview of the motivations behind this approach. A similar approach is to create a new language, inspired from C and C++, with the additional required features. This is the approach followed bisect. The approach didn't get a lot of success in the industry, partly because it requires a specific compiler.

System 2.0 has been designed to meet the above requirements. It is open source and relies on an ISOstandard language: C++. This is crucial for two reasons: first, it guarantees a fast learning-curve for the engineers of the domain; second, it guarantees that the models of systems developed in SystemC can beexploited even if the tool that was used to build them is no longer available.

B. THE SYSTEMC LIBRARY

A model written in SystemC is executed in two phases:

ELABORATION: The entry point for the execution of the model is the function sc_main() (the SystemC library itself provides the main() function, which is a very simple wrapper around sc_main()).This starts the elaboration phase during which the modules will be instantiated in the usual C++ way, and connected (bound) together. Then, the program calls the function sc_start that will launch the simulation.

SIMULATION: After the call to sc_start(), the architecture of the model is fixed. No module can be instantiated, and the binding cannot change. The SystemC kernel will call the member functions of the modules that have been registered as processes. This is called the simulation phase.

During the simulation, SystemC distinguishes two kinds of processes: SC THREAD and SC METHOD (plus the semi-deprecated SC CTHREAD). An SC THREAD is an explicit infinite loop. It is a function that never terminates, but that hands back the control to the scheduler using the wait statement or equivalent. An SC METHOD in a process that executes in zero time, implemented by a C++ function that must terminate, and that will be called repeatedly by the scheduler.

CONCLUSION

This paper begins with presentation of SystemC, SystemC Scheduling along with TLM Library. Paper try to presents today's design flow, with the different levels of abstraction used to describe a chip. Then it details the Transaction Level Modeling level of abstractions that explained in this paper and present the way it is implemented in SystemC and finally, paper ends with TLM API.

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THE STUDY OF THE PERFORMANCE APPRAISAL –BASED ON CRITERIA ANALYSIS

Swaroop Kumar Chattopadhyay*

ABSTRACT

Performance appraisal has widened as a concept and as a set of practices and in the form of performance management has become part of a more strategic approach to integrating HR activities and business policies. As a result of this, the research on the subject has moved beyond the limited confines of measurement issues and accuracy of performance ratings and has begun to focus more of social and motivational aspects of appraisal. I am doing this project in order to identify and discusses a number of themes and trends that together make up the developing research agenda for this field. It breaks these down in terms of the nature of appraisal and the context in which it operates. The former is considered in terms of contemporary thinking on the content of appraisal (contextual performance, goal orientation and self awareness) and the process of appraisal (appraiser–appraisee interaction, and multi-source feedback). My discussion of the context of appraisal would concentrate on cultural differences and the impact of new technology. In reviewing these emerging areas of research, this study seeks to explore some of the implications for appraisal practice at both organizational and individual levels. Thus, the result of my survey and analysis would provide a very useful input to the management of the organization in order to give the better view for analyzing the skills as well as seniority during performance appraisal.

KEYWORDS: *One Of The Solutions To The Above Said Problems Which I Felt Is PERFORMANCE APPRAISAL, Which Should Be Conducted Effectively And Efficiently To Completely Eliminate Such Problems.*

INTRODUCTION

Performance appraisal, is a method by which the job performance of an employee is evaluated in terms of quality, quantity, cost and time. Performance appraisal is a part of career development. Performance appraisals are regular reviews of employee performance within organizations.

The aims of a performance appraisal are to:

- ➢ Give feedback on performance to employees.
- ➢ Identify employee training needs.
- ➢ Document criteria used to allocate organizational rewards.
- ➢ Form a basis for personnel decisions
- ➢ Provide the opportunity for organizational diagnosis and development.

➢ Facilitate communication between employee and administrator

➢ Validate selection techniques and human resource policies to meet federal Equal Employment Opportunity requirements.

Research has reported that appraises seem to have greater acceptance of the appraisal process, and feel more satisfied with it, when the process is directly linked to rewards. Such findings are a serious challenge to those who feel that appraisal results and reward outcomes must be strictly isolated from each other.

There is also a group who argues that the evaluation of employees for reward purposes, and frank communication with them about their performance, are part of the basic responsibilities of management. The practice of not discussing reward issues while appraising performance is, say critics, based on inconsistent and muddled ideas of motivation. In many organizations, this inconsistency is aggravated by the practice of having separate wage and salary reviews, in which merit rises and bonuses are decided arbitrarily, and often secretly, by supervisors and managers.

TYPES OF APPRAISALS

➢ Numeric rating - rates 1 to 10

➢ Free written report - appraiser writes an account of an employee's performance in essay style.

➢ Controlled written report - same as above but with a document completed.

➢ Personality trait report - rating initiative, reliability, and judgment

➢ Forced choice rating - an extension of numerical approach indicating high and low performance.

➢ Forced distribution - a number of categories (average, below average, above average, etc) assessed for each quality.

➢ Self rating - employee comments on his/her own performance and to put forward suggestions relating to modification of job description, further training and development needed.

BENEFITS OF APPRAISAL

Perhaps the most significant benefit of appraisal is that, in the rush and bustle of daily working life, it offers a rare chance for a supervisor and subordinate to have "time out" for a one-on-one discussion of important work issues that might not otherwise be addressed. Almost universally, where performance appraisal is conducted properly, both supervisors and subordinates have reported the experience as beneficial and positive.

➢ Motivation and Satisfaction

➢ Training and Development

➢ Recruitment and Induction

➢ Employee Evaluation

CONFLICT AND CONFRONTATION

Invariably the need arises in performance appraisal to provide an employee with less than flattering feedback.

The skill and sensitivity used to handle these often difficult sessions is critical. If the appraise accepts the negative feedback and resolves to improve, all is well. But if the result is an angry or hurt employee, then the process of correction has failed. The performance of an employee in such cases is unlikely to improve and may deteriorate even further.

OVERVIEW

Performance appraisals are a systematic way of evaluating the standard of an employee's performance.

Steps for Developing a Systematic Performance Appraisal.

1. Identify Key Performance Criteria

2. Develop Appraisal Measures

3. Collect Performance Information from Different Sources

4. Conduct an Appraisal Interview

5. Evaluate the Appraisal Process

BEST PRACTICE IN PERFORMANCE APPRAISAL

In essence, best practice in performance appraisals involves:

➢ Integrating performance appraisal into a formal goal setting system.

➢ Basing appraisals on accurate and current job descriptions.

➢ Offering adequate support and assistance to employees to improve their performance

➢ (e.g., professional development opportunities).

➢ Ensuring that appraisers have adequate knowledge and direct experience of the employee's performance.

➢ Conducting appraisals on a regular basis.

OBJECTIVES & SCOPE

AIMS

Performance appraisals are a way to give feedback to staff regarding their performance. The appraisal can be used to encourage good work as well as point out opportunities for improvement. Appraisals can also be used to set measurable targets and objectives to continually spur performance improvement.

INCREASING ROLE CLARITY

Performance appraisal is a tool for communicating the skills, knowledge and attitudes required for the different job roles. The appraisal criteria acts as a guide to the attitudes and behaviours that any company would like their staff in their various capacities to have.

TRAINING AND DEVELOPMENT

Performance appraisals measure an individual's performance and can identify opportunities for improvement or learning through training.

COMPENSATION AND REWARD

As any company bonuses and annual increments are linked to performance, a system for measuring performance in an equitable way is necessary. The performance appraisal encourages the use of objective, quantifiable criteria to measure performance which will be known to all staff. This system improves fair judgement and the perception of equity among staff.

CAREER PLANNING

Performance appraisals will allow any company to assess the skill set of their existing staff to ascertain the career path for each individual.

ENHANCE CORPORATE VALUES

Any company's corporate value is the pursuit of innovative quality in the areas of Customers, Employees, Society, Products, Technology, Management and Fairness. These values are translated to performance measures that are used in the appraisal. This enhances awareness of corporate values and promotes behaviours that are in line with any company's values.

Thus based on the above topics the objective of my study is "to analyze the criteria of performance appraisal and also to recommend measures to improve the same."

This objective has been classified as follows:

➢ To study the performance appraisal system of a standard organization.

➢ To analyze the transformation of performance appraisal form traditional to modern type.

➢ To study the practical application of performance appraisal in that organization.

➢ To compare appraisal system of different organization and find out the most common parameters for appraisal.

➢ How can companies use performance appraisal as an effective tool to achieve organisational effectiveness and efficiency.

SCOPE OF THE STUDY

A promotion is the appointment of a member to another position, within the same department or elsewhere in the organization, involving duties and responsibilities of a more complex or demanding nature and are recognized by a higher pay grade and salary.

A promotion is a move up the organizational ladder; job rotation and transfers are lateral moves; demotions are downward moves; and layoffs move employees out. Layoffs, in contrast to dismissals are terminations, sometimes temporary, required for business needs unrelated to worker behavior or performance. All of these changes bring about shifts in status, and often in pay, of the employees involved.

SENIORITY VS. MERIT IN PROMOTIONS

Seniority is an employee's length of service in a position, job grouping, or farm operation. An individual who has worked on a farm for three years has more seniority than one who has worked for two. Merit, in contrast, refers to "worth" or "excellence." Merit is more difficult to measure than seniority. In the context of promotion, it relates to relevant qualifications as well as effectiveness of past performance.

PROMOTION BY SENIORITY

In a straight seniority system - where the only factor in allocating jobs is length of service - a worker would enter the organization at the lowest possible level and advance to higher positions as vacancies occur. All prospective farm supervisors and managers would work their way up through the ranks. In a seniority system, length of service is the chief criteria for moving up the ladder.

More typically, seniority counts only within specified job groups. Some groups might contain only one job classification, others several. All managers, for instance, would have once worked as foremen. The benefits and disadvantages of using seniority in promotion decisions are summarized in the following Figure. The most obvious strength is its undisputed objectivity. Growers may deviate from a system based purely on seniority in order to avoid some of its inherent limitations. Seniority systems tend to reward loyalty and promote cooperation - albeit not excellence.

PROMOTION BY MERIT

Promotions based on merit advance workers who are best qualified for the position, rather than those with the greatest seniority. When present employees are applying for a position, a worker's past performance is also considered. Effective performance appraisal helps build trust in the system.

SUMMARY

Organizational movements, such as promotions, transfers, job rotations, demotions, and layoffs may alter workers' security, satisfaction and productivity. Arguments favoring merit-based promotions focus around worker qualifications and performance, while those based on seniority stress greater job security and protection from arbitrary treatment. Seniority tends to reward loyalty while merit promotes excellence. An effective blend may combine good points from each. Even workers who may favor promotions through merit often favor seniority-based layoffs that retain long-term employees. In contrast, arguments favoring merit layoffs stress the need to have qualified persons doing the work.

The most significant reasons of using Performance appraisal are:

➢ Making payroll and compensation decisions – 80%

➢ Training and development needs – 71%

➢ Identifying the gaps in desired and actual performance and its cause – 76%

➢ Deciding future goals and course of action – 42%

➢ Promotions, demotions and transfers – 49%

➢ Other purposes – 6% (including job analysis and providing superior support, assistance and counseling)

BENEFITS OF PERFORMANCE APPRAISAL

Perhaps the most significant benefit of appraisal is that, in the rush and bustle of daily working life, it offers a rare chance for a supervisor and subordinate to have "time out" for a one-on-one discussion of important work issues that might not otherwise be addressed.

Almost universally, where performance appraisal is conducted properly, both supervisors and subordinates have reported the experience as beneficial and positive.

Appraisal offers a valuable opportunity to focus on work activities and goals, to identify and correct existing problems, and to encourage better future performance. Thus the performance of the whole organization is enhanced.

For many employees, an "official" appraisal interview may be the only time they get to have exclusive, uninterrupted access to their supervisor. Said one employee of a large organization after his first formal performance appraisal, "In twenty years of work, that's the first time anyone has ever bothered to sit down and tell me how I'm doing."

The value of this intense and purposeful interaction between a supervisors and subordinate should not be underestimated.

CHALLENGES OF PERFORMANCE APPRAISAL

In order to make a performance appraisal system effective and successful, an organization comes across various challenges and problems. The main challenges involved in the performance appraisal process are:

1. Determining the Evaluation Criteria

2. Create a Rating Instrument

3. Lack of Competence

4. Errors in Rating and Evaluation

5. Resistance

METHODOLOGY

How to Conduct a Performance Appraisal Process

The following five-step approaches are available for conducting a systematic performance appraisal:

1) Identify key Performance Criteria

2) Develop Appraisal Measures

3) Collect Performance Information from different sources

4) Conduct an Appraisal Interview

5) Evaluate the Appraisal Process.

STEP 1: IDENTIFY KEY PERFORMANCE CRITERIA

Perhaps one of the most challenging aspects of setting up a performance appraisal is deciding what to assess. In essence, four key dimensions of performance should be considered in a performance appraisal.

i) Base the performance criteria on an up-to-date job description

ii) Develop criteria in consultation with appraisers and employees.

STEP 2: DEVELOP APPRAISAL MEASURES

Once clear and specific performance criteria have been developed, the next step is to decide how to assess employee's performance. It is recommended that a structured and systematic approach is

taken to assessing performance. Problems that arise when an unstructured "blank sheet" approach is used include:

There are three important considerations in the design of appraisal measures:

i)   Generic versus individually tailored measures

ii) Objective versus subjective assessments

iii) Assessing the impact of the work environment on performance.

STEP 3: COLLECT PERFORMANCE INFORMATION FROM DIFFERENT SOURCES

Once the appraisal measures are developed, the next step involves collection of accurate performance information. A common trap is to begin noting observations of employees just before conducting appraisals. This is likely to give an inaccurate picture of a employee's performance. Ideally, employee's performance should be observed in a systematic way over time (e.g., in a diary). This method ensures the accuracy of information about their performances.

STEP 4: CONDUCT AN APPRAISAL INTERVIEW

The next step in a performance appraisal is to conduct the appraisal interview. The two central purposes of the appraisal interview are to:

➢ **Reflect on past performance to identify major achievements, areas that require further development, and barriers / facilitators to effective performance**

➢ **Identify goals and strategies for future work practice.**

STEP 5: EVALUATE THE APPRAISAL PROCESS

As with any organisational system, the performance appraisal process should undergo regular review and improvement. For example, the process of performance appraisal could be evaluated by conducting focus groups or surveys with employees to gauge their satisfaction.

RESEARCH METHODOLOGY USED IN THIS PROJECT

The research design comprise of the plan and structure of investigation conceived so as to arrive at the responses to the research queries. It there by addresses the aims and objectives of the study, both descriptively and analytically.

SAMPLING TECHNIQUE

The sampling technique adopted for the study is non-probability Random sampling technique according to the convenience of the researcher. A questionnaire was administered to HR managers / executives of different software companies to obtain data for the purpose of analysis.

SAMPLE SIZE

Data is collected using a sample size of 30 employees at each Level (Top, Supervisory, and Officers Levels).

SAMPLE DESCRIPTION

The sample mainly consists of data from the primary sources that are utilized for the purpose of this study. This is done by means of administrating questioners to Top Level Managers /

Supervisory Level and Officers Level executives of the Company. Secondary data like company journals, newsletters, records etc. were also relied on for retrieving further information.

PRIMARY DATA

For obtaining the primary data of my project, I have used two research instruments i.e. Questionnaire and Structured interview:

QUESTIONNAIRE TARGETED TO

Top Level	-	Structured Method.
Supervisory Level	-	Structured and Operational Method.
Officers Level	-	Operational Method

SECONDARY DATA

I have obtained secondary data from

➢ Previous in house studies done in that organization.

➢ Earlier Appraisal Report / Past Employees/ Grievance

INSTRUMENTATION TECHNIQUE

Questionnaire and Structured Disguised Questions.

QUESTIONNAIRE

There were two questionnaire were designed. First has been designed to assess the job satisfaction level and morale of the employees in the organization. Second was designed for the HR of the organizations.

CHAPTER 4

DATA COLLECTION

ACTUAL COLLECTION OF DATA

Both secondary and primary sources of data are utilized for the purpose of this study. Primary data is collected by means of administering a questionnaire to the Employees Human Resource Managers / Executives of the organization. Secondary data is collected from various records, manuals and other sources of the HR Department.

LIMITATIONS OF STUDY

➢ To get contacts of HR Mangers for interviews was difficult.

➢ Getting the views and opinion of the interviewee (HR Manager) was a difficult task.

➢ Time constraint is also one of the limitations, because of the busy schedule of some employees data has not been collected from those employees.

➢ Few people failed to give exact information for the first particular 6 questions as they have to give ratings for superiors and subordinates.

ERRORS OCCURRED IN PERFORMANCE APPRAISAL

One of the biggest problems with performance appraisal is the fact that most people are not accurate raters of others' performance. When an employee's performance rating does not reflect their true or actual performance, we say a rater error has occurred. Whilst completing the appraisal form, the appraiser is advised to exercise caution, as there may be several pitfalls which may skew the assessment:

THE MOST COMMON RATER ERRORS ARE

➢ Halo/Horn Effect

➢ Central Tendency

➢ Regency Effect

➢ Rater Bias

➢ Negative Effect

USING THE APPRAISAL FORM

ELEMENTS OF THE APPRAISAL FORM

The appraisal form covers the following key areas:

➢ Assessment of Performance

➢ Employee's Growth and Development - Strengths and Areas for Improvement

➢ Training requirements

➢ Achievements

➢ Goals and Targets (for Managers and Executives)

➢ Review with Staff (for Managers and Executives)

➢ Recommendations

➢ Management Review- Review by Countersigning Authority

DATA ANALYSIS

STATISTICAL TOOLS USED FOR DATA ANALYSIS AND INTERPRETATION

SPSS and Rank Correlation had been used for data analysis and interpretation.

SPSS: Statistical Package for the Social Sciences (SPSS) is a computer program used for statistical analysis. SPSS has become a leader in predictive analytics technologies through a combination of commitment to innovation and dedication to customers. SPSS is now virtually used every industry, including telecommunications, banking, finance, insurance, healthcare, manufacturing, retail, consumer packaged goods, higher education, government, and market research. The many features of SPSS are accessible via pull-down menus or can be programmed with a proprietary 4GL command syntax language. Command syntax programming has the benefits of reproducibility; simplifying repetitive tasks; and handling complex data manipulations and analyses. Additionally, some complex applications can only be programmed in syntax and is not accessible through the menu structure. The pull-down menu interface also generates command syntax, this can be displayed in the output though the default settings have to be changed to make

the syntax visible to the user; or can be paste into a syntax file using the "paste" button present in each menu.

Source… http://www.answers.com/topic/spss

RANK CORRELATION: A nonparametric test of statistical dependence for a random sample of paired observations. A rank correlation coefficient measures the correspondence between two rankings and assesses its significance. Suppose that it is possible to arrange a number of individuals according to the degree to which they possess a given character, whether qualitative or quantitative. Thus, for example, a number of operators may be arranged in order of efficiency by their supervisor, although it may not be easy to offer any satisfactory measure of efficiency. Similarly, a number of students may be arranged in order of stature without measuring the height of each student. Such an ordered arrangement of individuals is called a ranking, and the ordinal number indicating the position of a given individual in the ranking is called its rank. To be specific, a rank r means that, with respect to the character under study, the individual stands r^{th}, so that (r-1) individuals have the character to a higher degree than this individual. In a given ranking, two or more individuals may be considered indistinguishable with respect to the character under study and so may be assigned the same rank. The ranking is then said to involve a tie.

Rank correlation has three possible uses. First, it may be used to find the degree of association between two series of data that are given as ranks, such as the standings of a group of students in two different examinations. Second, rank correlation enables us to correlate two qualitative characters that are amenable to ranking, such as eye-color and hair-color (for a group of people) or toughness of language and toughness of subject matter (for a group of books). Third, it may be used to measure the agreement between the ranks assigned by two judges to the same set of individuals with respect to the same (qualitative or quantitative) character. Fourth, it serves as an alternative to ordinary correlation when the data are observations on two quantitative characters. When the number of individuals is small, rank correlation is a quick and easy measure of association, which may be useful in case of intensive study is called for.

Source… Goon, Gupta, Dasgupta – Basic Statistics

FINDINGS

A. From the survey results its evident that both the appraisee's and appraisers expectation from Performance appraisal system are the same i.e. "Determination of Promotion or Transfer" and "Salary Administration and Benefits". Hence a single performance appraisal system can satisfy needs of both the Appraiser and appraisee. Therefore the Performance appraisal program would be designed in such a way that the appraiser would be able to analyse the contribution of the employee to the orgaisation periodically and all the employees who have been performing well would be rewarded suitably either by an increase in the salary or a promotion. Through this the appraiser can also motivate the employees who felt that they had no growth in the organisation and serves the purpose of employee development.Thus performance appraisals can be used as a significant tool fo career lanning.

B. Analyzing ones own strengths and weaknesses is the best way of identifying the potentials available, rather than the other person telling. Self-appraisal is a tool to analyze oneself. One of the most important findings was that almost all the employees wanted self-rating to be a part of performance appraisal program carried out by the organisation. From the responses of the appraiser we can also see that Self rating is not encouraged by the organisations. This

could therefore be an important factor which leads to dissatisfaction among the appraisees. At the end of the year of the appraisal period the appraisal process should begin with self-appraisal by every employee. To appraise ones own self on key performing targets and qualities, the appraise would go through a process of reflection and review. It is an established fact that change is faster when it is self initiated. If any employee has to improve or do better, he must first feel the need to do so. Reflection and review is a process that enables him to feel the need and improve more upon his strengths and weaknesses.

C. Another point to be noticed is that even in the other forms of Performance Appraisal also the employees expect that they should be given a chance to rate their own performance. This can allow the employee to analyze ones own performance which gives new insights on how one is performing and what are the critical points where he has to put his best and improve upon.

D. The existence of a proper complain channel was also of utmost importance to the appraisees. They should be given a chance to convey their greviences to the top management.

E. The findings suggest that for success of Appraisal system the credibility of appraiser is of utmost importance.

F. As per the Appraiser, a poorly conducted appraisal system would lead to demotivation and ineffective teamwok which will result in inefficient functioning and low productivity in the organization. Therefore, if at all they feel there is dissatisfaction among the appraisee's they should motivate them. Achievement, recogntion, invelvement, job satisfaction and development can motivate the employees to a large extent. Along with this satisfactory working conditions and appropraite awards also play an important role.

G. Also a majority of employees were satisfied with the current appraisal system although they requested for some changes.

H. From the survey we can also derive that the appraisee's expect a post appraisal interview to be conducted wherein they are given a proper feedback on their performance and they can also put forward their complaints if any. The appraisal should also be followed up with a session of counseling which is often neglected in many organizations. Counseling involves helping an employee to identify his strengths and weaknesses to contribute to his growth and development. Purpose is to help an employee improve his performance level, maintain his morale, guide him to identify and develop his strong points, overcome his weak points, develop new capabilities to handle more responsibilities, identify his training needs.

RECOMMENDATIONS

With rewards being directly linked to achievement of objectives, goal setting and Performance Appraisal assumes utmost importance. The Performance Appraisal System has been professionally designed and it is monitored by HRD. The implementation is the responsibility of each and every employee along with their supervisor. There should be adequate training to the evaluator that will go a long way in answering the quality of Performance Appraisal. In conclusion, a Performance Appraisal is a very important tool used to influence employees. A formal Performance review is important as it gives an opportunity to get an overall view of job performance and staff development. It encourages systematic and regular joint-stocking and planning for the future. Good performance reviews therefore don't just summarize the past they help determine future performance.

During the study, distribution of the questionnaire and conducting of personal interviews did help to arrive at the standards of appraisal system adopted by the organization.

Appraisal systems are a very effective means to realize the growth of a company and its employees. Hence, it is considered to be important for the development of the industry. From the appraisal systems, the 360° are the most preferred by a majority of them.

CONCLUSION

With rewards being directly linked to achievement of objectives, goal setting and Performance Appraisal assumes utmost importance. The Performance Appraisal System has been professionally designed and it is monitored by HRD. The implementation is the responsibility of each and every employee along with their supervisor. There should be adequate training to the evaluator that will go a long way in answering the quality of Performance Appraisal. In conclusion, a Performance Appraisal is a very important tool used to influence employees. A formal Performance review is important as it gives an opportunity to get an overall view of job performance and staff development. It encourages systematic and regular joint-stocking and planning for the future. Good performance reviews therefore don't just summarize the past they help determine future performance.

1. Performance appraisal should not be perceived just as a regular activity but its importance should be recognized and communicated down the line to all the employees.

2. There should be a review of job analysis, job design and work environment based on the performance appraisal.

3. It should bring more clarity to the goal and vision of the organization.

4. It should provide more empowerment to the employees.

5. New methods of appraisal should be adopted so that both appraiser and the appraise take interest in the appraisal process.

6. The employees who have excellent performance should be used as a mentor for other employees which would motivate others to perform better.

7. Employees should be given feedback regarding their appraisal. This will help them to improve on their weak areas.

8. The awareness sessions for the employees/appraisees should be made more interactive and the views and opinion of the appraisees regarding appraisal should be given due consideration.

9. Assistance should be sought from specialists for framing a proper appraisal system that suits the organisation climate. Constant monitoring of the appraisal system should be done through discussions, suggestions, interactions.

10. Combining the different methods of appraisal can minimize the element of biasness in an appraisal. Like the Rating method combined with assessment center method would give an evidence of poor/unfavorable or outstanding behaviour of the appraisee, if any.

11. Use of modern appraisal techniques like 360° appraisal, assessment centers which are more effective.

12. More transparency should be brought about in the appraisal system.Information regarding the performance of the employees should be kept in proper manner.

13. Performance appraisal should be effectively link to the performance management system of the organization.

14. Performance appraisal takes into account the past performance of the employees and focuses on the improvement of the future performance of the employees.

Thus Performance management lays an evaluative and developmental dimension to its makeup, and is crucial in both linking rewards to performance and providing a platform for the development of employees. Over concentration on the assessment of performance can work to the detriment of effort aimed at establishing the development needs of the individual in an open and honest way. The manager, as an appraiser, may encounter difficulties in reconciling the roles of 'judge' and 'mentor'. Managers need to develop the skills of coping with such tensions in their roles. In some organizations, this problem is solved by having different managers carrying out performance and development appraisals. Appraisal provides the context in which mangers can seek to ensure that there is acceptable congruency between the objectives of the individual and those of the organization.

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TRAINING & DEVELOPMENT PROGRAMMES FOR IMPROVED EMPLOYEE PERFORMANCE: A COMPARATIVE STUDY OF SELECTED ORGANIZATIONS FROM RUBBER PRODUCTS INDUSTRY AND NEWS PAPER INDUSTRY

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ABSTRACT

The study deals with the various training and development practices used in selected Rubber Products Industry and News Paper Industry in Kerala. It measures the impact of training and development programmes on employee productivity. The impact of T&D practices on employee productivity is measured in a sample of 150 employees drawn from top, middle and lower management levels in these Rubber Products industry and News Paper Industry. The perception of the respondents on the impact of 12 selected dimensions of T& D Practices was made by laying down various dimensions of employee performance. The effect is studied through t-test to see if there is any significant difference between the perception of employees in Rubber Products industry and News Paper Industry as far as the effectiveness of T&D programme is concerned, using the SPSS statistical package. Conclusions and implications for the industries in Kerala are discussed further.

KEYWORDS: *Training and Development, Employee Productivity, Employee Performance, Organisational performance.*

1.INTRODUCTION

'While technology is taken as locomotive, finance as the wheels which makes the locomotive move forward, it is the industrial relations which serves as grease to make the locomotive move frictionlessly'. Here lies the importance of HRM and Industrial Relations in today's business scenario where managers are faced with the difficult challenge of continuing to improve over time the performance of the unit or company they are managing. The present study investigates one of the Human Resource Practices, the training and development programmes,   and its impact on employee performance. It attempts to measure the impact of Training & Development Programmes on employee performance in a sample of 150 employees drawn from top, middle and lower management levels in the selected organisations from two different industries (Rubber Products Industry and News Paper Industry) in Kerala. Twelve major dimensions were researched to study the Training & Development Programmes in the selected organisations. Respondents' perception on the impact of Training & Development Programmes on employee performance was made by laying down various dimensions of employee performance. This impact has been assessed using t-test to see if there is any significant difference between the perception of employees in one industry and the other industry using SPSS statistical package. Conclusions and implications for industries in Kerala and theoretical considerations are discussed further.

2.REVIEW OF LITERATURE

In view of growing research evidence showing a positive correlation between progressive HRM techniques and superior financial performance, there is no doubt that HRM can be a valuable aid to turnaround of organizations ,which are seriously affected by chronic productivity crisis, high incidence of industrial sickness and growing labour unrest. The body of research examining the relationship between HR practices and firm performance has grown exponentially over the past few years. Guthrie (2001) examined the impact of HR practices on Turnover and firm productivity and identified a positive impact of High Involvement Work Practices on Employee retention and Productivity. Delery and Doty (1996) in their study in banking industry in U.S. and observed a positive relationship between HR practices and profitability. Huselid 1995 too examined the relationship between HR practices and corporate turnover, profitability and market value in the U.S. Ann P Bartel (1995) in the study entitled "Training, Wage Growth and Job Performance: Evidence From a Company Database" shows that Training leads to an improvement in job performance, as measured by performance rating scores.   Ronald Jacobs and Christopher (2003)) through the study 'Employee Development and Organiztional Performance' supports the commonly held belief that employee development programs make positive contributions to organizational performance.

3.SIGNIFICANCE / NEED OF THE STUDY

For company to be successful, it need to keep a tab on the changing aspirations of their people and adapt their training modules to the emerging needs. Above all, they should gauge the effectiveness of such training progrmmes. Even though there exists a lot of studies on the impact of Training and Development progrmmes on employee performance, a comparative study between two industries on such topic, especially in Kerala based companies is missing in the literature. The

significance of the study is to identify whether the same T&D practices can be applied to a large number of orgnisations, irrespective of the industries under consideration.

4. OBJECTIVES AND HYPOTHESIS

The primary objective of the present research is to study the impact of Training & Development Programmes on employee performance in selected organizations from two different industries, namely Rubber Products industry and News Paper Industry, to determine whether it can have a positive impact on employee productivity for improved organizational performance.

Objectives of the present study are,

-To compare the impact of Training & Development Programmes on employee performance in 'Rubber Products industry' and 'News Paper Industry'.

-To determine whether it can have a positive impact on employee performance.

- To compare the Training and Development Programmes of two different industries

The hypotheses for the study are

1. There is no significant variation in the effectiveness of the T& D Programmes of Rubber Products Industry and News Paper Industry.

2. There is a positive impact of training and development practices on employee performance

5.RESEARCH METHODOLOGY

In the present study samples were selected from organizations of two different industries. A total sample size of 400 was taken. Questionnaires were administered to 200 respondents in both the organizations. However, completed questionnaires could be obtained only from 100 respondents in the Rubber Products industry and 50 from News Paper Industry. The universe of the study consisted of employees from top, middle and lower management. The employees were selected on the basis of convenience sampling. The sample profile and the break- up can be shown as follows.

5.1 SAMPLE PROFILE AND BREAK-UP

Type of industry	Sample size	Final Responses obtained
Rubber Products	200	100
News paper	200	50
Total	400	150

A structured interview schedule has been used as the main tool for the purpose of collecting primary data. The interview schedule pertains to the profile of the respondents, different dimensions of T&D programmes and the impact of T&D programmes on employee performance. The views on T& D programmes were measured with the help of a 5-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. A study on the respondent's perception of the impact of T& D programmes on employee productivity was made by laying down various dimensions of employee performance. The 12 different dimensions identified for measuring the impact of T&D on employee performance were ' fall in accidents, scrap reduction, fall in damage to machinery and equipment, improved satisfaction, reduced grievances absenteeism, reduced LTO, decreased cost of production, , increase in output', Improvement in quality of output', 'improvement in team

work', and more motivated workforce'. The opinion expressed was classified in to a)positive, b)no impact c) uncertain (it means – not knowing) d)negative.

