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**THE IMPACT OF PLANNING AND CONTROL ON SERVICE SMES SUCCESS****GAD VITNER****ASSOCIATE PROFESSOR****INDUSTRIAL ENGINEERING AND MANAGEMENT DEPARTMENT****SCHOOL OF ENGINEERING****RUPPIN ACADEMIC CENTER****ISRAEL****SIBYLLE HEILBRUNN****ASSOCIATE PROFESSOR****BUSINESS ADMINISTRATION DEPARTMENT****SCHOOL OF ECONOMICS AND BUSINESS ADMINISTRATION****RUPPIN ACADEMIC CENTER****ISRAEL****ABSTRACT**

*Management literature shows that planning and control managing tools are very common mechanisms supporting daily organizational operations. The purpose of our study is to investigate the impact of planning and control mechanisms on the success of service sector SME's. Data for the study were collected during the year of 2010 using a comprehensive questionnaire submitted to a sample of 294 service SME business owners in Israel. They were approached via a snowball convenient sampling method. Research findings indicate that larger businesses in the SME sector implement planning and control systems more than smaller ones. Study results did not find any evidence of positive impact of planning and control management mechanisms on business success. However, it was found that human capital acts as an indirect positive mediating factor.*

**KEYWORDS**

Human Capital, Performance, Planning and Control, Service Organizations, SME.

**INTRODUCTION**

Planning and control systems are management mechanisms supporting daily organizational work by developing work plans and defining the monitoring and feedback processes and tools to verify the level of achievement. It also creates various operational data bases to support the management in decision making processes.

Malmi and Brown (2008) define management control systems (MCS) as a package despite the existence of the idea in management accounting literature for decades. The first question to be addressed is what control is and what is meant by MCS? Some authors have outlined very broad conceptions of what could be considered MCS. For example Chenhall (2003) discussed management accounting (MA) which is a "collection of practices such as budgeting or product costing", management accounting systems (MAS) which is the "systematic use of MA to achieve some goal" and MCS which "is a broader term that encompasses MAS and also includes other controls such as personal and clan controls". He also notes that the term organizational control "is sometimes used to refer to controls built into activities and processes such as statistical quality control, just-in-time management" (p. 129).

Merchant and Otley (2007) note that broader conceptualizations of control can include factors such as strategic development, strategic control and learning processes, all of which are typically beyond the scope of management accounting. In these conceptualizations "almost everything in the organization is included as part of the overall control system" (p. 785). Merchant and Van der Stede (2007) separate management control from strategic control and define management control as dealing with employees' behavior. "It is people in the organization who make things happen. Management controls are necessary to guard against the possibilities that people will do something the organization does not want them to do or fail to do something they should do. If all employees could always be relied on to do what is best for the organization, there would be no need for MCS" (p. 8). Abernethy and Chua (1996) employ the same line of argument in defining an organizational control system as comprising "a combination of control mechanisms designed and implemented by management to increase the probability that organizational actors will behave in ways consistent with the objectives of the dominant organizational coalition" (p. 573). Flamholtz et al. (1985) defined organizational controls as: "attempts by the organization to increase the probability that individuals and groups will behave in ways that lead to the attainment of organizational goals" (p. 36). They proceeded to define organizational control systems as "techniques and processes to achieve goal congruence which may be designed for all levels of behavioral influence: individuals, small groups, formal subunits and the organization as a whole" (p. 36). Note that their definition of organizational control is much broader than their definition for organizational control systems. The former allows many different types of controls (e.g. rules), whereas the latter definition is focused only on those systems that aim for goal congruence. Management controls include all the devices and systems managers use to ensure that the behaviors and decisions of their employees are consistent with the organization's objectives and strategies. Planning is a very dominant corner stone of MCS packages. Planning is an ex ante form of control (Flamholtz et al., 1985). Firstly, it sets out the goals of the functional areas of the organization, thereby directing effort and behavior. Secondly, it provides the standards to be achieved in relation to the goals, and clarifies the level of effort and behavior expected from organization members. Furthermore, planning can enable co-ordination through aligning a set of goals across the functional areas of an organization, thereby controlling the activities of groups and individuals to ensure they are in line with desired organizational outcomes. In relation to planning, there are two broad approaches. The first is action planning, in which the goals and actions for the immediate future, usually a 12-month period or less, are established. This has a tactical focus. The second broad approach is long-range planning, in which the goals and actions for the medium and long run are established. This has a more strategic focus. Merchant and Van der Stede (2007) present planning and budgeting together as the financial results control systems. However, planning can be done with little reference to finance. In strategic planning, management can create strategic projects and other initiatives, all of which may be effective in directing what people do. Similarly, operational planning often comprises task lists, which provide guidance on what to do, perhaps without clear link to finance and accounting.

Large organizations, such as multinational corporations, typically have a multi-layered organizational hierarchy. One ambiguous issue is how the elements of a control package relate to each other down the organizational levels? It would seem likely that at the various organizational levels emphasis would be given to different control systems. At the very senior management level in large organizations there are seldom many procedure-based controls. Conversely, policies and procedures may dominate at the shop-floor level. Not only is it unclear how the control package is configured at the different organizational levels, but we also do not know whether these different configurations have an impact on each other (Malmi and Brown, 2008).

In contrast, SMEs usually cannot afford to establish and manage MCS packages mainly due to the lack of formal management background and experienced professionals (Human Capital) to operate these MCS systems. MCS are costly and time-consuming to install and operate. As a consequence, SMEs are likely to choose their first set of MCS very selectively. MCS in SMEs differ from those confronted by mature firms for three reasons. First, mature companies usually have

an extensive amount of formal systems already in place and, SMEs. Second, the first MCS introduced provide a foundation for the future development of MCS in the firm (Davila 2005). In this respect, while the main concern in a mature company will be how to integrate new MCS with the existing ones, a young firm must consider how the first MCS will affect the choice of future MCS. Third, SMEs utilize informal control systems more intensely than do mature firms (Cardinal et al. 2004; Moores and Yuen 2001) and, thus, they might decide to invest only in those formal MCS that liberate managers from routine operations and allow them to informally focus on the firm's strategy. Sandino (2007) conducted a study in two phases using data from 40 field interviews and 97 responses to a survey directed to early-stage store-based retailers. In the first phase, based on the field study, the study sought to understand what initial MCS were introduced in early-stage firms and why. It was found that the initial MCS introduced in early-stage firms could be categorized usefully based on their purpose. In the second phase the survey data was used to test: (1) whether the strategy pursued by an early-stage firm significantly determines the firm's choice of particular categories of initial MCS, and (2) whether early-stage firms with a better fit between the initial MCS and their strategy experience superior performance. King et al., (2010) study, presents evidence linking contingency factors, adoption and extent of budget use, and business performance in the Australian primary healthcare setting. Peel and Bridge (1998) studied the use of strategic planning among SMEs in the UK manufacturing sector. Their findings show that SMEs incorporate a range of objectives into their strategic planning process, with profit improvement perceived to be the most important objective, followed by sales growth. SMEs engaged in detailed strategic planning are more likely to use formal capital budgeting techniques, including the net present value method, which is consistent with maximizing the company's value. Perceived profitability and success in achieving organizational objectives were positively associated with planning detail, suggesting that strategic planning is a key component improving performance. Lyles et al., (1993) developed an understanding of the benefits formal planning provides in the management of the firm. They indicate that as small business owners adopt more formal planning processes, there is a significant increase in the thoroughness of their decision process, the breadth of strategic options emphasized in their business activity, and their overall performance as measured by growth in sales. Brinckmann et al., (2010), show that business planning promises greater returns for the average small firm than for the new small firm. Their study indicates that the cultural context of the organizations significantly moderates the business planning-performance relationship. Further, they show that both the output of business planning (written planning) and the process of business planning (planning meetings, market and scenario analysis, use of computers, portfolio analysis) augment firm performance. Accordingly, they reject the proposition that the value of business planning can be explained mainly by the formal-legitimizing or signaling function of written documentation. They concluded that both symbolic and the learning effects of business planning play a key role in augmenting small firm performance.

Large, complex firms commonly make extensive use of human capital programs-programs designed to affect workforce skill, motivation and performance. Further, such programs have been found, within a number of different settings, to positively affect organizational performance. Yet, human capital programs in the small business sector have traditionally been viewed as cost-prohibitive, limiting their use. But increasingly, SMEs are turning to HR outsourcing to provide these services. Klaas et al., (2010), in their study applied a diffusion of innovation perspective to determine why some SMEs adopt services while others do not. Their findings support the proposition that factors suggested by the rational account perspective would affect use of human capital programs at least among larger SMEs. They also found that emphasis on growth was associated with greater use of human capital programs, with this relationship being stronger among larger SMEs.

For more than three decades entrepreneurship researches have been interested in the relationship between human capital- including education, experience, knowledge, and skills- and success. A number of arguments suggest a positive relationship between human capital and success. Human capital increases owners' capabilities of discovering and exploiting business opportunities. Human capital helps owners to acquire other utilization resources such as financial and physical capital, and it assists in the accumulation of new knowledge and skills. However, uncertainty remains over the magnitude of this relationship as well as the circumstances under which human capital is more or less strongly associated with success (Unger et al., 2011). The study addresses the human capital-success relationship by systematically reviewing the literature and met analytically estimating the overall relationship between human capital variables and success.

Investments in human and social capital are widely believed to improve the performance of employees (Boselie et al., 2001). This is also the case for entrepreneurial performance (Van Praag, 2002). This is easy to understand since entrepreneurship is fundamental characteristic of modern knowledge-based economic activities. Bosma et al., (2004) researched the question: to what extent does investment in human and social capital, besides the widely believed determining effect of "talent", enhance entrepreneurial performance? The study's main findings show that the endowed level of talent of a small business founder is not the unique determinant of performance. Rather, investment in industry-specific and entrepreneurship-specific human and social capital contributes significantly to the explanation of the cross-sectional variance of the performance of small firm founders.

Entrepreneurial activity increases economic growth at national and local levels. Reynolds, Hay and Camp (1999) state, that a country's level of entrepreneurial activity explains significant proportion of the national economic growth rate. Henderson (2002) maintains that entrepreneurs have a significant impact upon local economies by fostering localized job creation, increasing wealth and income, and ultimately help to connect local economies to the larger global economy. In Israel small businesses are defined as of up to 50 employees with a turnover of up to \$ 5 Million with at least 90% private ownership. Medium size businesses are defined as up to 100 employees with a turnover of up to \$ 20 Million with at least 90% private ownership (Friedman, 2005). Data reveal that of all SME's 51% do not have any employees, 35% have one to four employees, 13% have five to 49 employees and only 1% of all SME's in Israel have between 50 and 100 employees and therefore are in the category of medium enterprises (Zucker, 2010). About 76% of all SME's are in the service sector. In comparison to the overall rate of businesses in the Israeli market the survival rate of SMEs is extremely low and consists of 30% at the end of 5 years. These findings are consistent with data on firm survival rates in most OECD countries where it is the smallest firms which are the least likely to last more than five years (Storey, 2002). The BDI found that the primary factors for SME survival in the first few years are marketing activities, short-term financing as well as human capital of the SME owner such as management skills and professional experience (BDI, 2006).

The purpose of our study is to investigate the impact of planning and control mechanisms on the success of service sector SME's. Figure 1 illustrates a common planning and control managing tools hierarchy.

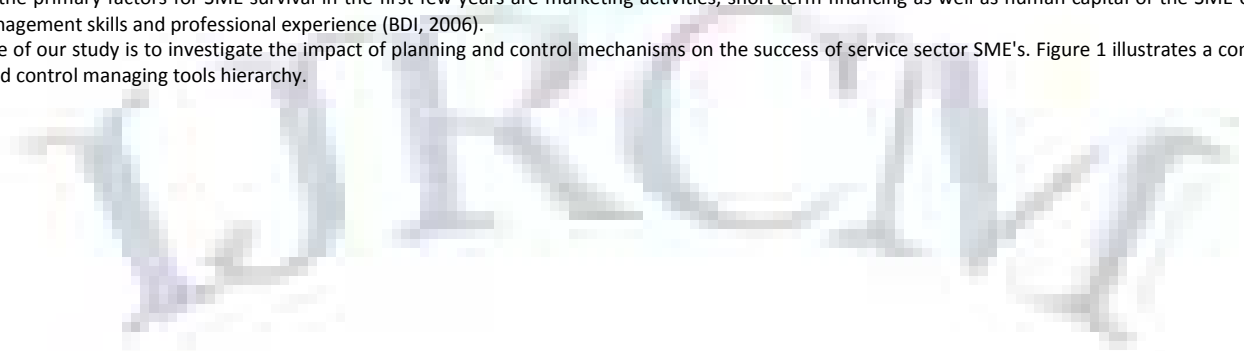
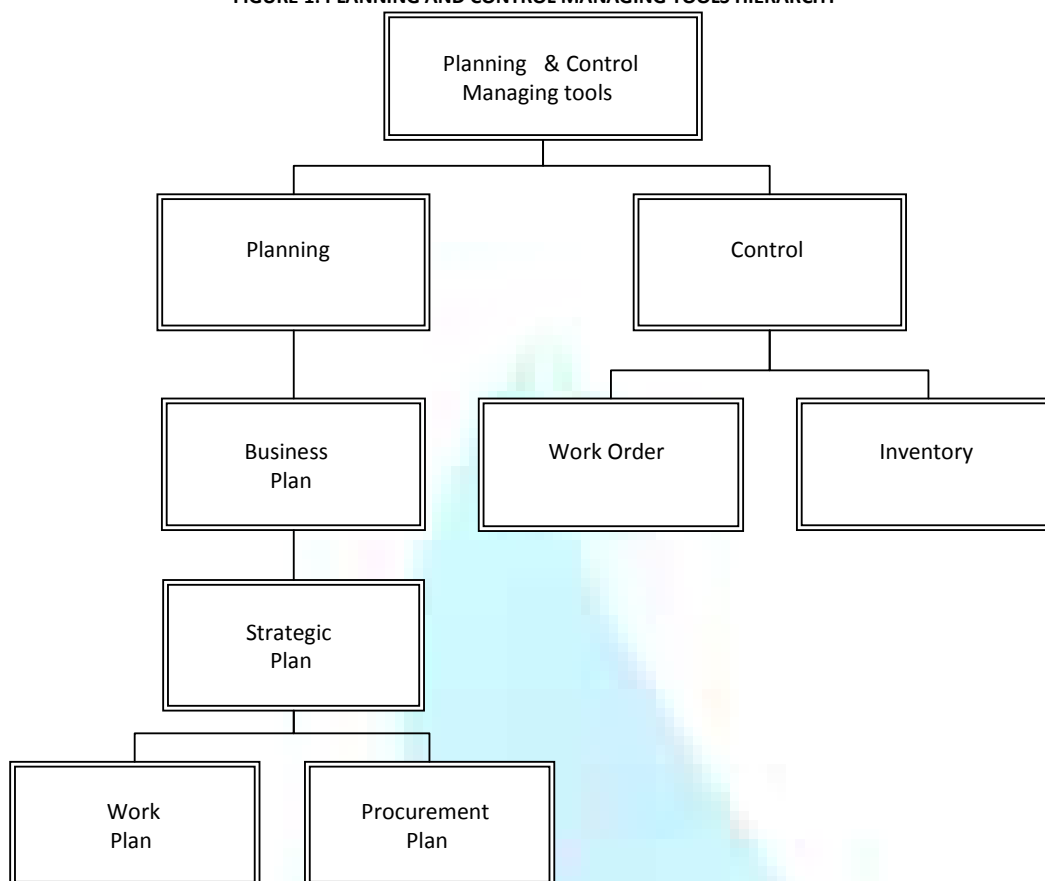




FIGURE 1: PLANNING AND CONTROL MANAGING TOOLS HIERARCHY



Planning and control managing tools are very common mechanisms supporting daily organizational operations. In regards to planning, it starts out with a business plan continuing with a related long range strategic plan. For daily management it is common to use work and procurement plans. Typical control mechanisms include work order and inventory.

The literature review revealed that in regards to planning and control mechanisms it is usually investigated in the framework of large organizations. To the best of our knowledge we could not find related research conducted in SMEs.

The following hypotheses were developed in order to explore the impact of planning and control mechanisms on service SMEs success:

H1: There is a correlation between planning and control and sales/employee.

H2: There is no correlation between planning and control mechanisms in SME's.

H3: Larger SME's implement planning mechanisms more than smaller ones.

H4: Larger SME's implement control systems more than smaller ones.

H5: There is a correlation between the owner's human capital and the usage of planning mechanisms.

H6: There is a correlation between the owner's human capital and the usage of control systems.

H7: There is a correlation between human capital of the owner and sales/employee.

## METHODS AND MATERIALS

### DATA COLLECTION

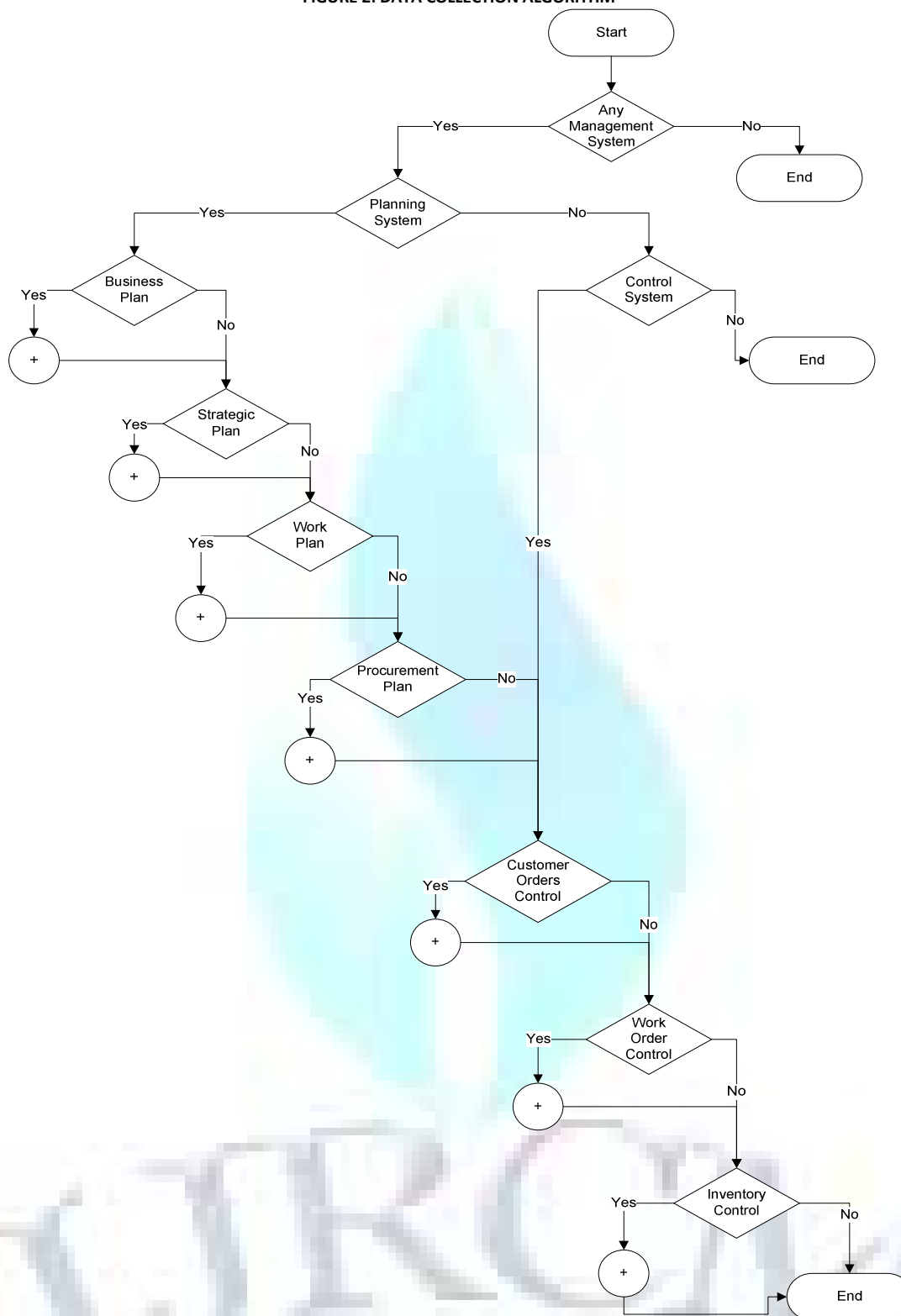
A comprehensive questionnaire was administered in 2010 to a sample of 294 service SME business owners Israel. They were approached via a snowball convenient sampling method. Using a comprehensive questionnaire we gathered demographic data on the business owners themselves such as age gender, family status, education, etc.; business data such as type, size in terms of number of employees, scope of investment and data on management control systems. The questionnaire was administered by interviewers in person.

Figure 2 illustrates the practical algorithm that was utilized in the process of data collection in the study.

### VARIABLES AND MEASURES

Variables in our study describe characteristics of entrepreneurs, their businesses and management control systems. Personal characteristics of the entrepreneurs' concern gender, age, family status, number of children, and human capital. Business characteristics concern size and type of business, and scope of investment. Management control system includes two separate dimensions: Planning and control. The magnitude of planning used by the business owners was determined by investigating presence or absence of five issues: business plan, strategic plan, computerized management package, periodic work plan, and procurement process. The magnitude of control used by the business owners was determined by investigating presence or absence of four issues: using control system, using inventory control system, work planning control, work order control.

FIGURE 2: DATA COLLECTION ALGORITHM



Human capital is a constructed variable calculated as the sum total of following items: degree of relevance of owners' professional education to their business (range from 1 – not at all relevant – to 4 – very relevant); formal education of business owner (1 = up to 12 school years, 2 = 12 – 15 school years, 3 = more than 15 school years of formal education); occupational status of business owner prior to start-up (1 = unemployed, 2 = employed, 3 = self-employed) and management experience (1 = no, 2 = yes). Thus, the human capital constructs in our study ranges from 4 (lowest) to 12 (highest).

The range of magnitude of planning is from 0 (none of the items are present in a given business) to 5 (all of the items are present in a given business). The range of magnitude of control is from 0 (none of the items are present in a given business) to 4 (all of the items are present in a given business).

The dependent variable of our study is constructed as the ratio of sales (in NIS) and number of employees (Ulrich, 1999).

#### SAMPLE CHARACTERISTICS

About 73 % of the sample population is male and nearly 80% are married. Their mean age is 40 years ranging from 22 to 78. Table 1 depicts the ingredients business owners' human capital. The mean of the calculated human capital constructed variable is 7.9 ranging from 4 to 12 with a standard deviation of 1.76.

The distribution of business' types in our sample is comparable with the distribution of types of SME's in Israel (BDI, 2006). Figure 3 depicts the distribution of size of businesses in our sample in terms number of employees.

FIGURE 3: BUSINESS TYPES INVOLVED IN STUDY

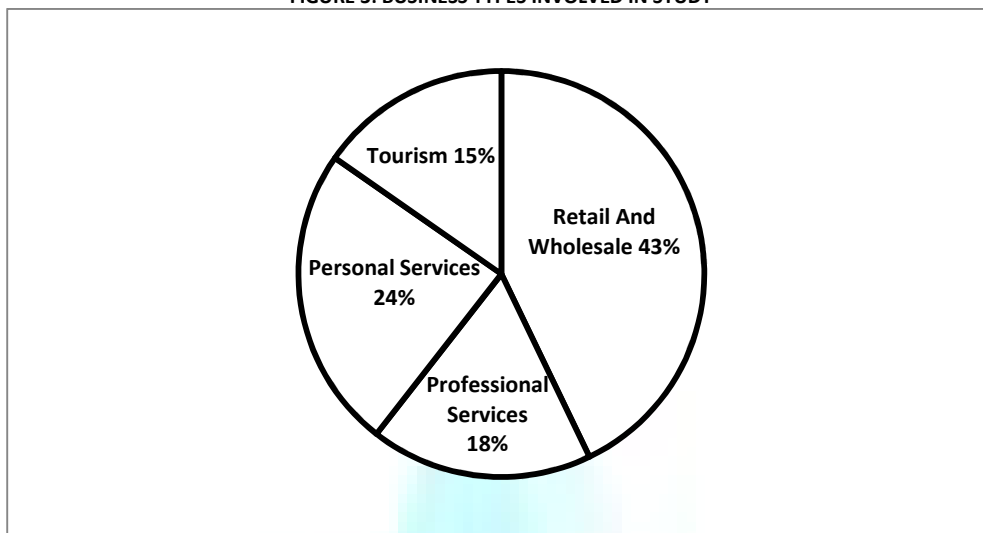


Figure 4 presents the Pareto analysis of business size intervals (number of employees).

FIGURE 4: DISTRIBUTION OF SIZE OF BUSINESSES INVOLVED IN THE STUDY

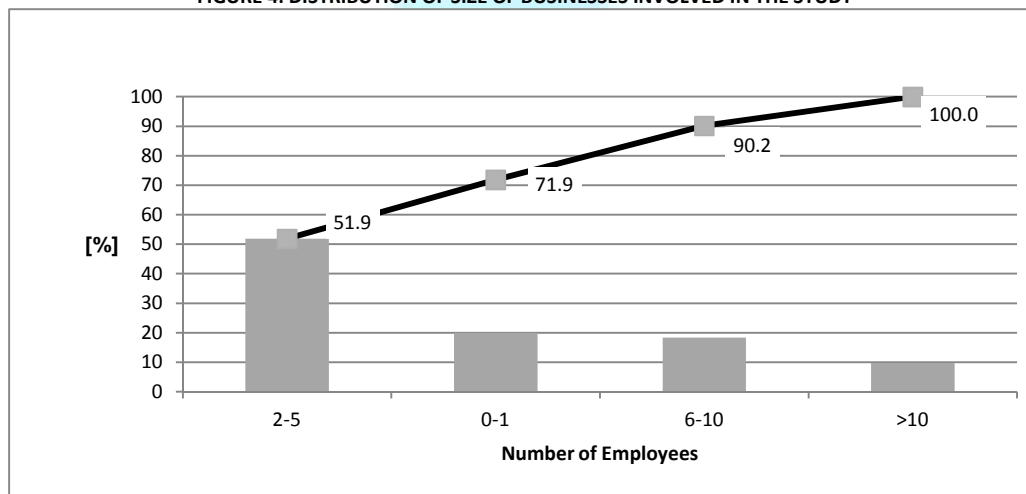


TABLE 1: HUMAN CAPITAL INGREDIENTS - FREQUENCIES OF CATEGORICAL VARIABLES

Category	Frequency	Percent
Formal education		
up to 12 years	181	61.6
13 – 15 years	66	22.4
15 + years	47	16.0
Total	294	100
Work experience prior to start-up		
Yes	150	51.0
No	141	48.0
Total	294	100
Occupational status prior to start-up		
self-employed	58	19.7
employed	220	74.8
unemployed	16	5.4
Total	294	100
Relevance of professional knowledge to business		
Not at all relevant	63	21.4
Not really relevant	54	18.4
To a certain degree relevant	82	27.9
Very much relevant	94	32.0
Total	294	100

The data reveal that about half of the businesses in our study employ between 2 and 5 workers and only about 10% have more than 10 employees. The mean number of employees is 5.3 ranging from 0 employees to 50 with a standard deviation of 6.59. Business size correlates significantly with scope of investment at

start-up (Pearsons .429,  $p < .000$ ). Owners of larger businesses invested more capital at start up. The mean business age is 7.9 years ranging from 1 to 36 years with a standard deviation of 6.8.

Table 2 reveals the descriptive data of the dependent variable (sales per employee) and the constructed variables planning and control.

TABLE 2: DESCRIPTIVE DATA OF VARIABLES

	N	Mean	Range	Std. Deviation
Sales per employee	274	100302.78 NIS	10,000 - 1 Mill. NIS	99087 NIS
Planning mechanisms	294	2.15	0 - 5	1.64
Control mechanisms	290	1.98	0 - 4	0.86

## RESULTS

Table 3 depicts the correlations between the variables of our study. Observing the correlations it should be noted that neither planning nor control mechanisms correlate with the dependent variable of our study. Furthermore, owners of larger businesses do not necessarily rate higher on human capital. Table 4 depicts the results of Anova analysis comparing organizations with different sizes as to the implementation of planning and control mechanisms.

TABLE 3: CORRELATIONS BETWEEN VARIABLES

	Sales per employee	Human Capital	Planning Mechanisms	Control Mechanism	Size of Business
Sales per employee	-				
Human Capital	.213** .000 (276)	-			
Planning Mechanisms	ns	.230** .000 (291)	-		
Control Mechanism	ns	.131* .027 (287)	.271** .000 (291)	-	
Size of Business	-.124* .039 (278)	ns	.343** .000 (294)	.268** .000 (290)	-

The results of the Anova test reveal significant differences between the size groups of organizations and the use of planning and control mechanisms. Scheffe's post hoc tests indicate that for planning, control and planning and control those businesses employing more than 11 workers implement all mechanisms significantly more than organizations of smaller size.

TABLE 4: ANOVA ANALYSIS COMPARING ORGANIZATIONS WITH DIFFERENT SIZES

	N	Mean	Std.Deviation	Range	F (sig)
Planning					
0 – 1 employees	59	1.54	1.57	0-5	14.57 (.000)
2 – 5 employees	153	2.07	1.57	0-5	
6 – 10 employees	54	2.18	1.56	0-5	
11+ employees	28	3.85	1.20	1-5	
Total	294	2.15	1.64	0-5	
Control					
0 – 1 employees	58	2.15	0.83	0-4	10.22 (.000)
2 – 5 employees	152	2.07	0.93	0-4	
6 – 10 employees	52	2.05	0.84	0-4	
11+ employees	28	3.07	0.85	2-4	
Total	290	2.18	0.93	0-4	
Planning and control					
0 – 1 employees	58	3.65	1.98	0-7	19.22 (.000)
2 – 5 employees	152	4.14	1.97	0-8	
6 – 10 employees	52	4.23	1.91	0-8	
11+ employees	28	6.92	1.86	3-9	
Total	290	4.33	2.13	0-9	

Figure 5 illustrates two clusters of organizations characterized by the number of planning and control mechanisms and the number of employees. Note that each data point in the clusters may represent a group of organizations.

FIGURE 5: CORRELATION BETWEEN FIRM SIZE AND IMPLEMENTATION OF PLANNING AND CONTROL MECHANISMS (PCMs)



The clusters presented in figure 5 demonstrate the study findings showing positive relationships between business size and the number of planning and control management mechanisms in service sector organizations. It may be observed that organizations with up to 15 employees have up to four planning and control management mechanisms while organizations with above 15 employees have five to eight planning and control management mechanisms.

## DISCUSSION

Table 5 summarizes the study findings for the hypotheses investigated.

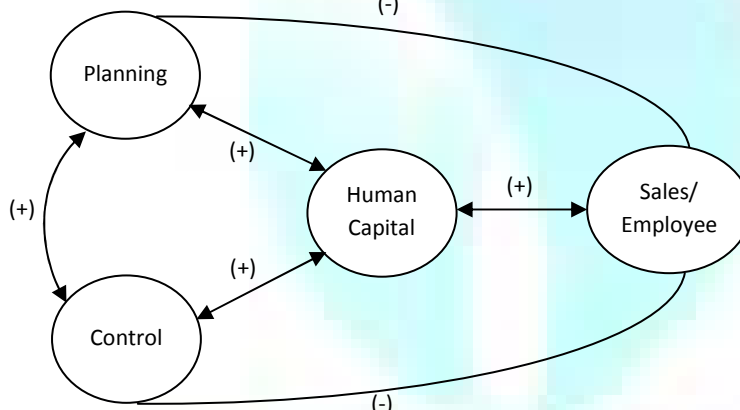
TABLE 5: SUMMARY OF HYPOTHESES TESTING RESULTS

Hypotheses	Test	Results	Accepted/Rejected
H1: There is a correlation between planning and control and sales/employee	Pearson's correlation	ns	Rejected
H2: There is no correlation between planning and control mechanisms in SME's	Pearson's correlation	.271** .000 (291)	Rejected
H3: Larger SME's implement planning mechanisms more than smaller ones	Anova	F = 14.572 Sig.= .000	Accepted
H4: Larger SME's implement control systems more than smaller ones	Anova	F = 10.220 Sig.= .000	Accepted
H5: There is a correlation between the owner's human capital and the usage of planning mechanisms	Pearson's correlation	.230** .000 (291)	Accepted
H6: There is a correlation between the owner's human capital and the usage of control systems	Pearson's correlation	.131* .027 (287)	Accepted
H7: There is a correlation between human capital of the owner and sales/employee	Pearson's correlation	.213** .000 (276)	Accepted

It should be noted that five out of seven hypotheses were accepted.

Figure 6 depicts the interesting and somehow unexpected importance of human capital and the fact that it is a mediating variable creating an indirect connection between planning, control and business performance in terms of sales per employee.

FIGURE 6: HUMAN CAPITALS AS MEDIATING VARIABLE  
(-)



Further studies should be conducted to elaborate the interrelationships between the usage of planning and control management mechanisms and business performance in terms of sales per employee.

## SUMMARY AND CONCLUSIONS

Planning and control systems are management mechanisms supporting daily organizational work by developing work plans and defining the monitoring and feedback processes and tools to verify the level of achievement. SMEs usually cannot afford to establish and manage extensive MCS packages mainly due to the lack of formal management background and experienced professionals (human capital) to operate these MCS systems. MCS are costly and time-consuming to install and to operate. As a consequence, SMEs are likely to choose their first set of MCS very selectively. MCS in SMEs differ from those confronted by mature firms for three reasons. First, mature companies usually have an extensive amount of formal systems already in place. Second, the first MCS introduced provide a foundation for the future development of MCS in the firm (Davila 2005). In this respect, while the main concern in a mature company will be how to integrate new MCS with the existing ones, a young firm must consider how the first MCS will affect the choice of future MCS. Third, SMEs utilize informal control systems more intensely than do mature firms (Cardinal et al. 2004; Moores and Yuen 2001) and, thus, they might decide to invest only in those formal MCS that liberate managers from routine operations and allow them to informally focus on the firm's strategy. Investments in human capital are widely believed to improve the performance of employees (Boselie et al., 2001). This is also the case for entrepreneurial performance (Van Praag, 2002).

Our study findings support previous research. We did not find any correlation between planning and control and sales per employee (the measurement for performance/SME success). Our research findings indicate that larger businesses in the SME service sector implement planning systems more than smaller businesses. The same accounts the implementation of control systems: Larger SMEs implement control systems more than smaller ones. These findings comply with the fact that small organizations usually cannot afford the investment needed to establish these systems. Furthermore, findings indicate a positive correlation between the business owner's human capital level and the usage of planning or control systems. In addition, a positive correlation was found between human capital level and the success measure sales per employee.

It is interesting to mention that we also found an indirect positive correlation between planning and control and business success via the human capital variable. No direct correlation was found between implementing either planning or control systems and SME success. The impact of the business owner's human capital



level in SMEs is more dominant and important than in larger organizations. This can be explained by the diversity of the human capital level (see table 1) where in larger organizations no such diversity can be expected.

The study investigated the impact of planning and control mechanisms on success of service SMEs in Israel. To our best knowledge there is no evidence in the scientific literature about studies investigating the issue of management control systems in SMEs. Therefore, a set of hypotheses was developed to explore the extent of implementing planning and control systems and its impact on business performance in small organizations. We thought that this research subject is crucial since the high failure rate of SMEs in general and in Israel in particular.

Following the research findings it is recommended that SMEs should invest in relevant human capital. Both international and Israeli studies highlight the importance of the investment in human capital as a key issue motivating business owners to implement planning and control mechanism thus improving business performance. Further research should elaborate the fact that we did not find in our study a direct correlation between implementing planning and control management mechanisms and business success.

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## CHALLENGES FOR SMALL AND MEDIUM ENTERPRISES IN INFORMATION TECHNOLOGY IN THE CITY OF BANGALORE, INDIA

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### ABSTRACT

*The paper analyzes the state of small and medium enterprises (SME) engaged in Information Technology industry in the city of Bangalore in India. It studies the past and present of this industrial segment and tries to predict the future prospects of this industry. The objective of this research is to analyze the performance of small and medium enterprises engaged in Information Technology industry and to evaluate available opportunities and challenges for them in India. The literature review describes the overall Indian economy and factors affecting its growth whether positively or negatively. For this purpose of research a qualitative research methodology has been chosen. The researcher has taken interviews with managers and entrepreneurs in order to understand and satisfy the aims and objectives of this research. The results from the interviews have been discussed and analyzed by dividing them into various themes based on the literature review. The study concludes by discussing the limitations and recommendations.*

### KEYWORDS

Small and Medium enterprises, Information Technology, Opportunities, Challenges, Qualitative Research.

### INTRODUCTION

 Small and Medium Sized Enterprises (SME) play an important role in the economic development of a country. It is estimated that half to two-third of businesses all over the world are SMEs. They comprise a widely divergent spectrum of establishments, engaged in economic activities ranging from micro and rural enterprise to modern industrial units using sophisticated technologies. Such enterprises exist in the form of factories, workshops, trading and service organizations. Ownership patterns range from proprietorship and partnership to companies and co-operatives. Small and Medium Enterprises (SMEs) are today recognized as a priority in almost all countries. Several theories elaborate on connection between information technology, economic development and social change. Almost all agree on the importance of information and communication technology adoption in SME, while the importance of SME as engines to economic growth is well acknowledged worldwide.

Information technology had a great impact in all aspects of life and the global economy is currently undergoing fundamental transformation. Information technology has very real impact in most of industries and in all aspects of economy, while businesses and enterprises continue to undergo considerable changes. Usage of these technologies is revolutionizing the rules of business, resulting in structural transformation of enterprises. Modern businesses are not possible without help of information technology, which is having a significant impact on the operations of Small and Medium Sized Enterprises (SME) and it is claimed to be essential for the survival and growth of economies in general.

Bangalore, a city of nearly five million people, has some of India's most advanced engineering and electronic industries. Bangalore has a dense network of large and small firms using advanced technologies, and abundant skilled labor. The many small engineering and electronic firms depend mainly on large public and private sector factories for orders, but some of them market their own products. Increasingly, these small firms are using CNCs (computer numerically controlled machine tools) and CAD (computer-aided design). If they lack some of the necessary machines and skills, they put the work out to other small firms and consultancies. It is also seen that companies are moving towards a less hierarchical model, where smaller firms are no longer ancillaries making components and doing job work to the large firm's designs, but interdependent firms supplying markets which the large firms do not reach. The challenge here is can smaller firms work together to develop their own products, and compete successfully with large firms on national and foreign markets, creating faster economic growth and more employment than big firms alone could provide?

### BACKGROUND AND PROBLEM STATEMENT

The purpose of this study is to analyze the past present and future of Indian SMEs concentrating on Information Technology. The researcher intends to study the performance of these SMEs and bring out available opportunities and challenges for them in India.

The researcher seeks to answer the following four research questions:

1. To identify, analyze and evaluate performance of SMEs engaged in IT industry in India from past to present.
2. To analyze opportunities available in this industry in India.
3. To analyze challenges in this industry in India
4. To study the future prospects of IT manufacturing SMEs.

### REVIEW OF LITERATURE

According to Reserve Bank of India (2006), "Small and Medium Enterprises can be defined as investments ranging from Rs 2.5 million to Rs 10 million and manpower ranging from 25 persons to 400 persons. Enterprises with capital upto Rs 10 million are treated as small scale industries (SSIs) and those with capital over Rs 10 million and upto 100 million as medium enterprises."

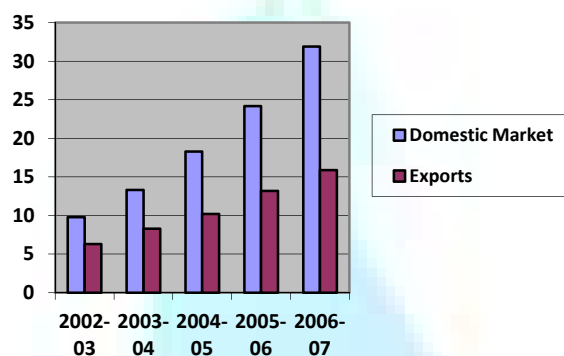
Various other definitions have also been proposed by the central government from time to time to enhance the competitiveness and sustainability. According to a recent revision of the SME act to Micro, Small and Medium Enterprises (MSME) Development Act 2006 firms will now be categorized as micro small and medium units. Those enterprises that are engaged in production will be called micro if the investment in plant and machinery does not exceed 2.5 million rupees. Small enterprises will henceforth be the units with investment in plant and machinery in the range of 2.5 million rupees to 50 million rupees and medium enterprises with an investment of at least 50 million but not exceeding 100 million rupees.

According to Venkataramanaiah and Parashar (2007) Indian SMEs were supposed to be hit hardest by the opening of the economy in 1990 because they were not expected to withstand the onslaught of the big Multinationals. However, according to Business World 2005, SMEs are outperforming the big corporation by huge margins.

### INFORMATION TECHNOLOGY INDUSTRY IN INDIA

The IT/ITES industry is by far the biggest and the most prominent service industry in India. It currently accounts for almost 7% of India's GDP. There are more than 100 major foreign companies and a larger and a more diverse group of Indian companies ranging from large organizations with global operations to small companies focusing on exports or the domestic markets. The industry has recorded a phenomenal growth in terms of revenues and employment generation over the past 5 years as shown in the figure below. The domestic and export revenues increased from USD 15 Billion in 2002-03 to USD 50 Billion in 2006-07. Interestingly over the years the domestic market (top bar) is providing more revenues than the exports. (bottom bar).

FIGURE 1: IT/ITES SECTOR REVENUE 2002-2007 IN USD



Source: NASSCOM

Software and IT enabled services have emerged as a niche sector for India. The Information technology industry in India has gained a brand identity as a knowledge economy due to its IT and ITES sector. The IT-ITES industry has two major components: IT Services and business process outsourcing (BPO). The growth in the service sector in India has been led by the IT-ITES sector, contributing substantially to increase in GDP, employment, and exports. The sector has increased its contribution to India's GDP from 6.1% in 2009-10 to 6.4% in 2010-11. According to NASSCOM, the IT-BPO sector in India aggregated revenues of US\$88.1 billion in FY2011. The top seven cities that account for about 90% of this sectors exports are Bangalore, Chennai, Hyderabad, Mumbai, Pune, Delhi, Kolkata, Coimbatore and Kochi. Export dominate the IT-ITES industry, and constitute about 77% of the total industry revenue. Though the IT-ITES sector is export driven, the domestic market is also significant with a robust revenue growth.

### SIZE OF THE INDUSTRY: PHYSICAL SPACE

It is estimated that the IT/ITES sector employ about 2.3 million people directly and 6.5 million people indirectly. In terms of class A space i.e. premier commercial space the industry has registered Compound Annual Growth Rate (CAGR) of 52% over past 6 years. IT/ITES space grew from 35 million square feet in 2001 to 85 million square feet by end of 2007.

### INDUSTRY CONCENTRATION

It is largely concentrated in a few cities of India such as Bangalore, Hyderabad, Chennai, Pune, Kolkata and National Capital Region (NCR) that comprises of New Delhi, Gurgaon, and Noida. Maximum number of software companies are in Bangalore now Bengaluru (1700) followed by NCR (1400), Hyderabad (1060). Chennai, Pune, Mumbai and Kolkata follow next.

### SMALL AND MEDIUM ENTERPRISES IN INFORMATION TECHNOLOGY

In India Small and Medium Enterprises are organized in clusters. The importance of small and medium enterprises in any economy cannot be overlooked as they form a major chunk in the economic activity of nations. They play a key role in the industrialization of a developing country like India. They have unique advantages due to their size; they have comparatively a high labor-capital ratio, they need a shorter gestation period, they focus on relatively smaller markets, they need lower investments, they ensure a more equitable distribution of national income, they facilitate an effective mobilization of resources of capital and skills which might otherwise remain unutilized and they stimulate the growth of industrial entrepreneurship.

According to a UNIDO report, support for SMEs is generally based on 3 assumptions. First is that it sustains a broad and diversified private sector and creates employment and thus benefits the country as a whole, second a strong SME sector will not emerge without support from the state but they suffer disadvantage in the markets because of their size, third the programs aimed at smallest enterprises have been justified more in terms of their welfare impact than their economic efficiency.

Industry clusters are groups of competing, collaborating and interdependent businesses working in a common industry and concentrated in a geographic region. Clusters improve competitiveness, which results in improved productivity by improved access to specialized suppliers, skills and information. Innovation is given more importance as the need for improvement in the process of production is highlighted and once established, clusters will grow as new firms and new suppliers will enter the system which will have the cascading effect towards a strong and competitive cluster.

### CHALLENGES CHARACTERISING THE SMEs

1. They are unable to capture market opportunities which require large production facilities and thus cannot achieve economies of scale, homogenous standards and regular supply.
2. Experiencing difficulties in purchase of inputs such as raw materials, machinery and equipments, finance, consulting services, new technology, highly skilled labor etc.
3. Small size hinders the internationalization of functions such as market research, market intelligence, supply chain, technology innovation, training and division of labor that impedes productivity.
4. Emphasis to preserve narrow profit margins makes the SMEs myopic about the innovative improvements to their product and processes and to capture new markets.

5. Unable to compete with big players in terms of product quality, range of products, marketing abilities and cost.
6. Absence of a wide range of financing and other services that is available to raise money and sustain the business.
7. Absence of infrastructure, quality of labor, business acumen and limited options/opportunities to widen the business.
8. Poor IT and knowledge infrastructure

To overcome all these difficulties, Indian SMEs deserve all the policy support the Government can offer.

What they need is not protection but institutional support to fund modernization and technology up gradation, infrastructure support and adequate working capital finance. Also they must have professional inputs and knowledge about various happenings in their own industries in and around the country. This brings in the concept of SME networks and clusters that stimulate innovative and competitive SMEs.

As far as SME clusters are concerned every SME should know that the other SME in the same cluster is also vying for the same customer, also going to use the same support structures and also suffers the same shortcomings.

There are always some comparative advantages for the SMEs in the cluster, as the cluster participants can either be allied industries or suppliers or any other stakeholder or even rivals. Extending the theory of comparative advantage of David Ricardo to SME clusters, even though all SMEs inside the cluster are having the common facilities and problems, each unit is unique with its own characteristic features that determine its productivity. This could be in terms of organizational culture, leadership, quality of work life, labor quality, internal environment and processes, adaptation to change and new technology among others.

Factors like economic slowdown especially in the US and ever-increasing internal costs have impacted the margins of small and medium IT players.

### INFORMATION TECHNOLOGY SME CHARACTERISTICS

1. Thriving on single contract or client
2. More in numbers through contribution to the IT industry's revenue bases is very low.
3. Focus on outsourcing led growth.
4. Missing entrepreneurial mindset.
5. Desire to go global but lack the vision or/and adequate exposure.
6. Go alone approach
7. Mostly followers of the successful models set forth by the likes of Infosys, Wipro etc.

Startups	Manpower strength: Very less	Acts as a sub-vendor to another sub-vendor. No direct interaction with the end client	Very small capital. Do not even qualify for most of VC funds	Mostly resellers
Strugglers	Manpower strength: Medium	Acts as a sub-vendor to the main vendor. But no direct interaction with the end client.	Moderate capital qualifies for some VC funds. Yet most of the VC's ignore them	Service provider/Reseller
Survivors	Manpower strength: Medium to high	May have direct access/dealing with the end user. Multiple client base	Beneficiary of most VC funds and policies implemented for SMEs	Customized service provider/Integrator/Reseller/Product companies, Global presence/Operations

### EMERGENCE OF IT SMEs

The first generation of Indian IT entrepreneurs were individuals who had worked for MNCs in India or abroad at some point of time in their career, and who were not only subjected to international exposure but also to the cultivation of entrepreneurship, leading many to start their own enterprises. The trend was further intensified as IT veterans preferred to establish their own set ups based on their management expertise, experience, and knowledge of cutting-edge technology — mostly in the small-scale industry (SSI) or SME category. Booming domestic and export markets, growing opportunities, and the lure of being able to stay close to family are some of the major factors that contributed to this trend, which ultimately resulted in the establishment of SMEs in the IT sector since 2000. Financial incentives put in place in 1999 — such as a 10-year income tax benefit for small units in the IT sector — enabled many Indian IT SMEs to survive the initial battles against bigger players.

There is huge opportunity for IT SMEs in the form of domestic customers and SMEs from other industries. The Indian domestic market has been growing steadily over the last 2 years, which offers tremendous opportunities to Indian IT SME companies to explore, as Indian companies are increasingly adopting IT to gain efficiencies in view of globalization. Indian domestic IT services and software products market size was estimated at US\$ 7.2 billion in 2007. Hence, Indian players have a choice — to source their IT requirements either from large MNCs or from local vendors, the latter of which a majority can be categorized as IT SME.

### SOFTWARE TECHNOLOGY PARKS OF INDIA, STPI

The STPI is an autonomous society set up by the Department of Communication and Information Technology, Government of India in 1991 with the main objective of promoting software exports from the country. The main services rendered by STPI for the software-exporting community include statutory services, data communications services, and incubation facilities. Currently, there are 47 centers of STPI across the country. STPI has also played a developmental role in the promotion of software exports with a special focus on SMEs and start-ups. IT-ITeS exports from STPs have grown at CAGR of 37.8 per cent during FY03 to FY07.

On-site development was the only mode of software exports, which was very expensive, and adopted mainly by big players. However, the scenario has changed with the introduction of high-speed data communication (HSDC) facilities by the STPI. The setting up of HSDC facilities enhanced off-shore development of software, and was indirectly responsible for the entry of many SMEs into this sector. Today, more than 80 per cent STPI members units are SMEs.

The software technology park (STP) scheme is a 100-per-cent export-oriented scheme for the development and export of computer software, combining the concepts of totally export-oriented units (EOUs) and export processing zones (EPZs). It has been quite successful and exports from STP units have grown manifold over the years. Today, exports from STPI-registered units account for more than 95 per cent of total software exports from the country.

Apart from providing statutory and fiscal support, STPI centres conduct seminars in technology as well as on policy matters. They are also involved in conducting interactions with the industry, especially for SMEs, through various industry associations; participation in road shows in domestic and foreign markets; and arranging interactions between venture capitalists and potential SMEs. The SME segment relies heavily on the STPI ecosystem that has gradually nurtured SMEs from inception to becoming independent, successful units.

### OPPORTUNITIES FOR IT SME

In view of globalization trends, a booming economy and the emergence of India as an IT outsourcing hub, the IT industry seems to be the fastest growing sector in the country over the last couple of years, and SMEs play a significant role in driving the Indian IT industry to new heights by sustaining the current growth. The SME segment would target niche verticals such as transportation, education, utilities, and e-Governance, while in terms of the technology segment; SMEs can target embedded systems, GIS, and web services. In addition, there is tremendous potential in the products and component segment. IT associations need to foster more partnerships and alliances, and encourage cooperative relationships between big and small players. Associations should try to build a healthy business environmental framework that can meet market demands and help India retain its competitive edge. To sum up, Indian software SMEs have the



potential to compete in the global arena and to play a significant role in promoting both regional and national economic development. However, in order to enhance their business opportunities, SMEs will need to enhance their technological and organizational capabilities to develop global competitiveness. There is much scope for public policy to support these small firms' efforts to build competitiveness, in terms of developing technical and marketing skills, and fostering technological and innovation capabilities.

## RESEARCH METHODOLOGY

Considering the research topic and aim of the investigation a Qualitative approach has been undertaken. One of the main causes for adopting qualitative research is to answer the research question in depth and to gather the information from managers with the help of interviews. The main tool used for data collection was interviews.

## DATA ANALYSES

The data gathered by the researcher while conducting the interviews of owners and managers of various Information Technology SMEs in India. Due to confidentiality issues the names of the respondents are not being disclosed and will be referred to as respondents. The researcher has conducted a 45 minute open ended semi structured interview to get inside perspective of the practical issues and the solutions relating to this industry.

Most of the respondents agreed with the fact that the scope and future prospects of the industry is very bright and through proper planning the SMEs can become more successful. Everybody agreed to the fact that the Government is drafting policies to promote the growth of SMEs but also added that it is not sufficient. When probed there was a unanimous feeling of want of a more conducive environment and policies from the Government.

There was a feeling of shortage of capital and majority of the respondents expressed that it is difficult for them to secure loans from financial institutions at competitive interest rates.

Most of the respondents agreed that they did not spend much on marketing and marketing expenses as such for their organization was minimal. On the issue of clusters and informal agreements, every single SME overwhelmingly supported it. One SME went to the extent of quoting that the SMEs can't exist without being present in clusters. Due to small requirements of raw materials, cheap transportation, the units were pound to club or pool their resources and achieve the economies of scale.

## FINDINGS

- The researcher has found that although the Indian SME was expected to be doomed after the 1990 economic reforms, it is performing well and there are good future prospects of the industry.
- The performance of SMEs can be increased to a large extent by providing good regulatory environment and more government support.
- SMEs benefit to large extent from clusters and reap benefits from each other's support.
- The study shows that the external factors such as inter-firm co-operation and institutional support can play a key role in helping SMEs to build up the internal capabilities to compete in regional and global markets.
- Cost, quality and delivery time are the main pressures on the IT sector component.

## RECOMMENDATIONS

- In order to improve their competitiveness SMEs need to invest more in R&D activities.
- React to the needs of their customers, but also act as "industry leaders" encouraging "best practices"
- Provide marketing information and encourage marketing research.

## INTERVIEWS BY MANAGERS

The researcher has organized the data in 3 themes

- A. Winning Differentiators for SME
- B. Role of NASSCOM in IT SME
- C. Bright Outlook for Indian IT SMEs

### A. WINNING DIFFERENTIATORS FOR SME

In order to help SMEs make more revenues and to create a brand identity for them, there are a few suggestions which the researcher has summed up through interviews with managers working in IT SMEs. The researcher has termed these as Winning Differentiators.

#### 1. IT deployment

SMEs in India must invest in smart IT technologies. Simple inexpensive technologies have added to the success of small and medium IT Businesses. The mistake most IT SMEs do is ignoring IT deployment. The researcher would strongly recommend that every IT SME must also look at a phased scalable strategy. The downturn had a devastating impact on SMEs worldwide, and it has lowered the IT spending, but IT SME's must invest in next generation technologies like the Cloud, advanced CRM technologies and so on.

#### 2. PR Management Tips

IT SMEs in India must carefully manage their media stakeholders; they must map and manage them well. It is important to have a public relations plan. This can be press releases for a company product or a service, building thought leadership, IT Channel communications, just to name a few. Often this phase can seem daunting, but these activities will help the enterprise by enhancing their development step-by-step.

It is necessary that they classify the media stakeholder category and develop a communication strategy. Short term and long term goals need to be prepared. PR goals must be aligned with the Marketing goals. Most IT SMEs in India do standalone PR activities, forgetting to align them with the company's marketing goals.

#### 3. Social Media Management Techniques

In an era of increased interaction, every IT SME in India must invest time and resources in Social Media. Small and Medium Business owners should look beyond the brick and mortar and reach out to a bigger audience with the web. Establishing one's online presence is vital, whether it's by creating an interactive, regularly updated site or blog, or by building informative yet informal profiles on social networking sites like Face book or Twitter. Opening communication channels online will not only increase product awareness, it will also boost the SME's online presence.

IT SME should also promote their business online through attractive design and content on their website that would appeal to users and position their business and brand/product /services as a source of valuable knowledge.

#### 1. Bartering Techniques

This is an excellent tool to promote an SME's business and get others to use their product and services. The idea is to trade your product for advertising space or for another company's product or service. This is especially helpful when two companies on limited budgets can exchange their services. This can range from running bartering channel schemes to loyalty schemes. All of these unique techniques need to be monitored for efficacy.

#### 2. Identifying the right strategy

No single marketing effort works all the time for every business, so several marketing tactics need to be tried out and the approach needs to be varied. Marketing can be fun; a SME should take advantage of the thousands of opportunities available for communicating their value to customers. The selection of marketing activities cannot be done arbitrarily. The planning needs to be done carefully. Feedback must be obtained from customers.



**B. ROLE OF NASSCOM IN IT SME**

The role of Nasscom cannot be disregarded when it comes to growth in IT SME... Over the years, the industry association has emerged as a powerful platform for small and mid-sized companies, facilitating business and trade in software and services, and helping them in identifying newer opportunities. While one would say that NASSCOM became a consortium acting as an interface to the Indian software and BPO industry. NASSCOM has successfully created Brand India on a global platform.

One must look at the role of NASSCOM in building an eco-system for the product industry in India. The product development space in India is dominated by SMEs and startups. As per data, SMEs are expected to contribute \$700 billion to the GDP and even if 2-3 percent could be tapped by Indian product companies, it would still be a big number. Right now, the country has around 2,400 product firms, generating revenues to the tune of \$2 billion.

The reason why NASSCOM holds a special place in the SME segment is because it has time and again proved that changing times demand changing models of engagement – unlike several other industry bodies. NASSCOM's approach not only helped the association remain a lobbying platform alone, but has also enabled industry-government collaborations and propagated the use of IT to make the country more competitive – be it in software products or services.

**C. BRIGHT OUTLOOK FOR INDIAN IT SMEs**

The present times are worrisome for enterprises across the world especially due to the economic turbulence in the West. The most concerned are perhaps those IT firms whose business depends on outsourced work, mainly from the West.

In India, today there are a number of small and mid-sized firms that are engaged in such business and they are more commonly termed as BPOs, KPOs and LPOs. Given that such firms usually operate with limited funds and under tight margins, it is crucial for their smooth functioning to get regular projects from their clients. The recent developments in the global economic scenario have made them apprehend of a dip in business. However, if one takes a view of the Indian IT scenario today and going by its outlook for the coming years, it will be safe to say that domestic IT players, including SMEs, are likely to remain unscathed despite the present economic turmoil. In other words, it can be said that today the Indian IT sector is better prepared to combat such situations than they did when the world was hit by recession in 2008.

What primarily makes outsourcing based SMEs safe now is that they have grown smarter over these last 3 years. Most of them have realized the wisdom of diversifying business and extending business horizon to non-traditional markets. As a result, these IT players today have revenues flowing in from other channels and other countries, besides the major ones like the US, the UK and Australia. However, BPO firms continue to rely largely on these markets, especially the US. Forecasts predict the global BPO market is slated to grow in the coming years and the Indian BPO sector, along with those in China and Australia, is likely to play a key role in this. Therefore, SMEs in the BPO industry can as well put off their worries.

Also, with apex IT industry body NASSCOM projecting 16-18% growth of the Indian IT industry in the current financial year, SMEs in the sector have reasons to be upbeat. The expansion in the industry size also manifests that sectoral players as well as new entrepreneurs are confident of the growth in the Indian IT industry in the days to come.

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## ROLE OF MANAGEMENT INFORMATION SYSTEMS IN MANAGERIAL DECISION MAKING OF ORGANIZATIONS IN THE GLOBAL BUSINESS WORLD

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### ABSTRACT

*The present paper focuses on how information technology plays an imperative role to change the global business world. It also aims that how information systems help managers to cope with the changes. This paper is prepared mainly in the light of secondary information gathering, reviewing and analyzing the existing international literatures published in the relevant books, journals, magazines and websites. The study finds a clear picture that now-a-days decision making strongly depends on information systems. The study also identifies that MIS is one of the most important information systems applications from different information systems (executive support systems, decisions support systems, management information systems, office automation systems, knowledge work systems and transaction processing systems) that provide help to the manager for taking effective decision in an organization. In global environment, competitiveness is the most important factor that must be kept in mind to be successful. MIS can play an effective role in an organization for taking "right decisions at right time and right place" by analyzing the surrounding situations with the help of other information systems like ESS, DSS, and TPS in global competitive environment.*

### KEYWORDS

Management Information Systems, Information Technology, Organization, Competitive environment, Global business world.

### INTRODUCTION

The future is about technology, not about emotion. It is about how people think and feel in the digital world. How many times have people changed their minds about whether they will use a new technology or not (Dixon, 2004)? Pertinently, information technology is one of the important key factors for that future change and mostly on business world. With the passage of time, needs and wants and way of behaving of human beings have been changed. It is about a revolution that is making profound changes in human life. The changes are happening in all parts of society and in all parts of the world. Some of these are social and political and others are ecological. Some are evolutionary, others revolutionary (Islam and Haque, 2003). Though these changes are ordinary part of human life, it has superior impact on modern business world. With the change of time, technology (combination of information technology and communication technology) plays a crucial role in the change of business world. Today's business world is not more unknown with the concept of globalization. In global environment competitiveness is the most important factor that must be kept in mind to be successful. There is a proverb- "taking right decision at the time is the key to success". And in taking a particular decision, managers need information.

So it can be said that decision making is a process which depends on information system. This information system can be established either manually or by using computer. Effective decision making is the precondition of organizational success and it relies on efficient information systems. An efficient information system means information systems that reduce time, cost, complexity and data redundancy. To design an information system, system designer should consider the factors that may make a system efficient.

### OBJECTIVES OF THE STUDY

The main objective of the study is to identify and analyze the role of management information systems in managerial decision making of an organization. In connection with this main objective, the specific objectives are as follows:

- i) To define and elaborate managerial decision making process and information systems.
- ii) To identify the information system needs in an organization.
- iii) To show the interrelationship between information system and decision making process of an organization.

### METHODOLOGY OF THE STUDY

This paper is prepared mainly based on secondary information gathering, reviewing and analyzing the existing international literatures published in the relevant books, journals, magazines and websites. Researchers' personal observations at different times at different organizations have been taken into consideration for insight vision of the study. However, some of the managerial level employees of different well reputed organizations have been consulted through convenience sampling with a set of unstructured questionnaire related to information systems used in different organizations and impact of the systems on managerial decision making. Based on this information a final conclusion has been made which shows the interrelationship between management information system and managerial decision making.

## MANAGERIAL DECISION MAKING PROCESS

Decision making can be defined as the selection of a course of action from among alternatives. Decision making is an important part of an organization and success of any organization depends on its strategic decision. However, the managerial decision making process consists of some steps which are the followings:

1. *Developing premises:* Manager develops premises for the decision making process by identifying problems and opportunities.
2. *Identifying alternatives:* On the basis of the developing premises, decision maker develops available alternatives for making effective decision.
3. *Evaluating alternatives and choosing best alternatives:* Once appropriate alternatives have been found, the next step in planning is to evaluate them and select the one that will be the best contribution to the goal. There are various approaches available e.g. cost effectiveness analysis, marginal analysis etc.
4. *Decision implementation:* Lastly, the best alternative which is selected among the alternatives will be implemented by the organization.

## COMPONENTS OF AN INFORMATION SYSTEM

Information systems can be defined as an arrangement of people, data, process, information presentation and information technology that interact together to support day to day operations of business as well as support the problem solving and decision making needs of a management (Whitten, 2002). From this definition, it is clear that an information system has the following components:

- People
- Data
- Process
- Information presentation
- Information technology

So, information system is a set of interrelated components that retrieve, process, store, and distribute information to support operations, management and decision making activities of an organization.

Information systems develop for the purpose of solving business problems and helping to the people of business community (users). These people are important part of an information system.

*Data* are raw facts about the organization and its business transactions. Most data items have little meaning and use by themselves. Data are the observations, measurement and recording from the source where source are consisting of the physical activities and objects, which are relevant to the business. On the other hand *information* is data that has been refined and organized by processing and purposeful intelligence. Information systems present the information according to the needs of the decision maker. *Information technology* is a contemporary term that describes the combination of computer technology (hardware and software) with telecommunication technology (data, image, and voice networks).

## KINDS OF INFORMATION SYSTEM APPLICATIONS

In today's practical business world, different classes of information systems applications are available. Each class serves the needs of different types users. Important systems applications are the followings:

- Transaction Processing Systems
- Management Information Systems
- Decision Support Systems
- Expert Systems
- Office automation and work group.

### TRANSACTION PROCESSING SYSTEMS (TPS)

A transaction processing systems are information systems applications that capture and process data about business transaction (Whitten et al., 2002). Transaction processing systems process transactions in two basic ways: (i) Batch processing, where transaction data are accumulated over a period of time and processed periodically, and (ii) Real time processing also known as online processing, where data are processed immediately after a transaction occurred (O'Brien, 2003).

TPS takes transactions and events as input and produces detailed reports and summaries as output for operational level manager. The database of transactions stored in TPS is used to support management information systems. Individual TPS supports individual functional area.

### DECISION SUPPORT SYSTEMS (DSS)

It is an information system application that provides its users with decision-oriented information whenever decision-making situation arises. When it used by executive managers, is called executive information systems. DSS designed actually for unstructured decisions that can't be predicted. Decision support systems also help managers react quickly to changing needs (Alter S, 1980).

### EXPERT SYSTEMS (ES)

Expert systems are programmed decision making information systems that capture and reproduce the knowledge and expertise of an expert problem solver or decision maker. It is implemented with artificial intelligence that captures, stores, and provides access to the reasoning of the experts like human being.

### MANAGEMENT INFORMATION SYSTEMS (MIS)

MIS is an information system application that provides for management oriented reporting. These reports are usually generated on a predetermined schedule and appreciate pre-arranged format. It serves the management level of the organization with online access to the organization's current performance and historical records. MIS primarily serves the functions of planning, controlling, and decision making at the management level.

## BASIC CHARACTERISTICS OF MIS

MIS has some basic characteristics that are as follows:

- MIS supports structured and semi-structured decisions at the operational level and management control level i.e. mid level of management.
- MIS takes processed transaction data such as bills, orders, pay checks, and internal data as input from TPS and produce output as structured reports, materials requirements planning, production scheduling, sales forecasting etc.
- MIS generally aids in decision making using past and present internal data rather than external.
- MIS draws from different departments or functional area like production, marketing, finance, research and development.

## CATEGORIES OR LEVELS OF MIS

Management Information system has four categories or levels. There is a basic difference between the "Information System" and "Decision Making System" i.e. where the information system leaves off and the decision maker begins. The process of decision making consists of five activities (Mason and Swason, 1981).

1. Source – consisting of the physical activities and objects, which are relevant to the business.
2. Data – observation, measurement and recording of data from source.
3. Inference and prediction drawn from data
4. Values and choice – evaluation of inferences with regard to the values (objectives or goals) of the organization and choosing a course of action.
5. Action – taking of a course of action.

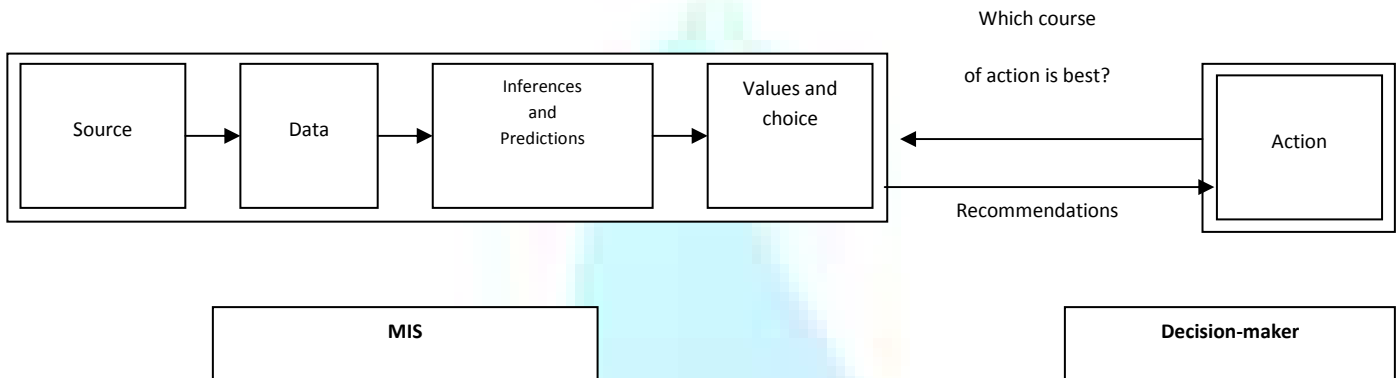
Again, MIS is of four categories (Mason, 1981). These are as follows:

- Databank information system.
- Predictive information system.
- Decision – making information system.
- Decision taking information system.

### DECISION MAKING MANAGEMENT INFORMATION SYSTEM

In the global business world, MIS plays very important role as it helps the decision maker to take an effective decision. Decision making management information system includes those in which the organization's value system and the criteria for choice are incorporated into the MIS itself. Thus it provides structured decision to the mid level managers and based on these information managers take action. (Masons, 1981).

FIGURE 1: MASON'S DECISION MAKING PROCESS THROUGH MIS



### LEVELS OF MANAGEMENT

Levels of management means the managerial hierarchy in an organization, typically three distinct levels: executive, middle and first line; usually portrayed as pyramid (Skinner and Ivancevich, 2004).

#### TOP MANAGEMENT

Top management is responsible for the overall management of an organization. These people are called executives. They establish operating and guide the organization's interactions with its environment. They actually take the decisions on non-programmer facts and those are strategic. Non-programmed decisions are used for unstructured, novel, and ill-defined situations of a nonrecurring nature. DSS and ESS help to the top level manager to take effective decisions.

#### MID-LEVEL MANAGEMENT

The middle level of the management hierarchy includes supervisors, college deans, project director, and regional sales coordinator. These managers receive the broad overall strategies, missions and objectives from executive level managers and translate them into specific action program. The middle level manager implements semi-structured decisions. They have taken routine decisions and taken strategic decisions collaboration with top executives. MIS directly provides semi-structure decisions and they aid to the mid level manager.

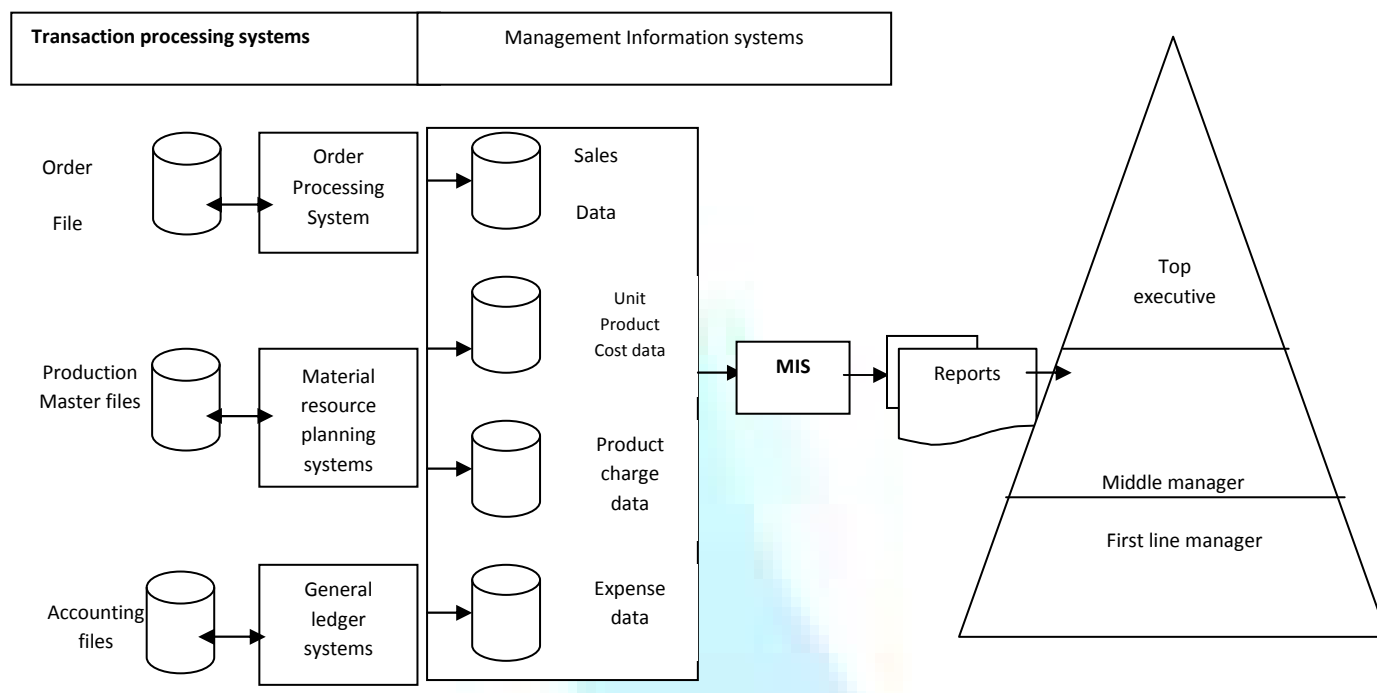
#### LOWER-LEVEL OR FIRST LINE MANAGEMENT

First line manager supervises employees and resources at the lowest levels of the organizational hierarchy. Most of their concerns with seeing that specific work assignments are carried out on time. They have taken structured decisions and taken help from their top. TPS aids to the first line manager by providing routine decisions.

### RELATIONSHIP BETWEEN MIS AND MANAGEMENT LEVELS

MIS is an information system application that serves 'Decision Making'- one of the important functions of management at the management levels of the organization by providing routine summary and exception reports. MIS actually provides routine information and exception reports to the mid level manager and mid level manager takes decision on the basis of those reports. Strategic decisions are made by top executives and DSS and ESS help to the executive level for making strategic decisions.

FIGURE 2: RELATIONSHIP BETWEEN MIS AND MANAGEMENT LEVELS



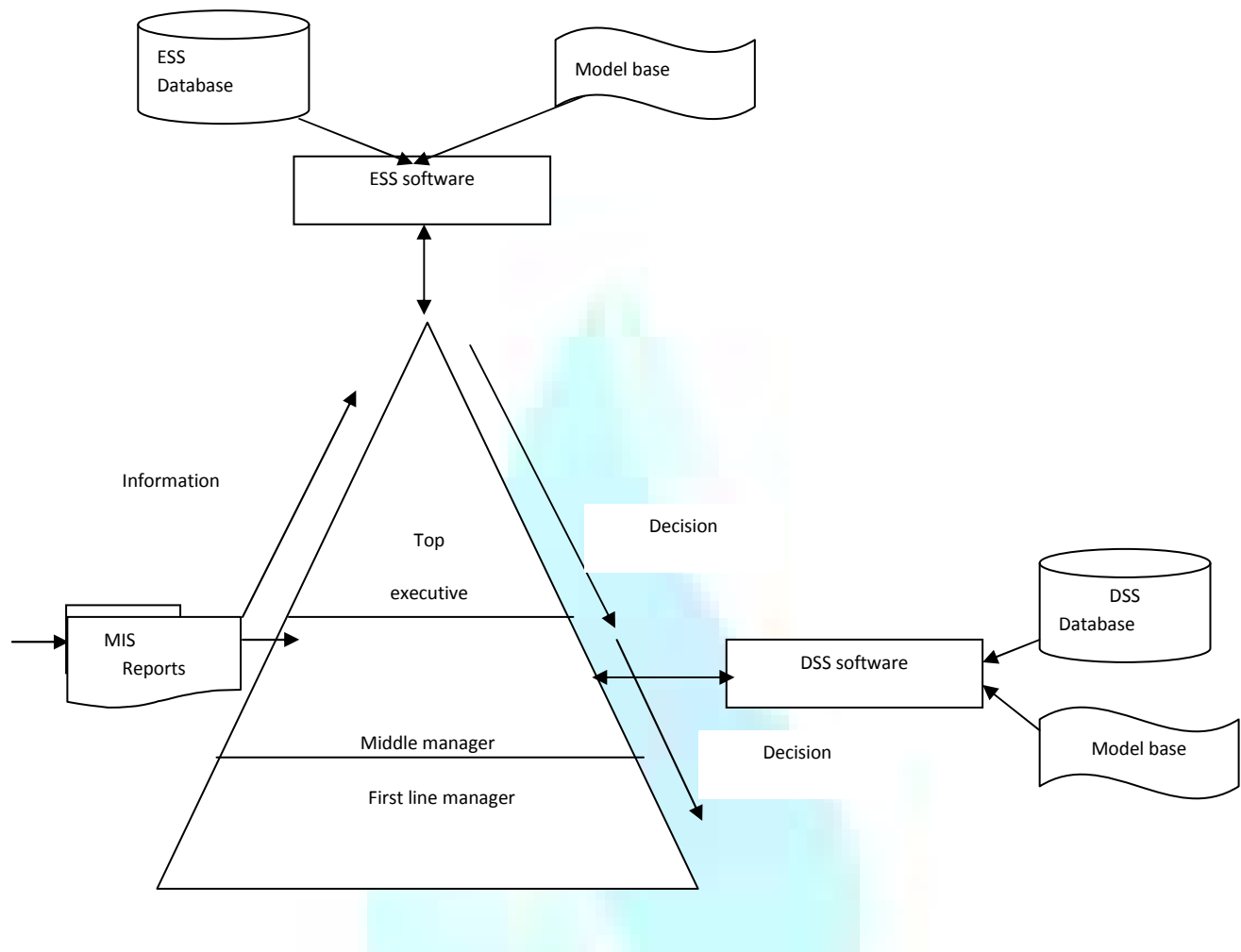
### DECISION MAKING PROCESS OF MANAGEMENT USING MIS

In today's business, decision-making is very important. Wherever the level, management of the organization make decisions on the basis of information, information may be manual or may be computerized. MIS is one of the important information system applications that help the different level managers to take effective decisions. MIS directly helps the mid level manager by providing routine reports on the basis of TPS information that are collected from organizations' operational activities. DSS also facilitate the decision making process of semi-structured tasks. These systems are designed not to replace managerial judgment but to support it and to make the decision process more effective (Weihrich and Koontz, 2000). ESS also helps the senior manager by providing critical information from a wide variety of internal and external sources (O'Brien, 2003).

On the basis of information transferring process i.e. bottom-up and decision-transferring process i.e. top-down, middle level manager makes decision based on MIS reports and transfer information to the top executives that are strategic. Mid level manager gets strategic decisions from top executives for proper implementation.



FIGURE 3: DECISION MAKING PROCESS OF MANAGEMENT THROUGH MIS



## CONCLUSION

Efficient managers are those whose decisions are effective. To do this, managers have to have insights and foresights on today's global information systems. Management Information System is an important weapon for the global world business managers to see the success of their organizations in a nearest day. MIS plays a vital role in the organization for taking right decision in a short time on the basis of gathered information from operation level of the organizations. Not only that but also it helps the strategic manager to take strategic decisions with the assistance of DSS and ESS. But, an important fact is that they must maintain to make balance between objective of the organization and the technological capabilities of the organization. So, MIS is a vital component of decision making task of managements in the organization in global business and information world.

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**EFFECTS OF CALL CENTER CRM PRACTICES ON EMPLOYEE JOB SATISFACTION**

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**ABSTRACT**

*The primary objective of this paper is to develop a conceptual framework that depicts the impact of customer relationship management (CRM) dimensions on employee job satisfaction within the customer contact center industry. This paper uses a qualitative methodology that comprises of a comprehensive literature review from academic researches and industry reports. Evidences from the extant literatures have suggested that effective implementations of the four dimensions of CRM (Customer Orientation, CRM Organization, Knowledge Management and Technology Based CRM) will positively effect employee job satisfaction within the customer contact center industry. Given that this paper is based on qualitative approach, there is need to embark on empirical data gathering to validate the conceptual model presented. The paper suggest that to achieve operational efficiency together with employee job satisfaction, there is need for customer contact centers to integrate CRM dimensions into its operations and measurement practices. This paper primarily conceptualizes a measurement model that would assist in determining the impacts of CRM on employee job satisfaction and performance within the contact centers. It generally provides contact center Executives with CRM focus, by complementing recent works that have been conducted on the role of CRM constructs in improving employee job satisfactions and organizational performances. It concluded by proposing a model for future testing.*

**KEYWORDS**

Customer Relationship Management (CRM), contact centers, call centers, employee job satisfaction.

**INTRODUCTION**

Customer Relationship Management (CRM) as referred is a concept that derives its popularity since 1990s. It is said to offer a long term changes and benefits to businesses that chose to adopt it. CRM has been argued to enable companies to successfully interact with their customers in a dynamic and profitable manner (Aihie and Bennani, 2007; Adam and Michael, 2005; Gummesson, 2004; Sin et al, 2005). However, many scholars still debate over what should exactly constitute CRM; some says CRM are nothing more than mere software, while others says it is a modern means of satisfying customers' requirement at profit (Soon 2007; Nguyen et al, 2007; and Eric et al, 2006). CRM was also defined by Nguyen et al (2007) as information system that allows organizations to track customers' interactions with their firms and allows employees to instantly pull up information about the customers such as past sales, service records, outstanding records and unresolved problem calls.

Customer Relationship Management (CRM) is a unit of a bigger Marketing Management which is the art and science of choosing target markets and building profitable relationships with them by delivering superior customer value and satisfaction (Dean, 2007, Eid, 2007; Adam and Michael, 2005; Gummesson, 2004; and Fox and Stead, 2001). McNally (2007) defines CRM as a system which allows both internal and external customers of an organization to critical information through the integration of company's telephone system, Chat groups, Interactive voice response, facsimile transmission, electronic data interchange, Voice over internet, Web sites and e-mail touch points that will result in satisfying customer self services for new product purchases, assist in up-selling and cross selling and creating customer loyalty, value and profitability.

While different researchers believed that there is no one correct definition of CRM, this research would like to define CRM as "Organization's ability to efficiently integrate people, process, and technology in maximizing positive relationships with both current and potential customers. Authors such as Sin et al (2005) argued that CRM is a strategic business process that involves an efficient management of detailed information about current and potential customers channeled through a carefully arranged customer "touch points" that assist in maximizing customer loyalty and minimizing costs. Other scholarly arguments have also established that the cost implications in CRM implementations are double sided, from one from the company and the other from the customers (McNally, 2007; Wang et al., 2006; Sin et al., 2005, Yim et al., 2005). On one hand, the customer is able to reduce the cost of traveling to the respective companies to get what they need, while the companies are able to save cost on both their human resources, processes and promotions (Wang et al., 2006; Sin et al., 2005). To strengthen their arguments, Sin et al (2005) explained that whatever orientation that an organization might have put in place, the primary role of marketing management is to create a positive relationship with customers.

**EXPLORING CRM LITERATURES**

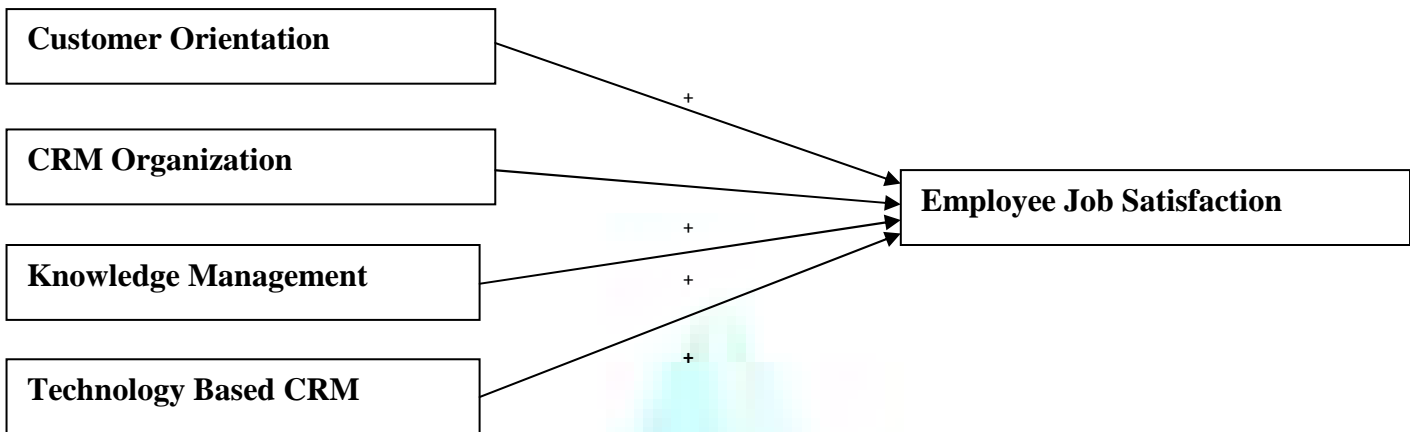
Findings from recent researches have indicated enormous opportunities CRM is availing employees in several organizations by getting detailed customer information to make quick and intelligent business decisions that will resolve issues and provide efficient service to the customers (Soon, 2007; Rajshekhhar et al., 2006; Yim et al., 2005; Adam and Michael, 2005). Similarly are arguments from both academic literatures and industry reports which have established the importance of customer relationship management in marketing activities, specifically in the customer contact centers where it has helped in digitalizing staff's knowledge about organization's customers through computer telephony integration, fax, email, web chatting etc (Dean, 2009; 2007; Sin et al., 2005; Yim et al., 2005; Roland and Werner, 2005).

While this current study cannot disconfirm the available arguments in favor of CRM applications on employee job satisfactions and performance, there are reliable data that shows a range of major issues that is globally affecting contact centers such as shortage of skilled employees, high abandonment rate, high average speed of answer, employee job dissatisfaction, high attrition rate, high cost of operations, and customer dissatisfaction (Chen et al., 2010; Callcentre.net, 2008; 2003; McNally, 2007; Adam and Michael, 2005).

**THE MODEL THAT IS CREATED FROM THE LITERATURE REVIEW**

From the findings in the extant literature reviews, below is the proposed conceptual model. Relevant literatures in support of each constructs are detailed under the elements of each variable.

FIGURE 1: CRM DIMENSIONS AND EMPLOYEE JOB SATISFACTION MODEL



#### INDEPENDENT VARIABLES: CRM DIMENSIONS

Based on the review of past related literatures on CRM and detail interview with some selected CRM managers, Sin et al (2005) hypothesized that the concept of CRM is a multi dimensional construct which consist of four broad behavioral components in every implementing organizations: key customer focus, CRM organization, knowledge management, and technology based CRM (Sin et al, 2005). They argued that their findings is in accordance with the general notion that a successful CRM is primarily designed to address four key areas in the implementing organization: corporate strategy; people; technology; and processes (Sin et al, 2005; Fox and Stead 2001), and that it is only when all these four components works according to target that a company will experience a superior customer related capability.

It was equally argued that for a company to be able to maximize its long term performance in metrics such as customer satisfaction, employees trust, satisfaction and commitment, and return on investment, such a company must build, maintain, and do everything possible to establish the four dimensions of CRM (McNally, 2007; Bang, 2006; Wang et al., 2006; Sin et al, 2005; Yim et al., 2005).

#### CUSTOMER ORIENTATIONS

Evidences from marketing literatures, IT literatures and Industry practices agreed to the fact that customer centric focus is a pre-requisite to any successful CRM Projects, particularly in shaping the minds and actions of the employees in becoming customer oriented (Dean, 2007; McNally, 2007; SQM, 2007; Roland and Werner, 2005; Callcenter.net, 2003). Looking at it from the contact center perspective, Dean (2002) defined customer Orientation as the degree to which an organization emphasizes on meeting customer needs and expectations for service quality. Dean (2004) went further to argue that customer orientation should incorporate commitment to customer needs and utilizing the available resources in gathering and efficiently managing customer feedback for effective decision making by the employees.

Over the last twenty years, the concept of customer orientation have started to be very critical in the field of marketing management practices and theories, with apparent conclusions in support of the statement that any organization that adopts customer orientation approach are more likely to establish the required customer quality, increase its employee and customer satisfactions, and able to achieve the desired organizational objectives more efficiently than its competitors (Chen et al., 2010; Dean, 2007; Roland and Werner, 2005; Sin et al., 2005; Yim et al., 2005; Brady and Cronin, 2001; Lukas and Ferrell, 2000; Narver and Slater, 1990).

To Sin et al (2005), they argued that although it is observed that most empirical studies have been concentrating on the degree and measurements of the concepts, but the extant literatures have long neglected the variations in the customer orientation dimensions or the features of the concepts as exhibited by each organizations (Sin et al., 2005). Therefore the general literatures on customer orientation could be argued as not been widely practiced specifically by the contact center professionals in the manner advocated by Sin et al (2005) and supported in other literatures such as Roland and Werner (2005) and Dean (2007) were they all have empirically established a positive linkages between customer orientation, perceived service quality, employee job satisfaction and customer satisfaction. Similarly are previous researches such as Kohli et al (1993) and Berry (1995) that cites several empirical studies that have suggest a linkage between the customer orientation and customer satisfaction.

Sources from other extant literatures have suggested that customer orientation (CO) is positively related to CRM adoption and customer relationships outcomes (Dean, 2007 and 2002; Eid 2007; James 2004). Customer orientation is said to reflect a company's culture on customers' focus, needs and feedbacks (Dean 2007). In a very developed customer oriented approach, it is argued that there should be a continuous ongoing information collection and dissemination about customer and competitor for better decision making process by the employees (Kohli and Jaworski, 1993). The culture of customer orientation in a firm is considered to be very significant in the successful adoption, implementation and acceptance of CRM technology by its employees (Nguyen et al, 2007; Dean, 2007; and Eid 2007). Several other studies have also emphasized that there exist a stronger relationship between customer orientation and employee satisfaction, especially in the service industries where employees are the first contact with the customers and taking into consideration the length of time employees spend with customers in the contact center industry (Bhimrao and Janardan., 2008; McNally, 2007; Soon, 2007; Wang et al., 2006; Bang, 2006; Sarah and Meredith., 2006; Roland and Werner., 2005; Feinberg et al, 2002).

Given the aforementioned evidences and many more empirical findings that have establish customer orientation as an important antecedent of competitive advantage and business profitability (Brady and Cronin, 2001; Narver and Slater, 1990), probing and measuring the impact of this orientation on employee job satisfaction is said to have captured the attentions of researchers (Wang et al., 2006; Sin et al, 2005; Yim et al., 2006). This research postulates that:

**H1:** Customer Orientation of the customer contact center is positively related to Employee Job Satisfaction.

#### CRM ORGANIZATIONS

CRM organization has been argued as an essential means through which fundamental changes in terms of how firms organized and conduct its business processes around employees and customers can be actualized (Wang et al., 2006; Sin et al., 2005; Yim et al., 2005). Implementing firms are encouraged to pay necessary attentions to the inherent organizational challenges in the CRM initiatives (Rajshekhar et al., 2006; Adam and Michael, 2005). Both Wang et al (2006), Sin et al (2005) and Yim et al (2005) have all empirically tested and established that there exist a positive relationship between CRM organization and customer satisfaction, with serious emphasis on the positive roles of the employees. They argued further that the key considerations for any successful CRM to be implemented within the whole firm are organizational structures, the organization wide commitment of available resources, human resource management policies and employee job satisfaction that positively worked together to influence customer satisfaction (Wang et al., 2006; Sin et al., 2005., Yim et al., 2005). By organizational structure means that CRM applications requires that the entire strategic business units in such firms be design to jointly work together towards achieving a common goal in terms of building a strong long-term customer relationships (Sin et al., 2005; Yim et al., 2005). For better efficiency of such organizational structure, it was advised that firms should incorporate productive process teams, cross discipline segment groups and customer focused departments (Aihie and Bennani, 2007; Sin et al., 2005; Yim et al., 2005). All the aforementioned structural designs are said to require a strong inter-functional



coordination between the different departments, a statement that further confirms the existence of a positive relationship between CRM organization and employee job satisfaction and performance (Rajshekhar et al., 2006).

Due to the high cost involvement of CRM applications, Sin et al (2005) and Yim et al (2005) conceptualized and established the importance of organization's wide commitment of resources to the intended design of CRM structures as having a positive relationship with employee satisfaction, performance and customer satisfaction. Also very important in their findings are the argument in favor of CRM organization as the established link between the human resources and the marketing interface (McNally, 2007; Sin et al., 2005). Also relevant in this area of studies are literatures such as Dean (2007) and Roland and Werner (2005) that empirically established that there exist a positive relationships between CRM dimensions (specifically customer orientation), employee job satisfaction, perceived service quality and customer satisfactions. Dean (2007), Roland and Werner (2005), Sin et al (2005) and Yim et al (2005) all empirically argued that this is a stage where firms need to logically instill in its customer service representatives the utmost importance of the CRM dimensions in order to positively influence employee job satisfaction, first call resolution, customer satisfaction and organization overall performance. In their concluding remarks they emphasized on four significant firms' internal marketing processes, which includes employee empowerment, effective internal communications, standard reward systems, and employee involvement as efficient means of actualizing CRM organizations on employee job satisfaction and performance (Sin et al., 2005). In view of this, this research Hypothesize that:

**H2:** CRM Organization of the customer contact is positively related to Employee Job Satisfaction

#### KNOWLEDGE MANAGEMENT

With reference to the knowledge based view theory of the firm, it states and I quote "that the primary reason for any company's existence is to possess the ability to create, transfer, and efficiently utilize its available knowledge (Acedo et al, 2006; Meso and Smith, 2000; Miller and Shamsie, 1996). Whereas, looking at this from the angle of CRM concept in Marketing, knowledge can be describe as whatever a company or individual has learnt from experience/practice or any empirical study of consumer data (Nguyen et al., 2007; Sin et al., 2005). This will bring us to the key facets of knowledge management dimension which includes a company's knowledge learning and generation, its knowledge dissemination and sharing, and finally knowledge responsiveness (Wang et al., 2006; Sin et al., 2005; Yim et al., 2005).

As previously discussed that knowledge about key customers in a company is important for a successful CRM application (Rajshekhar et al., 2006), because it could be use as a master plan to developing a learning relationship between the employees and company's current and potential customers (Nguyen et al., 2007) and thereby availing each organization the opportunity to a successful establishment of a stronger competitive strength in the market through employee job satisfaction and customer satisfaction (Roland and Werner, 2005; Dean, 2004). It is premised on these arguments that both Sin et al (2005) and Yim et al (2005) have conceptualized and empirically established a positive relationship between employee knowledge acquisition and usage, employee satisfaction and customer satisfaction. Also very important under this heading is Customer information, such as customers' needs and preferences which may be captured by both directly or indirectly, via a two way communications in the company's interactive feedback system (Sin et al., 2005). As argued that the primary reason of knowledge generation is for affording a 360 degree customer view, through an appropriate business intelligence tools such as data mining, data warehouse, and data mart all which could assist a company to incorporate a customer information into its strategic business intelligence (Rajshekhar et al., 2006; Sin et al., 2005).

Therefore, it became very important for organizations to develop a sound mechanism for sharing the existing customer knowledge that will facilitate the concerted actions that could positively influence employee knowledge, satisfaction and performance in all the strategic business units of every organization (Sin et al., 2005). Finally it is arguable that marketing is now more concerned with better means of responding to customer demand, with the general believes that actions taken in a prompt manner not only enhance service quality, but also foster positive long-term relationships with both employees and the customers (Dean, 2007; Roland & Werner, 2005; Antonio et al., 2005; and Sin et al., 2005; Yim et al., 2005).

This leads to the following Hypothesis:

**H3:** Knowledge management of the customer contact center is positively related to Employee Job Satisfaction.

#### TECHNOLOGY BASED CRM

Although it has been established that consumers do complained about the time and efforts that is required in getting their individual questions or problems solved whenever they interact with contact centers (SQM, 2007; Call Centre.net, 2003), but equally important are arguments in favor of careful implementations of CRM Screen Pop-Up as an effective means of improving customer service representative satisfaction and performance, first call resolution, and caller satisfactions while simultaneously reducing the contact center processing costs (SQM, 2007; Yim et al., 2005; Call Centre.net, 2003). This is because most of the findings in the existing literatures and industry reports aptly depict that the major cost of running a call centre is the labor cost (Levin, 2007a), a strong need why every organizations must efficiently link is technological applications to its employee acceptance, satisfaction and performance (McNally, 2007).

Meanwhile, not only within the contact centers that CRM technologies and systems are beneficial (McNally, 2007), there are enormous evidence in support of CRM systems as complements to other systems such as enterprise research planning systems etc (Nguyen et al, 2007; Dean, 2007; and Eid 2007). Evidence from existing contact center literatures shows that several authors have argued in favor of FCR technology enablers through intelligent skill based routing as a good means of achieving FCR, employee job satisfaction and caller satisfaction (SQM, 2007; Callcentre.net, 2003). This is because through the application of CRM technologies such as first call resolution enablers, contact centers can match their customers and/or their call types with the appropriate customer service representative's knowledge and skills (SQM, 2007).

Equally observed in the extant literatures is the suggestion that there are two aspects of CRM systems integration that are pertinent to the adoption of this technology. Eid (2007) describes the first part as integration into the existing organizational systems and applications, while the second integration is done across other functional customer contact touch – points. Part of the available evidence as identified by this research is that it is widely possible for researchers and practitioners to determine if an organization has put in place CRM technologies, but the major issues starts from measuring the effectiveness of CRM technology utilization in terms of user acceptance, and the desired operational performance which is argued to have since been neglected and has been confirmed as very vital to the success of the implementing firm (Sin et al., 2005; Yim et al., 2005; Ravipa and Mark, 2004). The existing academic and practitioner literatures on CRM are mostly in the areas of customer database, contact centers, online chatting systems, e-mails, Internets and some organizational group support systems, further creating a vacuum for future research in determining the impact of CRM technology on employee job satisfaction (McNally, 2007; Nguyen et al, 2007; Adam and Michael, 2005; Sin et al., 2005; James, 2004).

Furthermore, some literatures contend that a company's ability to link the CRM system to different strategic business units such as marketing, finance, distribution, operations, and human resources will provide additional value to both internal and external users, and more importantly to the achievement of both employee and customers satisfactions (Aihie and Az-Eddine, 2007; Coltman, 2007; Nguyen et al 2007; Roland and Werner, 2005; Yim et al., 2005). If efficiently managed, CRM system is argued as having the capacity to assist organizations in handling customer queries and complaints more professionally with both accurate and timely information that would assist in reducing employee role stress, attrition rate and subsequently increasing employee job satisfaction, first call resolution and customer satisfaction (McNally, 2007; SQM, 2007; 2005).

Also very important in this area of research is the a benefit inherent in the integration of every unit of the customer contact centers whether inbound, outbound or web enabled via CRM technology that provides a great opportunity for seamless and transparent services in customer touch points (Yim et al., 2005). In relation to the above, the extent of a company's CRM integration will strengthen its ability to resolving customer's request in the first call resolution, and also give opportunity for achieving both employee and customer satisfactions (Dean, 2007; SQM, 2007; Sin et al., 2005; Yim et al., 2005).

The above has led this research into hypothesizing that:

**H4:** Technology based CRM of the customer contact center is positively related to Employee Job Satisfaction.

#### DEPENDENT VARIABLE: EMPLOYEE JOB SATISFACTION

Issues on employee satisfaction are very much available in several studies, in which the majority postulates a positive relationship between employee satisfaction and customer satisfaction (Florian et al, 2007; Dean, 2007; Bernard and Stephen, 2004; Gummesson, 2004). These are so because employee and

customer satisfaction are often measured in different ways by marketing researchers, where the majority has stated that employee job satisfaction has a clear effect on customer satisfaction (Eric et al, 2006; Coltman, 2007; Christian, 2005; Gummesson, 2004).

Evidences from other recent researches have also confirmed that the relationship between employee satisfaction and performance could be strengthened if there is a high frequency of customer interaction with the employees (Dean, 2007; Florian et al, 2007; Christian, 2005; and Kode et al 2001). Whereas two major existing literatures in the contact center industry by Roland and Werner (2005) and McNally (2007) have empirically established that there exist a positive relationship between customer orientation, employee job satisfaction and customer satisfaction. In Roland and Werner (2005), they argued, tested and established that employee job satisfaction positively mediate the link between customer orientation and customer satisfaction of the contact center industry. A critical look at the foregoing information shows that all the above conditions currently exist in the customer contact centers. Because customer contact center employees enjoys a high level of customer interaction and the existing services within the contact centers shows that there is integration between external factors and the service delivery processes. A review of the reasons behind the relationship between employee satisfaction and customer satisfaction is often argued on the premise that the positive effects on every customer satisfaction are mediated by an existing positive effect on working performance (Florian et al, 2007). Importantly, the service marketing literatures have shown that there exist a positive effect of employee satisfaction on employee's working performance and perceived service quality (Sarah and Meredith, 2006; Rodoula, 2005; Zeithaml et al, 1985). With evidences from the above extant literatures, this research supposes that employee job satisfaction positively goes along with the psychological state of organization customer orientation, CRM organization, knowledge management and technology based CRM.

## CONCLUSION, LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Despite increasing acknowledgement of CRM importance, disappointingly very little studies have focused on the impacts of CRM dimensions on customer contact center performances. In support of the above emphasis are ample of evidences provided by several sources on the severe employee job dissatisfactions and customer dissatisfactions with contact centre systems and services across the globe (Callcentre.net, 2008; 2003; SQM, 2007; Feinberg et al., 2002; 2000; Miciak and Desmarais 2001), and that the major problems are stemming from factors such as lack of established customer orientation, CRM organization, knowledge management, and technology based CRM (Chen et al., 2010; McNally, 2007; SQM, 2007; Wang et al., 2006; Bang, 2006; Sin et al., 2005; Yim et al., 2005). The findings in this research indicate that there is strong reason to modifying the existing CRM implementations and organization performance measurements within the contact center industry. More importantly in areas such as measuring employee job satisfaction, first call resolution, customer satisfactions and dissatisfactions.

Beyond these findings is a main limitation in the qualitative approach that was applied in this research, a strong factor that is limiting the ability to generalize its findings and recommendations to all industries and countries. Importantly, suggestions from this research are not quantitatively backed by empirical data and appropriate statistical analysis that could validate the proposed theoretical linkages that exist between CRM dimensions and employee job satisfaction, thereby further limiting its diagnostic power of predictions. To rectify the observed limitations, this research suggests that there is need for future study to embark on empirical data gathering to validate the proposed model. However, as could be noted that this research has conducted a detailed literature review to establish the positive relationships that exist between CRM dimensions and employee job satisfaction, it is important for future researchers to conceptualize and if possible determine other constructs for measuring employee job satisfaction within the contact centers, specifically the inbound call centers.

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# DETERMINANTS OF CAPITAL STRUCTURE: EVIDENCE FROM TANZANIA'S LISTED NON FINANCIAL COMPANIES

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## ABSTRACT

*The current paper examines the potential determinants of the capital structure decisions the Tanzanian context. The study explains how the non-financial listed companies in Tanzania choose and adjust their strategic financing mix. The static trade-off theory, pecking order theory or information asymmetry theory, and agency cost theory guided the study. The study focused on all 8 non-financial companies listed in Dar es Salaam Stock Exchange (DSE) as at 2011. The financial statements and websites of the 8 companies were extracted to obtain the relevant information. The multiple regressions model was used to test the theoretical relationship between the financial leverage and characteristics of the company. The MINITAB 15 English Computer Software was used to run the regression model. The study reveals that the profitability and assets tangibility are the two key determinants of the capital structure decisions in Tanzania while company size and liquidity are suggestive determinants. The study recommends that, Tanzanian companies should adhere to these determinants in their decisions making on the capital structure.*

## KEYWORDS

Capital structure, Tanzania, stock exchange.

## INTRODUCTION

One of the challenges facing the Tanzanian investors is how to choose and adjust their strategic financing mix to form an optimal capital structure. A company's capital structure refers to the mix of its financial liabilities. As financial capital is an uncertain but critical resource for all companies, suppliers of finance are able to exert control over companies. Debt and equity are the two major classes of liabilities, with debt holders and equity holders representing the two types of investors in the company. Each of these is associated with different levels of risk, benefits, and control. While debt holders exert lower control, they earn a fixed rate of returns and are protected by contractual obligations with respect to their investment. Equity holders are the residual claimants, bearing most of the risk, and, correspondingly, have greater control over decisions.

Questions related to the choice of financing (debt versus equity) have increasingly gained importance in company finance research. Traditionally examined in the discipline of finance, these issues have gained relevance in the past few years, with researchers examining linkages to strategy and strategic outcomes. The basic question was formulated as, what are the factors guide companies to choose either debt and or equity financing?

The relationship between the proportion of debt usage and company's characteristics namely size of the company, profitability, growth rate, assets tangibility, liquidity and dividend payout has been the subject of considerable fact, in empirical research.

Previous studies have focused on testing those explanatory variables if they relate to the financial leverage of the company. Numerous of these studies have been done in the developed countries. For example, Rajan and Zingales (1995) use data from the G-7 countries, Bevan and Danbolt (2000 and 2002) utilized data from the UK.

The DSE is the solely secondary capital market in Tanzania incorporated in 1996 as a company limited by guarantee without a share capital. It became operational in April 1998. The securities currently being traded are Ordinary Shares of 15 listed companies, 5 company bonds and 8 Government of Tanzania bonds as per 10, October 2010. The DSE membership consists of Licensed Dealing Members (LDMs) and Associate Members. Both the Capital Markets and Securities Authority (CMSA) and DSE monitor the market trading activities to detect possible market malpractices such as false trading, market manipulation, insider dealing, short selling, and others.

The study was based on attempt to determine the determinants of the capital structure decisions in the Tanzanian non-financial companies listed at the Dar es Salaam Stock Exchange (DSE).

According to Rajan and Zingales (1995), and Harris and Raviv (1992), among others, further substantiation of capital structure hypotheses is needed to increase the robustness of their predictions. This research may be pursued through the empirical testing in different environmental contexts of country, time and industry. Such investigations may be helpful for a better understanding of the implications of environmental and behavioral factors on capital structure decisions, and thus contributing for broadening the explanatory and predictive power of the theory.

H<sub>01</sub>: There is no significant relationship between financial leverage and company size

H<sub>11</sub>: There is a significant relationship between financial leverage and company size

H<sub>02</sub>: There is no significant relationship between financial leverage and profitability

H<sub>12</sub>: There is a significant relationship between financial leverage and profitability

H<sub>03</sub>: There is no significant relationship between financial leverage and growth rate

H<sub>13</sub>: There is a significant relationship between financial leverage and growth rate

H<sub>04</sub>: There is no significant relationship between financial leverage and assets tangibility

H<sub>14</sub>: There is a significant relationship between financial leverage and assets tangibility.

H<sub>05</sub>: There is no significant relationship between financial leverage and liquidity.

H<sub>15</sub>: There is a significant relationship between financial leverage and liquidity.

H<sub>06</sub>: There is no significant relationship between financial leverage and dividend payout.

H<sub>16</sub>: There is a significant relationship between financial leverage and dividend payout.

Data were analyzed in regression model. The MINITAB 15 English computer software used to test the set of hypotheses. Before running the regression, investigation into the multicollinearity problems was carried out. The correlations among the independent variables were examined to find out the multicollinearity problem. First, the Pearson correlations were determined, and then diagnosis was done on the relationship of individual independent variables to all other independent variables. The examination of correlation among the explanatory variables found no multicollinearity problem (Table 4.2 & 4.3).

## FACTORS THAT INFLUENCE CAPITAL STRUCTURE DECISIONS AMONG NON-FINANCIAL LISTED COMPANIES AT DSE

Before determining the factors that influence the capital structure decisions the data descriptive statistics were computed to profile the characteristics of the sampled companies. The interested statistical measures were means, median, and range (minimum and maximum value) of the factors measured (Table 4.1.1).

**TABLE 4.1.1: DESCRIPTIVE STATISTICS FOR DEPENDENT VARIABLE AND INDEPENDENT VARIABLES**

Variable	N	Mean	SE Mean	StDev	Minimum	Median	Maximum
Financial leverage	8	0.5505	0.0944	0.2670	0.2982	0.4458	0.8954
Company size	8	11.236	0.2580	0.7290	10.0270	11.1430	12.2150
Profitability	8	0.2970	0.0783	0.2215	0.0374	0.3568	0.5359
Growth rate	8	0.2499	0.0472	0.1334	0.0508	0.2392	0.4432
Assets tangibility	8	0.3550	0.1060	0.3000	0.0170	0.4130	0.7290
Liquidity	8	0.1152	0.0270	0.0760	0.0288	0.1104	0.2649
Dividend payout	8	0.4310	0.0974	0.2756	0.0471	0.3447	0.8661

*Source: Field data (2011)*

The table above shows descriptive statistics for the dependent variable and independent variables from among the non-financial companies listed at DSE. The descriptive statistics show how the companies listed at the DSE characterized or vary in term of size, profitability, growth rate, assets tangibility, liquidity and dividend payout. The descriptive statistics shows that companies employ at least 50% of debt in their capital structure components and there are high variations of independent variables among the companies. After data descriptive statistics computation, the pair-wise Pearson correlation of the independent variables was run to diagnose the multicollinearity problem.

**TABLE 4.1.2: PAIR-WISE PEARSON CORRELATION MATRIX OF EXPLANATORY VARIABLES**

Variables	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>
Company size (X <sub>1</sub> )	1.000					
Profitability (X <sub>2</sub> )	-0.623	1.000				
Growth rate (X <sub>3</sub> )	0.151	-0.343	1.000			
Assets tangibility (X <sub>4</sub> )	-0.418	0.422	-0.079	1.000		
Liquidity (X <sub>5</sub> )	0.421	-0.604	-0.363	-0.792	1.000	
Dividend payout (X <sub>6</sub> )	-0.684	0.638	-0.217	0.337	-0.465	1.000

*Source: Field data (2011)*

The table above shows the correlation of the paired variables among the sampled companies. From this table, figures show that there is no strong correlation, more or equal to 0.8 among the independent variables. This implies that there is no multicollinearity problem among the independent variables.

The pair-wise correlation approach of diagnosing the multicollinearity problem does not take into account the relationship of each of independent variable on all other independent variables. Therefore, regression model of each independent variable on all other independent variables was run to assess the multicollinearity problem more precisely (Appendix C).

**TABLE 4.1.3: RESULTS OF THE MODELS USED TO ASSESS THE MULTICOLLINEARITY**

Problem	Model R <sup>2</sup>	Adjusted R <sup>2</sup>	S.E
Model (1.1)	53.6%	0.0 %	0.929250
Model (1.2)	87.9%	57.6 %	0.144325
Model (1.3)	72.3%	2.9 %	0.131439
Model (1.4)	92.2%	72.7%	0.156681
Model (1.5)	90.9%	68.1%	0.043177
Model (1.6)	78.2%	23.7%	0.240796

*Source: Field data (2011)*

The table above describes the correlation of each independent variable and all the other independent variables. The value of R<sup>2</sup> nearest to one or equal to one indicates the multicollinearity problems, Lewis-Back (1993). The table shows that figures are not nearest to or equal to one, therefore, there is no multicollinearity problem among the independent variables.

After clearing up the multicollinearity problem, the stepwise regression was run and found that the most effective factors, which influence the capital structure decisions among non-financial listed companies in Tanzania, are profitability and assets tangibility. The liquidity and company size variables are the suggestive determinants. The dividend payout and growth rate were left to the bottom of the best alternative factors implying that are less effective determinants (Table.4.1.4).

**TABLE 4.1.4 FACTORS THAT INFLUENCE THE CAPITAL STRUCTURE DECISIONS AMONG TANZANIAN NON- FINANCIAL COMPANIES LISTED AT DSE**

Alpha-to-Enter: 0.05 Alpha-to-Removes: 0.05

Response is financial leverage on 6 predictors, with N = 8

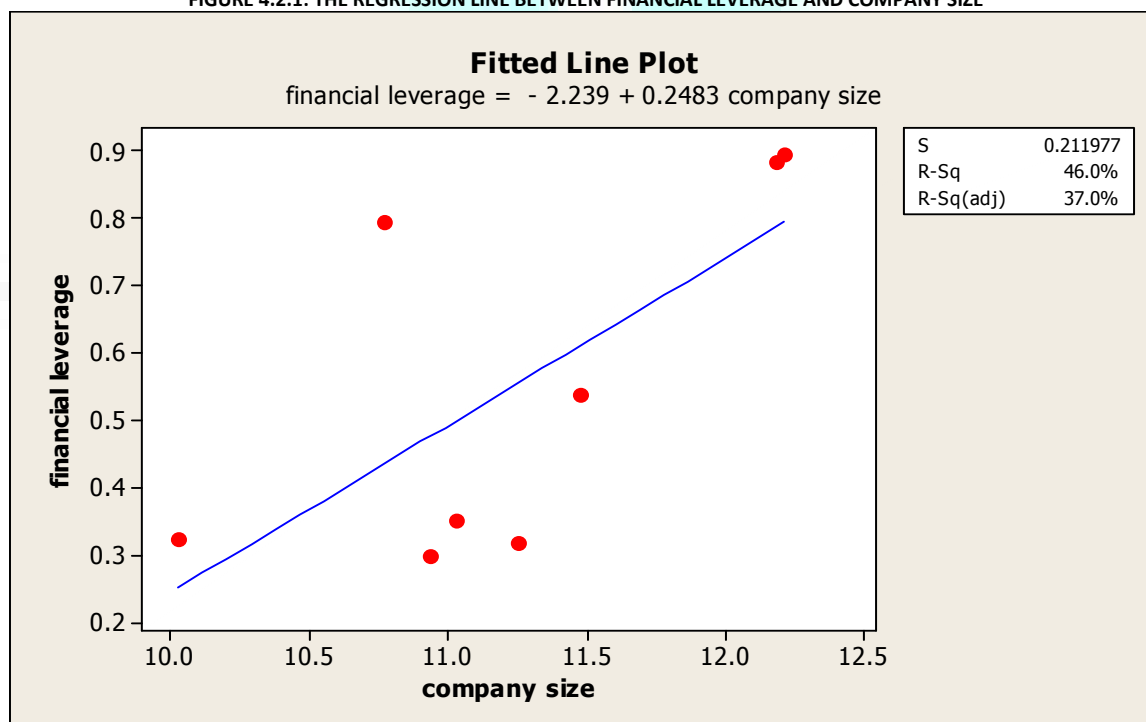
Step	1
Constant	0.8902
Profitability	-1.14
T-Value	-7.38
P-Value	0.000
S.E	0.0909
R <sup>2</sup>	90.07
R <sup>2</sup> (adj)	88.42
Mallows Cp	3.1
Best alternatives:	
<b>Factor</b>	<b>assets tangibility</b>
T-Value	-5.19
P-Value	0.002
<b>Factor</b>	<b>liquidity</b>
T-Value	2.35
P-Value	0.057
<b>Factor</b>	<b>company size</b>
T-Value	2.26
P-Value	0.065
<b>Factor</b>	<b>dividend payout</b>
T-Value	-1.48
P-Value	0.188
<b>Factor</b>	<b>growth rate</b>
T-Value	0.51
P-Value	0.627

*Source: Field data (2011)*

The table above shows results of the factors that influence the capital structure decision among the Tanzanian non-financial listed companies. The stepwise regression was run at 0.05 level of significant.

#### HOW NON-FINANCIAL LISTED COMPANIES IN TANZANIA CHOOSE AND ADJUST THEIR STRATEGIC FINANCING MIX

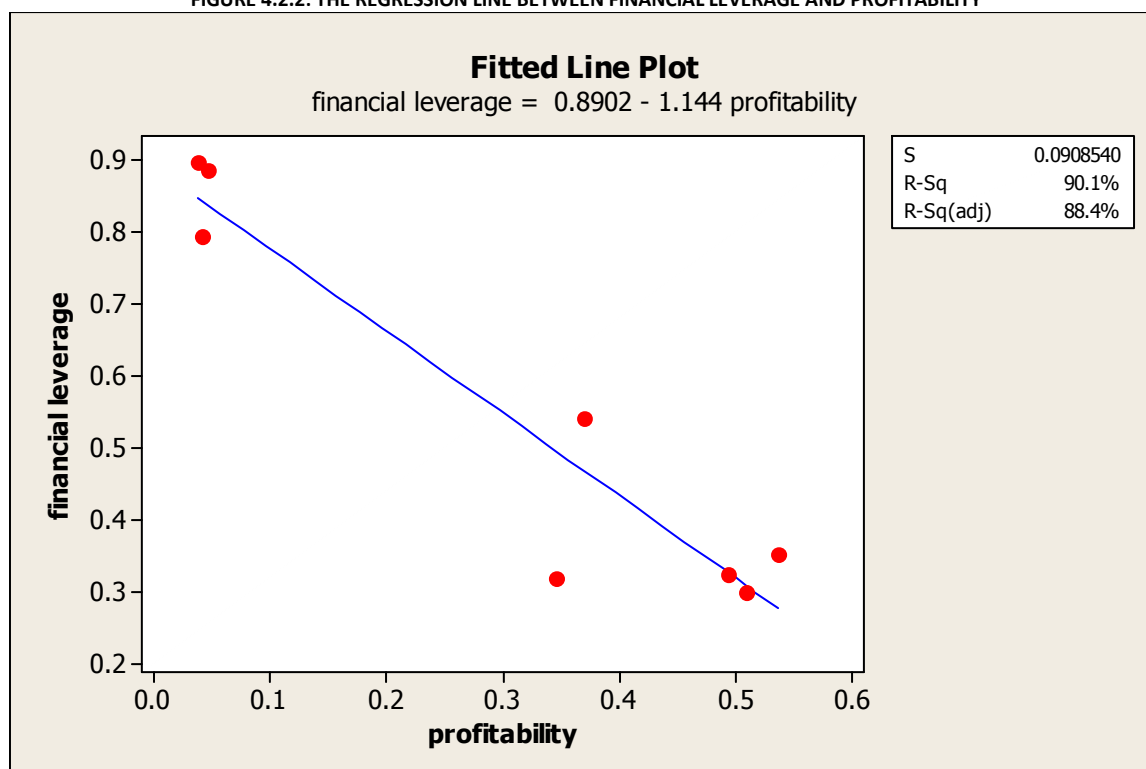
The factors described by the stepwise regression above were then plotted against the financial leverage. The regression lines (the lines of best fit) were plotted to show graphically how non-financial listed companies in Tanzania choose and adjusts their strategic financing mix. The regression lines portray the extent on how factors influence the capital structure decisions in the Tanzanian non-financial listed companies in Tanzania. The regression lines describe how the factors lead companies to choose and adjust their strategic financing mix. The companies choose and adjust their strategic financing mix by considering the extent of influence of the prescribed factors on the financial leverage

**FIGURE 4.2.1: THE REGRESSION LINE BETWEEN FINANCIAL LEVERAGE AND COMPANY SIZE***Source: Field data (2011)*

The graph above shows the relationship between financial leverage and company size. The line is determined by 46%. The company size is defined as the natural logarithm values of the total assets of the each of the eight samples companies. The financial leverage defined as the ratio of total debts to total assets of each of the eight sampled companies. The companies choose and adjust their debt levels positively to their companies' size.

The regression line between financial leverage and profitability was plotted. The regression line is fitted or determined at 90.1%. This factor is negatively related to the financial leverage. Therefore, the companies choose and adjust debt level in their capital structure negatively to the profitability level of their companies, thus the more profits in the company the less debt ratio in its capital structure and it is vice versa (Figure 4.2. 2)

FIGURE 4.2.2: THE REGRESSION LINE BETWEEN FINANCIAL LEVERAGE AND PROFITABILITY

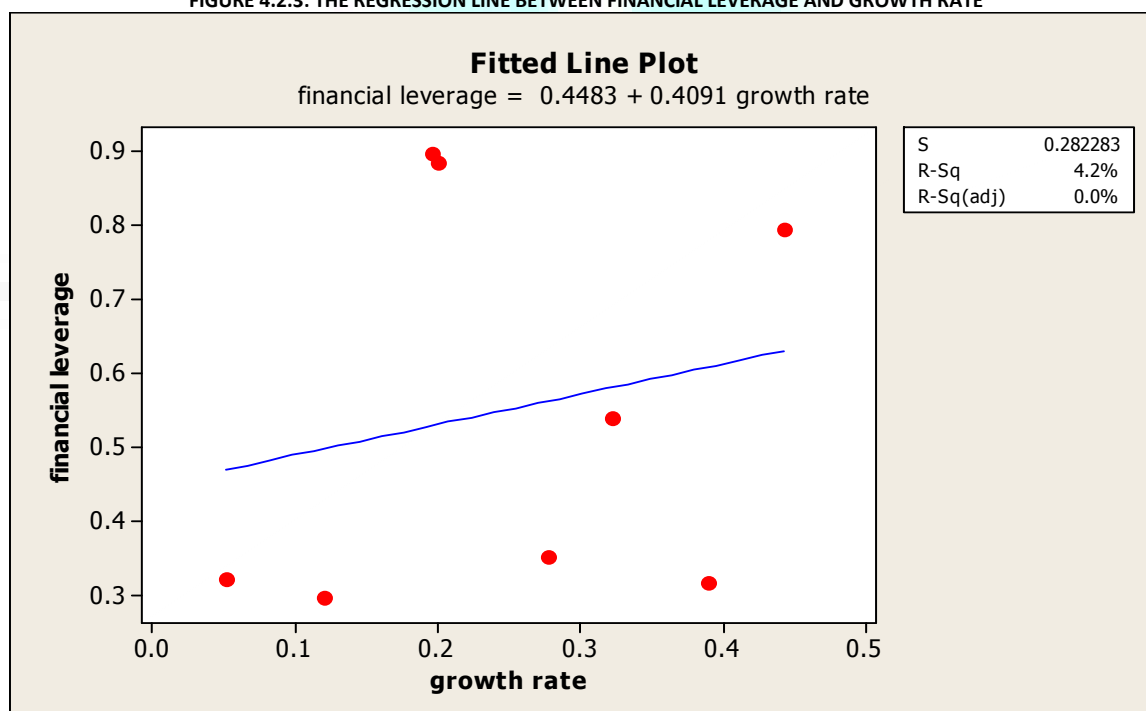


Source: Field data (2011)

The graph above describes the relationship between financial leverage and profitability. The profitability is defined as the ratio of earning before interest and tax (EBIT) to the total assets of each of the sampled companies. The graph portrays that there is a strong relationship between profitability and financial leverage.

The regression line between financial leverage and growth rate was plotted. The growth rate factor poorly relates positively with financial leverage. This relationship is determined at 4.2% (Figure 4.2.3). From this fact, the growth rate is entirely not a determinant of the capital structure decision in Tanzanian non-financial companies listed at DSE. This also, evidenced by the stepwise regression, the growth rate is the least determinant (Figure 4. 4)

FIGURE 4.2.3: THE REGRESSION LINE BETWEEN FINANCIAL LEVERAGE AND GROWTH RATE

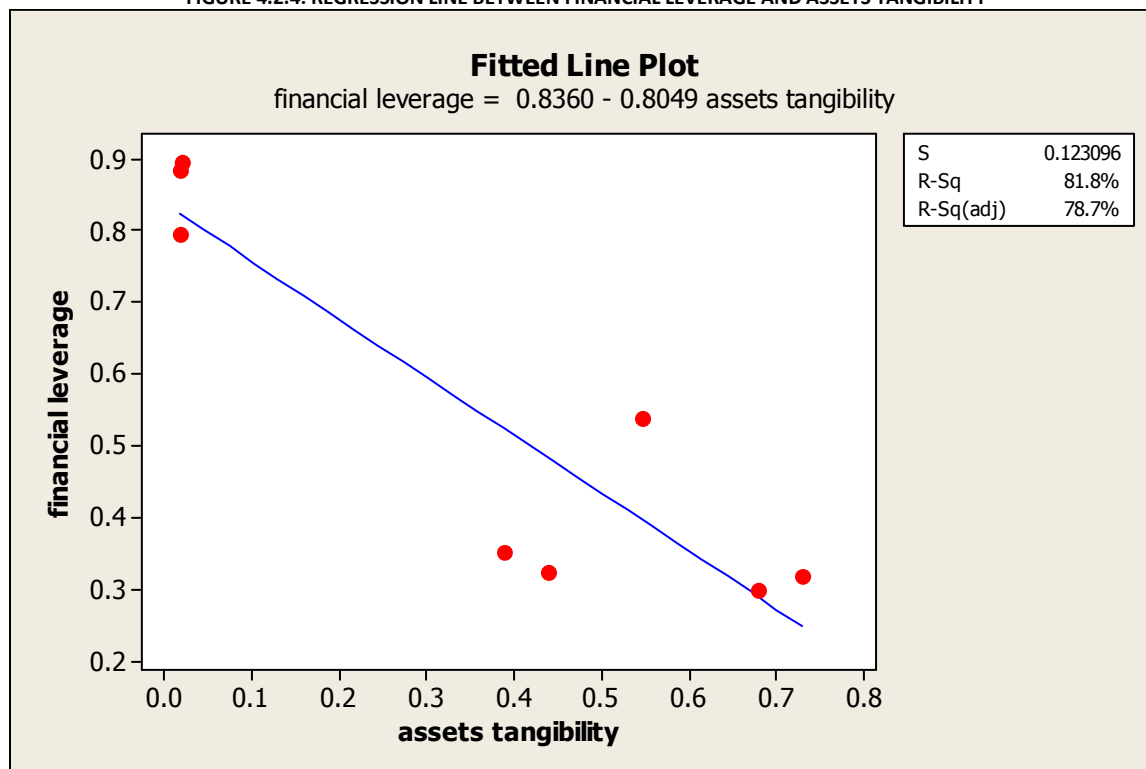


Source: Field data (2011)



This graph above shows the relationship between financial leverage and the growth rate. The growth rate is defined as the percentage change of the total assets of the sampled companies. The graph portrays that there is no strong evidence to support the relationship between financial leverage and growth rate. The financial leverage and assets tangibility was graphed together, the financial leverage as the dependent variable. The results show that the assets tangibility is negatively related to the financial leverage. Companies choose and adjust their debt level negatively to assets tangibility level. The company with higher value of fixed assets tends to use fewer debts in their capital structure and it is vice versa (Figure 4. 2.4).

FIGURE 4.2.4: REGRESSION LINE BETWEEN FINANCIAL LEVERAGE AND ASSETS TANGIBILITY

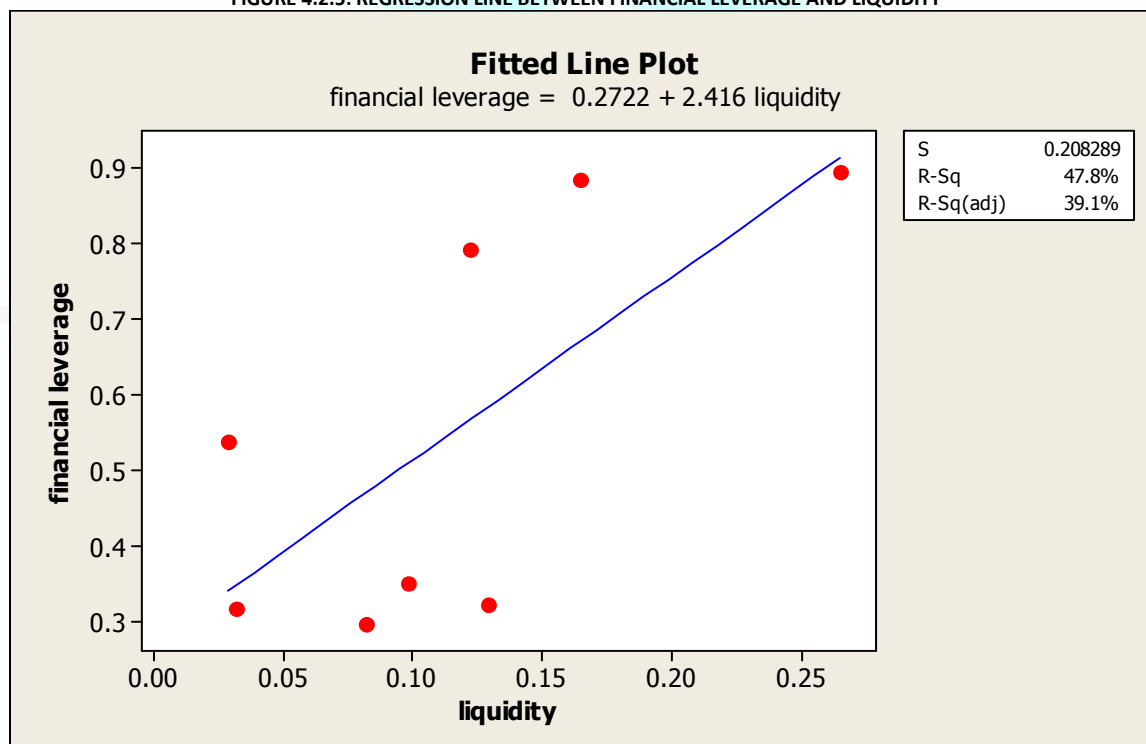


Source: Field data (2011)

This graph shows the relationship between the financial leverage and assets tangibility. Assets tangibility is defined as the ratio of tangible assets to the total assets of each of the sampled companies. The line of best fit fits at 81.8%. This implies that there is a strong relationship between financial leverage and assets tangibility.

In the stepwise regression results, the liquidity is the third best alternative factor. The regression line of best fit is determined at 47.8%. The slope of this line is positive, with a positive constant. The positive constant confirms the reality that in practice the financial leverage does not be zero. The liquidity is a suggestive determinant. The liquidity tends to vary positively with the debt ratio; therefore, companies choose and adjust their debt level positively to their liquidity ratios (Figure 4.2.5).

FIGURE 4.2.5: REGRESSION LINE BETWEEN FINANCIAL LEVERAGE AND LIQUIDITY

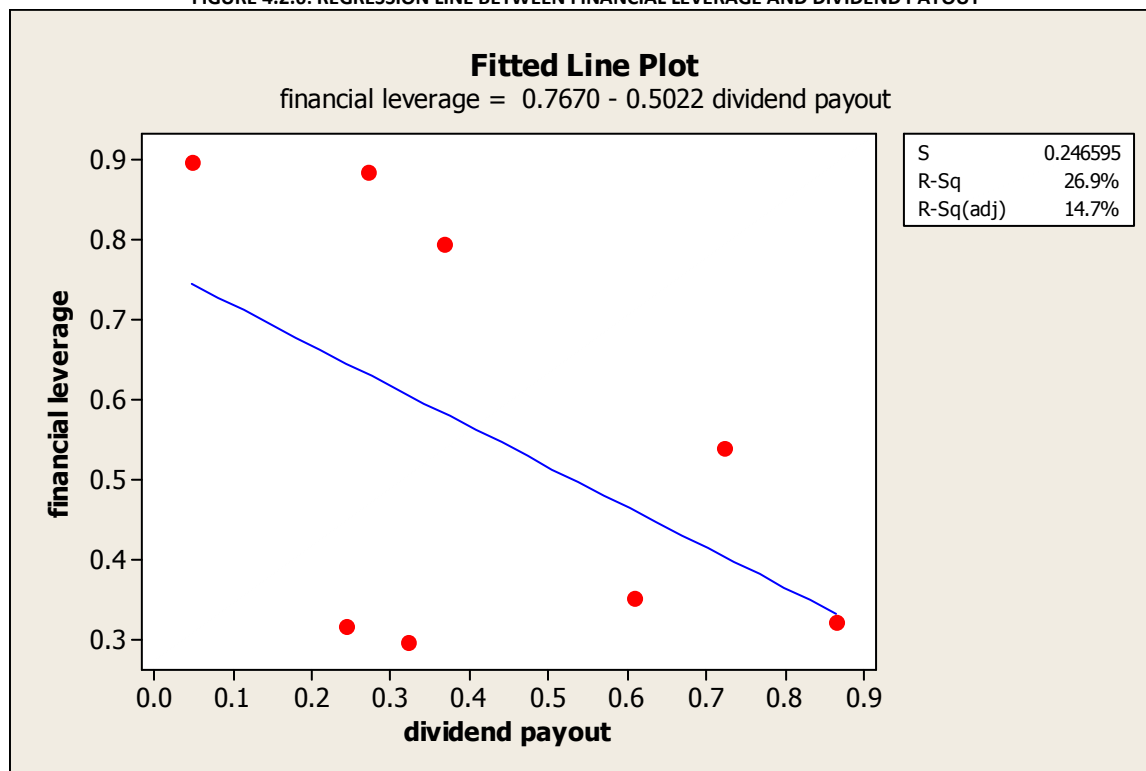


Source: Field data (2011)

The graph above shows the relationship between financial leverage and liquidity. The liquidity is defined as the ratio of cash and total assets of each of the sampled companies.

The regression line between financial leverage and dividend payout was plotted. The regression line portrays that the dividend payout is poorly positive related with financial leverage that no strong evidence to support this relationship (Figure 4.2.6). In the stepwise regression, the dividend payout is ranked to the fifth position of the best alternatives factors or determinants (Table 4.1.4).

FIGURE 4.2.6: REGRESSION LINE BETWEEN FINANCIAL LEVERAGE AND DIVIDEND PAYOUT



Source: Field data (2011)

This graph shows the relationship between the financial leverage and dividend payout. The dividend payout is defined as the ratio of dividends available to be distributing to the shareholders to net income of each of the sampled companies. The line of best fit is determined at 26.9%. Implying that there is a poor relationship between financial leverage and dividend payout.

## TESTS OF HYPOTHESES

The six set of paired hypotheses were tested statistically at 5% and 10% levels of significant. The Company size has a positive coefficient value of 0.2483 (Figure 4.2.1), the t-value of 2.26 and the p-value of 0.065 (Table 4.4), found to be statistically significant at 10% level and insignificant at 5% level. The p-value is greater than 0.05, this implies that there is no strong evidence to reject the null hypothesis at this level of significant, therefore the null hypothesis of the first set of the hypotheses is accepted. The variable was tested at 10% level of significant and found to be statistically significant, since the p-value is less than 0.10. Therefore, the null hypothesis is rejected at this level of significant.

The profitability variable has a very high t-value of -7.38 and p-value of 0.000. The coefficient is -1.144 and  $R^2$  of 90.1%. This variable was tested and found to be significant at 1% since the p-value is less than 0.01. The null hypothesis of the second set of the hypotheses is rejected at more than 99% confidence level.

The third set of the hypotheses were tested with the growth rate variable. The growth rate has a positive coefficient value of 0.4091 with  $R^2$  of 4.2 %, the t-value of 0.51 is very small and the p-value of 0.627 is greater than significant level of 0.05. This p-value is strong evidence enough to support the null hypothesis of the third set of the hypotheses. Then the variable was tested at 10% level of significant and found to be statistically insignificant, since the p-value is greater than 0.10, therefore the null hypothesis also is accepted at this level of significant.

Assets tangibility, with coefficient of -0.8049,  $R^2$  of 81.8% (Figure 4.2.4), it has the second highest t-value of -5.19 and very low p-value of 0.002 (Table 4.4), was tested with the fourth set of hypotheses. The p-value is less than 0.01; therefore, there is no evidence to support the null hypothesis. The alternative hypothesis is accepted at more than 99% level of confidence.

Liquidity is another explanatory variable tested. The coefficient is 2.416,  $R^2$  of 47.8% (Figure.4.2.5) and t-value of 2.35, p-value of 0.057 (Table 4. 4). The p-value of 0.057 is slightly greater than 0.05 level of significant; therefore, there is no strong evidence to support the alternative hypothesis of the fifth set of hypotheses. The null hypothesis is accepted at this level of significant. The variable is tested at 10% level of significant. The variable found to be statistically significant, since the value of p-value is less than 0.10. Therefore, the null hypothesis is rejected at this level of significant.

Dividend payout is tested with the sixth set of the hypotheses. The dividend payout variable has coefficient of -0.5022 with  $R^2$  of 26.9% (Figure 4.2.6), the t-value of -1.48, and p-value of 0.188 (Table 4.4). These values show that there is no strong evidence enough to support the alternative hypothesis of the sixth set of the hypotheses. Therefore, the null is accepted.

## DISCUSSION OF THE RESULTS

The companies based factors, company size, profitability, growth rate, assets tangibility, liquidity and dividend payout were related to the financial leverage of each of the sampled company. The descriptive statistics for the dependent and independent variables (Table 4.1) show that there is a slight variation of the financial leverage ratio of the sampled companies. Companies employ at least 50% of debts in their capital structure, the less debt-financed company employs at least 30% of the debt in its capital structure, and the most debt-financed company employs at least 89% of the debt in its capital structure.

The company sizes of the sampled companies slightly vary. This implies that the companies' assets of the sampled companies are configured with almost the same elements. Profitability of the sampled companies has a high variation of a range of 0.0374 to 0.5359. The less profitable company is 14 as times as the most profitable company. This implies that the companies sampled highly differ in generating income and managing of operating and administrative costs. The growth rates of these companies vary from 0.0508 to 0.4432. The company with smallest growth rate is 9 as times as the company with highest growth rate.

There is a high variation of the assets tangibility of the sampled companies, the company with smallest assets tangibility ratio is 43 as times as the company with the largest assets tangibility ratio. This fact profiles that the fixed assets of the sampled companies highly vary, and this is true due to the fact that fixed assets highly depends on the nature of business of each of the sampled company. The sampled companies fall under various categories of businesses. Liquidity and dividend payout also show a high variation implying that companies largely differ in debts paying ability.

The company size variable, with a positive slope is significant at 10% (Figure 4.4). This shows that company size variable is a suggestive determinant of the capital structure decisions in the Tanzanian non-financial companies listed at the DSE. This finding fairly does not support Rajan and Zingales (1995) argument, that there is less asymmetric information about the larger companies, which reduce the chance of undervaluation of new equity. The finding confirms to the Titman and Wessels (1988) as well as that larger companies are more diversified and have lesser chances of bankruptcy that should motivate the use of debt financing.

The finding on company size with relation to the financial leverage confirms to the established theories. Trade-off theory suggests that company size should matter in deciding an optimal capital structure because bankruptcy costs constitute a small percentage of the total company value for larger companies and greater percentage of the total company value for smaller companies. As debt increases the chances of bankruptcy, hence small companies should have lower debt ratio. Pecking order theory also expects this positive relation. Since large companies are diverse and have less volatile earnings, asymmetric information problem can be mitigated. Hence, size is expected to have positive impact on leverage. From this fact, size will matter.

The profitability variable is significant at 1% level with the coefficient of -1.144 (Table 4.4) statistically significant validates the acceptance of the alternative hypothesis of the second set of hypotheses. The negative sign approve the prediction of information asymmetry hypothesis by Myers and Majluf (1984). It is thus proved that pecking order theory dominates trade off theory. The finding explains that retained earning is the most important source of financing. Good profitability thus reduces the need for external debt.