5.2 MATERIALS AND METHODS

- Duration of Study June 2012– Aug 2012
- Period of Study Jan 2007– Dec 2011
- Type of Data –Primary & Secondary Data
- Method of Data collection - Direct Interview Method
- Sampling Unit: Workers, Supervisors, Company Executives
- Sampling Method: convenience Sampling Method
- Statistical tools used – t test , Mann-Whitney U TEST

5.3 DIMENSIONS OF T&D PROGRAMME

- Learning in the program
- Duration Program faculty
- Work load in the program
- Coverage of the program
- Depth of the course content
- Methods of presentation
- Application of learning to job
- Change of job Behavior
- Frequency
- Trainee ability
- Method of teaching
- Learning in the program

5.4 DIMENSIONS OF EMPLOYEE PERFORMANCE

- Fall In Accidents rate,
- Scrap Reduction,
- Less Damage To Machinery And Equipment,
- Improved Satisfaction,
- Reduced grievances
- Absenteeism,
- Reduced LTO,
- Decreased Cost Of Production, ,
- Increase In Output',

- ➢ Improvement In Quality Of Output',
- ➢ 'Improvement In Team Work',
- ➢ More Motivated Workforce'

6. RESULTS AND DISCUSSION

Respondent's perception on the impact of Training & Development Programmes on employee performance was made by laying down various dimensions of employee performance. This impact has been assessed and t-test has been conducted to see if there is any significant difference between the perception of employees in one industry and the other industry using SPSS statistical package. The investigations made and the interviews held with the employees have revealed that the effectiveness of the T& D Programmes is more in Rubber Products Industry as compared to News Paper Industry and the difference is significant enough. (t= 2.273). However there is no significant variation between the perception of employees in Rubber Products industry and the News Paper Industry, as far as the impact of T&D Programmes on employee performance is concerned.(t value – 1.885). (Table 1).

6.1 TABLE 1. A COMPARISON OF T&D PROGRAMME OF RUBBER PRODUCTS VS. NEWSPAPER INDUSTRIES & THE IMPACT OF T&D PROGRAMME ON EMPLOYEE PERFORMANCE OF RUBBER PRODUCTS VS. NEWSPAPER INDUSTRIES

	Industry	N	Mean	Std. Deviation	t Value
12 variables on T&D	Rubber Products Industry	100	42.22	8.407	2.273^S
	News Paper Industry	50	38.88	8.642	
12 variables on Performance	Rubber Products Industry	100	53.70	9.088	1.885^{NS}
	News Paper Industry	50	50.78	8.646	

Table 1 has been drawn to display the overall mean for the T& D Programmes in the Rubber Products Industry(42.22) and News Paper Industry (38.88) organizations, which indicates that the effectiveness of the T& D Programmes is more in Rubber Products Industry as compared to News Paper Industry and the difference is significant enough. (t= 2.273). The second part of the table compares the impact of the T& D Programme on various dimensions of employee performance , between Rubber Products Industry and News Paper Industry.

6.2 TABLE 2 . INDEPENDENT SAMPLES TEST

	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference

Q1-12	2.415	.122	2.273	148	.024	3.340
Q13-24	.737	.392	1.885	148	.061	2.920

6.3 TABLE 3. INDEPENDENT SAMPLES TEST

	t-test for Equality of Means		
	Std. Error Difference	95% Confidence Interval of the Difference	
		Lower	Upper
Variables of T&D	1.470	.436	6.244
Variables of emp. Performance	1.549	-.141	5.981

6.4 TABLE 4: VARIABLES OF T&D WHICH HAS SIGNIFICANT VARIATION IN THE TWO INDUSTRIES

Dimensions of T& D Program	Mann-Whitney U	Asymp. Sig. (2-tailed)
Learning in the program	1974	.011*
Duration	2499	0.991
Program faculty	1860	.003*
Work load in the program	2412	0.552
Coverage of the program	1930	.006*
Depth of the course content	2014	.031*
Methods of presentation	1965.5	.010*
Application of learning to job	1925	.016*
Change of job behavior	1925.5	.016*
Frequency	1930	.016*
Trainee ability	2069.5	0.066
Method of teaching	2081.5	.039*

*significant

6.5 IMPACT OF T&D PROGRAMME ON EMPLOYEE PERFORMANCE
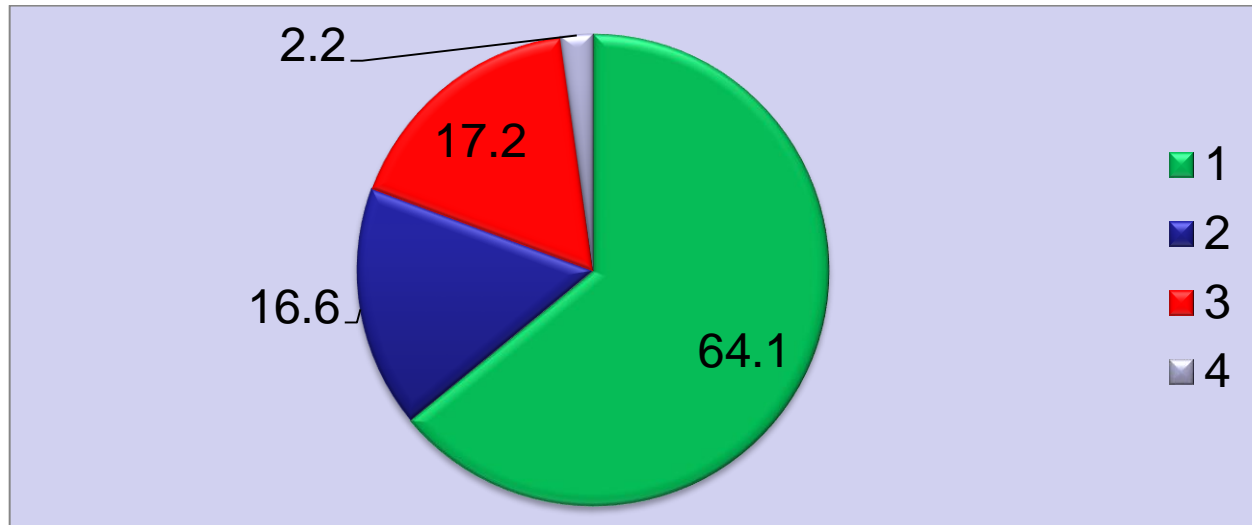
1   POSITIVE

2   NO IMPACT

3   UNCERTAIN

4   NEGATIVE

1.The opinion on 12 different variables under the dimension 'employee performance' , has been positive within the range of 42% for 'reduced dissatisfaction' to 96% for 'Team Work', which indicates – 'T&D prgm improves Team Work'.

2. The scope of the T& D Programmes is more in Rubber Products Industry as compared to News Paper Industry and the difference is significant enough. (t= 2.273).

3. There is no significant variation between the perception of respondents in Rubber Products industry and the News Paper Industry, as far as the impact of T&D Programmes on employee performance is concerned.(t value – 1.885).

7. CONCLUSION

To make training successful, the objectives must be clearly understood and it should be regularly matched with the larger organizational goals. Companies realize that one-time induction training or annual process training programmes are inadequate when it comes to improve people and process. However training is not without its share of challenges. The training effectiveness is usually measured on two parameters, on the degree to which the programme achieved the stated

objective and on the ratio of the cost of training to the return, ie, cost saving, increased productivity etc. The approach to training should be planned in the context and culture of the organization. An understanding of the real life work place challenges and the proper alignment of it with the content of the training programme is the need of the hour.

The present research highlights the dimensions of T&D Programmes and the impact of it on various dimensions of employee performance. The study shows that the Training and Development Programmes, if conducted effectively, will maximize the team spirit , commitment and productivity of all its employees and only then real Human Resource Development (HRD) will be brought about. The impact of Training and Development Practices alone on employee performance is very difficult to be determined because it depends on other factors like ability of the employee, their willingness/motivation, the working environment, the type of technology , compensation packages etc. All these and many other psychological factors more or less combined together have cumulative effect on employee performance.

Training and Development Programmes, if conducted effectively, will maximize -team spirit, commitment and productivity of all its employees and only then real Human Resource Development (HRD) will be brought about.If the Indian organizations are to be competitive

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A STUDY ON MUTUAL FUNDS WITH REFERENCE TO HDFC

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ABSTRACT

The important of commercial banks in the process of economical development has been stressed from time to time by the economical thinkers & progressive bankers in the country. Commercial banks play a very important role in our economic, in fact, it is difficult to imagine. How our economic system could foundation efficiently without many of their services. They are the heart of our financial structure, since they have the ability, in cooperation with the Reserve Bank of India. Today scenario in banking industry has totally changed. There is a significant transaction in Indian banking industry. Cross border flow and entry of new products, particularly derivative instruments, have impacted significantly on the domestic banking factor forcing banks to adjust the product mix, as also to effect rapid changes in their processes and operation in order to remain competitive to the globalize environment. These developments have facilitated greater choice for consumers, who have become more discerning and demanding, compelling banks to offer a broader range of products through diverse distribution channels.

KEYWORDS: *Discerning And Demanding, Compelling, Competitive, Diverse Distribution Channels.*

INTRODUCTION

Mutual fund is a trust which pools money, which then is invested in the capital market instruments like shares, debentures, g-sec and other related instruments. Mutual Fund units are investment vehicles that provide a means of participation in the stock market for people who have neither the time nor the expertise to undertake direct investment in equities successfully. A large number of investors pool their money in order to obtain a spread of professionally managed stock exchange investments that they cannot obtain individually. The investor in a Mutual Fund takes much less of a risk than a direct equity investor takes, because increase in the number of stocks held reduces the effect that any one stock can have on the overall equity portfolio. Mutual Fund provides professional management.

HOW A MUTUAL FUND WORKS

Investors put their saving as an investment in Mutual Fund. A professional Fund Manager takes the decisions where the money should be invested in securities according to the scheme's objective. Securities include equities, debentures, Govt. securities, bonds and commercial papers etc. These securities generate returns. The Fund Manager passes return to the investors.

PROCESS OF INVESTMENT IN MUTUAL FUND

❖ CHOOSE THE RIGHT MUTUAL FUND

The important thing is to choose the right mutual fund scheme which suits your requirements. The offer document of the scheme tells you its objectives and provides supplementary details like the track record of other schemes managed by the same Fund Manager. Some factors to evaluate before choosing a particular Mutual Fund are the track record of the performance of the fund over the last few years in relation to the appropriate yardstick and similar funds in the same category. Other factors could be the portfolio allocation, the dividend yield and the degree of transparency as reflected in the frequency and quality of their communications.

❖ SELECT THE IDEAL MIX OF SCHEMES

Investing in just one Mutual Fund scheme may not meet all your investment needs. You may consider investing in a combination of schemes to achieve your specific goals.

❖ INVEST REGULARLY

The best approach is to invest a fixed amount at specific intervals, say every month. By investing a fixed sum each month, you buy fewer units when the price is higher and more units when the price is low, thus bringing down your average cost per unit. This is called rupee cost averaging and is a disciplined investment strategy followed by investors all over the world. You can also avail the systematic investment plan facility offered by many open end funds.

❖ **START EARLY**

It is desirable to start investing early and stick to a regular investment plan. If you start now, you will make more than if you wait and invest later. The power of compounding lets you earn income on income and your money multiplies at a compounded rate of return.

❖ **THE FINAL STEP**

All you need to do now is to go for online application forms of various mutual fund schemes and start investing. You may reap the rewards in the years to come. Mutual Funds are suitable for every kind of investor – whether starting a career or retiring, conservative or risk taking, growth oriented or income seeking.

RESEARCH PROBLEM

There are too many scheme are available in the market. Each of the schemes has its different benefit. So people find difficulty in choosing the most suitable scheme. So here the comparison is made between open ended scheme & close ended scheme and giving some factor which are mostly affected in choosing between the schemes, Even though people choose their scheme according to their convenience.

OBJECTIVE OF RESEARCH

The objectives of the research for which it was carried out are as follows.

➢ To become familiar with basic knowledge of Mutual Fund.

➢ To become familiar with the retail banking channel in HDFC bank.

RESEARCH METHODOLOGY

➢ **RESEARCH DESIGN**

The research design in the project is exploratory in nature.

➢ **SAMPLE DESIGN**

The customers are divided into four major groups like

• Businessman

• Professional

• Service class

• Retired people

➢ **DATA COLLECTION**

The whole research project can be considered to be dependent on data collection. The data collection consists of primary as well as secondary data. The primary data is collected with the help of questionnaires. And secondary data is collected with the help of various websites.

DATA ANALYSIS

1. HOW MANY MEMBER ARE THEIR IN YOUR FAMILY?

☐ 1 to 2 ☐ 5 to 6
☐ 3 to 4 ☐ 7 +

1 to 2	3 to 4	5 to 6	7+
6	32	44	18

Out of the sample size of 100, 6% of the respondents were having the family members between 1
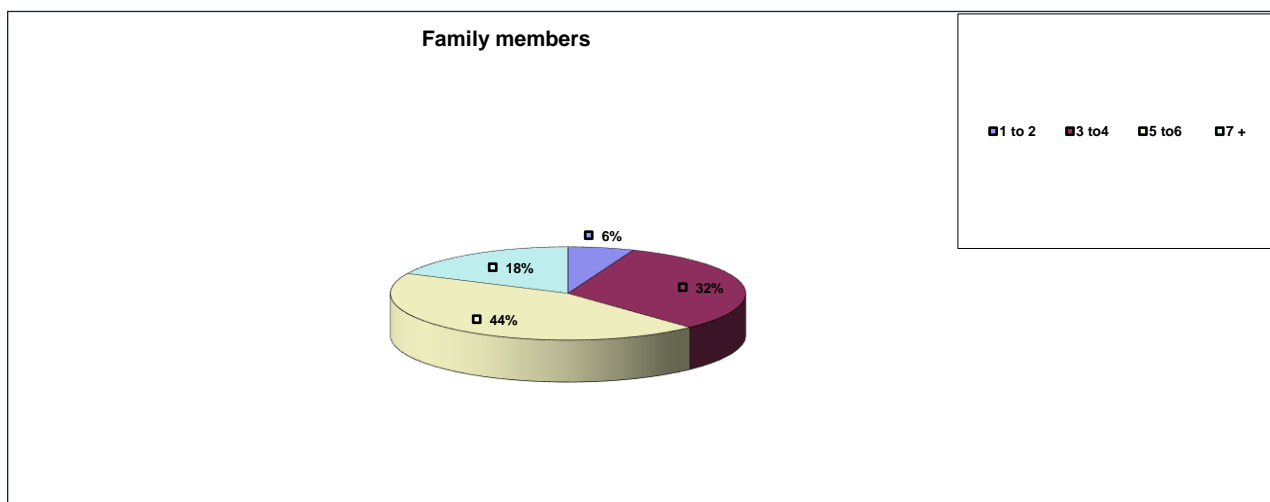
to 2, 32% of the respondents were having the family member between 3 to 4, 44% of the respondent were having the family member between 5 to6 and 18% of the respondent were having more than 7 family member.

2. WHICH OF THE BELOW MENTION CATEGORIES DO YOU BELONG?

☐ Businessman ☐ Salaried

☐ Professional ☐ Retired

☐ Others, Please specify_____

Businessman	Professional	Salaried	Retired	Others
48	7	36	9	0

Occupation

Legend: Business man, Professional, salaried, Retired

Values: 9%, 48%, 36%, 7%
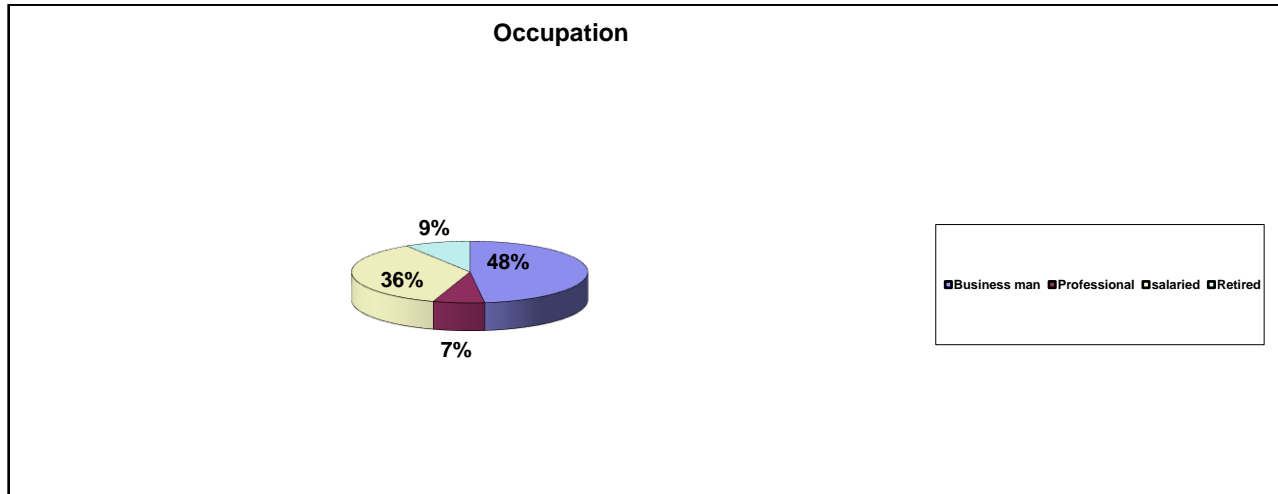
3. WHAT PROPORTION OF TOTAL INCOME DO YOU SAVE? (IN%)

☐ Below 10   ☐ 31-50
☐ 11-30   ☐ Above 50

Below 10	11-30	31-50	Above 50
31	43	17	9

Savings

Legend: Below 10, 11 to 30, 31 to 50, Above 50

Values: 9%, 31%, 43%, 17%
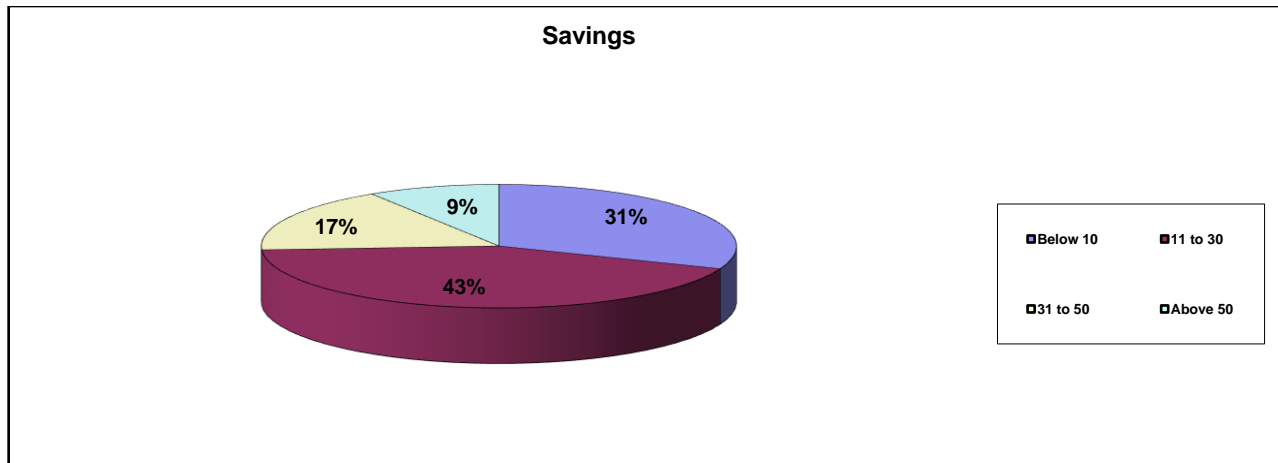
Out of sample size of 100, 31% of the people saved income below 10% of their total income, 43% of the people saved income between 11% to 31% of their total income, 17% of the people saved income between 31 to 50 % of their total income and 9% of the people saved income above 50% of their total income.

4. WHERE DO YOU MOST PREFER TO INVEST YOUR MONEY?

☐ Government securities   ☐ Mutual funds

☐ Fixed deposits   ☐ Equity market

☐ Others, please specify_____

Government securities	Fixed Deposits	Mutual funds	Equity market	Others
17	48	12	18	5
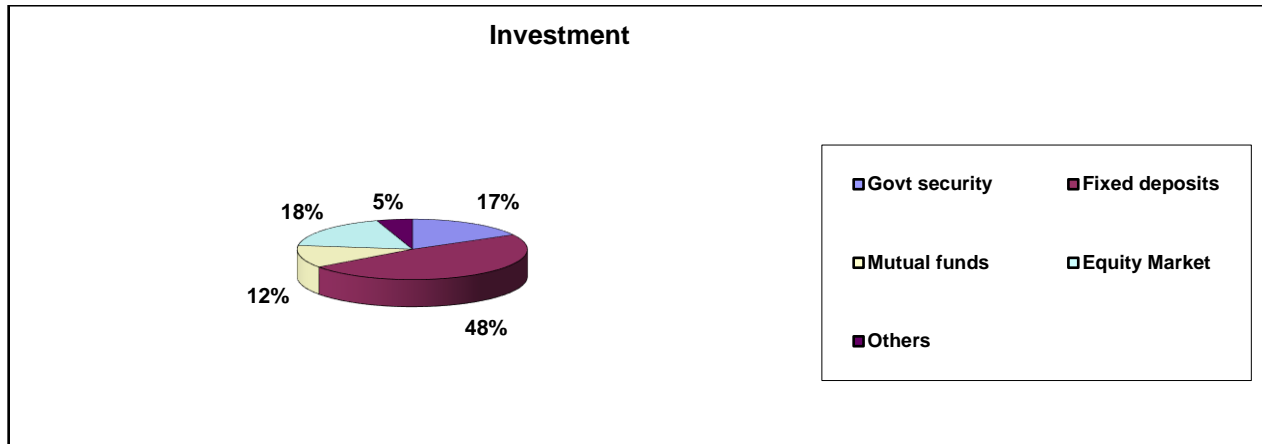
Out of sample size of 100, 17%of the people invest their money in government securities. 48% of invest their money in fixed deposite.12% of the people invest their money in mutual fund. 18% invest their money in Equity market. While 5% people invest their money in others.

5.   DO YOU HAVE ACCESS TO ANY FINANCIAL CONSULTANTS FOR MANAGEMENT OF YOUR FUNDS?

☐   Yes

☐   NO

Yes	No
35	65
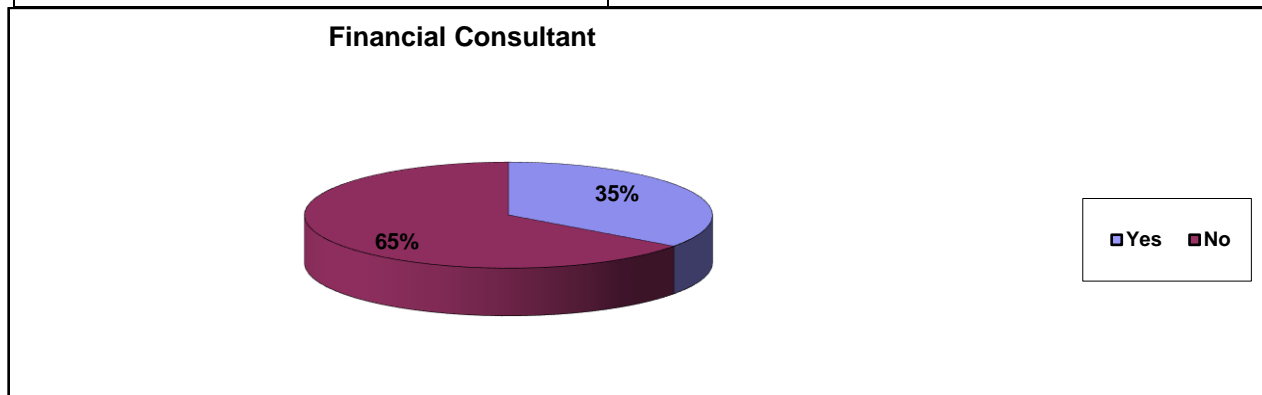
Out of the sample size of 100, 35% of respondent were having financial consultants and 65% of respondents were not having access to any financial consultant.

6. ARE YOU AWARE ABOUT THE FUNCTIONING OF THE MUTUAL FUND?

☐ Yes   ☐ No

Yes	No
73	27

Awareness about mutual fund functioning

☐ Yes ☐ No
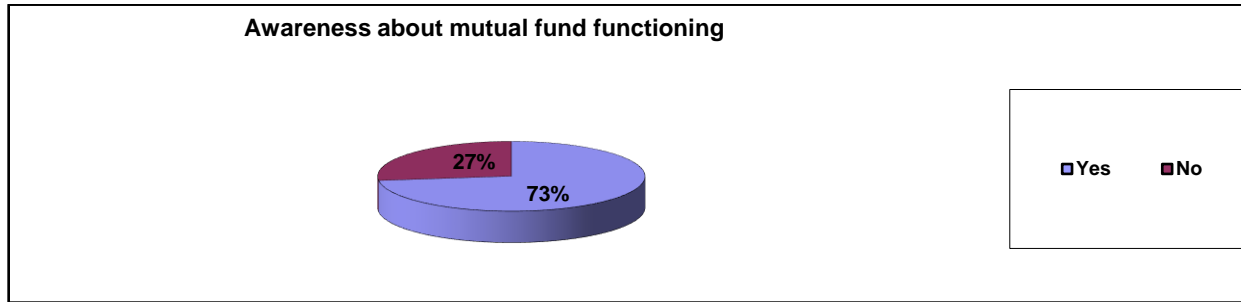
Out of the sample size of 100, only 73% of the respondents were aware about the functioning of the mutual funds while 27% of the respondents were not aware about the functioning of the mutual funds.

7. WHICH TYPE OF RETURN YOU WANT?

☐ High   ☐ Medium

☐ Low

High	Medium	Low
25	35	40

Return

☐ High ☐ Medium ☐ Low
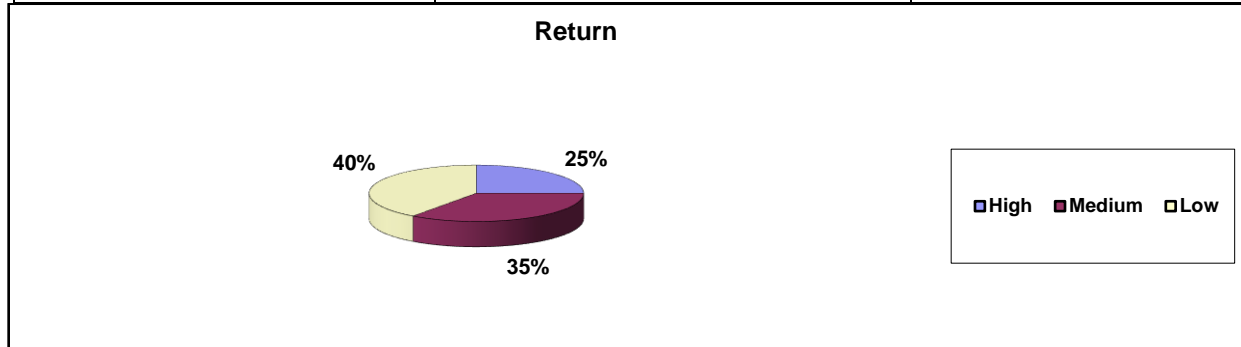
Out of the sample size of 100, only 25% of the respondent preferred to invest in mutual funds with high return even, 40% are preferred to invest with low return, 35% of the preferred to invest with medium return.

8. HOW MUCH TIME TO INVEST?

☐ Short term   ☐ Long term

Short term	Long term
60	40

Time period for investment

40%

60%

■Short term   ■Long term
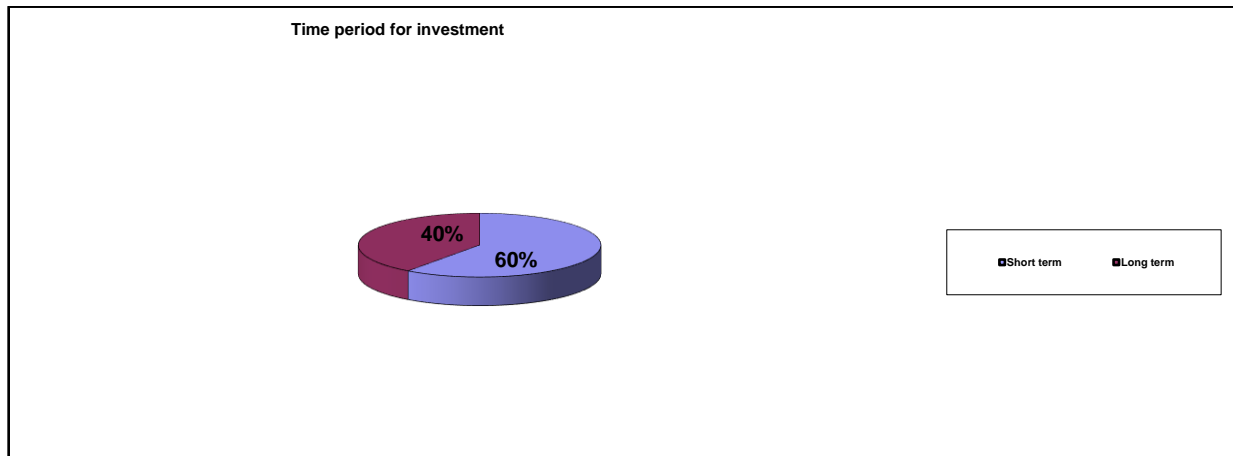
Out of 100 respondent 100 respondents, 60%of the respondent preferred to invest in mutual funds for short period of time even if the risk were high, While 40% preferred to invest in mutual funds for long period of time even if the return is low.

9.   WHAT LEVEL OF RISK YOU ARE WILLING TO TAKE FOR INVESTING IN ABOVE MENTION MUTUAL FUNDS?

☐ High risk   ☐ Medium risk

☐ Low risk

Low risk	Medium risk	High risk
34	46	20

Willingness to take risk

20%

34%

46%

■Low risk   ■Medium risk   □High risk
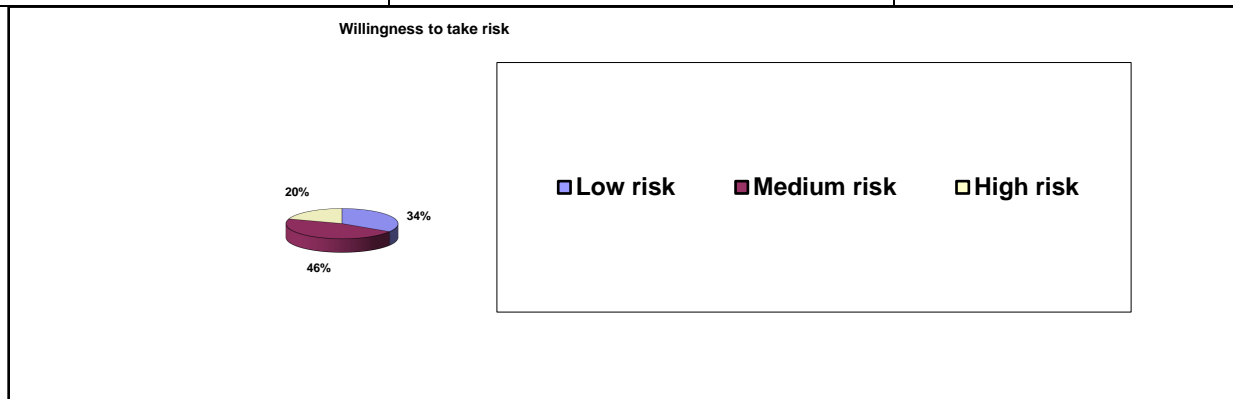
Out of 100 respondents, only 34% of the respondent preferred to invest in mutual funds with Low risk even if the return is low, 46% are preferred to invest with medium risk and medium return, while 20% of the preferred to invest with high return even if the risk was high.

10. WHICH TYPE OF FUND YOU PREFERRED FOR INVESTMENT?

☐ Open ended fund

☐ Close ended fund

Open ended fund	Close ended fund
60	40

Out of 100 respondents, 60% of the respondent preferred to invest in open ended mutual funds with high risk even if the returns were low, while 40% are preferred to invest in close ended mutual funds with medium risk or low risk even if return were medium or low.