The growth rate variable with the positive coefficient value of 0.4091 is statistically insignificant. The finding does not confirm to the agency cost theory, which explains the negative relationship between growth rate and the financial leverage, Jensen and Meckling (1976). The pecking order theory suggests the positive relationship between growth rate and financial leverage, this finding profiles this positive relationship but statistically insignificant. From the stepwise regression results, this variable is the least factor among the best alternative factors, this evidencing that the growth rate variable is not a determinant of the capital structure decision in the Tanzanian non-financial listed companies at DSE.

Asset tangibility, with coefficient of -0.8049 is very significantly related to financial leverage (Figure 4.2.4). This shows that tangibility is one of the most important determinants of the capital structure decisions in Tanzania. The negative sign confirms Grossman and Hart (1982) which suggested that, with high monitoring costs for shareholders of capital outlays for low tangibility of assets companies, there should be a correspondingly high level of debt acting as a cost effective monitoring mechanism. Consequently, this implies a negative relationship. The finding does not confirm to pecking order theory, Rajan and Zingales (1995), Frank, and Goyal (2002) which describes the positive relationship between tangibility and financial leverage, in the sense that tangibility constitutes a form of secured collateral.

Liquidity is another explanatory variable tested and found that is positive related with financial leverage at 10% level (Figure 4.2.5). This finding does not confirm to Juan and Yang (2002) which suggest the negative relationship between financial leverage and ability to pay of a given company. In the finding, the positive relationship explains that the liquidity generates a positive effect in the sense that high liquidity eases the availability of debt. Therefore, the liquidity variable is a suggestive determinant of capital structure decisions in Tanzanian non-financial companies listed at DSE.

Dividend payout is not significantly related to debt. The coefficient of dividend payout is -0.5022 (Figure 4.2.6). This finding does not confirm to the pecking order theory that shows the positive relation between financial leverage and dividend payout. This implies that the dividend payout is not a determinant of the capital structure in Tanzania.

## FINDINGS OF THE STUDY

The study was guided by the two researchable questions; namely what are the factors that influence the capital structure decisions in Tanzanian non-financial companies listed at DSE? And how the Tanzanian non-financial companies listed at DSE choose and adjust their strategic financing mix?

The findings profile that the determinants of the capital structure decisions in the Tanzanian non-financial companies listed at DSE are profitability and assets tangibility. The liquidity and company size are the suggestive determinants of the capital structure decisions in Tanzania. Therefore, in answering the first question, factors that influence the capital structure decisions among Tanzanian non-financial companies listed at DSE are profitability, assets tangibility, liquidity and company size.

The answer for second researched question answered by these findings is that the companies choose and adjust their strategic financing mixes, namely debt and equity by considering the determined factors above. Companies choose and adjust debt levels positively to their company sizes and liquidity and negatively to their profitability and assets tangibility levels. This is to say, the company increases the level of debts in its capital structure if its size and liquidity level increases and its vice versa. The companies fairly choose and adjust their capital structure in the sense that the larger company tends to employ more debt in its capital structure. Companies employ less debt if companies are profitable and increase the level of debts if the profits of the companies decrease. Companies do the same for the assets tangibility. The companies with less value of fixed assets tend to increase the level of debt in their capital structures.

## CONCLUSION

The study sought to test the validity of various capital structure theories in the Tanzanian context. The objectives of the study were guided by the two researchable questions. The first question was to establish the factors that influence capital structure decisions among non-financial companies listed in DSE, and the second question, was to identify how non-financial listed companies in Tanzania choose and adjust their strategic financing mix.

The findings of this study contribute towards a better understanding of financing behaviour in Tanzanian companies. Using multiple regression model, data was run into stepwise regression to find the determinants of capital structure decisions in Tanzanian non-financial listed companies. The data collected from the financial statements for the three years, 2007-2009. The six explanatory variables that represent company size, profitability, growth rate, assets tangibility, liquidity and dividend payout were related to financial leverage.

If the static trade-off theory holds, significant positive coefficients are expected for profitability, assets tangibility, and company size explanatory variables and negative coefficient for liquidity variable. This finding profiles that there is no strong evidence for validation of the static trade-off theory in Tanzanian context, as evidenced by the coefficients of profitability and assets tangibility variables, which portray negative relationship with financial leverage.

The company size variable has a positive slope, significant at 10% level. This variable confirms to the static trade-off theory in the Tanzanian companies. This implies that large companies with lower profits will have higher debt capacity and will, therefore be able to borrow more and take advantage of any tax deductibility. The liquidity has a positive slope but it is statistically insignificant.

There is a little support for the pecking order theory that predicts significant positive slopes for the growth rate, liquidity, dividend payout, and asset tangibility variables and a negative significant slope for profitability variable. The results suggest that profitability variable confirms to the pecking order theory and assets tangibility does not confirm to this theory, Rajan and Zingales (1995), Frank, and Goyal (2002) which describes the positive relationship between assets tangibility and financial leverage, in the sense that assets tangibility constitutes a form of secured collateral. In other hand, the finding confirms to Grossman and Hart (1982) which suggests that, with high monitoring costs for shareholders of capital outlays for low tangibility of assets companies, there should be a correspondingly high level of debt acting as a cost effective monitoring mechanism. Consequently, this implies a negative relationship. The growth rate, liquidity and dividend payout confirm to this theory but are statistically insignificant.

The agency cost theory predicts a positive significant slope for company size and negative for growth rate and assets tangibility variables. The results suggest that company size is statistical significant at 10% level and confirms to the theory, growth rate variables confirms to agency cost theory but is statistical insignificant. The assets tangibility approves the prediction of this theory.

Profitability and assets tangibility are the key determinants of the capital structure decisions in Tanzanian non-financial listed companies. Profitability variable confirms to the pecking order theory and fails to confirm static trade-off theory in the Tanzanian context. The assets tangibility is the second important determinant in Tanzania. The variable is negatively related to the financial leverage, that is, the higher the assets tangibility in a company implies the less the debt ratio. Companies that have high level of tangible assets are likely to employ less debt in financing their capitals in Tanzania context. This is due to fact that high monitoring costs for shareholders of capital outlays for low tangibility of assets companies, there should be a correspondingly high level of debt acting as a cost effective monitoring mechanism. Consequently, this implies a negative relationship.

## RECOMMENDATIONS

The financing behaviour is a key aspect in the corporate finance, which should be observed in establishing sustainable and profitable companies in Tanzania. Questions such as how, where, why and when to obtain funds are the key questions that should be addressed in companies. The determinants of the capital structure decisions should be a guide to the companies on how to choose and adjust their strategic financing mix. These findings target to equip the investors, directors, managers, academicians and other stakeholders the reality facts on financing behaviour of the Tanzanian non-financial companies listed at DSE. The findings should lead them to improve their decisions making in their respective areas. Basing on the theoretical and empirical foundations companies should employ debt financing if their internal funds are not enough to finance financial requirements of their companies Myers, (1984). Companies with higher growth rate should demand more funds that need external financing, which is debt Sinha, (1992). The internal financing based on the profitability of the companies improve the dividend payout of the companies that should employ less debt in their capital structures. Ability to pay and collateral strength of companies place companies in a good position of employing debts in their capital structures Rajan and Zingales, (2002), and Juan and Yang, (2002). The company that has high value of its assets (large company) should prefer external financing to internal financing.

Basing on these study findings, the profitability and assets tangibility found to be major determinants. The company with high level of profitability employs less debt in its capital structure components and hence does not improve the dividend payout of it company; external financing is an alternative one of the company with higher level of profitability. The company should observe this to avoid unnecessary burden of debts. The use of internal financing should be done with care since reduces the dividend payout of the companies. The unreliable dividends in the company cause the conflict of interest to rise between the shareholders and managers. This should be observed to safe the shareholders' interests.

The assets tangibility is negatively correlated with the debt ratio. This means that the company with high fixed assets value should employ less debt in its capital structure components and it is vice versa. This is valid if the company has an effective control mechanism in monitoring cost for their shareholders. The company with low level of tangible assets seeks for external source of fund.

The company size and liquidity are the moderate determinants of capital structure decision in Tanzania. They are positively related to financial leverage. The findings suggest that the large and liquidity companies employ more debts in their capital structure components. In due to this finding, companies should be aware of these determinants, the large companies should prefer debt financing to equity financing for tax deductibility benefits. In addition, the companies that have high paying ability should do the same.

For considering of these determinants of capital structure decisions, in our companies, the optimal capital structure should be constructed, and hence the sustainability and profitability of our companies should be improved.

This research can also be extended by using the same methodological approach in a different setting/country and then comparing the findings. This will generate additional insight on the general development of capital structure theories in developing countries.

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## RELATIONSHIP BETWEEN INTRINSIC REWARDS AND JOB SATISFACTION: A COMPARATIVE STUDY OF PUBLIC AND PRIVATE ORGANIZATION

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### ABSTRACT

*The focus of this research study is to explore the relationship between intrinsic rewards and job satisfaction for employees of service sector. The study examined the level of employee's job satisfaction for intrinsic rewards such as task autonomy, task significance, task involvement, opportunities to learn new things and recognition of public and private banking sector employees. The study was conducted in banking sector of Pakistan. Sample of 384 permanent employees of public and private banking sector of Pakistan was taken. Branches were randomly selected from Rawalpindi, Islamabad, Wah Cantt and Attock. To collect data, questionnaires survey was conducted. 384 questionnaires were equally distributed in both private and public sector banks, 263 questionnaires were returned and processed. SPSS 17 was used to analyze the data through independent sample t test, correlation and regression analysis. The Results of study indicated that the employees of private banks satisfied with task autonomy, task significance, task involvement and recognition, they were not satisfied with opportunities to learn new things. Results also reveals that public banking sector employees were satisfied with task autonomy, task involvement and recognition and they were not satisfied with task significance, opportunities to learn new things. Little differences were observed regarding preferences of intrinsic rewards between the employees of public and private banking sector. In general, the study findings suggest the intrinsic rewards such as task autonomy, task significance, task involvement, Opportunities to learn new things and recognition are important antecedence to job satisfaction for the employees of service sector organizations.*

### KEYWORDS

Job satisfaction, Intrinsic Rewards, Banking sector, Recognition, Task Autonomy.

### INTRODUCTION

Highly satisfied and motivated employees are valuable assets for any organization. The concept of employee satisfaction has great importance in the field of human resource management. A vast amount of research has been conducted on this subject. Organizations use different tools to satisfy and motivate their employees. According to Locke (1976), More than 3300 research articles have been compiled on this area. The main reason for the great interest in this area is the belief that work satisfaction affects employee productivity, absenteeism, turnover rate, and hence organizational performance. (Richard, 2006) argued that organizations design and implement rewards packages to attract and retain employees. (Richard, 2006) also found that the great difficulty faced by the organizations is to predict the behaviour of an individual. Some employees give importance to specific rewards and other attach to different rewards. The reward package may vary significantly over time and life style also affects on rewards package. (Clifford, 1985) suggested that different rewards have strong relationship with job satisfaction. If employees are highly satisfied with their work then they become more productive and loyal to their work. Job satisfaction is a concept that is affected by different factors like business environment, government rules and regulations and personality. There is great importance of motivation and commitment of the employees for organizations, with high level of job involvement in a workplace affects both outcomes of employees as well as organizations (Lawler, 1986). In a service industry especially employees of banking sector are highly motivated and loyal to the organization provide excellent quality customer services and keeping the customer happy. The satisfied customers always lead performance of the business. The level of employee satisfaction, commitment, motivation and job involvement could be determined by turn over rate of the employees. Employees with high job involvement are more focused towards their jobs, (Hackett, Lapierre, & Hausdorf, 2001).

The design of effective rewards package for employees is most difficult task for the organization told by (Chimanikire et al, 2007). Gaining employee satisfaction with rewards is not easy. It is important for the managers to understand the needs, expectations and desires of employees and offer those rewards which leads to satisfaction of the employees found by (Workineh & Shimels, 2010). There are different factors that are used to motivate the employees one of these is to recognize their work by saying thank you. There are a wide variety of intrinsic rewards available which increase satisfaction and overall job related productivity of employees. Some of these rewards come in the form of job involvement, participate in decision making, job autonomy, task significance and recognition. These rewards have their merits in creating a highly satisfied workforce. Through creation of a positive and cooperative atmosphere within an organization and design effective compensation package for employees leads to satisfaction, motivation and commitment the improvement of overall functioning of an organization. Considering the importance of human resources in the success of an organization, the current research study was conducted in banking sector of Pakistan and attempts to find the impact of Intrinsic Rewards on employees' job satisfaction.

### LITERATURE REVIEW

Impact of different intrinsic rewards such as task autonomy, task significance, task involvement, opportunities to learn new things and recognition on job satisfaction has been analyzed in the literature. (Locke, 1969) defines job satisfaction as a positive emotional feeling and it comes from by the comparison of expectation from his job and what he actually gets from it. Job satisfaction may also be come from the perception towards employee's job and working environment of the organization (Locke, 1976). Earlier research work done by (Kalleberg, 1977) on job satisfaction and he pointed out the question about the manner in which work values and job satisfaction. Basically (Kalleberg, 1977) distinguishes between work values and job rewards in his research. Work values refer to the attitude and attachment of an individual towards work. Job rewards are the intrinsic and extrinsic values which an individual receives from the job (Kalleberg, 1977). Differences in occupation, social class and different rewards offered by the employers to different occupation and level of employees discussed by (Kalleberg, 1980). Differences in occupation and class have effect on both types of rewards (Kalleberg, 1980).

Working hours, productivity, performance and job satisfaction studied by (Ravinder et al, 1977). Autonomy in the job can increase satisfaction and motivation of the employees. Motivation and satisfaction in the job increases the productivity of the employees discussed by (Ravinder et al, 1977). Chances to learn new things and more freedom in the job have positive relationship with employee job satisfaction. Chances to learn new things and autonomy in the job increases the satisfaction of the employees and Intrinsic rewards are equal beneficial for all the employees regardless of desirability (Linz et al, 2010). The division of intrinsic rewards as task autonomy, task significance, and task involvement is made by (Clifford, 1985).

There is effect of intrinsic rewards on employee satisfaction. These rewards enhance the satisfaction of employees (Jeffrey, 2008). (Donald & Sanjay, 2004) studied the variables of job satisfaction commitment, job involvement and job characteristics. The research study reveal that financial rewards are not important in all situations. The rewards other than financial may also matter for the satisfaction of the employees. The opportunities to learn skills and advancements are important for work satisfaction. (Hunjra et al, 2010) provided the evidence that there is positive relationship among autonomy, leadership behaviour team working environment and job satisfaction. This research study was conducted in banking sector. The results told that more autonomy in the work place increases the job satisfaction of the employees. (Karim, 2008) discussed that the job autonomy, job performance feedback and clarity which is significantly correlated with job satisfaction.

(Danish et al, 2010) conducted study in the different Pakistani organizations such as telecommunication, education, health and manufacturing sector etc and suggested, Reward and recognition have great impact on job satisfaction. There is a close relationship between several dimensions of work motivation and satisfaction but the relationship between recognition and Job satisfaction is low. Participation in decision making also increases the satisfaction of the employees. (James, 1991) had studied the predictor of job satisfaction of engineers. He found that task significance and interest in the work is a predictor of job satisfaction. According to (Janet, 1987) there is no difference between genders to prefer some specific types of rewards. Young Employees give more value to financial part of the rewards. He told that three factors of job satisfaction i.e. job values, rewards and work conditions. Job values related to intrinsic job rewards.

Intrinsic rewards motivate employees and have significant importance (John & Ron, 2009). According to (World at work; the reward association, 2008) Recognition is the most important reward for an employee; through recognition they become satisfy and stay with the organization. (Olagoke, 2010) discussed about the volunteer caregivers of people and tells that employees are more satisfied with intrinsic rewards like self-growth and personal emotional and psychological development. For employees, Job satisfaction is more related to extrinsic rewards than intrinsic rewards. (Rehman et al, 2010) studied the different intrinsic and extrinsic rewards and their relationship with employee job satisfaction. He conducted research study in the service industry, i.e. electric supply company. He found that rewards are the strong determinant of employee work satisfaction. He used rewards such as task autonomy; task significance and task involvement to determine the level of job satisfaction of three employees. He concluded that there is significant relationship between intrinsic rewards and employee job satisfaction.

There are different categories of rewards offered in hospital such as financial rewards, non financial rewards, and psychological rewards. Each type has its own sub types. Recognition is a subtype of psychological rewards. Researcher found that recognition has positive relationship with nurses' job satisfaction. If recognition increases then employee satisfaction will be increases. (Sara, Rein, Roland, Cindy & Marc, 2006).

More autonomy, variety, identity and significance increase the satisfaction of employees (Decarlo et al, 1999). According to (Corporate Leadership Council, 2006) autonomy increased the job satisfaction. With a high level of job autonomy, female workers have a significantly higher level of satisfaction than the male workers. (Nguyen et al, 2003) provided the evidence that job autonomy is highly correlated with the satisfaction of employees. Giving more autonomy at work place increases the satisfaction of the employees. (Rebecca, 2006) studied the teachers job satisfaction. He examined the relationship between recognition and teacher's job satisfaction. He found that there is a positive relationship between recognition and praise with job satisfaction. If recognition is offered from the higher level, the employee would be more satisfied with his work.

(Micheal, 2004) suggested that non cash rewards can be used for the high level of performance of employees. If organization keeps balance between extrinsic and intrinsic rewards, it leads to high satisfaction and performance. (Adeoti et al, 2006) found that non financial rewards such as recognition, achievement, responsibility and personal growth have positive effect on worker performance. Providing skill variety, task significance, autonomy and feedback makes employee's job more meaningful. The intrinsic rewards such as Sense of meaningfulness, choice, competence and progress enhance the employee engagement with his work (Thomas, 1999). (Magid, Saroj & Michael, 1994) provided evidence that Job involvement has the relationship with the job satisfaction, career Satisfaction and High commitment to the organization. (Ralph, 1978) suggested that task significance, autonomy, and feedback from job are highly linked with the job satisfaction. If there is task significance and autonomy present in work then the employees will be more satisfied with their work.

(Sumita & Arvind, 2002) said that job satisfaction is the part of the organizational behaviour research. He examines the variables such as job autonomy, opportunity for growth and chances to learn new things. He suggested that these variables enhance the employee's satisfaction towards his job. He also related the job satisfaction with job delight. Basically, his study was based on beyond job satisfaction when employees have greater satisfaction in job. Greater satisfaction through the freedom at work, opportunities for learn new things and growth leads the satisfaction and satisfied employee will be delightful from his job. (Endah & Carolyn, 2010) supported the idea that job autonomy, opportunity and supervisory support increases the satisfaction of the employees and is important for the work place relationships. (Karim & Roger et al, 2005) suggested that intrinsic factors such as autonomy and recognition increase the satisfaction with the job. (Huang et al, 2002) discussed about co determinants of job satisfaction i.e. interesting work and freedom at work. He also suggested that the employees of different countries do not prefer same type of intrinsic rewards. His study was based on employees of different countries who belong to different cultures. He collected data from 130,000 employees from 46 different countries and clearly identified that intrinsic rewards enhances the satisfaction of the employees.

Task significance, job autonomy and feedback enhance the job related satisfaction (P. Chelladurai, 2006). He defined autonomy as the degree to which the job provides substantial freedom. Significance is the degree to which the job has substantial impact on the lives of other people. (Baard et al, 2004) found that psychological adjustment like autonomy in the job increases the satisfaction of the employee. (Workineh & Shimels, 2010) conducted study at educational sector. Basically he studied the different job rewards i.e. recognition, involvement in decision making, freedom at work place, opportunities for learn new things through further education, salary and incentive and job security. He told that if rewards package is not effectively designed then it can leads to dissatisfaction of the employees. The rewards such as absence of recognition ranked second, Lack of opportunity to learn new things through further education ranked eighth, Low level of job freedom ranked sixth and less chance of participation in decision making ranked third to leads the dissatisfaction of the employees. In other words recognition is significantly related with the satisfaction of the employees. The rewards such as chances of participate in decision making, job freedom and opportunity to learn new things ranked respectively.

Giving variety of task enhances the motivational level of employees. Motivated employee is more satisfied and loyal with his work (Hertzberg, 1950). (Society for Human Resource Management, 2009) conducted a survey and presented report regarding employee job satisfaction. Society for Human Resource Management found that autonomy, variety of work, independence and recognition enhances the employee job satisfaction. (Lather et al, 2005) found that there is a positive relationship among job autonomy, need for growth and job satisfaction. If there is freedom at work then employees are highly motivated and satisfied with their job. (Clifford, 1985) found that that different rewards like recognition, appreciation and work autonomy increases the satisfaction of the employees towards job.

High involvement in a job, participation in decision making, feedback and sharing information with employees increase the job satisfaction. High involvement in a decision making has positive relationship with job satisfaction. If there is high involvement in job then there is high level of employee satisfaction towards job (Robert and Cindy, 2008). Intrinsic rewards followed by extrinsic social rewards, are powerful determinant of satisfaction across all occupational group. Rewards play an important role in attracting, motivating and retaining employees (Koala consulting and Training Co.). According to (Jenaibi, 2010) these are the instructions for supporting employee satisfaction in business, providing obvious opportunities, for information sharing and empowering employees work enhances the satisfaction of the employees. (Linz 2003), discussed about the job satisfaction among workers. He found that employees give importance to acquire new skills and opportunities to learn. Adopting these rewards raises the satisfaction level.

## PROBLEM STATEMENT (BROAD PROBLEM AREA)

The broad problem area of this research is to examine the impact of rewards on employee satisfaction. The Companies offer different types of rewards to its employees. The rewards offered by the organization include intrinsic, extrinsic, financial and non financial rewards. The effective package of rewards increases the motivational level which leads to satisfaction and ultimately increases the productivity of employees.

## RESEARCH OBJECTIVES

The importance of the service sector to the economy of Pakistan is contributing factor to formulating the aim of the study. The primary objective of this study is to examine and determine the perception of the employee respondents regarding the Impact of Intrinsic Rewards on job Satisfaction for Public sector banks and Private Sector Banks of Pakistan. The basic aims are as follows:

- Identify the importance of intrinsic rewards for the employees of public sector and private sector banks.
- To identify the specific factors for policy implications.

**RESEARCH METHODOLOGY****RESEARCH DESIGN**

Research is the technique for investigating something in a systematic manner. (Merriam, P.3). There are diverse kinds of researches conducted in a social science field. Academic research in social Sciences is usually divided into two types; one is qualitative and the other second is quantitative research. (Hopkins, 2000) suggested that quantitative research work connects independent and dependent variables. (Randall et al, 2011) proposed that there are three types of quantitative research. Experimental, Quasi experimental and non experimental. (Randall et al, 2011) proposed that experimental research allows the researcher to state end of the study whether or not one variable clearly caused something to happen to another variable. Quasi experimental research refers to control and manipulate variables in experimental design. (Randall et al, 2011). According to the findings of (Randall et al, 2011) some types of non experimental research are survey research includes questionnaire or structured interviews for gathering of data and it is used to providing support to research work which can then be tested, Correlation research is to observe the relationship among two or more variables, Ex post facto or comparative research attempts to infer the casual relationship among the variable because it does not manipulate the independent variable that has already occurred naturally.

Research study may first find out the relations of variables with quantitative method and then investigates relations and theories with qualitative method. (Morse, 1991) discussed that Qualitative results are used to help in explaining the findings of a primarily quantitative study, and are very useful when unanticipated results arises from a quantitative study. The study we will conduct is to find out the impact of Independent variables on one dependent variable.

**SAMPLING TECHNIQUES AND DATA COLLECTION**

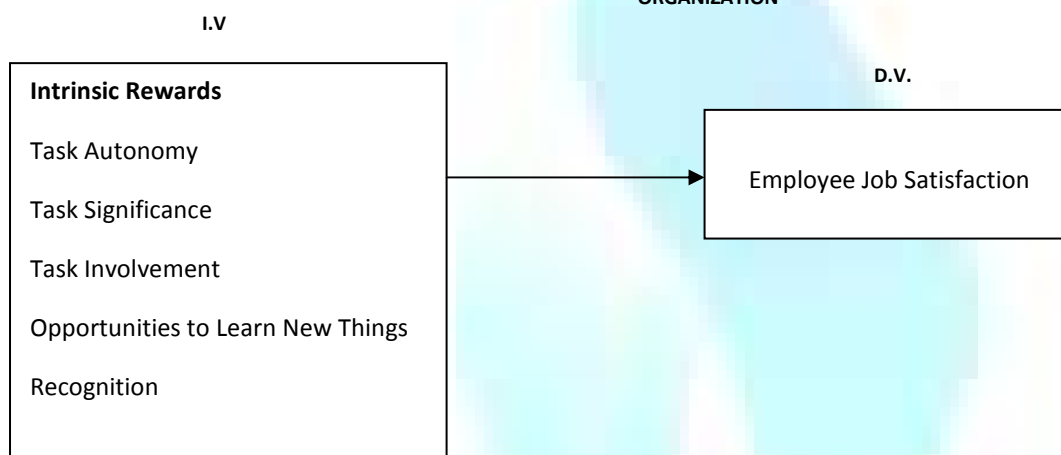
The survey was conducted in the branches chosen randomly from the cities of Islamabad and Rawalpindi, Wah Cantt and Attock, where employees of banks were acting as respondents to the survey. The reason for selecting Islamabad and Rawalpindi was that these are most developed cities in the Pakistan. Islamabad is also the Capital of Pakistan. There is high literacy rate and good infrastructure. Convenience sampling was used for the collection of data.

**SAMPLE SIZE**

The data for this study was obtained from public and private banking sector of Pakistan. A sample of 384 participants was taken from the population. The sample size is calculated from the table given by (Sekaran, 2005). The respondents were divided into four categories: Manager of a bank, Assistant Manager, Cashier and other includes clerical staff. The total sample consisted of full-time employees representing different levels and responsibilities. The response rate was 68 percent.

**THEORETICAL FRAMEWORK**

**CONCEPTUAL MODEL: RELATIONSHIP BETWEEN INTRINSIC REWARDS AND JOB SATISFACTION; A COMPARATIVE STUDY OF PUBLIC AND PRIVATE ORGANIZATION**

**DESCRIPTION OF THE MODEL**

**JOB SATISFACTION:** Job satisfaction refers to the worker's affective response to the total work situation (Rehman et al, 1995). Gupta defined job satisfaction as a positive emotional state resulting from the appraisal of one's job. According to discrepancy theory of (Locke, 1976), employee measures satisfaction based on comparison between current achievements and what they believe they deserve. According to (Richard, 2006), It is difficult to identify the level and strength of the satisfaction but employees gain satisfaction from their job. (Locke, 1969) argued that job satisfaction is a positive emotional feeling. (Ravinder et al, 1977) discussed that job autonomy has significant positive relationship with job satisfaction and it also increases the motivation and productivity of the employee.

**TASK AUTONOMY & JOB SATISFACTION:** Task autonomy is the extent to which employees have a major say in scheduling their work and deciding on procedures to be followed (DeCarlo, 1999). (Chelladurai, 2006) was defined autonomy as the degree to which the job provides substantial freedom. (Cary L, 2004) defines task autonomy refers to a feeling of control over the outcomes of one's work. (Baard et al, 2004) suggested that the employees of managers level prefer autonomous environment. Autonomy increases the satisfaction of employees. (Jenaibi, 2010) suggested that autonomy and empowerment at a work place enhances the satisfaction of the employees. (Han et al, 1995) told that autonomy has relationship with employee job satisfaction and autonomy at work increases the satisfaction level. (Karim & Roger, 2005) suggested that more autonomy increase the satisfaction of employees. (Lather et al, 2005) said that autonomy in the work place has positive relation with job satisfaction. (Sims, Szilagy and McKemey 1976) defined Job autonomy as the extent to which workers are allowed freedom in the work place, independence when performing their job tasks and duties. If there is greater autonomy in a work, it increases the satisfaction of the employees. (Rockman, 1984) suggested that autonomy has the positive relationship with satisfaction of the employees.

**TASK SIGNIFICANCE & JOB SATISFACTION:** Task significance refers to the significant contribution to the organization from employee. Making significant contribution to an organization leads the purpose and value of the work to employees (Mottaz, 1985). Chelladurai defined Significance as the degree to which the job has substantial impact on the lives of other people. (Rahim, 2010) also defined task significance as the degree to which the job has an impact on the lives or work of other people, within or outside. (Rehman et al, 2010) found that task significant has positive relationship with employee job satisfaction. Feeling of significant contribution towards work enhances the satisfaction level of employees. (Clifford, 1985) divided intrinsic rewards into three types i.e., task Autonomy, Task Significance and task involvement. He suggested that intrinsic rewards has significant relationship with employee job satisfaction.

**TASK INVOLVEMENT & JOB SATISFACTION:** It is a process for empowering employees to participate in managerial decision-making and improvement activities appropriate to their levels in the organization suggested by (Apos tolu, 2000). Job involvement of an employee in his work place and his organizational commitment towards job are the key outcomes of the internal career (Davis and Cherns, 1975). (Han et al, 1995) provided the evidence that involvement in decision making enhances the satisfaction of the employees. (Barker et al, 2007) suggested that high involvement and feedback culture in an organization enhances the satisfaction level of employees. (Coch and French, 1949) are considered as initial researcher to studying the relationship among employee involvement in decision making, productivity and satisfaction. According to (Clifford, 1985) found that recognition is positively related with the satisfaction of the employees. (Hackett, 2001) argued that job involvement has significant relationship with satisfaction of the employees. Job involvement has relationship with employee job satisfaction but job involvement and job satisfaction are theoretically different from job satisfaction suggested by the (Blau, 1985, 1987, 1980;



Kanungo, 1982). According to (Kraig, 2003) participation of the employees has positive relationship with productivity of the employees which ultimately effect on organizational productivity and performance.

**OPPORTUNITIES TO LEARN NEW THINGS & JOB SATISFACTION:** An opportunity to learn new things refers to providing opportunities for skill enhancement and development (Lathe et al 2005). (Herzberg, 1959) Conducted study regarding job satisfaction of workers, he told that opportunities for advancement lead to worker satisfaction. (Graham et al, (1998) provided the evidence that opportunities for advancement is least related with employee satisfaction. (Linz 2003), examined the relationship between opportunities to acquire new skills and employee satisfaction. He found that employees give importance to get new expertise and chance to learn. Adopting these rewards raises the satisfaction level of employees.

**RECOGNITION & JOB SATISFACTION:** Recognition describes how much the appreciation and the way of an organization gives rewards to its employees suggested by (Danish et al 2010). (Herzberg 1959) found that recognition enhance the worker satisfaction. (Karim & Roger, 2005) suggested that recognition has relationship with employee's satisfaction. Recognition enhances the satisfaction level of employees. (Ali et al, 2009) suggested that employees less satisfy and motivated through recognition and highly motivated through other rewards such as promotion, benefits, work contents and working conditions. (Clifford, 1985) said that different rewards like work autonomy and participation in work increases the satisfaction of the employees towards job. Recognition tells how the work of an employee is assessed and how much the appreciation he gets in return from the boss. Andrew (2004) stated that rewards and recognition enhances the loyalty and commitment of all employees. (Nienhuis, 1994) suggested that recognition has significant impact on an employee's decision to stay or leave his or her organization. According to Blasé and Kirby (1992), recognition can increase motivation, and employee loyalty. (Kraig, 2003) suggested that the effective reward package enhances the productivity of the employee's such as recognition and appreciation from the boss which leads to satisfaction of the employees.

#### RESEARCH QUESTIONS

This proposed research intends to answers the following research questions:

- Do the intrinsic rewards increase the satisfaction of employee?
- What is the difference between employees of public sector and private sector banks regarding preference of intrinsic rewards?

#### HYPOTHESIS DEVELOPMENT

**H1:** There is a positive relationship between intrinsic rewards and employee satisfaction.

**H2:** There is a significant difference regarding preference of intrinsic rewards between the employees of public and private banking sector in Pakistan.

#### DATA ANALYSIS

##### PRIVATE SECTOR ORGANIZATION

In these days service industry has significant importance and its trend is expanding day by day. Many organizations provide purely services to society and customers and some organization have separate service department. This research was conducted in service industry to consider the importance of service sector. Banks provide financial services to the communities and customers. There is need to design effective reward package for employees working in banks because if employees are satisfied with their job, they will be more committed and do their job with great interest and put their maximum input which ultimately increases the satisfaction of the employees. In the Pakistani context banking sector divided into two main sectors i.e. Private banking sector and public banking sector. The main focus of our study was to examine the difference between the preferences of public and private banking sector regarding intrinsic rewards and employee job satisfaction. Different commercial private banks were selected to gather data from the region of Islamabad, Rawalpindi, Wah Cantt and Attock. These banks include Habib Bank limited, Al- Habib Bank, Al-Falah Bank, Unined Bank limited, Al-Barkah Bank, Muslim Commercial Bank and Allied Bank Limited.

**Reliability Analysis:** The measurement of variables is a challenging task in the research. In social sciences, if we use unreliable measurements of variable then it will be useless effort to measure any variable. A measurement is reliable if it reflects mostly true score, relative to the error. According to (Sekaran, 2006) reliability of a measure defined as the extent to which it is without bias and there should be consistency of results across time and across various items.

The reliability of measurement is always defined in the term of repeatability. Reliability is a number that expresses the relationship between the true score variance and the measurement error variance. If there is lower the error then there is higher the reliability told by (Velde et al, 2004). Cronbach Alpha is a reliability coefficient that shows how well the items in a set are positively correlated to one another defined by (Sekaran, 2006).

TABLE: 4.1

Variables	Cronbach's Alpha
Job Satisfaction	.772
Task Autonomy	.700
Task Significance	.695
Task Involvement	.695
Opportunities to learn New Things	.790
Recognition	.708

Two items were used to measure the employee job satisfaction. Cronbach's Alpha was yielded .772 which shows that the items used to measure job satisfaction. The value of alpha truly suggests that the items used to measure job satisfaction are reliable. Two items were used to measures the task autonomy and its Cronbach's Alpha was .700. To measure the task significance and involvement, three and two items were used and Cronbach's Alpha was yielded .695 for both. Opportunities to Learn New Things were measured by two items and its Cronbach's Alpha was .790 and recognition was measured by three items, its Cronbach's Alpha was .708.

**Descriptive Analysis:** Descriptive Statistics allows the researcher to give explanation of different pieces of data with a few indices. Descriptive statistics or analysis such as standard Deviation and means were obtained for the interval scale independent and dependent variables.

TABLE: 4.2

	Mean	Std. Deviation
Job Satisfaction	3.7810	.73480
Task Autonomy	3.7591	.79081
Task Significance	4.0949	.60492
Task Involvement	3.9489	.85165
Opportunity to Learn New Things	4.4015	.68018
Recognition	4.0949	.76584

The table of Descriptive Statistics shows that the direction of job satisfaction with intrinsic rewards such as task autonomy, task significance, task involvement, opportunities to learn new things and recognition ranged from 3.75 to 4.40. The mean value for task autonomy is lowest value and Opportunity to learn new things is highest value 4.4015. From the results it may be seen that the mean on job satisfaction is rather low, 3.78 at 5-point scale, the mean of task autonomy was 3.76. Task significance and recognition are about average 4.09 on five point scale. The mean of task involvement is 3.95 and Opportunity to Learn New Things is 4.40 on five point scale.

**Correlation Analysis:** Correlation is a statistical technique that shows how the variables are related with each other. According to (creative research systems, 2011) correlation analysis told the correlation among variables but it doesn't tell which relation is stronger.

TABLE: 4.3

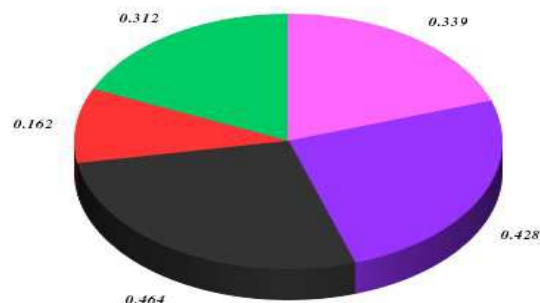
	Job Satisfaction
Pearson Correlation	
Task Autonomy	.339*
Task Significance	.428*
Task Involvement	.464*
Opportunities to Learn New Things	.162**
Recognition	.312*

The (table 3.3) Pearson correlation shows the test of measuring the association of variables. Pearson correlation was computed for to determine the relationships among variables such as relationship of task autonomy, task significance, task involvement, opportunities to learn new things and recognition with employee job satisfaction. The Pearson correlation matrix indicates that there is positive and significant relationship between intrinsic rewards and employee job satisfaction. Pearson Correlation of task autonomy with job satisfaction i.e. .339 reflects the extent of relationship between task autonomy and job satisfaction. Same as the values of Pearson correlation for Task Significance .428, Task Involvement .464, Opportunities to Learn New Things .162 and Recognition .312 shows that the relationship among variables such as task autonomy, task significance, task involvement, opportunities to learn new things, recognition and employee job satisfaction.

FIGURE 1

*Correlation (Private Sector)*

■ Task Autonomy ■ Task Significance ■ Task Involvement ■ Opportunities to Learn New Things ■ Recognition



The (figure 1) is indicating the relationship of independent variables i.e. task autonomy, task significance, task involvement, opportunities to learn new things and recognition with dependent variable i.e. employee job satisfaction. Chart clearly shows that value of task autonomy is 0.339, task significance 0.428, task involvement 0.464, opportunities to learn new things 0.162 and recognition .0312. These values indicate the degree of relationship between every independent variable with dependent variable.

#### Model Summary

TABLE: 4.4

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.591	.350	.325	.60378

The table 3.4 indicates the "Model Summary". It's indicating the R, R square, adjusted R squared, and the standard error of estimate. R shows the correlation among the independent and dependent variables. The values of R range from -1 to 1 show the direction of relationship either positive or negative. Greater the value of R indicates stronger relationship. The value of R square indicates that the model tested is significant i.e. value of R square is .350 which means that there is 35 percent relationship between independent variables (i.e. task autonomy, task significance, task involvement, opportunities to learn new things and recognition) and dependent variable (i.e. employee job satisfaction). There is 35 percent change is caused by intrinsic rewards to employees job satisfaction for the private banking sector which is dependent variable. The value of adjusted R square .325, indicates the correct R square which shows more closely fit of the model in the population.

**ANOVA:** Table 3.5 shows the model fit. F statistics divided into Regression mean square and residual mean square. Table 5 indicates value of "F" which is 14.08, it means model is fit. Significance level is .000.

TABLE: 4.5

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	25.675	5	5.135	14.086	.000
Residual	47.756	131	.365		
Total	73.431	136			

**COEFFICIENTS:** The table 3.6 indicates measurement of independent variables is in different units. The value of the beta shows the rate of change occurs in dependent variable due to independent variables.

TABLE: 4.6

Model	Standardized Coefficients	T	Sig
	Beta		
(Constant)		1.779	.078
Task Autonomy	.199	2.540	.012
Task Significance	.289	3.612	.000
Task Involvement	.313	4.077	.000
Opportunities to Learn New Things	-.140	-1.511	.133
Recognition	.116	1.213	.227



The value of beta shows the positive rate of change for task autonomy for task autonomy. Task Significance also has positive relationship with job satisfaction. Task significance and involvement also shows positive relation with job satisfaction of employees. The value of beta shows the negative rate of change for opportunities to learn new things by dependent variable.

#### PUBLIC SECTOR ORGANIZATION

The public sector organizations also have significant importance. In the Pakistani context, some banks include in public service sector. The basic purpose of public banks is not to generate profit. They are working on the behalf of government and best interest of the society. So there is need to satisfied and motivated workforce for the public sector organizations. We collected data from the two main public banks from the region of Rawalpindi, Islamabad, Wah Cantt and Attock, Total sample to collect data was 384 full time employees of public and private banking sector. That's why we distributed 192 questionnaires in private banking sector and 192 in public banking sector.

**Reliability Analysis:** For public Sector banks, variables measured by five point likert scale. Degree of agreement varies from 1-5. 1 representing for strongly disagree to 5 for strongly agree and 2 for disagree and 4 for agree and 3 for Neutral. Two items were used to measure the employee job satisfaction. Cronbach's Alpha was yielded .709. Two items were used to measures the task autonomy and its Cronbach's Alpha was .741. To measure the task significance and three items were used and Cronbach's Alpha was yielded .746 and to measure the task involvement two items were used and Cronbach's Alpha was .826. Opportunities to Learn New Things were measured by two items and its Cronbach's Alpha was .755 and recognition was measured by three items, its Cronbach's Alpha was .707. The values of Alpha clearly show that the items used to measure the variables are reliable because the values of Alpha were greater than .700. The value of Alpha closeness to '1' show that items are more reliable. The value of Alpha less than .700 shows less reliability. The Alpha value of .700 means it is in acceptable range. However in some cases the value of alpha greater than .6 acceptable. This occurs usually in which situation if we examine the human behaviour related variables because to predict human behaviour is difficult task.

TABLE: 4.7

Variables	Cronbach's Alpha
Job Satisfaction	.709
Task Autonomy	.741
Task Significance	.746
Task Involvement	.826
Opportunities to learn New Things	.755
Recognition	.707

**Descriptive analysis:** The table 3.8 'Descriptive Statistics' indicates the direction of job satisfaction with intrinsic rewards i.e. task autonomy, task significance, task involvement, opportunities to learn new things and recognition for public banking sector ranged from 3.8 to 4.44.

TABLE: 4.8

Variables	Mean	Std. Deviation
Job Satisfaction	4.0238	.66289
Task Autonomy	3.8333	.71274
Task Significance	4.0873	.50628
Task Involvement	4.2540	.72594
Opportunity to Learn New Things	4.4524	.58797
Recognition	4.1508	.56664

The mean value for task autonomy is lowest value. Opportunities to learn new things have highest value of mean which is 4.4453. The mean value of task significance, task involvement and recognition is 4.0, 4.25 and 4.15.

TABLE: 4.9

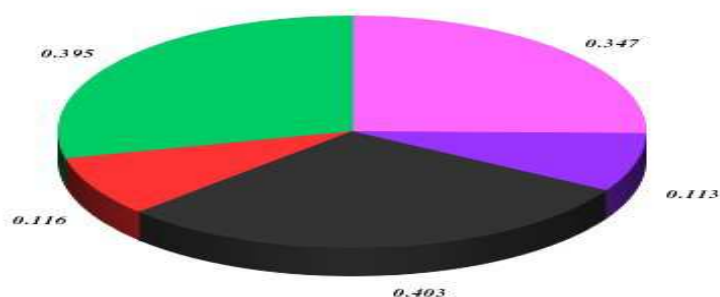
	Job satisfaction
Pearson Correlation	
Task Autonomy	.347*
Task Significance	.113**
Task Involvement	.403*
Opportunities to Learn New Things	.116**
Recognition	.395*

The table 3.9 shows the Pearson Correlation and it indicates the relationship among variables such as task autonomy, task significance, task involvement, opportunities to learn new things, recognition and job satisfaction. The Pearson correlation indicates that there is positive and significance relationship between variables because the values for task autonomy are .347, task significance is .113, task involvement is .403, opportunities to learn new things are .116 and recognition is .395.

FIGURE 2

Correlation (Public Sector)

■ Task Autonomy ■ Task Significance ■ Task Involvement ■ Opportunities to Learn New Things ■ Recognition



The (figure 2) is representing the relationship of independent variables i.e. task autonomy, task significance, task involvement, opportunities to learn new things and recognition with dependent variable i.e. employee job satisfaction. Chart clearly shows that value of task autonomy is 0.347, task significance 0.113, task involvement 0.403, opportunities to learn new things 0.116 and recognition .0395. These values indicate the degree of relationship between every independent variable with dependent variable.

#### Model Summary

TABLE: 4.10

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.537	.289	.259	.57066

The table 3.10 'Model Summary' indicates the value of R, R square, Adjusted R square and Standard error of estimate. There is 28.9 percent change is caused by intrinsic rewards to employees job satisfaction for the public banking sector. Model Summary shows that model tested is significant. The adjusted R square shows model fit in population more closely. The value of R square is .289 which shows there is 29 percent relationship between independent and dependent variable.

**ANOVA:** The table 3.11 'ANOVA' includes the mean squares of regression and residual. The value of F indicates the model is significant and fit at significant level .000.

TABLE: 4.11

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	15.850	5	3.170	9.734	.000
Residual	59.929	120	.326		
Total	39.079	125			

**Coefficients:** The table 3.12 'Coefficient' indicates the relationship of every independent variable with dependent variable. The value of beta shows the rate of change caused by the independent variable on dependent variable. The value of beta for task autonomy is 0.160, task significance is -.040, task involvement is 0.277, opportunities to learn new things is -.014 and recognition is 0.36.

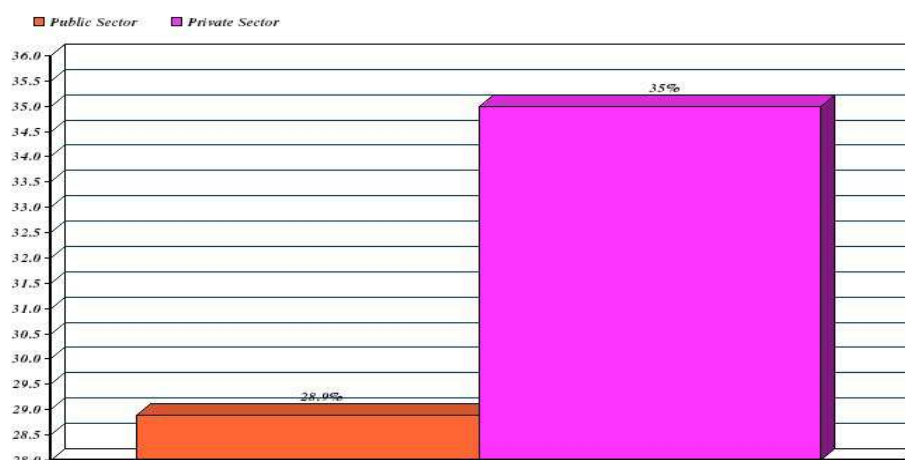
TABLE: 4.12

Model	Standardized Coefficients	T	Sig
	Beta		
(Constant)		2.711	.008
Task Autonomy	.160	1.877	.063
Task Significance	-.040	-.496	.621
Task Involvement	.277	3.265	.001
Opportunities to Learn New Things	-.140	-1.493	.138
Recognition	.360	3.621	.000

The value of beta indicates the positive rate of change for task autonomy, task involvement and recognition. The value of beta also shows the negative rate of change for opportunities to learn new things and task significance by dependent variable. It means job satisfaction is positively related with task autonomy, task significance, task involvement and recognition and negatively related with opportunities to learn new things and task significance.

FIGURE 3

Relationship between Independent and Dependent Variables (%)



The (figure 3) is indicating the value of r square for both public and private sector organization. The value of r square of public sector organization is .289 or 28.9 % which means that 28.9 percent change caused by the intrinsic rewards on employee job satisfaction. Same as the figure 3 also clearly indicating value of r square .350 or 35 percent, which means that there is 35 percent change caused by the intrinsic rewards on employee job satisfaction.

#### DISCUSSION AND CONCLUSION

The objective of this paper was to find out the answer of following questions i.e. do the intrinsic rewards increase the satisfaction of employee and what is the difference between employees of public sector and private banking sector regarding preference of intrinsic rewards? The purpose of different rewards is to satisfy and motivate employees. Organizations offer different rewards to employees to motivate and satisfy them.

Variables measured by questionnaire, through the sample of 384 employees. Questionnaire was filled from full time banking employees. After interpretation of results, research study proves the relationship between intrinsic rewards such as task autonomy, task significance, task involvement, opportunities to learn new things and recognition with employee job satisfaction.

This study proves that intrinsic rewards i.e. task autonomy, task significance, task involvement and recognition has positive relationship with employee job satisfaction for private banking sector. Provide more autonomy at work place, task significance, involvement in decision making and recognition enhances the satisfaction of the employees. Results also show that there is a negative relationship between opportunities to learn new things and employee job satisfaction for private service organization. Private Banking sector employees are not satisfied with opportunities to learn new things.

The results of research study indicate that there is positive relationship among task autonomy, task involvement and recognition. Public service sector employees are satisfied with freedom at work, involvement and department current recognition program and there is negative relationship among task significance, opportunities to learn new things and employee job satisfaction. Employees of public service sector organizations are not satisfied with chances and opportunities to learn new things and task significance.

The second objective of study was to find out answer of the following question i.e. what is the difference between employees of public sector and private sector banks regarding preference of intrinsic rewards? Results of study clearly show that there is difference exist between employees of public and private financial institutions regarding preference of intrinsic rewards. Public sector employees are less satisfied than private sector employees. They do not feel that they added significant contribution to organization. They are also not satisfied with chances to develop and learn new skills and abilities.

The delimitation of this study was to examine only one variable, Impact of "Intrinsic rewards" on employee job satisfaction. Role of other variables, such as Extrinsic Rewards, age of employees and gender differentiation might also be capable of clarifying this concept further but was not included in this study. Examination of the impact of intrinsic rewards such as, Task Autonomy, Task Significance, task Involvement, Opportunities to learn new things and Recognition on employee job satisfaction will be based on the attitude of the participants of the study. It was not possible to evaluate actual behaviour by conducting interviews and filling questionnaire alone because there were a diverse mix of employees and it was not possible to interview or fill questionnaire from every individual.

### SUGGESTIONS FOR THE FURTHER STUDY

This study is indicating that the intrinsic rewards could effect on employee satisfaction and the differences of the preferences of public and private banking sector employees. Future direction for research could be:

- To use the age and gender factor as moderating variable could be effective for investigating the different preferences of genders and age groups.
- To investigate the combine effect of intrinsic and extrinsic job rewards on job satisfaction.

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**NUCLEAR ENERGY IN INDIA: A COMPULSION FOR THE FUTURE**

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**ABSTRACT**

*India requires 80,000 MWe of power up to the year 2050, to achieve this target of power generation India is neither having Thermal power nor Hydral power to achieve this mega target. The only option India is having is of nuclear energy. Nuclear power supplies 50.8 billion KWh (2.5% of India's total electricity generation) in the year of 2007. It is a very small percentage of nuclear power generation by a nation of the size of India. Even smaller countries like South Korea are producing more than 20% of their total power generation by nuclear energy. So it is the need of the time for India to generate nuclear energy at a large scale. Presently 25 reactors at 8 sites are producing 2170 MWe of power in India. To generate more nuclear power India needs Uranium-232, from the international nuclear club. In 1998 in the NDA Government India blasted five underground nuclear bombs. The result of this was that the Uranium supply to India was crippled but the nuclear blast hampered India's efforts. India was in search of an International recognition of its nuclear power. This resulted in Indo-US Civil Nuclear agreements on March 2, 2006 in New Delhi. It was a big achievement of India's recognition as a global nuclear power and presently India is in its way of setting of 39 Nuclear Power reactors to produce 45000 MWe electricity in the near future.*

**KEYWORDS**

Nuclear Power, Indo-US Civilian Nuclear Deal, Nuclear Radiations.

**INTRODUCTION**

India's Atomic Energy programme has been a mission-oriented comprehensive programme with a long-term focus. From its inception the guiding principle of this programme has been self-reliance through the utilization of domestic mineral resources, and building up capability to face possible restrictions in international technology and the exchange of resources. The events of the last 50 years have, in fact, validated this approach. (Reddy S, Balachandra P, 2002)

The Department of Atomic Energy (DAE) in India is today a broad-based multidisciplinary organization incorporating basic and applied research, technology development and their translation into industrial application, as closely linked activities. As a result, India today builds its own thermal reactors and associated nuclear fuel cycle facilities and is well poised to march on to the second and third stages of its planned programme involving fast breeder and thorium utilization technologies respectively. This effort is expected to provide a significant long-term solution to India's crucial electricity needs to support its overall development. The Atomic Energy Establishment was set up at Trombay, near Mumbai, in 1957 and renamed as Bhabha Atomic Research Centre (BARC) ten years later. Plans for building the first Pressurised Heavy Water Reactor (PHWR) were finalised in 1964, and this prototype - Rajasthan-1, which had Canada's Douglas Point reactor as a reference unit, was built as a collaborative venture between Atomic Energy of Canada Ltd (AECL) and Nuclear Power Corporation of India Limited (NPCIL). It started up in 1972 and was duplicated Subsequent indigenous PHWR development has been based on these units.

**THE ROLE OF NUCLEAR POWER**

There is a well established link between per capita electricity consumption and human development. The installed electricity generation capacity in the country is quite impressive and gross electricity generated during the year 2009-2010 was about 800,000 million units. <sup>2</sup> (India Development Report 2004-2005). In absolute terms, this is a large figure, but when looked at on a per capita basis, this is far below the world average. To meet our large electricity production needs, we have to tap all energy resources available to us. While coal-fired thermal power plants, apart from hydro, would remain the mainstay for our electricity production for quite some time, we would need to supplement them with sizeable additional resources to assure long-term energy-security as well as environmental protection. In this energy mix, nuclear power has an important role to play in the coming years.

The Indian uranium reserves are modest and cannot make an overly significant contribution to electricity requirements, if this uranium is used once in a nuclear reactor and then disposed of as waste. However, with a carefully planned programme, the available uranium can be used to harness the energy contained in non-fissile thorium, of which India possesses about 30 per cent of the world's reserves. The first stage of this programme involves using the indigenous uranium in Pressurised Heavy Water Reactors (PHWRs), which produce not only energy but also fissile plutonium. In the second stage, by reprocessing the spent nuclear fuel and using the recovered plutonium in Fast Breeder Reactors (FBR), the non-fissile depleted uranium and thorium can breed additional fissile nuclear fuel plutonium and uranium-233 respectively. In the third stage, thorium and uranium-233 based nuclear reactors can meet India's long-term energy requirements. Sustainable development of the country's economy requires nuclear energy, and sustainable development of nuclear energy requires closing the nuclear fuel cycle with thorium utilization. (Kakodkar & R.Grover, 2004)

Indian concerns and priorities are, thus, quite unique. For its long-term energy security India has no option but to deploy nuclear power according to a strategy precisely tuned to its needs and resources.

**THE PRESENT AND THE FUTURE**

Electricity demand in India is increasing rapidly, and the 830 billion kilowatt hours produced in 2008 was triple the 1990 output, though still represented only some 700 kWh per capita for the year. With huge transmission losses, this resulted in only 591 billion kWh consumption. Coal provides 68% of the electricity at present, but reserves are limited. Gas provides 8%, hydro 14%. The per capita electricity consumption figure is expected to double by 2020, with 6.3% annual growth, and reach 5000-6000 kWh by 2050. (The World Fact Book- India, 2005).

Nuclear power supplied 15.8 billion kWh (2.5%) of India's electricity in 2007 from 3.7 GWe (of 110 GWe total) capacity and after a dip in 2008-09 this will increase steadily as imported uranium becomes available and new plants come on line. In the year to March 2010, 22 billion kWh was forecast, and for the 2010-11 year 24 billion kWh is expected. For 2011-12, 32 billion kWh is now forecast. Some 300 reactor-years of operation had been achieved by mid 2009. India's fuel



situation, with shortage of fossil fuels, is driving the nuclear investment for electricity, and 25% nuclear contribution is foreseen by 2050, when 1094 GWe of base-load capacity is expected to be required. Almost as much investment in the grid system as in power plants is necessary. (A.Gopalakrishnan, 2002)

In 2006 almost US\$ 9 billion was committed for power projects, including 9.35 GWe of new generating capacity, taking forward projects to 43.6 GWe and US\$ 51 billion. In late 2009 the government said that it was confident that 62 GWe of new capacity would be added in the 11th 5- year plan to March 2012, and best efforts were being made to add 12.5 GWe on top of this, though only 18 GWe had been achieved by the mid point of October 2009, when 152 GWe was on line. The government's 12th 5-year plan for 2012-17 was targeting the addition of 100 GWe over the period. Three quarters of this would be coal- or lignite-fired and only 3.4 GWe nuclear, including two imported 1000 MWe units at one site and two indigenous 700 MWe units at another. (S. Banerjee 2010)

A report in 2007 said that India needed to spend US\$ 120-150 billion on power infrastructure over the next five years, including transmission and distribution (T&D). It said that T&D losses were some 30-40%, worth more than \$6 billion per year. A 2010 estimate shows big differences among states, with some very high, and a national average of 27% T&D loss, well above the target 15% set in 2001 when the average figure was 34%. The target since about 2004 has been for nuclear power to provide 20 GWe by 2020, but in 2007 the Prime Minister of India referred to this as "modest" and capable of being "doubled with the opening up of international cooperation." However, it is evident that even the 20 GWe target will require substantial uranium imports. Late in 2008 NPCIL projected 22 GWe on line by 2015, and the government was talking about having 50 GWe of nuclear power operating by 2050. Then in June 2009 NPCIL said it aimed for 60 GWe nuclear by 2032, including 40 GWe of PWR capacity and 7 GWe of new PHWR capacity, all fuelled by imported uranium. This target was reiterated late in 2010. (CMIE, Energy, 2005).

The table given below summarizes the present status of and future plans for nuclear power in India. The designs of new reactors have progressively evolved to incorporate advanced features to further improve safety, reliability and economics. The country has successfully developed technologies for in-service inspection, maintenance and refurbishment of older plants. As India gains experience and masters various aspects of nuclear technology, the performance of its nuclear plants continues to improve. The average capacity factor of Indian plants in 1995-96 was 60 per cent and it has risen to 82.5 per cent during 2000-2001. So far they have produced more than 165 billion units of electricity. (CMIE, Energy, 2005).

#### NUCLEAR POWER PLANTS: PRESENT STATUS (2010) AND FUTURE PLANS

<b>Plants under operation</b> 25 reactors at 8 sites --	6,730 MWe
<b>Future plans</b> 2x220 PHWR 4x500 PFBR 10x500PHWR 6x1000LWR	13,440
<b>Total</b>	20,170

Source: Annual Report, Department of Atomic Energy, Gol. 2010

Two 500 MWe PHWRs, fully designed and developed in India, are under construction at Tarapur. In parallel, to further accelerate the growth of nuclear power, plans are being considered to build a few light water reactor based plants as an additionally, with foreign collaboration. The deal with the Russian Federation for setting up two 1,000 MWe units at Kundankulam is a step in this direction. (Ghosh S., 2009). Pre-project activities for setting up these units have commenced and DAE expects to start construction later this year. The two programmes of light water reactor and the indigenous self-reliant three-stage PHWRs, run as parallel programmes. The Nuclear Power Corporation of India Limited (NPCIL) has gained considerable experience and confidence in plant life management, after many complex repair and rehabilitation jobs. Its nuclear power reactor maintenance capability is now on par with that of advanced countries. The intricate job of *en masse* replacement of coolant channel assemblies in the RAPS-2 reactor was successfully completed by employing indigenously developed technology well ahead of schedule and with minimum consumption of man-rem. The technology for tackling the Over Pressure Relief Device (OPRD) problem of the RAPS- 1 leak was evolved and demonstrated and the repair work carried out successfully. From RAPS-2 onwards, improved coolant channel material and modified channel design have been adopted for longer life of the coolant channel.

**FBR** (Fast Breeder Reactors) technology is critical to developing stage two of India's nuclear power programme. Without developing the wide-scale use of FBR technology, India will find it difficult to go beyond 10,000 MWe nuclear capacities based on known indigenous Uranium resources. Use of FBR technology would enable indigenous Uranium resources to support a 20,000 MWe nuclear power programme by the year 2020. Such a FBR programme is critical to developing the Thorium-based third stage of India's nuclear power programme. The Bhabha Atomic Research Centre (BARC) is also engaged in R&D activities to develop an Advanced Heavy Water Reactor of 300 MWe capacity that would provide industrial scale experience necessary for the Thorium-based Stage Three of India's nuclear power programme. (Annual Report,Gol, 2006-07).

#### POWER PLANTS IN INDIA

India ranked sixth in the world's elite nuclear club, with its 20th nuclear-powered reactor at Kaiga in Karnataka and another nuclear power plant is proposed to be setup in CHUTKA Mandla District in the state of Madhya Pradesh. About 39 new sites have been proposed to be set up in India generating in future 45000 MWe of electricity.

## POWER PLANTS IN INDIA

Name	Location	Type	Rating, MWe	Status
Tarapur Atomic Power Station	Tarapur, Maharashtra	BWR	160	Operational Oct. 1969
		BWR	160	Operational Oct. 1969
		PHWR	540	Operational Aug. 2006
		PHWR	540	Operational Sept. 2005
Rajasthan Atomic Power Station	Rawatbhata, Rajasthan	PHWR	90	Operational Dec. 1973
		PHWR	187	Operational April 1981
		PHWR	202	Operational June 2000
		PHWR	202	Operational Dec. 2000
		PHWR	202	Operational Dec., 2009
		PHWR	202	Operational March, 2010
Madras Atomic Power Station	Kalpakkam, Tamilnadu	PHWR	170	Operational Jan. 1984
		PHWR	220	Operational March 1986
Narora Atomic Power Station	Narora, Uttar Pradesh	PHWR	220	Operational Jan. 1991
		PHWR	220	Operational July 1992
Kakrapar Atomic Power Station	Kakrapar, Gujarat	PHWR	220	Operational May 1993
		PHWR	220	Operational Sept. 1995
		PHWR	700	under construction
		PHWR	700	under construction
Kaiga Atomic Power Station	Kaiga, Karnataka	PHWR	220	Operational Nov. 2000
		PHWR	220	Operational March 2000
		PHWR	220	Operational May 2007
		PHWR	220	Operational Jan. 2011
Koodankulam Nuclear Power Plant	Kudankulam, Tamilnadu	VVER	1000	Under construction, online February 2011
		VVER	1000	Under construction, online August 2011
Prototype Fast Breeder Reactor	Kalpakkam, Tamilnadu	FBR	500	Under construction
<b>Total Capacity</b>			<b>6,730 MWe</b>	

Source: Annual Report, Department of Atomic Energy, Govt. of India. 2010

In 1998 a new party named Bharitya Janta Party came to power in India to the general election. Mr. A.B. Bajpai became the Prime Minister of India. BJP is a highest party and May 1998 India blasted five atomic device underground at Pokhran in the desert of Rajasthan. The whole world became anti-India regarding the nuclear fuel supplies. The nuclear club which was supplying nuclear fuel to India almost stopped the nuclear fuel to India. The World opinion was that India must signed NPT and then only the nuclear fuel will be supplied to India.

India was totally against this treaty because of some political reasons and the China factor. India and China has fought a fairest battle in 1962 and the china became a nuclear power. India is still subspecies of Chinese and military and atomic activities, so India has even today not signed the NPT after this incident India's nuclear programme was adversely effected and most of the nuclear plant were running below their instilled capacity.

After a year of these atomic blasts in 2001 India secretly started talking to U.S. for the supply of nuclear fuel and has a comprehensive nuclear agreement with U.S. These talks resulted in 2005, in India-US civilian nuclear agreement.

### INDO-U.S. CIVILIAN NUCLEAR AGREEMENT

The Indo-U.S. civilian nuclear agreement, also known as the Indo-U.S. nuclear deal, refers to a bilateral accord on civil nuclear cooperation between the United States of America and the Republic of India. The framework for this agreement was a July 18, 2005 joint statement by Indian Prime Minister Dr. Manmohan Singh and then U.S. President George W. Bush, under which India agreed to separate its civil and military nuclear facilities and place all its civil nuclear facilities under International Atomic Energy Agency (IAEA) safeguards and, in exchange, the United States agreed to work toward full civil nuclear cooperation with India. On March 2, 2006 in New Delhi, George W. Bush and Dr. Manmohan Singh signed a Civil Nuclear Cooperation Agreement, following an initiation during the July 2005 summit in Washington between the two leaders over civilian nuclear cooperation. (Planning Commission (Gol), 2005).

Heavily endorsed by the White House, the agreement is thought to be a major victory to George W. Bush's foreign policy initiative and was described by many lawmakers as a cornerstone of the new strategic partnership between the two countries. The agreement is widely considered to help India fulfill its soaring energy demands and boost U.S. and India into a strategic partnership. The Pentagon speculates this will help ease global demand for crude oil and natural gas. On August 3, 2007, both the countries released the full text of the 123 agreement. Nicholas Burns, the chief negotiator of the India-United States nuclear deal, said the U.S. has the right to terminate the deal if India tests a nuclear weapon and that no part of the agreement recognizes India as a nuclear weapons state.

### IMPACTS OF INDO-US NUCLEAR DEAL ON HEALTH CARE

Investment in Research & Development health care has resulted in the setting up of a Radiation Medicine Centre (RMC) as part of BARC in Mumbai, which has become the nucleus for the growth of nuclear medicine in the country. Similarly, Tata Memorial Centre (TMC), a fully autonomous institute aided by the DAE, provides comprehensive treatment for cancer and allied diseases and is one of the best internationally. It carries out a vast number of patient investigations every year (about 800,000 pathological investigations in 1999-2000). To cater to the requirements of the eastern region of the country, a regional radiation medicine centre has been set up at Kolkata as a part of the Variable Energy Cyclotron Centre (VECC). The facilities include those for in vitro studies like RIA and IRMA, gamma cameras for diagnostic and 4MeV LINAC for therapy. Radio-pharmaceuticals and other preparations for these and several other medical centers in the country are regularly supplied by BRIT, which runs a comprehensive programme for this purpose based on the R&D generated at BARC. (Rosenthal, Elisabeth and William Broad, 2011).

### AGRICULTURE AND FOOD

Application of radiation to agriculture has resulted in the release of 22 improved varieties of seeds, which are contributing directly to the increase of GDP in the country. Of these mutant varieties, blackgram (urad) accounts for 95 per cent of the cultivation of this pulse in the State of Maharashtra. (IEA, 2003). At an all-India level, four BARC blackgram varieties account for over 49 per cent of the total national breeder seed indent of all the blackgram varieties taken together. Groundnut variety TAG-24 is very popular and accounts for 11 per cent of the national breeder seed indent. (Key World Energy Statistics 2005.). At a conservative estimate, these varieties constitute a GDP of over Rs.10,000 millions per year. Research done in BARC and other centers in the world, has clearly demonstrated the advantages of food preservation by irradiation, and the Government of India has cleared several items for radiation processing. Setting up of such plants is expected to reduce the percentage of food that is lost due to various causes and provide the means for improving food hygiene and facilitate

export. One spice irradiator is already operating at BRIT in Navi Mumbai, to treat items requiring high doses. A Proton irradiator at Lasalgaon, near Nasik, is being set up by BARC and will be completed in the year 2001 to treat items requiring low doses. Efforts are being made to encourage other agencies to set up such plants in the private sector. (Annual Report, Gol, 2006).

## INDUSTRY

Applications of radiation technology for industry span a wide range, including radiography, water hydrology, gamma scanning of process equipment, use of tracers to study sediment transport at ports and harbours, flow measurements, pigging of buried pipelines and water hydrology in general. All these applications are in use and have made significant contributions to Indian industry. For example, the country's expertise in gamma scanning has been used by almost all the major petrochemical companies for troubleshooting in process equipment and this has resulted in minimizing downtime and production loss costs, which could be of the order of several crores per day for such big units. BARC has handled about 20 such scanings every year for the past five years. Radiotracers have been utilized to study sediment transport at almost all the major ports and harbours. Such studies have provided guidance for desilting operations, increasing the time intervals between desilting campaigns and thus saving costs. On a conservative estimate, savings to the nation due to isotope application related services like gamma scanning, blockage and leakage detection, RTD studies and sediment transport studies amount to over Rs.20,000 millions per year. (Belson, Ken and Hiroko Tabuchi 2011).

## SOCIAL BENEFITS

Over 6,000 technicians have been trained in the use of radiography and they have found employment in India and abroad, where the certification provided by BARC is well recognized. BARC has also developed many applications using electron beam machines, for radiation processing of products such as cross-linking of polyethylene insulation, heat shrinkables, and vulcanization of natural rubber. BARC has developed desalination technologies based on multi-stage flash (MSF) evaporation, reverse osmosis (RO) and low temperature vacuum evaporation. A425 cu.m/day MSF desalination plant is in operation at Trombay. Plants based on BARC's RO technology have been set up in rural areas for purification of brackish water. Currently, BARC is setting up a 6,300 cu.m/day capacity desalination plant using MSF-RO technology at Kalpakkam using nuclear heat from the Madras Atomic Power Station. (National Academies of Science, 2006).

## BASIC RESEARCH

The DAE places high importance on basic research. All disciplines in nuclear sciences and several science disciplines where nuclear techniques play a role, are covered by this programme, which is broad-based enough to enable use of the DAE facilities by scientists from other organizations as well as provide support to nuclear science activities there. Apart from the four R&D centers BARC, Mumbai; CAT, Indore; VECC, Kolkata; and IGCAR, Kalpakam; there are aided institutions such as Tata Institute of Fundamental Research, Saha Institute of Nuclear Physics, Institute of Physics, Harish-Chandra Research Institute, Institute of Mathematical Sciences, Cancer Research Institute and Institute of Plasma Research, which are engaged in basic research activities spanning a broad range of disciplines. The DAE also offers several opportunities to scientists from other institutions in India and abroad to interact and collaborate on research activities of mutual interest.