CONCLUSION

Through these research and analysis I conclude that open ended and close ended mutual funds are two option provide better facility to investor for invest their money for long term and short term. Open ended schemes are very popular option for investment for short term and high return while close ended option are popular for long term investment and for low return with minimum risk.

So, through these research and analysis I conclude that in India out of these two scheme open ended and close ended more preferable and popular scheme is Reliance Growth scheme because of it's features and it provide the facility to redeem the money at any time, while these facility is not available in close ended scheme. The open ended schemes are providing the facility to purchase and redeem the unit after one year. So, people like the Reliance Growth scheme.

But today In India most of the people are invested in money in fixed deposit because they want takes low risk and fixed return.

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THE IMPACT OF FINANCIAL PLANNING AND CONTROLLING ON FUNCTIONING & POSITION OF THE BUSINESS

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ABSTRACT

This paper focuses on the impact of financial planning and control on effectiveness of business organizations in the twenty-first century. The study employs descriptive survey as its method of research and finds out that financial planning and control not only affects the growth of a company but also improves the profitability and cash management, leading to increase in liquidity for the organization. The paper therefore recommends that financial planning and control should be pro-active and implementers should be involved in the planning stage. Management should follow laid-down programme of action judiciously and it is obvious that effective and efficient financial planning and control of Nigerian organizations is feasible within minimum sacrifice.

KEYWORDS: *increase in liquidity, minimum sacrifice, judiciously.*

INTRODUCTION

Financial Management means planning, organizing, directing and controlling the financial activities such as procurement and utilization of funds of the enterprise. It means applying general management principles to financial resources of the enterprise. Towards the attainment of corporate objectives, many organizations adopt various strategies among which is the financial planning and control. Financial planning and control is an integral part of financial management which deals with the management of a firm's funds with a view to maximizing profit and the wealth of shareholders. The purpose of financial planning is to determine where the firm has been, where it is now, and where it is going. It also determines deviations from the most likely outcome. Finance is concerned with the study of the problems involved in the acquisition and use of funds by a business as well as the function of profit planning for the business organization. Planning can be defined as a managerial tool through which objectives and goals are determined and the future course of action to attain them; while control is a management action to ensure conformity with a plan or budget.

Functions of Financial Management

1. **ESTIMATION OF CAPITAL REQUIREMENTS:** A finance manager has to make estimation with regards to capital requirements of the company. This will depend upon expected costs and profits and future programmes and policies of a concern. Estimations have to be made in an adequate manner which increases earning capacity of enterprise.

2. **DETERMINATION OF CAPITAL COMPOSITION:** Once the estimation have been made, the capital structure have to be decided. This involves short- term and long- term debt equity analysis. This will depend upon the proportion of equity capital a company is possessing and additional funds which have to be raised from outside parties.

3. **CHOICE OF SOURCES OF FUNDS:** For additional funds to be procured, a company has many choices like-

   A. Issue of shares and debentures

   B. Loans to be taken from banks and financial institutions

   C. Public deposits to be drawn like in form of bonds.

   Choice of factor will depend on relative merits and demerits of each source and period of financing.

4. **INVESTMENT OF FUNDS:** The finance manager has to decide to allocate funds into profitable ventures so that there is safety on investment and regular returns is possible.

5. **DISPOSAL OF SURPLUS:** The net profits decision have to be made by the finance manager. This can be done in two ways:

   A. **DIVIDEND DECLARATION:** It includes identifying the rate of dividends and other benefits like bonus.

   B. **RETAINED PROFITS:** The volume has to be decided which will depend upon expansional, innovational, diversification plans of the company.

6. **MANAGEMENT OF CASH:** Finance manager has to make decisions with regards to cash management. Cash is required for many purposes like payment of wages and salaries, payment of electricity and water bills, payment to creditors, meeting current liabilities, maintenance of enough stock, purchase of raw materials, etc.

7. **FINANCIAL CONTROLS:** The finance manager has not only to plan, procure and utilize the funds but he also has to exercise control over finances. This can be done through many techniques like ratio analysis, financial forecasting, cost and profit control, etc.

ORGANIZATION OF FINANCE FUNCTIONS IN PUBLIC AND PRIVATE BUSINESS ORGANIZATIONS

Finance plays an extremely crucial role in the continuity and growth of business. It is said to be the circulating system of an enterprise making possible the needed cooperation among many diverse units of activity. Broadly speaking, finance serves two important functions.

First, it is a means of assembling the funds necessary to initiate a new activity. Second, it provides the basis for continued operation and furnishing additional capital, covering the costs of operation and generally synchronizing the various factors of a going business. Underlying these two functions is the formulation of policy, which provides a sense of direction and actual plan of operation. Organization of these functions is important for all types of business units, especially in private undertakings where small and medium scale investments are much higher. It is necessary to organize the finance function in such a manner that should help the business in achieving its basic objectives with minimum costs. Finance involves three important functions:

a. Planning   b. Controlling   c. Co-ordinating

Financial planning involves analyzing financial flows of a firm as a whole, forecasting the consequences of various investment, financing and dividend decisions and weighting the effects of various alternatives. Financial planning is the core of financial management. The complex nature of business demands that management should place greater emphasis upon financial planning to

secure and employ capital resources in the amount and proportion necessary to increase the efficiency of remaining factors of production. Financial planning is needed both in dynamic and perfect economic conditions. It helps management to avoid waste by furnishing policies and procedures which make possible a closer co-ordination between the various functions of business.

The success of any business depends on the manner the production and distribution functions are coordinated. An important function of financial management is the coordination of the various decisions taken within a company so that they are mutually consistent, having regard for financial aims and constraints. The exercise of this function is perhaps most clearly seen in formulating financial plans which involves merging of estimates of each department into a budget for the whole firm. In this process the financial manager holds a strategic position. Coordination is the process of integrating the activities and objectives of the separate units of an organization in order to efficiently achieve organizational goals. Without coordination, individuals and departments would lose sight of their roles within the organization. They would begin to pursue their own specialized interests, often at the expense of the large organizational goals. Also, the point to be emphasized is that the activities of all departments must mesh. It is through budgeting that the activities of various departments are coordinated and unnecessary wastage of resources and efforts is stopped. Budgeting requires each manager to establish a proper rapport between the activities of his department and that of other departments. Any imbalance in the relationship between the departmental activities should be identified and corrective measure taken.

BUDGET AND BUDGETARY CONTROL IN BUSINESS ORGANIZATIONS

The Chartered Institute of Management Accountants (CIMA) defines a budget as "a financial and/or quantitative statement, prepared and approved prior to a defined period of time, of the policy to be pursued during that period for the purpose of attaining a given objective".

Koontz (1988) defined budget as a statement of expected results expressed in numerical terms. It may therefore be referred to as a "Numberized" Programme. Budget is a widely recognized instrument of financial control.

Pandey (1985) defined a budget as "a comprehensive and coordinated plan, expressed in financial terms, for the operations and resources of an enterprise for some specific period in the future."

A budget is thus a standard with which to measure the actual achievement of people,. departments, firms, etc. It is the plan of the firm's expectations in the future. It is a comprehensive plan in the sense that all activities and operations are considered when it is prepared. Budgets are indeed prepared for various segments of the enterprise, but they are the components of the total budget – the master budget. The budget must plan for and quantify revenues and expenses of firm's operation in financial terms.

BUDGETARY CONTROL

According to Chartered Institute of Management Accountants (CIMA), budgetary control is "the establishment of departmental budgets relating the responsibilities of executives to the requirements of a policy, and the continuous comparison of actual with budgeted results, either to ensure by individual action the objectives of that policy to provide a firm's basis for its revision".

Budgetary control is one of the approaches to the control of firm's financial activities. To ensure that the firm's actual performance coincides with expected performance, it is necessary to initiate a system of controls. This method is used to ascertain deviation from the norms which are the

result of the economy and make the necessary correction in order that they will not recur. Budgetary control is a complex function which is related to production planning and control, cost control and sales planning and control. If optimum balance is not achieved in planning and controlling this triangle of operations, financial planning and control will be adversely affected. It is worthy to note that budgeting aims at providing a benchmark for controlling performance of managers and their subordinates. Control is sought to be achieved by comparing actual performance with budgeted performance and taking action to correct the budget variance. The principle of management by exception should be applied while enforcing control through budgets. No action or intervention is required so long as the actual performance approximately conforms with the budget (plan). Management attention should be focused only on exceptional or significant deviations. To determine significant deviations, control limits that represent the range of normal deviations from budget (plan) should be developed.

The budgetary control process involves the following:

i   Realistic budgets or plans are prepared to provide direction to carry out business operations.

ii   Actual performance for each area of responsibility is measured. Generally, the accounting system is used to measure actual performance in financial terms.

iii   Actual performance is compared with the budgeted performance to identify significant deviations (or variances).

iv   As a feedback mechanism, reports are prepared to inform management about deviations from budgets (plans).

v   Corrective action is initiated to ensure that future performance is in accordance with budgets (plans). Action may involve motivating people to implement policies, modifying certain policies, retaining employees or changing the manufacturing methods. The budget (plan) will have to be serviced if the deviation is due to incorrectly set budget.

CASH BUDGETING – AN AID TO FINANCIAL PLANNING AND CONTROL IN BUSINESS ORGANIZATIONS

Cash budget is one of the most budgets prepared in any organization. Liquidity of the firm and its cash flow management are key features in the control of working capital. Cash budget therefore merits close attention from both managers and accountants. Cash budgets are prepared in order to ensure that there is just sufficient cash in hand to cope with the budgeted activities. It enables a balance to be maintained between the available cash and demanding activities and consists of two parts:

(a)   Forecasts of Cash receipts; and

(b)   Forecasts of Cash disbursements

The cash budget may show there is likely to be cash deficiency in some future period, in which case activities may be curtailed as a loan or an overdraft will be arranged. Alternatively, the budget may show that there is likely to be cash surplus, in which case appropriate investment can be planned. A typical cash budget contains two broad areas:

1.   **RECEIPT SIDE:** This involves sales, dividend received, loan received and any other receipts.

2. **PAYMENT / DISBURSEMENT SIDE:** This involves payments made to creditors, dividend paid, wages, rent, loan repayment, interest payments, cash expenditures, capital acquisitions and purchases.

In a cash budget, a firm may decide to have a minimum cash requirement of certain amount which they will not touch but retain it in their file or bank balance. It may be a requirement by the bank to ensure liquidity. Control of cash is very important because of its susceptibility to misappropriation while planning of cash is very important to avoid liquidity problems.

CONCLUSION

Financial planning and control involves the management of financial resources of a firm in conjunction with its materials resources. Financial planning and control on the average constitute a major part of every management's decision. There is no industry that can exist without fair planning and control of its finances. This fact underscores the need to properly plan and control the finances of a firm, especially during harsh economic conditions. Companies engage in financial planning and control to minimize expenses and maximize profit for more effective and efficient management, to reduce industrial accidents and waste of resources.

RECOMMENDATIONS

Following are recommendations of the study

i.   Management should involve those who are to implement the plans of the business organization during the planning stage to guard against mis-guided implementation.

ii   Financial planning and control should be pro-active and not reactive to enable management foresee the dangers that may adversely affect the organization and avoid it before time.

iii.   Management should follow laid-down programme of action judiciously.

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EXPLORING ACADEMIC USERS' ONLINE USE BEHAVIOURS AND STRUCTURING A HIERARCHICAL TREE DIAGRAM USING A BINARY SEGMENTATION PROCEDURE

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ABSTRACT

Many published research studies examined and explored the modern users' behaviors with the online features that are available in their institutions libraries. This paper examines the academic users' library visit frequencies and their online access frequencies for their purposes. However, scope of this paper doesn't cover the reasons, which behind the users' online access. The visual distributions also incorporated for capturing the distributions of the opted variables. Further, a binary segmentation procedure named as 'Search' has been applied to develop a predictive model for the dependent variable(s) Branch. At each step this split into two new subgroups accounts for more of the variance or the distribution than a split into any other pair of subgroups. Selected branches of Annamalai University were covered for mapping the information and also designing a Hierarchical Tree Diagram. Apart from structuring the tree diagram, a few research questions have been formulated in this study. They are; do the users significantly differ in their library visits? ; do the users' net access frequencies significantly differ?

KEYWORDS: *Library; Visit; Information seekers; Internet; Mapping; Tree.*

INTRODUCTION

Modern Libraries increasingly turn to adopt an advanced technology for library operations in order to satisfy their users' expectations. Sophisticated technological infrastructures do fulfil the librarians and the users' requirements in the digital environment. Various studies revealed that the modern users are aware of many value added features that are now available in the digitalized libraries under various platforms. Hemminger (2007) and others conducted a study among the users to trace their preferences to search and browse online sources. Boyce and others (2004) carried out a study on browsing that explores the differences among the disciplines. Nicholas and others (2008) examined the differences in browsing behaviours among the various academic groups. Users' age was correlated with their searching and browsing behaviours in one of the review from university college London.

LITERATURE REVIEW

Nagpaul P.S(2010 a&b) conducted a study among the scientists of various departments comprising science, engineering, medicine and agriculture belonging to 20 Universities in India in order to explore the pattern of relationships between the Scientists' time-involvement in teaching and a set of contextual variables namely Rank, Institutional Settings, Scientific field etc. The sample size opted for this study was 1073. The author also conducted various studies using

different Search modules namely 'Search-Regression' and 'Search-Means'. Yu-Hsiang Yang and Rua-Huan Tsaih(2010) conducted a study to trace the characteristics of articles related to studies of altruism found in SCIE and SSCI databases. In this study they have used GHOSM [Growing hierarchical self learning map) procedure to obtain a hierarchical topic map.

OBJECTIVES

The following objectives have been framed to examine a perceptual structure of relationships between the selected disciplines and a set of variables.

To find out the respondents' frequency of Library visit.

To find out the respondents' Net access frequency ranges.

To compare the subject factors using Tukey HSD method.

To trace the best splits for the predictors variable(s).

To analyze the split summaries.

To analyze the best split summaries.

To generate the Hierarchical Tree Diagram.

HYPOTHESES

The set of proposed hypotheses under this study are as follows:

H_1.*There would be no statistically significance difference exist between the respondents' library visit.*

H_2. *There would be no statistically significance difference exist between the Pair wise Comparisons of the respondents' library visit.*

H_3. *There would be no statistically significance difference exist between the respondents' Internet access frequency.*

H_4. *There would be no statistically significance difference exist between the Pair wise Comparisons of the respondents' Internet access frequency.*

METHODOLOGY

The study was conducted using the questionnaire as a tool. Only Post Graduate students from the selected disciplines of Annamalai University were considered for the purpose of this study. The identified population for the present experimental design was more than 900. Selecting sample is of course a cumbersome task in any social sciences research. Hence the standard method was applied to measure the required sample size. The samples were selected for evaluation as calculated using the expected error rate, desired precision range and confidence level. Based on the said attributes the required sample size was traced as 160, but the study had obtained 155 samples, which was considered for further investigation. Of the distributed 180 questionnaires 171 questionnaires were filled by the respondents in which 16 questionnaires were not included in this study due to the low and missing responses. Investigation included the stratified random sampling procedure. The collected data were carefully processed with the required statistical tools namely Welch F, Tukey HSD and a binary segmentation procedure known as 'search'.

EDGE

Study is revolved around the selected discipline users of the Annamalai University only. Besides a tree diagram module namely 'Search' has been adopted here to trace the best splits and generate a hierarchical tree diagram. Though many modules offered by the SEARCH, to fulfill the aforesaid objectives the classification and regression trees-SEARCH module-Chi analysis has been utilized to predict the variable(s) in the structured Hierarchical Tree Diagram. This method can be applied when analysis the dependent variable(s) with the required predictor(s). This

method helps for creating groups, which would allow for the best prediction of the dependant variable from its group distribution. The splitting criterion is calculated on the basis of frequency distribution of the dependant variable branch. Morgan(1973) and Sonquist (1974) have cleared discussed about this procedure and their implementation in various analyses.

DISCUSSIONS
TABLE A: BRANCH WISE LIBRARY VISIT -BREAK UP

Branch		Daily	2 Days Once	Week	Bi-Week	Month	Bi-Month	Total	Cumul	Revised
Commerce		6	2	0	11	4	15	38	38	38
Row	%	15.79	5.26	0	28.95	10.53	39.47	100		
Col	%	11.54	9.52	0	20	100	83.33	24.52	24.52	
Tot	%	3.87	1.29	0	7.1	2.58	9.68	24.52	24.52	
Economics		3	1	2	6	0	0	12	50	12
Row	%	25	8.33	16.67	50	0	0	100		
Col	%	5.77	4.76	40	10.91	0	0	7.74	32.26	
Tot	%	1.94	0.65	1.29	3.87	0	0	7.74	32.26	
English		4	6	2	15	0	3	30	80	30
Row	%	13.33	20	6.67	50	0	10	100		
Col	%	7.69	28.57	40	27.27	0	16.67	19.35	51.61	
Tot	%	2.58	3.87	1.29	9.68	0	1.94	19.35	51.61	
History		4	4	0	2	0	0	10	90	10
Row	%	40	40	0	20	0	0	100		
Col	%	7.69	19.05	0	3.64	0	0	6.45	58.06	
Tot	%	2.58	2.58	0	1.29	0	0	6.45	58.06	
LIS		3	2	0	2	0	0	7	97	7
Row	%	42.86	28.57	0	28.57	0	0	100		
Col	%	5.77	9.52	0	3.64	0	0	4.52	62.58	
Tot	%	1.94	1.29	0	1.29	0	0	4.52	62.58	
MBA		7	3	0	6	0	0	16	113	16
Row	%	43.75	18.75	0	37.5	0	0	100		
Col	%	13.46	14.29	0	10.91	0	0	10.32	72.9	
Tot	%	4.52	1.94	0	3.87	0	0	10.32	72.9	
Pol.Sci.		10	0	1	1	0	0	12	125	12
Row	%	83.33	0	8.33	8.33	0	0	100		
Col	%	19.23	0	20	1.82	0	0	7.74	80.65	
Tot	%	6.45	0	0.65	0.65	0	0	7.74	80.65	
Pop.Stu.		9	0	0	1	0	0	10	135	10
Row	%	90	0	0	10	0	0	100		
Col	%	17.31	0	0	1.82	0	0	6.45	87.1	
Tot	%	5.81	0	0	0.65	0	0	6.45	87.1	
Sociology		6	3	0	11	0	0	20	155	20
Row	%	30	15	0	55	0	0	100		
Col	%	11.54	14.29	0	20	0	0	12.9	100	
Tot	%	3.87	1.94	0	7.1	0	0	12.9	100	
Totals		52	21	5	55	4	18	155		
Col%		100	100	100	100	100	100			
Tot%		33.55	13.55	3.23	35.48	2.58	11.61	100		
Cumul		52	73	78	133	137	155			
Tot		33.55	47.1	50.32	85.81	88.39	100			
Revised		52	21	5	55	4	18			155

TABLE-A.1: DESCRIPTIVE DETAILS

Measures	Daily	2 Days Once	Week	Bi-Week	Month	Bi-Month
Mean	5.78	2.33	0.56	6.11	0.44	2.00
StDev	2.54	1.94	0.88	5.16	1.33	4.97
SE	0.85	0.65	0.29	1.72	0.44	1.66
Var	6.44	3.75	0.78	26.61	1.78	24.75
Skew	0.555	0.590	1.192	0.621	3.000	2.796
zSkew	0.679	0.723	1.460	0.760	3.674	3.424

Tables-a, a.1 and a.2 clearly explore the respondents' frequency of library visit and other related statistic measurements in multi dimensions. It could be observed from those tables that 39.47% of the users from the discipline of Commerce visit the library Bi-Monthly followed by Bi-Week, Daily in that order. Users from the Economics and English discipline represent the maximum value of 50% for the option Bi-Week. History users visit the library daily and 2 days once for which they have scored 40% in each. 42.86% of LIS users and 43.75% of MBA users visit the library daily while rests of the options have scored their own. More than 80% of the users from Political science and population studies visit the library daily. 55% of the sociology users preferred the option 'Bi-Week'. Sample dispersions are clearly explored towards the 3D Figure-1. Welch F test results between the groups indicate the statistic values as F (df:21.33) = 8.61, p<0.0001376. The significance between the subject factors may be observed from the given Tukey Comparison Test results. The Welch F test results led us to claim support to the alternative against the formulated hypothesis H_1. Pair wise subject comparisons results showed the significance for the tests 1, 2, 4, 5, 6, 7, 8, 10, 13 and based on these evidences we could claim support to the alternative against the formulated hypothesis H_2. However, I am uncertain about the tests results for the pairs 5 and 7 as they indicate weak significance. In contrary the rests of the pairs 3, 9, 11, 12, 14, 15 did not turn up with the significance that made us to hold back the same hypothesis H_2 against the alternative.

TABLE-A.2: PAIR WISE COMPARISONS [TUKEY HSD: *=p<0.05 **=p<0.01]

Tests No.	Subject	t	p
1.	[Daily]vs[2 Days once]	t(16)=3.24	p< 0.0052
2.	[Daily]vs[Week]	t(16)=5.83	p< 0.0001
3.	[Daily]vs[Bi-Week]	t(16)=0.17	p< 0.8641
4.	[Daily]vs[Month]	t(16)=5.58	p< 0.0001
5.	[Daily]vs[Bi-Month]	t(16)=2.03	p< 0.0594
6.	[2 Days once]vs[Week]	t(16)=2.51	p< 0.0234
7.	[2 Days once]vs[Bi-Week]	t(16)=2.06	p< 0.0564
8.	[2 Days once]vs[Month]	t(16)=2.41	p< 0.0283
9.	[2 Days once]vs[Bi-Month]	t(16)=0.19	p< 0.8538
10.	[Week]vs[Bi-Week]	t(16)=3.18	p< 0.0058
11.	[Week]vs[Month]	t(16)=0.21	p< 0.8375
12.	[Week]vs[Bi-Month]	t(16)=0.86	p< 0.4037
13.	[Bi-Week]vs[Month]	t(16)=3.19	p< 0.0057
14.	[Bi-Week]vs[Bi-Month]	t(16)=1.72	p< 0.1045
15.	[Month]vs[Bi-Month]	t(16)=0.91	p< 0.3783

Branch Vs Library Visit
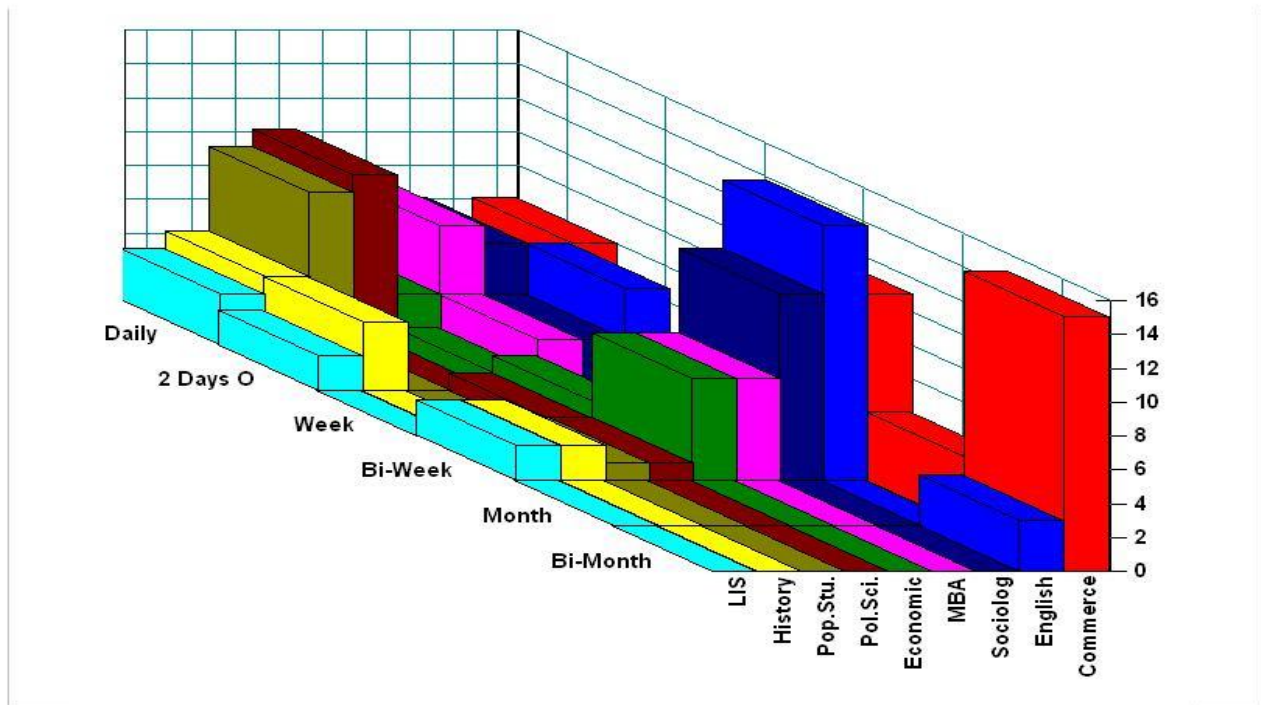
3D FIGURE 1: BRANCH WISE LIBRARY VISIT

TABLE B: BRANCH WISE NET ACCESS FREQUENCY-BREAK UP

Branch		1hr	2hrs	3hrs	>3hrs	Total	Cumul	Revised
Commerce		5	14	5	14	38	38	38
Row	%	13.16	36.84	13.16	36.84	100		
Col	%	15.62	18.67	29.41	45.16	24.52	24.52	
Tot	%	3.23	9.03	3.23	9.03	24.52	24.52	
Economics		1	5	2	4	12	50	12
Row	%	8.33	41.67	16.67	33.33	100		
Col	%	3.12	6.67	11.76	12.9	7.74	32.26	
Tot	%	0.65	3.23	1.29	2.58	7.74	32.26	
English		5	15	6	4	30	80	30
Row	%	16.67	50	20	13.33	100		
Col	%	15.62	20	35.29	12.9	19.35	51.61	
Tot	%	3.23	9.68	3.87	2.58	19.35	51.61	
History		1	7	1	1	10	90	10
Row	%	10	70	10	10	100		
Col	%	3.12	9.33	5.88	3.23	6.45	58.06	
Tot	%	0.65	4.52	0.65	0.65	6.45	58.06	
LIS		2	2	0	3	7	97	7
Row	%	28.57	28.57	0	42.86	100		
Col	%	6.25	2.67	0	9.68	4.52	62.58	
Tot	%	1.29	1.29	0	1.94	4.52	62.58	
MBA		6	8	1	1	16	113	16
Row	%	37.5	50	6.25	6.25	100		
Col	%	18.75	10.67	5.88	3.23	10.32	72.9	
Tot	%	3.87	5.16	0.65	0.65	10.32	72.9	
Pol.Sci.		6	3	1	2	12	125	12
Row	%	50	25	8.33	16.67	100		
Col	%	18.75	4	5.88	6.45	7.74	80.65	
Tot	%	3.87	1.94	0.65	1.29	7.74	80.65	
Pop.Stu.		6	4	0	0	10	135	10
Row	%	60	40	0	0	100		
Col	%	18.75	5.33	0	0	6.45	87.1	
Tot	%	3.87	2.58	0	0	6.45	87.1	
Sociology		0	17	1	2	20	155	20
Row	%	0	85	5	10	100		
Col	%	0	22.67	5.88	6.45	12.9	100	
Tot	%	0	10.97	0.65	1.29	12.9	100	
Totals		32	75	17	31	155		
	Col%	100	100	100	100			
	Tot%	20.65	48.39	10.97	20	100		
Cumul		32	107	124	155			
Tot		20.65	69.03	80	100			
Revised		32	75	17	31			155

TABLE B.1: DESCRIPTIVE DETAILS

Measures	1 Hr	2 Hrs	3 Hrs	>3 Hrs
Mean	3.56	8.33	1.89	3.44
StDev	2.51	5.61	2.15	4.19
SE	0.84	1.87	0.72	1.40
Var	6.28	31.50	4.61	17.53
Skew	–0.329	0.548	1.352	2.410
zSkew	–0.404	0.671	1.656	2.951

TABLE-B.2: PAIR WISE COMPARISONS [TUKEYHSD: *=p<0.05 **=p<0.01]

Tests No.	Subject	t	p
1.	[1 Hr]vs[2 Hrs]	t(16)=2.33	p< 0.0331
2.	[1 Hr]vs[3 Hrs]	t(16)=1.52	p< 0.1492
3.	[1 Hr]vs[>3 Hrs]	t(16)=0.07	p< 0.9464
4.	[2 Hrs]vs[3 Hrs]	t(16)=3.22	p< 0.0054
5.	[2 Hrs]vs[>3 Hrs]	t(16)=2.09	p< 0.0525
6.	[3 Hrs]vs[>3 Hrs]	t(16)=0.99	p< 0.3361

Branch Vs Net Acces Freq.
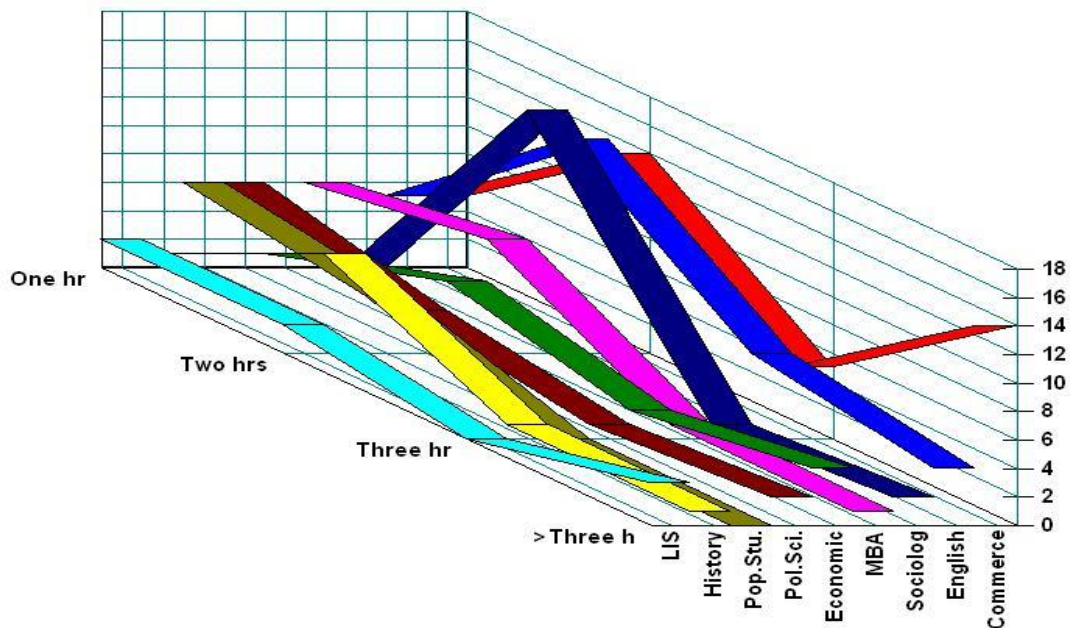
3D FIGURE 2: BRANCH WISE NET ACCESS FREQUENCY

Respondents' frequency of net access in library and the related statistic measurements are given via the Tables b-b.2. It could be observed from those tables that 36.84% of the users from the discipline of Commerce access the net more than 3 hours. Users from the Economics discipline

access the net for 2 hours that represents 41.67%. English discipline users have secured 50% for the option '2 hours' while History users have scored 70%. 42.86% of LIS users access the net for above 3 hours. 50% of MBA and Political Science users access the net for 2 hours. 60% of the users from population studies preferred the option '1 hr' whereas 85% of the sociology users preferred the option'2 hours'. Sample dispersions may be visually observed from the 3D Figure-2. Welch F test results between the groups indicate the statistic values as F (df:16.99) = 3.414, p<0.04137. The significance between the subject factors may be observed from the given Tukey Comparison Test results. The Welch F test statistic results led us to claim support to the alternative against the formulated hypothesis H_3. Pair wise subject comparisons results showed the significance for the tests 1, 4, 5 and based on these evidences we could claim support to the alternative against the formulated hypothesis H_4. However, I am uncertain about the tests results for the pair 5 as they indicate weak significance. In contrary the rests of the pairs 2, 3, 6 did not turn up with the significance that made us to retain the same hypothesis H_4 against the alternative.