The Board of Research in Nuclear Sciences enables such support to Indian scientists, while those from abroad are supported through several bilateral cooperative arrangements or through schemes sponsored by international organizations like the International Atomic Energy Agency in Vienna, the Third World Academy of Sciences in Trieste and others. In conclusion, it may be stated that the DAE is manned by trained scientists and engineers, who are relentlessly working towards fulfilling the mandate given to them by the nation, by developing technologies having direct and widespread societal benefits. Nuclear power plants are working well; application of radiation technology to health care is benefiting a large number of patients on a regular basis; improved crop varieties are helping to increase the agricultural output; and radio-isotopes and tracer techniques are helping industry in many ways. It has been able to reach this level because of the broad R&D base that has been nurtured over the years. India is happy to share its experience with scientists from the third world countries and collaborate in areas of mutual interest.

## NUCLEAR ACCIDENT IN JAPAN AND IT'S IMPACT ON INDIA'S NUCLEAR ENERGY PROGRAMME

Almost ten months into the nuclear crisis in Japan, efforts to contain radioactive emissions are still underway. Officials there have indicated that it will take years to fully cool the facility's nuclear fuel, a process that is currently releasing radioactive material into the environment. (Washington Post, 2011).

Reports from Japan bring almost daily evidence of continued radioactive releases. Eleven types of vegetables have been found to contain radioactivity and have been deemed unfit for consumption. Tokyo's drinking water has been deemed unsafe for children based on its levels of radioactivity.

The full impact of the Japanese nuclear crisis remains to be seen, but the health risks posed by radioactive contamination are well documented. In 2006, the National Academies of Science issued a definitive report on radiation exposure that concluded that even low levels of radiation can cause human health problems, including cancer, heart disease, or immune disorders. (Sato, Shigeru, 2011). Children are especially susceptible to the impact of foodborne exposure to radioactive materials, making safeguards of food and water particularly critical. While government officials have thus far downplayed the significance of radioactivity from the Japanese nuclear crisis, the science shows that the radioactive materials will have an impact somewhere, and that impact could last for decades.

## RADIATION IMPACTS ON HEALTH

Japan's nuclear disaster has released several kinds of ionizing radiation. This radiation can create or break chemical bonds in cells, causing chemical changes that damage the DNA in living organisms, leading to cell death and cancer. Once inside a living organism, radioactive materials continue to radiate—and cause the body harm – until they are excreted or naturally decay, which can take a lifetime. (Washington Post). Officials have identified two main radioactive materials being emitted in Japan, iodine and cesium – both of which are extremely dangerous to human health. There is also concern about two other highly dangerous radioactive materials, strontium and plutonium, which may have been released as well. (Barclay, Eliza, 2011).

## CONTAMINATION OF FOOD AND WATER

A major avenue for exposure to radioactive contamination comes through food and water. Decades after the Chernobyl accident, the United Kingdom still maintains restrictions on large sectors of the country's sheep production because radioactive cesium—dispersed through wind and rain—still contaminates grazing lands. (Patel, Tara, 2011).

Additionally, thousands of square miles of land experienced radioactive iodine contamination from Chernobyl, ending up in the grazing paddocks of animal herds, and then in the milk and animal products that humans consumed. After Chernobyl, there were 6000 cases of thyroid cancer reported from 1991 to 2005 in Belarus, Ukraine, and four affected regions of Russia, many of which were attributed to consumption of radioactive milk after the accident. Radiation contamination remains a fact of life for parts of Europe following Chernobyl, especially for wild foods like mushrooms, berries, and game that have not been effectively treated for contamination. (Broder, John, 2011). In Germany, the government continues to pay hunters compensation for lost revenue from wild boar meat found to have high levels of cesium, and the problem is expected to continue for decades.

It remains unknown where or to what degree the radioactive material emitted from Japan's nuclear facilities will cause similar problems. But already in Japan, tests have found eleven types of vegetables to contain levels of radioactive iodine exceeding national standards by as much as a factor of seven as well as milk. A soil sample taken 40 kilometers from the nuclear reactors showed levels of radioactive cesium 1630 times higher than normal. This is especially disconcerting because of cesium's long half-life and its unique chemical composition that allows it to move freely through the environment. (Rubin, Rita and Dan Vergano, 2011).

India has suffered adversely due to Japan's nuclear reactors disaster. The friendly countries to India as Canada, France and some of the European countries and Russia who were supplying nuclear fuel to atomic reactors in India were not sure of the safety measure in Indian nuclear reactors. They were sending many queries to Govt. of India about the safety measure and cooling system of the nuclear plants in India.

The Govt. of India sent them satisfactory reply that when in 2004 the Tsunami struck the Kalpakkam Nuclear Power Plant near Chennai. The power plant was submerged by four feet of water and the plant was automatically shut-down. The cooling system of the plant was intact. There were no radiations or any other dangers to the people and the environment. This strong reply by India has satisfied some of the donor countries of nuclear fuel but some of the countries like Australia are still not satisfied and have stopped supplying nuclear fuel to India after the Japanese disaster.

India has no option but the only option is to have nuclear power plants for India's long term need to develop alternative energy sources. India is having large amount of Thorium. It is estimated that about 300,000 MWe of electricity generation capacity for about 300 years. Now it is necessary to diversify the energy resources for long term energy requirement and energy independence before saturation effects that may throttle other technologies like constraints in transport and infrastructure; and also to limit green house gases such as carbon dioxide from thermal stations.

Keeping abreast with nuclear power technology among the developed and developing countries, especially in Asia. The nuclear power industry is almost totally indigenous for the entire nuclear fuel cycle. Thus, installation of nuclear power plants can give a fillip to other Indian industries.

It is worth noting in this context that countries such as China, which have larger resources of coal than India, are developing nuclear power at a rapid pace. Japan, South Korea and South East Asia are also increasing their nuclear power capacities in a big way. Even Indonesia with good oil reserves, Thailand, Malaysia and Vietnam etc. are going for nuclear power in a big way then why only India should be dragged to limit its nuclear power programme?

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# CONTEXTUAL FACTORS FOR EFFECTIVE IMPLEMENTATION OF PERFORMANCE APPRAISAL IN THE INDIAN IT SECTOR: AN EMPIRICAL STUDY

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## ABSTRACT

*Designing and implementing performance appraisals for professionals engaged in knowledge intensive professions such as Information Technology (IT) is in itself a daunting task given the skilful yet abstract nature of knowledge work. It may be argued that the contextual factors of the performance appraisal function not only contribute to the performance orientation of the IT knowledge workers, but also pave the way for synergistic and cohesive working relationships. The significance of the contextual variables which impact performance appraisal (PA) thus cannot be ignored and if so would render any attempt to improve the practice deficient. This paper is an attempt to identify the contextual factors that have a significant impact on the performance appraisal function in the IT sector. Using the method of exploratory factor analysis, data collected from 118 IT professionals working in different Indian cities on varied contextual variables has been grouped into six factors relevant to the IT profession and knowledge workers employed in the same. Both distal and proximal contextual variables have been identified and the rationale of the resulting factors for has been examined keeping in tune with previous research in related areas.*

## KEYWORDS

Performance Appraisal, Indian IT sector, Contextual Variables.

## INTRODUCTION

The Performance appraisal (PA) function in any organisation plays a role much beyond simply evaluating an individual/team/organisations performance in terms of set standards or goals. As an umbrella function consisting goal setting, appraising, developing, counselling and rewarding, the Performance Management System (PMS) reflects the underlying man management philosophy and is thereby a manifestation of the performance culture of an organisation. Performance appraisal systems (PAS), the evaluative component of the PMS, is one of the most integral human resource practices due its critical association with other HR functions like compensation, training and employee engagement. Much research in the area of appraisals has focused on areas pertaining to implementation, evaluation of the different models / instruments of appraisal or process issues per se. However, it must be appreciated that despite efficient design of constituent elements/processes of a practice there are factors that could impede the effective execution of the same. The context within which the practice is executed plays a significant role in the effective implementation of any human resource (HR) system.

## SIGNIFICANCE OF 'CONTEXT' IN PERFORMANCE APPRAISALS

Mowday and Sutton (1993) characterise context as "stimuli and phenomena that surround and thus exist in the environment external to the individual, most often at a different level of analysis". In the study of organisational behaviour and practices, it has been observed that strong situational factors with obvious norms and rigid roles tend to constrain the expression of individual differences. Weak situations permit more latitude or opportunity for the expression of such differences. In a more complex manner, context can be conceived of as a set of situational opportunities for, and countervailing constraints against, organisational behaviour (Mowday & Sutton, 1993). Johns (2007) in his study on context impacting organisational behaviour has categorised context into two levels: *omnibus context* and *discrete context*. The term *omnibus* refers to an entity that comprises many features or particulars. Thus, it refers to context broadly considered. Discrete context, however, refers to the *particular* contextual variables or levers that shape behaviour or attitudes. Discrete context can be viewed as nested within omnibus context such that the effects of omnibus context are mediated by discrete contextual variables or their interactions. Discrete contextual variables might apply to any level of analysis, from individuals to industries. Johns (2006) has interpreted context as situational opportunities and constraints that affect the occurrence and meaning of organisational behaviour as well as functional relationships between variables. Context can serve as a main effect or interact with personal variables such as disposition to affect organisational behaviour.

The context within which PA is practiced plays a major role in influencing the success/failure of the system. Context is very important in organisational studies on HR practices as it helps frame phenomena in ways that influence our perceptions and interpretations of them, which in turn, affect decisions and actions (e.g., Johns, 2006). Supervisor-subordinate dyadic interactions and evaluations take place within a work relationship, and this relationship reflects social, emotional, political, and cognitive processes that help explain the decision outcomes. Levy and Williams (2004) have discussed at length the distal and proximal variables which constitute the contextual canvas of performance appraisals. They referred to distal variables as macro-level factors that influence the performance evaluation system and include social norms, regulatory mandates, culture and climate effects, strategy, and network relationships. Environmental factors generally shape performance evaluations as antecedents to formal appraisal systems and informal appraisal norms. Theoretically, environmental factors should influence affective reactions only when they modify performance evaluation systems or influence perceptions of change. Structural proximal variables are performance evaluation features that influence the nature and content of the performance evaluation such as performance standards, the frequency of evaluation, legitimacy of the evaluation, and evaluation system features. Process proximal variables influence the conduct of a performance evaluation (Levy & Williams, 2004). Examples of process proximal variables include the rater-ratee relationship, performance expectancies, task characteristics, and rater and ratee affect. Few researchers have explored relevant aspects and features of the context within which performance appraisals takes place (e.g., Levy & Williams 2004). The efforts in this direction have not looked at the different components within the contextual domain. Organisational decisions, actions, and behaviour (e.g., performance evaluation) can be completely understood only in situ, or as played out against the contextual backdrop of the day-to-day interactions occurring in work contexts that frame such behaviour. (Ferris et al 2008)

In the past, Indian human resource practices have been studied extensively in comparison to global practices. Researchers such as Sparrow and Budhwar (1997) have highlighted employee performance appraisal as a relatively underemphasized factor in Indian managerial practices. Indian HRM practices that do not give priority to performance appraisal fail to enhance the strategic competitiveness of Indian firms. Another observation is this regard has been that the productivity of work cultures in Indian organisations is jeopardized by employee performance appraisal practices that appear to be biased, *ad hoc* and unintegrated into a



globally competitive HRM system (Mendonca and Kanungo, 1990; Virmani and Guptan, 1991). The lack of Indian performance appraisal practices formally integrated into a quality performance-based HRM system allows Indian managers to over-control and under-control employees (Lindsay and Patrick, 1997). Misuse of performance appraisal authority adversely impacts Indian employees who have already been described as low on 'efficiency emphasis' that is, low on initiative for process improvement, low on risk-taking propensity to increase productivity and low on self-monitoring inclinations (Sparrow and Budhwar, 1997). When Indian managerial appraisals do not distinguish between employee contributions and the limiting social, technical and environmental constraints on performance – over which the individual has no control – employees regard performance appraisal judgments as unfair and withhold productive efforts (Mendonca and Kanungo, 1990; Virmani and Guptan, 1991; Sparrow and Budhwar, 1997). It is also alleged when Indian managers rely exclusively on subjective biases in performance appraisal and do not objectively evaluate and develop employees in order to reward and improve performance, or remove constraints to performance, the integrated improvement of the HR quality system is threatened (Kanungo and Misra, 1985). Indian managers have also been criticized for not involving employees in the performance management process (Virmani and Guptan, 1991; Mendonca and Kanungo, 1990). The presence of mutual influence between Indian managers and their employees with regard to performance management leads to realistic and appropriate standards of performance, agreement about evaluation and development processes, and enhanced acceptance and commitment to performance improvements. The prevailing absence of this mutual influence in India, especially managerial receptiveness to employee feedback, has provoked scepticism and resistance to the implementation of formal performance management systems.

## STUDYING CONTEXT IN RELATION TO THE IT PROFESSION IN INDIA

The IT industry in India is a growing industry employing a large number of the total workforce in various positions across India and the globe. Certain factors that add to IT being a desirable profession and techie firms being employee destinations of choice are the exposure to foreign assignment, non linearity of entry level prerequisites (in terms of credentials) and plenty of opportunity to move ahead to greener pastures. However, research suggests that given the obviously technology centric nature of jobs and assignments, intellectual capital of the employees becomes a highly personal asset that lies with the individual themselves – an asset that they carry with them from assignment to assignment thus, organisation to organisation. Research suggests that occupational commitment often overshadows organisational commitment (Guzman et al, 2008). Productivity of knowledge workers has been found to be difficult to define in measurable/tangible terms but there can be no debate to the fact that individuals working in the IT sector need an environment conducive to learning and development while on the job. (Drucker)

Research pertaining to contextual studies is largely restricted to the traditional sectors of the economy like manufacturing and, in some cases, services, but has ignored dynamic and knowledge-intensive contexts like software, where the role of organisational culture is argued to be critical in enhancing productivity and quality. Most importantly, it has been argued that knowledge work does not lend itself for analysis to normal forms of standards (Mathew, 2007). (Ehin, 2008) Orlikowski and Baroudi (1989) argue that workers involved in IT-related activities within organisations form an occupational community, albeit one that is loosely defined and lacking in distinct boundaries. Studies of IT workers have suggested that they share many beliefs and behavioural patterns that transcend the particular organisational culture in which those workers are embedded (Duliba and Baroudi, 1991). Guzman et al. (2004, 2008) state that IT professionals form a distinctive occupational culture that crosses the boundaries of the organisations where these people work. Newell et al. (2002) argue that often, management in knowledge intensive firms does not have the level of expertise and skills that the people they employ possess. Furthermore, unlike the manufacturing sector, these organisations are people centric and employ predominantly knowledge workers (KW). Knowledge workers also called "gold-collared workers" (Kelly, 1990) are engaged in work the nature of which is difficult to objectively define in terms of contribution. It has also been discussed by researchers as to how knowledge workers desire autonomy and ownership of their task and how managing KW is largely about 'un-managing'. In keeping with the above features of IT work, HR managers have to continuously evolve career paths, motivate their employees and create a culture of oneness, which will also act as retention tools.

Paul and Anantharaman (2003) in their study on the impact of HR practices on a firm's performance observed from data collected from employees of 34 different software companies (multinationals and domestic) that Performance appraisal, training, job design, compensation and incentives directly influences the competence, organisational commitment and customer orientation of employees. Employee participation in the appraisal process, equity, fairness and justice can add to organisational commitment.

Mathew (2007) has also observed that since software organisations in India often take up large service projects for multinational companies, the clarity of operational goals and objectives enhances the coordination of projects and minimises waste of effort and resources. The implication of work being designed and allotted around projects is that teams are formed and disbanded continuously based on project requirements. This sometimes results in what is called "bench time" (the time employees are not billed to customer projects in the software business). Clearly set goals and objectives and their proper communication helps a better coordination of projects and ensures lower "bench" time and higher utilisation of resources. Mathew's study suggests that the people-oriented aspects of culture like concern for employees and trust enhance the affective disposition of the employees. Empowerment or professional freedom is a significant aspect of organisational culture, and this often enables employees to approach and deal with customers, colleagues and reporting officers freely and informally without the restrictions of hierarchy, and this helps in the timely execution and closure of projects.

Mahadevan and Sundarajan (2008) also state that the effectiveness of performance management in the Indian IT sector depends on many factors including content, linkages and the extent to which employee's perceive the practice to be useful. However, detailed studies into the factors involved are limited.

In the following study of contextual factors of performance appraisals, we refer to the general studies of Levy and Williams (2004) and Ferris et al. (2008) 'Context' is interpreted as a rather broad term, which encompasses the research examining the cognitive perspective on supervisor rating processes, the social and relationship context, social influence and politics, the role of affect and emotion in rating processes, and other features of the dyadic context, such as fit, perceived similarity, and distance. In essence, the 'performance evaluation context' reflects the multifaceted background against which formal and informal appraisals of job performance take place. Distal variables comprise macro-level factors that influence the performance evaluation system. These are classified as environmental factors in accountability theory (Frink et al., 2008), and include social norms, regulatory mandates, culture and climate effects, strategy, and network relationships. Environmental factors generally shape performance evaluations as antecedents to formal appraisal systems and informal appraisal norms. Theoretically, environmental factors should influence affective reactions only when they modify performance evaluation systems or influence perceptions of change. These factors are expected to be mediated through structural and process proximal variables. Structural proximal variables are performance evaluation features that influence the nature and content of the performance appraisals. Examples include performance standards, the frequency of evaluation, legitimacy of the evaluation, and evaluation system features. Process proximal variables that are considered to influence the implementation of a performance evaluation would include the rater–ratee relationship, performance expectancies, task characteristics, and rater and ratee affect.

Of these factors identified in prior research mentioned above, the following study is an attempt to identify those contextual factors that impact the implementation of appraisals in the knowledge based and people centric IT occupation.

## OBJECTIVES OF THE STUDY

The following study is an attempt to identify the contextual variables, which contribute to effective implementation of performance appraisals in the Indian IT sector and further explore the relevance of these variables in the context of knowledge workers employed in the same.

## RESEARCH METHODOLOGY

### SAMPLE

Using simple random sampling, data was collected from 118 (total sent-150, received 118) IT sector employees (both male and female) with a minimum of 8 years experience in the Indian IT sector working in supervisory roles (thus rater and ratee) .. The purpose of selecting the same was to gain insight into the

factors affecting PAS from both appraisee and appraiser perspectives. Employees working in Nasscom listed organisations were chosen for this survey. The questionnaire was distributed to most respondents in an on-line format so as to reach out to employees based in different cities in India. (Kolkata, Mumbai, Bangalore and Pune).

#### RESEARCH INSTRUMENT

The study depends mainly on the primary data collected through a structured questionnaire consisting 19 Likert Scale items (5 point scale) covering different variables that form the backdrop of the performance appraisal function such awareness, pre appraisal involvement, supervisor competence, goal/task features and other aspects identified as variables in contextual studies.

The scale consisted of 19 statements. It was measured on a Likert 5 point scale ranging from strongly agree, agree, neutral, disagree and strongly disagree. In the pilot testing phase on basis of 40 respondents' data the scale was tested for its Cronbach's Alpha Co-efficient Reliability Score. The alpha score was found to be 0.891, on the basis of which the survey was continued with the same scale.

#### TECHNIQUE

The data obtained in the research has been evaluated by exploratory factor analysis in SPSS in order to transform the data structures including many variables constituting the backdrop of appraisal systems for e.g., performance orientation in the organisation, pre appraisal training, perceptions of relevance of appraisal etc into contextual variables that impact an individual's satisfaction with the PA system.

#### FINDINGS & ANALYSIS

For the analysis, confirmation that the data are correlated is revealed by the Kaiser-Mayer-Olkin Measure of Sampling Adequacy (above 0.609) and Bartlett's test of sphericity ( $p=0.000$ ). The items with highest loadings were used in assigning the labelling of the factor. The data were analyzed using factor analysis (Principal Components with Varimax Rotation). Factor Analysis reduced the 19 independent variables into six factor groups.

The factor solution employed principal components extraction with varimax rotation. Factors were derived using the Eigen value criterion. The rotated component matrix is reported in Table 1.

TABLE 1: ROTATED COMPONENT MATRIX

	Component					
	1	2	3	4	5	6
Q1	.778	.196	.076	.055	.149	-.002
Q2	.352	.089	.658	.028	.174	-.211
Q3	.753	-.193	.293	-.068	.274	.160
Q4	.317	.822	.166	-.066	.009	-.035
Q5	.614	.456	.488	.084	.007	-.057
Q6	.118	.300	-.259	.105	.003	.823
Q7	.621	.249	-.040	.347	.390	.324
Q8	.885	.164	.117	.206	.019	-.023
Q9	.365	.227	.538	.180	.232	.191
Q10	-.032	-.229	.243	-.008	.125	.812
Q11	.525	.196	-.164	.302	.564	.125
Q12	-.087	.689	.347	.390	.234	.173
Q13	.350	.662	.320	.241	.338	-.044
Q14	.017	.093	.113	.909	.213	-.108
Q15	.215	.049	.104	.876	.001	.217
Q16	.216	.027	.098	.069	.919	.166
Q17	-.131	.321	.815	.157	-.131	.121
Q18	.155	.327	.350	.398	.596	-.216
Q19	.606	.284	-.268	-.102	.427	-.302

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 9 iterations.

According to the results of Factor Analysis, the first six factors were chosen because they explained a high proportion of original variance and had Eigen value higher than one. This globally explained 80.557% of variance, respectively. (Table2)

TABLE 2: TOTAL VARIANCE EXPLAINED

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.147	37.615	37.615	7.147	37.615	37.615	3.999	21.047	21.047
2	2.335	12.290	49.905	2.335	12.290	49.905	2.503	13.172	34.219
3	2.008	10.568	60.473	2.008	10.568	60.473	2.362	12.432	46.651
4	1.542	8.114	68.587	1.542	8.114	68.587	2.321	12.214	58.865
5	1.212	6.379	74.966	1.212	6.379	74.966	2.282	12.008	70.873
6	1.062	5.591	80.557	1.062	5.591	80.557	1.840	9.684	80.557
Extraction Method: Principal Component Analysis.									

**INTERPRETATION OF FACTORS AND RELEVANCE TO THE IT INDUSTRY****FACTOR 1: EMPLOYEE AWARENESS OF AND INVOLVEMENT IN OVERALL PAS**

The item with the highest factor loading for this factor group corresponds to the organisations' initiative in making the employee aware of the importance and functionality of PAS. Another component of this factor is how far the organisation invites participation and suggestions for improvement in the overall effectiveness of the system. Other items include minimal use of external consultants and more internally initiated action research oriented interventions for improvement of appraisal efficiency over time.

Mitchell & Daniels (2003) state that individual differences in knowledge, skills, and dispositions combine with features of the IT work environment, such as norms for hard work, positive expectations, and elements of task design to enhance motivation (e.g., challenge and autonomy). Robson (2005) in his work on how performance measurement systems contribute to building high performance cultures states that in such cultures employees feel that in addition to their everyday operational activities, part of their job was to continually assist in improving the performance of the organisation. This would result in the belief that they could somehow affect or control critical aspects of overall performance. Measurement system has to be constructed specifically to encourage everyone in the organisation to be in the psychological state of "in-control" of the performance of the relevant systems within the organisation. For this purpose, performance measurement systems have to be designed, from the outset, with the psychological consequences in mind. This is best achieved by understanding organisations in terms of different types of systems that interact with each other. In order to encourage the perceptions that are required for a culture of high performance, measurements systems have to provide the relevant, local, team level, and graphical information. This information has to be in a form that can assist in the process of enabling people to perceive an important part of their job as being "in control" of the performance of the systems in which they are involved. (Robson, 2005)

**FACTOR 2: PERCEPTION OF PERFORMANCE CONSEQUENCES/PERFORMANCE EXPECTANCIES**

This factor represents the extent to which employees believe that there is a link between their appraisal results and the reward/recognition attached to the same. On the flip side, this also represents to what extent that employees feel that poor performance is suitably dealt with. Thus the company's policy in terms of performance-reward linkage – both positive and negative discipline in the context of appraisals is a factor that impacts implementation.

Ownership of work (one's perceived degree of control over his outcomes within his work environment) and individual accountability for tasks would imply that there is tangible proof of the implementation of consequences for both good and below par performance. Knowledge intensive organisations such as IT are examples of high performance work cultures which share information, involve employees in decision making, and emphasize employee feedback about quality and business processes (Becker & Huselid, 1998; Huselid, 1995; Lawler, Mohrman, & Benson, 2001). In such work cultures it is necessary that supervisors recognize the link between performance and motivation. (Mahadevan and Sundararajan, 2008)

**FACTOR 3: ORGANISATIONAL SUPPORT SYSTEMS**

The components under this label comprise the provision of resources in terms of both physical support infrastructures (technology and resource sharing, work procedures, physical work environment etc.), information and knowledge sharing as well as effective work relationships in terms of quality of supervision (supervisors knowledge of individuals job and constructive inputs as and when required) and team capabilities (when working in project team based structures). IT workers experience numerous sources of stress that are universal across occupations and work environments. Research shows that, similar to other professions, stress in IT results from intensive work demands, complex relationships with others, career concerns, systems maintenance, role ambiguity, and tedious administrative tasks (Lim & Teo, 1999), as well as fear of obsolescence, team and client interactions, role overload, work culture issues, technical constraints, and competing work and family demands (Rajeswari & Anantharaman, 2003)

**FACTOR 4: FOCUS AND SIGNIFICANCE OF INDIVIDUAL JOB/ ROLE**

Items on the Likert Scale which correspond to this factor are based on the role his job plays in the organisation. The extent to which not only the strategic direction of the organisation is communicated but also the strategic relevance of the individual's role in the organisation is clarified is important for efficiency of the PAS. The significance of what the employee does combine with the 'importance' of the work given to him the overall. The individual is responsible and accountable for his role.

An aspect of performance management in high performance professions such as IT is that the system should reinforce the employee's perception that he plays a larger role than just a cog in the system. This factor seems to reinforce the fact that knowledge workers have a strong need for autonomy and control over one's work processes within the workplace, a fact that reflects Drucker's (1999) description of the very nature of knowledge work stating that KWs must identify the task themselves and have autonomy. Ehin's (2008) believes in 'unmanaging' knowledge workers where he advocated that employees should be given the opportunity to participate and contribute in organisational setups which do not adhere strictly to hierarchical control mechanisms but provide autonomy, challenging tasks and organisational information sharing.

**FACTOR 5: APPRAISER COMPETENCE**

It might be mentioned here that the highest factor loading corresponded to the item specifying that supervisors should be appraised also on how they contribute to, reward and recognise subordinate and team performance. Another component of this factor is the practice of PA being done for all levels of the organisation. This reflects on the appraisal of those who are in supervisory positions (playing the role of a rater) as well as having other responsibilities (to be rated upon).

This factor reflects the need for developing rater/supervisor competence and the extent to which the organisation identifies gaps in appraiser competence and addresses the issue of pre appraisal training initiatives (appraiser training). Generally it is understood that during the performance planning stage, supervisors and subordinates jointly set and clarify goals, performance expectations, and evaluation methods and criteria. The supervisors must ensure that the subordinates have the authority, knowledge, skills, and organisational resources to successfully complete work targets. Certain areas of pre appraisal preparedness would include knowledge of organisation's rating forms and procedures so as to clarify performance expectations, evaluation criteria, and methods; delegation/empowerment to create accountability by clarifying duties, work assignments, goals and expectations, and providing sufficient authority to achieve assigned responsibilities (for those in supervisory roles) (Fink and Longnecker, 1998, Kumar 2005). The supervisor's competence would include ability for effective decision making and sound judgment – to effectively evaluate the subordinate's actual performance on various rating criteria. In an industry such as the IT Industry where quantifying contributions is essentially a difficult task, the competence of the rater would definitely be a defining factor in effective implementation.

**FACTOR 6: REFLECTION OF STATED RULES, NORMS AND BELIEFS**

The performance appraisal function should be a tangible demonstration of behaviour which is supported by the stated norms, values and beliefs (organisation culture) of the organisation i.e. should reinforce the organisation culture. The factor loading that defines this factor corresponds to what extent the organisation has been able to convey that the PA system is an important part of and in turn contributes is important in sustaining the organisations culture.

Guzman et al. (2008) indicated that some features of the IT occupational culture (ITOC) were a high value of technical knowledge; extreme and unusual demands pertaining to long hours; dealing with unsatisfied users; need for constant self re-education; feelings of superiority relative to the IT user community; High IT pervasiveness in non-work contexts (e.g. use of IT in leisure time); a typical lack of formal work rules in the IT occupational setting; and cultural forms manifested in the frequent use of technical jargon and the social stigmatization or stereotyping (e.g. the geek/nerd label). Knowledge intensive firms are also characterised by what is called people centrality. People centrality can be understood from the fact that about 50 per cent of the revenue of firms in the software sector in India is spent on remuneration and benefits to employees. It is clear that investment in plant and machinery in the traditional sectors of the economy is replaced by the investment in people in the software sector. People centrality can further be understood from several workplace practices in these organisations. Most organisations in the software sector have the practice of conducting an annual employee satisfaction survey, which covers most aspects of work life. It is argued that employees take part in such surveys with great interest, and this becomes the springboard for many workplace initiatives. In these dynamic and knowledge-intensive contexts, organisational culture would play a critical role in enhancing productivity by fostering innovation and creativity (Paul and Anantharaman, 2004). Johns (2007) in his study acknowledged that organisational culture has a significant influence on productivity in software organisations. Furthermore, the



study shows that organisational culture has an impact on the conception, planning, implementation and effectiveness of quality initiatives. The abstract and sophisticated nature of the work in software organisations renders the traditional levers of productivity and quality inadequate and makes a strong case for the relevance of organisational culture, which is recognised as an important analytical organisational framework, for analysing productivity and quality.

## CONCLUSION

This paper attempts to identify contextual variables within the organisation that impact the effectiveness of the performance appraisal process being practiced. Contextual factors identified in this research comprise employee awareness of and involvement in goal setting, which in fact possessed the highest factor loading. This reinforces the belief that knowledge workers would require a certain degree of control over their own goals and targets. Implications for empowerment and autonomy are reflected strongly as a pre requisite for effective performance appraisal practices in IT organisations. Another factor which stands out is a strong perception of reward linkages which in turn reinforce performance expectancies. Explicitly stated consequences of performance therefore remain an integral variable which affects employees' perceptions of the appraisal process. Organisation support in terms of physical workplace design, ergonomic considerations as well as knowledge sharing and learning resources also have been identified as an important contextual factor. An interesting fourth factor reveals the relevance of the knowledge workers role in the canvas of the organisations strategy. It is therefore important to identify how organisation strategies are cascaded and translated into individual roles in the organisation. The competence of the rater /supervisor reflects the perception of the supervisors rating skills in terms of understanding and evaluating performance in keeping with perceptions of fairness and equity. Pre appraisal training in rating behaviour and bias control thus can contribute to better appraisals. Affectively, the rater-ratee relationship is also a variable for scrutiny under this factor especially given that the scope for supervision in the context of knowledge work is task allotment, delegation, providing autonomy, learning resources and guiding when required. Finally, the perceived congruence of the PA system with the organisations culture as apparent in the stated norms, values and performance culture constitutes the sixth factor. Two reasons could be attributed to this being the factor with the lowest Eigen value. Firstly, we can attribute this to an interesting observation which reinforces Levy and Williams(2004) and later Ferris et al's (2008) theories is that the first five factors can be categorized as the proximal factors and the sixth factor is the broader distal factor which in turn is largely moderated and explained through the proximal factors. Secondly, it could be in keeping to the fact that occupational culture; therefore 'work' related aspects have been found to often override organisational culture considerations.

Of the proximal factors, the first factor is related to the design of the system in general (participation and design) and can be broadly termed as a structural proximal variable and the next four factors fall in the category of process proximal variables. This study reinforces the fact that nature of knowledge work and how human resource management practices relating to knowledge intensive firms need to be based on the unique features and nature of knowledge work and knowledge workers.

## SCOPE FOR FURTHER RESEARCH

This paper is based on primary data collected from a relatively small sample of IT professionals working in India. Also, this survey has been conducted on a sample of professionals who have been in the industry between 8-10 years. Therefore, such research can be extended to other industries so as to enable HR practitioners an insight into what beyond the appraisal instrument per se; monitoring and feedback process impacts employees' perceptions on the effectiveness of performance appraisals.

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# A STUDY OF CITIZEN CENTRIC SERVICE DELIVERY THROUGH e-GOVERNANCE: CASE STUDY OF e-MITRA IN JAIPUR DISTRICT

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## ABSTRACT

Good Governance is being recognized as an important goal by many countries across the world. These countries have taken up specific initiatives for open government. Along with this, there is a conscious effort to put the citizen as the centre of focus in governance where citizens are being perceived as consumers and clients. The Internet revolution has proved to be a powerful tool for good governance initiatives. An important dimension of the Internet potential is the possibility of providing anytime – anywhere services. Services rendered by the government are being provided through mix of methods such as manual system or with the help of Information and Communication Technology (ICT) in which, service centres provide most of the government services, located mostly in the convenient places within the reach of consumer or through Internet. The use of ICT helps improving efficiency of not only the government machinery but also provide better services which saves time and cost to the consumer along with convenience. One such project is e-Mitra in Rajasthan, India which renders most common services e.g. payment of utility bills (Electricity, water and telephone) and payment of dues to Jaipur Development Authority, Rajasthan Housing Board, Jaipur Municipal Corporation etc. A study was carried out to assess the awareness and usage pattern of e-Mitra in Jaipur district. The present paper focuses on the analysis and finding of the study in terms of level of awareness about e-Mitra and usage by consumers of different demographic profile such as gender, religion, cast, education, occupation etc. It also analyses the method which is being used by consumers for availing these services and media through which they have come to know about these ICT based services.

## KEYWORDS

Citizen Centric Services, e-Governance, e-Mitra, Good Governance, Role of ICT in Good Governance, Payment of Utility Bills.

## INTRODUCTION

Governments around the world are embracing electronic government (e-Government) i.e. by deploying Information and Communication Technologies (ICTs) for several decades to increase efficiency and effectiveness of their functioning. In every region – from developing countries to industries ones – national and local governments are putting critical information online, automating the once cumbersome processes and interacting with their citizens electronically (Bhattacharya, 2012).

Early applications of computers were focused on building management information system for planning and monitoring. In the initial stage many large ICT based projects were undertaken but the benefits of these projects has been quite dismal. However, with the advent of the Internet and its explosive growth, fuelled by the use of e-mail, e-commerce prompted some governments to use the Internet for delivery of information and services to the citizens. The growing use of Internet for advocacy, distance learning and fostering participation revived the hope that ICTs could indeed deliver value commensurate with investments (Bhatnagar, 2009). Borrowing from the world of e-commerce, a new term, e-Governance, was coined to describe a variety of use of the Internet by Governments.

## UNDERSTANDING e-GOVERNANCE

The revolution in information technology has brought a whole new agenda for governance into realm of possibility. e-Governance comprises decisional processes and the use of ICT for wider participation of citizen in public affairs. The purpose of implementing e-Governance is to improve governance processes and outcomes with a view to improving delivery of public services to citizen.

The “e” in e-Governance stands for ‘electronic’. Thus, e-Governance is basically associated with carrying out the functions and achieving the results of governance through the utilization of what has today come to be known as ICT (Information and Communications Technology). The reason why countries around the world are increasingly opting for ‘e-Governance’ is that governance per se has become more complex and varied in the last few decades and more importantly, citizens’ expectations from government have increased manifold. ICT facilitates efficient storing and retrieval of data, instantaneous transmission of information, processing information and data faster than the earlier manual systems, speeding up governmental processes, taking decisions expeditiously and judiciously, increasing transparency and enforcing accountability (Deva, 2005).

Although the term ‘e-Governance’ has gained currency in recent years, there is no standard definition of this term. Different governments and organizations define this term to suit their own aims and objectives. Sometimes, the term ‘e-Government’ is also used instead of ‘e-Governance’. Some widely used definitions are listed below:

**a. According to the World Bank** ([www.worldbank.org](http://www.worldbank.org))

“e-Government refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions.”

Thus, the stress here is on use of information technologies in improving citizen-government interactions, cost-cutting and generation of revenue and transparency.

**b. The US E-Government Act of 2002 defines “electronic Government” to mean** (Jeong, 2007)

“the use by the Government of web-based Internet applications and other information technologies, combined with processes that implement these technologies, to-

(i) enhance the access to and delivery of Government information and services to the public, other agencies, and other Government entities; or

(ii) bring about improvements in Government operations that may include effectiveness, efficiency, service quality, or transformation”.

This definition reflects the strategy of the US Government regarding the use of ICT in improving Government operations on the one hand and enhancing the access and delivery of information and services to citizens and government entities on the other.

c. **In Indian context, Dr. APJ Abdul Kalam, former President of India, has visualized e-Governance as** (ARC Report, 2008):

*"A transparent smart e-Governance with seamless access, secure and authentic flow of information crossing the interdepartmental barrier and providing a fair and unbiased service to the citizen."*

Basically, e-Governance is generally understood as the use of Information and Communications Technology (ICT) at all levels of the Government in order to provide services to the citizens, interaction with business enterprises and communication and exchange of information between different agencies of the Government in a speedy, convenient, efficient and transparent manner.

### NEED FOR e-GOVERNANCE

Government is responsible for providing various services to the citizen. It is important that the government provides services which are really required by the citizen, these services are provided at the place where it is easily accessible by them, at a time when it is convenient to them and at the cost which they can afford for these services. The purpose of implementing e-Governance is to improve governance processes and outcomes with a view to improving delivery of public services to citizen (Heeks, 2002). e-Governance offers a large opportunity for serving the citizens in better ways. The goals of e-Governance can be assessed in terms of better service delivery to citizen, ushering transparency and accountability, empowering people through information and improving interface with citizen, business and industry.

There are no institutionalized standards for the delivery of public services. Therefore, there always appears to be an unending struggle between the governmental systems, its capability to deliver and the actual needs of the citizens. For the citizens, any encounter with the government is a harrowing experience (Rao, 2003). Be it a visit to pay utility bill or to the police station for registering an FIR, or to the respective authorities for obtaining a permission/license/certificate, or a visit to the government hospitals or government educational institutions – the procedures are so lengthy and the number of officials and their attitudes are so complicated that the citizen remains a dissatisfied and frustrated customer.

Despite using various mechanisms of delivery of these services, most governments are increasingly perceived as unresponsive, with no covert accountability systems and mere lip service to transparency (Paneerwala, 2005). The traditional system of governance has the following drawback, which affects the credibility of the government:

- The citizens are required not only to travel a long distance but also stand in long queue to avail these services. Even to get a form for ration card, he has to travel a long distance.
- In the offices, citizen may have to bounce from one table to another table to get the requisite service and may have to travel more than once.
- The timing of getting these services may not be convenient for the citizen, for example, in the traditional system, telephone bills are deposited during 9.30 AM - 2.00 PM, during which they are expected to attend their office.
- There are rigid hierarchies in the system which affects the timely completion of the task and the official providing services poses as if he is granting a favour to the citizen.
- The governance system has complicated procedures and decision making is rather slow.
- There seems to be no accountability in many cases, if the work is not being done in time.
- The services offered are government centric, i.e. services are provided as per the convenience of official concern and the entire system is based on basic mistrust for the citizen.

and ALL THIS INDUCES CORRUPTION

Thus, e-Governance can play a vital role in facilitating to make the governance responsible, accountable transparent and also effective. Many governments have already initiated various e-Governance projects in the country, so as Rajasthan Government, one such project in Rajasthan is e-Mitra.

### e-MITRA

e-Mitra is an ambitious e-Governance initiative of Government of Rajasthan and is being implemented in all 33 Districts of the state using Public-Private Partnership (PPP) model for convenience and transparency to citizens in availing various services of the Government and Private Sectors under a single roof at their door steps using an e-platform. The services are delivered via counters known as CSC (Common Service Centre) kiosks in rural areas and e-Mitra kiosks in urban areas and also online via [www.emitra.gov.in](http://www.emitra.gov.in). These counters provide services related to various departments in an integrated and easily accessible manner to people residing in rural as well as urban areas without any need for running around in government offices. The project has been operational since 2005. Initially it was functioning through a Client Server Based Application Software developed by Department of IT & C. In 2010, the old Client Server Application was migrated to Web-based on-line e-Mitra application across all the 33 districts. A new generic module has been added in May 2011 to e-Mitra portal which allows end to end application and delivery of "Digitally Signed Certificates". 'e-Mitra' has been awarded Bronze Icon for 'Outstanding performance in Citizen-centric Service Delivery' in the 10th National e-Governance Conference in February, 2007 ([www.rajasthan.gov.in](http://www.rajasthan.gov.in)).

The key objectives of e-Mitra Project is to provide hassle free one-stop solution to the citizen and provide unified e-services platform to minimize multiple interaction points for the citizen and hence reducing the wastage of valuable time. The services being offered at e-Mitra are as follows:-

- Payment of electricity bills.
- Payment of water bills of PHED.
- Online bus ticketing of RSRTC.
- Issue of Birth & Death certificates.
- Payment of various dues/fee of Jaipur Municipal Corporation.
- Payment of various dues/fee of Jaipur Development Authority.
- Payment of various dues/fee of Rajasthan Housing Board.
- Payment of Land line & Mobile bills (BSNL and others).
- Public grievance redressal.
- Access to Land & Revenue Records (ROR).
- Access to Government Information.
- Development schemes.
- BPL List.
- Immovable Property Rates (DLC).
- Agriculture information & Mandi rates.

The service deliveries are on charge basis so as to make the system self-sustaining. For services that any government department/ organization wants to offer, like bill/ taxes collection and awareness generation, the payment of service charges is made by the concerned department. While in case of services which are rendered on citizen's demand, e.g. Caste Certificate, Death/ Birth Certificate etc., the payment is made by the citizen himself.

### NEED AND SIGNIFICANCE OF THE STUDY

The aim of the research is to review the development and state of e-Governance initiative with respect to ICT enabled Public Services Delivery for common citizen with specific reference to e-Mitra in Jaipur District. The study tries to examine the e-Mitra project mainly from the perspective of consumers. The primary objective of this research paper is to know the awareness and usage pattern of ICT enabled services by users of different demographic profile.

The specific objectives of the present study are:

1. To assess the awareness and usage pattern of services by users of different demographic profile.
2. To analyse the percentage of user availing different type of services through ICT based system i.e. e-Mitra.
3. To identify the important media of publicity for creating awareness among users.
4. To suggest improvement in the ICT based service delivery system.

## RESEARCH METHODOLOGY

The present study is an exploratory cum descriptive research as primary objective is to identify knowledge and usage of e-Mitra by the consumers of different demographic profile. Based on the objective of the study and limitations in terms of time and other resources it was proposed that the unit of analysis will be Jaipur city for e-Mitra project. The ICT enabled public services through e-Mitra are at present provided through 348 centres in Jaipur district which consist of 165 centres in rural area and 183 centres in urban area. The profile of the consumers are examined mainly on the basis of (a) locality i.e. urban or rural (semi urban) (b) religion (c) caste (d) status of respondent (e) age (f) gender (f) education (g) occupation and (h) monthly income.

A sample of 220 respondents has been chosen for the present study across the city consisted of 145 urban and 75 rural respondents. The data was collected during July 2011 to December 2011 in the Jaipur city including the rural and urban area around the city. The data was collected through a structured questionnaire which was designed in Hindi and English. Special care was also taken to include non users of e-Mitra in the sample for which researcher also visited departmental counters, shops, offices and residences of various consumers for collecting the responses. The survey instrument was also administered at the e-Mitra centres where consumers were availing various services.

The data was entered in the **Spreadsheet Software (Microsoft Excel 2007)**. To ensure that the correct data is entered, **data validation features** of the Excel was used, which helped minimizing errors at the time of entry. Most of the data analysis was done using SPSS 19.0 (Kirkpatrick, 2012). The **frequency distribution, cross tabulation, descriptive statistics, test for testing two population proportions (z Statistic) and Chi Square were the main methods used for analysis of data and drawing inferences based on the sample in the research.**

The specific research objective of the study is to examine the knowledge and usage pattern of e-Mitra in relation to area (semi rural/ urban), religion, gender, income, profession and age group, therefore following hypothesis were formulated:

- H<sub>01</sub>: There is no significant difference about awareness & use of e-Mitra between the consumers of rural and urban area  
H<sub>02</sub>: There is no significant difference about awareness & use of e-Mitra between the consumers of different gender  
H<sub>03</sub>: There is no significant difference about awareness & use of e-Mitra between the consumers of Hindu and other religions  
H<sub>04</sub>: There is no significant difference about awareness & use of e-Mitra between the consumers of General category and other castes  
H<sub>05</sub>: There is no significant difference about awareness & use of e-Mitra between the consumers of various education groups  
H<sub>06</sub>: There is no significant difference about awareness & use of e-Mitra between the consumers of different occupation  
H<sub>07</sub>: There is no significant difference about awareness and use of e-Mitra between the consumers of different income group  
H<sub>08</sub>: Source at which the payment of utility bills are paid do not differ significantly between rural and urban area

## ANALYSIS AND FINDINGS OF e-MITRA BY TARGETED CONSUMERS

The data collection through questionnaire and personal interview was tabulated and analysis was carried through the SPSS 19.0 Version (Statistical Package for Social Sciences). The significance level has been tested for 95% confidence interval for all hypothesis i.e. alpha <0.05.

## AWARENESS AND USAGE OF e-MITRA

One of the most important questions put to the consumers was about their awareness of e-Mitra and whether they are using these services continuously or discontinued them after using at least once. Table 1 depicts the distribution of respondents on awareness and usage of e-Mitra for different demographic profiles. It also shows value of Pearson Chi Square for examining test of independence and test for two population proportion (z statistic) between awareness and usage of e-Mitra with various demographic parameters. The significance is tested at 95% confidence interval. Since, in certain parameters, the values in the cell is less than five therefore, appropriate grouping has been made for applying Chi Square test of significance.

TABLE 1: DISTRIBUTION OF RESPONDENTS ON AWARENESS AND USAGE OF e-MITRA BASED ON DEMOGRAPHIC PROFILE

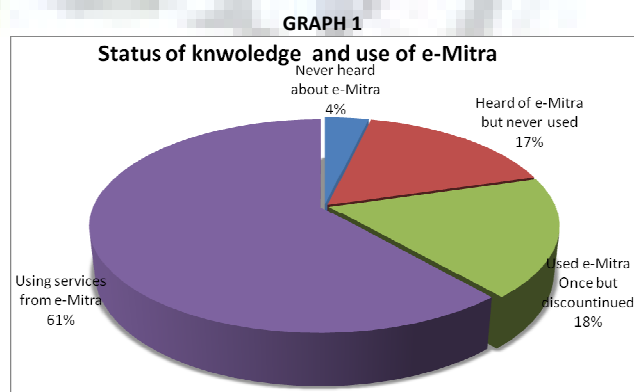
Demographic Profile/ Status of Awareness and Usage	Never heard about e-Mitra		Heard of e-Mitra but never used		Discontinued after availing service at least once		Availing services from e-Mitra		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
A: Status with respect to awareness and use of e-Mitra according to locality										
Rural/Semi urban	7	9.33	20	26.67	15	20.00	33	44.00	75	100.00
Urban	1	0.69	17	11.72	25	17.24	102	70.34	145	100.00
Total	8	3.64	37	16.82	40	18.18	135	61.36	220	100.00
Pearson Chi square*	12.352		df	2		p	0.002	z	3.8	
B: Status with respect to awareness and use of e-Mitra based on Gender										
Male	8	4.26	33	17.55	30	15.96	117	62.23	188	100.00
Female	0	0.00	4	12.50	10	31.25	18	56.25	32	100.00
Total	8	3.64	37	16.82	40	18.18	135	61.36	220	100.00
Pearson Chi square*	3.919		df	2		p	0.141	z	0.642	
C: Status with respect to awareness and use of e-Mitra based religion										
Hindu	8	4.23	33	17.46	36	19.05	112	59.26	189	100.00
Muslim	0	0.00	4	33.33	1	8.33	7	58.33	12	100.00
Sikh	0	0.00	0	0.00	1	10.00	9	90.00	10	100.00
Christian	0	0.00	0	0.00	2	22.22	7	77.78	9	100.00
Total	8	3.64	37	16.82	40	18.18	135	61.36	220	100.00
Pearson Chi square*	1.746		df	2		p	0.418	z	1.58	
D: Status with respect to awareness and use of e-Mitra based on caste										
General	0	0.00	11	10.09	20	18.35	78	71.56	109	100.00
SC	5	11.11	9	20.00	9	20.00	22	48.89	45	100.00
ST	3	8.57	10	28.57	3	8.57	19	54.29	35	100.00
OBC	0	0.00	7	22.58	8	25.81	16	51.61	31	100.00
Total	8	3.64	37	16.82	40	18.18	135	61.36	220	100.00

Demographic Profile/ Status of Awareness and Usage	Never heard about e-Mitra		Heard of e-Mitra but never used		Discontinued after availing service at least once		Availing services from e-Mitra		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Pearson Chi square*	9.185		df	2		p	0.01	z	3.33	
E: Status with respect to awareness and use of e-Mitra based on Status of Respondent										
Head of the Family	5	3.76	24	18.05	24	18.05	80	60.15	133	100.00
Spouse	3	15.00	4	20.00	4	20.00	9	45.00	20	100.00
Other Family Member	0	0.00	9	13.43	12	17.91	46	68.66	67	100.00
Total	8	3.64	37	16.82	40	18.18	135	61.36	220	100.00
Pearson Chi square*	0.384		df	2		p	0.825			
F: Status with respect to awareness and use of e-Mitra according to age										
Up to 30	1	1.85	14	25.93	11	20.37	28	51.85	54	100.00
31 to 45	3	3.49	10	11.63	21	24.42	52	60.47	86	100.00
46 to 60	4	5.88	12	17.65	8	11.76	44	64.71	68	100.00
Above 60	0	0.00	1	8.33	0	0.00	11	91.67	12	100.00
Total	8	3.64	37	16.82	40	18.18	135	61.36	220	100.00
Pearson Chi square*	10.452		df	4		p	0.033			
G: Status with respect to awareness and use of e-Mitra based on education level										
Literate without Education	4	28.57	6	42.86	1	7.14	3	21.43	14	100.00
Upto Primary	1	5.00	7	35.00	6	30.00	6	30.00	20	100.00
Upto Secondary	1	5.56	3	16.67	3	16.67	11	61.11	18	100.00
Upto Higher Secondary/ Pre-University	1	3.57	8	28.57	7	25.00	12	42.86	28	100.00
Graduate	1	2.13	5	10.64	6	12.77	35	74.47	47	100.00
Post Graduate	0	0.00	7	8.43	15	18.07	61	73.49	83	100.00
Doctorate	0	0.00	1	10.00	2	20.00	7	70.00	10	100.00
Total	8	3.64	37	16.82	40	18.18	135	61.36	220	100.00
Pearson Chi square*	23.295		df	4		p	0.000			
H: Status with respect to awareness and use of e-Mitra based on occupation										
Government/ PSU Employee	0	0.00	7	11.29	12	19.35	43	69.35	62	100.00
Private Employee	3	5.45	5	9.09	11	20.00	36	65.45	55	100.00
Businessmen	3	7.69	13	33.33	7	17.95	16	41.03	39	100.00
Labourer (Domestic/ Industry/Other	2	10.53	7	36.84	4	21.05	6	31.58	19	100.00
Self employed	0	0.00	3	23.08	4	30.77	6	46.15	13	100.00
Student	0	0.00	0	0.00	2	13.33	13	86.67	15	100.00
Retired	0	0.00	0	0.00	0	0.00	10	100.00	10	100.00
Others	0	0.00	2	28.57	0	0.00	5	71.43	7	100.00
Total	8	3.64	37	16.82	40	18.18	135	61.36	220	100.00
Pearson Chi square*	13.557		df	6		p	.035			
I: Status with respect to awareness and use of e-Mitra according to monthly income of the family										
Upto 5000	2	8.70	7	30.43	10	43.48	4	17.39	23	100.00
5000 - 10000	3	7.50	11	27.50	10	25.00	16	40.00	40	100.00
10000-20000	2	4.88	8	19.51	1	2.44	30	73.17	41	100.00
20000-30000	0	0.00	6	15.00	8	20.00	26	65.00	40	100.00
30000-50000	1	3.13	2	6.25	4	12.50	25	78.13	32	100.00
Above 50000	0	0.00	3	6.82	7	15.91	34	77.27	44	100.00
Total	8	3.64	37	16.82	40	18.18	135	61.36	220	100.00
Pearson Chi square*	32.723		Df	4		p	0.000			

\*Appropriate grouping has been made for applying the Chi Square test of significance

### AWARENESS AND USAGE OF e-MITRA ACCORDING TO AREA (RURAL/ URBAN)

Table 1A and Graph 1 depicts the status with respect to awareness and use of e-Mitra by the citizen, i.e. ICT based service delivery system. It is highly encouraging that more than 96% (212) of the users have heard of e-Mitra. There are only 8 (3.6%) persons who have not heard of e-Mitra, of which, only one respondent is from the urban area. It shows that more than 99% of the consumers in the urban area are aware of e-Mitra, this ratio is 90% in the rural area. Of the total, 220 respondents, 135 (61.4%) of the respondents have been continuously using e-Mitra for at least one service, while there are 40 (18.2%) respondents, who used e-Mitra services at least once and then discontinued. The reason cited to discontinue were either e-Mitra centres are not placed at convenient location or e-Mitra centre was closed as it was not financially viable. 37 (16.8%) of the respondents have heard about e-Mitra, but never availed services from it. In the rural area relatively less, 33 (44.0%) consumers are using e-Mitra as compared to 120 (70.3%) urban consumers, which shows that more efforts are required in rural area.





Initially data were collected on 4 point scale about awareness and usage of e-Mitra, but for the test of significance or drawing the inference a hypothesis regarding proportion of usage of e-Mitra between rural and urban is considered. The test for testing two population proportion i.e. rural and urban on the frequencies availing the services from e-Mitra was Therefore applied. The z value of proportion of usage between rural and urban (3.8) shows highly significant difference, therefore the hypothesis ( $H_01$ ) is rejected at 99.9% confidence level. The chi square test of significance also shows the similar result for independence between rural and urban area with respect to awareness and usage of awareness of e-Mitra with  $p < 0.05$  (0.002). Hence, we conclude that the awareness of e-Mitra differs significantly between rural and urban population and the proportion of users of e-Mitra is higher in urban area as compared to rural area. It is thus important that government should put more efforts in creating awareness in the rural area, so that ICT enabled services can be made more popular.

#### **AWARENESS AND USAGE OF e-MITRA ACCORDING TO GENDER**

Table 1B shows that there were 188 male respondents and 32 female respondents in the study. Interesting aspect of the survey is that all the females have heard of e-Mitra, while only 4.3% of the male did not know about it. Amongst female, 28 (87.7%) have used e-Mitra at least once and 56.3% of them are using it continuously, while 33 (17.6%) of the male have heard of e-Mitra but never used it. To test the hypothesis for equality of two population proportions i.e. male and female, about usage of e-Mitra, z statistics was calculated with a value of 0.642. This value of z is not significant and hence null hypothesis ( $H_02$ ) is accepted. The chi square value of 3.919 with 2 degree of freedom and a p value of 0.141 also show that the difference is insignificant and we accept the hypothesis that there is no significant difference about awareness and usage of e-Mitra between gender, i.e. male and female consumers are equally aware of e-Mitra and using it. Although sample size for female is small in comparison to male, but our data supports that there is no significant difference between gender about awareness and usage of e-Mitra is concern

#### **AWARENESS AND USAGE OF e-MITRA ACCORDING TO RELIGION**

The majority of the respondents (189) were from the Hindu religion (Table 1C), this could be due to the fact that Jaipur city is dominated by Hindu population, however, there were Muslims (12), Sikhs (10) and Christians (9) who participated in the survey. In almost all the religion consumers were evenly aware of e-Mitra and more than 70% of them have heard of e-Mitra and used its services at least one. Almost 60% of Hindu and Muslims are continuously using services through e-Mitra; while as many as 90% of Sikhs are using these services. To test the hypothesis for equality of two population proportions i.e. between Hindu and other religion z statistics was calculated. This value of z (1.58) is not significant and hence null hypothesis ( $H_03$ ) is accepted that there is no significant difference about awareness and usage of e-Mitra between Hindu and other religion. Chi Square value of 1.765 with 3 degree of freedom and p value of 0.418 ( $p > 0.05$ ) also signifies that there is no significance difference between the consumers of Hindu and other religions and conclude that the people of Hindu and other religions are equally aware about e-Mitra in the Jaipur city and using the services through e-Mitra.

#### **AWARENESS AND USAGE OF e-MITRA ACCORDING TO CASTE**

Sample constituted of different category of persons as regard caste is concern (Table 1D). There were 109 (49.8%) from General caste, while 45, 35 and 31 were from Scheduled Caste, Scheduled Tribe and Other Backward classes, respectively. All the general category of respondents have heard of e-Mitra, while 5 (11.1%) of SC did not even know about e-Mitra. Of the 109 respondents from General category, 78 (71.6%) of the respondents are continuously availing services through e-Mitra, while this ratio for other caste is SC (48.9%), ST (54.3%) and OBC (51.6%). The value of z (3.33) is highly significant and thus we reject the null hypothesis. The chi square test of independence also shows similar result (chi square = 9.185, df = 2,  $p = 0.01$ ) and is highly significant. Hence hypothesis is rejected ( $H_04$ ) and we infer that there is a dependence of awareness of e-Mitra on caste. The general caste is better aware of e-Mitra as compared to other caste.

#### **AWARENESS AND USAGE OF e-MITRA ACCORDING TO STATUS OF RESPONDENTS**

Table 1E illustrates that head of the family (133, 60.5%) is mostly the person in the family who looks after most of the services, while other family members constitute 39.8%. Only 5 (3.8%), head of family did not know about e-Mitra, while 60.2% of them continue to use e-Mitra for availing various services. Interestingly, study shows that in the category of other members of family, all have heard about e-Mitra and 68.7% of them are continuously using e-Mitra. This is usually the younger generation of family members. Approximately, 18% of respondents discontinued using e-Mitra after using it at least once. Table 1E indicates that there is no significant difference ( $p = 0.825$ ) about knowledge of e-Mitra among different category of respondents and most of them are evenly aware about services being offered at e-Mitra.

#### **AWARENESS AND USAGE OF e-MITRA ACCORDING TO AGE GROUP**

Distribution of awareness and usage of e-Mitra among various age groups is shown in Table 1F. In the younger generation of age group (up to 30), 51.85% of the respondents have been continuously using e-Mitra, while 20.37% have discontinued it after using at least once. More than 60% of the respondents in the age group of 31 to 45 years and 46 to 60 are continuously using e-Mitra. There are only 12 respondents who are above the age of 60 and of these, 91.7% are continuously using services of e-Mitra. The chi test for independence shows p value of 0.033 (chi square 10.452 with 2 df) indicates a significant value and we reject the null hypothesis ( $H_05$ ). Therefore we infer that awareness of e-Mitra amongst various age groups differ significantly. The elderly persons are better aware of e-Mitra and using it continuously as compared to other age groups.

#### **AWARENESS AND USAGE OF e-MITRA ACCORDING TO EDUCATION**

The Table 1G shows the distribution of awareness and usage of e-Mitra according to education level. Of the 220 respondents, 140 (64%) respondents were graduate and above and more than 70% of them are using e-Mitra continuously for availing various services. Amongst the group, literate without formal education (those who can sign and read numbers) which consisted of 14 respondents, 4 (28.6%) have not heard of e-Mitra, while only 3 (21.43%) of them are continuously using e-Mitra. The percentage of consumers with education level of up to primary, only 30% are using e-Mitra continuously. This shows that the awareness and usage of e-Mitra has dependence on education and this also corroborates with the value chi square (23.295) with  $p = 0.000$  and is highly significant. Hence we reject the null hypothesis ( $H_06$ ). The analysis of data shows that persons with higher education are better aware of e-Mitra and continuously using it for various services.

#### **AWARENESS AND USAGE OF e-MITRA ACCORDING TO OCCUPATION**

Table 1H shows the distribution of respondents according to their occupation as regard awareness and usage of e-Mitra is concern. Majority of respondents (117) are from government or private service. All the respondents who are in government service have heard of e-Mitra, while 10.5% of labour class have not heard of e-Mitra. Only 30% of labour class is continuously using e-Mitra, while this ratio is much higher among other classes. 86.7% of students are continuously availing services, as they are the ones who use e-Mitra for filling online applications for various examinations. All the retired persons are continuously using e-Mitra for various services. This analysis indicates that the awareness and usage of e-Mitra differ among various occupation which is also confirmed with the p value which is significant ( $p = 0.035$ , i.e.  $< 0.05$ ) and is not same for various occupation. The students and retired persons are better aware of e-Mitra along with service class people.

### AWARENESS AND USAGE OF e-MITRA ACCORDING TO INCOME

Distribution of respondents based on income is shown in Table 11. There are only 23 respondents who are from the income group of less than 5000 per month, of which only 17.4% are continuously using e-Mitra, while 74.1% knew about e-Mitra but either did not use it or discontinued after using it once. Similarly in the income group of 5000 to 10000 only 40% of users are continuously using e-Mitra, while this ratio is much higher in the income group of 10000 & above which is more than 70%. This shows that e-Mitra is more used in higher income group as compared to low income group. The p value of < 0.05 also confirms this that there is a significant difference among the respondents of different income group about awareness of e-Mitra. Thus, there is a dependence of income group on awareness and usage of e-Mitra. The persons with income of up to Rs 10000 or less are relatively less aware of e-Mitra and using it as compared to relatively higher income group.

### SOURCE / PLACE WHERE THE SERVICES ARE AVAILED BY CONSUMERS

The services of making payment of utility bills are availed by consumers at different sources i.e. concerned department, e-Mitra, shops and other places such as through ECS or internet banking. This section of the analysis is devoted to find out what percentage of users are using e-Mitra or other sources and also to draw inference whether this pattern of using various sources at which services are availed differ in rural and urban area.

TABLE 2: DISTRIBUTION OF RESPONDENTS AVAILING SERVICES AT VARIOUS SOURCES							
Place where payment is made	Rural		Urban		Total		Z
	Count	%	Count	%	Count	%	
Concerned Department	37	49.3	27	18.6	64	29.1	4.75
e-Mitra Kiosk	32	42.7	99	68.3	131	59.5	3.66
Shop & Others	6	8.0	19	13.1	25	11.4	1.11
Total	75	100.0	145	100.0	220	100.0	
Chi Square = 22.605		df = 2		p =0.000			

Table 2 and Graph 2 enumerate distribution of users using various sources at which services are availed by consumers and their dependence on area i.e. rural and urban. Majority of respondents 131 (59.5%) are making payment at e-Mitra kiosks, which shows its popularity. The proportion of consumers making payment at counter of the concerned department is 64 (29.1%). This is because some of the departments have made computerized system at their cash counters to facilitate payment of utility bills, such as Electricity Department. There are 25 (11.4%) respondents that are using other means of making utility bill payment which are either at shop or through Electronic Clearance System/ Net Banking. This shows that there are consumers who still make payment of utility bills at General Shops. These respondents find it more convenient to pay at the general shops as either they are close to their houses or while shopping, they can make the payment. In such cases they pay some charges to these shop keepers. The use of ECS and Net banking would increase in future as the users of Internet are increasing.

There are relatively less number of consumers in the rural area, 32 (42.7%) as against 99 (68.3%) in urban that are using e-Mitra for availing various services. Thirty seven (49.3%), of the consumers in the rural area still resort to the departmental counter, while this category of respondents are only 27 (18.6%) in urban area. This is due to the distance from the home/ office of the e-Mitra kiosk in the rural area. There is relatively less number of persons in the rural area who prefer to pay their utility bills through general shop or using ECS or Internet payment for utility bills, which could be due difficulty in accessing Internet or literacy.

Table 2 also illustrates the test of significance for two population proportion i.e. rural and urban for the source at which services are availed. This is being tested for e-Mitra and also for use of Departmental counter. The z value of two population proportion i.e. rural and urban for source as e-Mitra is 4.75, while for departmental counter the value is 3.66, both of which are highly significant. Hence, we reject the null hypothesis ( $H_0$ ) and infer that there is a significant difference at source where utility bills are paid between rural and urban population. Further, the hypothesis is also tested using Pearson's Chi Square, which is 22.605 with 2 degrees of freedom. The value of  $p < 0.05$  (0.000) is statistically highly significant. This indicates that there is a significant difference between the rural and urban population as regard source of payment of utility bills are concern. The rural population prefer department counter for the payment of utility bills while urban population prefer e-Mitra kiosk. This difference can be correlated with the awareness and facilities available in the rural area.

### SOURCE OF KNOWLEDGE ABOUT e-MITRA

It is important that proper method of publicity be used to make aware common citizen for any service being offered by agencies.

Source of Knowledge	Rural (Semi urban)		Urban		Total	
	Count	%	Count	%	Count	%
News Paper	15	22.1	50	34.7	65	30.7
Television/ Radio	3	4.4	8	5.6	11	5.2
Friends/ Neighbour/ Relatives	20	29.4	56	38.9	76	35.8
Colleagues at office	8	11.8	21	14.6	29	13.7
Hoarding/ Others	22	32.4	9	6.3	31	14.6
Total	68	100.0	144	100.0	212	100.0
Pearson Chi-Square = 25.48		df = 4		p=0.000		

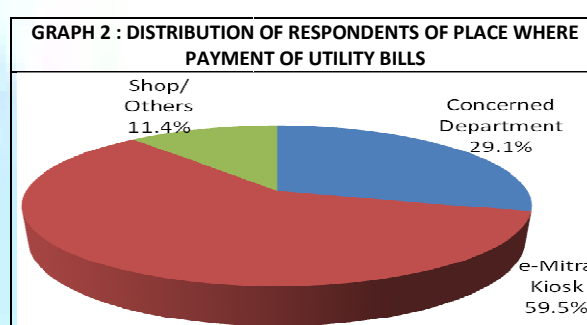
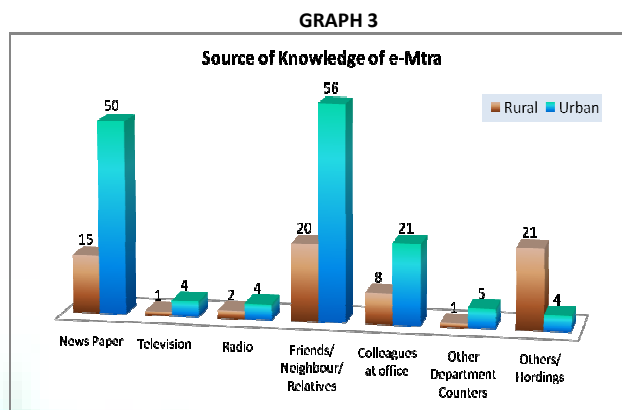


Table 3 indicates that 76 (35.8%) of the respondents have come to know about e-Mitra through friends and relatives, while 65 (34.7%) have mentioned about newspaper as a source. Hoardings/ Camps and information available from other department counters accounted for 31 (14.6%) of respondents. Television and radio seems to be least useful source of getting aware about e-Mitra. Hoardings/camps are more popular in rural (32.4%) as compared to urban population (6.3%). The difference in the method of publicity differ significantly in urban and rural area ( $p < 0.05$ , chi square = 25.48) which shows that the method used in creating awareness among rural and urban masses should be different. In rural hoarding/ camps and mouth publicity plays important role while in urban area, newspaper and mouth publicity is vital.



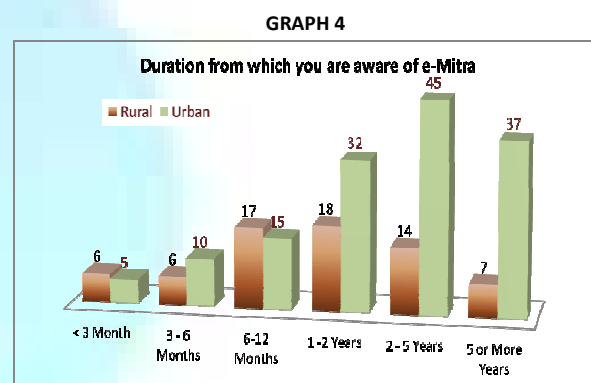
## DURATION FOR WHICH RESPONDENTS ARE AWARE OF e-MITRA

**TABLE 4: DISTRIBUTION OF DURATION FOR WHICH USERS AWARE OF COMPUTERIZED SERVICE DELIVERY THROUGH e-MITRA**

Duration	Rural (Semi urban)		Urban		Total	
	Count	% of Total	Count	% of Total	Count	% of Total
< 3 Month	6	8.8	5	3.5	11	5.2
3 - 6 Months	6	8.8	10	6.9	16	7.5
6-12 Months	17	25.0	15	10.4	32	15.1
1 -2 Years	18	26.5	32	22.2	50	23.6
2 - 5 Years	14	20.6	45	31.3	59	27.8
5 or More Years	7	10.3	37	25.7	44	20.8
Total	68	100.0	144	100.0	212	100.0
Pearson Chi-Square = 16.79		df = 5		p = 0.005		

Table 4 indicates that majority (72.6%) of the respondents are aware of ICT based service delivery system for more than a year. In the semi urban area 57.4% of the respondents know about e-Mitra for one year or more, while this ratio in the urban area is almost 80%. In the urban area more than 25% of the users are aware of e-Mitra for more than five year, while it is only 10.3% in rural area, which shows that urban respondents are better aware of e-Mitra as compared to semi urban area.

The p value of 0.005 indicates that there is highly significant difference among the population of rural and urban area with reference to the duration for which they are aware of e-Mitra centres as in the urban area more users are aware of these services for longer period than rural area.



## SERVICE USAGE PATTERN OF THE CONSUMER

It is important to know, whether consumers are aware of variety of services available at e-Mitra. This helps in knowing proportion of consumer using e-Mitra kiosk for availing services. Table 5 depicts distribution of various services which are being provided through e-Mitra kiosk. The respondents (212) are those who have heard of e-Mitra. There are 8 respondents who have never heard of e-Mitra and are excluded from this analysis, as this would have lead to misleading interpretation. Table shows that more than 90% of the consumers are aware that utility bill payments can be made at the e-Mitra kiosk. The main reason of high percentage of this awareness is the facility of making payment at a single counter. 116 (54.7%) of the respondents are aware that Rajasthan Roadways bus tickets can also be obtained at e-Mitra. On the contrary, more than 170 (80.2%) do not have any idea that payment of various dues of housing board, JDA or Municipal Corporation can be paid at e-Mitra. Only 30.7% of the respondents are aware that RPSC (Rajasthan Public Service Commission) and University examination forms can be submitted online at e-Mitra.

**TABLE 5: DISTRIBUTION OF AWARENESS OF DIFFERENT TYPE OF SERVICES THAT CAN BE AVAILED AT e-MITRA AND PERCENTAGE OF CONSUMERS AVAILING THESE SERVICES AT e-MITRA**

Service	% of consumers knowing that service can be availed at e-Mitra		% of consumers availing services among those who knows that service can be availed at e-Mitra	
	Number	%	Number	%
Electricity bills	205	96.7	138	67.3
Water bills	206	97.2	139	67.5
Land line & Mobile bills (BSNL & others)	198	93.4	119	60.1
Online bus ticketing of RSRTC/ Railway	116	54.7	45	38.8
Issue of Birth & Death Certificate	56	26.4	16	28.6
Payment of various dues/fee of JMC/ JDA/ RHB	42	19.8	10	23.8
Submitting forms of RPSC/ University Exams	65	30.7	23	35.4
N		212		

Table 5 also shows the percentage of consumers (among those who knows that particular service is available at e-Mitra) who are using e-Mitra for availing these services. Almost 2/3<sup>rd</sup> of the consumers of the utility bills are using services through e-Mitra while less than 1/3<sup>rd</sup> of the consumers of other services are using it. This is due to the fact that these services are needed either once in a year or whenever required, in other words the frequency of using these services are much less as compared to payment of utility bills which is done almost every month or once in two months. Also these services have been introduced recently and some of the kiosk owners may not be providing these services.

**SUGGESTIONS FOR IMPROVEMENT**

The study also tried to find out suggestions through open question which citizens may have for improving the system. Based on the analysis of the quantitative data and suggestions received from the users the following suggestions are worth mentioning:

1. The government should publicize in the rural area through camps and hoarding which is an effective media of publicity.
2. More service centres (kiosk) should be opened at sub district level and cities.
3. Most of the kiosks do not work on Sunday therefore this must be ensured.
4. The number of transaction being done on line (using Internet) is much less; therefore government should encourage online payment of utility bills and other services. It has many indirect advantages such as reduces traffic, less congestions on road, reduces environment pollution, saving of time and cost for availing service which can be used for more productive work.
5. There should not be any charges for making online payment as more than 1% of the bill or ten rupee is charged towards services.
6. Different service providers such as electricity, water and telephone department should have billing cycle in such a way that the bills of various services are sent to consumers together, so that they may make payment together for all the bills which would save time and money in making multiple trips.
7. Increase number of services at these centres, as at present very few places payment of Urban Development Tax or due to RHB/ JDA / Municipal Corporation is paid. Services such as Ration Card, Domicile certificate etc should also be made available through these kiosks.

**CONCLUSION**

The Information and Communication Technology plays a very important role in implementing good governance, i.e. converting a government into SMART government. The major component of SMART governance is simple, moral, accountable, responsive and transparent; which helps in improving credibility of government among the common man. The government of Rajasthan has taken many initiatives in bringing good governance with the help of Information and Communication Technology, one such initiative is the implementation of e-Mitra which provides delivery of most common services through ICT.

This research paper provided a detailed analysis of the perceptions of citizens regarding the services offered through e-Mitra and an attempt has been made to highlight the extent of awareness consumers have about e-Mitra and its usage by them. As has been indicated that as many as 96.4% of the consumers have heard of e-Mitra and almost 80% of the consumers have used e-Mitra services at least once, which is encouraging sign for government to consider ICT for providing more and more services through ICT. Apart from awareness creation, it is equally important to roll out the centres at the sub-district level. This would help solve issues of distance and accessibility, which were the major constraints highlighted by non-users. It was learned during the study that the Government is planning a roll out immediately.

Overall, the study clearly highlights the fact that citizens are extremely happy about the project. It is also interesting to note that the participation of rural consumer is equally distributed in making payments at e-Mitra as compared to departmental counters. The project has also been able to demonstrate to the common man the possibilities of ICT in governance and has thus been able to gather support of the general public for future e-governance projects in the state.

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**TWO UNIT COLD STANDBY PRIORITY SYSTEM WITH FAULT DETECTION AND PROVISION OF REST**

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**ABSTRACT**

*In the present paper a system model which consists of two dissimilar units one being main unit and another as cold standby is investigated and analyzed. The failure time distributions of both the units are assumed to be exponential with different failure rates while the repair time distributions are taken as general. The reliability analysis of this model has been carried out by using regenerative point technique.*

**KEYWORDS**

dissimilar, exponential and general.

**INTRODUCTION AND DESCRIPTION OF THE SYSTEM**

The concept of inspection is widely used in literature, for describing the models, by several authors. The concept of inspection is widely used in literature, for describing the models, by several authors including Agnihotri and Satsangi (1), Goel, Agnihotri and Gupta (2), Goel, Gupta and Agnihotri (3), Gupta, Bajaj and Singh (4), Malik (6), Naidu and Gopalan (7) and Pour Darvish and Joorel (8). Using the concept of inspection, we propose a reliability model which consists of two dissimilar units one being main unit and another as cold standby. Initially the main unit is in operative mode while other is kept as cold standby which becomes operative on failure of the main unit. The main unit may fail directly or becomes hot after some time of operation. The main unit on becoming hot is put under inspection to identify whether it becomes hot due to its operational behaviour or due to some partial failure and in mean time the cold standby unit becomes operative. If the main unit is found to be hot due to its operational behavior it is given rest for some random time after which it works as good as new and if found to be partially failed then it is put under repair. If the cold standby unit also fails during the inspection of the main unit, the main unit which was already hot is put under operation but it works with low efficiency. The priority is given to the main unit both for operation and repair. The failure time distributions of both the units are assumed to be exponential with different failure rates while the repair time distributions are taken as general. The system breaks down on failure of both units. All the random variables associated to different times are mutually independent. Using regenerative points in Markov renewal process, the various measures of reliability such as transient and steady state transition probabilities, distribution of time to system failure and its mean, the mean sojourn time in different states, point wise availability of system at epoch 't' and its steady state availability, expected busy period in time interval (0,t] and expected number of visits of the repairman are obtained. The cost benefit analysis of the proposed models has also been carried out.

**NOTATIONS**

$M_o$	: Main unit is under operation.
$C_s$	: Cold standby unit
$M_H$	: Main unit becomes hot.
$M_{HI}$	: Main unit under inspection on becoming hot.
$M_r$	: Main unit failed completely and put under repair.
$M_{pr}$	: Main unit failed partially and under repair.

$M_{HO}$	: Main unit under operation after becoming hot.
$M_{PR}$	: Main unit failed partially and its repair is continued.
$C_O$	: Cold standby unit is under operation.
$C_r$	: Cold standby unit is under repair.
$C_w$	: Cold standby unit is waiting for repair.
$M_{FR}$	: Repair of main unit continued/put under repair on complete failure during hot period.
$M_R$	: Main unit under rest.
$\alpha$	: Constant mean failure rate of complete failure of main unit.
$\beta$	: Constant mean failure rate of cold standby unit.
$\gamma$	: Constant mean failure rate of partial failure of main unit.
$\mu_1$	: Constant mean rate of becoming hot for main unit.
$\delta$	: Constant mean rate of inspection of main unit on becoming hot.
$\mu_2$	: Constant mean rate of entering into rest mode of main unit after becoming hot.
$\lambda$	: Constant mean rate of completion of rest of main unit.
$F(\cdot), f(\cdot)$	: c.d.f. and p.d.f. of repair time distribution of complete failure of main unit.
$G(\cdot), g(\cdot)$	: c.d.f. and p.d.f. of repair time distribution of partial failure of main unit.
$H(\cdot), h(\cdot)$	: c.d.f. and p.d.f. of repair time of cold standby unit.

Using these notations the various possible states of the system along with all possible transitions are presented in the Fig. 1.1. The states  $S_0, S_1, S_2, S_3, S_4, S_5, S_6$  and  $S_9$  are up states while  $S_7$  and  $S_8$  are failed states. Further, the states  $S_7$  and  $S_8$  are non regenerative states while rest of states are regenerative states.

**Possible States of the System:** The system, at any point of time, may be in one of the following states:

$$\begin{aligned}
 S_0 &\equiv [M_o, C_s] & S_1 &\equiv [M_r, C_o] & S_2 &\equiv [M_H, C_o] \\
 S_3 &\equiv [M_{HO}, C_r] & S_4 &\equiv [M_{HI}, C_o] & S_5 &\equiv [M_{pr}, C_o] \\
 S_6 &\equiv [M_R, C_o] & S_7 &\equiv [M_{FR}, C_w] & S_8 &\equiv [M_{PR}, C_w] \\
 S_9 &\equiv [M_o, C_r]
 \end{aligned}$$

### TRANSITION PROBABILITIES AND SOJOURN TIMES

The various steady state transition probabilities are as follows:

$$\begin{aligned}
 p_{01} &= \frac{\alpha}{\alpha + \mu_1} & p_{02} &= \frac{\mu_1}{\alpha + \mu_1} & p_{10} &= \tilde{F}(\beta) & p_{17} &= 1 - \tilde{F}(\beta) \\
 p_{23} &= \frac{\beta}{\delta + \beta} & p_{24} &= \frac{\delta}{\delta + \beta} & p_{32} &= \tilde{H}(\alpha) & p_{37} &= 1 - \tilde{H}(\alpha) \\
 p_{43} &= \frac{\beta}{\beta + \gamma + \mu_2} & p_{45} &= \frac{\gamma}{\beta + \gamma + \mu_2} & p_{46} &= \frac{\mu_2}{\beta + \gamma + \mu_2} & p_{50} &= \tilde{G}(\beta) \\
 p_{58} &= 1 - \tilde{G}(\beta) & p_{60} &= \frac{\lambda}{\lambda + \beta} & p_{63} &= \frac{\beta}{\lambda + \beta} & p_{79} &= p_{89} = 1 \\
 p_{90} &= \tilde{H}(\alpha + \mu_1) & p_{93} &= \frac{\mu_1}{\alpha + \mu_1} [1 - \tilde{H}(\alpha + \mu_1)] & p_{97} &= \frac{\alpha}{\alpha + \mu_1} [1 - \tilde{H}(\alpha + \mu_1)]
 \end{aligned} \tag{1}$$

$$\sum_j p_{ij} = 1, i = 0, 1, \dots, 9$$

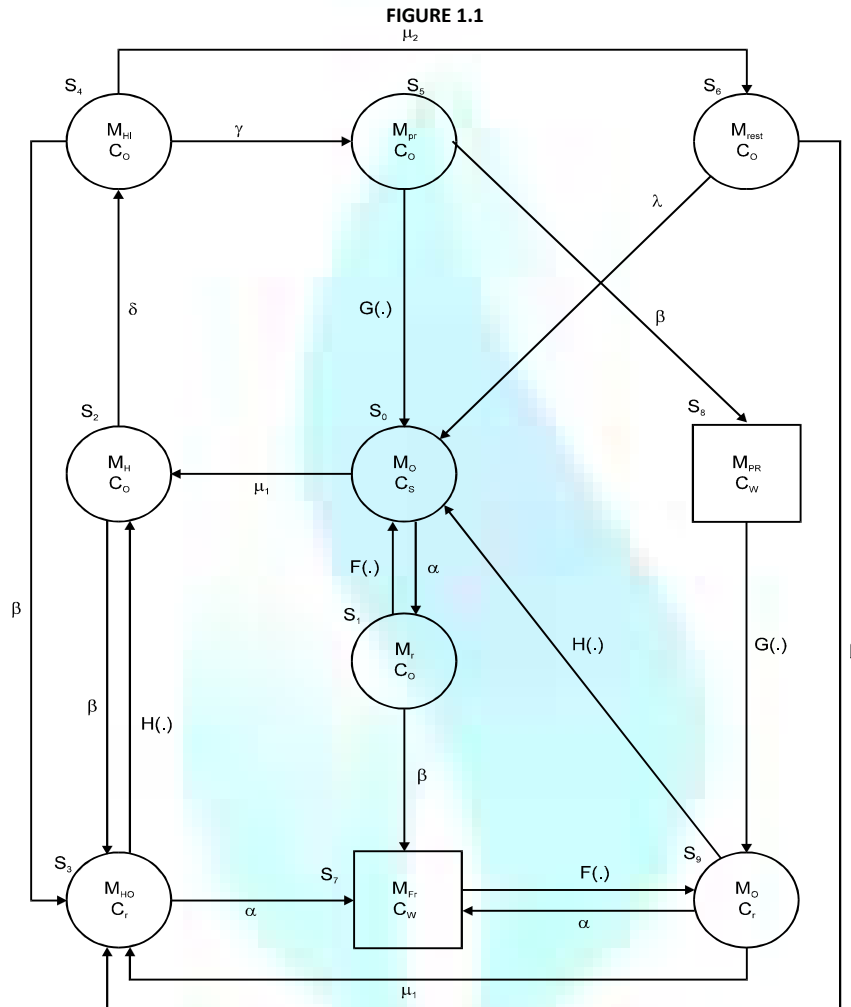
From the obtained steady state probabilities, it can be easily verified that

(2)

## Mean Sojourn time

$$\begin{aligned}
 \mu_0 &= \frac{1}{\alpha + \mu_1} & \mu_1 &= \frac{1 - \tilde{F}(\beta)}{\beta} & \mu_2 &= \frac{1}{\delta + \beta} & \mu_3 &= \frac{1 - \tilde{H}(\alpha)}{\alpha} \\
 \mu_4 &= \frac{1}{\beta + \mu_2 + \gamma} & \mu_5 &= \frac{1 - \tilde{G}(\beta)}{\beta} & \mu_6 &= \frac{1}{\lambda + \beta} & \mu_9 &= \frac{1 - \tilde{H}(\mu_1)}{\mu_1}
 \end{aligned}
 \quad (3)$$

## STATE TRANSITION DIAGRAM



## MEAN TIME TO SYSTEM FAILURE

let  $U_i$  be the random variable denoting time to system failure when the system starts from state  $S_i$ ,  $S_i \in E$  and let  $\pi_i(t) = P[U_i \leq t]$  be the cdf of time to system failure for the first time when it starts operation from state  $S_i$ . To determine the distribution function,  $\pi_i(t)$ , we regard the failed states  $S_7$  and  $S_8$  as absorbing states. Using basic probabilistic arguments, the recursive relations among  $\pi_i(t)$  can be easily developed and taking Laplace Stieltjes

transform of the relations and solving for  $\tilde{\pi}_0(s)$ , we get

$$\tilde{\pi}_0(s) = \frac{N_1(s)}{D_1(s)} \quad (4)$$

where

$$\begin{aligned}
 N_1(s) = & \tilde{Q}_{01} \tilde{Q}_{17} [1 - \tilde{Q}_{32} \tilde{Q}_{23} - \tilde{Q}_{24} \tilde{Q}_{32} (\tilde{Q}_{43} + \tilde{Q}_{46} \tilde{Q}_{63})] + \tilde{Q}_{02} \tilde{Q}_{23} \tilde{Q}_{37} \\
 & + \tilde{Q}_{02} \tilde{Q}_{24} [\tilde{Q}_{45} \tilde{Q}_{58} + \tilde{Q}_{37} (\tilde{Q}_{43} + \tilde{Q}_{46} \tilde{Q}_{63})]
 \end{aligned}$$

And

$$D_1(s) = (1 - \tilde{Q}_{01} \tilde{Q}_{10}) [1 - \tilde{Q}_{23} \tilde{Q}_{32} - \tilde{Q}_{24} \tilde{Q}_{32} (\tilde{Q}_{43} + \tilde{Q}_{46} \tilde{Q}_{63})] - \tilde{Q}_{02} \tilde{Q}_{24} (\tilde{Q}_{45} \tilde{Q}_{50} + \tilde{Q}_{46} \tilde{Q}_{60})$$

$\tilde{Q}_{ij}(s)$

(for simplicity we have omitted the argument 's' from  $\tilde{Q}_{ij}(s)$ )

and Using  $\lim_{s \rightarrow 0} \tilde{Q}_{ij}(s) \rightarrow p_{ij}$ , and eq. (1) and eq. (2), we obtain the following limiting values of  $N_1(s)$  and  $D_1(s)$  on 's' approaches to zero

$$N_1(0) = p_{01}p_{17}[1 - p_{32}p_{23} - p_{24}p_{32}(p_{43} + p_{46}p_{63})] + p_{02}p_{23}p_{37}$$

$$+ p_{02}p_{24}[p_{45}p_{58} + p_{37}(p_{43} + p_{46}p_{63})]$$

$$= (1 - p_{01}p_{10})[1 - p_{23}p_{32} - p_{24}p_{32}(p_{43} + p_{46}p_{63})] - p_{02}p_{24}(p_{45}p_{50} + p_{46}p_{60})$$

$$D_1(0) = (1 - p_{01}p_{10})[1 - p_{23}p_{32} - p_{24}p_{32}(p_{43} + p_{46}p_{63})] - p_{02}p_{24}(p_{45}p_{50} + p_{46}p_{60}) \quad (5)$$

On comparing the above expressions of  $N_1(0)$  and  $D_1(0)$ , we observe that  $N_1(0) = D_1(0)$  and thus  $\tilde{\pi}_0(s) = 1$  as  $s \rightarrow 0$ , which implies that  $\pi_0(t)$  is a proper cumulative distribution function.

Thus, Mean Time to System Failure (MTSF) when system starts operation with the entrance into  $S_0$  is obtained as

$$E(T) = - \frac{d}{ds} \tilde{\pi}_0(0) = \frac{D'_1(0) - N'_1(0)}{D_1(0)} \quad (6)$$

where  $N'_1(0)$  and  $D'_1(0)$  are the derivatives of the numerator and denominator of  $\tilde{\pi}_0(s)$  at  $s \rightarrow 0$ .

To obtain the numerator of MTSF defined by (5),

$$m_{ij} = -\tilde{Q}'_{ij}(s)_{s=0} = \frac{d}{ds} \int_0^\infty e^{-st} dQ_{ij}(t)_{s=0} \quad \text{and} \quad \sum_j m_{ij} = \mu_i$$

where  $m_{ij}$  is the mean elapsed time of the system in state  $S_i$  before transiting to state  $S_j$ .

Therefore, on arranging the coefficients of  $m_{ij}$ 's and also by using the above relations, the expression for  $D'_1(0) - N'_1(0)$  can be written as:

$$D'_1(0) - N'_1(0) = (\mu_0 + \mu_1 p_{01})[1 - p_{23}p_{32} - p_{24}p_{32}(p_{43} + p_{46}p_{63})] + \mu_2(1 - p_{01}) + \mu_3 p_{02}[p_{23} + p_{24}(p_{43} + p_{46}p_{63})] + p_{02}p_{24}(\mu_4 + \mu_5 p_{45} + \mu_6 p_{46}) \quad (7)$$

Therefore, using (5) and (7) in (6), the mean time to system failure (MTSF) becomes

$$E(T) = \frac{(\mu_0 + \mu_1 p_{01})[1 - p_{23}p_{32} - p_{24}p_{32}(p_{43} + p_{46}p_{63})] + \mu_2(1 - p_{01}) + \mu_3 p_{02}[p_{23} + p_{24}(p_{43} + p_{46}p_{63})] + p_{02}p_{24}(\mu_4 + \mu_5 p_{45} + \mu_6 p_{46})}{(1 - p_{01}p_{10})[1 - p_{23}p_{32} - p_{24}p_{32}(p_{43} + p_{46}p_{63})] - p_{02}p_{24}(p_{45}p_{50} + p_{46}p_{60})}$$

## AVAILABILITY ANALYSIS

$A_i(t)$  is the probability that the system is up at epoch 't' given that initially it was in up state  $S_i$ . Using the definition of  $A_i(t)$ , the recursive relations among  $A_i(t)$  can be easily developed, taking their Laplace transform and solving  $A_0^*(s)$ , we can write the expression of steady-state availability of the system in the following form:

$$A_0 = \lim_{t \rightarrow \infty} A_0(t) = \lim_{s \rightarrow 0} s A_0^*(s) = \lim_{s \rightarrow 0} s \frac{N_2(s)}{D_2(s)} \quad (8)$$

which is an indeterminate form since the denominator of (8) becomes zero as  $s \rightarrow 0$ , which can easily be verified.

Therefore, on using L' Hospital's rule, the steady state availability,  $A_0$  becomes

$$A_0 = \lim_{s \rightarrow 0} \frac{s N_2'(s) + N_2(s)}{D_2'(s)} = \frac{N_2(0)}{D_2'(0)} \quad (9)$$

Further on using the following relations:

$$\lim_{s \rightarrow 0} q_{ij}^*(s) = q_{ij}^*(0) = p_{ij} \quad \text{and} \quad -q_{ij}^{*'}(0) = m_{ij}$$

$$\text{also } Z_i^*(0) = \mu_i, i = 0, 1, 2, 3, 4, 5, 6, 9$$

The numerator and denominator of steady state availability of the system starting from state  $S_0, S_0 \in E$ , is thus becomes



$$N_2(0) = [(1-p_{97})(\mu_0 + p_{01}\mu_1) + p_{01}p_{17}\mu_9] \left[ \frac{(1-p_{97})(1-p_{23}p_{32} - p_{24}p_{32}p_{43} - p_{24}p_{46}p_{32}p_{63})}{-p_{37}p_{93}(p_{23} + p_{24}p_{43}) - p_{24}p_{93}(p_{45}p_{58} + p_{46}p_{37}p_{63})} \right]$$

$$+ [p_{01}p_{17}p_{93} + p_{02}(1-p_{97})] \left[ \frac{(\mu_2 + \mu_3p_{23} + \mu_4p_{24} + \mu_3p_{24}p_{43} + \mu_5p_{24}p_{45})(1-p_{97})}{+ \mu_6p_{24}p_{46} + \mu_3p_{24}p_{46}p_{63}} \right]$$

$$+ \frac{(p_{23}p_{37} + p_{24}p_{45}p_{58} + p_{24}p_{37}p_{46}p_{63} + p_{24}p_{37}p_{43})\mu_9}{+ (p_{23}p_{37} + p_{24}p_{45}p_{58} + p_{24}p_{37}p_{46}p_{63} + p_{24}p_{37}p_{43})\mu_9}$$

$$D'_2(0) = \mu_0(1-p_{97}) \left[ \frac{p_{23}p_{37}p_{90} + p_{24}p_{43}p_{37}p_{90} + p_{24}p_{45}p_{90} + p_{24}p_{45}p_{50}p_{93}}{+ p_{24}p_{46}p_{90} + p_{24}p_{46}p_{60}p_{93}} \right]$$

$$+ \mu_1p_{01}(1-p_{97}) \left[ \frac{1-p_{97} - p_{23}p_{32}p_{90} - p_{23}p_{93} - p_{24}p_{45}p_{58}p_{93} - p_{24}p_{32}p_{43}p_{90}}{-p_{24}p_{43}p_{93} - p_{24}p_{46}p_{32}p_{63}p_{90} - p_{24}p_{46}p_{63}p_{93}} \right]$$

$$+ \mu_2(1-p_{97})(1-p_{97} - p_{01}p_{10} + p_{01}p_{10}p_{97} - p_{01}p_{17}p_{90})$$

$$+ \mu_3(1-p_{97} - p_{01}p_{10} + p_{01}p_{10}p_{97} - p_{01}p_{17}p_{90})(p_{23} + p_{24}p_{43} + p_{24}p_{46}p_{63})(1-p_{97})$$

$$+ \mu_4p_{24}(1-p_{97})(1-p_{01}p_{10} - p_{01}p_{17}p_{90})(1-p_{97})$$

$$+ \mu_5p_{24}p_{45}(1-p_{97})(1-p_{97} - p_{01}p_{10} + p_{01}p_{10}p_{97} - p_{01}p_{17}p_{90})$$

$$+ \mu_6p_{24}p_{46}(1-p_{97})(1-p_{97} - p_{01}p_{10} + p_{01}p_{10}p_{97} - p_{01}p_{17}p_{90})$$

$$+ \mu_7p_{97} \left[ (1-p_{01}p_{10}) \left( \frac{1-p_{97} - p_{23}p_{32}p_{97} + p_{23}p_{37}p_{93} - p_{24}p_{43}p_{32}p_{97}}{+ p_{24}p_{43}p_{37}p_{93} - p_{24}p_{46}p_{32}p_{63}p_{97} + p_{24}p_{46}p_{37}p_{63}p_{93}} \right) \right]$$

$$+ \mu_7p_{97}[(1-p_{01}p_{10})p_{24}p_{43}p_{37}p_{90}]$$

$$+ \mu_7p_{97}(p_{23}p_{37}p_{90} - p_{24}p_{45}p_{50}p_{97} - p_{24}p_{46}p_{60}p_{97} + p_{24}p_{46}p_{37}p_{63}p_{90})$$

### BUSY PERIOD ANALYSIS

$B_i(t)$  is the probability that the system having started from regenerative state  $S_i, S_i \in E$  at time  $t=0$  is under repair i.e. the repairman is busy. Using the definition of  $B_i(t)$ , the recursive relations among  $B_i(t)$  can be easily developed, taking their Laplace transform and solving them for  $B_0^*(s)$ , the steady state probability that the system is under repair with repairman starting from state  $S_0$ , i.e. in the long-run the repairman is busy is given by

$$B_0 = \lim_{t \rightarrow \infty} B_0(t) = \lim_{s \rightarrow 0} s B_0^*(s) = \lim_{s \rightarrow 0} s \frac{N_3(s)}{D_3(s)} \quad (10)$$

Since the denominator of (10) becomes zero as  $s \rightarrow 0$ , thus on using L' Hospital's Rule and the results  $\lim_{s \rightarrow 0} q_{ij}^*(s) = q_{ij}^*(0) = p_{ij}$  and

$$-q_{ij}'(0) = m_{ij} \quad \text{also}$$

the expression for  $B_0$  becomes

$$B_0 = \lim_{s \rightarrow 0} \frac{N_3(s)}{D_3(s)} = \frac{N_3(0)}{D_3'(0)} \quad (11)$$

where

$$N_3(0) = (1-p_{97} - p_{23}p_{37}p_{93} - p_{24}p_{43}p_{37}p_{93} - p_{24}p_{45}p_{58}p_{93} - p_{24}p_{37}p_{46}p_{63}p_{93})$$

$$[\mu_1p_{01}(1-p_{97}) + p_{01}p_{17}\mu_9 + p_{01}p_{17}\mu_7]$$

$$+ (p_{23}p_{37} + p_{24}p_{43}p_{37} + p_{24}p_{45}p_{58} + p_{24}p_{46}p_{37}p_{63})\mu_9$$

$$+ (1-p_{97})(p_{23}\mu_3 + p_{24}\mu_4 + p_{24}p_{43}\mu_3 + p_{24}p_{45}\mu_5 + p_{24}p_{46}p_{63}\mu_3)$$

$$+ (p_{23}p_{37} + p_{24}p_{43}p_{37} + p_{24}p_{45}p_{58}p_{97} + p_{24}p_{46}p_{37}p_{63})\mu_7$$

and the expression of  $D_3'(0)$  is equivalent to  $D_2'(0)$ ,

**EXPECTED NUMBER OF VISITS**

$V_i(t)$  is the expected number of visits by the repairman during time  $(0, t]$ , given that the system initially starts from the regenerative state  $S_i, S_i \in E$  at time  $t = 0$ . Thus, the expressions for various  $V_i(t), i = 0, 1, 2, 3, 4, 5, 6, 7, 9$  can be obtained and taking Laplace Stieltjes transform, we get a system of linear equations in  $\tilde{V}_i(s)$  and solving them for  $\tilde{V}_0(s)$  we get the expected number of visits per unit of time, in steady state

$$V_0 = \lim_{t \rightarrow \infty} \left[ \frac{V_0(t)}{t} \right] = \lim_{s \rightarrow 0} s \tilde{V}_0(s) = \lim_{s \rightarrow 0} s \frac{N_4(s)}{D_4(s)} = \frac{N_4(0)}{D'_4(0)} \quad (12)$$

(since  $D_4(s)$  tends to zero as  $s \rightarrow 0$  and on using L' Hospital's rule)  
where

$$N_4(0) = p_{01}(1-p_{97})(1-p_{97})(1-p_{23}p_{32} - p_{24}p_{43}p_{32} - p_{24}p_{46}p_{32}p_{63}) \\ + p_{01}(1-p_{97})[p_{23}p_{37}p_{93} + p_{24}p_{43}p_{37}p_{93} + p_{24}p_{45}p_{58}p_{93} - p_{24}p_{46}p_{37}p_{63}p_{93}] \\ + (1-p_{97})[p_{01}p_{17}p_{93} + p_{02}(1-p_{97})]$$

and the expression of  $D'_4(0)$  is equivalent to  $D'_2(0)$ ,

**COST BENEFIT ANALYSIS**

For obtaining, the total expected cost incurred in time  $(0, t]$ , we consider the expected time for which the system is under repair and the number of times the repairman becomes available.

Let  $C(t)$  denotes the expected total cost incurred in time  $(0, t]$ , which is given as

$$C(t) = C_1 \mu_R(t) + C_2 V_0(t) \quad (13)$$

where

$C_1$  = Cost per unit time for the system to be repaired by repairman

$C_2$  = Cost per visit by the repairman

Further, let the expected total revenue in time  $(0, t]$  is denoted by  $R(t)$  and is defined as

$$R(t) = C_0 \mu_{up}(t) \quad (14)$$

where

$C_0$  is revenue per unit up time of the system.

Therefore, the total expected profit of the system in time  $(0, t]$ , is given by

$$P(t) = R(t) - C(t) = p_0 \mu(t) - C_1 \mu(t) + C_2 V_0(t)$$

The expected total profit per unit is given by

$$P = \frac{P(t)}{t}$$

And, in the long- run, this profit is becomes

$$P = \lim_{t \rightarrow \infty} \frac{P(t)}{t} = \lim_{s \rightarrow 0} [s^2 \cdot P^*(s)] = C_0 A_0 - C_1 B_0 - C_2 V_0 \quad (15)$$

**GRAPHICAL REPRESENTATIONS OF MTSF AND AVAILABILITY**

The repair time distributions of the complete failure of main unit, partial failure of main unit and cold standby unit of the system were assumed arbitrary while describing the system description and all other times assumed exponentially distributed with different parameters. To study the behavior of its MTSF and availability through graphical presentation, we assume that the repair time distributions of these three failures are also exponential with constant failure rate

$\theta_1, \theta_2$  and  $\theta_3$ , respectively. To plot the graphs of MTSF and availability of the system, we consider three different cases for the various values of the failure

and repair rates. In the first case, we fixed the values of  $\beta = \gamma = \delta = \mu_1 = \mu_2 = \lambda = \theta_1 = \theta_2 = \theta_3 = 0.30$  and different values of

$\alpha, 0 < \alpha \leq 1$ . In the second case,  $\beta = \gamma = \delta = \mu_1 = \mu_2 = \lambda = \theta_1 = \theta_2 = \theta_3 = 0.50$  and different values of  $\alpha, 0 < \alpha \leq 1$ , while in the

third case,  $\beta = \gamma = \delta = \mu_1 = \mu_2 = \lambda = \theta_1 = \theta_2 = \theta_3 = 0.80$  and different values of  $\alpha, 0 < \alpha \leq 1$ . The three sets of graphs of MTSF and

availability have been plotted and presented through Figure 1.2 and Figure 1.3, respectively. From, these figures we observed that, in all cases, both MTSF and availability of the system decreases with increasing failure rate of complete failure of main unit.

FIGURE 1.2  
Behaviour of MTSF

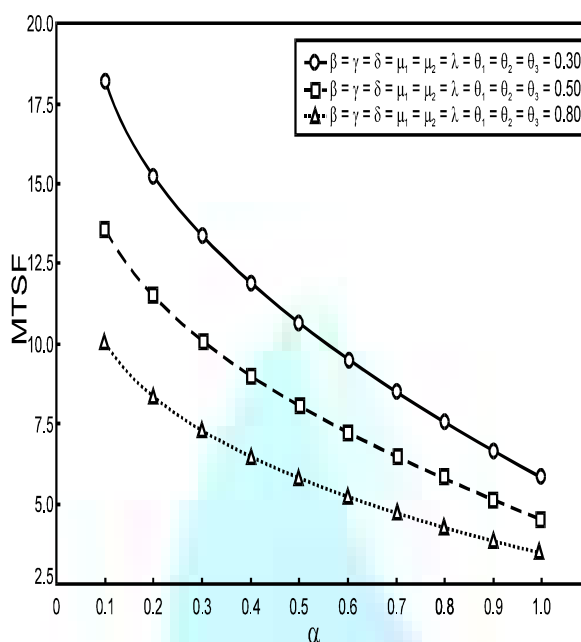
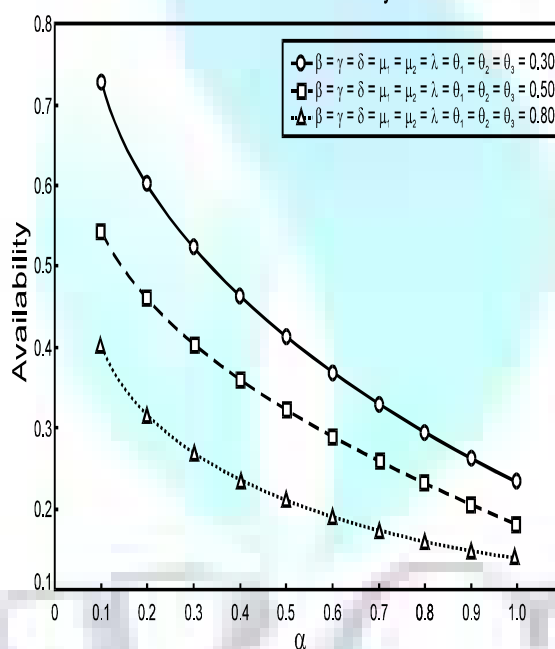


FIGURE 1.3  
Behaviour of Availability



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## MACRO ECONOMIC FACTORS INFLUENCING THE COMMODITY MARKET WITH SPECIAL REFERENCE TO GOLD AND SILVER

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### ABSTRACT

*In this paper, we have made an attempt to predict precious metals market, how it is influenced by the macro economic factors. In order to perform our analysis we extract the necessary information from the secondary source. The data for the study consist of 3 months futures prices and spot prices: Gold - 10<sup>th</sup> January, 2007 to 31<sup>st</sup> March, 2009 comprising 581 observations and Silver – 14<sup>th</sup> July, 2008 to 24<sup>th</sup> March, 2010 comprising 229 observations. We have identified few macro economic factors and tested its influence on the gold and silver prices. We found that the interest rate is important factors to determine the prices of both gold and silver price.*

### KEYWORDS

Commodity market, and macroeconomic factor influences

### INTRODUCTION

Movements in commodity prices are important for the welfare of both developing and developed countries. Perfect market models presume that all investors are equally endowed with knowledge and ability to analyze the available information. Generally investors interested on acquiring particular information and they are not interest rest of it. Another relevant feature of commodity prices is their tendency to co-movements. Understanding such co-movement is important, because of the welfare implications for both commodity importers and exporters. Considering the information exchange and price discovery roles of the futures market, many theoretical as well as empirical attempts have been made and the regulatory bodies, market makers, academicians and practitioners unanimously have agreed upon the common notion that organized futures markets contain significant information for the prospective cash market price.

### REVIEW OF LITERATURE

Earlier research focused on the historical movements of primary commodity prices relative to the price of manufactured goods in the examination of the Prebisch (1950) and Singer (1950) hypothesis, as recently re-examined by Harvey et al. (2010). Attention has also focused on commodity prices on time series properties Cuddington (1992), Deaton(1999), and Cashin, et al.,(2000) changes. Beck (1993), based upon Muths (1961) model of commodity prices with rational expectations, suggests that commodity prices may exhibit conditional heteroskedasticity. Later the researchers made attempt on economic factors determinants of commodity prices. Frankel (2008) and Calvo (2008) have discussed the role of the real interest rate; Wolf (2008) and Svensson (2008) have mentioned the importance of shifts in global supply and demand. Further, Krugman (2008) has argued that the increase in oil prices, providing an incentive to produce biofuels, is responsible for the increase in commodity prices. Akram (2009), for example, uses structural VAR models of quarterly data from 1990 to 2007 to separately look at the impact of real interest rates changes on the real price of crude oil, industrial raw materials, food and metals. Vansteenkiste (2009) has found a dynamic principal component from a large set of monthly commodity prices for the recent period and tests its potential determinants using regressions. She found that co-movement was highest in the 1970s and 1980s, declined in the 1990s and has recovered somewhat during the early years of this century.

### DATA AND METHODOLOGY

This study attempt is a descriptive research one. Data were collected in secondary sources. The data for the study consist of 3 months futures prices and spot prices: Gold - 10<sup>th</sup> January, 2007 to 31<sup>st</sup> March, 2009 comprising 581 observations and Silver – 14<sup>th</sup> July, 2008 to 24<sup>th</sup> March, 2010 comprising 229 observations. All the times series are obtained from NCDEX (National Commodities and Derivatives Exchange) database. Most of the investors prefer to invest in Bullion market not only because it is a safe investment but also it hedges against inflation and political uncertainties and it is easy to liquidate. The macro economic



factors data were obtained from Reserve Bank of India (RBI) official bulletin and official website. Series of data, the regression which was used as a tool to estimate in measuring the influence of various sets of macroeconomic factors that affect the price of gold and silver market. There is one standard model followed by other models, checking for robustness of the results. The table captures the regression estimates for inflation rate, United States (US) dollar exchange, and crude oil price, and Interest rate.

Before constructing the model, important to check if there is any multi-collinearity and for this the Variance Inflation Factor is found.

The Variance Inflation Factor (VIF) measures the impact of collinearity among the variables in a regression model. The Variance Inflation Factor (VIF) is 1 Tolerance, it is always greater than or equal to 1. There is no formal VIF value for determining presence of multi-collinearity. Values of VIF that exceed 10 are often regarded as indicating multi collinearity, but in weaker models values above 2.5 may be a cause for concern. In many statistics programs, the results are shown both as an individual  $R^2$  value (distinct from the overall  $R^2$  of the model) and a Variance Inflation Factor (VIF). When those  $R^2$  and VIF values are high for any of the variables in your model, multicollinearity is probably an issue. When VIF is high there is high multicollinearity

## RESEARCH QUESTIONS AND CONTRIBUTION

- Whether identify macroeconomic factors influence on the price of precious metals?

Many studies first examine this relationship on the basis of price or return. This Study focuses on the model setting for commodity market. This will implicate to make better understanding commodity market in long term aspect.

## RESULTS AND DISCUSSION

### Gold Market (Ref. Table no.01 and 02)

Comparing the R-squared values, in Model 1 is found that when all the four factors, namely Inflation Rate, Dollar Exchange, Crude Oil and Interest Rate are included the value is high; this shows the model is fit. Also, In Model 2, when Interest rate was excluded in building the model, the R-squared values is getting down. Interest rate is the predominantly affect in commodity price determinants gold market. When the inflation rate and US Dollar exchange rate were excluded in the model (Model 4 and Model 5 respectively), does not have much impact. The variables which was selected falls between values 1 to 3 in Variance Inflation Factor (VIF), generally accepted levels in VIF is maximum value of 5. Therefore the model is not having any multicollinearity problem.

### Silver Market (Ref. Table. No. 03 and 04)

Comparing to all other models, Model 1 has the high amount of R Squared values (0.84), this shows the model is fit. Also, when Interest rate was excluded in building the model, it is found that the value of R-square (0.48) is low. And hence we conclude that Interest rate is the major factor. Remaining factors does not have much impact towards price determinants in silver market

## CONCLUSION

Few macroeconomic factors were identified and tested its influence on the gold and silver prices. Interest rate is important factors to determine the prices of both gold and silver. Further research on other commodities will bring the best model, and it will give the better direction both investors and policy makers.

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## TABLES

TABLE NO. 1: MACRO ECONOMIC FACTORS INFLUENCING THE COMMODITY MARKET (GOLD)

VARIABLE	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
Constant	4638.99 (3540.31)	-9719.57 (4464.86)	13722.9 (4237.42)	14097.6 (1589.98)	2965.42 (3793.98)
Inflation Rate	262.907 (99.6000)	555.677 (140.677)	480.123 (124.067)	417.825 (93.6981)	-
Dollar Exchange	204.836 (70.1316)	341.458 (105.101)	4.58482 (80.8895)	-	303.421 (64.6583)
Crude Oil	38.8951 (7.27678)	29.1039 (11.1519)	-	27.5413 (6.83709)	46.7322 (7.23652)
Interest Rate	-1282.66 (186.781)	-	-1087.04 (249.903)	-1437.42 (199.071)	-1493.70 (183.872)
R-squared	0.909051	0.770696	0.825230	0.884023	0.888608
Adjusted R-squared	0.897315	0.749199	0.808846	0.873150	0.878166
Prob (F-statistic)	1.10e-15	2.39e-10	3.20e-12	4.67e-15	2.46e-15

TABLE NO.2::VARIANCE INFLATION FACTOR (GOLD)

VARIABLE	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
Inflation Rate	2.975	2.430	2.480	2.131	-
Dollar Exchange	3.774	3.470	2.697	-	2.704
Crude Oil	1.794	1.725	-	1.282	1.495
Interest Rate	2.755	-	2.649	2.533	2.250

TABLE NO. 3: MACRO ECONOMIC FACTORS INFLUENCING THE COMMODITY MARKET (SILVER)

VARIABLE	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
Constant	30972.5 (35971.8)	38003.7 (64803.2)	49259.6 (33609.0)	21536.5 (3555.67)	61654.1 (27498.1)
Inflation Rate	517.761 (405.921)	442.842 (731.324)	611.326 (408.519)	585.529 (300.648)	-
Dollar Exchange	-174.606 (662.069)	-540.247 (1186.51)	-490.749 (625.883)	-	-709.197 (526.925)
Crude Oil	59.6991 (48.1144)	93.4729 (85.9085)	-	64.5824 (42.4890)	71.1001 (48.6055)
Interest Rate	-2431.90 (479.222)	-	-2514.15 (486.115)	-2445.65 (455.783)	-2409.67 (492.364)
R-squared	0.844700	0.444765	0.820791	0.843620	0.819433
Adjusted R-squared	0.782580	0.293338	0.771916	0.800971	0.770188
Prob (F-statistic)	0.000472	0.008061	0.000203	0.000097	0.000212

TABLE NO. 4: VARIANCE INFLATION FACTOR (SILVER)

VARIABLE	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
Inflation Rate	2.726	2.723	2.632	1.634	-
Dollar Exchange	3.190	3.152	2.717	-	1.911
Crude Oil	1.991	1.953	-	1.696	1.922
Interest Rate	1.099	-	1.078	1.086	1.097

## CRITICAL ANALYSIS OF EXPONENTIAL SMOOTHING METHODS FOR FORECASTING

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**ABSTRACT**

Financial forecasting is important for an organization; it enables management to change operations at the right time in order to reap the greatest benefit. It also helps the company prevent losses by making the proper decisions based on relevant information. Organizations that can create high quality and accurate forecasts are able to see what interventions are required to meet their business performance targets. Forecasting is also important when it comes to developing new products or new product lines. It helps management decide whether the product or product line will be successful. Forecasting prevents the company from spending time and money developing, manufacturing, and marketing a product that will fail. The selection and implementation of the proper forecast methodology has always been an important planning and control issue for most firms and agencies. Often, the financial wellbeing of the entire organization operation rely on the accuracy of the forecast, since such information will likely be used to make interrelated budgetary and operative decisions in areas of personnel management, purchasing, marketing and advertising, capital financing, etc. The present article mainly focus on Single exponential smoothing method of Time Series analysis for forecasting, How trend and seasonality factor influences the Time Series data in forecasting, How these factor smoothed by double exponential smoothing, triple exponential smoothing methods and also discuss the impact of the smoothing constants ( $\alpha$ ) on forecasting.

**KEYWORD**

Forecasting, Exponential Smoothing, Time Series Analysis, Trend Factor, Seasonality.

**INTRODUCTION**

Accurate forecasting is vital in many areas of scientific, industrial, commercial and economical activities. The selection and implementation of the proper forecast methodology has always been an important planning and control issue for most firms and agencies. Often, the financial wellbeing of the entire organization operation rely on the accuracy of the forecast, since such information will likely be used to make interrelated budgetary and operative decisions in areas of personnel management, purchasing, marketing and advertising, capital financing, etc.<sup>[1][5]</sup>.

For Example any significant over-or-under sales forecast error may cause the firm to be overly burdened with excess inventory carrying costs or else create lost sales revenue through unanticipated item stock outs. When demand is fairly stable (e.g., unchanging or else growing or declining at a known constant rate), making an accurate forecast is less difficult on the other hand if the firm has historically experienced an up-and-down sales pattern, then the complexity of the forecasting task is compounded.

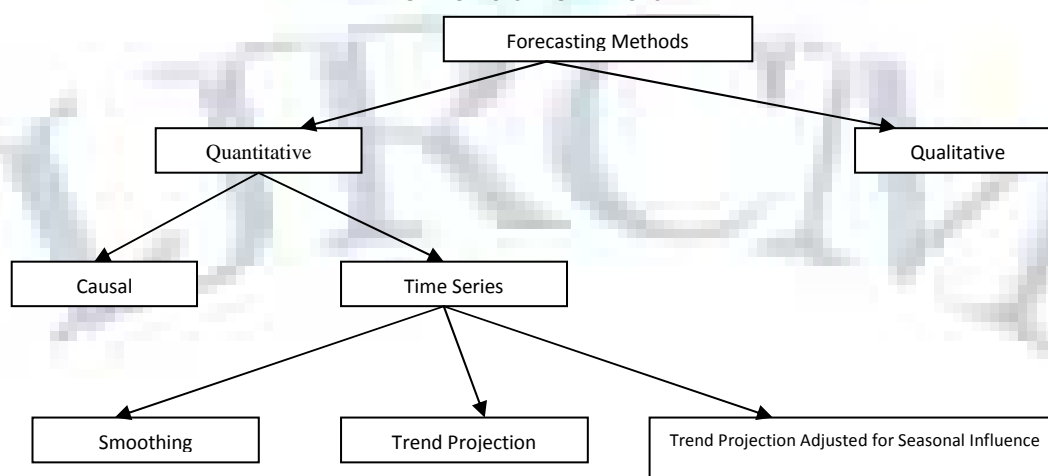
There are two main approaches to forecasting. The estimation of future value is either based on an analysis of factors which are believed to influence future values (the explanatory method) or the prediction is based on an inferred study of past general data behavior over the period of time (the extrapolation method)<sup>[2]</sup>.

For example, the sale of branded textile outlet will increase from current levels because of a recent advertising blitz rather than proximity to Christmas illustrates the difference between the two philosophies. It is possible that both approaches will lead to the creation of accurate and useful forecasts, but for a modest degree of desired accuracy the former method is often more difficult to implement and validate than the latter approach.

**FORECASTING METHODS**

Broadly the forecasting can be categorized into the Qualitative Forecasting and Quantitative Forecasting. Qualitative Methods of forecasting are subjective in nature and rely on human judgment and opinion. This method is used when situation is vague & few values of past data are available. Qualitative Methods basically used in forecasting of new products and technology and heavily dependent upon intuition and experience of management. On the other hand Quantitative Methods uses mathematical or simulation models based on historical demand or relationships between variables. This method is used when situation is 'stable' & historical data over a period of time is available. Qualitative Methods is basically used in forecasting of existing products and current technology<sup>[2][3]</sup>.

This article is mainly concerned with forecasting using exponential smoothing methods, where forecasts are made on the basis of data comprising one or more time series.

**FIG 1: FORECASTING METHODS**

A *time-series* forecasting is based on collection of observations made sequentially through time with equal intervals, (i) sales of a particular product in successive months, (ii) the temperature at a particular location at noon on successive days, and (iii) electricity consumption in a particular area for successive one-hour periods, are few example of time series data.

There are various applications of time-series forecasting few of them are:

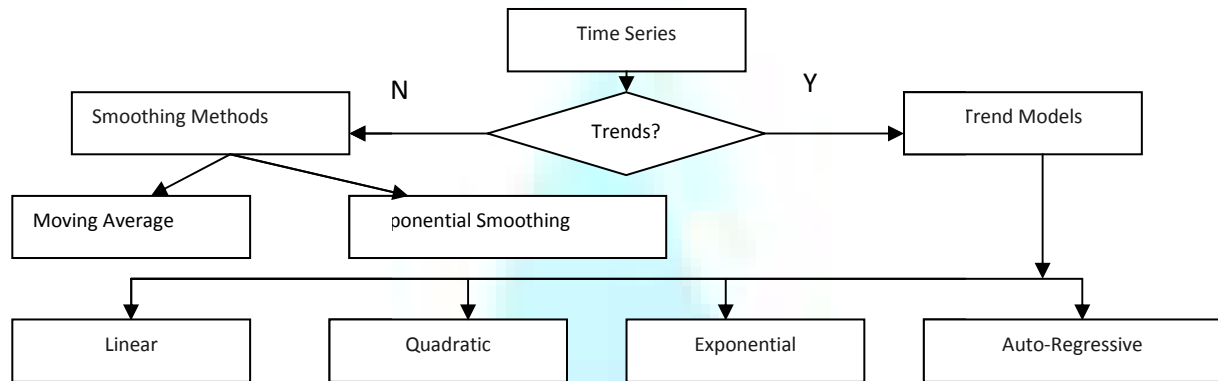
1. Economic planning

2. Sales forecasting
3. Inventory (or stock) control
4. Production and capacity planning
5. The evaluation of alternative economic strategies
6. Budgeting
7. Financial risk management
8. Model evaluation

## TIME-SERIES FORECASTING MODELS

Time-series models are based on a series of discrete and equal time increments i.e. predictions for the next {week, month, quarter, year} are based on, and only on, the past values of the last N periods{weeks, months, quarter, years} of the variable<sup>[7]</sup>.

FIGURE 2: TIME SERIES FORECASTING



A time-series has four main components that need to taken into account while forecasting<sup>[6] [7]</sup>.

- **Trends:** A time series may be stationary or exhibit trend over time. Long-term trend is typically modeled as a linear, quadratic or exponential function
- **Seasonality:** Seasonalities are regular fluctuations which are repeated from year to year with about the same timing and level of intensity.
- **Cycles:** The fluctuations in a variable that occur repeatedly and in the long-term (i.e. every several years).
- **Random Variations:** The irregular component is caused by short-term, unanticipated and non-recurring factors that affect the values of the time series. This component is the residual, or "catch-all," factor that accounts for unexpected data values. Random variation is often unpredictable.

## EXPONENTIAL SMOOTHING OVERVIEW

When the time series data is fairly stable and has no significant trend, seasonal, or cyclical effects, smoothing methods is able to average out the irregular component. Exponential smoothing (ES) is one of the most successful methods for forecasting, simple moving average (MA) method is a special case of the exponential smoothing (ES). Exponential smoothing (ES) is more parsimonious in its data usage and can be modified efficiently to use effectively for time series data having trend and seasonal patterns. Different categories of Exponential smoothing (ES) can easily adjust past errors, easy to prepare follow-on forecasts, and ideal for situations where many forecasts must be prepared depending on presence of trend or cyclical variations of time series data. In short, an exponential smoothing (ES) is an averaging technique that uses unequal weights, however, the weights applied to past observations decline in an exponential manner.<sup>[3][4]</sup>

There are some categories of this method:

1. Single exponential smoothing
2. Browns Double exponential smoothing method
3. Holts Double exponential smoothing method
4. Winters Triple exponential smoothing method

## SINGLE EXPONENTIAL SMOOTHING

Single Exponential Smoothing is a procedure that repeats enumeration continually by using the newest data. This method can be used if the data is not significantly influenced by trend and seasonal factor.

To smooth the data with single exponential smoothing requires a parameter called the smoothing constant ( $\alpha$ ). Each data point is given a certain weighting,  $\alpha$  for the newest data,  $(1-\alpha)$  for older data and etc. The value of  $\alpha$  must be between 0 and 1. The following is the equation of smoothed value<sup>[9]</sup>:

$$S_x = \alpha Y_x + (1-\alpha)Y_{x-1} + (1-\alpha)^2 Y_{x-2} + \dots$$

By doing a simple substitution, the equation above can be written as:

$$S_x = \alpha Y_x + (1-\alpha)S_{x-1} \quad (S_x\text{-smoothed value and } Y_x\text{-actual value})$$

Forecasting value  $\hat{Y}_{x+1}$

Forecasting with single exponential smoothing can be done by substituting this equation:

$$\hat{Y}_{x+1} = \alpha Y_x + (1-\alpha)\hat{Y}_x$$

The equation above also can be written in the following way:

$$\hat{Y}_{x+1} = \hat{Y}_x + \alpha(e_x)$$

Where  $e_x = (Y_x - \hat{Y}_x)$  is the forecasting error for n period. From this equation, we can see that the forecasting resulted with this method is the last forecasted value added with an adjustment for error in the last forecasted value.

Starting value  $S_0$



Practically, to calculate the smoothing statistic at the first observation  $Y_1$ , we can use the equation  $S_1 = \alpha Y_1 + (1 - \alpha)S_0$ . Then it is substituted into the smoothing statistic equation to calculate  $S_2 = \alpha Y_2 + (1 - \alpha)S_1$ , and the smoothing process is continued until we get  $S_n$  value. To calculate the equation above, a starting value  $S_0$  is needed.  $S_0$  can be calculated from the average of several observations. The first several observations can be chosen to determine  $S_0$ .

### IMPACT OF THE SMOOTHING CONSTANTS (ALPHA)

The smoothing constants values lies in the range of 0.0-1.0, the "best" values to use for the smoothing constants is depends on how data series being modeled for forecasting

In general, the speed at which the older responses are dampened (smoothed) is a function of the value of the smoothing constant. When this smoothing constant is close to 1.0, dampening is quick - more weight is given to recent observations - and when it is close to 0.0, dampening is slow - and relatively less weight is given to recent observations. For example if alpha value is .7 it means that 70% of the next forecast will come from the most recent observation and only 30% will come from all the previous forecasts. The best value for the smoothing constant is the one that results in the smallest mean of the squared errors (or other similar accuracy indicator).

### DOUBLE EXPONENTIAL SMOOTHING (BROWNS)

This smoothing method can be used for data which contains linear trend. This method is often called as Brown's one-parameter linear method. The following equations are used in double exponential smoothing with Browns method:

Single smoothing statistic equation:

$$S'_n = \alpha Y_n + (1 - \alpha)S'_{n-1}$$

Double smoothing statistic equation:

$$S''_n = \alpha S'_n + (1 - \alpha)S''_{n-1}$$

Forecasting value  $\hat{Y}_{n+m}$

The procedure to calculate forecasting m forward period with double exponential smoothing with Brown method can be calculated from this equation:

$$\hat{Y}_{n+m} = \beta_{0,n} + \beta_{1,n}m$$

This equation is similar to linear trend method, where:

$$\beta_{0,n} = 2S'_n - S''_n$$

$$\beta_{1,n} = \frac{\alpha}{1 - \alpha} (S'_n - S''_n)$$

Starting value  $S_0$

The smoothing statistic equation above can be solved if the estimation value for  $S_0$  is defined. Starting value  $S_0$  is defined as:

$$S'_0 = \hat{\beta}_{0,0} - \frac{\alpha}{1 - \alpha} \hat{\beta}_{1,0}$$

$$S''_0 = \hat{\beta}_{0,0} - 2 \frac{\alpha}{1 - \alpha} \hat{\beta}_{1,0}$$

We can use linear trend model constant calculated with the least squares estimation method to estimate the coefficient of  $S_0$ ,  $\hat{\beta}_{0,0}$  and  $\hat{\beta}_{1,0}$ .

### DOUBLE EXPONENTIAL SMOOTHING (HOLTS)

This method is similar to Browns method, but Holts Method uses different parameters than the one used in original series to smooth the trend value.

The prediction of exponential smoothing can be obtained by using two smoothing constants (with values between 0 and 1) and three equations as follows:

$$S'_n = \alpha Y_n + (1 - \alpha)(S'_{n-1} + T'_{n-1}) \quad (1)$$

$$T'_n = \gamma (S'_n - S'_{n-1}) + (1 - \gamma)T'_{n-1} \quad (2)$$

$$\hat{Y}_{n+m} = S'_n + T'_n m \quad (3)$$

Equation (1) calculates smoothing value  $S'_n$  from the trend of the previous period  $T'_{n-1}$  added by the last smoothing value  $S'_{n-1}$ . Equation (2) calculates trend value  $T'_n$  from  $S'_n$ ,  $S'_{n-1}$ , and  $T'_{n-1}$ . Finally, equation (3) (forward prediction) is obtained from trend,  $T'_n$ , multiplied with the amount of next period forecasted, m, and added to basic value  $S'_n$ .

The first smoothing equation adjusts  $S_n$  directly for the trend of the previous period,  $T_{n-1}$  by adding it to the last smoothed value,  $S_{n-1}$ . This helps to eliminate the lag and brings  $S_n$  to the appropriate base of the current value.

The second smoothing equation then updates the trend, which is expressed as the difference between the last two values. The equation is similar to the basic form of single smoothing, but here applied to the updating of the trend

Starting value  $S_0$  and  $T_0$

There are two parameters needed to estimate exponential smoothing with Holts method, the smoothing value  $S_0$  and the trend  $T_0$ . To find these parameters, the least squares method is used. The estimation value for  $S_0$  is the intercept value of linear estimation, while  $T_0$  is the slope value.  $S_0$  is in general set to  $y_1$ . Here are three suggestions for  $T_0$ :

$$T_0 = y_2 - y_1$$

$$T_0 = [(y_2 - y_1) + (y_3 - y_2) + (y_4 - y_3)]/3$$

$$T_0 = (y_n - y_1)/(n - 1)$$

The values for  $\mu$  and  $\gamma$  can be obtained via non-linear optimization techniques, such as the Marquardt Algorithm

### TRIPLE EXPONENTIAL SMOOTHING (WINTERS)

If a time series is stationary, the moving average method or single exponential smoothing can be used to analyze it. If a time series data has a trend component, then double exponential smoothing with Holts method can be used. However, if the time series data contains a seasonal component, then the Triple Exponential Smoothing (Winters) method can be used to handle it.

This method is based on three smoothing equations, Stationary Component, Trend and Seasonal. Both Seasonal component and Trend can be additive or multiplicative.

#### Additive

The whole smoothing equation

$$\mu_n = \alpha(y_n - S_{n-l}) + (1 - \alpha)(\mu_{n-1} + T_n)$$

Trend smoothing

$$T_n = \gamma(\mu_n - \mu_{n-1}) + (1 - \gamma)T_{n-1}$$

Seasonal smoothing

$$S_n = \beta(y_n - \mu_n) + (1 - \beta)S_{n-l}$$

Forecasted value

$$\hat{Y}_{n+m} = \mu_n + T_n m + S_{n-l+m}$$

#### Multiplicative

The whole smoothing equation

$$\mu_n = \alpha \frac{y_n}{S_{n-l}} + (1 - \alpha)(\mu_{n-1} + T_n)$$

Trend smoothing

$$T_n = \gamma(\mu_n - \mu_{n-1}) + (1 - \gamma)T_{n-1}$$

Seasonal smoothing

$$S_n = \beta \frac{y_n}{\mu_n} + (1 - \beta)S_{n-l}$$

Forecasted value

$$\hat{Y}_{n+m} = (\mu_n + T_n m) S_{n-l+m}$$

Where  $l$  is seasonal length (for example, amount of month, or quartile in a year),  $T$  is trend component,  $S$  is seasonal adjustment factor, and  $\hat{Y}_{n+m}$  is forecasted value for  $m$  next period.

Starting value  $\mu_0$ ,  $T_0$  and  $S_{j-l}$

The starting values for  $\mu_0$  and  $T_0$  can be obtained from regression equations which have actual variables as dependent variables and time variables as independent variables. This equation constant is a starting value estimation for  $\mu_0$  and slope of regression coefficient is starting value estimation for the trend component  $T_0$ . Whereas the starting value for the seasonal component  $S_{j-l}$  is calculated by using dummy-variable regression on de trended data (without trend).

### CONCLUSION

Moving average methods of forecasting has got certain limitation like i) Increasing  $N$  (no of instance of time series) makes forecast less sensitive to changes ii) Do not forecast trends and seasonal smoothing well iii) Forecasting require sufficient historical data. Exponential smoothing methods taken care of the limitation of moving average and can be utilize for developing the mathematical model for forecasting. Single Exponential Smoothing is used in a situation in which the data is not significantly influenced by trend and seasonal factor. Double Exponential Smoothing is used for data which contains linear trend but no seasonality and Triple Exponential Smoothing (Winters) can be used if the time series data contains a seasonal component also.

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## COMPARATIVE STUDY ON RETAIL LIABILITIES, PRODUCTS & SERVICES OF DISTRICT CENTRAL CO-OPERATIVE BANK & AXIS BANK

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### ABSTRACT

*This research paper seeks to make a comparative study of retail liability products of an emerging player (a private sector bank) vis-à-vis a established institution (a co-operative bank) to assess their suitability and acceptability in the rural market. The research methodology relies upon collection and analysis of secondary data. The results and findings show that there is a significant difference between product and services by private bank and co-operative bank. The findings would be useful in evolving appropriate strategies to attune banking products and services to the needs of the rural clientele and thereby enhance market share.*

### KEYWORDS

Retail liability products and services, Priority Banking, CASA Deposits, Third Party Products, and Customer Segmentation.

### INTRODUCTION

The post-liberalization era has witnessed a paradigm shift in the banking sector. The new generation private sector banks have leveraged their technological advantage to carve out a market share for themselves in a market which was virtually monopolized by public sector banks (PSBs). Private sector banks identified the retail banking segment as a high growth potential market which was neglected by the PSBs. These banks have aggressively targeted the low cost CASA (Current Account & Savings Account) deposits. A With competition intensifying in urban areas, private sector banks have now shifted focus to the rural market.

The participants in the rural market include players from the organized sector as well as the organized sector. The organized sector mainly comprises the commercial banks- mostly PSBs- co-operative banks and Regional Rural Banks (RRBs). The major thrust of these banks has been to provide adequate credit for farm and non-farm activities in the rural sector and to reduce dependence of rural folk on usurious money-lenders. There are, however, serious lacunae in the present institutional delivery system in rural areas with the viability of the specially designed RRBs, in particular, getting badly eroded over the years. There is therefore potential for strong financial institutions to meet the deficit and supplement the efforts of the present rural institutions. Further, sections of the rural population have experienced a significant spurt in their income levels as the benefits of economic development spread to interior areas. There is now a growing demand from this emerging section of affluent rural folk for more sophisticated and complex financial products and services. A scenario has therefore emerged in which there is a growing convergence of interest between the rural clientele and the new generation private sector banks.

The co-operative credit structure in rural India still continues to hold an important position, notwithstanding its inherent failings. Many influential farmers are even today stakeholders in these co-operative institutions and owing to their strong connect with the rural culture, these institutions have maintained a strong client-base in the rural areas.

This paper attempts to make a comparison between a private sector bank and a co-operative bank having regard to the following considerations:

1. Financially strong Co-operative Banks are competing with private sector banks by leveraging technology to provide better services to customers in rural areas
2. Private Sector Banks are aggressively expanding their operations into rural areas to get a share of the rural market.
3. The co-operative banks are offering a variety of services and products to match up with the services of private sector banks.
4. RBI has mandated that private sector banks should also participate in the process of financial inclusion. Hence a comparison is required to assess their contribution vis a vis co-operative banks to achieve financial inclusion.

This paper seeks to study the relative position of new players like private banks vis-à-vis the well-established co-operative institutions. A comparative study has been made of retail liability products of Axis Bank and a District Co-operative Bank. The findings suggest that there is growth potential for both these institutions and recommendations in this regard have been incorporated at the end of this study.

### REVIEW OF LITERATURE

Galal *et al.* (1994), World Bank (1995), and La Porta and Lopezde-Silanes (1997) support the view that privatization helps improve performance. The RBI (2003) did present a comparative position of the performance and efficiency ratios of five government owned PSBs, five partially privatized government-owned banks (divested PSBs), and those banks that were already in the private sector. However, statistical significance was not tested.

Although some studies have measured the efficiency of Indian banks, their analysis is restricted either to the pre-liberalization period (see Bhattacharyya *et al.*, 1997) or to a single year in the post-liberalization period (see Sathye, 2003).

Only a recent study by Kumbhakar and Sarkar (2003) investigates the impact of financial liberalization by calculating growth in the total factor productivity (TFP) of 23 public sector banks and 27 private domestic banks during 1985–1996 (their study excludes foreign banks). Kumbhakar and Sarkar (2003) measure TFP growth by estimating a translog cost function, and decompose TFP growth into a technological change, a scale, and a miscellaneous component. They find considerable over-employment of labour in Indian banks and find little evidence to suggest that the liberalization enhanced the productivity of banks, especially that of public sector banks. Bhattacharyya *et al.* (1997) studied the impact of the limited liberalization initiated before the deregulation of the nineties on the performance of the different categories of banks, using DEA. Their study covered 70 banks in the period 1986–91. However, public sector banks stated showing a decline in efficiency after 1987, private banks showed no change and foreign banks showed a sharp rise in efficiency. The main results accord with the general perception that in the nationalized era, public sector banks were successful in achieving deposit and loan expansion. It should be noted, however, that the use of one grand frontier for the entire period implies that technical change is not separately accounted for.

Das (1997) analyses overall efficiency- technical, allocative and scale- at PSBs. In the period 1990–96, the study found a decline in overall efficiency. This occurred because there was a decline in technical efficiency, both pure and scale, which was not offset by an improvement in allocative efficiency. The study, however, pointed out that the deterioration in technical efficiency was mainly on account of four nationalised banks.

Further, Das (1999) compares performance among public sector banks for three years in the post-reform period, 1992, 1995 and 1998. He finds a certain convergence in performance. He also notes that while there is a welcome increase in emphasis on non-interest income, banks have tended to show risk-averse behaviour by opting for risk-free investments over risky loans.

Sarkar, Sarkar and Bhaumik (1998) compared performance across the three categories of banks, public, private and foreign, in India, using two measures of profitability, return on assets and operating profit ratio, and four efficiency measures, net interest margin, operating profit to staff expense, operating cost ratio and staff expense ratio (all ratios except operating profit to staff expense having average total assets in the denominator). The authors attempted these comparisons after controlling for a variety of non-ownership factors that might impact on performance: asset size, the proportion of investment in government securities, the proportion of directed credit, the proportion of rural and semi-urban branches, and the proportion of noninterest income to total income. They found that, in the comparison between private banks and PSBs, there was only a weak ownership effect.

Ram Mohan (2002) found a trend towards convergence in performance among the three categories of banks- public, private and foreign- using financial measures of performance. Ram Mohan (2003) found that this result was reinforced by a comparison of returns to stocks in the three categories- the evidence was that returns to public sector bank stocks were not significantly different from returns to private sector bank stocks.

According to RBI, The origins of the urban co-operative banking movement in India can be traced to the close of nineteenth century. Inspired by the success of the experiments related to the cooperative movement in Britain and the co-operative credit movement in Germany, such societies were set up in India. Co-operative societies are based on the principles of cooperation, mutual help, democratic decision making, and open membership. Cooperatives represented a new and alternative approach to organization as against proprietary firms, partnership firms, and joint stock companies which represent the dominant form of commercial organization. They mainly rely upon deposits from members and non-members and in case of need, they get finance from either the district central co-operative bank to which they are affiliated or from the apex co-operative bank if they work in big cities where the apex bank has its Head Office. They provide credit to small scale industrialists, salaried employees, and other urban and semi-urban residents.

### CONTRIBUTION OF THE RESEARCH PAPER

Most of the existing literature on the banking sector relates to the private and public sector banks. There is not much literature available on co-operative banking sector, and more specifically in comparison with the private sector banks. The present study adds to the existing literature on banking and finance by giving comparative study on the co-operative banks and private sector banks operating in rural areas with special focus on retail liability products and services offered by both types of banks.