INFORMATION MAPPING: SEARCHING FOR STRUCTURE: Hierarchical tree diagram-V2 (Branch), V5 (Library Visit), V6 (Net Access Frequency) / Analysis type: Chi-square.

DEPENDENT VARIABLE: V2/Dependent variable code values: 1 2 3 4 5 6 7 8 9 / after filtering, 155 cases read from the input data file. The variables V5, V6 have been adopted as predictors to generate the following splits.

TRACE OF SPLITS

TABLE 1: SPLIT 1 CANDIDATE GROUPS

Group	N	Sum(WT)	Variation
1	155	0.15500E+03	0.63576E+03

Attempt to split group   1   Var= 635.75958

TABLE 2: LIBRARY VISIT

Predictor V5   /   Library Visit   /   Rank 3 Type S
Codes 1 2 3 4 5 6
Best split after code 1   Var expl=0.40872700E+02

TABLE 3: NET ACCESS FREQUENCY

Predictor V6   /Net Access Freq   /   Rank 3 Type S
Codes 1 2 3 4
Best split after code 1   Var expl=0.28203690E+02

TABLE 4: LIBRARY VISIT

Best split for group   1 on predictor V5   Library Visit   Rank 1
Var expl=0.40872700E+02

Split group 1 on V5 Library Visit	Var expl=0.40872700E+02
Into group 2, codes 1	
and group 3, codes 2 3 4 5 6	

TABLE 5: SPLIT 2 CANDIDATE GROUPS

Group	N	Sum(WT)	Variation
2	52	0.52000E+02	0.21972E+03
3	103	0.10300E+03	0.37517E+03

Attempt to split group 3 Var= 375.16830

Predictor V5 Library Visit Rank 3 Type S
Codes 2 3 4 5 6
Best split after code 6 Var expl=0.32617123E+02

Predictor V6 Net Access Freq Rank 3 Type S
Codes 1 2 3 4
Best split after code 1 Var expl=0.15044652E+02
Best split for group 3 on predictor V5 Library Visit Rank 1
Var expl=0.32617123E+02
Split group 3 on V5 Library Visit Var expl=0.32617123E+02
Into group 4, codes 6
and group 5, codes 2 3 4 5

TABLE 6: SPLIT 3 CANDIDATE GROUPS

Group	N	Sum(WT)	Variation
2	52	0.52000E+02	0.21972E+03
4	18	0.18000E+02	0.16220E+02
5	85	0.85000E+02	0.32633E+03

Attempt to split group 5 Var= 326.33099

Predictor V5 Library Visit Rank 3 Type S
Codes 2 3 4 5
Best split after code 2 Var expl=0.10858410E+02

Predictor V6 Net Access Freq Rank 3 Type S
Codes 1 2 3 4
Best split after code 1 Var expl=0.14270057E+02

Best split for group 5 on predictor V6 Net Access Freq Rank 1
Var expl=0.14270057E+02
Split group 5 on V6 Net Access Freq Var expl=0.14270057E+02
Into group 6, codes 1
and group 7, codes 2 3 4

TABLE 7: SPLIT 4 CANDIDATE GROUPS

Group	N	Sum(WT)	Variation
2	52	0.52000E+02	0.21972E+03
4	18	0.18000E+02	0.16220E+02
6	15	0.15000E+02	0.51284E+02
7	70	0.70000E+02	0.26078E+03

Attempt to split group 7 Var= 260.77676

Predictor V5 Library Visit Rank 3 Type S
Codes 2 3 4 5
Best split after code 2 Var expl=0.14660691E+02

Predictor V6 Net Access Freq Rank 3 Type S
Codes 2 3 4
Best split after code 4 Var expl=0.10691532E+02

Best split for group 7 on predictor V5 Library Visit Rank 1
Var expl=0.14660691E+02
Split group 7 on V5 Library Visit Var expl=0.14660691E+02
Into group 8, codes 2
and group 9, codes 3 4 5

TABLE 8: SPLIT 5 CANDIDATE GROUPS

Group	N	Sum(WT)	Variation
2	52	0.52000E+02	0.21972E+03
4	18	0.18000E+02	0.16220E+02
6	15	0.15000E+02	0.51284E+02
8	14	0.14000E+02	0.48573E+02
9	56	0.56000E+02	0.19754E+03

Attempt to split group 2 Var= 219.71858

Predictor V5	Library Visit	Rank 3 Type S
Codes 1		
No eligible split		

Predictor V6	Net Access Freq	Rank 3 Type S
Codes 1 2 3 4		
Best split after code 2 Var expl=0.27286064E+02		

Best split for group 2 on predictor V6 / Net Access Freq / Rank 1

Var expl=0.27286064E+02

Split group 2 on V6 / Net Access Freq / Var expl=0.27286064E+02

Into group 10, codes 2

and group 11, codes 1 3 4

TABLE 9: SPLIT 6 CANDIDATE GROUPS

Group	N	Sum(WT)	Variation
4	18	0.18000E+02	0.16220E+02
6	15	0.15000E+02	0.51284E+02
8	14	0.14000E+02	0.48573E+02
9	56	0.56000E+02	0.19754E+03
10	30	0.30000E+02	0.12175E+03
11	22	0.22000E+02	0.70684E+02

Attempt to split group 9 Var= 197.54266

Predictor V5	Library Visit	Rank 3	Type S
Codes 3 4 5			
No eligible split			

Predictor V6	Net Access Freq	Rank 3	Type S
Codes 2 3 4			
Best split after code 4 Var expl=0.98893013E+01			

Best split for group 9 on predictor V6 Net Access Freq Rank 1

Var expl=0.98893013E+01

Split group 9 on V6 Net Access Freq Var expl=0.98893013E+01

Into group 12, codes 4

and group 13, codes 2 3

TABLE 10: SPLIT 7 CANDIDATE GROUPS

Group	N	Sum(WT)	Variation
4	18	0.18000E+02	0.16220E+02
6	15	0.15000E+02	0.51284E+02
8	14	0.14000E+02	0.48573E+02
10	30	0.30000E+02	0.12175E+03
11	22	0.22000E+02	0.70684E+02
12	15	0.15000E+02	0.43105E+02
13	41	0.41000E+02	0.14455E+03

Attempt to split group 13 Var= 144.54851

Predictor V5	Library Visit	Rank 3	Type S
Codes 3 4 5			
No eligible split			

Predictor V6	Net Access Freq	Rank 3	Type S
Codes 2 3			
No eligible split			
No eligible split for group 13			

TABLE 11: SPLIT 7 CANDIDATE GROUPS

Group	N	Sum(WT)	Variation
4	18	0.18000E+02	0.16220E+02
6	15	0.15000E+02	0.51284E+02
8	14	0.14000E+02	0.48573E+02
10	30	0.30000E+02	0.12175E+03
11	22	0.22000E+02	0.70684E+02
12	15	0.15000E+02	0.43105E+02

Attempt to split group 10 Var= 121.74803

Predictor V5	Library Visit	Rank 3 Type S
Codes 1		
No eligible split		

Predictor V6	Net Access Freq	Rank 3 Type S
Codes 2		
No eligible split		
No eligible split for group 10		

TABLE 12: SPLIT 7 CANDIDATE GROUPS

Group	N	Sum(WT)	Variation
4	18	0.18000E+02	0.16220E+02
6	15	0.15000E+02	0.51284E+02
8	14	0.14000E+02	0.48573E+02
11	22	0.22000E+02	0.70684E+02
12	15	0.15000E+02	0.43105E+02

Attempt to split group 11 Var= 70.684486

Predictor V5	Library Visit	Rank 3	Type S
Codes 1			
No eligible split			

Predictor V6	Net Access Freq	Rank 3	Type S
Codes 1 3 4			
No eligible split			
No eligible split for group 11			
No splits possible			

THE PARTITIONING ENDS WITH 7 FINAL GROUPS

The variation explained is 22.0%

TABLE 13: ONE-WAY ANALYSIS OF FINAL GROUPS

Source	Variation	DF
Explained	0.13959593E+03	6
Error	0.49616364E+03	148
Total	0.63575958E+03	154

SPLIT SUMMARY TABLE

Group 1	155 cases	Variation=0.63575958E+03
Split on V5	Library Visit	Var expl=0.40872700E+02
Into group 2, codes 1		
and group 3, codes 2 3 4 5 6		
Group 3	103 cases	Variation=0.37516830E+03
Split on V5	Library Visit	Var expl=0.32617123E+02
Into group 4, codes 6		
and group 5, codes 2 3 4 5		
Group 5	85 cases	Variation=0.32633099E+03
Split on V6	Net Access Freq	Var expl=0.14270057E+02
Into group 6, codes 1		
and group 7, codes 2 3 4		
Group 7	70 cases	Variation=0.26077676E+03
Split on V5	Library Visit	Var expl=0.14660691E+02
Into group 8, codes 2		
and group 9, codes 3 4 5		
Group 2	52 cases	Variation=0.21971858E+03
Split on V6	Net Access Freq	Var expl=0.27286064E+02
Into group 10, codes 2		
and group 11, codes 1 3 4		
Group 9	56 cases	Variation=0.19754266E+03
Split on V6	Net Access Freq	Var expl=0.98893013E+01
Into group 12, codes 4		
and group 13, codes 2 3		

TABLE 14: FINAL GROUP SUMMARY TABLE

Group 4	18 cases	Variation=0.16220203E+02
Group 6	15 cases	Variation=0.51284184E+02
Group 8	14 cases	Variation=0.48573406E+02
Group 10	30 cases	Variation=0.12174803E+03
Group 11	22 cases	Variation=0.70684486E+02
Group 12	15 cases	Variation=0.43104858E+02
Group 13	41 cases	Variation=0.14454851E+03

TABLE 15: PER CENT OF TOTAL VARIATION EXPLAINED BY BEST SPLIT FOR EACH GROUP (*=FINAL GROUPS)

	1	2	3	4*	5	6*	7	8*	9	10*	11*	12*	13*
V5	6.43	0.00	5.13	0.00	1.71	0.00	2.31	0.00	0.00	0.00	0.00	0.00	0.00
V6	4.44	4.29	2.37	0.00	2.24	0.00	1.68	0.00	1.56	0.00	0.00	0.00	0.80

TABLE 16: PERCENT DISTRIBUTION OF THE DEPENDENT VARIABLE FOR EACH GROUP (*=FINAL GROUPS)

Branch	1	2	3	4*	5	6*	7	8*	9	10*	11*	12*	13*
Commerce	24.52	11.54	31.07	83.33	20.00	13.33	21.43	7.14	25.00	10.00	13.64	40.00	19.51
Economics	7.74	5.77	8.74	0.00	10.59	6.67	11.43	0.00	14.29	10.00	0.00	26.67	9.76
English	19.35	7.69	25.24	16.67	27.06	33.33	25.71	21.43	26.79	13.33	0.00	13.33	31.71
History	6.45	7.69	5.83	0.00	7.06	6.67	7.14	21.43	3.57	10.00	4.55	0.00	4.88
LIS	4.52	5.77	3.88	0.00	4.71	6.67	4.29	14.29	1.79	0.00	13.64	0.00	2.44
MBA	10.32	13.46	8.74	0.00	10.59	26.67	7.14	14.29	5.36	16.67	9.09	0.00	7.32
Pol.Sci.	7.74	19.23	1.94	0.00	2.35	0.00	2.86	0.00	3.57	6.67	36.36	6.67	2.44
Pop.Stu.	6.45	17.31	0.97	0.00	1.18	6.67	0.00	0.00	0.00	13.33	22.73	0.00	0.00
Sociology	12.90	11.54	13.59	0.00	16.47	0.00	20.00	21.43	19.64	20.00	0.00	13.33	21.95

TABLE 17: PREDICTOR SUMMARY TABLES (LIBRARY VISIT & NET ACCESS FREQUENCY)

SUMMARY TABLE FOR GROUP 13

TABLE 17.1: PREDICTOR V5 LIBRARY VISIT

Code	N	Sum(WT)	Dependent variable % distribution
3 Week	3	0.30000000E+01	2:66.67 3:33.33
4 Bi-Week	37	0.37000000E+02	1:18.92 2:5.41 3:32.43 4:5.41 5:2.70 6:8.11 7:2.70 9:24.32
5 Month	1	0.10000000E+01	1:100.00

All-way per cent of variance explained= 8.36

TABLE 17.2: PREDICTOR V6 NET ACCESS FREQ

Code	N	Sum(WT)	Dependent variable % distribution
2 Two hrs	31	0.31000000E+02	1:22.58 2:6.45 3:29.03 4:3.23 5:3.23 6:6.45 7:3.23 9:25.81
3 Three hrs	10	0.10000000E+02	1:10.00 2:20.00 3:40.00 4:10.00 6:10.00 9:10.00

All-way per cent of variance explained= 3.50

SUMMARY TABLE FOR GROUP 12

TABLE 17.3: PREDICTOR V5 LIBRARY VISIT

Code	N	Sum(WT)	Dependent variable % distribution
2 Two hrs	31	0.31000000E+02	1:22.58 2:6.45 3:29.03 4:3.23 5:3.23 6:6.45 7:3.23 9:25.81
3 Three hrs	10	0.10000000E+02	1:10.00 2:20.00 3:40.00 4:10.00 6:10.00 9:10.00

All-way per cent of variance explained= 34.18

TABLE 17.4: PREDICTOR V6 NET ACCESS FREQ

Code	N	Sum(WT)	Dependent variable % distribution
4 >Three hrs	15	0.15000000E+02	1:40.00 2:26.67 3:13.33 7:6.67 9:13.33

All-way per cent of variance explained= 0.00

SUMMARY TABLE FOR GROUP 11

TABLE 17.5: PREDICTOR V5 LIBRARY VISIT

Code	N	Sum(WT)	Dependent variable % distribution
1 Daily	22	0.22000000E+02	1:13.64 4:4.55 5:13.64 6:9.09 7:36.36 8:22.73

All-way per cent of variance explained= 0.00

TABLE 17.6: PREDICTOR V6 NET ACCESS FREQ

Code	N	Sum(WT)	Dependent variable % distribution
1 One hr	16	0.16000000E+02	1:12.50 5:6.25 6:12.50 7:37.50 8:31.25
3 Three hrs	2	0.20000000E+01	1:50.00 7:50.00
4 >Three hrs	4	0.40000000E+01	4:25.00 5:50.00 7:25.00

All-way per cent of variance explained = 19.82

SUMMARY TABLE FOR GROUP 10

TABLE 17.7: PREDICTOR V5 LIBRARY VISIT

Code	N	Sum(WT)	Dependent variable % distribution
1 Daily	30	0.30000000E+02	1:10.00 2:10.00 3:13.33 4:10.00 6:16.67 7:6.67 8:13.33 9:20.00

All-way per cent of variance explained= 0.00

TABLE 17.8: PREDICTOR V6 NET ACCESS FREQ

Code	N	Sum(WT)	Dependent variable % distribution
2 Two hrs	30	0.30000000E+02	1:10.00 2:10.00 3:13.33 4:10.00 6:16.67 7:6.67 8:13.33 9:20.00

All-way per cent of variance explained= 0.00

SUMMARY TABLE FOR GROUP 8

TABLE 17.9: PREDICTOR V5 LIBRARY VISIT

Code	N	Sum(WT)	Dependent variable % distribution
2 (2 Days Once)	14	0.14000000E+02	1:7.14 3:21.43 4:21.43 5:14.29 6:14.29 9:21.43

All-way per cent of variance explained= 0.00

TABLE 17.10: PREDICTOR V6 NET ACCESS FREQ

Code	N	Sum(WT)	Dependent variable % distribution
2 Two hrs	11	0.11000000E+02	1:9.09 3:18.18 4:27.27 5:9.09 6:9.09 9:27.27
3 Three hrs	1	0.10000000E+01	3:100.00
4 > Three hrs	2	0.20000000E+01	5:50.00 6:50.00

All-way per cent of variance explained= 18.53

SUMMARY TABLE FOR GROUP 6

TABLE 17.11: PREDICTOR V5 LIBRARY VISIT

Code	N	Sum(WT)	Dependent variable % distribution
2 2 Days Once	7	0.70000000E+01	1:14.29 2:14.29 3:42.86 4:14.29 6:14.29
4 Bi-Week	8	0.80000000E+01	1:12.50 3:25.00 5:12.50 6:37.50 8:12.50

All-way per cent of variance explained= 13.12

TABLE 17.12: PREDICTOR V6 NET ACCESS FREQ

Code	N	Sum(WT)	Dependent variable % distribution
1 One hr	15	0.15000000E+02	1:13.33 2:6.67 3:33.33 4:6.67 5:6.67 6:26.67 8:6.67

All-way per cent of variance explained= 0.00

SUMMARY TABLE FOR GROUP 4

TABLE 17.13: PREDICTOR V5 LIBRARY VISIT

Code	N	Sum(WT)	Dependent variable % distribution
6 Bi-Month	18	0.18000000E+02	1:83.33 3:16.67

All-way per cent of variance explained= 0.00

TABLE 17.14: PREDICTOR V6 NET ACCESS FREQ

Code	N	Sum(WT)	Dependent variable % distribution
1 One hr	1	0.10000000E+01	1:100.00
2 Two hrs	3	0.30000000E+01	1:100.00
3 Three hrs	4	0.40000000E+01	1:75.00 3:25.00
4 > Three hrs	10	0.10000000E+02	1:80.00 3:20.00

All-way per cent of variance explained= 10.56
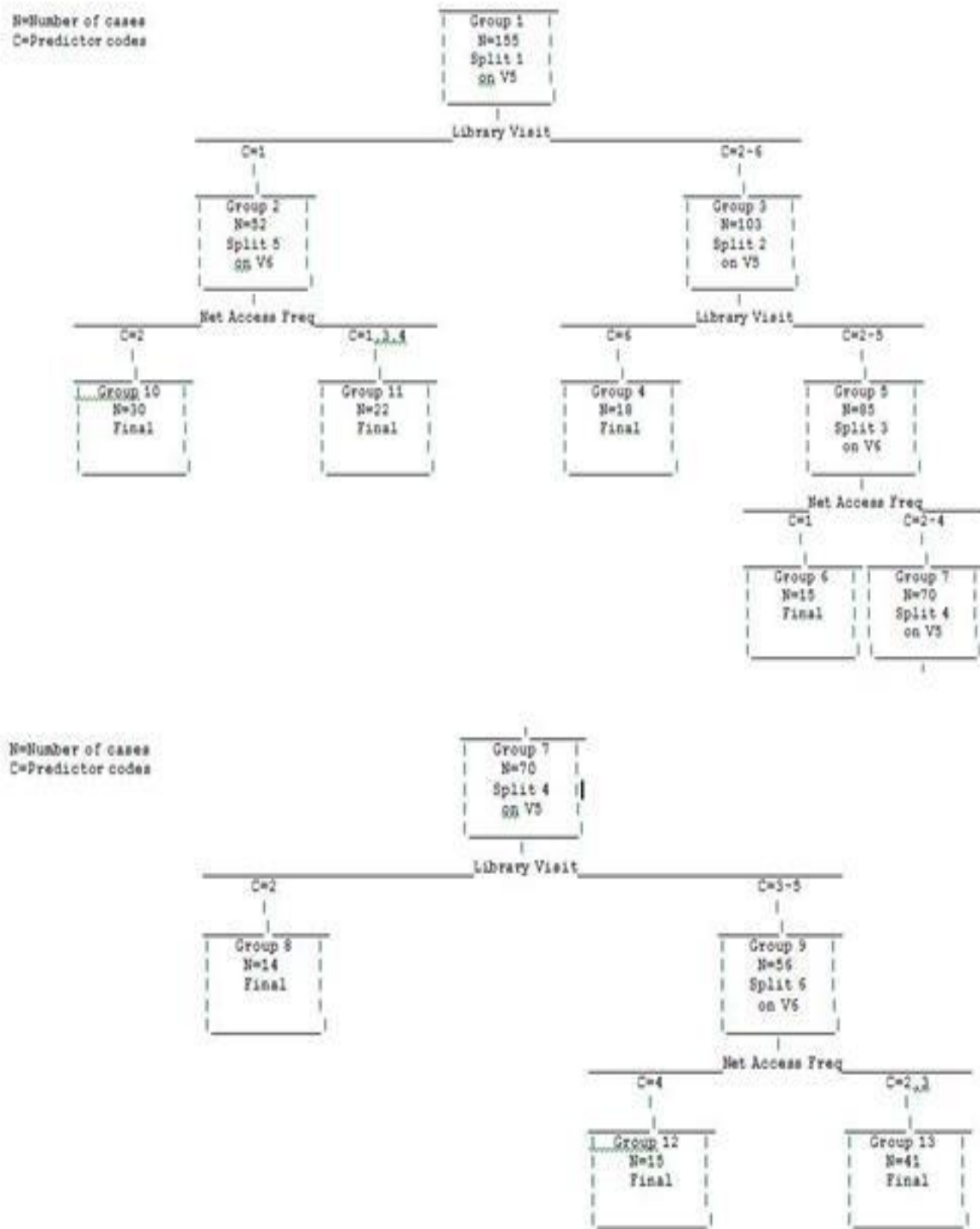
***** Normal termination of SEARCH

FIGURE 3: TREE DIAGRAM

DETERMINATIONS

It could be observed from the Tables a-a.2 (Library Visit) that the option 'Bi-Week' has got the top slot with the mean 6.11 followed by 'Daily' (5.78). Month wise visit has slipped to the last slot with the score 0.44. The deviation is not stable for 'Bi-Week' when compared to the daily visits. It is inferred that though the respondents preferred the option 'Bi-Week' there would be much variance identified among the groups while the daily visit had turn up with the less variance for the same groups. The Tukey pair wise comparisons also depicted the significance between the 'Daily' Vs others when compared to the 'Bi-Week" Vs others. The structured first research question could be fulfilled as the Welch F statistic value (8.61, $p<0.0001376$) supported the alternative hypothesis. The Tukey test results also satisfied the same question except for a few levels of comparisons. Tables b-b.2 (Net access frequency) revealed that the option '2 hrs' has got the top slot with the mean 8.33 followed by '1 hr' (3.56). But, the statistic measures did not show the stable in deviation for '2 hrs' while the level '1 hr' has shown the deviation as stable. It is inferred that though the respondents preferred the option '2 hrs' there would be much variance identified among the groups while the option '1 hr' has secured the less variance for the same groups. However, the Tukey pair wise comparisons results indicated that the significance would be strong between '2 hrs' Vs others when compared to the '1 hr" Vs others. The structured second research question could be fulfilled as the Welch F statistic value (3.414, $p<0.04137$) supported the alternative hypothesis. The Tukey test results also satisfied the same question except for a few levels of comparisons.

SEARCHING FOR STRUCTURE: (V2, V5, V6/ BRANCH, LIBRARY VISIT, NET ACCESS FREQUENCY)

In every split the group that would receive the first choice was identified as the best one among others and their further splits also have been clearly explored here with the enough statistical evidences. In all the stages, the candidate group is Group 1 comprising all the cases (155) with the variation 635.759 and this is the maximum outcome of the whole group. The visual has been explored towards the Tree diagram (Figure 3) for better capture of the all splits.

TABLE 18: BEST SPLITS (CAPTURED FROM TRACE OF SPLITS)

SPLIT 1

At this stage the candidate group is Group 1 includes all the observed cases. An attempt has been made to split Group 1 and all the predictors are evaluated as given below for their best splits.

TABLE 18.1: PREDICTOR V5 (LIBRARY VISIT) & CUT-OFF

Predictor	cut-off After Code	Outcome
V5 (1,2,3,4,5,6)	1	0.40872700E+02
V6 (1,2,3,4)	1	0.28203690E+02

Best split for group 1 on predictor V5 (Library Visit) was traced in this split. Group 1 is split on V5 (Library Visit) into the following groups

TABLE 18.2: GROUPS & CODES

Group 2V5 [Codes 1]
Group 3V5 [Codes 2,3,4,5,6

SPLIT 2

At this stage, there were two candidate groups identified as 2 & 3 and group 3 has got the first choice for further split. The predictors are evaluated here one by one for their best splits.

TABLE 18.3: PREDICTORS & CUT-OFF

Predictor	cut-off After Code	Outcome
V5 (2,3,4,5,6)	6	0.32617123E+02
V6 (1,2,3,4)	1	0.15044652E+02

Best split for group 3 on predictor V5 (Library Visit) was traced in this split. Group 3 is split on V5 into the following groups:

TABLE 18.4: GROUPS & CODES

Group 4V5 [Codes 6]
Group 5V5 [Codes 2, 3, 4, 5]

SPLIT 3

At this stage, there were three candidate groups identified as 2, 4, 5 and group 5 has got the first choice for further split. The predictors are evaluated one by one for their best splits.

TABLE 18.5: PREDICTORS & CUT-OFF

Predictor	cut-off After Code	Outcome
V5 (2,3,4,5)	2	0.10858410E+02
V6 (1,2,3,4)	1	0.14270057E+02

Best split for group 5 on predictor V6 (Net Access Frequency) was traced in this split. Group 5 is split on V6 into the following groups:

TABLE 18.6: GROUPS & CODES

Group 6V6 [Codes 1]
Group 7V6 [Codes 2, 3, 4]

SPLIT 4: (TABLE 7)

At this stage, there were four candidate groups identified as 2, 4, 6, 7 and group 7 has got the first choice for further split. The predictors are evaluated one by one for their best splits.

TABLE 18.7: PREDICTORS & CUT-OFF

Predictor	cut-off After Code	Outcome
V5 (2,3,4,5)	2	0.14660691E+02
V6 (2,3,4)	4	0.10691532E+02

Best split for group 7 on predictor V5 (Library Visit) was traced in this split. Group 7 is split on V5 into the following groups:

TABLE 18.8: GROUPS & CODES

Group 8V5 [Codes 2]
Group 9V5 [Codes 3, 4, 5]

SPLIT 5: (TABLE 8)

At this stage, there were five candidate groups identified as 2, 4, 6, 8, 9 and group 2 has got the first choice for further split. The predictors are evaluated one by one for their best splits.

TABLE 18.9: PREDICTORS & CUT-OFF

Predictor	cut-off After Code	Outcome
V5 (1)	No eligible split	
V6 (1,2,3,4)	2	0.27286064E+02

Best split for group 2 on predictor V6 (Net Access Freq.) was traced in this split. Group 2 is split on V6 into the following groups. However no eligible split is found for the predictor V5 in this level.

TABLE 18.10

Group 10V6 [Codes 2]
Group 11V6 [Codes 1, 3, 4]

SPLIT 6: (TABLE 9)

At this stage, there were six candidate groups identified as 4, 6, 8, 9, 10, 11 and group 9 has got the first choice for further split. The predictors are evaluated one by one for their best splits.

TABLE 18.11

Predictor	cut-off After Code	Outcome
V5 (3,4,5)	No eligible split	
V6 (2,3,4)	4	0.98893013E+01

Best split for group 9 on predictor V6 (Net Access Freq.) was traced in this split. Group 9 is split on V6 into the following groups. However no eligible split is found for the predictor V5 in this level.

TABLE 18.12

Group 12V6 [Codes 4]
Group 13V6 [Codes 2, 3]

SPLIT 7: (TABLE 10)

At this stage, there were seven candidate groups identified as 4, 6, 8, 10, 11, 12, 13 and group 13 has got the first choice for further split. The predictors are evaluated one by one for their best splits.

TABLE 18.13

Predictor	cut-off After Code	Outcome
V5 (3,4,5)	No eligible split	
V6 (2,3)	No eligible split	

But, No eligible split was found for the group 13. In the next attempt there were six candidate groups identified as 4, 6, 8, 10, 11, 12 and group 10 did receive the first choice for further split. But, no eligible split was traced in this split. In final attempt there were five candidate groups identified as 4, 6, 8, 11, 12 and group 11 did get the first choice for further split. But, no eligible

split was traced in this split. The partitioning for the predictors V5 (Library Visit), V6 (Net access frequency) and the dependent variable V3(Branch) in the splits had ended with 7 final groups and the total variation was explained as 22%. The One-Way analysis of final groups generated the variation 0.139 with df 6.

SUMMARY TABLES RESULTS

TABLE 15 EXPLORES ALL THE GROUPS IN WHICH THE CASES HAVE BEEN GROUPED ALONG WITH THE VARIATIONS

The best split for each group helped to trace the percent of total variation for the predictors Library Visit and Net access frequency. In group 1 the predictor 'Library Visit' has secured the value 6.43, which is higher than the value of the predictor 'Net access frequency'. In group 3 the predictor V5 has secured the value 5.13, which is higher than the value of the Predictor V6. The groups 2, 4, 6, 8, 10-13 are belonging to the final groups.

TABLE 16 DEPICTS THE PERCENT DISTRIBUTION OF THE DEPENDENT VARIABLE FOR EACH GROUP AS GIVEN BELOW

In group 1 'Commerce' has secured the maximum value 24.52% followed by English (19.35), Sociology (12.90%), MBA(10.32%) while rest of the branches have secured below 8%. In group 2 'Political Science' has secured the maximum value 19.23% followed by Population Studies (17.31),MBA (13.46%), Sociology & Commerce (11.54%), MBA(10.32%) while rest of the branches have secured below 8%. In group 3 'Commerce' has secured the maximum value 31.07% followed by English (25.24), Sociology (13.59%) while rest of the branches have secured below 9%. In the final group 4 'Commerce' has secured the maximum value 83.33% while the branch English has secured the rest of the values (16.67%) . Group 5 shows the highest per cent 27.06 for the branch 'English' and the least value is traced for the branch Population Studies (1.18%). Group 6 shows the highest per cent 33.33 for the branch 'English' and the least value is traced for the branch Political science (0.00%). Group 7 shows the highest per cent 25.71 for the branch 'English' and the least value is traced for the branch Population Studies (0.00%). In Group 8 the highest per cent 21.43 is found for 3 branches namely English, History and Sociology and the least value is traced for the branches Economics, Political Science and Population Studies (0.00%). Group 9 shows the highest per cent 26.79 for the branch 'English' and the least value is traced for the branch Population Studies (0.00%). Group 10 shows the highest per cent 16.67 for the branch 'MBA' and the least value is traced for the branch LIS (0.00%). Group 11 shows the highest per cent 36.36 for the branch 'Political Science' and the least value is traced for the branches Economics, English and Sociology (0.00%). Group 12 shows the highest per cent 40.00 for the branch 'Commerce' and the least value is traced for the branches History, LIS, MBA and Population Studies (0.00%). Group 13 shows the highest per cent 31.71 for the branch 'English' and the least value is traced for the branch Population Studies (0.00%).

DISCUSSIONS ON FINAL GROUP SUMMARY TABLES

It has been observed from the final group summary tables 17.1 and 17.2 that the group 13 includes 41 cases which covers the codes 3, 4, 5 (Week, Bi-Week and Month) for the predictor 'Library Visit' and 2,3 (Two hrs, Three hrs) for the predictor Net access frequency. Tables 17.3 and 17.4 from the group 12 depict that the total cases traced in this group are 15 which covers the

codes 3-5 (Week, Bi-Week, Month) for the predictor 'Library visit' and the code 4 (> Three hrs) for the predictor 'Net access frequency'. Tables 17.5 and 17.6 from the group 11 indicate 22 cases, which cover the codes 1 (Daily) for the predictor 'Library visit' and the codes 1, 3, 4 (One hr, Three hrs, > Three hrs) for the predictor 'Net access frequency'. Group 10 includes the tables 17.7 and 17.8 in which 30 cases have been traced for the predictors Library visit (Daily) and Net access frequency (Two hrs). Tables 17.9 and 17.10 from the group 8 indicate 14 cases, which cover the codes 2 (2 Days once) for the predictor 'Library visit' and the codes 2, 3, 4 (Two hrs, Three hrs, > Three hrs) for the predictor 'Net access frequency'. Tables 17.11 and 17.12 from the group 6 depict that the total cases traced in this group are 15 which cover the codes 2, 4 (2 Days once, Bi-Week) for the predictor 'Library visit' and the code 1 (One hr) for the predictor 'Net access frequency'. Tables 17.13 and 17.14 from the group 4 depict that the total cases traced in this group are 18, which cover the code 6 (Bi-Month) for the predictor 'Library visit' and all the codes 1-4 for the predictor 'Net access frequency'.