### OBJECTIVES

1. To conduct a detailed study of retail liabilities, products and services of Axis Bank and District Co-operative Bank.
2. Comparative Analysis of products and services of both banks to find differential features and benefits of products and services of both banks and their advantages and disadvantages.
3. To recommend some strategies to both type of banks to enhance the marketability of their retail liability products.

### HYPOTHESIS

H0: There is no significant difference between product and services by private bank and co-operative bank

H1: The product and services of private bank are better than those by co-operative bank

### RESEARCH METHODOLOGY

**Type of Research:** Descriptive Research

**Type of Data:** Secondary Data

**Sampling Frame:** Axis Bank and Central co-operative Bank

**Sampling Method:** Non-Probability Convenience Sampling

**Sample Size:** 2 Bank branches (one each from Axis Bank & Central Co-operative Bank)

**Sampling Area:** Barwani Branch (Madhya Pradesh)

### DATA COLLECTION

For the purpose of the study, all the information related to the retail liabilities products of Axis Bank and central Cooperative Bank has been taken from the above mentioned bank branches, from company reports and websites.

### RESULTS & DISCUSSION

The various retail liability products and services have been analyzed and compared of both types of bank (private bank and co-operative bank) at the Barwani (Madhya Pradesh). The analysis has been shown in tables below.

TABLE 1: SAVINGS ACCOUNT

S. no.	Features	Axis Bank, Barwani Branch (M.P)	District Central Co-operative Bank, Barwani Branch (M.P)
1	Average Quarterly Balance	Rs. 2500	Minimum balance required is Rs. 500 and with Cheque book minimum balance is Rs. 1000.
2	Initial Pay Amount	Rs. 2700	Minimum balance required is Rs. 500 and with Cheque book minimum balance is Rs. 1000.
3	Debit Card Charges	For Normal Card Rs. 105 per annum For Gold Card 550 first year then after 250 per annum.	Debit Card facility not available.
4	Accidental Insurance	With Normal Card Rs. 2 lakh. With Gold Card Rs. 5 lakh.	Facility not available
5	Mobile Banking	Free	Mobile Banking is not available
6	Internet Banking	Free	Internet Banking is not available
7	Cheque Book Facility	Available with Normal Saving Account	Cheque Book Facility Available with Account of minimum Balance Rs. 1000 (not for Rs.500 A/c)
8	Cheque Book Charges	1 Cheque Book free in a Quarter	10 leaves book for Rs.15
9	Cheque Return Charges	Rs. 350 per Chequebook.	Rs. 50 per Chequebook.
10	Charges for Non-maintenance of Balance	In Case of Non-maintenance of AQB Rs. 750 is Charged.	In Case of Non-maintenance of Account Rs. 15 is charged per annum.
11	Non Cash Facilities		
	1. DD Charges	Below Rs. 10000, Rs. 56 and above that Rs. 1.50 per Rs. 1000 will increase.	Rs. 2 per Rs. 1000 is charged for any amount.
	2. MC Charges	Below Rs. 10000, Rs. 6 and above that Rs. 1.50 per Rs. 1000 will increase.	Rs. 2 per Rs. 1000 is charged for any amount.
	3. RTGS Charges	Rs. 27 per RTGS	Facility Not Available.

TABLE 2: TERM DEPOSIT

S. no.	Features	Axis Bank, Barwani Branch (M.P)	District Central Co-operative Bank, Barwani Branch (M.P)
1	Minimum Period	7 Days	15 days
2	Maximum Period	10 Year	10 Year
3	Interest Rates	For 15 Days 3%, for 1 Year to 14 Months 9.25%, and for 10 Year 8.50%.	For 15 Days 4%, for 1 Year 7.6% and for 10 Year 7.5%.
4	FD Closer Charges Before Maturity	There are no charges	Rs. 50 is Charged
5	Auto Renewal Facility	Facility Available.	Facility Not Available.

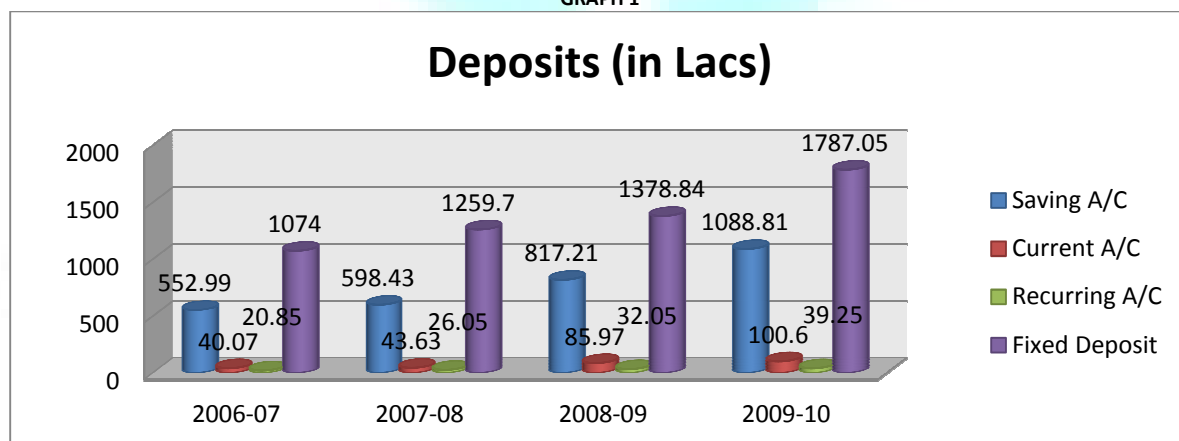
TABLE 3: CUURENT ACCOUNT

S. no.	Features	Axis Bank, Barwani Branch (M.P)	District Central Co-operative Bank, Barwani Branch (M.P)
1	Minimum Balance	Minimum Balance Required is Rs. 5000	Minimum Balance Required is Rs. 3000
2	Initial Pay Amount	Rs. 5000	Rs. 5000
3	Debit Card Facility	Available in Current Account For Normal Card Rs. 105 per annum.	Debit Card facility not available.
4	Accidental Insurance	With Normal Card Rs. 2 lakh.	Facility not available
5	Mobile Banking	Free	Mobile Banking is not available
6	Cheque Book Facility	Cheque Book Facility Available.	Cheque Book Facility Available with Charge of Rs. 2/ Leave
7	Cheque Book Charges	1 Cheque Book free in a Quarter	10 leaves book for Rs.15
8	Cheque Return Charges	Rs. 350 per Cheque book.	Rs. 50 per Cheque book.
9	Charges for Non-maintenance of Balance	In Case of Non-maintenance of AQB Rs. 350 is Charged.	In Case of Non-maintenance of Account Rs. 15 is charged per annum.
10	Non Cash Facilities	Upto Rs.1, 20,000 is free on Normal Current Account.	There is no such type of Free Facility.
	1. DD Charges	Below Rs. 10000, Rs. 56 and above that Rs. 1.50 per Rs. 1000 will increase.	Rs. 2 per Rs. 1000 is charged for any amount.
	2. MC Charges	Below Rs. 10000, Rs. 6 and above that Rs. 1.50 per Rs. 1000 will increase.	Rs. 2 per Rs. 1000 is charged for any amount.
	3. RTGS Charges	Rs. 27 per RTGS	Facility Not Available.

TABLE 4: TRENDS IN GROWTH OF RETAIL LIABILITY PRODUCTS OF DISTRICT CENTRAL CO-OPERATIVE BANK (BARWANI BRANCH M.P)

Year	Saving Account Amount (In Lacs.)	Current Account Amount (In Lacs)	Recurring Account Amount (In Lacs)	Fixed Deposit Amount (In Lacs.)
2006-07	552.99	40.07	20.85	1074
2007-08	598.43	43.63	26.05	1259.7
2008-09	817.21	85.97	32.05	1378.84
2009-10	1088.81	100.6	39.25	1787.05
2010-11	1144.03	124.27	56.52	2062.51

GRAPH 1



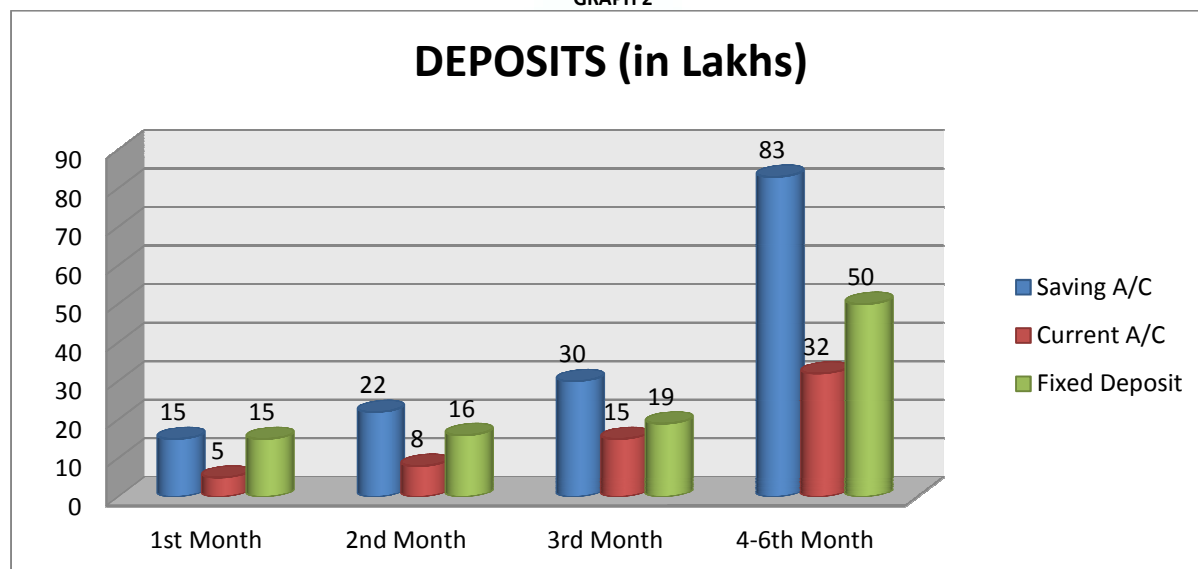
The graph shows that in District Central Cooperative Bank deposits have been increasing on Y-o-Y basis. In 2006-07 and 2007-08 there was no significant growth. But in 2009-10 there is a substantial spurt in deposits.



TABLE 5: TRENDS IN GROWTH OF RETAIL LIABILITY PRODUCTS OF AXIS BANK (BARWANI BRANCH M.P)

Year	Saving Account	Current Account	Fixed Deposit
For 2010	Amount (In Lacs)	Amount (In Lacs)	Amount (In Lacs)
Jan	15	5	15
Feb	22	8	16
March	30	15	19
April-June	83	32	50

GRAPH 2



Axis Bank's deposits have grown steadily in the first half of 2010. In tune with the banks' strategy of tapping low cost funds, CASA deposits account for a major share of total deposits. It is evident from the data that the bank has succeeded in mobilizing deposits in its initial stage of operations and has developed a good customer base.

The graph shows that in District Central Cooperative Bank deposits have been increasing on Y-o-Y basis. In 2006-07 and 2007-08 there was no significant growth. But in 2009-10 there is a substantial spurt in deposits.

TABLE 6: REMITTANCES

S.no.	Services	AXIS BANK (Barwani Branch M.P)	DISTRICT CENTRAL COOPERATIVE BANK (Barwani Branch M.P)
1	DD Charges	Below Rs. 10000, Rs. 56 and above that Rs. 1.50/Rs. 1000 will increase.	Rs. 2/Rs. 1000 is charged for any amount.
2	PO Charges	Below Rs. 10000, Rs. 6 and above that Rs. 1.50/Rs. 1000 will increase.	Rs. 2/Rs. 1000 is charged for any amount.
3	RTGS Charges	Rs. 27/ RTGS	Facility Not Available.

TABLE 7: CASH COUNTER

S.no.	Services	AXIS BANK (Barwani Branch M.P)	DISTRICT CENTRAL COOPERATIVE BANK (Barwani Branch M.P)
1	Free Transactions	Number of free Cash Withdrawal and deposit transactions are 5 in a month.	There are no restrictions on Cash deposition and Withdrawal.
2	Cash Deposition limit	For Home Branch no limit for customer and for third party.  For Non Home Branch Rs. 50000 for customers without any Charges and above Rs. 50000 charges are applied, for 3 <sup>rd</sup> party 1 transaction is free in a quarter Upto 50000 and Rs. 100 is charged for another transaction.	For Home Branch no limit for customer and for third party.  Because of Non-core banking system deposition and withdrawal from Non Home Branch is not possible.

TABLE 8: CLEARING

S.no.	AXIS BANK (Barwani Branch M.P)	DISTRICT CENTRAL COOPERATIVE BANK (Barwani Branch M.P)
1.	Because of CBS Banking Cheque pertained to any branches can be cleared in any other branches.	Branches of Central Cooperative are non CBS but even after this Cheque pertained to other branches are cleared in clearing because of availability of statement of customer balances of other branches on daily basis.

TABLE 9: CMS

S.no.	AXIS BANK (Barwani Branch M.P)	DISTRICT CENTRAL COOPERATIVE BANK (Barwani Branch M.P)
1.	CMS facility like cash deposits, local and outstation Cheque, realization is provided to corporate clients and also realization of outstation Cheque is done through CMS facility for customer.	Outstation cheques are realized by over the counter presentation of cheques.

**10. CUSTOMER SEGMENT****AXIS BANK**

Normal saving account of AQB( Average Quarterly Balance) 2500 is designed to target normal customer segment. Priority banking account of AQB 1 lakh is for upper class segment (the main focus is on urban cities). Krishi account is for those whose source of income is from agriculture and Krishi account can be opened with an initial pay amount of Rs 1000.

**DISTRICT CENTRAL COOPERATIVE BANK**

Customer segmentation is not done on the basis of retail liabilities products and services.

**11. THIRD PARTY PRODUCTS****AXIS BANK**

Axis Bank provides Third party products like life insurance to customers in collaboration with MAX New York life insurance and General insurance like Accidental insurance, Medical insurance etc. It also provides this in collaboration with Bajaj Allianz. Also mutual funds and systematic investment plans of HDFC, Axis etc. are provided to customers.

**DISTRICT CENTRAL COOPERATIVE BANK**

Third party products like Life insurance, General insurance, Mutual funds, and Systematic investment plans are not provided to customers.

**CONCLUSIONS**

S.no.	AXIS BANK (Barwani Branch M.P)	DIST. CENTRAL CO-OPERATIVE BANK, (Barwani Branch M.P)
1	In Axis Bank normal saving account, Krishi account and priority account are designed to focus on middle, lower and upper segment customers, but as the minimum average quarterly balance (AQB) in saving account is Rs. 2500 lower income strata customers are less attracted towards their retail liabilities products.	In district central cooperative bank minimum balance is more suitable for customers at the bottom of the pyramid.
2	Facility like debit card and multicity Cheque book helps in less cash handling	In district central cooperative bank because of non-availability of debit card, customers have to face issue of cash handling.
3	In Axis Bank international debit card Cheque book, passbook, bank statement are in English language also various communication from bank to customer are mostly in English language which results in lesser understanding and language problem in semi-urban and rural branches.	In district central cooperative bank, banking stationery and communication are in Hindi which is easy to understand for customers in semi urban and rural branches.
4	Mobile banking and internet banking helps customers to do banking transactions without visiting braches and according to their convenience.	In district central cooperative bank branches are the only place to perform banking transactions and virtual banking facilities are not available.
5	Cheque return charges, RTGS charges, NEFT charges, AQB charges are much higher.	Cheque return charges, AQB charges are lower.
6	Debit card, mobile banking and internet banking facilities are available which results in better customer services and less cash handling.	In this non availability of debit card, mobile banking and internet banking results in inconvenience and cash handling risk.
7	In Axis Bank Barwani branch overdraft facility is not available in current account because of which customers do not get overdraft and credit facilities.	District Central Cooperative Bank Kargone provides OD limit in current account which provides customer overdraft limit and cash advances.
8	Facilities like RTGS, NEFT, DD, ECS provides better and faster mode of remittances.	In District Central Cooperative Bank these facilities are not available.
9	Due to Core Banking Solutions (CBS) customers can do transactions in their account from anywhere in India and also cheque and cash deposit can be done by any other person in non-home branch also.	In this customers can do transactions in their account in home branch only.
10	Customers can also get third party products like Life Insurance, General Insurance, Systematic Investment Plan, Mutual Fund, etc.	Third party products are not available.
11	Bank internet website is available from which customers can come to know about different products, services, plans and facilities of bank.	Internet website is not available.
12	In Axis Bank Barwani branch due to limited number of lockers allotment is done on priority basis.	Lockers allotment is easy.
13	Account opening process is done in centers like Nagpur, and Mumbai because of which it Turn Around Time ( TAT) is 4-5 working days in opening a normal account.	Account opening process is done by branch itself which is faster than Axis Bank.
14	Facility like travel card is available which can be used outside India and have replaced traveler's cheques	Such type of facility is not available.

**RECOMMENDATIONS**

Based on our conclusion from a comparative analysis of both banks, the following recommendations can be given to both banks.

**AXIS BANK (BARWANI BRANCH M.P)**

1. In Semi urban and rural branches banking stationery and other communication like brochures, templates, pamphlets and other product literature etc. should be published in regional language.
2. Account opening process should be decentralized by way of regional processing center located in the vicinity of the branch
3. Account Opening Forms (AOFs) can be scanned by branch itself. This will reduce account opening turnaround time (TAT) and minimize errors.
4. For Semi urban and rural branches schedule of charges for annual maintenance, remittance charges, locker hiring charges, loan processing charges etc should be lower compared to urban branches. This would make the products and services competitive and popular among the rural masses.
5. The Bank should lower the minimum balance in SB accounts and encourage opening of no-frills accounts to meet the objective of financial inclusion.

**CENTRAL COOPERATIVE BANK (BARWANI BRANCH M.P)**

1. Cooperative bank should adopt core banking technology so that customers have the convenience of Any Time Any Where Banking.

2. Third party products such as insurance and mutual fund products and gold coins can be sold by branch for generating good fee based income.
3. Bank instrument must be Ultra Violet protected to avoid fraud and more emphasis should be given on KYC norms to avoid any financial risk.
4. Co-operative bank should conduct customer awareness programs to impart financial education to the rural masses. This would help achieve the objective of financial inclusion.
5. Portfolio Management Services (PMS) should be offered to High Net worth Rural Clients.

#### LIMITATIONS

1. The branch where the study was carried out was in nascent stage.
2. As the branch was located in semi urban area the scope was limited as exposure of all the products & services of bank could not be availed.

#### SCOPE FOR FUTURE WORK

1. A study can be done on customer perception about new generation private bank Axis Bank and District Central Cooperative Bank.
2. A study can be done on customer requirement and recommendation of both banks.

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## SECURE KEY EXCHANGE WITH RANDOM CHALLENGE RESPONSES IN CLOUD

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### ABSTRACT

With rapid development of cloud computing, more and more enterprises will outsource their sensitive data for sharing in a cloud. To keep the shared data confidential against untrusted cloud service providers (CSPs), a natural way is to store only the encrypted data in a cloud. The key problems of this approach include establishing access control for the encrypted data. We establish a secure challenge response protocol for sharing a secret key in the cloud environment where users want to access a document encrypted by an owner without the intervention of the service provider. In order to do this, user need to get the key from the document owner in a secure way. Any trusted users in the environment can obtain the key using random challenges. The challenge response protocol uses quadratic residuosity techniques from number theory. The proposed scheme does not use any encryption techniques so the computation requirement is greatly reduced and hence it can also be used efficiently in devices with limited computation power.

### KEYWORDS

Key exchange; Random Challenge; Secure Cloud; Quadratic Residuosity.

### INTRODUCTION

Cloud computing [10], as an emerging computing paradigm, enables users to remotely store their data in a cloud, so as to enjoy services on-demand. Migrating data from the user side to the cloud offers great convenience to users, since they can access data in the cloud anytime and anywhere, using any device, without caring about the capital investment to deploy the hardware infrastructures. Especially for small and medium-sized enterprises with limited budgets, they can achieve cost savings and the flexibility to scale (or shrink) investments on-demand, by using cloud-based services to manage projects, enterprise-wide contacts and schedules, and the like.

However, allowing a Cloud Service Provider (CSP), operated for making a profit, to take care of confidential corporate data, raises underlying security and privacy issues. For instance, an untrustworthy CSP may sell the confidential information about an enterprise to its closest business competitors for making a profit. Therefore, a natural way to keep sensitive data confidential against an untrusted CSP is to store only the encrypted data in the cloud.

But there are application scenarios where users want to access the data encrypted and store by other users (owners) in a corporate environment. This raises a situation where a secret key used to encrypt a document must be shared among the users for mutually sharing documents. Consider the following application scenario [9] Company A pays a CSP for sharing corporate data in cloud servers. Suppose the sales department (SD), the research and development department (RDD), and the finance department (FD) are collaborating in Project X. The SD manager wants to store an encrypted user requirement analysis (URA) in the cloud, so that only the personnel that have secret key can access the document as shown in Fig. 1. The CSP must maintain proper authentication mechanism and access control policies for granting access but the secret key must be shared directly to the user by the owner.

Diffie-Hellman Key exchange was used to jointly establish a shared secret key over an insecure communications channel. This key can then be used to encrypt subsequent communications using a symmetric key cipher. But this technique cannot be used to agree upon a specific key by the sender and the receiver.

The proposed scheme can be used to establish a specific shared secret key between sender and the receiver with the help of random challenges.

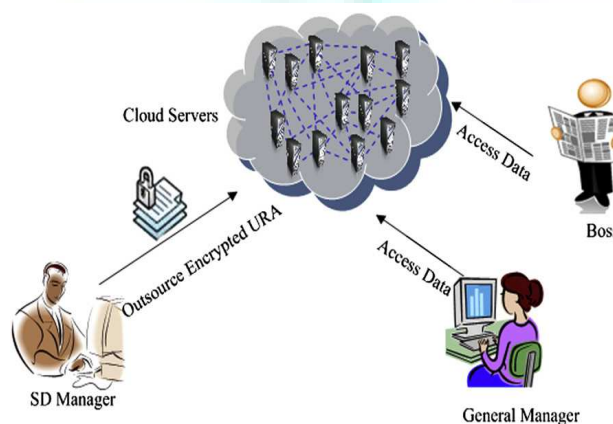


FIGURE 1: THE SAMPLE SCENARIO

### SYSTEM MODEL

We assume that the system is composed of the following parties: the CSP, the trusted third party (TTP), enterprise users, end users, and internal trusted parties (ITPs). The first two parties can be easily understood: the CSP operates a large number of interconnected cloud servers with abundant storage capacity and computation power to provide high quality services and the TTP is responsible for generating keys for the CSP and enterprise users. Company A that pays for

sharing corporate data in cloud servers is an enterprise user, all personnel in the company, who share data in cloud servers are end users, and a department in the company that delegates keys inside the company is the ITP.

There are two main attacks under such a circumstance, i.e., external attacks initiated by unauthorized outsiders, and internal attacks initiated by an honest but curious CSP, as well as malicious end users. Since data is stored with the encrypted form in the cloud and communication channels between users and cloud are assumed to be secured under existing security protocols such as SSL, we only consider the internal attacks. The honest but curious CSP will always correctly execute a given protocol, but may try to learn some additional information about the stored data. The malicious end user wants to access the data that he is ineligible to decrypt. We assume that the CSP will not collude with the end users, since the CSP is considered to be honest but curious.

## KEY EXCHANGE PROBLEM

Alice and Bob have to share a secret SA own by Alice. Let SA is the password of a file which Bob want to access or it may be encryption key. The question is how Alice can exchange this key to Bob without a trusted third party.

Several key establishment protocols and key management techniques [5] are used in secure communication between the parties. RSA [6] and Diffie-Hellman [7] are the most widely used techniques. Both use public key techniques to allow the exchange of a private encryption key.

Both RSA and Diffie-Hellman are public key encryption algorithms strong enough for commercial purposes. The minimum recommended key length for encryption systems is 128 bits, and both exceed that with their 1,024-bit keys. The nature of the Diffie-Hellman key exchange, however, makes it susceptible to man-in-the-middle (MITM) attacks, since it doesn't authenticate either party involved in the exchange. The MITM maneuver can also create a key pair and spoof messages between the two parties, who think they're both communicating with each other. Mutually authenticating both parties can defeat attempts at MITM attacks.

Diffie-Hellman scheme can be used to set up a shared secret key but the two parties engaged in the protocol cannot set up a specified key as they wish. So this technique cannot be used to agree upon a specific key by the sender and the receiver.

The key exchange can also be done with RSA algorithm but the computational complexity is more and also it needs a trusted third party for the distribution of private and public keys. Techniques are also implemented to exchange secrets by oblivious transfer by M. O. Rabin [8].

The proposed scheme does not use any encryption techniques so it can be used in devices with less computational power. It uses only simple arithmetic operations in the field.

## PRELIMINARIES

In this section we give some mathematical techniques from number-theory [3] and state the Quadratic Residuosity (QR) problem [4], which is the principal technique used here. The quadratic residuosity was first used in the cryptographic setting by Goldwasser and Micali [2]. Then it has found many applications in cryptography. It is used by Eyal Kushilevitz and Rafail Ostrovsky for computationally-Private Information Retrieval [1]. We shall use in this work the intractability of the Quadratic Residuosity problem.

### Quadratic Residues

Let us consider the quadratic congruence of the form

$$x^2 \equiv y \pmod{p}$$

Where  $p$  is an odd prime and  $y \not\equiv 0 \pmod{p}$ . If the congruence has a solution we say that  $y$  is a quadratic residue (QR)  $\pmod{p}$  else quadratic non residue (QNR)  $\pmod{p}$ .

The basic problem that dominates the theory of quadratic residue is, given  $p$ , determine which  $y$  are quadratic residues  $\pmod{p}$  and which  $y$  are quadratic non residues  $\pmod{p}$ .

If  $N$  is a positive odd integer with prime factorization.

$$N = \prod_{i=1}^r p_i^{a_i}$$

The Jacobi symbol  $(y|N)$  is defined for all integers  $y$  by the equation

$$(y|N) = \prod_{i=1}^r (y|p_i)^{a_i}$$

Where  $(y|p_i)$  is the Legendre symbol.

If the congruence  $x^2 \equiv y \pmod{N}$  has a solution then  $(y|p_i) = 1$  for each prime  $p_i$  and hence  $(y|N) = 1$ . However the converse is not true since  $(y|N)$  can be 1 if an even number of factors is -1. So it will be difficult to distinguish the residues and non residues. The problem is considered hardest when  $N$  is a product of two distinct primes of equal length. If the factorization of  $N$  is known it can be done easily. The real complexities lie in the prime factorization of large  $N$ .

## PROPOSED SCHEME

### Assumptions

The key is assumed to be a binary string of specified length. The scheme provides better security if the key bits can be represented as square matrix of a particular size.

Let  $b_1 b_2 b_3 \dots b_n$  be the bits of the key to be exchanged between the sender and the receiver.  $K$  is an  $m \times n$  matrix representing the key bits. (make  $m$  and  $n$  equal for better security). The following figure (Fig.2) shows the organization of 64 bit key.

b1	b2	b3	b4	b5	b6	b7	b8
b9	b10	b11	b12	b13	b14	b15	b16
b17	b18	b19	b20	b21	b22	b23	b24
b25	b26	b27	b28	b29	b30	b31	b32
b33	b34	b35	b36	b37	b38	b39	b40
b41	b42	b43	b44	b45	b46	b47	b48
b49	b50	b51	b52	b53	b54	b55	b56
b57	b58	b59	b60	b61	b62	b63	b64

FIGURE 2: KEY MATRIX  $K$  (8X8)

The owner wants to share a secret key of a particular encrypted document with the user. The owner and the user must be authenticated by the CSP to access the resources. The protocol uses a challenge response technique and at the end of the protocol the receiver will be able to reconstruct the key from  $K$ .

### Key Exchange with Random Challenge Protocol

Now we are ready to define key exchange algorithm with challenge response protocol.

Let  $N$  be a natural number define

$$Z_N^* = \{x \mid 1 \leq x < N, \gcd(N, x) = 1\}$$

$$Z_N^+ = \{y \in Z_N^*, (y|N) = 1\}$$

The user selects two random  $k/2$  bit prime numbers and the product  $N$  is a  $k$  bit random number. The user sends  $N$  to the owner but keeps its factorization secret.



The user picks uniformly at random  $n$  numbers which are not perfect squares,  $y_1, y_2, y_3, \dots, y_n \in Z_N^+$ , such that  $y_c$  is a QNR and  $y_j$ , for  $j \neq c$ , is a QR. Here each number corresponds to one column of the matrix  $K$ . He sends these  $n$  numbers to the owner (total of  $n * k$  bits).

The owner computes for every row  $r$  a number  $Z_r \in Z_N^*$ , as follows: It first computes (in  $Z_N^*$ )

$$K_{r,j} = \begin{cases} y_j^2 & \text{if } Kr, j = 0 \\ y_j & \text{if } Kr, j = 1 \end{cases}$$

Where  $1 \leq j \leq n$ , then it computes

$$Z_r = \prod_{j=1}^n K_{r,j}$$

The observation here is that if  $j \neq c$  then  $K_{r,j}$  is always a QR, while if  $j = c$  then  $K_{r,j}$  is QR iff  $K_{r,j} = 0$  and it is QNR otherwise. Therefore  $Z_r$  is a QR iff  $K_{r,j} = 0$

The set of  $Z_r$  computed for each row  $1 \leq r \leq m$  is sent to the user by the owner (total of  $m * k$  bits).

With these  $Z_r$ , the user will be able to retrieve the column  $c$  of  $K$  by computing and checking each of the received  $Z_r$  for QR or QNR.

The above procedure from can be repeated for different values of  $c$  and obtain the other columns also.

The challenge response protocol ends when the user retrieves  $K$  after  $n$  rounds.

The selection of QR and QNR can be done efficiently using the following method.

For QR, choose a random number  $y$  which is in  $Z_N^*$ , square it and find  $\text{mod } N$ .

For QNR choose a random number  $y$

if  $(y|p) = -1$  and  $(y|q) = -1$ , then  $y$  is a QNR.

If  $(y|p) = -1$  and  $(y|q) = 1$ , if for another  $x$  if  $(x|p) = 1$  and  $(x|q) = -1$ , then we can combine  $x$  and  $y$  to efficiently compute a QNR,  $(xy|N)$ .

If  $(y|p) = 1$  and  $(y|q) = 1$ , neglect the  $y$  and try the next random number.

The QNR can be computed efficiently if  $p$  (or  $q$ ) in the form,  $4n + 3$ . In this case take any random number  $r$  and find  $p - (r^2 \text{ mod } p)$  which will be a QNR.

Once a QNR is obtained, we can use it to find another QNR and then use it in the next challenge by computing  $(r^2 y|N)$ , where  $y$  is the previously obtained QNR and  $r$  is a random number.

Do not choose  $c$  sequentially. The value of  $c$  must be chosen randomly so that the adversary does not have any idea which column the user is retrieving. Also different  $N$  must be chosen for each challenge. The challenge and response will have the same size because  $K$  is a square matrix. So the adversary cannot distinguish between challenge and response.

We can also consider the operations in an alternate way by retrieving the rows of key matrix where the key bits organized in each column sequentially.

#### Communication complexity

The communication in this scheme consists of  $m + n + 1 - k$  bit numbers  $(N, y_1, y_2, y_3, \dots, y_n, Z_1, Z_2, \dots, Z_m)$ .

Pick  $m = n = \sqrt{K_n}$  and the communication complexity in one challenge is  $(2\sqrt{K_n} + 1) * k$  bits, where  $K_n$  is the number of bits in the key. The major factor deciding the security and communication complexity is  $k$ , which depends on the size of  $N$ . The number of rounds in the protocol is decided by  $n$ , which depends on the size of the key to be shared.

## CONCLUSION AND FUTURE DIRECTIONS

We have described a new technique for exchanging a secret key using random challenge responses. The protocol can be used to exchange a specific key unlike setting up a random key between the sender and the receiver. This scheme can also be used to share different keys with different users in an efficient way. An efficient authentication scheme can also be implemented where unauthorized users can be easily identified without using an encryption technique, which is required in the conventional random challenge response technique.

In the cloud-computing environment, users may access data anytime and anywhere using any device. When a user wants to access data using a thin client with limited bandwidth, CPU, and memory capabilities, we need to develop algorithms with low communication and computational costs. An efficient delegation mechanism and revocation scheme must also be incorporated with this scheme for the key management in the enterprise scenario.

## ACKNOWLEDGEMENT

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# COMPUTATIONAL TRACKING AND MONITORING FOR EFFICIENCY ENHANCEMENT OF SOLAR BASED REFRIGERATION

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## ABSTRACT

*The primary source of our energy is the sun. The growing demand for energy throughout the world has caused great importance to attach to the exploration of new sources of energy. And also there is currently a widespread need around the world to reduce the emission of the green house gases. One such process which still contributes to global warming is the household refrigeration process. This can be avoided if the process works on non-conventional energy. This process involves activated carbon and methanol as the refrigerant mixture to produce the refrigeration effect. Parabolic trough is used to focus the sun's energy for heating up of the water. An embedded based tracking system is built, in which a computational control program is loaded. The tracking kit is fitted with the parabolic trough so as to improve its efficiency. This solar adsorption system can be an adequate replacement for the conventional refrigeration process as it does not contribute to environmental pollution. This system when implemented along with a tracking device shows an increase in performance of over 50%. Moreover as this refrigeration system involves only installation costs and minimal working costs, it reduces the expenses on conventional refrigeration system by around 40% on monthly basis. This process can be implemented for various applications like preserving the vaccines, dairy products and for other perishable food items.*

## KEYWORDS

solid adsorption refrigeration, refrigerant mixture, computer programming, parabolic trough, activated carbon

## INTRODUCTION

 unlight is a source of energy regarded as an alternative source of energy along with other alternative source such as hydrogen and natural gas. Solar energy is a vital that can make environment friendly energy more flexible, cost effective and commercially widespread. The two methods in which solar energy can be utilized is by using photovoltaic cells and by concentrating solar power.

Although photovoltaic source are widely used today in many applications such as battery charging, water heating system, satellite power system, and others, they remain a distant dream for peasants and lower middle class people as their installation cost is pretty much high.

So the method of concentrating solar energy has to be implemented in variety of present day processes so as to address the needs of the poor people around the world. One such process is the solar adsorption refrigeration system.

Various researches around the world have shown that adsorption refrigeration technology has a promising potential for competing with conventional vapor compression and absorption refrigeration techniques. When this process is done by means of non-conventional energy sources, not only it will become an affordable system but also as a system which is environment friendly. So the solar powered adsorption refrigeration systems can be used as an alternative to the conventional refrigeration systems.

The solar energy is concentrated by means of a parabolic trough. The purpose of using parabolic trough is to get the ray reflection of light at the highest efficiency and to get the source of energy at the maximum value. The development of this system is as an alternative of power source and also to utilize the source from the sun at the highest efficiency from morning until afternoon.

## WORKING PRINCIPLE

The principle behind this refrigeration system is the normal adsorption cycle. The absorption cycle is similar to the compression cycle, except for the method of raising the pressure of the refrigerant vapor as in [1].

In the absorption system, the compressor is replaced by an absorber which dissolves the refrigerant in a suitable liquid, a liquid pump which raises the pressure and a generator which, on heat addition, drives off the refrigerant vapor from the high-pressure liquid.

The basic principle applied in collecting the energy from the sun is to focus the light falling on trough onto a glass tube fitted at the middle of it. This is done by designing a parabolic shaped trough having a particular focal point. A control program is written to control the trough movement according to the input from the light sensors fitted on the trough.. Thus the trough is aligned to move along the sun.

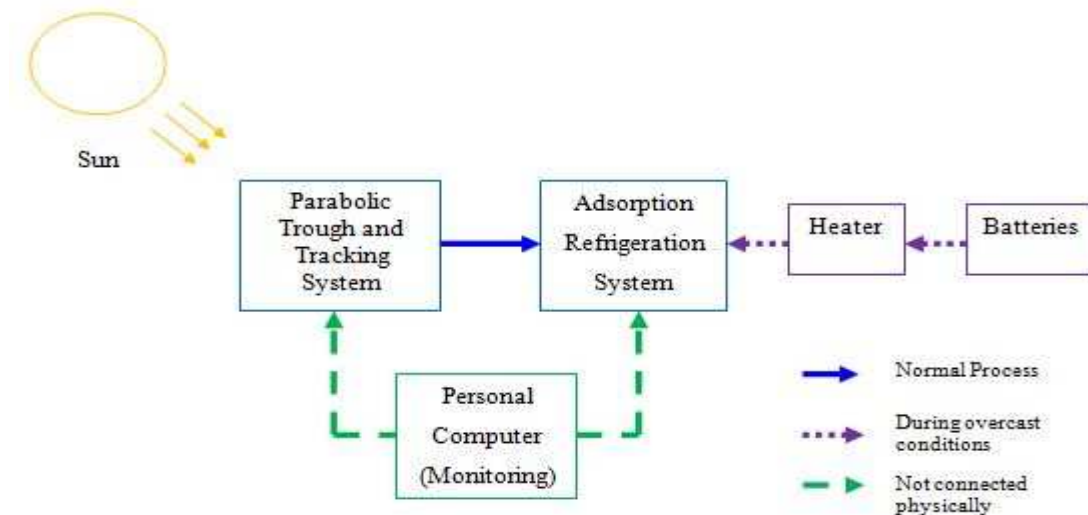
## EXPERIMENTAL SETUP

The solar adsorption refrigeration system consists mainly of three units is shown in fig.1 and they are as follows.

- The Parabolic Trough and Tracking Kit
- The Adsorption Refrigeration Setup
- The Backup and Monitoring Devices

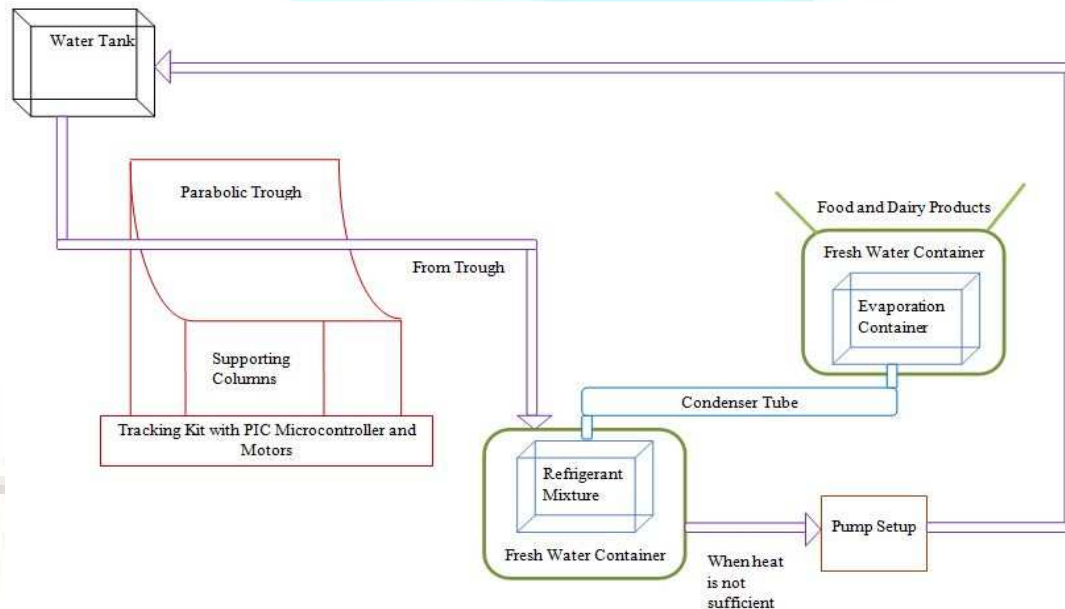
The parabolic trough is made from a plain stainless steel sheet. The angle at which the plain sheet must be bent can be found out using software called Parabola Calculator. The stainless steel dimensions are entered and the software determines the focal length of the parabola. The parabolic trough is fitted with a tracking device to reposition it according to the movement of the sun as in [3] and [4].

FIG. 1: BLOCK DIAGRAM OF THE SOLAR ADSORPTION REFRIGERATION SYSTEM



The proposed model of the process is shown in fig.2. The tracking kit consists of a pair of LDR's fitted on either side of the parabolic trough. It senses the light rays and depending upon the intensity of the light, the resistance value changes. This signal is sent to the microcontroller. Depending on the control program, the controller triggers the driver circuit which actuates the motor and moves the parabolic trough according to the sun's position as in [5].

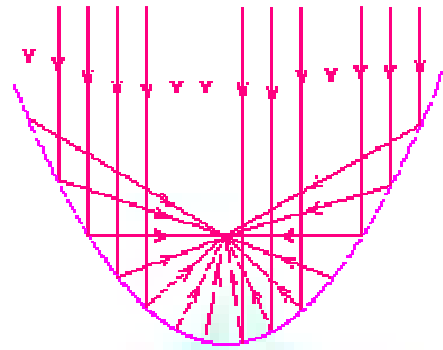
FIG. 2: MODEL OF THE SOLAR ADSORPTION REFRIGERATION SYSTEM



The tracking kit consists of a PIC microcontroller, a driver circuit and a power supply circuit. The PIC microcontroller is loaded with an Embedded C program. This program is written so as to move the trough according to the light input sensed by the LDR's. The focusing of the trough is shown in fig.3. The program is written in software called MPLAB IDE.

MPLAB IDE is a Windows OS based Integrated Development Environment for the PIC microcontrollers. The chip is loaded with the program and it can also be erased and re-written.

FIG. 3: THE FOCUSING ACTION OF THE PARABOLIC TROUGH



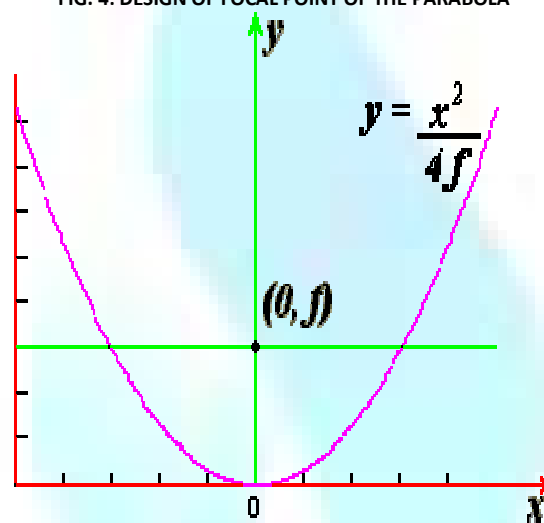
The parabolic trough is made of stainless steel and its focusing angle is determined using software called Parabola Calculator. The dimensional values are entered in it, and the software calculates the focal point.

The general equation of a parabola is:

$y = ax^2$ , where  $a$  is a constant.

For a parabola with a focal length of  $f$ ;  $a = 1/(4f)$

FIG. 4: DESIGN OF FOCAL POINT OF THE PARABOLA



The axis of the parabola is coincident with the y-axis and the focus is located at  $(0, f)$  as shown in fig.4.

The adsorption refrigeration consists mainly of a refrigerant container and a condenser. The refrigerant mixture used for this process is Activated Carbon (Adsorbent) and Methanol (Refrigerant).

Activated carbon is a form of carbon that has been processed to make it extremely porous and thus to have a very large surface area available for adsorption as in [8]. Methanol, also called as Methyl Alcohol, has the molecular formula of  $\text{CH}_3\text{OH}$ .

The refrigerant mixture is kept in a small container surrounded by another container called the storage container. The water which is heated through the parabolic trough is stored in that container. The heated water transfers the heat onto the refrigerant mixture which starts evaporating and the vapor is stored inside the condenser tube. The condenser tube is surrounded by a tray having fresh water.

The vaporized refrigerant mixture tries to return to its original state; the liquid state. Thus by absorbing the heat from the fresh water in the tray, it attains the liquid state; thereby converting the fresh water into ice.

This is the basic working principle of the adsorption refrigeration system. The activated carbon can adsorb a large amount of methanol vapors in ambient temperature and desorbs it at a higher temperature of around  $100^\circ\text{C}$ .

During the daytime, the container is heated up and the methanol is desorbed from the activated carbon. In desorption, the liquid methanol adsorbed in the charcoal heats up and vaporizes. The methanol vapor condenses and is stored in the condenser tube.

After some time, when the temperature decreases to the ambient temperature, the charcoal adsorbs the methanol from the condenser tube. The liquid methanol in the condenser tube vaporizes and absorbs the heat from the water contained in the trays surrounding it as in [9]. The backup kit consists of a heater and a rechargeable battery for power supply.

The backup kit is used when the day is darkened and foggy. During such overcast conditions the battery supplies power to the heater. The heater heats up the water to the sufficient temperature and the process continues normally without any interruption.

The monitoring devices include noting down the temperature of the water, checking the temperature of ice formation and the positioning of the parabolic trough. The exact values have to be tabulated and can be used for further modifications to the process.

#### ALGORITHM OF THE REFRIGERATION PROCESS

- Step 1:** The water tank is filled with water
- Step 2:** The water is passed in a zigzag manner through the focal point of the parabolic trough
- Step 3:** The sensors detect the position of the sun and sends the input to the microcontroller.
- Step 4:** The controller triggers the driver circuit and controls the motor.
- Step 5:** The motor rotates the trough according to the movement of the sun.
- Step 6:** The water is heated and it is stored in a storage container
- Step 7:** Is the temperature of water sufficient? If Yes, go to Step 8 else Step 1.
- Step 8:** The Adsorption Process starts; the surrounding hot water heats up the refrigerant mixture

**Step 9:** The methanol vaporizes and stored in a condenser tube

**Step 10:** After sometime, the methanol gets back to its liquid state by forming ice in the tray

## EXPERIMENTAL RESULTS

The solar powered refrigeration system working on adsorption effect is subjected to three different experimental analysis and the data obtained through various measurements are tabulated for clear understanding. One is based on the temperature at focal point at different time while using tracking and non-tracking and another is based on the temperature of water at various time intervals, while the final table analyzes the different refrigerant mixtures and their boiling point.

**TABLE 1: TEMPERATURE MEASUREMENT ON THE FOCAL POINT OF THE PARABOLIC TROUGH**

Timeline	Temperature in °C Without Tracking	Temperature in °C With Tracking
6 a.m.	18	18
7 a.m.	20	22
8 a.m.	22	25
9 a.m.	25	29
10 a.m.	26	33
11 a.m.	28	36
12 p.m.	30	40
1 p.m.	31	43
2 p.m.	32	45
3 p.m.	28	44
4 p.m.	26	40
5 p.m.	23	36
6 p.m.	21	32

**TABLE 2: TEMPERATURE MEASUREMENT OF THE WATER STORED IN THE CONTAINER**

Timeline	Temperature in °C
6 a.m.	15
7 a.m.	18
8 a.m.	20
9 a.m.	22
10 a.m.	30
11 a.m.	45
12 p.m.	65
1 p.m.	75
2 p.m.	80
3 p.m.	80
4 p.m.	80
5 p.m.	78
6 p.m.	78

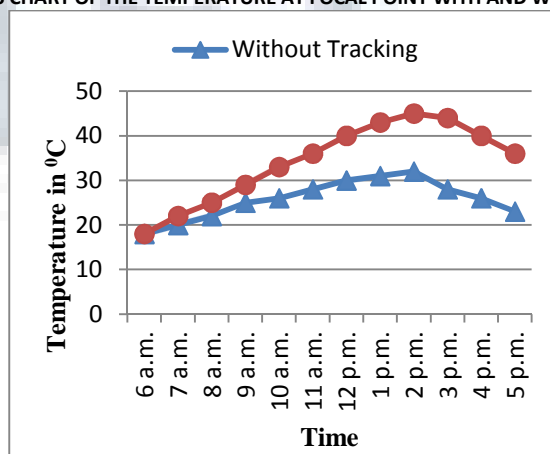
**TABLE 3: TEMPERATURE OF VAPORIZATION FOR DIFFERENT REFRIGERANT MIXTURES**

Refrigerant Mixtures	Boiling Point in °F
Carbon tetrachloride-(R-10)	170.2
Hexachloroethane-(R-110)	365
Methanol	149
Trichloroethane-( R-140a)	165

## PERFORMANCE ANALYSIS

The performance of the system depends on the amount of heat produced by the parabolic trough. As it is fitted with a tracking kit, the heat production rate will be more than normal heat produced. The analysis of the process is carried out and table 1 illustrates the temperature on the focal point, using the tracking kit and without the tracking kit. This analysis is carried out as read from [2] and [7].

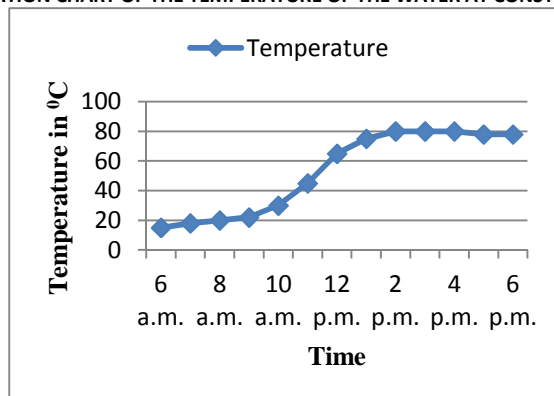
**FIG. 3: ANALYSIS CHART OF THE TEMPERATURE AT FOCAL POINT WITH AND WITHOUT TRACKING**





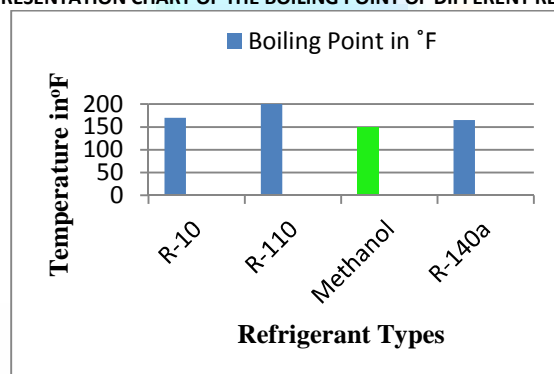
The chart (Fig.3) depicts that when the tracking system is fitted to the parabolic trough, the trough movement is adjusted in relevance to the movement of the sun. So as a result there is more focusing of the sun onto the focal point which results in increasing the temperature when a tracking device is fitted. Calculating the temperature of the water in the storage container is an important phenomenon. It helps in pumping the water back into the water tank if the sufficient temperature is not reached. After carrying out the experiment for a certain number of times, the temperature of the water stored in the container at various time intervals is tabulated in table 2 and represented in the second chart.

FIG. 4: REPRESENTATION CHART OF THE TEMPERATURE OF THE WATER AT CONSTANT TIME INTERVALS



As studied from [1], the chart (Fig.4) indicates that as the day progresses the temperature of the water stored inside the container increases. Till the desired temperature is attained, the water is recycled back into the tank and sent through the trough. Once the water reaches the desired temperature, its temperature does not come down as it is kept inside a black coated container to prevent loss of heat.

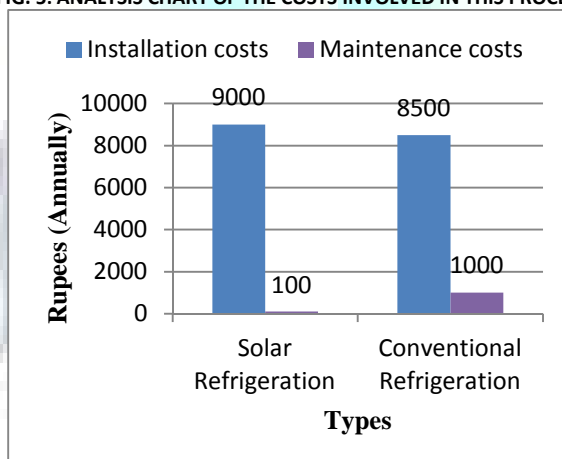
FIG. 5: REPRESENTATION CHART OF THE BOILING POINT OF DIFFERENT REFRIGERANTS



From the analysis carried out on various refrigerant components that can be used as refrigerants for this process as in [9], it is understood that the refrigerant methanol is of very low boiling point and also it forms a cohesive link with the adsorption component – Activated carbon. The different refrigerants and their boiling points are shown in table 3 and the corresponding chart is shown in fig. 5 above.

As it is studied from [10], the cost-wise analysis is also done and it is very less when compared to conventional refrigeration system, as it includes only installation costs and no maintenance costs.

FIG. 5: ANALYSIS CHART OF THE COSTS INVOLVED IN THIS PROCESS



The Reference [6] indicates a low cost approach and the chart (Fig.5) shows that though the installation cost of solar refrigeration is little more than conventional refrigeration system, when considering the maintenance costs, it is very minimal. Therefore, this system proves there is an alternate non-conventional way of creating refrigeration at an environment friendly way.

## FUTURE WORKS AND CONCLUSION

The future works that can be done in this process is that by using Activated Carbon Fiber instead of Activated carbon as an adsorbent; Activated Carbon Fiber is a little costlier; the rate at which the adsorption process takes place can be fastened and also the formation of ice can be made quicker.

Thus the efficiency of the solar adsorption refrigeration system can be improved by continuous tracking of the parabolic trough and monitoring of the process. This process helps in bringing down the money spent on energy. The process is completely analyzed and by implementing in a larger scale will help many rural

people and dairy industries. Storage of food items and vaccines in this refrigeration system will also benefit people living all over the world. Moreover implementing this process will help in reducing the environmental impact of the current refrigeration system.

## ACKNOWLEDGEMENT

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**FINANCIAL ANALYSIS OF OIL AND PETROLEUM INDUSTRY**

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**ABSTRACT**

*The Indian oil and gas sector is one of the six core industries in India and has very significant forward linkages with the entire economy. India has been growing at a decent rate annually and is committed to accelerate the growth momentum in the years to come. This would translate into India's energy needs growing many times in the years to come. Hence, there is an emphasized need for wider and more intensive exploration for new finds, more efficient and effective recovery, a more rational and optimally balanced global price regime - as against the rather wide upward fluctuations of recent times, and a spirit of equitable common benefit in global energy cooperation. The purpose of this study is to comparative study of financial performance, of India's five leading oil and petroleum companies i.e. Oil and Natural Gas Corporation, Reliance Petroleum Limited, Oil India Limited, Hindustan Petroleum Corporation and Cairn India Limited have been selected for the study. The most common tool of financial analysis various ratios as used. It is concluded that the overall performance of Oil and Natural Gas Corporation found highly satisfactory in net profit growth on the profitability level, short term liquidity position, efficiency level, solvency capacity and investment analysis.*

**KEYWORDS**

Performance Analysis, Technical Efficiency, Investment Analysis, Financial Analysis, Inter and Intra Industry Analysis, Business Effectiveness.

**INTRODUCTION**

India is the sixth largest consumer of oil. There is a huge demand-supply gap in oil and gas in India. The country imports more than 70% of its crude oil requirement. In 2005, oil and gas accounted for 38% of primary energy consumption in India, followed by coal at 55%. Oil and gas industry is broadly classified into Upstream and Downstream segments and comprises 18 refineries, with total refining capacity of 132.47 mmtpa as of April 1, 2006. According to Ministry of Petroleum and Natural Gas, India's crude oil reserves have increased from 726mmt in FY02 to an estimated 786mmt in FY06, whereas natural gas reserves have increased from 763 billion cubic metres (bcm) to 1,101bcm between FY02 and FY06. Crude oil production was estimated at 32.19mmt and natural gas at 32.20bcm in FY06. Consumption of crude oil was estimated at 130.11mmt, whereas consumption for natural gas was estimated to be 31.02bcm in the same year. The production and consumption of petroleum products was estimated at 119.75mmtpa and 111.92mmt respectively. Recently, India has emerged as net exporter of petroleum products.

The Indian oil and gas sector is of strategic importance and plays a predominantly pivotal role in influencing decisions in all other spheres of the economy. The annual growth has been commendable and will accelerate in future consequently encouraging all round growth and development. This has necessitated the need for a wider intensified search for new fields, evolving better methods of extraction, refining and distribution, the constitution of a national price mechanism - keeping in mind the alarming price fluctuation in the recent past and evolving a spirit of equitable global cooperation.

**GROWTH**

In the 50 years since Independence India has witnessed a significant growth in the refining facilities and increase in the number of refineries from one to seventeen now. There has been an increase in the refining capacity from 0.25 tonnes MMTpa to about 103 MMTpa.

The first decade of Independence (1947-57) saw the establishment of three coastal refineries by multinational oil companies operating in India at that time, viz. Burmah Shell, Esso Stanvac and Caltex; the first two at Mumbai and the third at Visakhapatnam.

The second decade (1957-67) witnessed the setting up of Indian Refineries Ltd. in 1958, a wholly-owned public sector Government company. Under its banner three refineries were set up at Guwahati (Assam), Barauni (Bihar) and Koyali (Gujarat) essentially to process the indigenous crude discovered in Assam and Gujarat. In addition, one joint sector refinery was set up with the participation of an American company at Cochin, based on imported crude.

The next ten year period (1967-77) witnessed the establishment of two refineries, one with equity participation from American and Iranian companies at Chennai and another in the public sector at Haldia by Indian Oil.

The period 1977-87 saw the commissioning of two more refineries in the public sector. The refinery at Bongaigaon was the first experiment in having an integrated petroleum refinery-cum-petrochemicals unit. The notable feature of the capacity additions during this decade have been the extensive utilisation of the process design capabilities of M/s Engineers India Ltd. and installation of Secondary Processing Facilities to increase the production of much required kerosene, diesel and LPG.

During the fifth decade (1987-97), a small refinery of 0.5 MMTpa at Nagapattinam was built in Tamil Nadu. It is based on crude from adjoining fields. In 1996, a 3 MMTpa refinery was built in the joint sector at Mangalore between HPCL and Indian Rayon. This decade also witnessed major policy initiatives in the refining sector. In 1987, the Government decided to set up refineries in the joint sector in which the equity participation of public sector undertaking was envisaged to be 26%. Another 26% equity was meant for the private sector partner and the balance 48% was to be raised from the public.

The Government has also announced that investments in the refining sector will be encouraged by providing reasonable tariff protection and making marketing rights for transportation fuels viz. MS, HSD & ATF conditional on owning and operating refineries with an investment of at least Rs.2,000 crore or oil exploration and production companies producing at least 3 million tonnes of crude oil annually. As per the current outlook, India's refining capacity is estimated to reach a level of 129 MMTpa by the end of the IX Plan (2001-02).

**REVIEW OF LITERATURE**

Brian Carver, Christy He, Jonah Hister (2004), has made an attempt study of historical aspect of Oil and Petroleum industry. They analyzed that Oil and Petroleums have historically formed an important component of India's exports. There is archaeological evidence from Mohenjo-Daro, which establishes that the complex technology of mordant dyeing was being used in the subcontinent from at least the second millennium B.C. It is believed that the use of printing blocks in India started in 3000 B.C., and some historians have concluded that India may have given birth to Oil and Petroleum printing. Marco Polo's records show that Indian Oil and Petroleums used to be exported to China and South East Asia from Andhra and Tamil ports in the "largest ships" then known. Buddhist era scripts reveal that woollen carpets were known in India as early as 500 B.C. and the technical skill that went into Indian carpets of the Mughal period is still hailed today.

Maurice Landes, Stephen MacDonald, Santosh K. Singh, and Thomas Vollrat (2005) emphasized that growth of Oil and Petroleum industry in India is depend upon execution of reforms to policies, including taxes that discriminate against the use of manmade fibers and regulations affecting the scale, technology use, and export competitiveness of the Oil and Petroleum and apparel industries. Imports of raw cotton have increased in concert with rising demand in recent years, but future growth will depend on the extent to which India can boost chronically low cotton yields and improve cotton quality.

Bhandari & Maiti (2007), in his study on Efficiency of Indian Manufacturing Oil and Petroleum industry, has analyzed the Technical Efficiency (TE) varies between 68% to 84% across these years and that individual TEs vary with firm-specific characteristics such as size and age. Further public sector firms are found to be relatively less efficient.

## COMPANY PROFILE

**1. Oil and Natural Gas Corporation** - With a market cap of Rs. 235,000 crores ONGC ranks 3rd in Oil & Gas Exploration & Production (E&P) Industry globally. It cumulatively produced 803 Million Metric Tonnes of crude and 485 Billion Cubic Meters of Natural Gas from 111 fields. ONGC's wholly-owned subsidiary ONGC Videsh Ltd. (OVL) is the biggest Indian multinational, with 40 Oil & Gas projects in 15 countries. The company earned a revenue of approx Rs. 20,000 crores with net profit margin of 34% in Dec'10. It holds largest share of hydrocarbon acreages in India & contributes over 79 per cent of Indian's oil and gas production. It created a record of sorts by turning **Mangalore Refinery and Petrochemicals Limited (MRPL)** around from being a stretcher case at BIFR to the BSE Top 30, within a year.

**2. Reliance Petroleum Industries** - The Flagship Company of the Ambanis and India's largest Private Company Reliance Industries is also an Oil and Gas Giant. The Company has seen very sharp growth in the last decade and is diversifying into Retail. With a market cap exceeding \$30 billion it is India's most valued company. The company is also one of the biggest exporters in India with one of the largest petrochemical and oil refining complexes in the world at Jam Nager. It recently sold a stake in its valuable Godavari Basin to BP for a whopping \$7.5 billion. Extremely cash rich with a horde of more than \$15 billion, it has started on empire building through ventures in Finance (DE Shaw), Communications (buying of wireless broadband spectrum), Shale Gas Buys in the USA, Hospitality (Buying up stakes in Hotel Companies).

**3. Oil India Ltd.** - With a market capitalisation of Rs. 31,000 crores, OIL is engaged in the business of exploration, development and production of crude oil and natural gas, transportation of crude oil and production of LPG. It became a wholly-owned Government of India enterprise in 1981. The revenue earned by the company was 2,400 crores & with a net profit margin of 36% in Dec '10. Very similar in profile to ONGC it presently produces over 3.2 million tons pa of crude oil, Natural Gas and over 50,000 Tones of LPG annually. Most of this emanates from its traditionally rich oil and gas fields concentrated in the Northeastern part of India and contribute to over 65% of total oil & gas produced in the region. It has emerged as a consistently profitable international company with exploration blocks as far as Libya and sub-Saharan Africa.

**4. Hindustan Petroleum Corp. Ltd (HPCL)** - One of the smallest of the major Oil and Gas PSUs with a market capitalisation of Rs. 11,000 crores. The company owns and operates the largest Lube Refinery in the country producing Lube Base Oils of international standards, with a capacity of 335 TMT. This Lube Refinery accounts for over 40% of the India's total Lube Base Oil production. It has two major refineries producing a wide variety of petroleum fuels & specialties, one in Mumbai (West Coast) and the other in Vishakhapatnam, (East Coast). HPCL's vast marketing network consists of its zonal & regional offices facilitated by a supply & distribution infrastructure comprising terminals, pipeline networks, aviation service stations, LPG bottling plants, inland relay depots & retail outlets, lube and LPG distributorships. HPCL accounts for about 20% of the market share and about 10% of the nation's refining capacity. The revenue earned was around Rs. 34,000 crores with a net profit margin of 0.6% in Dec'10.

HPCL is a Government of India Enterprise with a Navratna Status, and a Fortune 500 and Forbes 2000 company, with an annual turnover of Rs. 1,32,670 Crores and sales/income from operations of Rs 1,43,396 Crores (US\$ 31,546 Millions) during FY 2010-11, having about 20% Marketing share in India among PSUs and a strong market infrastructure. HPCL's Crude Thruput and Market Sales (including exports) are 14.75 Million Metric Tonnes (MMT) and 27.03 MMT respectively in the same period.

HPCL operates 2 major refineries producing a wide variety of petroleum fuels & specialties, one in Mumbai (West Coast) of 6.5 Million Metric Tonnes Per Annum (MMTPA) capacity and the other in Vishakhapatnam, (East Coast) with a capacity of 8.3 MMTPA. HPCL holds an equity stake of 16.95% in Mangalore Refinery & Petrochemicals Limited, a state-of-the-art refinery at Mangalore with a capacity of 9 MMTPA. In addition, HPCL is constructing a 9 MMTPA refinery at Bathinda, in the state of Punjab, as a Joint venture with Mittal Energy Investment Pvt. Limited. HPCL also owns and operates the largest Lube Refinery in the India producing Lube Base Oils of international standards, with a capacity of 335 TMT. This Lube Refinery accounts for over 40% of the India's total Lube Base Oil production.

**5. Cairn India Limited** - With a market cap Rs. 66,000 crores, Cairn India is now one of the biggest private exploration and production companies currently operating in the region. A subsidiary of the British company Cairn, its growth has been nothing short of phenomenal after winning a bid to explore oil blocs in Rajasthan in the NELP. Cairn India's strategy is to establish commercial reserves from strategic positions in order to create and deliver shareholder value. The company operates the largest producing oil field in the Indian private sector and has pioneered the use of cutting-edge technology to extend production life. The company has set up a Processing terminal in Barmer (Rajasthan) to process the crude from fields. A pipeline has also been constructed to transport the crude from Barmer to Bhogat in the Gujarat coast. The pipeline section from Barmer to Salaya is operational and sales have commenced to Essar, RIL and IOC. Cairn India has recently agreed to be taken over by London listed India's largest Mining Group Vedanta though the approval is still awaited from the government of India. It is the second largest Oil and Gas private company listed on the Indian stock exchange.

## UNIQUENESS OF PETROLEUM INDUSTRY

The petroleum industry is such an industry which has the largest earning capacity. The various petroleum products are diversified in a very wide range. The main functional areas of this industry are extraction of crude, refining of crude, processing and transporting. The main problem faced by the entire petroleum industry is the pollution problem. The refining of crude oil creates huge pollution by producing various harmful gases. Another problem is of drilling mud. When the drilling work is done a huge amount of crude, water, soil mixture gets wasted. Here innovative and upgraded technology is required to minimize the wastage of petroleum. The leakage and drainage problems are also one of the major barriers in case of refinery work. Good piping technology and proper drainage system is also very essential in this industry. One thing we must appreciate that India has very limited production of petroleum in comparison with demand scenario. In this condition the wastage is a critical issue which must be addressed properly.

## PERFORMANCE OF INDIAN OIL INDUSTRY

The petroleum industry in India stands out as an example of the strides made by the country in its march towards economic self-reliance. At the time of Independence in 1947, the industry was controlled by international companies. Indigenous expertise was scarce, if not non-existent. Today, a little over 50 years later, the industry is largely in the public domain with skills and technical know-how comparable to the highest international standards. The testimony of its vigour and success during the past five decades is the significant increase in crude oil production from 0.25 to 33 million tonnes per annum and refining capacity from 0.3 to 103 million metric tonnes per annum (MMTPA). The consumption of petroleum products has grown 30 times in the last 50 years from 3 million tonnes during 1948-49 to about 91 million tonnes in 1998-99. A vast network of over 29,000 dealerships and distributorships has been developed backed by over 400 storage points over the years to serve the people even in the remote and once-inaccessible areas.

## OBJECTIVES OF THE STUDY

- To analyze the profitability, solvency position and liquidity position of companies.
- To identify the net profit and EPS growth rate performance of companies.

## METHODOLOGY

The researcher, being an external analyst, had to depend mainly upon secondary data for the purpose of studying the financing performance of Oil and Petroleum Industries in India from the top three companies in India which is highly performed in overall growth in terms of finance, exports and total assets value. The exploratory research techniques have been used for this study and also the study is restricted only to Indian based oil and petroleum organizations.

**SOURCES OF DATA****DATA COLLECTION**

The present study is mainly based on secondary data which were collected from the corporate annual audited reports, company database, published research reports by various industries, related websites and research organization.

**SELECTION OF COMPANY AND PERIOD**

The present study is mainly intended to examine the comparative financial performance of oil and petroleum companies i.e. Oil and Natural Gas Corporation, Reliance Petroleum Limited, Oil India Limited, Hindustan Petroleum Corporation and **Cairn India Limited** for five years in the period between 2006 – 2010.

**TOOLS USED FOR ANALYSIS**

The present study has analyzed the financial performance of three Oil and Petroleum companies. In order to evaluate and compare the financial performance of selected industries Ratio Analysis technique and average mean has been used.