It could be observed from the information mapping towards 'Search Module' that the maximum output (41) for the predictor 'Library Visit' is found in the 13th group with the variance 8.35, where as the predictor 'Net access freq.' has received the variance 3.50. Further splits and variance levels could be clearly observed from the generated tables.

Both the predictors (Library visit and Net access frequency) have been evaluated one by one for their best splits. On the basis of the best 7 splits it is concluded that both the predictors have got eligibility for further splits up to the split level 4 where as in split 5 and 6 the predictor 'Net access frequency' only has got an opportunity for further splits. However, in the final attempt both the predictors did not receive the chance for further splits and found with 'No eligible split'.

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EMPLOYABILITY SKILLS IN MANAGEMENT STUDENTS – AN INDUSTRY PERSPECTIVE

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ABSTRACT

Employability skills are those basic skills necessary for getting, keeping, and doing well on a job. These are the skills, attitudes and actions that enable workers to get along with their fellow workers and supervisors and to make sound, critical decisions. Unlike occupational or technical skills, employability skills are generic in nature rather than job specific and cut across all industry types, business sizes, and job levels from the entry-level worker to the senior-most position. Management education today has to address a wide variety of critical issues, one of survival, intense competition, serving the needs of stakeholders, delivering industry employable graduates and in the process of doing all this develop brand equity. While all of these issues are critical and important enough to generate a discussion, research and elaboration at length, this paper will address the issue of employability skills needed by management students from an industry perspective which has been drawn from a survey of 48 corporate interviews, representing HR managers, marketing managers who are involved in recruitment process and later appraisal of the selected candidates also. \the paper has drawn from their experiences and highlights the skill sets needed by management students in the current market scenario which shall be in the author's view even applicable in the next decade to come. 10 major skill areas have been identified and in them the important ones that need to be addressed are effective communication both oral and written, problem identification and problem solving, time management, numerical competency, data analysis, flexibility and adaptability.

KEYWORDS: *Employability skill, management education, industry expectations.*

INTRODUCTION

Employability Skills are skills that apply across a variety of jobs and life contexts. They are sometimes referred to as key skills, core skills, life skills, essential skills, key competencies, necessary skills, and transferable skills. Industry's preferred term is Employability Skills.

Employability Skills can also be defined as "skills required not only to gain employment, but also to progress within an enterprise so as to achieve one's potential and contribute successfully to enterprise strategic directions.

When we talk og management students in the Indian perspective, thee is a paradox, unlike the west wherein majority of stdnets undergoing a manageent degree qualification have work experience, in a country like India, a management degree isconsidered a passport to seek a good job. This raises the criticality of emoloyability skill dveelopment among managemnt sudents in the Indian context. Developing these skills among studnets who usually have no hands on

experience, no idea of reality what the industry wants and still desire the best. Here we are talking of management stdunets who are from the business schools other than the Indian Institute of manageent and rekated managements chools of this category. 3500 business schools with an average of 200 students enrolled ready to face the industry for seeking employment lays a big pressure in the preparation of these as a GDP indicator and economic development inittiative to make them employable.

LITERATURE REVIEW

Employability skills cover the following areas:

• Developing key transferable skills

• Planning and personal development skills

• Career planning and gaining employment

• Successfully contributing to the role once acquired

• Continuing to develop within a career throughout their working lifetime

From the perspective of employers, 'employability' often seems to refer to 'work-readiness', that is, possession of the skills, knowledge, attitudes and commercial understanding that will enable new graduates to make productive contributions to organisational objectives soon after commencing employment. Indeed, studies of employer demand for graduates in engineering and science disciplines have found that appropriate work experience and evidence of commercial understanding rank highly as selection criteria because of commercial pressures to seek graduates who will not require long 'learning curves' when they start employment (Mason, 1998, 1999).

However, in an extended discussion of the employability concept, Hillage and Pollard (1998:11) put more emphasis on individuals possessing the capability 'to move self- sufficiently within the labour market to realise potential through sustainable employment'. In a similar vein Harvey and Morey (2003) highlight the skills which graduates need in order to manage their own careers and those which will enable them to continue learning throughout their working lives

These broader conceptions of employability partly reflect the influence of Coppers (1998) report which identified a set of key skills which were 'relevant throughout life, not simply in employment' These skills are Communication, Numeracy, IT and Learning how to learn at a higher level and recommended that provision of such skills should become a central aim for higher education. Within HE the generic skills needed to enhance graduate employability (whether defined in terms of immediate work-readiness or longer-term career prospects) are now typically seen as including the skills emphasised by Dearing and also Literacy, Problem-solving skills and Team-working skills. In addition, the employability skills agenda is commonly defined to include 'Understanding of the world of work' which typically refers to knowledge about the ways in which organisations work, what their objectives are and how people in those organisations do their jobs (Coopers and Lybrand, 1998).

University responses to this agenda typically include modifications to existing course content (sometimes in response to employer suggestions), the introduction of new courses and teaching methods and expanded provision of opportunities for work experience – all intended to enhance

the development of employability skills and/or ensure that the acquisition of such skills is made more explicit. In some cases university departments have sought to 'embed' the desired skills within courses; in other departments students are offered 'stand-alone' skills courses which are effectively 'bolted on' to traditional academic programmes. In fact many university departments now use a mix of embedded and stand-alone teaching methods in their efforts to develop employability skills.

METHODOLOGY

The work in this paper is descriptive in nature with data collected from 48 corporate managers who undertake recruitment process, interviewing management students enrolled in the MBA program through a structured interview containing both open ended and close ended questions. 100 corporate managers were targeted for the study while only 48 responded to spare their time for the interview positively to agree to participate in this dialogue giving a response rate of 48%. A convenience sampling was used for the study.

RESULTS

The gender respondents from the industry who participated in this survey was

GENDER	NUMBER	PERCENTAGE
MALE	29	60.4%
FEMALE	40	39.6%

INDUSTRY SECTORS: The respondents from various industry sectors have been represented below with their percentage representation.

SECTOR	% age RSPONDENTS
TELECOM	15
BANKING	35
HOSPITALITY	28
REAL ESTATE	18
INSURANCE	7
TOTAL	100%

EMPLOYABILITY SKILLS

The skill sets identified by the respondents in the order of importance are listed below :

S.NO.	SKILLS IDENTIFIED
1	**EFFECTIVE COMMUNICATION:** The ability to explain what is meant in a clear concise way through written and spoken means. The ability to listen to people and act

	upon key instructions and information.
2	**PROBLEM SOLVING:** The ability to identify key issues, implications and generate solutions. The ability to process data, formulate a vision and resolution. To be able to apply knowledge through critical thinking and creativity within a framework of bounded rationality.
3	**NUMERACY:** To be able to use data and mathematics to support evidence and demonstrate a point. To understand and apply mathematical concepts and reasoning.
4	**SELF MOTIVATION:** The possession of a strong personal drive where you do not wait to be told what to do. The possession of own ideas and innovative thinking and the ability to transform this thinking into reality through action.
5	**ORGANISATIONAL SKILLS:** The ability to be organised and methodical in meeting priorities, deadlines and targets.
6	**LEADERSHIP & MANAGEMENT:** The ability to manage and lead teams with a strong focus on organisational goals, perform under pressure and manage a crisis.
7	**FLEXIBILITY & ADAPTABILITY:** The ability to adjust to ever changing business demands, adjusting in a cross cultural work force, adapting to unforeseen situations effectively.
8	**TEAM WORKING:** the ability to work with people ina group from different disciplines, backgrounds, expertise to accomplish a task or common goal with or without minor supervision.
9	**NEGOTIATION SKILLS:** the ability to express your own requirements in an unemotional and cear fashion toachieve a win win outcome whilst taking on board other people.
10	**DIVERSITY/ SENSTIVITY:** The ability to build cultural sensitivity and share a common platform with people in a multi cultural environment without hurting the feelings, emotions and sentiments of others. Being Geocentric rather than ethnocentric.

PERSONAL ATTRIBUTES

The personal attributes that the industry looks for in management students as being desirable are:

S.NO.	PERSONAL ATTRIBUTES
1	Professional but friendly behaviour
2	Good time keeping
3	Excellent communication
4	Personal grooming and etiquette
5	Good time keeping

6	Adaptable
7	Resourceful
8	Self Confidence (not over confidence)
9	Thinking and reasoning
10	Commercial awareness
11	Self motivation
12	Integrity, trustworthiness
13	Proactive nature
14	Negotiation skill
15	Goal orientation
16	Willingness to Learning
17	Creativity & innovativeness
18	Social concern
19	Conflict management
20	Flexibility

MANAGEMENT TASKS THAT AID EMPLOYABILITY SKILL DEVELOPMENT

WRITING SKILLS

- Writing up a project or dissertation
- Writing for the student newspaper
- Writing a report for a course placement
- Essays, dissertations, project reports
- Secretary of student society
- Publicity materials for a charity
- Letter to raise sponsorship for an event

SPEAKING SKILLS

- Joining a campus drama group.
- Public speaking or debating
- Seminars
- Working in a summer/ vacation job

- Market research, telesales
- Showing new entrants/guests around the campus
- Course presentations
- Student presenter for various events

ADAPTABILITYSKILLS

- Year abroad or independent travel abroad
- Working part-time while studying
- Changing courses
- Combining study with family
- Shift work or working at short notice

OPERATING SKILLS

- Working on a group project
- Rag fund-raising
- Team sports
- Working as a clerical assistant in a busy office
- Group project
- Team sports
- Playing in an orchestra or band

ANALYSING SKILLS

- Preparing Student Election Statistics
- Analysing data from an experiment
- Vacation job as a market research interviewer
- Voluntary work for a publisher
- Creative solutions to coursework problems
- Chess, computing, role playing

INITIATIVE TAKING SKILL

- Suggesting changes to a course when a student representative
- Getting relevant work experience/project work/sponsorship
- Starting your own business: selling on Ebay
- Starting a new society
- Creating a website/ blog

- Coping with a sudden crisis
- Stretching your loan to go further

PLANNING AND ORGANISING SKILLS

- Organising your revision schedule
- Planning a trip round Europe with friends
- Stage manager for a play
- Representative for an event
- Managing a course project
- Organising sporting events
- Organising charity events
- Students' union activities

LEADERSHIP SKILLS

- Leading a group project
- Chairing a student society
- Captaining a sports team
- Being a play scheme helper
- Guide leader
- Air training corps
- Mentor in school to juniors

NEGOTIATING SKILLS

- Negotiating the rent with your landlord
- Negotiating the late handing in of essays
- Staff-student liaison committee
- Resolving an argument between friends

PERSUADING SKILLS

- Arguing your case in a seminar
- Getting club members to turn up for events!
- Fund-raising for a local charity
- Telesales job in the vacation

NETWORKING SKILLS

- Careers fairs

- Speculative applications for work

INVESTIGATING SKILLS

- Researching for coursework in the library
- Student journalism
- Finding out about different careers through work shadowing
- Market research interviewer in a vac. job
- Building your own computer

LISTENING SKILLS

- In lectures!
- Helping the student telephone counselling service
- Working as a waiter or barmaid

LEARNING NEW SKILLS

- Learning a new language
- Taking up a new sport
- Improving your computing skills
- First aid
- Music/ dance like jazz/ Salsa

MAKING SKILLS

- Deciding which modules to take next year
- College Welfare Representative
- Buying an expensive item (car or computer)
- Targeting appropriate customers in a sales job

NUMERACY **SKILLS**

- Working in a bank or managing your own savings account/ investment portfolio
- Budgeting your expenses over the year
- Interpreting a statistical table for your course
- Treasurer of committee

COMMERCIAL AWARENESS

- Current affairs interest
- Taking business options on a course
- Organising events

- Reading financial pages of a newspaper

A rigorous and continuous personality development program should encourage the students to ask themselves the following questions:

- How well am I doing?
- What are my strengths?
- What are my goals?
- What could I do better?
- What academic support or skills do I need?
- What skills do I need to gain or develop further?
- What extra-curricular activities will help me towards my career goals?

DISCUSSIONS AND IMPLICATIONS FOR MANAGEMENT EDUCATORS

Management teachers need to address these skill development orientation while teachign their respective courses, giving assignments to students so that the entire learning process creates the skill development, It is important to realise that skill development is not an overnight ask and not a pill oriented method that a specific course taken will develop these skills in the student. Although the academic skill level required by some entry-level jobs may be low, basic academic skills are still essential for high job performance. Ideally, new hires will have the ability and will want to learn. They also need the ability to listen to and read instructions and then to carry out those instructions. When asked for information, these individuals should be able to respond appropriately both orally and in writing, including recording and relaying information. Reading ability includes comprehending what has been read and using a variety of written materials, including graphs, charts, tables and displays. Entry-level employees also need the ability to complete basic math computations accurately. Perhaps even more important to job success than having good basic academic skills is having good higher-order thinking skills. The ability to think, reason, and make sound decisions is crucial for employees desiring to do well and advance. A person who can think critically, act logically, and evaluate situations to make decisions and solve problems, is a valuable asset. Application of higher order thinking skills in the use of technology, instruments, tools and information systems takes these higher order skills to a new level making the employee even more valuable. Employers will usually try to help valued employees seek and get more advanced training, thus widening the gap between those with higher order skills and those possessing basic academic skills alone.

If basic academic skills and higher order thinking skills are so important, why then are employers deeply concerned with personal skills? Because in most jobs, it is difficult to utilize workers effectively who lack personal skills. Entry-level employees with good personal skills have confidence in themselves and deal with others honestly and openly, displaying respect for themselves, their co-workers, and their supervisors regardless of other people's diversity and individual differences. They view themselves as a part of a team and are willing to work within the culture of the group. They have a positive attitude and take the initiative to learn new things to get the job done. Rather than blaming others when things go wrong, they are accountable for their

actions. They also have the ability to set goals and priorities in their work and personal lives so that resources of time, money and other resources may be conserved and managed. These individuals practice good personal habits, come to work as scheduled, on time and dressed appropriately, and are agreeable to change when necessary.

The following is a direction which could be adopted to correct the skill development process:

1. Employability skills are teachable skills and may be taught in business school and employment settings. Goals and objectives for teaching employability skills should be set. Instruction should be designed to ensure those goals and objectives are reached.

2. Parents need to be involved in goal setting and modelling behaviour.

3. Teach employability skills using a democratic approach so that students' awareness of values, attitudes, and worker responsibilities is increased.

4. Supervisors, trainers and teachers should set good examples of the desired behavior. Students should have the opportunity to observe the type of work place behavior that is being required of them.

5. When possible, classrooms should replicate the features of real work settings.

6. Set and communicate high expectations and hold students responsible for their behavior.

7. Psychometric analysis of student personalities can be adopted and detailed systematic feedback for modelling desired behaviour can be given to keen followers.

8. Neuro Linguistics techniques can be adopted to shape behavior and mapping techniques can be adopted to generate the desired skill development.

9. Teach, don't tell. Teachers and trainers tend to be most effective when they assume the role of coach or facilitator.

CONCLUSION

It is often said that it is too late to teach values after a child has reached or completed high school; that their personality is set and nothing can change it. That is not true. It is, fortunately, never too late. Change may be difficult, but it can be done. Teaching of values should begin in the home as a child, be continued through development to adulthood, and reinforced as an adult. If good behavior is reinforced and good role models are presented, people can change for the better. Good habits can be acquired. Employers, schools and parents should remember that you get the behavior you reward and model.

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A STUDY ON COSTING OF AN OPEN LEARNING COURSE: SRI LANKAN CASE STUDY

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ABSTRACT

An important financial aspect in open and distance learning (ODL) systems is the need to manage investments. The ODL systems, especially those which produce print materials, tend to have higher fixed costs and longer financial planning. This study investigates cost structures, emphasizing on cost per course and cost per student at similar local centers. At local centers, student support is through face-to-face and Tutor Marked Assignments (TMA) at the Open University of Sri Lanka (OUSL).The knowledge of how much it costs to develop, deliver and evaluate student an ODL course will help academics and governing authorities in making informed decisions on various aspects including whether the mode of present delivery needs upgrading to an online method where the benefits of technological advances could be captured. Interviews, structured open-ended questionnaires and the relevant financial circulars/reports at OUSL were used to collect data. Data from relevant divisions, OUSL Press, local regional and study centers were used. Finding shows that, costs of instruction delivery amounts to 40 % and production amounts to 35 % of the total cost. Course development, costs 9% and evaluation and overheads costs, 9% and 7% respectively. The unit cost (cost/learner) was LKR 2669 for the evaluated course. However, the tuition fee charged from each student in 2010/2011 for the above course was LKR 2403.00 which is LKR 266.00 lower than the calculated cost per student for this study. It is necessary to look into pricing, in this context, for courses with short shelf lives at OUSL, urgently.

KEYWORDS: *cost structure, open and distance learning, unit cost.*

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1. INTRODUCTION

Rapid technological changes and shifting market conditions in the world significantly influence the annual national budget on both general education as well as higher education. Bramble & Panda (2008:107) points out that tertiary education is at the centre of the debate today, focusing on how and from where it should be funded and how to reduce the unit costs to break even without sacrificing quality.

SRI LANKAN CONTEXT

According to the report published by UNESCO (2003), some of the countries in Asia have spent varied amounts on education as percentage of GDP in 2000-01. For instance, 1.4 (Myanmar), 1.5 (Indonesia), 1.8 (Pakistan), 2.5 (Bangladesh), 3.1 (Sri Lanka), 3.5 (Philippines), 4.1 (India), 5.4 (Thailand) and 6.2 (Malaysia) have been spent as a percentage of the annual GDP on education.

In Sri Lanka, the percentage of the annual GDP on education has been drastically lowered from 3.1% to 1.9% GDP for the year 2011 (Central Bank of Sri Lanka, 2011). This could be as a direct result due to increasing expenditure on other sectors, especially expanding infrastructure in the war-driven areas in the country. However, if this trend persists, it will lead to a further decrease of expenditure on education, higher education in particular and as a result the overall quality of education system in Sri Lanka will be severely affected. This emphasizes the need to implement a cost recovery mechanism of higher education by providing education at a large scale (Bramble & Panda, 2008) which will seriously affect on the student enrollments and student retention in the system.

Human capital theorists firmly believe that education could be a ladder to empower people by providing knowledge, attitudes and skills thereby they would be in a better position to move towards the upper layers in the society. Therefore, there is a massive demand for education across the world. Many professional experts believe that by providing mass-scale education especially in the higher education sector could address this issue of demand driven outbound movement of students. In a study carried out by Wagner (cited in Rumble 1997), shows that the cost efficiencies can be generated by mass scale education quoting the Open University of the United Kingdom as an example. Also in a study carried out by educational planners of Andhra Pradesh in India, state that the development of an open university would be the most cost-efficient means of expanding higher education (Rumble 1997:120). Therefore, open and distance learning universities are regarded both by developed and developing countries as a cost-effective venture to reach the outreach by providing a quality education.

THE COST OF ESTABLISHING AN EDUCATION SYSTEM

The higher education is always tied up with the three vectors, access, cost and quality as the vectors of an eternal triangle (Daniel 2001). Open and Distance Learning (ODL) naturally fits with these requirements with its inherited cost structure in which it has lower variable costs per learner as it caters for masses. On the down side ODL systems has considerably higher startup cost embedded with its quality dimension. Most experts emphasize that the quality should not be reduced, whilst increasing access and lowering costs. This fact is clearly elaborated in the fact that

mega universities such as Open University of United Kingdom (OUUK), in which the student enrollment is over one hundred thousand, would easily achieve this status by lowering the variable cost per learner (Daniel 2001). A small scale ODL institution like the Open University of Sri Lanka (OUSL) which reached its current learner enrollment, which is about 33,500, with its 30 years history, may find it difficult to lower the costs while retaining the quality of its programs.

2. REVIEW OF LITERATURE

A variety of tools and approaches have been used by researchers to study the economics of ODL systems (Rumble 1997, Rumble 2002, Moore & Anderson 2003). Many researchers have used the framework explained by Rumble (1997) for costing ODL institutions. Cost drivers in the open and distance education system includes, two major operating systems. They are materials subsystem and student subsystem (Rumble 1997). Material subsystem includes design, production, distribution and reception of course materials. Student subsystem mainly deals with all the student related activities from student enrolment to organizing of graduate ceremonies and to provide transcripts and references after graduation. Logistical and regulatory subsystems support the major operating systems. Logistical subsystem deals with human and financial resources and infrastructure facilities while regulatory subsystem plans and manages the overall system relating all the systems.

3. NEED OF THE STUDY

There have been a considerable studies devoted to costing of educational technologies with their appropriate media and operating costs of open and distance learning institutions during the period of 1970s and 1980s. With the introduction of online learning, many studies have been reported on costing of online open and distance learning systems in the decade starting off in 1990s. However, a very few studies have been reported on the costs of open and distance learning after the year 2000. This was clearly evident from the review carried out by Zawacki-Richter et al. (2009) on open and distance learning research. Their study was based on articles published in five prominent open and distance learning journals between the periods of 2000 to 2008. According to them only 1.7% (only 12 articles found on costs and benefits out of 695 articles) have been focused on costs and benefit and it was the lowest out of all the other research areas. This may be due to the rapid development of Internet technologies in the latter part of 1990s' and beginning of decades 2000s, have heavily influenced administrative and research activities

Rumble (1997:121) states that the nature of the cost structure of open and distance learning explains why the development of an open university in a state would be the most cost–efficient means of expanding higher education. He further emphasizes on differences of cost structures in traditional education and open and distance learning. The cost of traditional education driven by the labor costs for classroom teachers, and is directly related to the number of students. They rise inexorably with the increase in student numbers. The issue could be addressed by open and distance learning, by changing the production function of education by substituting a range of media for classroom teachers. Therefore, this study attempted to address the cost recovery issues relevant to a small scale ODL institution like the OUSL.

4. RESEARCH OBJECTIVES

The objectives of this study were to identify:

- the cost structure of an open and distance learning course; print as the main delivery medium
- costs per course,
- cost per student in the ODL course.

5. METHODOLGY

This study used the conceptual framework proposed by Rumble (1997:6) to calculate the costs for the selected course.

Interviews were used as the main method of gathering information from different key personnel. In addition, documents associated to procedures, mechanisms, approvals, circulars, paying vouchers, working sheets, etc. were used to collect other relevant information.

COLLECTION OF DATA

The major activities relevant to the ODL course based on Rumble's system view for distance education course (1997:6) was tabulated in Table 1.

TABLE 1: CONCEPTUAL FRAMEWORK ADOPTED FROM RUMBLE (1997:6)

Material subsystem	Student Subsystem	Logistical Subsystem	Regulatory Subsystem
Design of courseware	Enrollments	Human resources management	Overall Planning
Production of courseware	Conducting Face-to face sessions	Provide infra-structure facilities	Decisions making
Distribution of courseware	Conducting continuing Assessments and examinations	Make arrangements to make payments	Administration of the overall system
Reception of courseware	Organizing Certification graduation ceremonies	Coordination of local centers	Academic administration

The costs of course development related to the material subsystem were gathered from interviewing academic staff who had estimated costs for new programmes, academic coordinator of the selected course (pure mathematics), the printer and assistant bursar at the press/OUSL. The production costs for course material were calculated assigning the costs for relevant quantity of course materials and labour charges. Apportioning of overheads such as cost of machineries by applying depreciation values and repair charges of the relevant machines, water and power consumption were also considered.

The data relevant to delivery cost including conducting face to face sessions (Day Schools) Tutor Marked Assignments (TMAs), Continuing Assignment Test (CATs) and Final examination were collected from structured interviews focused on relevant academic, academic support, administrative and technical staff of the various departments/divisions including local centres of

the OUSL and relevant documents such as circulars, minutes of meetings, paying vouchers, working schedules, cost sheets etc.

The costs related to student subsystem were collected from relevant academic, academic support, administrative, course coordinators at the two types of local centres (Regional Centres – RCs, Study Centres – SCs) in which students come for the contact sessions (day schools) and relevant clerical staff of the various departments/divisions of the OUSL, using a structured interview schedule. Further, details of conducting examinations were obtained from the Senior Assistant Registrar who is the Head of the examination division. Director/Information Technology (IT) and system analysis at IT division were also consulted to gather past student enrollment data. The student's evaluation costs were estimated from the records available at relevant RCs and SCs.

Details of payments were obtained from the Bursar who is in charge of the finance division, Assistant Bursar/payments and their staff, for calculating costs related to logistical subsystem. Heads of Operations and Regional Educational Services were interviewed in order to get the information related to the regulatory subsystem.

SELECTION OF THE COURSE FOR THE STUDY

There are different types of OUSL courses delivered using a network of RCs and SCs. Some use different media (print, audio-visual and online) and different types of contact sessions (face to face sessions, laboratory sessions, field visits etc.) through three different languages (Sinhala, Tamil and English). The simplest course comprises of print course material and has only face to face sessions as contact sessions. In this study this type of course is referred to as a basic model. The courses under intermediate model uses print, day schools and laboratory sessions as contact sessions. The advanced model refers to the courses which have print AV/online learning, day schools, laboratories and other contact sessions.

According to the student guide for 2010/2011 by the Faculty of Engineering Technology (FET), Pure Mathematics course (MPZ2310), contains the maximum number of academic activities. Further, the course was conducted in all 3 languages using 14 Regional/Study centres and instructions were delivered only through print. Therefore, Pure Mathematics course (MPZ2310) was selected as the basic model as it has only print and face to face sessions.

THE DESCRIPTION OF THE COURSE SELECTED: PURE MATHEMATICS COURSE (MPZ2310)

- Print course material – two blocks in each language, block-I contains 370,408,384 pages while block-II contains 428,434,678 pages for English, Sinhala and Tamil language respectively.
- Delivery method: Twenty face to face sessions (3 hours duration)
  - at four regional centers and six study centers in Sinhala language
  - at four regional centers and one study centers in Tamil language
  - at two regional centers in English language
- Assessment and Evaluation:
  - four Tutor Marked Assignments (TMAs)
  - two Continues Assessments Tests (CATs) with 1.25 hours duration and
  - final examination papers (part I -1 hour duration, part II -3 hour duration)

Cost drivers were categorized using Rumble's framework. Production costs and delivery costs (including evaluation) were separated by differentiating costs according to their functions.

DETERMINATION OF COSTS RELEVANT TO EACH SUBSYSTEM

Costs relevant to the development of course material were calculated using two separate methods:

(A) WORK FOR LESSON WRITING: used piece rate method where payment was calculated based on the completed number of sessions.

(b) Costs for needs survey, syllabus development, coordination and course team meetings were calculated by multiplying relevant academic working hours with the hourly rates based on their monthly salaries.

The average cost per student per year within the five year period of the lifecycle has been determined by annualization of initial course development costs with a prevailing rate of interest.

6. RESULTS & DISCUSSION

Development cost for the course is given in Table 2. The course material development costs should be 'annualized' by estimating an average of the combination of depreciation and interest on the un-depreciated portion over the life of the facility and illustrated in table

TABLE: 2: DEVELOPMENT COST FOR THE COURSE

Item of expenditure for course development	Costs in LKR	Costs in US $
Need Survey costs	80625	713.496
Syllabus development costs	64500	570.796
Co-ordination costs	48375	428.097
Course Team meeting costs	80625	713.496
Lesson writing costs	88000	778.761
Lesson editing costs	44000	389.381
Type setting cost for English language course content	22920	202.832
Translation in to Sinhala language costs	162400	1437.17
Sinhala language editing costs	81200	718.584
Type setting cost for Sinhala language course content	24360	215.575
Translation in to Tamil language costs	161600	1430.09
Tamil language editing costs	80800	715.044
Type setting cost for Tamil language course content	24240	214.513
Total for course material development	**963645**	**8527.83**

ANNUALIZATION OF COURSE MATERIAL DEVELOPMENT COSTS OF THE COURSE: MPZ2310

This course had been offered in year 2009, 2010, 2011, and 2012 and (assumed for calculation purposes) would be offered in 2013 without changing the course content. The initial course development costs carried out in 2008 (before commencement of the course) were considered as up-front capital investment (costs of development of course materials is an investment that pays

off over the life of the course). The course material development costs were 'annualized' by estimating an average of the combination of depreciation and interest on the un-depreciated portion over the life of the facility. The standard formula for calculating the annualization factor (Rumble, 1997:45) which has been used to take account of both the cost of depreciation and the opportunity cost of interest forgone is:

$$a(r, n) = \frac{r(1 + r)^n}{(1 + r)^n - 1}$$

where a(r,n) is the annualization factor, n is the life of the capital investment, and r is the prevailing rate of interest. The interest rate would be lower, however, the risk free investment in Sri Lanka is investing in Government Treasury Bills and its rate was 12 %. By substituting r = 12.5 and n = 5, to the formula = 0.281 was obtained. (This value could also be extracted from the table titled annualization factor as shown in Table 6.). The annualized course development cost per year was determined as (Rs. 963845 x 0.281) Rs. 270784. The full annualized course development cost of the course over 5 years is (Rs. 270784 x 5) Rs. 1353920). The total student population over the life of the course is 5518. Therefore, the average annualized course development cost per student was (Rs. 1353920/5518) Rs. 245 as shown in the Table-6.

TABLE 3: ANNUALIZED COURSE DEVELOPMENT AVERAGE COSTS PER STUDENT (LKR IN 2010 VALUES)

Year of course life								
		2008	**2009**	**2010**	**2011**	**2012**	**2013**	**Total**
1.	Cash flow	578,187	385,458					
2.	Annualized cost							
	(a) original development		270,784	270,784	270,784	270,784	270,784	1,353,920
	(b) redevelopment		0	0	0	0	0	
	Total annualized cost per year		270,784	270,784	270,784	270,784	270,784	1,353,920
3.	Number of students		1060	975	1197	1143	1143	5518
4.	Course development cost per student		255	278	226	237	237	1233
5.	Average course development cost per student							245

Production cost for course material was calculated assigning the cost drivers for the relevant quantity of materials, labour charges, apportioning overhead costs of machines and by getting depreciation values of the relevant machines (Table 4).

TABLE 4: PRODUCTION COST FOR THE COURSE MATERIAL (VARIABLE COST-1)

Item of expenditure for course material production	Costs in LKR	Costs in US $
English Language Book1 (310 copies)	140663	1244.81
English Language Book2 (310 copies)	161436	1428.64
Sinhala Language Book1 (510 copies)	183707	1625.73
Sinhala Language Book2 (510 copies)	215990	1911.42
Tamil Language Book1 (155 copies)	84566	748.372
Tamil Language Book2 (155 copies)	105687	935.283
Total for course material production	**892049**	**7894.24**
Average cost for course material production (per student)	**915**	**8.10**

The relevant course delivery and evaluation costs were calculated using collected data from the relevant local centres (Table 5 and 6).

TABLE 5: COSTS FOR COURSE DELIVERY (VARIABLE COST-2)

Item of expenditure for course delivery	Costs in LKR	Costs in US $
Course material delivery cost to local centres	14495	128.27
Tutors' costs for conducting 20 face to face sessions in 3 languages	750000	6637.17
Infrastructure costs including Class room, equipment and labour for course delivery	266661	2359.83
Total for course delivery	**1031156**	**9125.27**
Average cost for course delivery(per student)	**1058**	**9.36**

TABLE 6: COSTS OF STUDENT EVALUATION (VARIABLE COST-3)

Item of expenditure for course student evaluation	Costs in LKR	Costs in US $
Setting Marked Assignments Marking(5-TMA)s	1200	10.62
Marking TMAs	58500	517.70
Setting Continues Assessment Test (2-CAT)s	1600	14.16
Conducting Continues Assessments Test (2-CAT)s	47740	422.48
Marking Continues Assessment Test (2-CAT)s	28650	253.54
Setting final examination papers (2-paper)s	2400	21.24

Conducting final examination papers (2-paper)s	36110	319.56
Marking final examination papers (2-paper)s	8640	76.46
Printing papers for 5-TMAs, 2-CATs and 2-Final	48943	433.12
Total for course evaluation	**233783**	**2068.88**
Average cost for course evaluation (per student)	**240**	**2.12**

INDIRECT COSTS (OVERHEAD) RELEVANT TO THE PURE MATHEMATICS COURSE (MPZ2310)

The overhead costs could be associated with the regulatory and logistical sub systems as they were incurred for special kinds of activities that were not directly attributed to this course. A percentage of the areas of expenditure where their activities have a more significant relationship with a particular course have been attributed as overheads. The areas identified are the senior management of the OUSL, the general management of the academic department which offers this course and the relevant faculty Dean's office and any associated expenses incurred by such management, special functions such as planning, finance, personnel, estates, building management and management of local centre network. The OUSL practice is to charge overhead costs as (10% to 30 %) of direct costs such as course development costs and costs for printing course material. In this study overhead costs are considered as 15 % of (course development costs + course material printing) costs for year 2010/2011 since in most of cost calculations system overhead are calculated as percentage (15 %) of direct labour and material costs. Calculation of overhead cost was done as follows:

Overhead costs = (15% course material development + production costs)

$$= LKR (963645 \times 0.281 + 892049)$$
$$= LKR\ 174425$$

The average cost for overheads is LKR is 174425 and per student it is LKR 179 (Enrolled Student number was 975 for year 2010/1011).

TOTAL DIRECT COSTS

It was identified that the total costs for this course is only the annualized course development costs. According to the table-6 the total annualized cost per year is LKR 270,874.

6.6.2 TOTAL VARIABLE COSTS

The variable costs = Average costs for (production + course delivery + student evaluation)

The variable costs = LKR (915+1058+240) = LKR 2213

Total costs per course

$$T = F + V*S$$

Total costs (per year) = Annualized course development costs per year + total Overheads + (average variable costs)*s

Total costs (per year) = LKR (270,784 + 174,425) + LKR (915+1058+240)*975

$$= LKR (445,209 + 2213*975)$$
$$= LKR\ 260,\ 2884$$

Average cost per student = Total costs/Number of students =LKR 2602884/975= LKR 2669.62

6.6.2 COST STRUCTURE OF THE COURSE
COST PER STUDENT BASED ON LOCAL CENTRE

Table 7 illustrated that cost per student, of the variable costs is changed with the local centre due to center dependent cost drivers, such as course material delivery costs to the center from the central campus and due to the student and the instructor ratio; due to the different number of students registered at different local centers and the different number of instructional languages used, for the face to face sessions. Student/instructor ratio is the major contributor for changing variable costs. However, the variable costs increase with increasing student activities. That means when the number of students at face to face sessions decreases the variable cost increases due to increases of student/instructor ratio. This cost variance of behavior according to local centre is tabulated in Table 7.

TABLE 7: COMPARISON OF AVERAGE COSTS PER STUDENT BASED ON THE REGIONAL/STUDY CENTRE

Centre	Variable cost per student - based on the centre	Fixed cost per student	Total cost per student based on Local centre	Centre costs deviated from whole student population cost(LKR 2669.67)
Jaffna	2152.85	245.36	2398.22	-239.04
Colombo	2243.21	245.36	2488.58	-148.69
Matara	2461.14	245.36	2706.51	69.24
Gampaha	2567.04	245.36	2812.40	175.14
Batticaloa	2607.22	245.36	2852.58	215.32
Anuradhapura	2641.84	245.36	2887.20	249.94
Kurunagala	2846.72	245.36	3092.08	454.82
Kandy	2866.85	245.36	3112.21	474.95
Ratnapura	3247.70	245.36	3493.06	855.80
Ambalangoda	3395.01	245.36	3640.37	1003.11
Bandarawela	3582.36	245.36	3827.73	1190.47
Kalutara	4178.37	245.36	4423.73	1786.47
Galle	7527.60	245.36	7772.96	5135.70

The cost structure of the MPZ2310 is as follows

Average cost per student = average cost of (course development+ course production + course delivery + student evaluation+ overhead)

This cost structure is graphically represented in figure -1

FIGURE 1: COST STRUCTURE OF MPZ2310
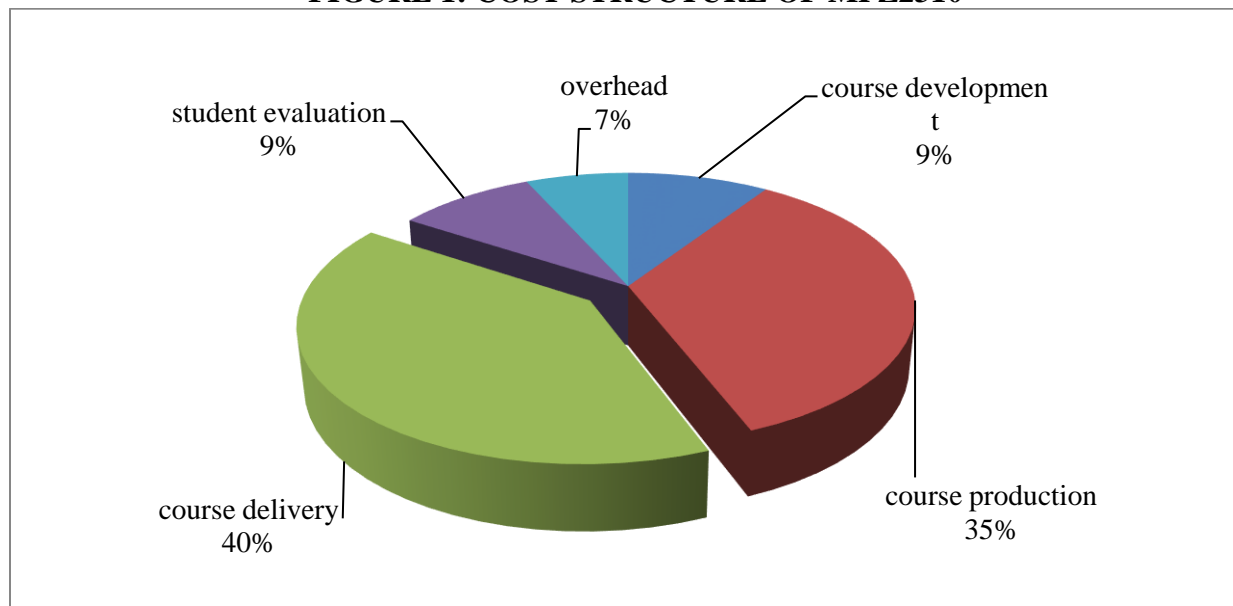
7. CONCLUSION

The findings of the study show that the high fixed costs of course development (LKR 963,645) could be spread across a large number of students by offering a long shelf life (at least five consecutive years). Since print media tends to have a long shelf life this method could be ideal for longer preservation of a course. Unlike mega universities, essentially have enrolled over 100,000 of students, the small scale universities like the OUSL can, therefore, adopt this kind of economies of scale for decreasing the high fixed costs (from LKR 963,645 to LKR 270,784 per year), of a print based open and distance education course. It is also noted that fixed costs/variable costs ratio of this study is 0.41 i.e. is a very low value. It indicates low course development (fixed) cost with high variable costs as the main feature of the cost structure of the course considered in this study. Hence, open and distance education cost structures in small scale ODL institutions low fixed and high variable costs per student could be observed due to low fixed cost as a results of development of poor quality course materials which demand more face to face session. This obviously increases the variable cost. In practical situation if variable cost is higher the duration for pay off the fixed cost is increased. Therefore, in such a system the course life cycle should be increased more than five years in order to recover the initial fixed cost (course development cost).

8. RECOMMENDATIONS

The unit cost (cost/learner) was LKR 2669 for the evaluated course. However, the tuition fee charged from each student in 2010/2011 for the above course was LKR 2403.00 which is LKR 266.00 lower than the calculated cost per student for this study. It is necessary to look into pricing, in this context, for courses with short shelf lives at OUSL, urgently. Further, Having a clear idea about cost structures of open and distance education courses, which are offered more at local centres would be useful for academics and educational mangers who think in favour of moving existing print based delivery methods to other media supported by modern ICT technology such as on line learning, especially who work at small scale open and distance institutions.

8.1 SCOPE FOR FURTHER RESEARCH

Future research needs to be carried out to estimate the cost for the intermediate and advance models for courses which have more complex academic activities and thereby needs to propose a costing structure suitable for any ODL course. In this study costs have been considered only from the view of the open and distance learning institute. However, for comprehensive cost analysis, student costs including opportunity costs, would also need to be considered when calculating the unit cost and an area open for further future studies. The most difficult task of a comprehensive cost study of open and distance education course is to identify overheads correctly. The traditional way of overhead identification, cost apportionment and absorption to cost centers would need to be revisited. Applying new approaches to identify costs of open and distance education courses would be the activity-based costing method, in which costs of disconnected educational activities could be evaluated separately and, be used in full for better identification of overheads.

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REPRESENTATION, RECONCILIATION AND REFORMATION IN BHABANI BHATTACHARYA'S MUSIC FOR MOHINI

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INTRODUCTION

Every society is the product of clashes and conflicts of two cultures, the old and the new, the east and the west. As literature is the mirror of the age, Indian creative writers treated the theme of conflicts in their creative writings. Sarath Kumar Ghose is the earliest of Indian English writers to deal with the theme of clash between tradition and modernity. In his novel The Prince of Destiny, he portrays Bharath, the hero of the novel, as the harbingers of the synthesis between east and the west.

In the general sense, tradition is a continuous process of handing down from generation to generation, conventions, beliefs, habits and even superstitions through oral and written practice. It plays a significant role in the advancement of humanity. In the literary context, tradition becomes a body of customs, beliefs, skills or sayings, handed down from generation to generation or age to age. As S.N. Ganguly rightly remarks, " Tradition, and this is one of the most important functions, helps man in this selective behaviour. The human potential is realized significantly in a changing world and civilization only through the help of tradition". (1)

Society is the base for tradition. As society is dynamic, it undergoes changes in course of time. As a result tradition is also modified. The development in humanity causes change in tradition by way of creating new ideas. The spirit of reform and revolt gives way to modernity. In the literal sense modernity pertains to the present and recent times. It is about the current age or period. According to Balram S. Sorot, " … modernity is that spirit of newness and uniqueness, be it in the field a conscious questioning – a break from the set patterns established theories and beliefs or all sorts of influences". (2)

The Indian English novel has been a vivid portrayal of different attitudes which pleaded for the balance of tradition and modernity. In Mulk Raj Anand's The Big Heart, Ananth, the hero of the novel emphasizes the values of modern technology and the traditional human values. In R.K. Narayan's novels, the conflict takes the form of the clash between the older generation and his son Balu in The Financial Expert., Raju and his mother in The Guide, Jagan and his son Mali in The Vendor of sweets. There is a blend of tradition and modernity in the novels of Raja Rao like Kanthapura and The Serpent and the Rope.

Bhabani Bhattacharya, as a representative writer of contemporary period has treated the theme of tradition and modernity very well in his novels. He analyses the impact of both tradition and modernity on the human society in a wider perspective. Balram S. Sorot writes, "While in the novels of the Indian – English writers in general, the problem of conflict or synthesis between tradition and modernity figures as a secondary theme, in the writings of Bhabani Bhattacharya it

assumes the significance of the dominating issue in contemporary Indian life. The author analyses the political, religious, social and economic problems of modern India through the perspective of this basic conflict in our ethos". (3)

In his first novel So Many Hungers! Bhabani Bhattacharya, dealt with the old and new values through Basu's family in Calcutta and Kajoli's family in Baruni. In another novel, He Who Rides a Tiger, the author presents the blending of the traditional and the modern values through the story of Kalo and his daughter Chandra Lekha. The theme of confrontation of the old and the new values acquires a new dimension in his novel The Goddess Named Gold. In Shadow from Ladakh the central theme is the synthesis of Indian spiritual values and the western modernism. In his last novel, A Dream in Hawaii, the novelist projects the view of integration through the principle character, Swami Yogananda.

Music for Mohini, Bhabani Bhattacharya's second novel, has the conflict of tradition and modernity as its main theme. As Malta Grover remarks, "He has not only responded to this theme the conflict of tradition – modernity in its varied aspects but has transcended it." (4) The novelist deals with the varied aspects of both rural and urban areas. The first part is set in the city and the rest in Behula Village. As the title of the novel indicates, Mohini is the central character in this novel. She is the principle character who faces the conflict from the beginning of the novel to the end. The conflict intensified after her marriage with Jayadev and her stay in a remote village of Bengal, Behula.

Regarding the theme of the novel, G. Rai prints out, "The central theme of the novel is the tie or tussle between orthodoxy and modernity which remains a glaring problem in Indian society even today. The rural – urban clash is an important feature of the novel. The traditional ways of life stand in sharp conflict with those of modern ways" (5) Bhabani Bhattacharya analyses the impact of both tradition and modernity on the human society in a wider aspect.

The central character, Mohini, lives in city with her father, grandmother and brother at the beginning of the novel. The story begins with Mohini's modern out look at her parental home in city. Her father is a Professor and a man of modern views, while her grandmother is conservative and rigid in outlook. The old mother is quite contrary to her son and grand daughter, She protests her son's ideas, whenever her son does not hear her words, She threatens to renounce the world.

Regarding Mohini's school education, there arises a conflict between the old mother and her son. The Professor wants to send Mohini at an English convent, but the old mother sternly opposes her son and says". Let Mohini be trained at home, let her learn classical Sanskrit, the language of Gods, the precious vase that holds the essence of true knowledge and wisdom". (MFM, P.20). But Mohini's father did not agree. He would mould the girl in a modern way, which was his way. For the old mother, convent education is meaningless and harmful to her grand daughter. But atlast, "she compromises with her son.

As Mohini is a good singer, she gets a contract to sing for All India Radio once a week. The old mother is very serious about this and begins to quarrel with her son. On the other hand, the Professor is very happy and proudly remarks that as Mohini's father, he will soon be a celebrity himself. But to the old mother that is shameful for the family. She feels it a disgrace for the family tradition. In this context, She expresses her conventional view as, "A fellow, good or bad, saint or

lout, can go to the gramophone shop and buy a shiny black disc for three rupees and it is as though he buys a little of our girl, for her voice is truly a part of herself. Terrible! Even her name is printed, there on the disc, for every eye to feel." (MFM,P.19).

In the matter of horoscope, mother and son have different opinions. The old mother believes in horoscope and wants her son to make it for Mohini. But the Professor has no belief in it. He regards it a joke. He argues that in this age of microscope, who needs a horoscope. He mocks at the view of astrologer that the life story of every person is being controlled by the stellar beings. Though he mocks at many of the old beliefs, he wears amulet for his mother's satisfaction. Bhattacharya remarks that clashes like these are frequent between them, but they can compromise. It is common, "Over Mohini developed a clash between mother and son, even though on many points of orthodox living they had reached a fair adjustment." (MFM, P.20)

The novelist brilliantly brought out the confrontation between the old and new ideas, the traditional Indian and the modern western ways of life in this novel, when a suitable husband for Mohini is being searched out. The attitudes of old fashioned elders and modern youngsters in the ceremony of bride showing is the realistic representation of Indian society. The first party was an old fashioned party of elders, who came at dusk, the traditional bride showing hour. They didn't bring the bridegroom with them. They asked questions in ancient culture and yoga and demanded more dowry.

Through some incidents in the novel Bhabani Bhattacharya points out the ill-manners of some people in bride – showing. Regarding the second party, the novelist points out, "Four pairs of eyes surveyed the girl from foot to head. She head to walk a few steps at mother's bidding to prove she did not lack grace hair and unloosed it down her back to know its length. They rubbed her face with their thumbs to make sure the fair complexion was natural, not of paint." This indecent behaviour made Mohini shameful. (MFM P.49) Her father couldn't bear this, so he asked them to quit.

The third party comprised only youngsters. The bridegroom came with his friends, to make his own choice. As they were all modern young men they joked and appreciated Mohini's voice on the radio. They asked about Tennis, films, the novelist presents the contrast between traditional elders and modern youngsters. Though her father is happy with the third party, the old mother is annoyed by their modern way of questioning. She rejects the proposal by saying that the groom has no tradition and culture. However all the clashes disappear soon, and they are on harmonious terms. Balram S.Sorot comments, "The novelist synthesizes the old values with the new ones in the persons of the Professor and the old mother, showing that on many points of orthodox living they had reached a fair adjustment." (6)

Soon after her School education, Mohini is married to a handsome well educated Youngman, Jayadev. He is both a great scholar and master of Behula village. The attitude of Mohini towards Jayadev provides interesting insight into the novelist's attitude towards traditional Indian women. Though Mohini has education of a new kind and is dare enough to reveal her mind, her sensibility is coloured by her traditional inheritance. Bhattacharya observes, "The Hindu maiden, born and bred in the ancient starlight of vedic civilization washed by the running stream of the centuries sheathing her limbs and her thoughts in a conventional dress to suit the needs of each passing age was innately unchanged. She had retained all her ancient hunger to offer worship." (MFM, P.65).

As a scholar, Jayadev is sensitive to modern progressive ideas, while as a master of the Big House he symbolizes the old traditions in his personality. He dreams about a fusion of the past with the present. For Mohini, a city bred girl, the Big House is contrary to her expectations. She has to adjust herself to the new environment, which is full of traditions. As K.H. Kunjo Singh remarks, "Music for Mohini dwells on the intellectual and emotional development of the heroine, Mohini, from care – free and sheltered girlhood to the position of wife and the mistress of a prominent and influential house with great traditions and orthodoxy." (7)

Jayadev, who is a visionary and an idealist, expects Mohini to be different from an ordinary young woman. He looks at her as the vedic women like Gargi and Maitreyi. He wishes his wife to share his scholarly pursuits and be an intellectual betterhalf. To adjust herself to the wishes of her husband, Mohini endeavours to rise expectation of Jayadev and starts learning Sanskrit from him. She shares his ideals and renders him help in the social reconstruction programmes. Moreover, She identifies herself with women of the village and establishes communication with her husband She begins to share his responsibility and becomes one with him. The novelist views, "He belonged to the people what right had she to claim him for herself alone?. She would be his true partner in feeling, in faith and in dream. " (MFM, P.152). In this way the clash between herself and her husband is resolved.

The village of Behula is a typical backward village of India, during pre-independence period. Its people are superstitious and conservative. They have blind faith in religious beliefs, horoscopes and irrational religious rites and ceremonies. In the village, a beautiful village girl Sudha's life is ruined by her uncle due to horoscope and she is nick named as "Saturn's Eyesore" and she remains unwed.

Mohini's mother-in-law is a typical Indian traditional woman and feels proud of her family tree. As Mohini has been brought up in an altogether different type of environment. Convent education and a radio star, she finds her life at the Big House unbearable. He mother-in-law is stern and puts a number of restraits upon Mohini. She has to struggle hard to adjust herself. Bhattacharya writes, "An old proud house of an old proud family. A tradition within a tradition. And here she was, sprung out of shallow soil, forced by circumstance to be mistress of the ancient house and trustee of an alien tradition. The struggle to retouch her expectations, hurt fiercely." (MFM, P.128).

Her mother-in-law advises her not to use face powder, not to wear sleeveless blouses, not to wear glass bangles. She insists her to sing only religious songs and to wear a plain cotton saree. The widowed mother in law has kept a fair of wooden sandals of her late husband in the family prayer room and offers worship to them daily. Many taboos like this make life colourless and monotonous for Mohini.

Mohini's sister-in-law, Rooplekha, combines in her character the raditional and modern values. When Mohini doubts the fusion of the city and the village representing the modern and the traditional values, Rooplekha remarks that such an union is necessary. Through the character of Rooplekha, Bhattacharya asserts his vision of India, " We connect culture with culture. Mohini, our old eastern view of life with the new semi – western outlook. The city absorbs a little of the barbaric village, the village absorbs a little of the west- polluted city. Both change unaware. This is more urgent today than ever before. Our new India must rest on this foundation". (MFM, P.111).

There is another conflict between the old and the new values in the story of Harindra's family. Harindra's father the old Kaviraj is a practitioner of Ayurvedic system of medicine, while his son Harindra is a surgeon, educated and trained in a western – style medical college. The old father often argues with his son about the supremacy of Ayurveda, that had prevailed for the millennium. The old man gives his wife Ayurvedic medicine and never allows his son to treat her. Harindra argues "There are many good drugs in our Ayurvedic system. We know them, we use them, not the home products but those made in modern laboratories. What's wrong in using in the fight against disease the best that east and west have to offer? Medicine knows no race or nationality." (MFM, P. 166).

Through this story of Harindra, Bhattacharya reconciles the old values and systems with the new values and systems. The reconciliation starts in Mohini's family also. For Mohini, the Big House is in the shadow of the family tree. She comes to Know that her mother in law has dedicated her right hand, for her son's longevity. She tells Mohini about the horoscope of her son that he should have a child within two years after his marriage. Only a child can save his life. Mohini strives hard to adjust to the old ways and modes of life in the rural society and in this process, she too changes unawares.

Though Mohini does not believe superstitions and old beliefs, she begins to fear superstitions and old beliefs, she begins to fear about her husband. She begins to realize that the mother is not completely devoid of the basic qualities of compassion and sacrifice. She develops a great love and sympathy for the old lady. So she becomes ready to give her skin from her bosom to satisfy the Devi in the temple. Mohini views, "Perhaps she saw the wrong side of this old tapestry of tradition and missed the design of duty and compassion were not at odds in the mother. The key to the design was sacrifice which was a right and privilege, not a duty alone."   (MFM, P.204).

Jayadev opposes his mother regarding blind beliefs, horoscope and superstitions. The conflict turns serious when his mother attempts to make Mohini offer her heart's blood to the virgin Goddess to get rid of her barrenness. Jayadev sternly opposes the act and says, "We are not slaves of the stars. There is no room in the Big House for crazy beliefs. The village looks to us for ideals and a way of living. The pattern we set is not our private affair, it carries the stongest social sanction." (MFM, P. 211) The infuriated mother scolds her son for displeasing the Goddess. She curses her fate for her son's deeds. She struggles hard to control herself and she decides to leave the matter to her fate.

After a few days, mother comes to know from Harindra of Mohinil's pregnancy. She realizes that it is the age of the young men and women with their new ideals and aspirations. She starts changing her ideas to cope with the new age. At last the mother agrees that her son's path is the right one, "for the first time she could see her son clearly. His ideas, his point of new, moulded by the new spirit in the land, were different from hers and opposed to them, but they were, none the less, true ideals". (MFM, P.220)

Bhattacharya in Music for Mohini depicts the two contraries, tradition and modernity, old and new and arrives at compromise between them. He resolves the conflict between mother and son, father and son, husband and wife, daughter-in-law and mother-in-law and ends in compromise. There are two sets of characters in the novel, the first set of characters uphold the old,

conventional values of the past like old mother, Mohini's mother in law and Harndra's father. The second type plead for a change and reform and unconventional values of modern age like Jayadev, Mohini's father, Mohini and Harindra. As Shashikala Singh comments, "Even though, Bhattacharya reveals the conflict between the old and the new cultures, there is more of a compromise than a violent confrontation".(8)

Bhabani Bhattacharya perceives the conflict of old and new values both in rural and urban societies. Regarding the urban side, Mohini's family in the city, represents both traditional and modern values. Mohini and her father represent modern values but the old mother represents traditional values. At the rural side, Jayadev and Harinadra represent modern values but Jayadev's mother and Harindra's father represent traditional values. So the conflict is not limited to village but it extends to the city also. As C. Tamilarasan points out, "Traditional elements are not limited to village not the modern spirit to the city. There is a mingling of these elements in both rural and urban areas. Bhattacharya deals with the interaction of the two sets of values with exquisite deftness". (9)

After independence there was a great concern for country's stability and development. So Bhattacharya reflects the benefit of political freedom in the novel. The social evils of pre independence time should be eliminated. The novel Music for Mohini was published in 1952. Hence certain major social reforms like prevention of child marriages, widow remarriage, elimination of caste system and untouchability are mentioned in this novel. Dr. K.R. Chandra Sekhar rightly remarks, "Music for Mohini is a forward looking novel in which the author dwells on certain sociological aspects of Indian life and suggests the direction in which we have to move if we are to fully benefit by our political freedom". (10)

In this novel Jayadev fights superstitious beliefs and blind belief in astrological predictions. He educates the villagers about the new social changes. Harindra the young medical man, takes up social work with other interested people and fights against the social evils. Social reformation and reconstruction programmes are being taken up by a few youngmen with the help of Jayadev and Mohini The words and deeds of the hero, Jayadev, reflect Gandhian views on social reconstruction. Dr. P.N. Bhatt rightly remarks, "Jayadev in Music for Mohini, reveals Gandhian views on Social reform. It is the story of a fight against old superstitions, taboos and religious orthodoxy. Jayadev believes that political freedom without social and economic freedom has no value. The rural society is sick with the set taboos of caste, untouchability and the blind belief in superstitions. He wants to reorient the set values of rural folk."(11)

Jayadev and his friend doctor Harindra take active part to bring positive change in the attitude of the villagers. Jayadev insists Mohini to take part in the social work and teach women folk about the social evils. He forms a group of active young men to carry on the constructive works in the village. His involvement in the reformative activities is the symbol for modern values in the post – independent India, which is the dream of Gandhiji. As Rama Jha observes, "Music for Mohini deals with the protagonist Jayadev's passionate involvement with the Gandhian constructive programmes in the village Behula. As a practical idealist Jayadev is trying to turn Behula into a model village rid of superstitions, caste - system and exploitation of women". (12)

In all aspects, Bhabani Bhattacharya represents the contemporary situation and suggests solutions for the development of Indian society. As a committed writer, he strongly pleads for reformation in the society through his novel Music for Mohini.

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THEME OF MARRIAGE IN SHASHI DESHPANDE'S THAT LONG SILENCE

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INTRODUCTION

That Long Silence is Shashi Deshpande's most popular novel which won the prestigious Sahitya Akademi Award for the year 1990. Most of the critics tend to read the novel as a feminist writing or as a novel expressing woman's struggle to achieve an identity in the society which is primarily male-dominated. S.P. Swain analyses the novel in terms of the articulation of the feminine voice. He holds the view that in the present novel "the feminist struggle for liberation is looked upon within the framework of the freedom crisis. The quest for an authentic selfhood on the part of the protagonist finds an artistic expression through the heroine's rebellion against the patriarchal core of society."[1] A.N. Dwivedi[2] also highlights the conflict between man and woman in the novel from the feminist perspective.

While Rajeshwar Mittapalli[3] concentrates on the trauma of a house wife which initiates the process of self-discovery leading to a new perception of life, Bijay Kumar Das[4] studies the novel as a portrayal of the contemporary Indian woman who becomes a victim of circumstances and revolts against patriarchy. G. Lakshmi Narasaiah ingeniously discovers the existential theme in the novel. According to the critic: "Jaya speaks not like a woman liberated from the burdens of either her humanity or her womanhood, but a woman redefining her existential situation in her own terms, having it out 'on her own premises.' "[5] Adesh Pal[6] attempts to explore the novel as a quest for self or identity by Jaya as she feels having no identity within the framework of marriage.

So, most of the critics focus on the feminist concerns of Deshpande or on the theme of search for identity in the novel. Only occasional attention is paid to the theme of marriage. For example, Ujwala Hiremath[7] tries to explore the novel in terms of the victim-consciousness of the protagonist. He analyses the novel as Jaya's search for release from the constraints of tradition-bound institution of marriage. The theme of marriage holds a great fascination for Deshpande. In most of the cases, marriage culminates in a travesty of faith man and woman seek in each other, leading to suffering and the conflict between traditional limitations and modern aspirations. In the present novel, Deshpande critically analyses the institution of marriage in the modern context.

The novel is the story of an educated middle class girl, Jaya, who finds herself restricted in her married life. The silence between Jaya and her husband further deteriorates the situation. Towards the end of the novel, she realizes that she should break the silence and try to achieve her identity as an individual through self-realization and self-assertion. Through this simple story of Jaya, Deshpande has raised many issues related to matrimony, and questioned the concepts of love and marriage. This is what S.P. Swain means when he says: "A sensitive and realistic dramatization of the married life of Jaya and her husband Mohan, it [That Long Silence] portrays an inquisitive critical appraisal to which the institution of marriage has been subjected to in recent years."[8]

Deshpande depicts two different pictures of Indian women at two parallel levels in the novel – the lower class women engaged in menial domestic chores to earn their living; and middle class

women of some financial independence. She further divides middle class women into two categories: those who never question their marriage and submit to insult, injuries and humiliation without any complaint; and those who, refusing to become the victim of trends, raise voice against their oppression. Jaya, the protagonist, belongs to the second category of middle class women. In the beginning, she is not different from other women of her class, but towards the end, we notice a great change in her personality. Deshpande brings out the similarities and differences among Jaya and other female characters in the novel – among women of different generations (Jaya, her mother and her grandmother), among women of the different classes (Jaya, Nayana and Jeeja), among women of the same class and generation (Jaya, her cousin, Kusum and her neighbour, Mukta).

The condition of women from lower class, as presented by Deshpande, is really pitiable. Their suffering starts much before their marriage. They start adding to the family income at a tender age, the way Jeeja's grand daughter, Manda, does. They continue working and earning all their life. They are married off at the age considered suitable by their parents, to any boy who has one head, two eyes, two ears, two hands and two legs like any man. Marriage does not bring any positive change in their lives, but it brings with it endless pain, suffering and burden. They have to work to earn bread for the family, as in most cases husbands fail to earn, and become targets of their husband's ill-treatment.

The lives of Jeeja and Nayana, housemaids of Jaya, are like a hell. Their life is a continuous drudgery. They both receive very bad treatment at the hands of their husbands. Nayana has an apathetic attitude to life. She wants a son not because she expects any help from him in her old age, but because she does not want her child, her daughter, to suffer at some drunkard's hands as she herself has suffered. Nayana says to Jaya, "Why give birth to a girl, behnji, who'll only suffer because of men all her life? Look at me! My mother loved me very much, she wanted so much for me … a house with electricity and water, shining brass vessels, a silver waist chain, silver anklets … and what have I got? No, no, behnji, better to have a son."[9]

Jeeja's husband is also a drunkard like Nayana's and often beats her. The burden of the whole household is on her shoulders, yet she never complains. She accepts his second marriage as perfectly justified because she fails to give him any child. She has only one question: "With whom shall I be angry" (p. 52). Tara's life is another example of the suffering and the marital problems of the lower class woman. Her husband, Rajaram, is a drunkard and he treats her very badly. He even beats up Tara when she refuses to give him her earning. Frustrated by such a miserable married life, she curses her husband and says: "So many drunkards die … but this one won't. He'll torture us all to death instead" (p. 53). Jeeja shuts her up saying that husband is a symbol of social prestige because he "keeps the Kumkum" (p. 53) on her forehead, and "what is a woman without that" (p. 53)?

The situation of women belonging to middle class is different. Work outside the house, for them, in most of the cases, is not a compulsion but a matter of choice. They receive much better treatment as compared to lower class women. But the idea that marriage is the only career and husband the only destiny for a woman does not lose ground here also. They also become victims of trends, but their suffering is more mental than physical.

Middle class girls get good education and caring atmosphere in family, but they are also conditioned to mould themselves to suit the requirements of their future life partner. From early girlhood, a girl is conditioned in a certain way by the society so that she can be a good wife in future. She is taught to merge her identity in that of her husband. In childhood, Jaya used to be of witty and inquisitive nature which made her grandmother say, "Look at you – for everything a question, for everything a retort. What husband can be comfortable with that" (p. 27)? Jaya is thus conditioned towards the comforts of her future life-partner. At the time of Jaya's marriage, Ramukaka tells her that the happiness of her husband and home depends on her. Dada advised her to be good to Mohan. And Vanitamami tells her about the importance of being with a husband: "Remember, Jaya … a husband is like a sheltering tree …. Without the tree, you're dangerously unprotected and vulnerable" (p. 32). These words keep on echoing in the ears of Jaya and she realizes that since a husband is like "a sheltering tree," he must be nourished and nurtured adequately even if the wife has to suffer to give it nourishment.