**RESULT & DISCUSSIONS****[A] COMPANY ANALYSIS- INTER ANALYSIS****I PROFITABILITY RATIO:****(A) NET PROFIT RATIO****TABLE 1: NET PROFIT RATIO**

	2006	2007	2008	2009	2010
ONGC	14.52	15.96	16.52	17.85	18.45
RIL	15.99	13.09	13.87	13.51	17.29
HPL	19.53	16.55	14.34	12.88	15.63
IOL	19.97	18.41	17.37	16.28	17.5
CAIRIN	16.61	15.25	15.65	16.48	16.64

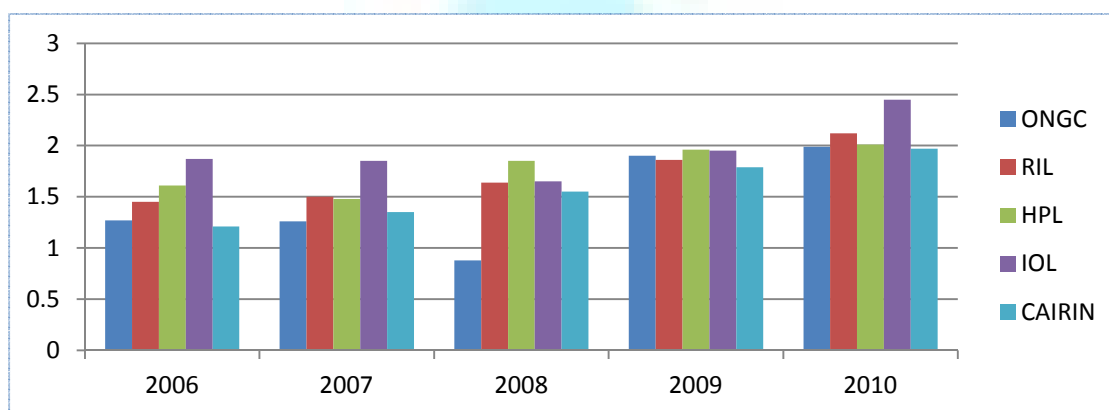
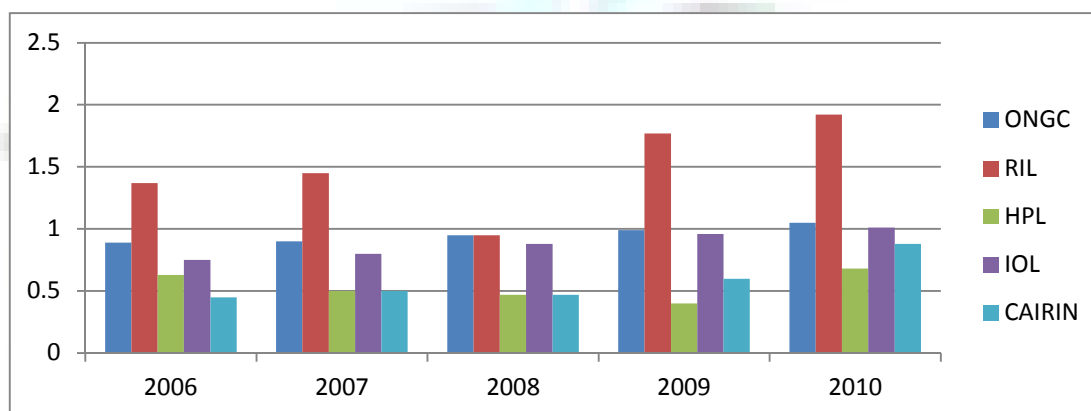


Table 1 shows the Net Profit ratio of selected units. It shows that the percentage of net profit is declining in each year other than ONGC. The year 2010 was financial good for all the companies.

**(II) TESTING OF FINANCIAL POSITION:****(A) CURRENT RATIO****TABLE 2: CURRENT RATIO**

	2006	2007	2008	2009	2010
ONGC	0.89	0.9	0.95	0.99	1.05
RIL	1.37	1.45	0.95	1.77	1.92
HPL	0.63	0.5	0.47	0.4	0.68
IOL	0.75	0.8	0.88	0.96	1.01
CAIRIN	0.45	0.5	0.47	0.6	0.88



Current ratio is the study of Current Assets and Current Liability. Current ratio of the company is less than 1 which shows company's current assets are insufficient to pay off the current liabilities.

Current ratio is the study of Current Assets and Current Liability. Table 1 shows that RPL and ONGC has adequate current assets, it is more than the average but HPL is carrying the least ratio.



**(B) ACID TEST RATIO****TABLE 3: QUICK RATIO**

	2006	2007	2008	2009	2010
ONGC	1.27	1.26	0.88	1.9	1.99
RIL	1.45	1.5	1.64	1.86	2.12
HPL	1.61	1.48	1.85	1.96	2.01
IOL	1.87	1.85	1.65	1.95	2.45
CAIRIN	1.21	1.35	1.55	1.79	1.97

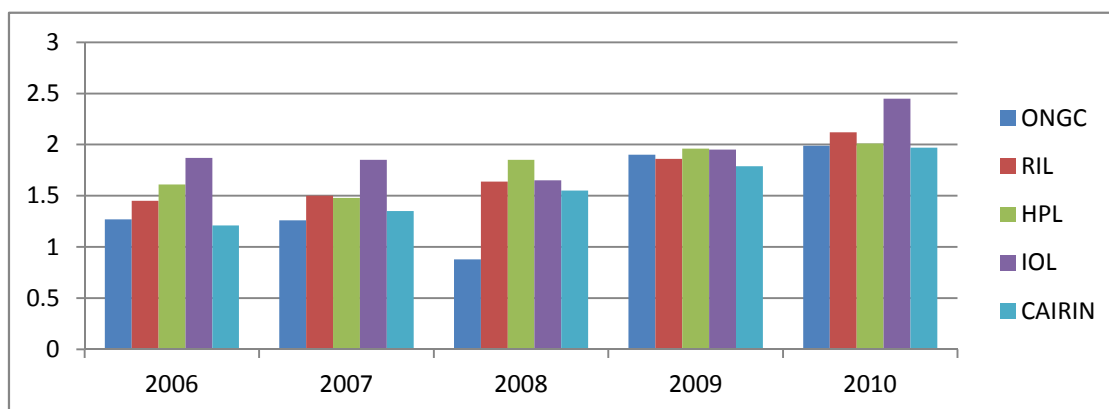
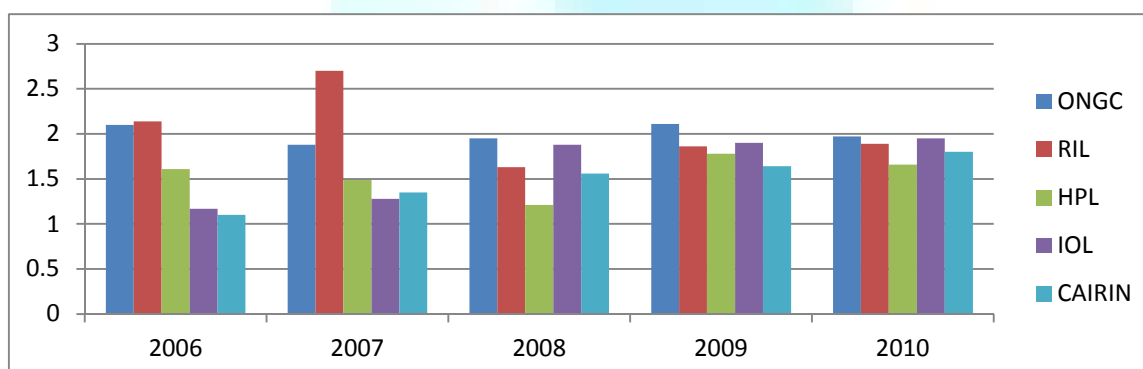


Table 2 shows that all the companies has sufficient quick ratio, means very short time liquidity position is good enough. It means the fund of liquidity assets of RPL, HPL and IOL is much more than the other two companies.

**(C) DEBT-EQUITY RATIO****TABLE 4: DEBT -EQUITY RATIO**

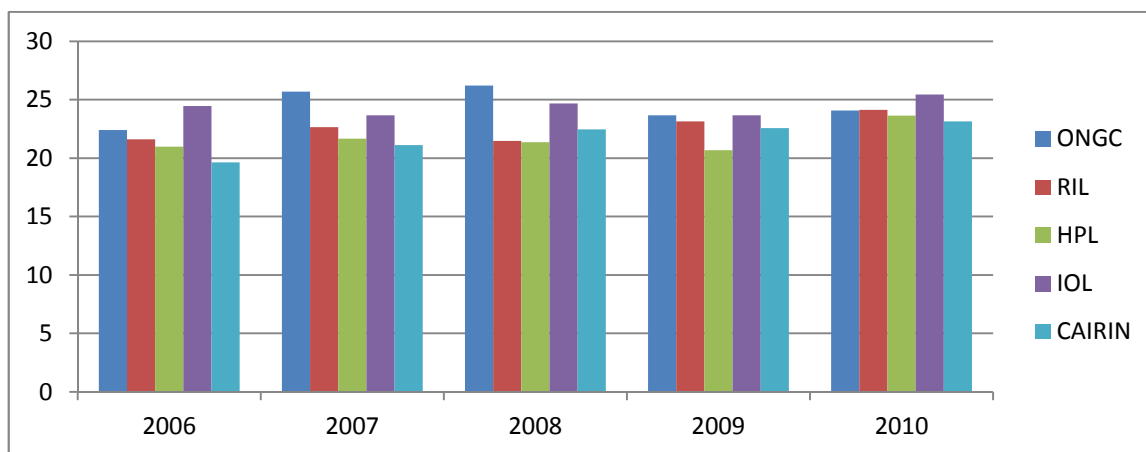
	2006	2007	2008	2009	2010
ONGC	2.1	1.88	1.95	2.11	1.97
RIL	2.14	2.7	1.63	1.86	1.89
HPL	1.61	1.49	1.21	1.78	1.66
IOL	1.17	1.28	1.88	1.9	1.95
CAIRIN	1.1	1.35	1.56	1.64	1.8



Debt-equity indicates what proportion of equity and debt the company is using to finance its assets. Debts equity ratio is relationship between debts and equity. Table 7 shows that the debt equity ratio of ONGC is too high. It means the company arrange fund from debt securities. In case of debt equity ratio of CAIRIN is at minimum point.

**(D) EARNING PER SHARE (EPS) RATIO:****TABLE 5: EARNINGS PER SHARE**

	2006	2007	2008	2009	2010
ONGC	22.4	25.69	26.21	23.67	24.06
RIL	21.6	22.64	21.46	23.14	24.12
HPL	20.97	21.65	21.37	20.67	23.64
IOL	24.45	23.65	24.68	23.65	25.44
CAIRIN	19.64	21.12	22.45	22.55	23.14

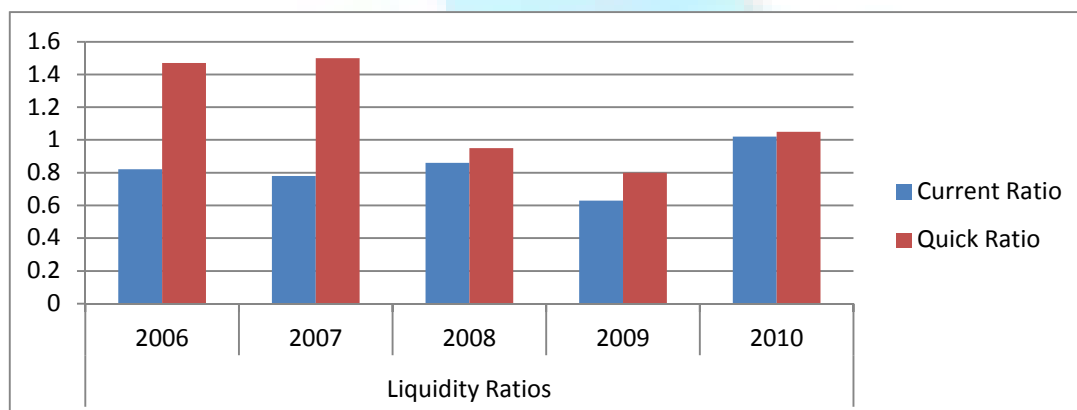


EPS measures the overall profit generated for each share in existence over a particular period. Table 5 shows that the EPS ratio in the year 2006 of IOL was highest, year 2007 to 2009, ONGC was standing at No. 1 position in term of earning per share. However IOL maintain its old position which it was carrying 4 year back and jumped at No. 1 for the year 2010. When we compare the average EPS, ONGC and IOL is in better position.

#### INDUSTRY ANALYSIS- INTRA ANALYSIS

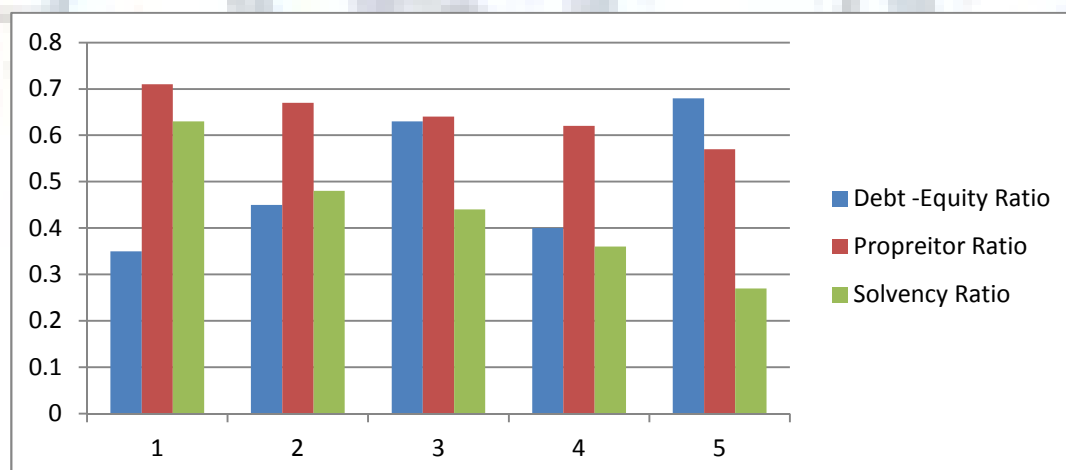
	Liquidity Ratios				
	2006	2007	2008	2009	2010
Current Ratio	0.82	0.78	0.86	0.63	1.02
Quick Ratio	1.47	1.5	0.95	0.8	1.05

Current ratio of the company is less than 1 which shows company's current assets are insufficient to pay off the current liabilities. A quick ratio of 1:1 is usually considered satisfactory. Here the quick ratio is increasing which shows company's liquidity position is becoming good.



#### SOLVENCY RATIO

	Solvency Ratios				
	2006	2007	2008	2009	2010
Debt -Equity Ratio	0.35	0.45	0.63	0.4	0.68
Proprietor Ratio	0.71	0.67	0.64	0.62	0.57
Solvency Ratio	0.63	0.48	0.44	0.36	0.27



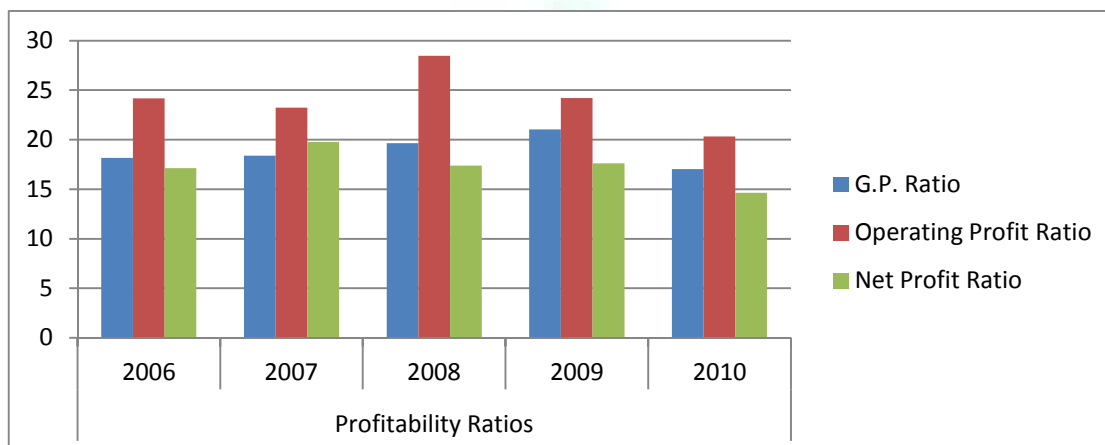
The overall solvency ratio is favorable from the point of view of shareholders as it is debt is lower in comparison of own investment. It is not taking too much risk. Industry's trend is changing 2006 onwards. It has started to take leverage advantage. As debt-equity ratio is increasing other than 2009. So it is much focus and care on safe and liquid priority of its shareholders.

#### PROFITABILITY RATIO

PROFITABILITY RATIOS

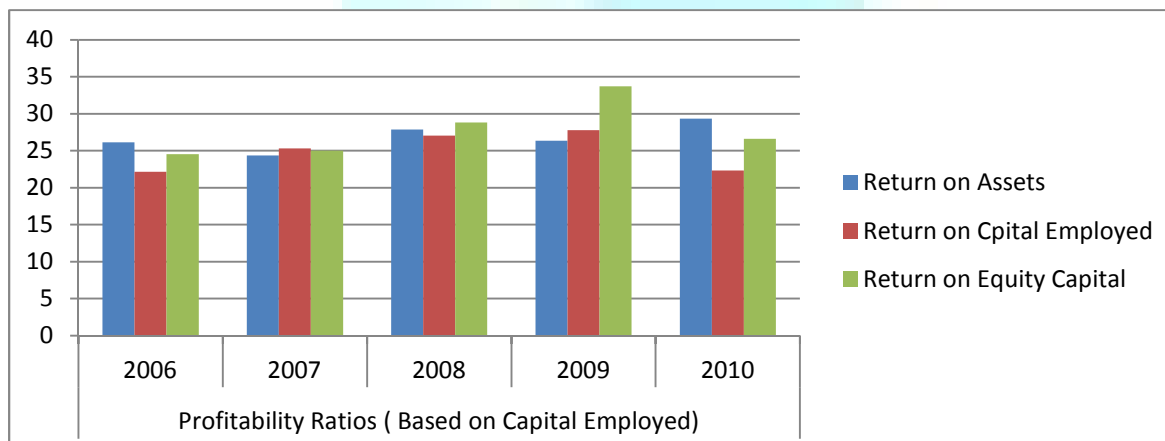
	2006	2007	2008	2009	2010
G.P. Ratio	18.17	18.39	19.64	21.04	17.02
Operating Profit Ratio	24.18	23.23	28.45	24.19	20.34
Net Profit Ratio	17.12	19.78	17.37	17.61	14.65

The gross profit ratio is increasing in 2010 which indicates that cost of production is coming down and sales are increasing. The net profit indicates that the overall profit in the industry is increasing which indicates sound financial position in telecom industry. Operational efficiency in the industry is decreasing after 2008.



PROFITABILITY RATIOS ( BASED ON CAPITAL EMPLOYED)

	2006	2007	2008	2009	2010
Return on Assets	26.12	24.35	27.85	26.33	29.35
Return on Capital Employed	22.15	25.32	27.03	27.77	22.32
Return on Equity Capital	24.51	24.99	28.8	33.72	26.61



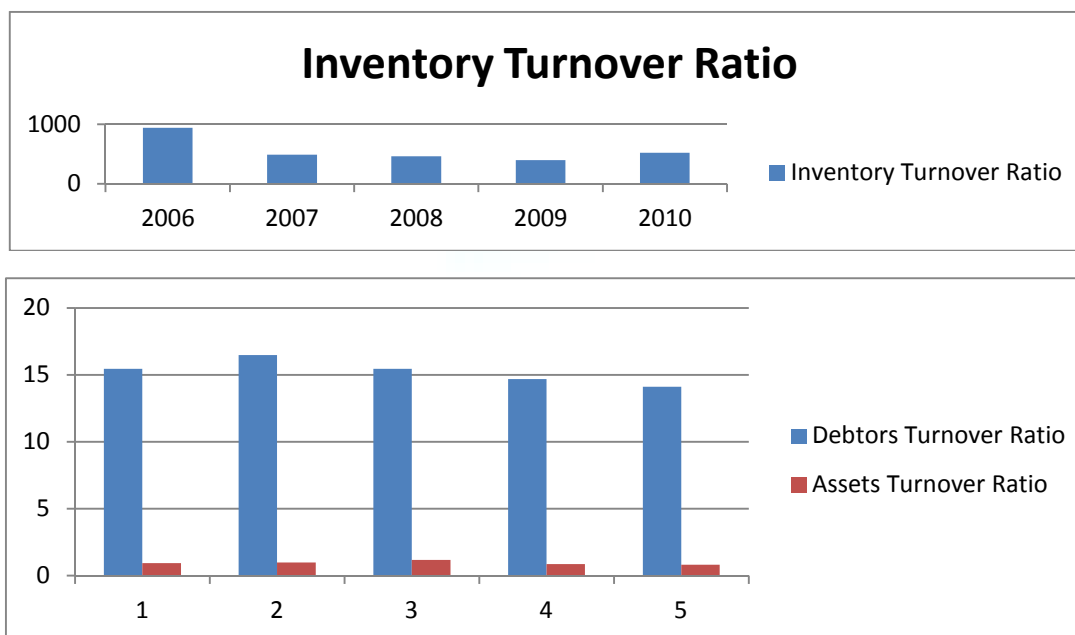
The gross profit ratio is increasing in 2010 which indicates that cost of production is coming down and sales is increasing. The net profit indicates that the overall profit in the industry is increasing which indicates sound financial position in telecom industry.

#### EFFICIENCY RATIO

EFFICIENCY RATIO

	2006	2007	2008	2009	2010
Inventory Turnover Ratio	936.45	489.35	460.52	399.45	521.32
Debtors Turnover Ratio	15.45	16.47	15.45	14.68	14.1
Assets Turnover Ratio	0.92	0.98	1.16	0.86	0.8

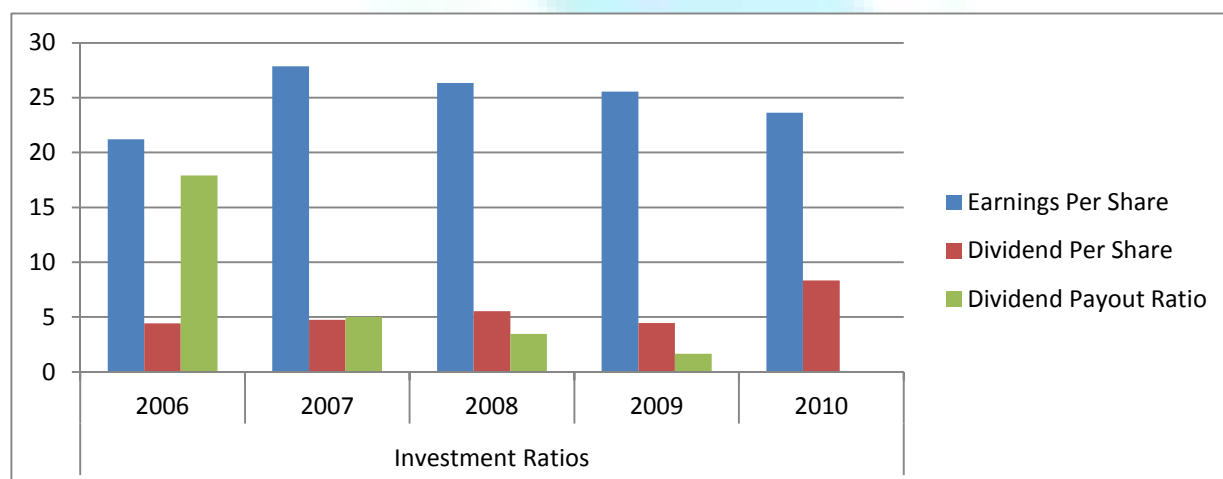
The higher the value of debtor's turnover the more liquid the debtors are. In the year 2010 debtors are more liquid In 2010 the stock turnover ratio is very high which shows the industry has less investment in inventories. Total assets turnover ratio determines the efficiency of fixed assets.



#### INVESTMENT RATIOS

INVESTMENT RATIOS					
	2006	2007	2008	2009	2010
Earnings Per Share	21.2	27.85	26.34	25.55	23.64
Dividend Per Share	4.44	4.76	5.55	4.46	8.34
Dividend Payout Ratio	17.9	5.02	3.46	1.65	0

The industry has paid higher dividend in 2010. Till 2009 industry has retained its earning in the business it was done to maintain strong financial position.



#### FINDINGS

The major findings from the present study are:

- Profitability – decline.
- Financial Strength – not highly satisfactory.
- Fixed Assets-Financed mainly through owners fund
- Working Capital - Not efficiently and effectively managed.

On the basis of the analysis of profitability, Activity, earning per share, fixed assets and inventory turnover, it can be concluded that the performance of selected five companies i.e., Oil and Natural Gas Corporation, Reliance Petroleum Limited, Oil India Limited, Hindustan Petroleum Corporation and Cairn India Limited EPS is high, Current Assets is above standard, Proprietary fund also found satisfactory. The position of the ONGC can be ranked on top among the selected unit and based on the analysis of data.

#### CONCLUSION

Indian Oil and Petroleum Industry is an independent and self-reliant industry. It has large and potential domestic and international market. The main problems with the Petroleum Industry in India are related to infrastructural developments. The lack of proper storage facilities, enhancements in refining capacities, and fluctuating import prices plays important role in the development of the sector.

The study has analyzed the short term and profitability position of leading Oil and Petroleum companies in India, some of the important ratios were used to measure the financial performance of five selected companies. Based on the above analysis the overall performance of ONGC is one of the major and fully vertically integrated composite mills player in India. It produces around 77% of India's total crude oil production (and around 30% of total demand) and around 81% of natural gas production. ONGC is one of the largest publicly traded companies by market capitalization in India and the largest India-based company measured by. The result of financial analysis also shows that ONGC is comparatively good with the other four companies. Its financial position is found to be highly satisfactory level in net profit growth on the profitability level, short term liquidity position, efficiency level, solvency capacity and investment analysis

basis. The other two selected ONGC companies performance were not satisfactory positions. Hence these companies will have to strengthen its shareholders funds and working capital to compete and enhancing its current performances in growing Oil and Petroleum in global business environment.

This is an attempt identify and study the movement of key financial parameters and their relationship with profitability of Oil and Petroleum industry. It is an attempt to and the study whether the key identified parameters move in a synchronous way going up and coming down with basic profitability parameters. All three comparably profit-making companies have been taken as the sample for study for the period of 2006 to 2010. The data have been taken from the figures supplied by prowess database. On the basis of this data a trend parameter is calculated for the year 2011. So, on the base of the analysis, the broad conclusion is that the parameters are consistent within a wide horizon and with the growth that companies have achieved, the parameters have also responded in a synchronous manner.

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## ANOVA BETWEEN THE STATEMENT REGARDING THE MOBILE BANKING FACILITY AND TYPE OF MOBILE PHONE OWNED: A STUDY WITH REFERENCE TO TENKASI AT VIRUDHUNAGAR DSITRICT

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**KODAIKANAL**

### ABSTRACT

*The digital media comprising of internet and mobile phone are the fastest growth avenues for marketing of both consumption and financial products. In India marketing through digital media was much less affected by the economic slowdown than through other media. Further, digital marketing looks set to continue its rapid growth as new developments and their advantages become even more apparent, when marketing budgets are faced with increasing constraints. Mobile Marketing is one of the fastest growing personal digital media tools; Now, with the third and fourth generations of mobile telephony (3G and 4G) coming into picture, the dimensions of mobile marketing have undergone a paradigm shift and one has moved far ahead from the early days and SMS was very successful as a marketing tool because of its user friendliness and ever present nature. In other words, mobile phone users regard their phones as part of their own body and this shows that marketers have a power full tool for communication and their disposal. This has promoted marketers to recognize the utility and role that mobile phones play in the lives of consumers. The services which are necessary to facilitate marketing functions, provided through mobile phones differ according to the type of mobile they owned and facilities (technology) it contains. Depends on the technology adopted in mobile phone, the banker is rendering the banking services. Hence it is imperative to study to what extent customers felt the relevancy of services they availed and whether their opinion differs according to the type of mobile they owned and services availed through mobile phones through an analysis of variance test.*

### KEYWORDS

mobile banking, Tenkasi.

### INTRODUCTION

Banking system is the backbone of the economy and Information Technology (IT) in turn has become the backbone of banking activities.<sup>1</sup> Technology, which was playing a supportive role in banking, has come to the forefront with the ever-increasing challenges and requirements. Technology to start with was a business enabler and now has become a business driver. The Banks cannot think of introducing a financial product without IT support. Be it customer service, transactions, remittances, audit, marketing, pricing or any other activity in the Banks, IT plays an important role not to complete the activity with high efficiency but also has the potential to innovate and meet the future requirements.

The Banking Sector was early adopter of technology and in that way set an example to the other Industries the need to opt for automation for taking full advantage in operational efficiency.<sup>2</sup>

### STATEMENT OF THE PROBLEM

In order to cater to the changing preferences, bankers are bound to provide the services suitable to their customers needs to survive in the competition;. Besides, the business relationship between a bank and its customer is not a non-time transitory relationship, but a relatively permanent and enduring one, which requires to be nurtured with good quality of service. In such a situation, any bank not having a mind towards bettering the quality of customer service is almost certain to lose its business.<sup>3</sup> Needless to say, in the post-reform era which is becoming day by day frighteningly competitive, only those banks which have been exactlying customer-focused will have better chances of survival and growth.

Despite so many measures initiated at various levels to improve the standard of customer service, the level of satisfaction perceived by various segments of customers has been low. Demand for improvement in customer service continues to be louder-and so is the level of customer complaints regarding poor service.

Despite so many measures initiated at various levels to improve the standard of customer service, the level of satisfaction perceived by various segments of customers has been low. Demand for improvement in customer service continues to be louder-and so is the level of customer complaints regarding poor service.<sup>4</sup>

### OBJECTIVES OF THE STUDY

- To know the opinion about the relevancy of the statements on mobile banking facility used
- To verify whether Type of mobile phone owned and the opinion about the relevancy of the statements on mobile banking facility differ significantly or not.
- And to offer suggestions based on the findings of the study

### REVIEW OF LITERATURE

**Jim Dale Reed** conducted a study on "Commercial Bank selection: A Factor Analysis of the Determinants of Consumer Choice" with the purpose to identify the variables that influence the consumer behavior in selecting a commercial bank and concluded that no single variable was responsible for a particular decision. It was the combination of several factors that led to final selection.<sup>5</sup>

**Eugene W. Anderson, Daes and Furness and Donald R. Lehmann** discussed the links between quality, expectations, customer satisfaction and profitability. The findings state that when quality and expectations increase, there is a positive impact on customer satisfaction and in turn, profitability.<sup>6</sup>

**Stephen S. Tax, Stephen W. Brown and Murali Chandrasekaran** developed and tested a hypothesis regarding the inter play between satisfaction with complaint handling and prior experience in shaping customer trust and commitment. The result indicates that a firm's favourable actions during conflict demonstrate its reliability and trustworthiness and implies that investments in complaint handling can improve service quality, strengthen customer relationships and build customer commitment.<sup>7</sup>

### FRAMEWORK OF ANALYSIS

Arithmetic mean and percentages are used to describe the data.

Analysis of variance (ANOVA) test to verify whether the opinion about the relevancy of the statements on mobile banking facility used, and Type of mobile phone owned differ significantly or not.

**ANALYSIS OF VARIANCE – ONE WAY CLASSIFICATION MODEL**

Source of Variation	Sum of Squares	Degrees of freedom	Mean Squares	Variable ratio of F
Between Samples		$V1=C-1$	$\frac{\text{Sum of squares}}{C-1}$	$\frac{\text{Mean squares between columns}}{\text{Mean square within sample}}$
With in Samples		$V2=n-c$	$\frac{\text{Sum of squares}}{C-1}$	
Total			$n-1$	

**SCOPE OF THE STUDY**

This study covers the mobile banking services rendered by ICICI bank in Tenkasi taluk. As the study is an empirical study to identify the satisfaction level of the customers towards mobile banking services rendered by the banker, the study has been focused towards customers who are the recipient of services. The ICICI bank in Tenkasi taluk consists of 5 branches. The study was undertaken on the customers of 5 branches only.

**SAMPLING DESIGN**

The customers of ICICI bank in tenkasi taluk branches are large in number and hence a comprehensive list of customers could not be prepared. Moreover, the list of customers of each branch could not be obtained only from the bank managers. They should not reveal the names of customers due to their obligations to maintain the confidentiality of customers' accounts as per sec.13 of Banking Company (Acquisition and Transfer of undertakings) Act, 1970. Therefore, a sample of 100 customers inclusive of all branches was selected by applying a non-probability random sampling method.

**GEOGRAPHICAL AREA OF THE STUDY**

The study covers the whole area of Tenkasi, Virudhunagar District in Tamil Nadu, only where the branches of the ICICI Bank are situated. They are Illathur Branch, Sundharapadiapuram Branch, Malapa Branch, Ravannasamuthiram Branch, pathamadaai Branch, in 5 branch.

**ANALYSIS OF THE STUDY**

Irrespective of sector whether public or private, Banks are offering variety of services through mobile banking. In this study, the various banking facility provided through mobile are listed and an analysis is made to know the whether the services are availed by the customers and to verify whether the opinion about the relevancy of the statements on mobile banking facility used, and Type of mobile phone owned differ significantly or not.

**SAMPLE ADEQUACY TEST**

For that first KMO and Bartlett's Test is applied to assess the sample adequacy. Table 1 shows the results.

**TABLE 1: KMO AND BARTLETT'S TEST**

Kaiser-Meyer- Olkin Measure of Sampling Adequacy.		.599
Bartlett's Test of Sphericity	Approx. Chi-Square	852.489
	df	171
	Sig.	.000

The value of Kaiser-Meyer-Olkin Measure of Sampling Adequacy is .599 is just adequate

**CUSTOMERS DETAILS WITH REGARD TO MOBILE****A) MOBILE OWNED**

The table 2 shows the classification of the respondents of the study on the basis of mobile owned.

**TABLE 2: TYPE OF MOBILE OWNED**

mobile is owned	NUMBER OF RESPONDENTS	PERCENTAGE
CDMA	29	29
GSM	71	71
Total	100	100

(Source: Primary)

Among the 100 respondents 71 respondents owned GSM type mobile, 29 respondents owned CDMA type mobile.

**B) FACILITIES IN THE MOBILE PHONE**

The table 3 shows the classification of the respondents of the study on the basis of Facilities in the mobile phone.

**TABLE 3: FACILITIES IN THE MOBILE PHONE**

Facilities	NUMBER OF RESPONDENTS	PERCENTAGE
GPRS	23	23
SMS	72	72
Internet	5	5
Total	100	100

(Source: Primary)

Out of respondents most of the respondents 72 percent use SMS, 23 per cent use GPRS, and 5 per cent use internet facility to mobile banking service.

**C) OPINION ABOUT RELEVANCY OF THE STATEMENT REGARDING THE MOBILE BANKING FACILITY**

The table below shows the opinion of the respondent regarding the relevancy of a mobile banking facility. If a respondent says yes it means the facility is relevant and vice versa.

TABLE 4: OPINION ABOUT RELEVANCY OF THE STATEMENT REGARDING THE MOBILE BANKING FACILITY

Mobile banking facility	Number of respondents who stated Yes	Number of respondents who stated No	Total
Mini- Statements and (checking of account history)	96	4	100
Alerts on account activity or passing of set thresholds	98	2	100
Monitoring of term deposits	90	10	100
Access to loan statements	73	27	100
Access to card statements	68	32	100
Mutual funds/ equity statements	53	47	100
Insurance Policy management	32	68	100
Pension plan management	18	82	100
Status on cheques stop payment on cheque	43	57	100
Ordering check books	66	34	100
Balance checking in the account	69	31	100
Recent transactions	96	4	100
Due dates of payment (functionality) for stop change and deleting of payments)	69	31	100
Pin provision, change of pin and reminder over the internet	67	33	100
Blocking of (lost \ stolen) cards	64	33	100

Source: computed from Primary Data

98 respondents stated that 'Alerts on account activity or passing of set thresholds' on account activity facility was relevant for their mobile banking account. This facility is ranked number -I with regard to relevancy to respondents.

96 respondents stated that 'Mini- Statements and (checking of account history)' and information about Recent transactions was relevant for their mobile banking account. This facility is ranked number - II with regard to relevancy to respondents.

90 respondents stated the 'Monitoring of term deposits' is relevant therefore it is ranked III.

82 respondents stated that 'Pension plan management's was not relevant. So with regard irrelevant are facilities pension plan management facility ranks number-I

68 respondents stated that 'Insurance Policy management's not relevant. So with regard irrelevant are facilities pension plan management facility ranks number-II

57 respondents stated that 'Status on cheques, stop payment on cheque's not relevant. So with regard irrelevant is facilities pension plan management facility ranks number-III

#### D) RESULTS OF ANOVA TEST

ANOVA test is applied to know whether there is any variance between relevancy of statement on mobile banking facility used and type of mobile phone owned. The results of the analysis of given in Table 5

TABLE 5: ANOVA BETWEEN OPINIONS ABOUT RELEVANCY OF THE STATEMENT REGARDING THE MOBILE BANKING FACILITY AND TYPE OF MOBILE PHONE OWNED

Statement	Variation	Sum of Squares	DF	Mean Square	F	Sig.	Acceptance / Rejection of $H_0$
Mini- Statements and (checking of account history)	Between Groups	.008	2	.004	.107	.898	Accept
	Within Groups	3.832	97	.040			
	Total	3.840	99				
Alerts on account activity or passing of set thresholds	Between Groups	.016	2	.008	.388	.679	Accept
	Within Groups	1.944	97	.020			
	Total	1.960	99				
Monitoring of term deposits	Between Groups	.054	2	.027	.295	.745	Accept
	Within Groups	8.946	97	.092			
	Total	9.000	99				
Access to loan statements	Between Groups	.054	2	.027	.134	.875	Accept
	Within Groups	19.656	97	.203			
	Total	19.710	99				
Access to card statements	Between Groups	.206	2	.103	.463	.631	Accept
	Within Groups	21.554	97	.222			
	Total	21.760	99				
Mutual funds/ equity statements	Between Groups	.458	2	.229	.908	.407	Accept
	Within Groups	24.452	97	.252			
	Total	24.910	99				
Insurance Policy management	Between Groups	.207	2	.103	.465	.629	Accept
	Within Groups	21.553	97	.222			
	Total	21.760	99				
Pension plan management	Between Groups	.047	2	.023	.155	.857	Accept
	Within Groups	14.713	97	.152			
	Total	14.760	99				
Status on cheques stop payment on cheque	Between Groups	.054	2	.027	.107	.899	Accept
	Within Groups	24.456	97	.252			
	Total	24.510	99				
Ordering check books	Between Groups	.023	2	.011	.049	.952	Accept
	Within Groups	22.417	97	.231			
	Total	22.440	99				
Balance checking in the account	Between Groups	.267	2	.134	.614	.543	Accept
	Within Groups	21.123	97	.218			
	Total	21.390	99				
Recent transactions	Between Groups	.008	2	.004	.107	.898	Accept
	Within Groups	3.832	97	.040			
	Total	3.840	99				
Due dates of payment (functionality) for stop change and deleting of payments)	Between Groups	.520	2	.260	1.209	.303	Accept
	Within Groups	20.870	97	.215			
	Total	21.390	99				
Pin provision, change of pin and reminder over the internet	Between Groups	.121	2	.060	.267	.766	Accept
	Within Groups	21.989	97	.227			
	Total	22.110	99				
Blocking of (lost \ stolen) cards	Between Groups	.471	2	.235	.475	.623	Accept
	Within Groups	48.039	97	.495			
	Total	48.510	99				

Source: computed from Primary Data

**HYPOTHESIS 1**

$H_0$ : The opinion about relevancy of the statement regarding the mobile banking facility and mobile phone owned do not differ significantly at 5%.

It is clear from the above table that on applying analysis of variance, on the basis of the computed value of F for the statements Mini- Statements and (checking of account history), Alerts on account activity or passing of set thresholds, Monitoring of term deposits, Access to loan statements, Access to card statements, Mutual funds/ equity statements, Insurance Policy management, Pension plan management, Ordering check books, Balance checking in the

account, Recent transactions, Due dates of payment (functionality) for stop change and deleting of payments, Pin provision, and change of pin and reminder over the internet, Blocking of (lost \ stolen) cards and the significance level of F which is more than 0.05 (5%), the null hypothesis is accepted and it is concluded that the opinion about relevancy of the statements Mini- Statements and (checking of account history), Alerts on account activity or passing of set thresholds, Monitoring of term deposits, Access to loan statements, Access to card statements, Mutual funds/ equity statements, Insurance Policy management, Pension plan management, Ordering check books, Balance checking in the account, Recent transactions, Due dates of payment (functionality) for stop change and deleting of payments, Pin provision, and change of pin and reminder over the internet, Blocking of (lost \ stolen) cards regarding the mobile banking facility and Type of mobile phone owned do not differ significantly at 5%.

## SUGGESTIONS

Consumers are becoming more tech-literate, buying mobile phones, toying with online trading and just as much in need of banking services as consumers anywhere. So banks are trying to harness banking and mobile telephony into a set of applications and services, called m-banking, and are expecting that the money will roll in.<sup>8</sup>

That is what cell-phone operators and financial institutions have expected. However the substance of their offering was quite different from what they promised. Though there were many plans to enhance mobile-banking offerings and services, in reality the initiatives were very restricted

## CONCLUSION

The digital media comprising of internet and mobile phone are among the fastest growth avenues for banking. In India, banking through digital media was much less affected by the economic slowdown than through other media.

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## VIDEO REGISTRATION BY INTEGRATION OF IMAGE MOTIONS

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**ABSTRACT**

*In this research, we consider the problems of registering multiple video sequences dynamic scenes which are not limited non rigid objects such as fireworks, blasting, high speed car moving taken from different vantage points. In this paper we propose a simple algorithm we can create different frames on particular videos moving for matching such complex scenes. Our algorithm does not require the cameras to be synchronized, and is not based on frame-by-frame or volume-by-volume registration. Instead, we model each video as the output of a linear dynamical system and transform the task of registering the video sequences to that of registering the parameters of the corresponding dynamical models. In this paper we use of a joint frame together to form distinct frame concurrently. The joint identification and the Jordan canonical form are not only applicable to the case of registering video sequences, but also to the entire genre of algorithms based on the dynamic texture model. We have also shown that out of all the possible choices for the method of identification and canonical form, the JID using JCF performs the best.*

**KEYWORDS**

Dynamic textures, non-rigid dynamical scenes, video registration.

**INTRODUCTION**

The purpose of this paper is to outline a technique for finding the registration between two frames from a sequence of video that corresponds to the camera motion that also provides a means of detecting, and approximately segmenting, the moving objects within that scene. The approach taken is to split the image up into a series of blocks, and run a search comparing different registration parameters to find the transform that most effectively maps the motion of the scene background by means of grouping. A sequence of video generally involves two main unknowns: the movement of the camera, and the form and motion of the moving objects in the scene. This can involve many different motions, all of which must be detected and calculated separately, which is a very difficult task.

Image registration is the process of matching a pair of similar images in terms of the rotation, translation, scale and shear required to make those images correctly align. The particular focus of this paper is the application of this on two frames from a video sequence to describe image motion. Applications include automated image and video in painting for special effects in the film industry, use with mobile security systems, and vision systems for autonomous agents. For images that do not contain moving objects, the process of extracting information about the movement of the camera for the scene is relatively straightforward – by using an affine transformation model it is simply a matter of finding transformation parameters (rotation and translation) that match the two images using a simple error metric like sum of squares difference. However, once moving objects are introduced to the scene, the registration process becomes more complicated. For a situation where the motion of the camera is unknown, and the location of any moving objects is unknown, a registration algorithm has a significant amount of information that it needs to infer. Different sections of the images will have different motions (for example the background moving in one direction due to camera motion, while a person walking through the scene moves in a different direction). These areas of separate motion need to be identified and the magnitude and direction of the motion needs to be independently calculated.

This paper looks at an approach to this problem using a block-based technique for the registration. This enables differentiation between the dominant object in the scene (assumed to be the background) and other objects, which move relative to the dominant object. This provides information on the motion of the camera filming the scene. The task of identifying moving objects within a scene is another area of computer vision that is attracting attention. This paper proposes to use the information obtained through the process of registering the two images to provide a reasonable identification of the object location, for eventual application in the area of video in painting.

**METHOD****AFFINE REGISTRATION**

The technique used for registration in this paper is parametric affine registration. We currently restrict the algorithm from full affine to a three-parameter model, using rotation and x- and y- translation. The decision to ignore shear and scale considers that the effect of these between adjacent frames in standard video is likely to be minimal, and the block-based approach should allow for this to be detected without explicitly searching for it. Though it may have some impact on accuracy, the gain in efficiency obtained by ignoring scale and shear is significant.

The three-parameter affine transformation model for mapping the registration of a single pixel between two images

( $I_0$  and  $I_1$ ) is as follows

$$fx_0, y_0 = x_1 y_1 = \cos(\theta) \quad \sin(\theta) - \sin(\theta) \cos(\theta) + x_0 y_0 + t_x t_y$$

where  $x_0 y_0$  is the position of a pixel in the original image

$I_0$  and  $x_1 y_1$  is the position of the corresponding pixel in the second image,  $I_1$ .

The rotation is conducted about the point (0, 0) on the image (the top left corner), so for a different centre of rotation the image must be offset. The values  $t_x$  and  $t_y$  are the x- and y-translations respectively. The registration itself is a minimisation problem: identifying values for  $t_x$ ,  $t_y$ , and  $\theta$  that minimise an error value between image  $I_1$  and the transformed  $I_0$ . The error used for this paper is the sum-of-squares difference between the RGB colour values of each pixel over the image or image section:

$$E = \sum (I_0(x_i, y_i) - I_1(f(x_i, y_i)))^2$$

As algorithmic efficiency is a major concern, the use of a gradient descent algorithm to optimise the search was investigated. For this application, however, gradient descent is not ideal – the frequent occurrence of local minima throughout the search space, a high susceptibility to noise, and an inability to effectively process areas of low colour differential severely hamper its effectiveness. The efficiency problems can be greatly reduced with an approach using a series of

iterative searches over reduced scale images. The scale of the reduction required depends on the image sizes involved – for the relatively small samples analysed in this project, an initial coarse search is conducted over a quarter-scale image, which is then refined over a half scale image before a full-scale image is used to obtain the sub-pixel accuracy required.

#### THE INTEGRATION APPROACH

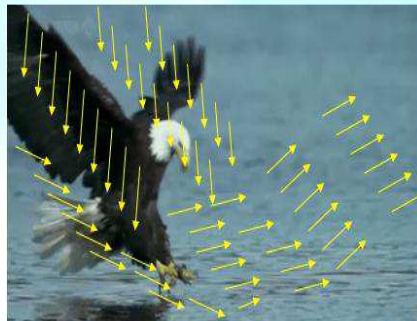
Attempting to match a transform to the entirety of an image is impractical for a registration technique on video containing moving objects, as different parts of the image will be moving different amounts. Therefore, it makes sense to acknowledge that there will be objects, and allow them to be excluded from the registration. Methods like optical flow can achieve this by mapping pixels individually, but individual pixels are highly susceptible to noise, which can in turn affect the registration.

If working over the entire image is too broad, and looking at individual pixels is too fine, then it is logical to try and find a sort of middle ground. By splitting the image up into a series of blocks and tracking these separately, errors caused by certain types of noise (most notably, the blurring that is a common result of video compression) can be minimized, and sections of the image containing moving objects can be eliminated from the registration problem.

There are two approaches to the block-based image registration. The first involves running the registration search algorithm for each block individually to calculate the best transform for each block. These results can then be correlated in the form of a three dimensional histogram, where the largest group corresponds to the transformation that describes the motion of the largest 'object', which can be taken to be the background. This method is inherently slow, as the search space is fairly large. For this reason, an iterative search approach over a multi-resolution pyramid is employed. The algorithm is initially run at quarter-scale or smaller (depending on the size of the original image) with broad search parameters, then the results are aggregated and used to determine a much smaller search area, which is then applied to a half-scale image. The search parameters are then refined again, before finally being applied to the original full-scale image. Susceptibility to noise and difficulty distinguishing large areas of colour lead to a proportion of blocks returning incorrect results for the registration. For this reason, at each stage of the refinement the overall best result is used as the base for the next iteration of the registration for each block. The second method is considerably faster, but also introduces a much greater potential for error. It involves picking a block at random and running the affine search over that sole block to find the transformation that fits that block to the next image. That transformation is then applied to all the blocks and thresholding is used to identify which blocks agree with the transform, which in turn gives the approximate area of the object whose movement is mapped by the transform.

Largely, this causes problems because the system is based on arbitrary thresholds. If the threshold identifying which blocks agree with a transform is too low, blocks which do agree may be excluded, resulting in a lower value for object area, which could result in the background being disregarded as being just a small object. If the threshold is too high, the algorithm may find local minima that is deemed an acceptable transform, but is not the global minima – most likely to occur when the sampled block contains parts of more than one object. The other threshold that may cause problems is the one that is used to determine whether an object is large enough to be identified as the background. If the value is too high then there may be no objects that meet the criteria and the algorithm will never complete, or, conversely, if it is set too low then a smaller object may be incorrectly identified as the background. This particular problem may be countered by eliminating blocks that have already been grouped and resampling until every region of the image has been identified, at which point the largest of these can be positively identified as the background. This will, however, significantly increase the computational cost of the algorithm (as it will no longer halt as soon as it finds an acceptably large object) as well as introducing the possibility of error when a block is assigned into a group that 'fits' but is not the optimum grouping for the block. In theory, this algorithm appears to solve the problem that is the target of this paper: identifying and tracking each individual object in the scene. In practice, however, this is unachievable. Firstly, there are the blocks that contain parts of more than one object; these will seldom match the transform of any object, so will not be grouped correctly. Similarly, blocks that are resampled to by the algorithm and that exist in areas of solid colour (i.e. have no distinguishing features/colours) will likely not track correctly, which would also interfere with the results. Figure 1 shows the chosen transformations for a registration search run over an image pair using 20x20 blocks. Only a single search is run on the full-scale image, to demonstrate the registration process without the corrective measures that are used in the iterative coarse-to-fine search. The number of blocks that produce conflicting registrations demonstrates the high occurrence of local minima over the search, and thus the necessity of the corrective groupings used in the iterative search.

FIGURE 1



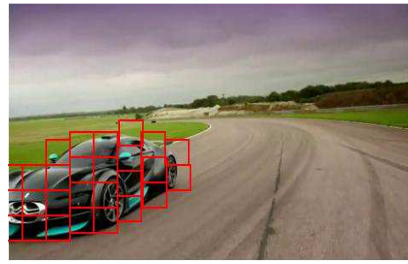
This shows the detected motion paths of blocks across the image after one iteration of the affine search on the full-scale image. (See Figure 3 for the images used in this registration). The necessity of an iterative search approach is shown by the number of apparently random motion paths that are produced.

#### EXTRACTING OBJECT INFORMATION

The extraction of object information is based on the premise that most of the image is background, which moves according to the motion of the camera, with certain sections of the image not conforming to this motion – those sections belonging to independently moving objects. During the process of tracking the camera motion, the image sections that do not conform to the global motion must be detected and eliminated in order for the result to be accurate. Thus, the location and, to a certain extent, the motion of these objects is already available once the camera tracking algorithm has run. Due to the necessarily coarse nature of the block-based approach, an exact outline of the objects is not provided (see Figure 2), however enough information is discovered to make the task of accurately segmenting these objects much easier with the application of an algorithm such as active contours.

For the purpose of comparison, a second method based on a difference algorithm applied post-registration is used. The algorithm uses the existing block structure to reduce the impact of noise on the results. Each block is marked as belonging to an independently moving object if sufficient pixels within the block are significantly different. The level of difference that is taken as significant is determined by an adjustable threshold, which requires changes depending on the level of contrast. Fig. 2. Example of detection of a moving object using the block-based method. The image was first registered to a second image, then the block information was used to highlight moving objects within the scene. The blocks shown on the image indicate the detected object area between background and foreground in the samples.

FIGURE 2



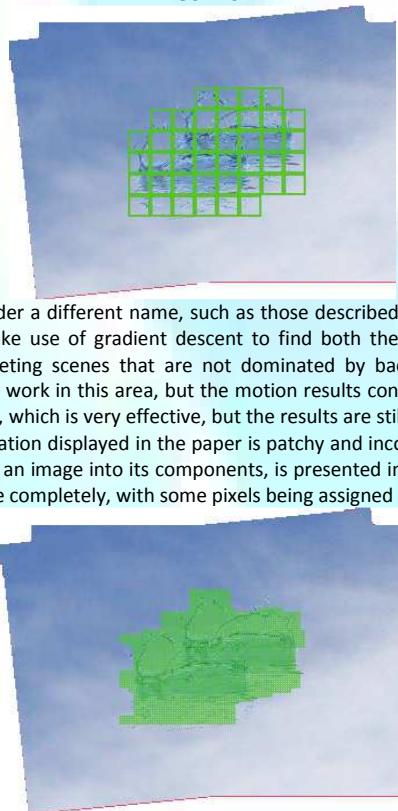
Example of detection of a moving object using the block-based method.

The image was first registered to a second image, and then the block information was used to highlight moving objects within the scene. The blocks shown on the image indicate the detected object area. The method using registration information to identify moving objects works well in a broader range of situations. While the difference algorithm is often slightly more effective in high contrast scenarios, it struggles with low contrast.

#### RELATED WORK

There are many methods of affine registration; good overviews of the work in the area are offered by [1], [2]. A common application makes use of registration techniques for mapping medical imaging scans to assist in the detection of anomalies, however the types of deformation involved do not transfer to the area of camera motion effectively. Patch-tracking is one area within the scope of registration and object tracking that has been pursued, with two different interpretations of its meaning available. The patch-tracking algorithm put forward in [3] is focused on tracking an object, and requires prior knowledge about the form of that object, which is not particularly useful here. [4] Offers an entirely different patch-based algorithm, which uses patches similar to the blocks used in this paper to solve regression equations for image distortion. The results presented here are impressive; however it does not deal with the existence of moving objects in the scene.

FIGURE 3



Window-based algorithms offer a similar sort of idea under a different name, such as those described in [5], [6]. These algorithms are designed to identify the camera motion in scenes with moving objects, and make use of gradient descent to find both the global minimum and a secondary, local minimum that describes the camera motion – this is specifically targeting scenes that are not dominated by background. In terms of a registration approach to object segmentation, [7] establishes an effective foundation for work in this area, but the motion results contain some sections of image unrelated to the objects. [8] Presents with a more complete example of this approach, which is very effective, but the results are still influenced by outliers in the sequence. [9] Also provides some work in this area, but the resulting object segmentation displayed in the paper is patchy and incomplete. Another approach to the problem, using a pixel-wise optical flow method for registering and segmenting an image into its components, is presented in [10]. It produces some impressive results, but due to its pixel-wise nature the layers of the image will not separate completely, with some pixels being assigned incorrectly.

The work presented in [7] is somewhat in between. A block based approach is used for the object detection stage but not for the global motion estimation, and the object detection uses a difference based approach rather than using the information available from the registration.

#### MULTI INTEGRATION MAPPING

By introducing extra blocks across the image that overlap but are offset from the main registration blocks before the final fine-search of the registration, a higher degree of accuracy can be achieved for the object tracking at a certain cost in terms of computing power. These extra blocks are registered in the same way as the original blocks, and the results are aggregated using the logical AND operator to produce a finer resolution for the tracking result – only areas that are marked as moving objects by *all* of the blocks that contain them are included in the tracking result. This can be seen as a basic form of image super-resolution. For example, using one extra set of pixel blocks, offset from the original grid by 10 pixels in both the x- and y-directions, would produce a tracking result constructed of  $5 \times 5$  pixel blocks rather than the  $20 \times 20$  blocks that would otherwise be the result.

Figure 3 shows both the basic approach and the multi-block approach (using three extra block sets over the image). The multi-block approach provides a segmentation that does not include as much non-object data, but it still loses small sections of the edge of the object.

Figure 3 The first image shows the object detection using the basic approach, with the detected object area shown by the registration blocks it is detected in.

The second image shows the multi-block approach, this time the detected area is shown as a grid to simplify the drawing algorithm. The images that the object detection is shown on is the mean image taken after registration (allowing the position of the object in both frames to be seen on the same picture).

#### DYNAMIC TEXTURES FRAMEWORK

Given a video sequence  $\{I(t)\}_{t=1}^F$ , we model the temporal evolution of its intensities as the output of an LDS. The equations that model the sequence are given by

$$Z(t+1) = AZ(t) + BV(t), \quad (1)$$

$$I(t) = C^0 + CZ(t) + W(t). \quad (2)$$



The parameters of this model can be classified into three types, namely, the appearance, dynamics, and noise parameters. The vector  $z(t) \in \mathbb{R}^n$  represents the hidden state of the system at time  $t$ . Its evolution is controlled by the dynamics matrix  $A \in \mathbb{R}^{n \times n}$  and the input-to-state matrix  $B \in \mathbb{R}^{n \times q}$ . These parameters are termed the dynamics parameters of the dynamic texture model. The parameter  $C \in \mathbb{R}^{p \times n}$  maps the hidden state to the image and the vector  $C^0 \in \mathbb{R}^p$  is the temporal mean of the video sequence.

These parameters are called the appearance parameters of the dynamic texture model. The noise parameters are given by the zero-mean Gaussian processes  $v(t) \sim N(0, Q)$  and  $w(t) \sim N(0, R)$ , which model the process noise and the measurement noise, respectively. The order of the system is given by  $n$  and  $p$  is the number of pixels in the image. The advantage of using this model is that it enables us to decouple the appearance parameters of the video sequence from the dynamics parameters. Thus, if one is interested in recovering appearance-based information from the video sequence, such as optical flow or, in our case, the spatial registration, then one only needs to deal with the appearance parameters. This allows us to recover the spatial registration independent of the temporal alignment of the sequence, as will be seen in the next section.

#### RECOVERING THE SPATIAL-TEMPORAL TRANSFORMATION FROM THE PARAMETERS OF DYNAMIC TEXTURES

As motivated in the previous section, spatial registration can be recovered using a subset of the parameters of the LDS. In this section, we explore the relationship between the parameters of two video sequences that are spatially and temporally transformed versions of each other.

Let  $x = (x, y)$  be the coordinates of a pixel in the image. We define  $C^i(x)$  to be the  $i$ th column of the  $C$  matrix reshaped as an image. Likewise, we define  $C^0(x)$  to be the mean of the video sequence reshaped as an image. With this notation, the dynamic texture model can be rewritten as

$$I(x, t) = \sum_{i=0}^n z^i(t) C^i(x) + w(t), \quad (3)$$

Where  $z^0(t) = 1$ . Therefore, under the dynamic texture model, a video sequence is interpreted as an affine combination of  $n$  basis images and the mean image. We call these  $n + 1$  images  $\{C^i(x)\}_{i=0}^n$  the dynamic appearance images. In the following analysis, we consider a video sequence and its corresponding LDS. We show that a spatial and temporal transformation on the video sequences induces a spatial and temporal transformation in the parameters of the LDS. We first consider the simple case of the two video sequences being just spatially transformed version of each other. Such video sequences are termed as synchronized video sequences. We then consider the more general case of two video sequences being both spatially and temporally transformed versions of each other. Such video sequences are also known as unsynchronized video sequences.

#### SYNCHRONIZED VIDEO SEQUENCES

Let  $T: \mathbb{R}^2 \rightarrow \mathbb{R}^2$  be any spatial transformation relating the frames from each video, such as a 2D affine transformation or a homography. The relationship between two synchronized video sequence is then given by  $\tilde{I}(x, t) = I(T(x), t)$ . Consider now the following LDSs, with the evolution of the hidden state as

$$z(t+1) = Az(t) + Bv(t), \quad (4)$$

and the outputs defined as

$$I(x, t) = \sum_{i=0}^n z^i(t) C^i(x) + w(t), \quad (5)$$

$$\tilde{I}(x, t) = \sum_{i=0}^n z^i(t) C^i(T(x)) + W(t). \quad (6)$$

We can see that  $\tilde{I}(x, t) = I(T(x), t)$ . This shows that when a constant spatial transformation is applied to all the frames in a video sequence, the transformed video can be represented by an LDS that has the same  $A$  and  $B$  matrices as the original video. The main difference is that the dynamic appearance images  $\{C^i(x)\}_{i=0}^n$  are transformed by the same spatial transformation applied to the frames of the sequences, i.e.,  $\{C^i(x) = C^i(T(x))\}_{i=0}^n$ .

#### UNSYNCHRONIZED VIDEO SEQUENCES

In this case, in addition to the spatial transformation, we now introduce a temporal lag between the two video sequences denoted by  $T$ . The relationship between two unsynchronized video sequence can be represented as  $\tilde{I}(x, t) = I(T(x), t + T)$ . Now let us consider the following two systems, with the evolution of the hidden states given by (4), and the outputs defined as

$$I(x, t) = \sum_{i=0}^n z^i(t) C^i(x) + w(t), \quad (7)$$

$$\tilde{I}(x, t) = \sum_{i=0}^n z^i(t+T) C^i(T(x)) + W(t+T). \quad (8)$$

We now see that the above equations model two unsynchronized sequences. Thus, a video sequence that is a spatially and temporally transformed version of the original video sequence can be represented with an LDS with the same  $A$  and the same  $B$  as the original video sequences. However, in addition to the  $C$  matrix being modified by the spatial transformation, as in the synchronized case, we also have a different initial state. Instead of the video sequence starting at  $z(0)$ , the initial state now is  $z(T)$ . Nevertheless, if one wants to only recover the spatial transformation, the  $C$  matrices of the two LDSs are the only parameters that need to be compared. Thus, given two video sequences, either synchronized or the unsynchronized, in order to recover the spatial registration, we only need to compare the  $C$  matrices. But this is under the assumption that both the  $A$  matrix and the state of the system  $z(t)$ , modulo a temporal shift  $T_i \in \mathbb{Z}$ , for the two systems remain the same. The rationale behind this assumption is that since the video sequences are of the same scene, the evolution of the hidden states remains the same. More specifically, the objects in the scene undergo the same deformation; hence, they possess the same dynamics. However, if one learns the parameters of the LDSs from the data using existing methods, one encounter two problems. The first problem is that the  $A$  matrix is not the same for the different LDSs. Second, the  $C$  matrices that are recovered are only unique up to an invertible transformation. Hence, in order to perform the registration, we address these issues in the next section.

#### RECOVERING TRANSFORMATION PARAMETERS FROM THE DYNAMIC TEXTURE MODEL

In the previous section, we have introduced the dynamic texture model and shown how the model parameters vary for video sequences taken at different viewpoints and time instances. In this section, we will show how the spatial transformation can be recovered using the parameters of the LDSs. In Section 3.4.1, we review the classical system identification algorithm for learning the parameters of an LDS and show that the recovered parameters are not unique. Since we would like to compare the parameters of different LDSs, our first task is to remove such ambiguities. This issue is addressed in Section 3.4.2. We then, in Section 3.4.3, show how we can enforce the dynamics of multiple video sequences to be the same. Finally, in Section 3.4.4, we propose an algorithm to recover the spatial and temporal transformation from the dynamic appearance images of two video sequences.

#### PARAMETER IDENTIFICATION

Given a video sequence  $\{I(t)\}_{t=1}^F$ , the first step is to identify the parameters of the LDS. There are several choices for the identification of such systems from the classical system identification literature, e.g., subspace identification methods such as N4SID [14]. The problem with such methods is that as the size of the output increases, these methods become computationally very expensive. Hence, traditionally, the method of identification for dynamic textures has been a suboptimal solution proposed in [12]. This method is essentially a Principal Component Analysis (PCA) decomposition of the video sequence. Given the video sequence

$\{I(t)\}_{t=1}^F$  the mean  $C^0 = 1/F \sum_{t=1}^F I(t)$  is first calculated. The parameters of the system are then identified from the compact (rank- $n$ ) SVD of the mean subtracted data matrix as

$$[I(1) - C^0, \dots, I(F) - C^0] = U(SV)^T = CZ, \quad (9)$$

where  $Z = [Z(1) \dots Z(F)]$ . Given  $Z$ , the parameter  $A$  is obtained as the least-square solution to the system of linear equation  $A[Z(1) \dots Z(F-1)] = [Z(2) \dots Z(F)]$ .

It is well known that the factorization obtained from the SVD is unique up to an invertible transformation, i.e., the factors that are recovered are  $(CP^{-1}, P^T)$ , where  $P \in \mathbb{R}^{n \times n}$  is an arbitrary invertible matrix. Hence, the LDSs with  $(A, B, C)$  and  $(PAP^{-1}, PB, CP^{-1})$  both generate the same output process. This fact does not pose a problem when dealing with a single video sequence. However, when one wants to compare the parameters identified from multiple sequences, each set of identified parameters could potentially be computed with respect to a different basis. Since our goal is to compare the C matrices, to perform the registration we need to ensure that different C matrices are in the same basis. In order to address this issue, in the next section, we outline a method to account for the basis change. We propose to do this by using a canonical form and converting the parameters into the canonical form.

### CANONICAL FORMS FOR PARAMETER COMPARISON

Given the parameters of an LDS  $(A, B, C)$ , the family of parameters that generate the same output process is given by  $(PAP^{-1}, PB, CP^{-1})$ . There are several approaches to removing the ambiguities from the system parameters. For instance, one can restrict the columns of the C matrix to be orthogonal. Exploiting this fact, one option to overcome the basis ambiguities is to project all the C matrices into the subspace spanned by one of the C matrices. In [11], Chan and Vasconcelos used such an approach where one sequence was chosen as the reference and the parameters of the other sequence were converted into the basis of the reference sequence. One drawback of such a method is that it requires a reference sequence. Choosing such a reference sequence might not always be feasible. An alternate approach from linear systems theory, to address the basis issue, is to use a canonical form. The advantage of such canonical forms is that the model parameters in the canonical forms have a specific structure. As a consequence, if the model parameters identified using the suboptimal approach is converted to the canonical form, the parameters are in the same basis. This removes the basis ambiguity induced in the suboptimal identification algorithm due to the SVD factorization. Also, using the canonical form does not require a reference sequence.

If one refers to the literature from linear systems theory, several canonical forms have been proposed for the model parameters of an LDS in the particular case of a single output system, i.e.,  $p = 1$ . Although, in principle, any canonical form can be used to overcome the ambiguities, the fact that these LDSs model the temporal evolution of the intensities of pixels of a video sequence poses some constraints in the choice of the canonical form. For example, we do not want such forms to be complex. This would make it difficult to perform comparison between parameters of different systems. Also, even though, theoretically, all of the canonical forms are equivalent, in practice they differ in their numerical stability. Vidal and Ravichandran in [17] used a diagonal form for the A matrix. Since the equivalence class of parameters for A is  $PAP^{-1}$ , i.e., a similarity transformation, the diagonal form reduces to the diagonal matrix of eigenvalues of A. Thus, the resulting parameters in canonical form can be complex, since the eigenvalues of A can be complex. To overcome this, the Reachability Canonical Form (RCF) was used in [15]. The RCF is given by

$$A_c = \begin{bmatrix} 0 & 1 & \dots & 0 \\ -a_0 & -a_1 & \dots & -a_{n-1} \end{bmatrix}, \quad B_c = \begin{bmatrix} 0 \\ 0 \\ \dots \\ 1 \end{bmatrix} \in \mathbb{R}^{n \times 1}, \quad (10)$$

where  $A^n + a_{n-1}A^{n-1} + \dots + a_0I = 0$  is the characteristic polynomial of A and  $I_{n-1}$  is the identity matrix of size  $n-1$ . The problem with the RCF is that it uses the pair  $(A, B)$  to convert the system into canonical form. For most common applications of dynamic textures, such as registration and recognition, it is preferable to have a canonical form based on the parameters  $(A, C)$  because they model the appearance and the dynamics of the system. The matrix B, on the other hand, models the input noise and is not that critical to describe the appearance of the scene. Thus, a suitable candidate for the canonical form is the Observability Canonical Form (OCF) [16] given above by However, the estimation of the transformation that converts a set of parameters to this canonical form is numerically unstable [16]. As a result, in the presence of noise, two dynamical systems that are similar can be mapped to dynamical systems in the canonical form that are fairly different. In order to address this drawback, we propose to use a canonical form based on the Jordan real form. When A has  $2q$  complex eigenvalues and  $n-2q$  real eigenvalues, the Jordan Canonical Form is given by

$$A_c = \begin{bmatrix} -\lambda_1 & 1 & \dots & 0 \\ & -\lambda_1 & \dots & 0 \\ & & \ddots & 1 \\ & & & -\lambda_q \\ & & & & \lambda_{q+1} & & & \\ & & & & & \ddots & & \\ & & & & & & \lambda_{n-2q+1} & \\ & & & & & & & \ddots & \\ & & & & & & & & \lambda_{n-2q+1} \end{bmatrix}, \quad C_c = \begin{bmatrix} 1 & 0 & \dots & 0 \end{bmatrix} \in \mathbb{R}^{1 \times n} \quad (11)$$

$$C_c = \begin{bmatrix} \sigma_1 & \omega_1 & 0 & \dots & 0 & -\omega_1 & \sigma_1 & 0 & \dots & 0 & \vdots & \vdots & \vdots & 0 & 0 & 0 & 0 & \lambda_{2q-n+1} & 0 & 0 & 0 & \dots & 0 & \lambda_{2q-n} \end{bmatrix} \quad (12)$$

where the eigenvalues of A are given by  $\{\delta_1 \pm i\omega_1, \delta_2 \pm i\omega_2, \dots, \delta_q \pm i\omega_q, \lambda_1, \dots, \lambda_{n-2q}\}$ . It can be noted that the JCF is indeed equivalent to the RCF or the OCF, but in a different basis.