After her marriage, Jaya, who used to consider herself independent and intelligent, shapes herself to suit her husband's model of a wife. She gets transformed into "stereotype of a woman: nervous, incompetent, needing male help and support" (p. 76). Apparently she has all the material comforts and is almost satisfied. But she has to compromise and suppress many aspects of her individuality for this. In order to become an ideal wife and mother, she devotes herself to the comforts of her husband and to the maintenance of the house. In this process, she feels that she has no identity, no status of her own. When the editor of a magazine asks her to give them her bio-data, she feels that she has nothing meaningful in her life. She thinks of only irrelevant facts: "I was born. My father died when I was fifteen. I got married to Mohan. I have two children and I did not let a third one live" (p. 2).

In fact, Jaya keeps on changing herself according to her husband's likes and dislikes. As a result of this, her individuality gets annihilated. Now whatever she practices or whatever she follows is dictated by only one consideration and that is, what her husband will think of it. In order to please her husband, she even transforms her appearance. She gets her hair cut and wears dark glasses. After marriage, Mohan renames Jaya as Suhasini. The name 'Jaya' means 'Victory' and 'Suhasini' means "a soft, smiling, placid, motherly woman. A woman who lovingly nurtured her family. A woman who coped" (pp. 15-16). Slowly and painfully, she learns what is expected of her. She learns how sharply defined a woman's role is. A wife should not be angry with her husband because that undoes his position of authority. She knows very well that to survive within marriage, one has to learn many tricks, and silence is one of these tricks. Therefore, she silences her emotions as well as her physical desires.

A woman is often given no right to express her physical desires. She has to submit to the desires of her husband. Jaya also follows the same tradition which results in frustration in her marital life. She pines for emotional communication between her and her husband. But she finds in her relationship with Mohan nothing except emptiness and the suppressed silence as she tells Mukta: "… nothing between me and Mohan either. We lived together but there had been only emptiness between us" (p. 185). She realizes that despite seventeen years of married life, they have not become one, only their bodies occasionally meet, not their souls.

Jaya, like Indu of Roots and Shadows, subdues her independent spirit to the expectations of her husband. She describes her relationship with Mohan as a mechanical and forced relationship: "A pair of bullocks yoked together …. A man and a woman married for seventeen years. A couple with two children. A family somewhat like the one caught and preserved for posterity by the advertising visuals I so loved. But the reality was only this. We were two persons. A man. A woman" (p. 8). But this image of the animals performing their duties mechanically undermines the husband-wife relationship. Marriage is expected to bring joy, glory and fulfilment to both man and woman. But in most cases, as we see in the novel, marriage fails to give the promised happiness to the individuals, especially to the woman.

According to Indian tradition, a wife is expected to stay at home, look after the babies and keep out the rest of the world. She is expected to have the qualities prescribed in Indian tradition :

> Karyeshu Mantri, Karaneshu Daasi,
> Rupeeha Lakshmi, Kshamayaa Dharitrii,
> Bhojyeshu Mata, Shayanetu Rambha,
> Shat Karma Yukta, Kula Dharma Patni.

(Like a slave while serving; a minister while counseling; Goddess Lakshmi in her looks; the earth in forbearance; a mother while feeding; as wife like Rambha, the celestial prostitute; these six are the true characteristics of an ideal wife.)[10] But Jaya resents the role assigned to a wife in our country. To Jaya, married life becomes unbearable and monotonous. She gets frustrated and says: "Worse than anything else had been the boredom of the unchanging pattern, the unending monotony" (p. 4). Marriage stifles the growth and right to free expression of a wife. A woman's role and contribution to the society is defined in terms of her role as a wife, daughter, sister or mother. Commenting on her married life, Jaya says that waiting is a part of her existence: "But for women the waiting game starts early in childhood. Wait until you get married. Wait until your husband comes. Wait until you go to your in-laws' home. Wait until you have kids. Yes, ever since I got married, I had done nothing but wait" (p. 30).

Because of the emptiness in her marriage, Jaya is drawn towards Kamat, a middle-aged intellectual. He treats Jaya as an equal and Jaya gives expression to her real self in Kamat's company. But there is no physical relation between the two. In society, a married woman can not be seen as a friend of another. The friendship between Jaya and Kamat suffers due to this reason. People, including her friends and neighbours like Mukta, do not approve their relationship. One day when Jaya finds Kamat lying dead on the floor, she silently leaves the place because of the fear of social disgrace.

Moreover, Jaya has to stifle her creative urges to save her career as a wife. Mohan objects to her creative writing because he finds that her themes reflected the autobiographical details. In order to avoid conflict in her marriage, Jaya gives up creative writing. Then she starts writing middles in newspapers which cause no trouble to her husband, which do not hurt him as Jaya says: "I had relinquished them instead, all those stories that had been taking shape in me because I had been scared – scared of hurting Mohan, scared of jeopardizing the only career I had, my marriage"(p. 144).

Mohan is a traditionalist who wants Jaya to conform to his expectations. He wishes his wife to be modern and educated, but also expects her to have traditional qualities like submissiveness and flexibility. Sarabjit Sandhu remarks: "Mohan is a traditionalist rooted in customs. To him, a woman sitting before the fire, waiting for her husband to come and eat hot food is the real 'strength' of a woman."[11] As a husband, Mohan never tries to understand his wife, her emotions and her psychological needs. On the other hand, Jaya annihilates the creative aspect of her personality to keep Mohan happy. She devotes herself to the care and fulfilment of her husband's and her children's needs. Thus, obedience and loyalty, which are considered to be the virtues of Hindu womanhood, degenerates into silent bearing of oppression. A woman is even expected not to be angry or revolting as stated in the novel: "A woman can never be angry; she can only be neurotic, hysterical, frustrated. There's … no room for despair, either. There is only order and routine" (pp. 147-148).

Marriage not only hinders Jaya's intellectual growth, but also undermines her sense of self. Mohan gives meaning to her existence. Her status as a wife, as mother, as a housewife owes itself to Mohan. She is aware that Mohan is her profession, her career and her means of livelihood. But this also denies her place as an individual. This realization that she has no existence as Jaya but only as a complement of Mohan becomes more acute when Dr. S.K. Vyas, her brother's classmate, invites her to his house with Mohan: "And drop in some time–with your husband, of course. 'With your husband, of course' – what did he mean by that? Was it impossible for me to relate to the world without Mohan? A husband is like a sheltering tree … Vanitamami, did you, without knowing it, speak the most profound truth I'm destined to heart in my life" (p. 167)?

A woman is subordinated in a number of ways and this results in disharmony between the two sexes. A husband denies his wife the right of her individuality. He wants her to see the world around her only in the way he would like her to see. He expects complete devotion, complete allegiance to his vision of life from his wife. This is what Mohan wants from Jaya when he is charged with corrupt activities. He seeks emotional support from Jaya. Having failed to get any sympathy from Jaya, Mohan leaves the house. This proves to be a traumatic experience for Jaya. Like any other traditional Indian wife, Jaya can not bear Mohan's absence. Even the thought of his death horrifies her: "The thought of living without him had twisted my insides. His death had seemed to me the final catastrophe. The very idea of his dying had made me feel so bereft that tears had flowed effortlessly down my cheeks" (pp. 96-97).

After Mohan's departure, she feels that she is secure only with Mohan and has no face to show, no identity without him. It awakens her to her real place in life. Under these frustrating circumstances, Jaya gets terribly disturbed and starts questioning herself. She rethinks over her marital relationship. She realizes that she is not only Mohan's wife, rather she is an individual having her own distinct identity as she states: "I'm not afraid any more. The panic has gone, I'm Mohan's wife, I had thought, and cut off the bits of me that had refused to be Mohan's wife. Now I know that kind of a fragmentation is not possible" (p. 191). She hopes to be on equal terms with Mohan, and at the same time, accepts the established norms and values.

Now Jaya comes to know that the reason of her depressing condition is not the society alone, but she has to take the responsibility of her own state and work according to it. The idea of marriage

as "two bullocks yoked together" is rejected by her. Understanding that life can not be lived in vacuum, she no longer looks at Mohan and herself as two bullocks, rather as two individual with independent minds. She realizes that meaningful co-existence can be achieved only through understanding and compassion, not through domination, subjugation or rejection. Sarala Parker beautifully sums up the idea when she says: "The important insight that Shashi Deshpande imparts to us through Jaya is that women should accept their own responsibility for what they are, see how much they have contributed to their victimization instead of putting the blame on everybody except themselves."[12]

Jaya makes her choice by refusing to become a victim of trends and is determined to break her long silence which has plagued her family since long. But there are other women who, like Jaya, belong to the middle class, but unlike her, suffer silently without protest taking the suffering to be their fate. The figures of Vanitamami, Kusum, Mukta, Mohan's Mother and Mohan's sister, Vimala can be quoted as examples.

Vanitamami, "who had never known what it was to choose" (p. 45), represents another facet of the traditionally suppressed woman. After her marriage, her life was ruled by her mother-in-law. As a daughter-in-law, her role has remained submissive and she is allowed no participation in decision making. The interest she takes in Kusum is the only protest she can register successfully. Kusum in also a victim figure. Passive surrender and insecurity which have been her lot in her mother's home, pursue her in the new family after marriage. Kusum becomes insane as she has internalized all her anger. She becomes a burden on her family. Finally, she commits suicide. Mukta, Jaya's neighour, works under financial compulsions. She is a widow caring for her old mother-in-law and teenaged daughter, Neelima. She is independent and capable of holding against strange situations, yet she is unable to overcome superstitions. But she wants her daughter to be free from them. She has accepted ill-treatment at the hands of her husband, as she could not have a son. In is the height of irony that if a woman fails to give a male inheritor to her husband, all the blame is put on her.

Women are the victims of generations of conditioning in which a woman is unchangeably suppressed. The husband is traditionally given the role of mentor and guide. To serve one's husband is considered to serve God. The slightest sign of independence on her part is not acceptable to him. Mohan's father, for example, is shown as dominant and authoritative figure embodying the patriarchal attitudes. He wants fresh food to be served when he returns home. Mohan's mother's failure to provide fresh chutney late one night drives him to wild fury. He picks up the plate and throws it. Mohan's mother picks up the plate, cleans the wall and sends her son next door to borrow some chillies. Patiently, she prepares fresh chutney, lights the fire, cooks the meal again and sits down to wait which is an important part of a woman's life, not of man's. Talking about women being treated cruelly by their husbands, Mohan says that this tolerance of violence is the strength of women. But Jaya thinks differently as she says: "He saw strength in the woman sitting silently in front of the fire, but I saw despair. I saw a despair so great that it would not voice itself. I saw a struggle so bitter that silence was the only weapon. Silence and surrender" (p. 36).

The chains of traditional marriage are heavy. In the absence of any other alternative, wives often seek consolation in obsession or mental slavery leading to physical decay, disease and death. This unacknowledged martyrdom becomes an essential part of a housewife's existence. She is expected to subordinate her own needs to those of her family. She is supposed to bear her exploitation and suffering silently as here fate. Mohan's mother and his sister, Vimala, both suffer throughout their lives. But they never utter a single word of protest. Finally, they die in silent agony without getting any help from their in-laws.

No doubt, some generation-wise changes are seen in the attitude of man towards marriage and towards woman also, but basically man remains a patriarchal figure, exercising his authority. These generation-wise change are not limited to man only, but are also seen in the case of women. In the novel, women belonging to the older generation like Ajji, Mohan's mother and Vanitamani endure the tyranny and injustice of male-dominated society as a natural way of life. They are depicted as docile and subdued figures following the tradition as a virtue. These uneducated women, though victim of male chauvinism, adapt themselves to the tradition completely. But the protagonist, being educated and awakened, fails to conform to the views of the women belonging to the older generation. She feels angry when these women ask her to conform to tradition. The main reasons of difference in the attitudes of these women are the generation gap and education.

Deshpande shows the influence of mother on daughter, and of father on son inspite of the generation gap between them. Vimala, Mohan's sister, follows her mother in suffering silently as Jaya says: "I can see something in common between them, something that links the destinies of the two … the silence in which they died" (p. 39). Mohan, like her father, holds that a wife is a docile animal who can never be angry. When Jaya talks to him in a daring tone, he retorts, "How could you? I never thought my wife could say such things to me. You're my wife …. My mother never raised her voice against my father, however badly he behaved to her" (pp. 82-83).

In fact, Mohan had seen his mother obeying his father and bearing the insults silently. But Jaya is brought up somewhat differently by his father, we can say, in an unconventional manner. This disparity in background is also a reason of lack of understanding and clash of expectations between them. But Jaya has to adapt herself to the expectations of Mohan. In India, a girl is married not only to a man, but also to his family traditions. She has to adapt herself according to his husband's family rituals and traditions without any complaint. Jeeja's husband and her son, Rajaram, represent the male domination in lower class. The son follows the father in drinking and beating his wife. They demonstrate their manhood by being violent to their wives.

Thus, Shashi Deshpande minutely analyses the institution of marriage by taking examples from the lives of women belonging to the lower and middle class. The condition of lower class women, as presented by Deshpande, is miserable. For them, marriage is a form of slavery. They share master-slave relationship with their husbands. Marriage for them means pain, suffering and burden. The condition of middle class woman is better than that of lower class woman, but she is also not free from suffering. One thing common to all these women is that they all prefer to get married and maintain their marriage at every cost.

All the marriages in the novel reveal that marriage is used as a tool in patriarchy for the advantage of man and to suppress woman. Tolerance, lack of protest, submissiveness and

faithfulness are the qualities that the society expects to be in a woman. Conformity to these characteristics is appreciated whereas any deviation from these is considered as bad or unwomanly. No doubt, a woman should inculcate in herself the qualities like love, kindness, faithfulness and tolerance, but self-assertion is not to be regarded as contrary to these values. This is the main focus of the present novel. Deshpande here suggests that woman should not succumb to the roles cast upon them. Woman should get rid of the fear on her part that allows the oppression to continue. It is not only man who subjugates woman. She is also responsible for her own predicament and should struggle to achieve her own identity. Adjustment should be made but not a servile one. Sumitra Kukreti remarks, "The realization that she [Jaya] can have her own way–yathecchasi tatha kuru – gives a new confidence to Jaya. This is her emancipation."[13] Jaya emerges as an individual with a distinct identity , as Indra Mohan writes: "She [Jaya] breaks herself self-imposed prison wall of mind and chooses to remain in the family at the same time comes out of the confining slots allotted to her by the patriarchal society."[14]

Shashi Deshpande shows that woman aspires for love, respect and expression of her self in marriage, but they do not get what they aspire for. But Deshpande suggests that a balanced and purposeful life is not a utopian fancy for a woman if she liberates herself from the stereotyped conditioning of the society and does not depend on the male presence to authenticate her thoughts, emotions and actions at ever step. A woman's relations with her family must develop within the totality of her life as a woman. Only then it can lead to a harmonious fulfilment.

So, Deshpande seems to give the message that "women should accept their own responsibility for what they are, see how much they have contributed to their own victimization …. It is only through self-analysis and self-understanding, through vigilance and courage, they can begin to change their lives."[15] Changes do not happen overnight but we should not lose hope and keep the gates of choice open. In order words, Jaya puts it more simply: "We don't change overnight. It's possible that we may not change even over long periods of time. But we can always hope. Without that, life would be impossible. And if there is anything to know now it is this : life has always to be made possible" (p. 193).

NOTES

[1]S.P. Swain, "Feminism in Shashi Deshpande's Novels," Contemporary Indian Writing in English: Critical Perceptions, ed. N.D.R. Chandra, II (New Delhi : Sarup and Sons, 2005), 129.

[2]A.N. Dwivedi, "Shashi Deshpande's That Long Silence (88) : A Feminist Reading," Writing the Female : Akademi Awarded Novels in English, ed. Mithilesh K. Pandey (New Delhi : Sarup and Sons, 2004).

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[4]Bijay Kumar Das, Post-Modern Indian English Literature (New Delhi : Atlantic Publishers and Distributors, 2003), pp. 81-82.

[5]G. Lakshmi Narasaiah, "Life Inside the Cage : Shashi Deshpande's That Long Silence," The Indian Novel with a Social Purpose, ed. K. Venkata Reddy and P. Bayapa Reddy (New Delhi : Atlantic Publishers and Distributors, 1999), p. 136.

[6]Adesh Pal, "That Long Silence : A Study in Displaced Anger," The Fiction of Shashi Deshpande, ed. R.S. Pathak (New Delhi : Creative Books, 1998).

[7]Ujwala Hiremath, "Victim-consciousness in Shashi Deshpande's Novels," Victim-consciousness in Indian English Novel, ed. Usha Bande (Jalandhar : ABS Publications, 1997).

[8]S.P. Swain, "Articulation of the Feminine Voice: Jaya in Shashi Deshpande's That Long Silence," Shashi Deshpande : A Critical Spectrum, ed. T.M.J. Indra Mohan (New Delhi : Atlantic Publishers and Distributors, 2004), p. 87.

[9]Shashi Deshpande, That Long Silence (1988; rpt. New Delhi : Penguin Books, 1989), p. 28.

All subsequent references to the text are from the same edition. Page numbers, in all such cases, are given within parentheses immediately following the quotations.

[10]Quoted in Urvashi Sinha and Gur Pyari Jandial, "Marriage and Sexuality in the Novels of Shashi Deshpande," Shashi Deshpande : A Critical Spectrum, p. 130.

[11]Sarabjit Sandhu, The Image of Women in the Novels of Shashi Deshpande (New Delhi : Prestige Books, 1991), p. 40.

[12]Sarala Parker, qt. in S. Prasanna Sree, Woman in the Novels of Shashi Deshpande: A Study (New Delhi: Sarup and Sons, 2003), p. 86.

[13]Sumitra Kukreti, qt. in S. Prasanna Sree, Woman in the Novels of Shashi Deshpande: A Study, p. 87.

[14] T.M.J. Indra Mohan, "Feminist Perspectives in Shashi Deshpande's That Long Silence and The Dark Holds No Terrors," Shashi Deshpande : A Critical spectrum, p. 117.

[15]Sarla Parker, qt. in Pashupati Jha and Nagendra Kumar, "Looking Back in Anger : Shashi Deshpande's That Long Silence," Writing the Female : Akademi Awarded Novel in English, ed. Mithilesh K. Pandey, p. 158.

LAND AND LIFE: A NATIVE PERSPECTIVE

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ABSTRACT

Land is now the most important source of economic riches. In fact, imperialism was an exercise aimed at getting control of the lands of Native people who were living a very contented life in their native lands. The arrival of the imperialists altered the situation and the native people were displaced from their lands. This created severe health problems for the natives because for them land was not only a commodity; it was an ancestor, a nourisher, fountain head of their culture and existence. So once they were removed from their lands they became distresses and developed the diseases which were unknown among them. The current paper studies the problems generated by the theft of land among the Aborigines.

KEYWORDS: *Land, native, health, suicide, environment.*

INTRODUCTION

Recently a video of a Jarawa girl made headlines in all the national dailies. People were concerned about how a nude girl was forced to perform in front of the police officials. The video was indeed a cause of concern, but it was not a cause of concern because of the nudity of the girl. The nudity among the Jarawas and many other tribes is very common, the cause of concern was how the proud people were degraded to perform their livelihood. Jarawas like many other tribes are among the hunter-gatherer communities, but they are unable to live that kind of lifestyle because their land has been shrinking. The government has been pushing them away from their land. To compensate they are provided with the food by the government which is unsuitable to them. Traditionally they used to eat food which was rich in protein, but now they are forced to eat sugary carbohydrate rich food which is paving the way for diseases which were earlier unknown to them. In fact, whatever has happened with Jarawas is happening all over the world.

In the present society land is one of the most important sources of economic riches. Earlier the economic utility of land was dependent on agriculture only, but now a days economic utility of land has transcended the agrarian aspect and land has become what is called "real estate." While people continue to earn money from land, there is a community in almost every corner of the world which is developing severe psychological problems because of the exploitation of land. Though the modern man has erased all the memories from his conscious mind of a time when land and man shared a relationship of son and a mother, yet there are still people in the world who still continue to bound themselves with this anachronic relationship with the mother earth. These people are sometimes called First Nations people, sometimes Aboriginals and sometimes the Natives. Whatever may be their name these people are the most oppressed people on the planet. They have no place in the modern nation states because their life styles are outdated and they

considered to be the remnants of stone age. The modern nation states have disturbed their life styles and created severe problems for their populations in the name of development. In fact, the impact has been so devastating that some experts have called "gentle genocide" (O'Malley 46).

The current paper discusses the impact of land theft among the natives. The protest is getting louder now. Earlier the voices were drowned under the loud colonial propaganda, but now the native writers of Australia and Canada are writing about their problems and concerns. And what is important is that they are being read by the people across the world. The writings of these native writers make it clear that their lives are closely associated with land. In their writings, land appears not only as an economic commodity, but as a living being that has a past and present:

People talk about country in the same way they would talk about a person: they speak to country, sing to country, visit country, worry about country, feel sorry for country, and long for country. People say that country knows, hears, smells, takes notice, takes care, is sorry or happy. Country is not a generalized or undifferentiated type of place, such as one might indicate with terms like 'spending a day in the country.' Rather the country is a living entity with a yesterday, today and tomorrow, with a consciousness, and a will toward life. Because of this richness, country is home, and peace; nourishment for body, mind and spirit; heart's ease. (Bird 6)

Earlier the colonial masters were not ready to accept this relationship between the people and the land. But now these relationships are not only accepted but are studied because these relationships seem to offer safety to the planet. It has now been established that the problems like global warming, environmental degradation and pollution are plaguing the world because man has forgotten the relationship which was nurtured by these people in the past. In fact, it has now been established that local cultures should be respected and preserved because these cultures emanated from the land and were best suited under those circumstances. Unfortunately, under the policy of imperialism, the imperial masters not only tried to plant alien civilizations on the native lands, but also alien cultures which were not suited for those lands. The best example is available in Australia where the Aborigines did not become agriculturalists because as the driest continent in the world, the land was not suitable for water intensive activities like agriculture.

In fact, the process started with the arrival of imperial masters in the native lands. The invaders knew that their cruel land grabbing exercise has to be justified somehow so they dehumanized the natives from the outset. The natives were degraded to the level of beasts, so when these helpless people were slaughtered no questions were asked by anybody. The degradation of the Australian Aborigines is clear in this early description where the writer justifies the land grab in the name of civilization:

When Captain Cook landed at Botany Bay probably there were not 500,000 natives in all Australia. And if the white man had not come, there probably would never have been any progress among the blacks. As they were then they had been for countless centuries, and in all likelihood would have remained for countless centuries more. They had never, like the Chinese, the Hindus, the Peruvians, the Mexicans, evolved a civilization of their own. There was not the slightest sign that they would be able to do so in the future. If there was ever a country on earth which the white man had a right to take on the ground that the black man could never put it to good use, it was Australia. (Fox 35)

It in indeed ironic that in the same account while trying to degrade the Natives, the writer paid a tribute to the Aborigines. In the same book he wrote:

Australia produced no grain of any sort naturally; neither wheat, oats, barley nor maize. It produced practically no edible fruit, excepting a few berries, and one or two nuts, the outer rind of which was eatable. There were no useful roots such as the potato, the turnip, or the yam, or the taro. The native animals were few and just barely eatable, the kangaroo, the koala (or native bear) being the principal ones. In birds alone was the country well supplied, and they were more beautiful of plumage than useful as food. Even the fisheries were infrequent, for the coast line, as you will see from the map, is unbroken by any great bays, and there is thus less sea frontage to Australia than to any other of the continents, and the rivers are few in number. (Fox 34)

The above account makes it clear that the Aborigines of Australia must have been very intelligent people to survive in such a continent where according to Fox's account there was such a scarcity of food. But, white man did not pay any attention to the achievement of the Aborigines because he was only interested in grabbing the land.

The Aborigines shared a special relationship with the land. The land is treated as a living entity. The land is not only a source of food but also the fountain spring of culture and life:

Land is closely linked with kinship. The land is often referred to as parent, sometimes father, and more often mother. Therefore if land is mother of all things, the members are all related as brothers and sisters and share associated rights, responsibilities, and dreaming. From these spiritual links with the land flow relationships between the members of the group and as part of these relationships, the language and skin groups of each member give Aboriginal people their associative bonds. (Bishop, Coluhoun et al 5)

So when these people were moved away from the land. It created severe complications for them. Most of these people developed severe psychological problems. One of the problems is described by the Canadian Native writer Carol Snow Moon Bachofner in her poem "Land Sickness":

> I'm flung away, far from the edges
>
> Of ocean, beneath brown, unsettled skies;
>
> I have no salt spray on my hair, no chill
>
> Gray sand beneath my feet. I am bereft
>
> Of crisp ocean kisses and wild seaweed,
>
> Dancing like a sultry lover around my ankles.
>
> Perhaps I will die from land sickness… (68)

This land sickness is caused because people are dislocated from their land. These people who lived in the forests in the natural surroundings and practised the hunter-gatherer life styles were forced to settle in the places where they could not hunt or gather food and had to depend on carbohydrate rich food provided by the governments. The camps were often crowded where the people lived like prisoners. The suicide rates among these people are highest because they live in the places which are like prisons to them and suicide is a welcome liberation from such

depressing and hopeless life. A lot of research has been done among a rural Brazilian tribe, the Guarani Indians:

Their suicide rate in 1995 was 160 per 100,000 markedly higher then it was a year earlier and dramatically higher then the U.S. rate of about 12 per 100,000. The reason for this high suicide rate may be found in a sudden change in their living conditions. The Guarani have recently lost most of their ancestral lands to industrialization. Communities that used to live by hunting and fishing are now crowded on to reservations too small to support that way of life. Nearby cities tempt the Guarani with consumer goods that they desire and yet can ill afford on their low wages. Because hunting, farming and family life have religious signification, their demise has significantly affected religious life. Life has lost its meaning for many of the Guarani. (qtd. in Davison and Neale 274)

Similarly, Australian Aboriginal novelist Alexis Wright writes that displacement from home land is another source of alcoholism for her people also. In Grog War, she tells how theWarumungu Aborigines were brought to the brink of starvation on their own land because the land was given to the miners which disrupted the food supply of the Aborigines. It was during this time that the Warumungu people realized that alcohol can relieve their distress at least for sometime:

In those times it must have been a revelation to the Aboriginal people who had succumbed to alcohol, to know that the grog could make you forget just about everything that reminded you who you were (Wright,1997, p. 36).

The problems faced by the Waramungu people can be easily generalized to the other tribes of Aborigines also who were dispossessed by the whites and the best lands were taken for agriculture and cattle stations and for mines.Mudrooroo, the noted Aboriginal writers writes:

It is said that the health of us mob depends on the health of our land, that is land suffers, so do we. Thus if sacred sites are destroyed, if the dreaming tracks of our ancestors are severed, is affects our bodies. For the Indigenous person, life and land are intimately connected, and if the land is harmed so is the person. (1996, p.126)

In fact, it has been established in so many researches that the hunter gatherer communities live a healthy and long life if they are allowed to live in their natural surroundings. On the other hand, if they are removed away from their lands and are forced to alter their life style then they become affected by diseases like diabetes, depression, schizophrenia etc. and their life spans become shorter:

Although life expectancies of hunter- gatherers are low by modern European or American standard, they compare favourably with expectancies for displaced hunter-gatherers, many subsistence agriculturalists, and impoverished urbanized people of the tropics today. Typically, life expectancies decrease when hunter-gatherers are settled, not increase. Their life expectancies are thought to be lower now then they would have been at the turn of the 20th Century because of the negative impacts of the outsiders, such as the stealing of land, depleting of food stocks and the spreading of diseases. (Goodman and Grigs 2)

The most important thing that we should understand at this juncture is that land is an important ingredient of the lives of the native people. These people should be allowed to live on their lands

which not only nourishes their life and health but also their spirits. Their right to live on their land should be respected and that right should not be taken away.

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BIOMETRICS: A HELPING HAND IN AUTHENTICATION

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ABSTRACT

In simple words, authentication means providing a proof of who we claim to be. For an authorized access to work place or even receptive public place like airport, stadiums one has to give verification of identity through passport, id-card or signature. This is nothing but authenticating. Lately there have been incidents of unauthorized access leading to wide spectrum of criminal activities. The existing scenario demands organizations and government bodies, agencies, offices to enhance their authentication method from the conventional ones like carrying badges or id-cards into stronger methods guaranteeing more security. Biometrics is one such technology, which can provide security at places vulnerable to unauthorized access. Though biometrics have certain advantages over the traditional methods, and several nations do understand its significance in the growing exposed environment wherein invaders perpetrate easily, there are many institutes and organizations which are in a fix as to which biometric is best suited to their needs, specially because of a variety of biometrics available today in market; facial scan, hand geometry, fingerprint, iris and retina scan to name a few. My attempt through this research paper is to carry out a comparative study between two mainstream biometrics viz. hand geometry and fingerprint for authentication. Their performance has been compared with respect to certain aspects like speed, cost, accuracy and reliability. The comparison has been carried out using the SPSS analysis tool, implementing the Post hoc and ANOVA test to reach certain inferences regarding the two biometrics that are under comparison.

KEYWORDS: *Authentication, Biometrics, Fingerprint, Hand geometry.*

INTRODUCTION

Biometrics is a security solution or system, which relies on detailed measurements of selected parts of human body or behavioral characteristics for authentication. Precisely, human traits such as faces, hand shapes, fingerprints and iris or retinas are scanned for identity verification or identification. Other biometrical traits that can be used for the same include ear shape, wrist veins, body odor, brain fingerprinting, thermal signature dynamics, gait recognition, voice verification, computer keystroke dynamics and DNA identification, to name a few. In short biometrics utilizes the uniqueness of physical or behavioral characteristics of human beings for their identification or verification.

In India, the two most popular types of biometrics are hand geometry and fingerprint. My attempt through this research will be to find out the most suitable biometric from the view point of manufacturers and vendors.

FINGERPRINTS

Fingerprint is the most commonly known method of biometric identification, which is used by police forces not only in India but several other countries including the US. Ink based fingerprints have been in use for over a century, however in recent years have gone digital.

HOW IS DIGITAL FINGERPRINT SCANNING CARRIED OUT?

A fingerprint is made up of a unique pattern of ridges, furrows, islands and deltas. A fingerprint match involves a study of these ridges and others, their bifurcations and their endings which are unique for each individual. A standard biometric system is composed of a sensor for scanning the fingerprint, a processor that stores the fingerprint database and software which distills the arches, loops and whorls of scanned fingerprints into a numerical code and compares it with the template stored in the database. The comparison is performed within seconds, with an extraordinary degree of accuracy and whether a match is found or not is conveyed immediately. Accordingly the match allows or the mismatch disallows access of the subject. Organizations like companies and institutes have realized that fingerprint scanning is an effective means of security which deters buddy attendance.

HAND GEOMETRY

One more biometrics technology that has been widely used is hand geometry. It involves the scanning of the shape, size and other characteristics such as finger length of the hand or the complete hand itself.

HOW IS HAND GEOMETRY VERIFICATION CARRIED OUT?

Hand geometry is generally used for verification. Users are required to make some claim about who, they are, for example, by swapping a card, before the scan. Then the biometric template of the person (which is stored as a record in the database) they claim to be and the one, which is usually on the card, is compared during the scan.

REVIEW OF LITERATURE

1. SECURITY VS. LIBERTY: WEIGHING THE OPTIONS BY GAIL R. LIGHT

June 20, 2002 - Reprinted from Spring 2002 MSU Today magazine.

Though long-standing civil rights remain a priority, Americans are willing to examine new ways of protecting their safety. Those new ways include biometics and biosecurity, as well as other new technology. They also include a closer examination of identity theft and the possibility of a national identification card.

Sherman Garnett, dean of MSU's James Madison College, argues that Sept. 11 was the first time that many Americans "realized they are more a part of the world than they thought."

When terrorists rammed jet airplanes into the World Trade Center and the Pentagon, the initial responses were largely ones of immediate security. The effectiveness of those responses is still not known. More questions than answers remain.

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2. AN OVERVIEW OF BIOMETRICS

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The Webpage of John Daugman, Cambridge University

A BRIEF HISTORY OF BIOMETRICS

Biometrics go back a lot further than their futuristic image might suggest. Even the architects of the Great Pyramids in Egypt recognized the benefits of identifying their labourers using previously noted bodily characteristics.

The Egyptians were clearly ahead of their time, as very little development in the field of biometrics occurred for around four thousand years. It was only in the late 1800s that people started to develop systems that used the fingerprint and other bodily characteristics in order to identify individuals.

In 1880, for example, Henry Faulds, a Scottish doctor living in Japan, published his thoughts on the variety and uniqueness of fingerprints, suggesting that they could be used for the identification of criminals. Meanwhile, in 1900, the important Galton-Henry system of classifying fingerprints was published.

Interest from the US armed forces and intelligence agencies then emerged, but it wasn't until the turn of the century, and in particular until after 9/11, that the awareness of biometrics broke out of specialized industry circles to reach the fever pitch levels seen today.

CHINESE PRECURSOR

Possibly the first known example of biometrics in practice was a form of finger printing being used in China in the 14th century, as reported by explorer Joao de Barros. He wrote that the Chinese merchants were stamping children's palm prints and footprints on paper with ink to distinguish the young children from one another. This is one of the earliest known cases of biometrics in use and is still being used today.

More Info: The International Biometrics Group

3. DEBUNKING MYTHS OF BIOMETRICS OUT-LAW NEWS, 09/07/2004

It's probably the hottest sector in the security field today. Yet the biometrics industry, which produces human-based identification systems, is weighed down with claims and counterclaims, fallacies and myths.

MYTH 1: STOLEN BODY PARTS TRICK THE SYSTEM

This is also a classic, and has been seized upon by many a Hollywood director, who are not known for letting the true facts cloud a good storyline.

With most biometric devices there is an element of 'liveness' detection, which can measure many variables, from a finger pulse to a pupil response. This would normally be enough to prevent the system from working once the body part had been removed.

However, other factors quickly come into play. For example, an extracted (or enucleated) eyeball quickly begins to decompose, with the cornea clouding over and obscuring the iris. A severed finger also dies rapidly – typically becoming useless after around 10 minutes.

MYTH 2: CHILDREN AND ASIAN WOMEN GO UNDETECTED

Fingerprint technology also gives us number four on the list of myths. This relates to the inability of the technology to enroll or verify the identity of children, or women of Asian descent. This myth is relatively new, because until a few years ago it was a reasonable criticism of the technology, given the challenge of acquiring small fingers with "faint" fingerprints.

However, recent advances in imaging have led to far greater resolutions being achieved by fingerprint sensors, so boosting a biometric system's ability to extract the pertinent information required to create a biometric template of that person.

MYTH 3: YOU'LL GET ARRESTED

Number five on the list relates to the belief that fingerprint information captured by a commercial fingerprint system could somehow be used in a criminal investigation. This myth stems from a misunderstanding of how a biometric system typically works in a commercial environment.

Almost none of the available commercial fingerprint-based systems store the entire image of a fingerprint. Rather they extract information from that fingerprint to create a mathematical representation or template. This template, which is often encrypted, is designed so that it cannot be reverse engineered to reconstruct the original fingerprint image, so is useless information to the police, or indeed a hacker.

The feeding of identical template data to a fingerprint system's matching engine by a hacker will normally fail, as this is almost a sure indication that the data has been stolen and that a replay attack is underway.

FROM MYTH TO REALITY

While there are many other myths plaguing the biometric industry, the good news is that the technology has been able to rise above them to claim its place at the security top table. The benefits of the technology have just been too attractive to let unfounded myths get in the way.

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See: http://www.isl-biometrics.com/

SIGNIFICANCE/NEED OF THE STUDY

After years of research and development, organizations are still in search for more secure authentication methods for user access, e-commerce, and other security applications. With the increased use of computers as carriers of information technology, it is necessary to restrict access to sensitive and personal data. Recently biometrics is gaining increasing attention as these can

substantially improve any company's information security posture. A large range of biometric products are commercially available as, today, vendors have several products to offer.

The security field uses three different types of authentication:

* Something which you know—a password, PIN, or piece of personal information (such as your mother's maiden name);

* something which you have—a card key, smart card, or token (like a Secure ID card); and/or

* something which you are—a biometric.

Of these, a biometric is the most secure and convenient authentication tool.

USES OF BIOMETRICS

Biometrics can be used in 2 possible ways: Identification and Verification

IDENTIFICATION

Identification is determining who a person is. Biometrics can be used to identify a person by comparing a measured biometric against a database of stored records. This method can require a large amount of processing power and some time if the database is very large. It is often used in determining the identity of a suspect from crime scene information. Here the person's identity is determined by one-to-many comparison.

VERIFICATION

Verification is determining if a person is, who he says he is. Biometrics can also be used to verify whether the person is the same who he claims to be. This method requires less processing power and time, and is often used for providing authorized access to places or information. This involves a one-to-one comparison between a measured biometric and the one known to come from a particular person.

In this case, the user has to provide his/her name or personal identification number along with the live data. Most commonly, the user enters a username or PIN and then offers the live data (i.e. scans the fingerprint, or gives hand geometry). The system compares the live data only with the template stored against that name or PIN. This is called verification or authentication. Verification based biometric systems thus tie the username or PIN to the template for a one-to-one match.

Verification based biometric systems are most common and reliable. All biometrics can be used for verification, but different kinds of biometrics vary in the extent to which they can be used for identification. They also vary in the cost, complexity and intrusiveness. Biometric systems are widely used for verification but seldom for identification. That is because identification is not easy with databases containing information templates of millions of users. This searching task is much harder. Moreover there are high possibilities of false matches.

BENEFITS OF BIOMETRICS OVER TRADITIONAL METHODS

Biometrics cannot be forgotten or piggy-backed (shoulder-surfed) like a password or personal identity number (PIN) or stolen, or borrowed, or lost, or forged like a key, an identity card or a badge.

Though the risk of privacy infringement is still one of the most compelling arguments against the widespread use of biometric technology in law enforcement, this view holds less weight today, in the light of recent tragedies. On the other hand, there are people, who insist that:

Biometrics is actually privacy's friend because biometrics safeguards information integrity and thwarts 'identity theft'.

Biometric technology is one area that no segment of the IT industry can afford to ignore. Biometrics provides security benefits across the spectrum, from IT vendors to end users, and from security system developers to security system users.

Different technologies may be appropriate for different applications, depending on perceived user profiles, the need to interface with other systems or databases, environmental conditions, and a host of other application-specific parameters. There must be a guide for industry sectors and for all others to evaluate the costs and benefits of implementing such security measures and to remove the ambiguousness, which people have today regarding biometrics due to incomplete knowledge.

This method, which involves automatic real-time identification of a person is preferred over traditional methods involving passwords and PINs for various reasons:

(i) The person to be identified is required to be physically present at the point-of-identification;

(ii) Identification based on biometric techniques obviates the need to remember a password or PIN or carry a token.

(iii) By replacing PINs, biometric techniques can potentially prevent unauthorized access to or fraudulent use of ATMs, cellular phones, smart cards, desktop PCs, workstations, and computer networks.

(iv) PINs and passwords may be forgotten, and token-based methods of identification like passports and driver's licenses may be forged, stolen or lost.

OBJECTIVES

In India, as far as the sector of authentication is considered, there is a lack of awareness regarding biometrics; those who know somewhat about biometrics are in question whether it is useful or harmful to their health and personal life i.e. there is a conflict between privacy and security; a few those who are convinced regarding the potential of biometrics for identification or verification are in a fix as to which biometric is the best for them in a scenario where a variety of biometric products are available in the market. To answer all such questions which dwell in people's mind I have attempted to carry out this research, the following being the objectives of my study.

The key objectives of the research are to

1. To select a biometric out of hand geometry and fingerprint which is most accurate, cost effective, reliable, and least prone to privacy infringement and provides high-speed authentication.

2. To find the perception of manufacturers and vendors of security products.

RESEARCH METHODOLOGY

 I have carried out the research in two phases. The first phase was an exploratory phase, which dealt with developing an appropriate research framework. It was started with literature review to understand the expediency and scope of biometrics, its limitations, and challenges faced in acceptance and implementation of biometrics. Before approaching the vendors and manufacturers a pilot questionnaire with all open ended questions was framed to understand the awareness and consecutive acceptance or reluctance of biometrics as a substitute to traditional security solutions like passwords and id-cards.

In the pilot study 4 manufacturers and vendors (dealing in security products), in total were surveyed to comprehend various aspects of biometric security solutions with special reference to Indian market and to identify its scope in India. The pilot questionnaire was then refined to produce final questionnaires to extract the fair side and the dark one of implementation of biometrics, if any (merits and demerits) and recognize its future prospects from the view point of vendors and manufacturers.

The second phase of the research was an explanatory research, wherein a survey using the final questionnaires was conducted to understand the concerns, issues, benefits and challenges of the vital participants of the security system viz. the vendors and manufacturers in comparison with the conventional systems adopted for security.

RESULTS AND DISCUSSION

Before arriving to the results I would like to put forth the sampling plan and how I performed data analysis to reach to any inferences.

SAMPLING PLAN

SAMPLE SIZE: A total of 99 vendors and/or manufacturers dealing in security products were surveyed.

SAMPLING METHOD: Census sampling method was used wherein all manufacturers and vendors dealing in security providing products in and around Pune were considered.

A total number of 70 vendors and/or manufacturers were found to deal with biometric products.

ANALYSIS OF DATA

From the filled questionnaires the following tables were formed for each type of biometric. These tables depict the grades received by each biometric for a total of 5 aspects:

Low cost

Speed

Accuracy

Reliability

Low Privacy infringement

The Likert scale used was: 5–Excellent,4–Good,3–Average,2–Satisfactory,1–Non satisfactory

The table indicates the grades received by hand geometry and fingerprint for the 5 criteria aspects:

TABLE 1 – GRADES RECEIVED BY BIOMETRICS FOR SELECTED ASPECTS

Sr. No.	Type of biometric	Criteria aspects	5	4	3	2	1
1.	HAND GEOMETRY	Low rate/price/cost	54	9	4	2	1
		Reliability (cannot be fooled)	1	5	7	45	12
		Accuracy	0	7	54	9	0
		Low privacy infringement	3	49	14	4	0
		Recognition is fast (speed)	2	56	9	3	0
2.	FINGERPRINT	Low rate/price/cost	4	59	3	2	2
		Reliability (cannot be fooled)	7	46	14	3	0
		Accuracy	5	53	11	1	0
		Works well with twins	1	58	9	2	0
		Low privacy infringement	0	2	9	17	42
		Recognition is fast (speed)	2	57	10	1	0

EXPLANATION: Out of 70 vendors and manufacturers 54 ticked on EXCELLENT for the aspect- Affordable cost/price/rate, 45 ticked on SATISFACTORY for the aspect-Reliability, 54 on AVERAGE for the aspect-Accuracy, 49 on GOOD for the aspect-Low privacy infringement and 56 on GOOD for the aspect-Speed.

Explanation on similar lines can be furnished for the other biometric as well.

COMPARISON OF BIOMETRICS REGARDING SELECTED CRITERIA ASPECTS

The data collected from the questionnaires was first put into the above table biometric-wise. Then this data was rearranged criteria aspect-wise in the following table:

TABLE 2: GRADES RECEIVED BY BIOMETRICS FOR THE SELECTED CRITERIA ASPECTS

Sr. No.	Criteria aspect	Type of Biometric	Excellent	Good	Average	Satis-factory	Non-satisfactory
1.	**Low cost**	Hand Geometry	54	9	4	2	1
		Fingerprint	4	59	3	2	2
2.	**Reliability**	Hand Geometry	1	5	7	45	12
		Fingerprint	7	46	14	3	0
3.	**Accuracy**	Hand Geometry	0	7	54	9	0
		Fingerprint	5	53	11	1	0
4.	**Low Privacy Infringement**	Hand Geometry	3	49	14	4	0
		Fingerprint	0	2	9	17	42
5.	**Speed**	Hand Geometry	2	56	9	3	0
		Fingerprint	2	57	10	1	0

As can be seen in the above table hand geometry has received maximum i.e. 54 Excellent remarks and fingerprint has received 59 Good remarks for the criteria aspect – Low cost. From the above table we get the distribution of votes achieved by both the biometrics for several criteria aspects.

ANALYSIS AND FINDINGS

After the data collected from the questionnaires after interviewing several subjects, has been tabulated and segregated criteria aspect-wise, it is ready for the actual analysis, wherein I have selected the SPSS (Statistical Package for Social Sciences) (Version 14.0) for Windows to analyze the data and the following tables are an outcome of my research data fed to the software.

As I fed the data from MS Excel to SPSS to get result files, I found out the outstanding mean scores for the performance of each mainstream biometric for each criteria factor, and referred the ANOVA to see if there is considerable difference between the performance of the two selected biometrics; only if there is considerable difference then comparing the performance pair-wise in POST HOC test yields fruitful results, otherwise there is no point in comparison.

Finally the priority decided from the POST HOC test and the mean scores are summarized to get the ranks achieved by each of the biometric in performance for each of the criteria aspect.

Table 3 shows data viz. mean score, standard deviation and the minimum and maximum scores achieved by each of the 2 mainstream biometric for a total of 5 criteria aspects viz. speed, reliability, accuracy to name a few.

DISCRIPTIVE STATISTICS
TABLE 3: TABLE OF FINDINGS - MEAN SCORES ACHEIVED BY THE BIOMETRICS

SR. NO.	CRITERIA ASPECT	Name Of Biometric	N	Mean	Std. Deviation	Mini-mum	Maxi-mum
1.	**LOW PRIVACY**	**Hand geometry**	70	**3.7286**	0.6352	2.00	5.00

	INFRINGEMENT	Fingerprint	70	**1.5857**	0.8252	1.00	4.00
2.	SPEED	Hand geometry	70	**3.8143**	0.5462	2.00	5.00
		Fingerprint	70	**3.8571**	0.4595	2.00	5.00
3.	RELIABILITY	Hand geometry	70	**2.1143**	0.8261	1.00	5.00
		Fingerprint	70	**3.8143**	0.6658	2.00	5.00
4.	ACCURACY	Hand geometry	70	**2.9714**	0.4807	2.00	4.00
		Fingerprint	70	**3.8857**	0.5259	2.00	5.00
5.	LOW COST	Hand geometry	70	**4.6143**	0.83913	1.00	5.00
		Fingerprint	70	**3.8714**	0.67933	1.00	5.00

The column titles in the table are explained below

- N means the Number of respondents. In all 70 vendors/manufacturers were interviewed.

- Mean means the Score received by respective biometric out of 5. Ideally it should be close to 5.

- Standard Deviation is the square root of Variance, and it should be minimum.

- Minimum indicates the Minimum Score obtained by each biometric for the respective criteria aspect; performance is tested for a total of 5 criteria aspects.

- Maximum indicates the Maximum Score obtained by each biometric for the respective criteria aspect; performance is tested for a total of 5 criteria aspects.

EXPLANATION FOR THE ASPECT – LOW PRIVACY INFRINGEMENT

From the above table, it is evident that Hand geometry should be the preferred biometric when it comes to minimum privacy infringement as it has received a mean score of 3.7286, we can say that Hand Geometry authentication works most well for discriminating persons as people are reluctant in giving fingerprints at public places like airports.

EXPLANATION FOR THE ASPECT – SPEED

The above table shows that the mean score of both biometrics is nearly same i.e. 3.8 which indicates that Hand geometry scan and Fingerprint scan are equally good when it comes to comparison of speed.

Though the speed provided by the biometrics is quite high, some time is required as human activity in also a part of the authentication. For example, in case of Hand geometry scan, some time is lapsed when the authenticator puts his/her hand palm on the scanner and in case of Fingerprint some time is involved when the authenticator places his/her finger on the scanner.

Likewise explanation can be given for each criteria aspect.

COMPARISON OF MAINSTREAM BIOMETRCIS USING ANOVA (ANALYSIS OF VARIANCE)

TABLE 4: ANALYSIS OF VARIANCE

The following table is outcome of data fed to the SPSS software and gives analysis of variance wherein significant value is extracted for each criteria aspect.

ANOVA						
Criteria		**Sum of Squares**	**df**	**Mean Square**	**F**	**P Value**
LOW PRIVACY INFRINGEMENT	**Between Groups**	274.771	4	68.693	95.390	**.000**
SPEED	**Between Groups**	1.011	4	.253	.770	**.546**
LOW COST	**Between Groups**	568.343	4	142.086	259.539	**0.00**
RELIABILITY	**Between Groups**	241.446	4	60.361	91.549	**.000**
ACCURACY	**Between Groups**	190.897	4	47.724	144.683	**.000**

It is expected that both the biometrics differ in performance considerably for each of the criteria aspect so that comparisons can lead to priorities (rankings) amongst themselves.

If the significant value is less than 0.05, it implies that there is considerable difference between the performances of the 2 biometrics, for that particular criteria aspect and that their performances if compared; can yield fruitful results.

On the other hand, if the significant value is greater than 0.05, it means that there is not considerable difference in the performance of the 2 mainstream biometrics for that particular criteria aspect and the comparison of their performances is not going to yield any fruitful results; in other words they give near about same results.

The above table, (Table 4) indicates significant value between the performance of the two biometrics using Analysis Of Variance. The further comparison is made in the Post Hoc test.

Referring the above table it can be seen that for all criteria aspects except **speed** the significant value is 0.0 i.e. less than 0.05, thus can be compared; comparison will yield fruitful results, these comparisons are made in the Post Hoc Test in next section.

POST HOC TESTS

Referring Table no. 1 I have derived conclusions based on samples. Now lets us see whether the two biometrics are comparable for an overall population through Post Hoc tests. In the Post Hoc test performance of each biometric, in terms of mean scores is compared with that of the other biometric to acquire the significant difference (P value). If there is significant difference between

the mean scores of each pair of biometric then we can draw particular inference as to which biometric is better among the two for each (total 5) criteria aspects.

Refer Table no.3: If the mean difference (I-J) is negative, it indicates that the biometric under the J heading gives better results than the biometric under I heading for that particular criteria and vice versa. Asterisk (*) in the column of mean difference indicates that there is significant difference in the mean scores (in other words, p value is less than 0.05) of the two biometric and thus the comparison of performances can lead to a fruitful decision for overall population. The post hoc test has been shown in the following table.

TABLE NO. 5: PAIRWISE COMPARISONS OF BIOMETRICS USING POST HOC TEST

Sr.No.	Criteria Aspect	Variable I	Variable J	Mean Difference (I-J)	Standard error	Significant (P) value
1	LOW COST	Hand geometry	Fingerprint	.74286(*)	.12507	**0.000**
		Fingerprint	Hand geometry	-.74286(*)	.12507	**0.000**
2	LOW PRIVACY INFRING-MENT	Hand geometry	Fingerprint	2.1429(*)	.1434	**0.000**
		Fingerprint	Hand geometry	-2.1429(*)	.1434	**0.000**
3	SPEED	Hand geometry	Fingerprint	-4.2857E-02	9.689E-02	**0.992**
		Fingerprint	Hand geometry	4.2857E-02	9.689E-02	**0.992**
4	RELI-ABILIY	Hand geometry	Fingerprint	-1.7000(*)	.1373	**0.000**
		Fingerprint	Hand geometry	1.7000(*)	.1373	**0.000**
5	ACCU-RACY	Hand geometry	Fingerprint	-.9143(*)	9.708E-02	**0.000**
		Fingerprint	Hand geometry	.9143(*)	9.708E-02	**0.000**

EXPLANATION

1. NO PRIVACY INFRINGEMENT

The significant value for the two biometrics viz. Hand geometry and Fingerprint when compared with each other is 0.0 i.e. less than 0.05 which indicates that there is significant difference between the performance of the pair and the comparison will lead to a fruitful inference. When the mean difference is negative, it indicates that the performance of J biometric is better than that of I biometric as far as the "Low privacy infringement" aspect is considered; to be precise, Hand geometry is a better option than Fingerprint when privacy is of utmost importance.

2. SPEED

The significant value for the two biometrics viz. Hand geometry and Fingerprint when compared with each other is 0.992 i.e. more than 0.05 which indicates that there is in significant difference between the performance of the two biometrics, consequently no

conclusion can drawn in this matter. In other words, comparison will not lead to any fruitful inference as far as the criteria aspect "speed' is considered. An organization can opt for either fingerprint or hand geometry if 'speed' of authentication is it's concern.

Such explanation can be furnished for each criteria aspect. This information can be utilized to rank the 2 biometrics for each criteria factor as shown in the following table (Table 6). The sample means have been derived from table 1 and the priority of biometrics for each criteria for overall population is obtained from the Post Hoc test referring table 5.

FINDINGS AND RECOMMENDATIONS

Using the data from table 1 and table 3, in combination I have formed the below table 6 which gives the priority of the 2 mainstream biometrics for each of the 5 criteria aspects.

TABLE 6: RESULT TABLE

Sr.No.	CRITERIA	PRIORITY	NAME OF BIOMETRIC	SAMPLE MEAN
1.	LOW PRIVACY INFRINGEMENT	1	Hand geometry	3.7286
		2	Fingerprint	1.5857
2.	SPEED	1	Fingerprint	3.8571
			Hand geometry	3.8143
3.	RELIABILITY	1	Fingerprint	3.8143
		2	Hand geometry	2.1143
4.	ACCURACY	1	Fingerprint	3.8857
		2	Hand geometry	2.9714
5.	LOW COST	1	Hand geometry	4.6143
		2	Fingerprint	3.8714

EXPLANATION

1. **NO PRIVACY INFRINGEMENT:** Hand geometry is at the first priority for the aspect – No privacy infringement, while fingerprint takes up the second priority. Hand geometry provides lesser privacy infringement as compared to fingerprint.

2. **SPEED:** Fingerprint and hand geometry share the first priority when it comes to the criteria aspect – Speed. Any of the two biometrics can provide reasonable performance when speed is the concerned factor.

3. **RELIABILITY:** Fingerprint takes up the first priority for the criteria aspect – Reliability, while hand geometry is at the second priority. This implies that fingerprint is more reliable than hand geometry.

4. **ACCURACY:** Fingerprint is at the first priority for the criteria aspect – Accuracy, while hand geometry takes up the second priority. This means fingerprint is more accurate than hand geometry.

5. **COST:** Hand geometry stands at first priority for the criteria aspect – low cost, while fingerprint is at the second priority.

CONCLUSIONS

From the survey carried out on the two selected biometrics across manufacturers and vendors in and around Pune, and after analysis of collected data (using SPSS) I found that there does not appear to be any one method of biometric that does the "best" job of ensuring secure authentication. Each biometric authentication have something to recommend it.

After the research carried out on the two biometrics I came to the following conclusions regarding comparison of hand geometry and fingerprint considering the 5 criteria factors viz. low privacy infringement, speed, reliability, accuracy, and low cost. Before choosing a biometric based user authentication solution, an organization should evaluate its needs carefully.

SPEED: Biometrics is a fast way of authenticating people and today we have biometric products which furnishes result in as little as one millisecond. Comparison of the 2 biometrics speed-wise lead to a conclusion that both them stand at first preference and that the organization opting for biometrics for verification or identification must select a biometric considering some other criteria as well, that is on its priority list. For example: Hand geometry readers work in harsh environments, do not require clean conditions and form a very small dataset. It is not regarded as an intrusive kind of test. It is often the authentication method of choice in industrial environments. On the other hand fingerprints remain constant throughout life.

RELIABILITY: An organization adopting biometrics for access should not select hand geometry as it is less reliable for authentication and if used may give flawed results; while fingerprint is more reliable and if cost is not an issue for the organization it should adopt fingerprint for authorized access.

ACCURACY: Accuracy of a biometric is inversely proportionate to its error rate. The main aspect to evaluate a biometric system is its accuracy. From the user's point of view, an error of accuracy occurs when the system fails to authenticate the identity of a registered person or when

the system erroneously authenticates the identity of an intruder. In the case of biometrics we have two important error rates: The False Matching Error Rate (FMR) measures the rate of actual impostor comparisons that are erroneously considered genuines. On the contrary the False Non matching Error Rate (FNMR) measures the rate of actual genuine comparisons that are erroneously considered impostors.

The applications of hand geometry have been limited due to its limited accuracy as compared to its other advantages like unobtrusive nature and speed. Fingerprint has achieved the first priority when accuracy is of utmost importance to the organization implementing biometric authentication.

COST: As the costs of biometrics are reducing they are being adopted by more and more organizations, gradually; the fingerprint based biometric application, that cost nearly 1 lakh in 1968, cost 80,000 in 1989, and by the year 2000, it was nearly 50,000 and the costs are still clashing down.

Among the two biometrics, hand geometry scanners provide the most reasonable option. Typically, stand-alone units include all of the hardware and software to operate a single, independent unit at one control point (i.e., a doorway or some other entryway).

Hand geometry scanners range from 5, 000 to 20,000 INR.

From the data analysis it is found that hand geometry is most cost effective biometric. So an organization willing to implement biometric authentication system can adopt hand geometry if low cost is of utmost preference.

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INDIA'S NUCLEAR STATUS AFTER POKHRAN II

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ABSTRACT

During 1947-98, while India is strongly opposed nuclear weapons and nuclear arms race among the nuclear nations, she fully favoured the development and use of nuclear Technology for peaceful and development purposes .After having Pursuit at peaceful nuclear policy for about five decades, India decided in March 1998 to go in for a nuclear policy directed towards the development of nuclear weapons. This change was fully reflected by the five nuclear Tests, 3 on May 11 and 2 on May 13, 1998 conducted by India at Pokhran II range. By the categorical declaration made by the Indian Prime Minister, India declared it was now a nuclear power in the sense of being a nuclear weapon state. The purpose of this article is to define the India's nuclear policy and explores its relations after Pokhran-II. Furthermore, this paper contains the factors, which compelled India for being a N-Weapon State.

KEYWORDS: *Nuclear Technology, Nuclear Arms, N-Weapon.*

INTRODUCTION

The Pokhran-II tests were a series of five nuclear bomb test explosions conducted by India at the Indian Army's Pokhran Test Range in May 1998. It was the second instance of nuclear testing conducted by India; the first test, code-named Smiling Buddha, was conducted in May 1974.Pokhran-II consisted of five detonations, the first of which was a fusion bomb while the remaining four were fission bombs.The tests were initiated on 11 May 1998, under the assigned code name Operation Shakti, with the detonation of one fusion and two fission bombs. On 13 May 1998, two additional fission devices were detonated.

The Factors which compelled India for being a N-weapon State-

1- The attempts of the nuclear haves particularly the USA to impose such discriminatory nuclear regimes as the NPT, CTBT and others on other countries like India.

2- The attempts of the developed countries to deny the transfer of even the dual Use technology, like supercomputers to India. Such Technologies were need by India for her Rapid economic, Industrial and Technological development.

3- The unwillingness and hence, inability of the N-powers(P-5) to accept, or even to recognize the need for any scheme for a really effective, universal, efficient and global nuclear arms control and disarmament regime.

4- The rising military power of nuclear China and the continued impasse over the Sino-Indian boundary dispute together acted as a source of pressure on India's security interests.

5- The known attempts of the five nuclear powers (P-5) to maintain their Nuclear weapon monopoly status and to practice a salt of nuclear imperialism and hegemony under the cloak

of measures like NPT, CTBT, FMCT and MCTR, also compelled India to meet the challenges head-on.

Development and test teams-

The main technical personnel involved in the operation were:

• Project Chief Coordinators :

1- Dr. A.P.J. Abdul Kalam (later, President of India), Scientific Adviser to the prime minister and Head of the DRDO.

2- Dr. R. Chidambaram, Chairman of the Atomic Energy Commission and the Department of Atomic energy.

• Defence Research & Development Organization (DRDO) :

1- Dr. K. Santhanam; Director, Test Site Preparations.

• Atomic Minerals Directorate for Exploration and Research :

1- Dr. G. R. Dikshitulu; Senior Research Scientist B.S.O.I Group, Nuclear Materials Acquisition.

• Bhabha Atomic Research Centre (BARC) :

1- Dr. Anil Kakodkar, Director of BARC.

2- Dr. Satinder Kumar Sikka, Director; Thermonuclear Weapon Development.

3- Dr. M. S. Ramakumar, Director of Nuclear Fuel and Automation Manufacturing Group; Director, Nuclear Component Manufacture.

4- Dr. D.D. Sood, Director of Radiochemistry and Isotope Group; Director, Nuclear Materials Acquisition.

5- Dr. S.K. Gupta, Solid State Physics and Spectroscopy Group; Director, Device Design & Assessment.

6- Dr. G. Govindraj, Associate Director of Electronic and Instrumentation Group; Director, Field Instrumentation.

International reactions-

The reactions from abroad started immediately after the tests were advertised. The United States issued a strong statement condemning India and promised that sections would follow. The American establishment was embarrassed as there had been a serious intelligence failure in detecting the preparations for the test. The UN also issued a statement expressing its disappointment. Canada which had earlier supplied the CIRUS nuclear reactor to India which was the source of plutonium for the 1974 tests, reassured the word that the Cyrus reactor was not in any way connected to the 1998 tests. China issued a vociferous contamination calling

upon the international community to exert pressure on India to sign the NPT and eliminate its nuclear Arsenal. With India joining the group of countries possessing nuclear weapons, a new strategic dimension had emerged in Asia, particularly South Asia.

The most vehement reaction to India's nuclear test was of Pakistan. Great was raised in Pakistan which issued a statement blaming India for instigating a nuclear arms race in the region. Pakistani Prime Minister Nawaz Sharif vowed that his country would give a suitable reply to the Indians. The Pakistan atomic energy commission (PAEC) carried out five underground tests at

the Chagai test site at 3:16 p.m. on the afternoon of May 28, 1998, just 15 days after India's last test. The yield of the tests was reported to be 40 KT.

Pakistan's subsequent tests invited similar contaminations from multiple nations ranging from Argentina to Russia, the United Kingdom and the United States. The US President Bill Clinton was quoted as saying "Two wrongs don't make a right", criticizing Pakistan's tests as reactionary to India's Pokhran II. India's decision to detonate nuclear devices resulted in severe and comprehensive economic and Technology related sections by a number of states. Over a period of time, these sections proved to have exerted only marginally effects on India's economy and technological progress and most of the sanctions were lifted within 5 years of their enactment.

After Pokhran II the Indian Nuclear policy came to be characterized by the following features: 1- To develop and maintain a minimum essential credible nuclear deterrent force.

2- To practice self imposed moratorium on further N-testing.

3- To develop the technology needed for maintaining a nuclear force. In April 1999, India successfully test fired its Agni II missile weapon delivery missile –IRBM.

4- No first use of nuclear weapons by India.

5- To work for time bound program for total nuclear disarmament at the global level. 6- Not to sign the NPT and CTBT.

7- To define nuclear India's nuclear doctrine.

8- To initiate high level diplomacy for neutralizing the economic sanctions imposed by the USA, Japan and some other countries in the post Pokhran II years.

9- To continue the ongoing integrated missile development program.

10- To become a responsible nuclear program and maintain transparency in India's nuclear program.

11- To create a nuclear command structure.

In July 2005 India and the USA agreed upon nuclear deal under which India was to open her non- military civilian nuclear reactors for inspections and control of IAEC, to receive and develop N-Technology for peaceful uses and to maintain the sovereign autonomy of its military oriented N- plants and reactors.

CONCLUSION

Hence the chances of India getting a unique position of being N- weapon state who has not signed NPT and yet will get and fuel and peaceful and Technology. It is a good and happy situation for India. Further, India was to get all the benefits which were currently being enjoyed by the P-5. The US administration recognized India as a responsible state with advanced nuclear Technology. This, in fact, involved at tracit recognition of India's new nuclear status.

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