Given any general canonical form based on A and C, we now outline the steps to convert the identified parameters into the canonical form. Assume that we have the identified parameters  $(A, C)$ . We now need to find an invertible matrix P such that  $(PAP^{-1}, P^T C P^{-1}) = (A_c, C_c)$ , where the subscript c represents any canonical form. The vector  $\gamma \in \mathbb{R}^p$  is an arbitrary vector chosen to convert the LDS  $(A, C)$  with  $p$  outputs to a canonical form, which is defined for only one output. In our experiments, we set  $\gamma = [1 \ 1 \dots 1]^T$  so that all rows of C are weighted equally. The relation between the A matrix and its canonical form  $A_c$  is a special form of the Sylvester equation:

$$A_c P - P A = 0. \quad (13)$$

Vectorizing this equation, we can solve for P as

$$\text{vec}(P) = \text{null} (I \otimes A_c - A^T \otimes I), \quad (14)$$

Where  $\otimes$  represents the Kronecker product. Similarly, if we consider the equation between the C matrices,  $C^c P = \gamma^T C$ , and vectorize it, we can solve for P by concatenating the two sets of equations as follows:

$$[I \otimes A_c - A^T \otimes I \quad I \otimes C C] \text{vec}(P) = [0 \ C] \quad (15)$$

Once we have solved this equation, we can convert the parameters into the canonical form using P. It should be noted that the JCF is unique only up to a permutation of the eigenvalues. However, if we select a predefined order to sort the eigenvalues, we obtain a unique JCF.

### JOINT IDENTIFICATION OF DYNAMIC TEXTURES

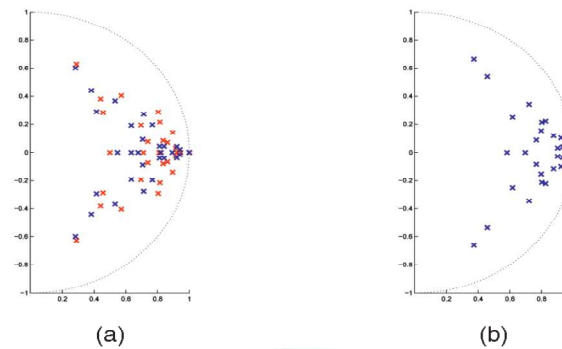
In the prior section, we have shown how to convert the identified parameters into the same basis so that we can compare the C matrices to recover the registration. However, comparing the C matrices to recover the spatial transformation is based on using the assumption that the A matrices for the two systems were the same. This assumption is valid as we observe the same scene, and since the hidden states  $z(t)$  captures the scene dynamics, they must evolve in the same way, irrespective of the viewpoint.

However, if we identify the LDS from each video sequence separately due to the presence of noise, viewpoint changes, and the suboptimal identification, there is no guarantee that the A matrix for the video sequences will be the same. This can be seen in Fig. 4a. We see that the eigenvalues of the A matrices identified separately are not the same. However, they are close to each other.

In this section, we propose a simple method to explicitly enforce the dynamics of multiple LDSs to be the same.



FIGURE 4



Eigenvalues of the identified  $A$  matrices of two spatially and temporally transformed video sequences. The red crosses denote the eigenvalues for sequence 1 and the blue crosses denote the eigenvalues of sequence 2. (a) Separate identification. (b) Joint identification.

Consider  $M$  video sequences, each represented as  $I_i(t) \in \mathbb{R}^{p_i}, t \in \{1 \dots F\}, i \in \{1 \dots M\}$ . Let us introduce  $\tilde{I}_i(t) = I_i(t) - C_i^0$  for notational brevity. The traditional identification works by first forming the matrix  $W_i = [\tilde{I}_i(1) \dots \tilde{I}_i(F)]$ , and then, calculating the singular value decomposition of  $W_i = U_i S_i V_i^T$ . The parameters of the LDS are identified as  $C_i = U_i(:, 1:n)$  and  $Z_i = S_i(1:n, 1:n) V_i(:, 1:n)^T$ . In our approach, we instead stack all the videos to form a single  $W$  matrix and factorize it using the SVD as

$$W = \begin{bmatrix} \tilde{I}_1 \\ \vdots \\ \tilde{I}_M \end{bmatrix} = \begin{bmatrix} U_1 \\ \vdots \\ U_M \end{bmatrix} \begin{bmatrix} S_1 \\ \vdots \\ S_M \end{bmatrix} \begin{bmatrix} V_1^T \\ \vdots \\ V_M^T \end{bmatrix} = USV^T \quad (16)$$

Although this seems to be the intuitively obvious thing to do, we will now show that this is indeed the correct thing to do. If, for the sake of analysis, we ignore the noise terms, we obtain the state evolution as  $Z(t) = A^t Z_0$ , where  $Z_0$  is the initial state of the system. Now if we consider the temporal lag  $T \in \mathbb{Z}$  for the  $i$ th video sequences, then the evolution of the hidden state of the  $i$ th sequence is given by  $z_i(t) = A^T z_i(t)$ . Therefore, we can now decompose  $W$  using the SVD as follows:

$$\begin{aligned} W &= C_1 A^T Z_1 \dots C_1 A^T Z_F \\ &= C_1 A^T : C_1 A^T Z_F \\ &= C_1 A^T : C_1 A^T Z_F \end{aligned} \quad \begin{aligned} &C_1 A^T Z_1 \dots C_1 A^T Z_F \\ &C_1 A^T Z_1 \dots C_1 A^T Z_F \end{aligned} \quad (17)$$

From the above equation, we can estimate a single common state for all the sequences. Moreover, given  $Z$ , we estimate a common dynamics matrix for all the sequences. Now we can also recover  $C_i$  from  $C$  up to the matrix  $A^T$ . The problem is that  $T$  is unknown, so we cannot directly compute  $C_i$  from  $C$ . Now if we consider the equation for the  $i$ th video sequence, we can see that

$$[\tilde{I}_i(1) \dots \tilde{I}_i(F)] = C_i A^T [Z(1) \dots Z(F)] \quad (20)$$

$$= C_i A^T (A^T)^{-1} [Z(T+1) \dots Z(F+T)] \quad (21)$$

Thus, we see that the parameters we estimate are the original parameters of the system, but in a different basis. Therefore, by converting the parameters to the canonical form, we can remove the trailing  $A^T$  and recover the original parameters in their canonical form. The joint identification algorithm is outlined in Algorithm 1. Now, by construction, the  $A$  matrices of the multiple video sequences are the same. Hence, their eigenvalues are also the same. This can be seen in Fig. 4b.

**Algorithm 1. Joint identification of video sequences**

1 Given  $m$  video sequence  $\{I_i(t) \in \mathbb{R}^{p_i}\}_{i=1}^m$ , calculate the temporal mean of each sequence  $C_i^0 \in \mathbb{R}^{p_i \times 1}, i=1, \dots, m$

2 Compute  $C; Z$  using the rank  $n$  singular value decomposition of the matrix

$$W = \begin{bmatrix} \tilde{I}_1 \\ \vdots \\ \tilde{I}_m \end{bmatrix} = \begin{bmatrix} U_1 \\ \vdots \\ U_m \end{bmatrix} \begin{bmatrix} S_1 \\ \vdots \\ S_m \end{bmatrix} \begin{bmatrix} V_1^T \\ \vdots \\ V_m^T \end{bmatrix} = USV^T \quad (18)$$

$$Z = SV^T, C = U \quad (19)$$

3 Compute

$$A = [z(2), \dots, z(F)][z(1), \dots, z(F-1)]^T \in \mathbb{R}^{n \times n}$$

4 Let  $C_i \in \mathbb{R}^{p_i \times n}$  be the matrix formed by rows  $\sum_{j=1}^{i-1} p_j + 1$  to  $\sum_{j=1}^i p_j$  of  $C$ , and convert the pair  $(A, C_i)$  to Jordan canonical form.

Having identified a dynamic texture model for all video sequences with a common  $A$  and all  $C$  matrices with respect to the same basis, in the next section we describe a method to register multiple video sequences using the appearance parameters of the LDSs. Other applications of using the joint identification include recognition of dynamic textures, joint synthesis of videos, etc.

#### REGISTERING USING THE DYNAMIC TEXTURE MODEL

In this section, we propose an algorithm to recover the spatial transformation from the appearance parameters of the LDSs identified from the two video sequences. We need to compare this parameter between two LDSs, to recover the relative spatial alignment. In addition, the mean of the video sequence also contains information that can be exploited to recover the spatial alignment. In our paper, we term the mean image ( $C_0$ ) and the  $n$  columns of the  $C$  matrix as the dynamic appearance images. Let us consider two video sequences,  $I_1(x, t)$  and  $I_2(x, t)$ , where  $x$  denotes the pixel coordinates and  $t=1, \dots, F$ . We assume that the video sequences are related by a Homography  $H$  and a temporal lag  $T$ , i.e.,  $I_1(x, t) = I_2(H(x), t+T)$ . Once we recover the spatial alignment independent of the temporal lag between the video sequences, we temporally align the two sequences using a simple line search in the temporal direction, i.e.,  $T = \arg \min_t \sum_t \|I_1(x, t) - I_2(H(x), t+T)\|^2, T \in \mathbb{Z}$ .

Our algorithm to spatially register the two video sequences  $I_1(t)$  and  $I_2(t)$  proceeds as follows: We calculate the mean images  $C_1^0$  and  $C_2^0$ , identify the system parameters  $(A, C_1)$  and  $(A, C_2)$  in the JCF, and convert every column of  $C_i$  into its image form. We use the notation  $C_i^j$  to denote the  $i$ th column of the  $j$ th sequence represented as an image. We use a feature-based approach to spatially register the two sets of images  $\{C_1^0, C_1^1, \dots, C_1^n\}$  and  $\{C_2^0, C_2^1, \dots, C_2^n\}$ . We extract SIFT features and feature descriptor around every feature point in the two sets of  $n+1$  images. We match the features extracted from image  $C_1^i$  with those extracted from image  $C_2^j$ , where  $i \in \{0, \dots, n\}$ , i.e., the forward direction. We also match the features from  $C_2^j$  with those extracted from image  $C_1^i$ , where  $i \in \{0, \dots, n\}$ , i.e., the reverse direction. We retain only the matches that are consistent both in the forward direction and the reverse direction. We then concatenate the correspondences into the matrices  $X_1 \in \mathbb{R}^{3 \times M}$  and  $X_2 \in \mathbb{R}^{3 \times M}$ . The corresponding columns of  $X_1$  and  $X_2$  are the location of the matched features in homogenous coordinates and  $M$  is the total number of matches from the  $n+1$  image pairs. We then need to recover a homography  $H$  such that  $X_2 \sim HX_1$ . In order to recover the homography, we first run RANSAC and obtain the inliers from the matches. We then fit a homography using the nonlinear method outlined in [17]. Our registration algorithm is summarized in Algorithm 2.

**Algorithm 2. Registration of video sequences**

1 Given  $I_1(t)$  and  $I_2(t)$ , calculate the parameters  $A, C_1^0$ , and  $C_2^0$ .

2 Extract features and the descriptors from  $(C_i^j), j = \{1, 2\}, i = 0, \dots, n$ .

3 Match features from  $C_1^i$  to  $C_2^j$  and also in the reverse direction. Retain the matches that are consistent across both directions and concatenate the feature point location from  $C_1^i$  into  $X_1$  and its corresponding match into  $X_2$ .

4 Recover the homography  $H$  using RANSAC such that  $X_2 \sim HX_1$ .

5 Calculate temporal alignment  $T$  as  $T = \arg \min_t \sum_t \|I_1(x, t) - I_2(H(x), t+T)\|^2$ .

**Remark** For rigid sequences, one could potentially argue that the mean image would be sufficient to register the video sequences. This motivates the fact that for such sequences, we could use only the matches from the mean images rather than the matches from  $C$  matrix when estimating the registration parameters.

The scenario for nonrigid scenes is the exact opposite. We would like to use the matches from C matrix rather than the matches from the mean image. Note that in our algorithm, the best matches given by RANSAC could arise from the mean image or the dynamic appearance images or both. Hence, we do not explicitly restrict the algorithm to use only the mean image or only the dynamic appearance images, as done in [15]. This choice now becomes automatic and makes our method applicable to both rigid and nonrigid sequences.

## EXPERIMENTAL RESULTS

### OBJECT DETECTION

For this section, the algorithm developed in this paper, which builds object information as a consequence of the registration, is compared against a difference-based object detection method that is applied post-registration.

Figure 3 shows a pair of images that will be used for this test. The images have a moving object, and the camera is shifted and rotated between frames. Block size of  $20 \times 20$  is used.

Upon application of the first object detection method, the result is shown in Figure 6. The image displayed is the mean of the images once they have been registered and aligned, allowing the two locations of the object to be visible simultaneously. The blocks identified as not belonging to the background give a fair approximation of the object. Figure 5 shows the same sequence processed by the difference-based method. The results are not massively different, with the registration-based detection giving slightly better coverage of the object. The main difference is that the difference-based method required a significant amount of threshold tweaking to get to this point, where the registration method did not.

### BLOCK SIZE

The block sizes tested for the current incarnation of the algorithm is all square, mainly to keep things simple. The use of rectangular and other shaped blocks at this stage is unlikely to have any benefit.

The block sizes looked at for the test sequences (which measure  $320 \times 240$  pixels) are as follows:  $5 \times 5$ ,  $10 \times 10$ ,  $15 \times 15$ ,  $20 \times 20$ ,  $25 \times 25$ ,  $30 \times 30$ , and  $40 \times 40$ . The same sized block is applied to the reduced-scale images used for the initial coarse search conducted by the full-spread search algorithm (see Section II-B), as the minimum number of pixels required to produce accurate results does not change as the image gets smaller, since the size of a pixel remains constant. Figure 6 shows the mean sum of squares error for registration with different block sizes over three different image pairs.

When the algorithm is run with block sizes of  $5 \times 5$  and  $10 \times 10$ , the number of pixels in each block is insufficient to accurately distinguish unique sections of the image and correctly map them in the registration. As a result, the registration at these block sizes is not sufficiently accurate to be useful. The object detection at this level is also not very effective, as essentially anywhere in the image with significant edges are picked up as deviating from the overall transform (since the transform is incorrect).

FIGURE 5



Sample image pair for registration involving camera motion and an independently moving object.

FIGURE 6: OBJECT DETECTION USING RESULTS OF THE BLOCK-BASED REGISTRATION

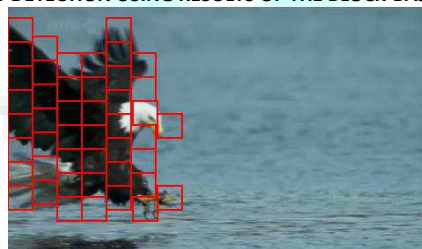


FIGURE 7: OBJECT DETECTION USING DIFFERENCE-BASED METHOD

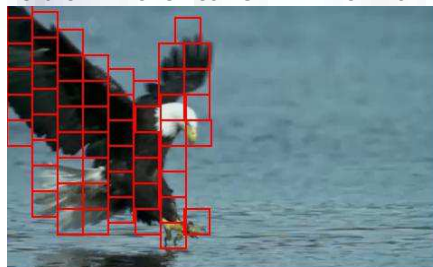
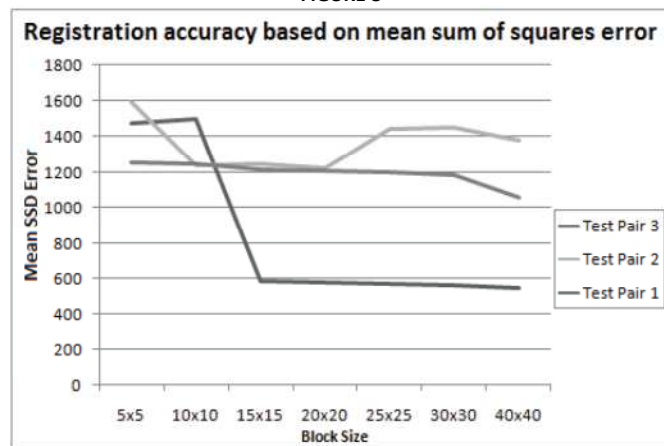


FIGURE 8



This shows the accuracy of the registrations on different test images using different block sizes. Three image pairs were used, based on images with different image statistics. Error values are mean sum-of-squares difference.

With a block-size of 15×15 to 25×25 the registration result remains the same for most image sequences, but in some cases 20 × 20 will give a more accurate result. In this case it can become a trade-off situation, since the smaller block size will give better object detail, but in most cases registration accuracy is the crucial element so a block size of 20 × 20 is best.

Beyond a block size of 30×30, the graph indicates that the registration is effective; however this is a limitation of using sum-of-squares difference as a measure of error when there are multiple objects in the image – the actual registration result for two of the test pairs is very poor, but the error value is low. The problem with a larger block size is that the proportion of blocks that contain multiple objects is high, which interferes with the registration.

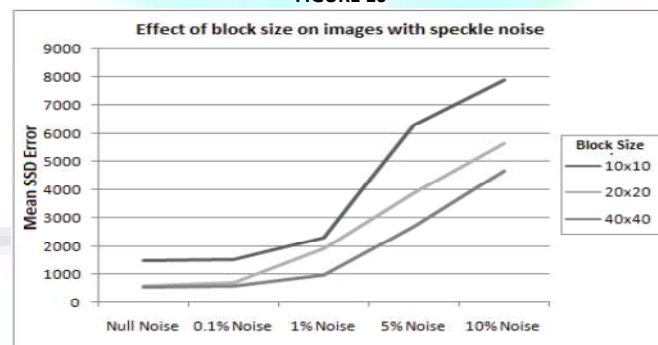
Another consideration for the algorithm is the capability for dealing with noise. This capability is dependent on the type of noise present: if the noise is in the form of a small number of clustered noise pixels across the image, these clusters will simply be treated as separate objects and captured by the algorithm; with speckle noise (see Figure 7), however, the entire registration can be affected. Figure 8 shows the accuracy of the registration for images containing different levels of speckle noise using different block sizes. This indicates that larger block sizes enable the algorithm to more easily cope with high levels of noise.

FIGURE 9



Example image with 5% speckle noise. The amount of damage is substantial.

FIGURE 10



Different amounts of speckle noise applied to sample images. This graph shows the accuracy of the registration using different block sizes for different noise levels. The difference in accuracy between the block sizes does not change very much over the changing noise levels, and beyond about 1% noise the accuracy is degraded too much to be useful.

## CONCLUSION

Dynamic texture of registering video sequences for recovering the spatial transformation independent of temporal transformation. Our result in the research shows that the methods reduce that number of frames at a time in one sequence. One needs to perform future extraction tracking and trajectory matching the multiset of  $F$  frames. In our case, we only need some extractions over for multi sets  $(n+1) \times \dots \times n$  images. In addition we have computation for the system parameters typically for  $F/n$  for the sequences presented in the range of 10-15 therefore using our method gives an advantage in with respect to number of frames are merged at the time. In short, we have presented a method that works equally well compare to the state of the art but is more efficient.

The other two important contributions of this paper are the use of a joint together of system identification framework with a canonical form representation. The joint identification and the Jordan canonical form are not only applicable to the case of registering video sequences, but also to the entire genre of algorithms based on the dynamic texture model. In this paper, we have also shown that out of all the possible choices for the method of identification and canonical form, the JID using JCF performs the best.

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# ANALYZING THE TRADITIONAL INDUCTION FORMAT AND RE – DESIGNING INDUCTION PROCESS AT TATA CHEMICALS LTD, MITHAPUR

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## ABSTRACT

*Induction is a very important attribute for any organization. The most common rate for measurement is by rating scales where employees rate accordingly to their reactions in induction programme. The new joinee joining an organization is completely new to the work place, to the new environment, to the new culture. He is not very sure about what phases of work will he be allotted in an organization. Induction helps an employee to remove such fears and increase his productivity. Another main impact of induction is that it makes an employee feels a homely atmosphere, and a sense of pride in an organization.*

## KEYWORDS

K – Café, Orientation, Induction, Recruitment, selection.

## INTRODUCTION

**R**ecruitment and training are major costs to any organization. Employers therefore need to retain themselves in the organization to ensure that this investment is not wasted. It's wisely said that – “First impression is the last impression”

So its therefore important to make this impression a positive one. Generally Induction is an area that is greatly neglected by the management policy with varied aims to achieve it. The newer joinees when they enter in an organization find the difference in the work culture, work environment, working habits and many other parameters. To make an Inductee comfortable in his new work environment he feels that he should be socially networked so as to attain rapid productivity. To make an inductee acclimatize in the comfort zone the management should design the induction process that is in the interest of the inductee. With respect to management it should be taken into consideration that employee turnover is always reflected as a negative reform in the balance sheet. It mainly reveals that it avails the wastage of the Human Resources that are available.

Ideally induction can defined as the methodology of making the new joiner comfortable in the organization so as to attain maximum productivity as soon as possible. Induction should make an employee productive in terms of his efficiency and his effectiveness.

In order to arrive at an Induction action plan we need to plans up the procedure in the format of three questionnaires –

- What should we discuss with the new inductees?
- Who should tell them?
- When should they be told?

## LITERATURE REVIEW

Bulleen Heights School (Autism /Intellectual disability) Staff Induction School Services Officer	Staff Induction Programme 2007
Assigning an active Induction and teaming up programme at the University of Chile Patricio Poblete, Carlos Vignolo, Sergio Celis, William Young, Carlos Albornoz University Of Chile Beauchef 850, Santiago, Chile,	NCIIA 10 <sup>th</sup> Annual Meeting in Portland, Oregon, March 23-25, 2006
The University of Manchester Office of the Registrar & Secretary	Local Induction Guide
Induction Process of Unilever	-
Staff Induction Process of Sun Microsystems	-
Center for Education in Built Environment	CASE STUDY
South Carolina, Induction & Mentoring Programmes Implementation guidelines Issued by – Division of Educator quality and leadership, South Carolina Department of Education Inez Moore Tenenbaum State Superintendent of Education	Revised 2006
'Campus to Corporate'	Akshay Manwani 30/11/2009
OPC (UK) Ltd. Employee Engagement through compelling Internal Communications Employee Engagement approach examples	<a href="http://www.opcuk.com">www.opcuk.com</a>

On referring to the induction process of Unilever we may say that when an inductee refers or joins any organization he needs to well clear regarding what sort of sector he is joining. The inductee in Unilever makes clear that he is clear with his job description, his roles and responsibilities. The inductee is made aware regarding the social networking that he follows so that he may be settled as the most comfortable place to live in. the induction process in Unilever gives us the knowledge about the personal development plan, identification of his learning requirements & an individual's aims and objectives. The plan in Unilever also gives us the idea about the “Buddy & Mentor” programme. The Unilever defines 'buddy' as the person who solves all the queries regarding the inductee's new working lifestyle. Unilever defines 'Mentor' as the person who guides the inductee's career development.

The MNC faced a problem of high turnover rate, and the consistent quality of service that was being delivered by its employees. High turnover rate was greatly reflected in the balance sheet and it was annihilating the good will of the MNC. The management desired to refine its induction process every quarter. Sun Microsystems decide to have variable induction for both technical and for the non – technical staff. The induction procedure followed was long term tenure. Moreover the first week showed the inductees the manner in which they proceeded to continue their business. The Sun Microsystems announced the new concept to have the performance appraisal of the inductee after one month of joining, which would give the main idea regarding the technical and the non –



technical skills, and whether the inductees alignment matched with their (Sun Microsystems) visions or not. The Sun Microsystems also follows the methodology of ongoing training that should be given to the inductee before he is assigned with his particular job. The MNC also gives other varied trainings like those of the business etiquettes, communication skills etc. that are needed when an employee deals with his clients. The inductee is also given knowledge about the ERP systems used in the company.

The article describes the methodology of induction to be followed when the fresher joins the organization. The article clearly determines the expectation that the fresher has in his mind when he joins the organization and his expectations. The fresher is a young blood and to tend to retain the inductee in an organization the induction programme should be such that could help the students transited in the corporate they are joining through the interesting and enthusiastic programme provided.

Accordingly the induction programme needs to be –

1. Exhaustive
2. Facilitate a two way relationship
3. Encouragement of the ideas and relationships
4. It must be reflection of the live business environment
5. It must be supported with continuous feedback
6. Communication meets should be arranged at regular intervals

The employee to retain in the organization should have an emotional attachment in order to reduce the overall turnover of the company. Thus various activities should be planned out.

1. A strong and effective induction orientation programme
2. Allotment of the right person to the right job and making him explain his job description.
3. Various team building activities so as to increase the coordination amongst the new joiner and make him socially networked.
4. The allotment of leadership activities should be done at regular intervals.
5. The inductees may be allotted with a reward scheme which may serve as a propelling career driven motivating force.
6. The evaluation of the activities should be done at regular intervals so as to have a continuous follow up.
7. Common approaches should also include at the inductee should be explained by the HR policies well in advance.

## RESEARCH OBJECTIVE

The main objectives of the research are –

1. To identify the effectiveness of the existing Induction process at Tata Chemicals Limited.
2. To study its corrective actions suggested by the new joiners &
3. Implement the suggestions in Re – Designing new induction process.

## HYPOTHESIS

Hypothesis is to determine whether the parameters like –

1. Duration (Sufficient time spent)
2. Manner of Organization (well – organized)
3. Relevance
4. Informative (Information shared)
5. Support by HR
6. Affect the various phases of Induction like Joining formalities, Safety Induction, Plant Visit, Introduction with HOD's & Overall Induction.
7. Null Hypothesis (H<sub>0</sub>) – The parameters affect the Overall Induction
8. Alternate Hypothesis (H<sub>a</sub>) – The parameters do not affect the Overall induction

## RESEARCH METHODOLOGY

Population – Finite population (all the new joiners of the year 2010 – 2011)

Sample – Random Sampling, size 19

Collection of Data – The source of data was primary data, as the new joiners who have joined the company in the year 2010 – 2011 were called for Induction feedback, in K – Café.

Research Design – My Research Design is Descriptive in which a detailed re – Designed induction procedure will be made after analyzing the data that reflects the Parameters which affected the overall induction.

## RESULT ANALYSIS

PARTICULARS	AS IT IS	TO BE
JOINING FORMALITIES	<b>JOINING FORMALITIES</b>	
	• The joining forms are not filled online	• The joining forms should be filled online
	• Joining Formalities are time consuming	• Joining Formalities should not be time consuming
	• Preferential dates of joining are not given	• Preferential dates of joining should be given
	• The security is not well informed well in advance regarding the new joiner	• The security should be informed well in advance regarding the new joiner
	• Continuous follow up is not taken	• Continuous follow up should be taken
	• Working e – mail id is not provided in advance	• Valid and working e – mail id should be provided in advance
	• Dependents and its eligibility is not give prior attention	• Dependents and their eligibility should be given prior attention so as to move forward for various processes like schools etc.
	• FAQ's are not provided well in advance	• FAQ's should be provided well in advance
	• Confirmation related to candidate's arrival in town should be intimated by candidate	• Confirmation of candidate's arrival should be submitted by candidate
	• Town office is not intimated for maintenance of quarters in advance	• Town office should be intimated well in advance for maintenance of quarters
	• Measurement relating to PPE's is not submitted by candidate	• Measurement relating to PPE's should be given by candidate so that he can obtain uniforms, glares, safety shoes etc on the day of joining
PROVISION OF INDUCTION KIT	<b>INDUCTION KIT</b>	
	• No employee handbook is provided	• Employee handbook should be provided
	• No calendar is provided	• Calendar should be provided
	• No Welcome mail from HR Head is forwarded	• Welcome mail from HR Head should be provided
	• Templates of PPT's are not given	• Templates of PPT's should be given
	• TCoC is not provided	• TCoC should be provided
	• No inclusion of 'Creation of Wealth'	• 'Creation of Wealth', should be included
	• No provision of Stationery	• Provision of Stationery should be made
	• Provision of punch – cards takes a long processing time	• Provision of punch – cards should be provided on the DOJ
	• No provision of extension numbers should be provided	• Extension number should be provided
	• No provision of Sexual Harassment Policy	• Sexual Harassment Policy should be provided
	• Mission, Vision & Value statements are not included	• Mission, Vision & Value Statements should be included
	• ISMS Manual is not provided	• ISMS Manual should be provided
	• TCL Brochure is not provided	• TCL Brochure should be provided
	• Information Booklet relating to Mithapur & its remote areas is not provided	• Information Booklet relating to Mithapur & its remote areas should be provided
PLANT & DEPARTMENTAL VISITS	<b>PLANT VISITS / DEPARTMENTAL VISITS</b>	
	• Departmental training is of 7 days	• Departmental training should be of 14 days
	• Departmental training is not inter – related	• Departmental training should be inter – related
	• Departmental training is not found interactive	• Departmental training should be interactive
	• Departmental representative is not involved	• Departmental representative should be involved
	• The inter – relation of departments is not maintained in departmental training	• The inter – relation of departments should be maintained in departmental training
	• Many HOD's are involved.	• A minimum of 3-4 HOD's should be involved
	• The HOD's are not found interactive	• The HOD's needs to be interactive
	• Processing Layout is not provided	• Processing Layout should be provided
	• Processing Functions are not explained	• Processing Functions should be explained
	• Plant layout is not provided	• Plant Layout should be provided
	• Cross functional relations are not explained	• Cross functional relations should be explained
	• Various team building activities are not found	• Team building activities should be included
	• Formal meets are not arranged on regular basis	• Formal meets should be arranged on regular basis
	• Safety induction is not spent with more time	• Safety induction should be spent with more time
	• Current induction format is not feasible	• New joiners demand new induction format
	• Know More Booklet relating to departmental induction that an inductee is following is not provided	• Know More Booklet relating to the departmental induction that an inductee is following should be provided
	• Joining Circular to the departmental heads relating to the batch who is going to join them for induction is not provided	• Joining Circular to all the departmental heads relating to the batch who is going to join them for induction should be provided
	• A specific person who is responsible to carry out induction of that particular batch joined in every department is not assigned	• A specific person who will be assigned to carry out induction of that particular batch should be assigned
	• Continuous follow-up relating to plant or departmental visit is not taken	• Continuous follow – up is necessary in terms of plant or departmental visit that are undergoing by an inductee
POST – INDUCTION PHASE	<b>POST – INDUCTION PHASE</b>	
	• Feedback regarding the inductee's induction is taken	• An inductee expects the report regarding the feeling that they had for induction
	• Questionnaire is not provided	• Questionnaire should be provided
	• Buddy programme is not implemented	• Buddy programe should be implemented
	• Mentor concept is not implemented	• Mentor concept should be implemented
	• Social meets are not arranged at regular intervals	• Social meets should be arranged at regular intervals
	• Analysis of the opportunities is not done at regular intervals	• Analysis of opportunities should be done at regular intervals
	• Progress of the new joiner is not reviewed	• Progress of the new joiner should be reviewed
	• Consideration of training needs is not done	• Consideration of training needs should be done
	• Communication meets are not arranged	• Communication meets should be arranged
	• Monthly meetings are not arranged with HR Head	• Monthly Meetings should be arranged with HR Head
	• Meetings are not arranged with VP (Manufacturing)	• Meetings should be arranged quarterly with VP (Manufacturing)
	• Goal Sheet submission is not done by candidate	• Goal Sheet submission should be done by candidate on monthly or quarterly basis

**FINDING AND SUGGESTION****RE – DESIGNED INDUCTION FORMAT**

S. No	Description	Information Flow		Time of Action
		From	To	
Stage 1: - OFFER ACCEPTANCE				
1	Offer Letter	HR	Candidate	
2	Acceptance	Candidate	HR	
3	Eligibility of Self & Dependents	HR	Candidate	10 days before Joining
4	Intimation to town for Accommodation maintenance	HR	Town Admin	after acceptance
4	HR Manager's Contact address	HR	Candidate	after acceptance
Stage 2: - FORMS FILLING & FOLLOW UP				
5	Resignation Acceptance Letter	Candidate	HR	after acceptance
6	Confirmed DOJ through mail	Candidate	HR	after acceptance
7	Fortnightly follow – up with Candidate	HR	Candidate	after acceptance
8	Online Form Filling	Candidate	HR	10 days before Joining
9	Online Document Submission	Candidate	HR	10 days before Joining
10	Intimation to Mithamahal	HR	Mithamahal	10 days before Joining
11	Informing Functional Unit/Department	HR	Functional unit/Department	7 days before Joining
12	Intimation to department to acquire System & work space			
13	Documents to be brought by candidate	HR	Candidate	7 days before Joining
14	Pre - Joining Intimation	HR	Candidate	7 days before Joining
15	PPE's Follow up	HR	Candidate	7 days before Joining
16	Contact Details of Mithamahal	HR	Candidate	7 days before Joining
17	Confirmation by Town for readiness of Accommodation	Town Admin	HR Manager	7 days before Joining
18	Arrival Confirmation (day, time, mode)	Candidate	HR	7 days before Joining
19	Intimation for Email id Creation	HR	IT	4 days before Joining
20	Reminder to Mithamahal/Hostel Complex with time of arrival	HR	Mithamahal	2 days before Joining
21	Intimating Security about New joinee	HR	Security	1 Day before Joining
Stage 4: - WELCOMING				
22	Receive new joinee at reception	HR Manager	Candidate	Candidate enters TATA CHEMICALS LIMITED
23	Forms filling, Joining Intimation Form, TCoC, SHE Policy	Candidate	HR	
24	Online SAP related details fill up	Candidate	Online	
25	Bank A/c Opening	Candidate		
26	Formalities of Medical Book	Candidate	HR	
27	Introduction with HR Team	HR	Candidate	
28	Joining Circular	HR	All Departments	
29	Introduction to functional unit/department	HOD	Candidate	
30	Welcome mail from HR Head	HR head	Candidate	
31	Introducing Buddy	HR	Candidate	
32	Handover Induction Kit	HR	Candidate	
33	Plant Visit	HR	Candidate	
34	Reminder to each Department on the day of Plant visit	HR	Departments	During Plant Visit
34	Induction Feedback	HR	Candidate	After Plant Visit
Stage 5: - FORMAL/INFORMAL MEETS				
35	Assign one HR person to each inductee	HR	Candidate	On DOJ
36	Meeting with assigned HR manager	HR	Candidate	Monthly till 6 months
37	Introducing Mentor(whenever Applicable)	HR	Candidate	After 1 Month of Joining
38	Goal Sheet Submission (online/ Offline)	Candidate	HOD	3rd Month
39	Communication meet with VP- Manufacturing	Candidate	VP- Manufacturing	within the quarter of Joining
40	Communication meet with HR Head	Candidate	HR Head	within the quarter of Joining
41	Feedback Of Buddy Program	Candidate	HR	3rd Month
42	Welcome all new joinee of the year (Yearly event)	HR	All new joinee	Yearly
43	Induction Feedback	HR	Candidate	Yearly
44	Induction Report	Candidate	HR	Yearly

## DEPARTMENTAL INDUCTION

TATA CHEMICALS LIMITED, MITHAPUR							
Name Of Employee							
Designation							
Function/Dept/Section							
Location							
Date Of Joining							
Index For Induction Schedule At Base Location							
Sr No.	Date & Day	Category	Sub Category	Schedule	Contact Person	Desig.	Signature
1	DAY 1	HR	HR	Joining Formalities & Tata Group & TCL introduction	Ashutosh Sohale & Upendra Bhayani		
2	Day 2	HR	HR & ESS	1st Half	Ashutosh Sohale		
		Personnel, KM	Personnel	2nd Half	Nilesh Joshi		
			KM, Unnati		S P Vithlani/B K Acharya/Pritesh Goswami		
					Milind Gajjar/S B Tank		
3	DAY 3	SHE	Safety	1st Half	DK Thakur & Team		
				2nd Half			
4	DAY 4	SHE	Safety	1st Half	DK Thakur & Team		
				2nd Half			
5	DAY 4	Power Plant	Power Plant	1st Half	Hitendra Padh/Hitesh Panchasara		
		Soda Ash, SAMG	Soda Ash				
			SAMG		MSS Rao/ D B Shukla		
					Maresh Deshpande/C B Andrews		
6	DAY 5	CC Group, Marine Chemicals	CC & Marine group	1st Half	R A Vadgama		
			MCMG	2nd Half	V R Trivedi		
			Business Excellence		Shalin Mehta		
7	DAY 6	Salt	Vaccum Salt	1st Half	P M Patel/Bhaves Patel		
			Solar Salt	2nd Half	Prakash Trivedi		
8	DAY 7	Loco , CMS, Workshop & foundary	CMS	1st Half	Harsh D Patel		
			Workshop & Foundary	2nd Half	A L Sah/Subrato Ghosh		
			Transport		R R Gheriya		
9	DAY 8	Instrumentation, Electrical, Accounts	Instrumentation	1st Half	B G Modhvadia		
			Electrical	2nd Half	Dilip Modi		
			Accounts		Chanchal Sinha		
10	DAY 9	Cement/MHY	Cement	1st Half	S Chakraborty/Suresh Patel		
			IBL	2nd Half	Bhaves Patel		
11	DAY 10	Projects & Commercial	Project	1st Half	N Kamath		
			Detailed Engg		Ramesh Babu		
			Technical Services	2nd Half	N azmul Hasan		
			Civil Eng		Ashok Dani		
			Mechanical Const.		Sanjay Bhayani		
12	DAY 11	Technical Services & Quality	Purchase	1st Half	Avdesh Chaudhary		
			Stores		Pushpendra Rathore		
			SCM		Alpesh Patel		
			Community	2nd Half	Rishi Ptahania		
			Town		Commtd. Bakshi		
			Hospital		Dr. Hasurkar		

## CONCLUSION

The psychology and the organizational behavior of the employees working in the company may vary at large. Some may prefer an elongated induction process before they are allotted with their job – description, while some may prefer to have an induction of their job and would prefer to start off. The major factors that would affect the Induction process re – designed in general are –

1. Age of the employees.
2. Expectations of the employees towards the company.
3. Need for providing Induction.

Thus the induction process re – designed would not be favorable to each and every Employees of the organization but would be favorable to major crowd of the company as the Induction process is re – designed after analyzing the feedback, suggestions that were given By the new joinees at K – café. Thus, it can be clearly said that the induction process re – Designed is an outcome of the improvements that were needed in the core areas where the traditional approach for induction had a loophole. The pedagogy of the employees towards the company may not be the same throughout. Their demands may vary with time. The feedback and the suggestions that were obtained in analyzing the new joinee's feedback forms was for the year 2010 – 2011, but it may vary to Wider aspect in the upcoming years.

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## THE JOURNEY OF E-FILING OF INCOME TAX RETURNS IN INDIA

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## ABSTRACT

The Income Tax Department (ITD) of the Ministry of Finance, Government of India is Committed to providing world class services to tax payers in the country. In the year 2007 the Income Tax Department of India took many initiatives such as training TRPS (Tax Return Preparer Scheme), launching saral forms in new avatar and so on for making tax filing convenient and handy for the citizens. In this e-age when ICT (Information & Communication Technology) is successfully intervening in so many fields and providing services from online banking to online news, online mutual fund investments to online buying and selling, the Income Tax Department of India launched the electronic filing of income tax returns. The concept of e-filing is still evolving & is undergoing changes at a rapid pace in the country. This paper provides an overview of this crucial initiative of the Government.

## KEYWORDS

E-filing, E-return intermediaries, Taxpayer, ITD, ITR.

## INTRODUCTION

In this internet driven age every sector & segment are partially or completely dependent on the World's most important invention of the modern times, Internet. Facilities like online banking, online news, online mutual funds investments, online buying and selling are few common practices people come across in their daily life. Forming it as the base, the Income Tax department of India launched the electronic filing of Income Tax Returns. The department desired a system that would make the process of filing of Income Tax Returns (ITR's) easier for tax payer as well as reduce the time required for data entry at their end on receipt of ITR's. Enabling the filing of ITR's over the internet was the most viable answer to the department's needs. Response time for processing the ITR's as well as claiming refund dropped significantly. The online process did not require the tax payers to be physically present for filing their ITR's.

## DEFINITION OF E-FILING

E-Filing is the system of submitting tax documents to the Income tax department through internet or direct connection. Under this process, citizens of the country can file the tax returns in a hassle free way. One just need to have a PC enabled with internet connection. For e-filing process, one needs to have a software application that generates the income tax form, which is available at the Income tax department website. Customized return forms have been devised by the income tax authority which is available on the site of the department. E-Filing offers convenience of time and place to tax payers. This facility is available around the clock & returns could be filed from any place in the world. It also eliminates/reduces interface between assessee & tax officials.

## LITERATURE REVIEW

The Government of India has chalked out a National E-governance action plan for the implementation of various e-governance initiatives for tax payers, 24 hours a day, so that a tax payer can fulfill his daily tax obligation without wasting time and without visiting income tax offices. Income tax department has launched the electronic furnishing of return of income scheme, 2004 wide notification dated 30-09-2004. Under this scheme eligible assessee can file their return of income electronically through persons authorized to act as e-return intermediaries. The intermediaries will digitise the data of such returns and transmit the same electronically to the e-filing server of ITD under their digital signatures. The Govt. committee believed that the expansion of electronic filing will significantly reduce errors. In addition tax payers who file their return electronically receive confirmation of the receipt of their return. E-Filing is mainly done of ITR, TDS Returns, AIR (annual information return), VAT (in some states), service tax etc.

In U.S self – preparers may visit IRS Taxpayer Assistance Centers (TAC) or VITA (Volunteer In Technical Assistance) locations or may utilize computers that are available to them at work or a public library. IRS Publication 17, Your Federal Income Tax, states, “Many VITA sites offers free electronic filing” [4]. At present there is very limited literature that focuses on the adoption of e-filing systems. Most of the literature related to e-filing adoption applies and extends the well known technology acceptance model (TAM) by Davis (1989) (Wang, 2002; Chang et al., 2005; Gallant et al., 2007), theory of planned behaviour (TPB) Fishbein and Ajzen (1975) and a unified model of both theories to assess the adoption intention of the e-filing system. Other literature such as Carter et al. (2008) used the unified theory of Acceptance and Use of Technology (UTAT) to observe e-filing adoption among taxpayers.

## TRENDS IN THE USAGE OF INDIAN E-FILING SYSTEMS

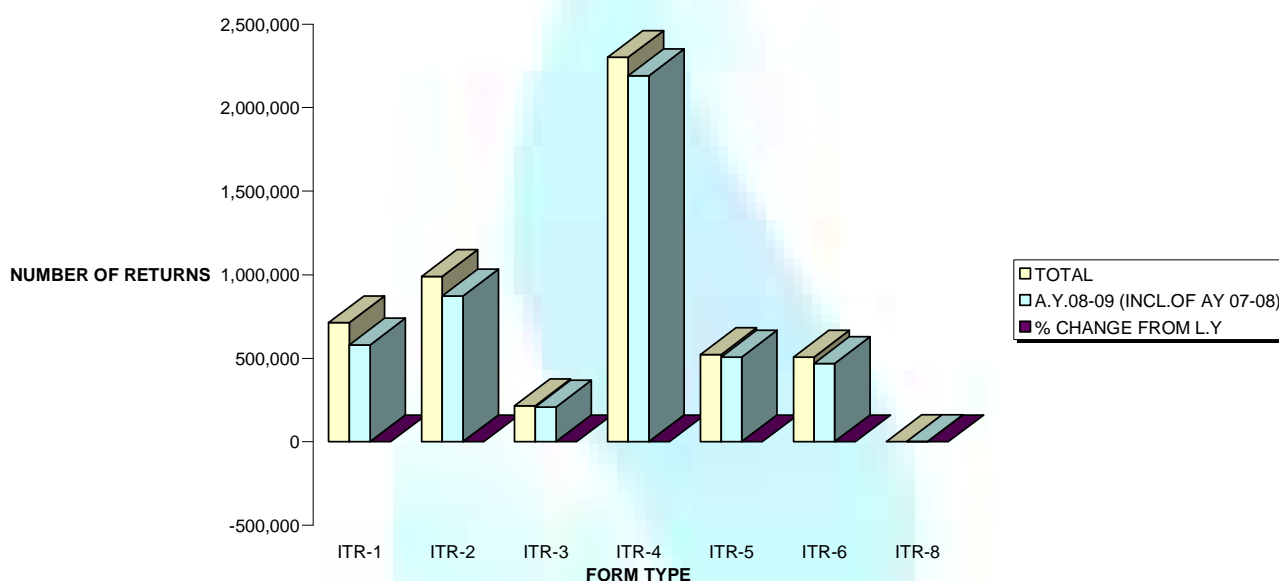
Following is the list of various forms which have been devised by the Indian Income Tax Department for e-filing of Income Tax Return.

FORM NO.	FORM DESCRIPTION
ITR1	For Individuals having Income from Salary/Pension/Family Pension & Interest
ITR2	For Individuals & HUFs not having income from Business or Profession
ITR3	For Individuals/HUFs being partners in firms & not carrying out Business or Profession under any proprietorship
ITR4	For Individuals/HUFs having income from a proprietary business or profession
ITR5	For Firms, AOPs & BOIs
ITR6	For Companies other than companies claiming exemptions under sec.11
ITR8	Return For Fringe Benefits
ITR7	(For not For Profit Trusts ) has not been notified for e-filing

## HIGHLIGHTS OF E-FILING SEASON AY 2009-10 (up to 31-03-2010)

TABLE 1- FORM WISE RECEIPT OF E-RETURNS UPTO 31-03-2010

FORM TYPE	COMPARATIVE PROGRESS OF E-FILING OF RETURNS				
	RETURNS RECEIVED FROM 01-04-2009 TO 31-03-2010			RETURNS RECD.FROM 01-04-08 TO 31-03-2009	
	A.Y. 09-10	A.Y 08-09 & 07-08 (ARREARS)	TOTAL	A.Y.08-09 (INCL.OF AY 07-08)	% CHANGE FROM L.Y
ITR-1	6,79,365	34,370	7,13,735	5,80,034	23.05%
ITR-2	9,12,940	76,544	9,89,484	8,73,483	13.28%
ITR-3	1,98,395	17,137	2,15,532	2,07,709	3.77%
ITR-4	20,50,879	2,51,327	23,02,206	21,92,419	5.01%
ITR-5	4,98,460	24,566	5,23,016	5,07,626	3.03%
ITR-6	4,72,409	35,439	5,07,848	4,68,851	8.32%
ITR-8	804	146	950	1,179	-19.42%
TOTAL	48,13,252	4,39,519	52,52,771	48,31,301	8.72%

(Source: <https://incometaxindiaefiling.gov.in/portal/downloads/efiling.ppt>)

## HIGHLIGHTS OF E-FILING SEASON AY 2011-12 (up to 31-12-2011)

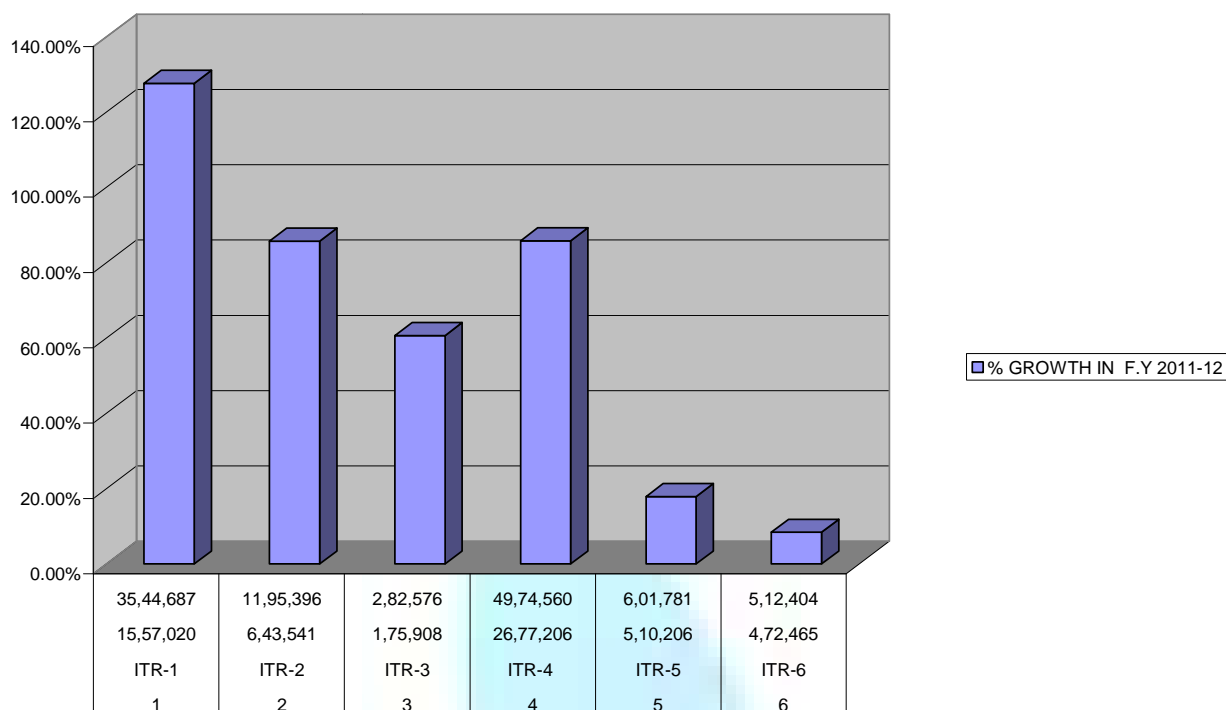
## COMPARATIVE GROWTH OF E-FILING IN CURRENT YEAR

TABLE 2 - FORM WISE RECEIPT OF E-RETURNS UP TO 31-12-2011

S.NO.	FORM NAME	F.Y.2010-11	F.Y 2011-12	% GROWTH IN F.Y 2011-12
1	ITR-1	15,57,020	35,44,687	127.66%
2	ITR-2	6,43,541	11,95,396	85.75%
3	ITR-3	1,75,908	2,82,576	60.64%
4	ITR-4	26,77,206	49,74,560	85.81%
5	ITR-5	5,10,206	6,01,781	17.95%
6	ITR-6	4,72,465	5,12,404	8.45%
	TOTAL	60,36,346	1,11,11,404	84.08%

(Source: <https://incometaxindiaefiling.gov.in/portal/downloads/efiling.ppt>)

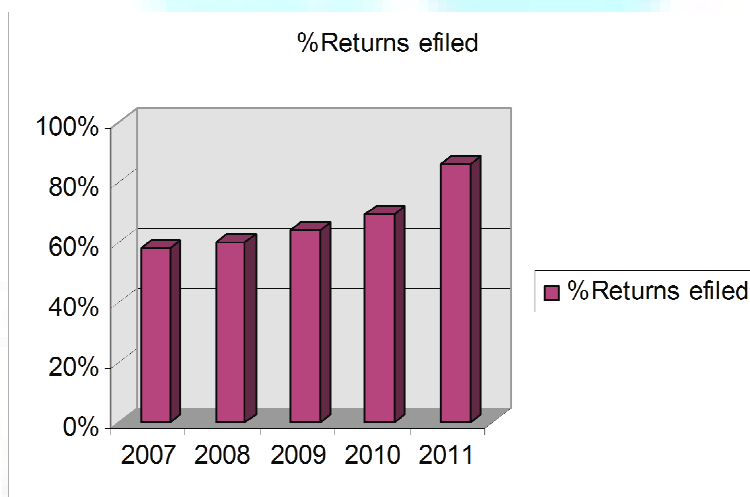
% GROWTH IN F.Y 2011-12



## OVERALL PICTURE OF E-FILING OF ITRs (F.Y 2007-F.Y 2011)

TABLE 3 – NUMBER OF ELECTRONICALLY FILED RETURNS

Year	%Returns efiled
2007	58%
2008	60%
2009	64.20%
2010	69.25%
2011	84.08%

(Source: <http://www.ijecbs.com>)

The 2010 e-file experience reflects year of continued progress. In absolute terms, the number of all major individual, business and tax exempt returns filed electronically in 2010 is estimated to be more than seven million higher than in 2008. From a longer perspective, the total number of major tax returns filed electronically has grown more than 90 million, from 29.4 million in 1998 to approximately 106 million in 2010. As illustrated in above figure, this growth has occurred every year and has been driven particularly by the electronic filing of individual tax returns, which increased from 24.6 million in 1998 to around 95 million for 2009. This increase may be due to the benefits enjoyed by the people over manual filing of ITRs.

## BENEFITS OF E-FILING OF INCOME TAX RETURNS

Return can be prepared and filed by the tax payer through electronic mode:

- Enables citizens to file "anytime & from anywhere".
- Saves time of the tax payer.
- Interface between ITD and the assessee reduced.
- Saves time of the ITD in dealing with the returns in physical forms.
- Saves issue up of record keeping & requirement of physical space.

- Easy availability of returns ensured.
- Accuracy of data ensured.
- Enables faster processing of returns.

There is advantage of acknowledgement from centralized processing centre (CPC), Bangalore about the receipt of ITR. Tools are available in e-file software that assists you in claiming deductions and credits, including the earned income tax credit, child and dependent care expenses Credit and business incentives etc. IRS has achieved a good e-filing participation rate, but in order to improve it more security techniques should be updated from time to time.

## CONCLUSIONS AND RECOMMENDATIONS

Earlier Researches have highlighted the importance of perceived risk to the adoption of e-filing. Various researchers have different opinion regarding the benefits of e-filing. Their main concern was about the security aspect of e-filing of tax returns. Now a days security measures like SSL (Secure Socket layer) & 128 Bit encryption guard the safety of data & information. Digital Signature being treated equal to physical signatures, guaranteed authenticity of the electronic data, ensuring that no party repudiated the transaction, while protecting the data against any fraudulent changes. On the other side People's acceptance of e-filing is highly related to their level of technology readiness. Technology readiness is defined as people's propensity to embrace and use new technology for accomplishing certain tasks. So more efforts must be made in this direction by Indian Income Tax Department only then they can achieve their mission "Technology in the service of Tax Payers".

In the end we can say that the concept of e-filing is still evolving & is undergoing changes at a rapid pace. In the near future when the full system will be in place it is expected that it will bring a new face of the Finance Ministry as an organized and well administered entity.

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## ROLE OF FINANCIAL TECHNOLOGY IN ERADICATION OF FINANCIAL EXCLUSION

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**ABSTRACT**

In rural parts of the country majority of population are “unbanked” i.e. they don’t have access to the formal financial services and hence poor people are forced to rely on money lenders (informal finance providers) or on their relatives or family. Money lenders adopt coercive practices in lending; they provide money at much higher rates as compared to the formal financial institutions. So as to protect the poor people Indian Government and the RBI framed a policy of “financial inclusion”. This paper aims at identifying the role of financial technology adopted by banks in eradication of financial exclusion and initiatives by RBI and Government.

**KEYWORDS**

Banks, Financial Inclusion, Financial Technology.

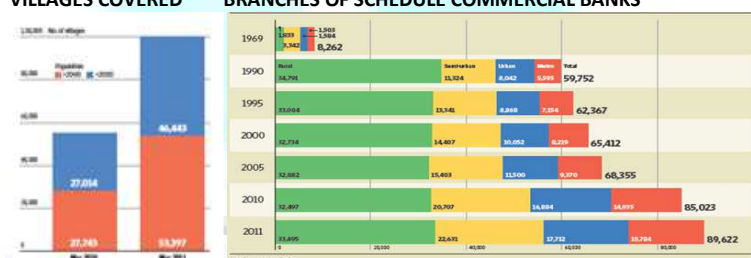
**INTRODUCTION**

Poverty is one of the burning problems of India mainly visible in the rural parts of the country. Earlier financing the poor in India was very difficult as timely credit at affordable cost was not available and rural areas lacked access to financial services. But in the year 2005-06 rural banking got a ray of hope when policy on financial inclusion through Business Correspondent (BC) model was announced. Financial Inclusion is aimed at increasing the reach to the poor and un-served people and providing them the banking services in a fair and transparent manner. By getting financial services they will be able to save money which would ultimately lead to reduction of poverty. Poor people were ignored as the transaction cost required for serving these un-served customers were high for bankers. Through this model cost will be reduced and by doing so business opportunities for bankers in the rural areas will increase leading to benefits for poor people.

**CURRENT SCENARIO OF BANKING INDUSTRY IN INDIA**

Urban areas are getting maximum access to banking facilities as compared to that of rural areas. As per 2001 census in order to provide financial inclusion 72,721 villages with population of 2,000 or more were identified. Today around two-third i.e. 67 per cent of urban household are getting banking services while just little over half i.e. around 54 per cent of rural household have access to banking facilities as per the data from Census 2011 by House listing and Housing Census data. According to finance ministry bank branches are available in only about 5 per cent of nearly six lakh villages in the country.

**TABLE 1: SCENARIO OF BANKING INDUSTRY**  
**VILLAGES COVERED BRANCHES OF SCHEDULE COMMERCIAL BANKS**



Source: Financial Inclusion | A road India needs to travel accessed from <http://www.livemint.com/2011/09/21211250/Financial-Inclusion--A-road-I.html>

**TECHNOLOGICAL MOVEMENT IN BANKING SECTOR**

Most Indian banks are now accepting the new responsibilities of financial inclusion and penetration into the rural sector to serve the less privileged. High mobile penetration and inadequate banking facilities are accelerating the growth of mobile banking in India. It is a huge opportunity for banks to offer innovative banking and payment services. With the technological movement, banks prefer servicing their customers at their doorsteps and at their convenience. This not only gives them an opportunity to service larger customer base but also reduces their transaction costs.

**TABLE 2: VARIOUS TECHNOLOGY-BASED INITIATIVES UNDERTAKEN BY INDIAN BANKS**

<b>Operational Efficiency:</b>	Straight-through-processing, Transformation of service channels, Collaborative channel management strategy, Branchless banking for financial inclusion, Business correspondents
<b>Governance &amp; Risk Management:</b>	Enterprise risk management, Real-time executive dashboards, Real time security management, Risk based authentication
<b>New solutions:</b>	Mobile phone based banking application, Social media support
<b>Regulatory / Compliance:</b>	IRFS, UID readiness, Data flow Automation
<b>Customer centricity:</b>	Customer analytics, Efficient customer data management

Source: [www.iba.org.in/events/ITEnabled%20FinInclApproachPaper.pdf](http://www.iba.org.in/events/ITEnabled%20FinInclApproachPaper.pdf)

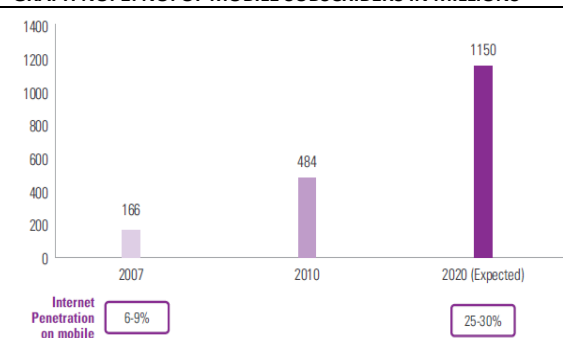


TABLE 3: CHANNEL INTERACTION MIX ACROSS CUSTOMER SEGMENT

	Branch Banking	Internet Banking	Mobile Banking	ATM/ Kiosk	IVR / Call Centre	Branch Correspondents / RM
Rural Banking – Urban Customers	Medium	High	High	High	High	Low
Rural Banking – Non- Urban Customers	High	Medium	High	Medium	Medium	Medium
Financial Inclusion Segment	High	Low	Medium	Low	Low	High

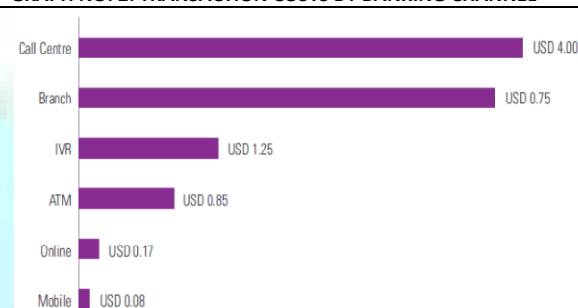
Source: Technology enabled transformation in Banking – KPMG 2011

GRAPH NO. 1: NO. OF MOBILE SUBSCRIBERS IN MILLIONS



Source: BCG, IBA and FICCI Report on Indian Banking 2020

GRAPH NO. 2: TRANSACTION COSTS BY BANKING CHANNEL



Source: Tower Group, Fisery, Mcom data, 2009

### BARRIERS IN SERVING RURAL CUSTOMERS

Major factors hindering the financial institutions in serving the rural customers are lack of regular income as most of the customers still rely on agriculture for their basic earning. People in rural areas are uneducated and hence they do not understand the importance and benefits of formal methods of financial assistance as compared to the financial assistance obtained from informal sources such as money lenders. Unaware about the availability of financial services and products is very low resulting in hindrance for the financial institutions in serving rural consumers.

For banking and other financial services institutions the transaction cost for providing the services to rural customers is very high besides this they do not have the products tailored to the needs of the customers of rural areas. In rural regions there are many places which are 'un-banked' i.e. they do not even have any branches of banks and hence reaching the customers become difficult. And even for the rural people the convenience is very less due to lack of branches in their areas.



### INITIATIVES TOWARDS ERADICATING FINANCIAL EXCLUSION: RBI

**NO-FRILLS ACCOUNTS:** Account which can be opened with very low or nil balance was an initiative launched in November 2005.

**RELAXATION ON KNOW-YOUR-CUSTOMER (KYC) NORMS:** Since August 2005 for small accounts KYC requirements for opening a bank account were relaxed. The Reserve Bank has given instructions to the banks to make accessible all printed material used by retail customers in English, Hindi and the concerned regional language.

**ENGAGING BUSINESS CORRESPONDENTS (BCS):** RBI permitted banks to appoint business facilitators (BFs) and business correspondents (BCs) who act as intermediaries in providing Banking and financial services since January 2006. Banks were permitted to utilize the services of non-governmental organizations (NGOs/SHGs), micro-finance institutions and other civil society organizations as intermediaries

**USE OF TECHNOLOGY:** banks have been advised to make use of information and communications technology (ICT) to address the problem of reaching and credit delivery in rural and remote areas.

**GENERAL CREDIT CARDS (GCC):** This facility up to Rs.25, 000 at their rural and semi-urban branches was introduced to provide hassle-free credit to customers.

**KISAN CREDIT CARDS (KCC):** It provides support short-term credit needs of the farmers through which farmers can purchase the necessary inputs required for farming purpose.

**SIMPLIFIED BRANCH AUTHORIZATION:** Since December 2009 domestic scheduled commercial banks were permitted to freely open branches in tier III to tier VI centres with a population of less than 50,000 to address the issue of uneven spread of bank branches under general permission, subject to reporting.

**OPENING OF BRANCHES IN UNBANKED RURAL CENTRES:** Banks have been mandated to allocate branches in the unbanked rural areas. For opening more bricks and mortar branches banks were required to open at least 25% of the total number of branches during a year

## INITIATIVES TOWARDS ERADICATING FINANCIAL EXCLUSION: BANKS AND ORGANIZATIONS

**INDIAN BANK:** For migrant workers, socially excluded people underprivileged as a part of its urban financial inclusion initiative Indian bank opened a branch at Dharavi, Mumbai and today the bank out of 1168 slums has covered around 932 under this initiative.

**SBI:** The bank launched "SBI Tiny card" as its initiative towards eradication of financial exclusion. SBI Tiny accounts can be opened with nil balance and does not require any KYC documents to open the account. SBI by using IT enabled solutions is benefiting 367,530 households of 506 villages by assisting 24,502 SHGs. SHG members are provided micro insurance & Investment, kiosk banking by SBI.

**THE UNION BANK OF INDIA:** On May 21 2011 announced the launch of "*unioninclusions*", an initiative to expand the financial inclusion. Bank launched 5 Financial Inclusion schemes: Opening of Financial Inclusion branches – 11 branches, Facility for migrant labour by Biometric card-to-card remittance, To reach unbanked villages - Mobile Van Banking, To spread financial literacy - Comic book series and Solar Powering of Union Adarsh Gram.

**HDFC BANK:** It leads in the list of private sector banks in area of financial inclusion among the with a disbursement of over `6 billion customers, 45,000 Self Help Groups (SHGs), it has a reach over 700,000 poor people. Recently HDFC bank has tied up with Vodafone to start its bank services to be distributed through its M-Paisa platform as a financial inclusion initiative. When this initiative starts in full swing sets a target of acquiring 10 million customers.

**KARNATAKA BANK:** Is planning to open 20 brick-and-mortar financial inclusion branches which will take care of credit disbursement and opening of accounts in the villages having population above 2000 by March 2013

**PNB:** They have adopted branchless banking model wherein they have more than 3,800 business correspondents to reach unbanked areas. PNB adopts technological backbone to offer all its financial inclusion products and using smart card along with biometric features they have designed its own delivery channel.

**ICICI BANK:** It serves more than 450,000 customers across 18 states; through biometric enabled smart cards and mobile banking they have created micro credit & saving opportunities for rural population.

**SEED Financial Services:** Initiated "*Rohtak project*" is a no-frills savings account facilities for Social Security Pensions. They inculcated among the villagers the saving habits in the unbanked areas and helped in providing door-step banking to beneficiaries of pensioners.

**Pahal:** An NGO has created linkage between banks, SHGs and the rural poor and is most active organization in area of financial inclusion. In Uttarakhand region it has supported over 3000 micro-enterprises and income generation activities.

**Atom Technologies:** Cash @ POS solution for Union Bank of India was developed by them. Through this system withdrawal of cash is possible from Point of Sale terminal at a merchant location. First Cash @ POS terminal was deployed at Jamburi Habsi village in Madhya Pradesh, in the villages of MP and UP. Total 11 machines have been deployed where even ATM machines were not available. They have identified new 55 places to deploy the project.

**Financial Inclusion Network and Operations (FINO):** For many banks and insurance companies it acts as Business Correspondent and offers wide variety of financial services to more than 65,536 villages through its 10,000 plus agents covering around 22 states.

## VARIOUS CAMPAIGNS TOWARDS FINANCIAL INCLUSION

**"Swabhimaan"** campaign was launched in 2010-11 to provide access of banking services to habitations having population in excess of 2000 through Business Correspondents.

**"Aadhaar"** initiative was undertaken with an aim of facilitating financial inclusion and reducing information gap.

**"JEEViKA"** also known as Bihar Rural Livelihood Project (BRLP) was launched by Central Bank of India in 2007. The Central Bank of India, under JEEViKA, accounts for 28.74% of the total SHG accounts opened and more than 30% of the total credit share.

**"Sarve/Swayam Shakti Suraksha"** project was undertaken by Bajaj Allianz Life Insurance with an aim to provide opportunity to save and to cover the impending liability of customers it has enrolled 1.8 million customers during its first year.

**"Tatkaal Baithaks"**, a unique insurance awareness campaign was initiated by DLF Pramerica Life Insurance and they have covered over 93 villages and 25,000 customers in Bihar, Orissa and East Uttar Pradesh.

**"Biz Connect"** project was undertaken by Mahindra & Mahindra with an aim of reducing the challenge of rural connectivity. Under this program with the help of cloud computing secured internal networking was possible and that ensuring security for the rural customers.

## APPROACHES FOR IMPLEMENTING FINANCIAL INCLUSION

The common strategies adopted by RBI, various banks and Organizations for eradicating the financial exclusion are as under:

- Reaching the rural population
- Creating Awareness: Saving & Investment options
- Use of Financial technology: Ease of use & availability
- Educating: Use of technology or service utilization



## BENEFITS OF FINANCIAL INCLUSION

- Banking facility will be available in isolated areas
- Products and services customized as per the need of un-banked customers at their location.
- Upgradation of infrastructural facilities in the rural areas.
- Maximises the reach of bank's financial inclusion services in untapped areas.
- Fulfilment of social responsibility of banks by introducing the common man to the technology
- Economies of operation can be achieved as the transaction cost is low.
- Competitive advantage for the banks by tapping the huge customer segment.
- Enhancing loyalty towards authenticate financial services providers.

## CONCLUSION

Financial exclusion exaggerates the poverty because poor people are not finding the affordable and authorized financial solutions. To ensure the better chances of prosperity in the society, financial inclusion of under privileged people is really needed. Understanding of role of financial technology is of paramount importance to create awareness among rural people. Unless and until they realize the need of authenticated financial service providers and have trust on them, they will not take initiatives so creating awareness is must for financial inclusion. Now-a-days Government and RBI are also using technology to tap the unserved market and by this way they are constantly reducing the transaction and operational cost. Technological solutions can be utilized as an effective tool in eradicating financial exclusion and it can help in reducing the barriers faced by banks and financial institutions in serving the un-banked areas.

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**ATTRITION: THE BIGGEST PROBLEM IN INDIAN IT INDUSTRIES****VIDYA SUNIL KADAM****ASST. PROFESSOR****RAJARAMBAPU INSTITUTE OF TECHNOLOGY MANAGEMENT STUDIES****SAKHARALE****ABSTRACT**

*The IT is witnessing the highest attrition rates among talented workforce. Employee attrition is giving sleepless nights to HR managers. High attrition is big HR challenge faced by IT industry. Most IT companies suffer high attrition, its reflects a company's internal strength, weaknesses and Company's ability. Attrition has already become a problem. It will get worse over the next coming years. Attrition levels are touching double-digit figures across IT companies. The attrition rate rose to 15.8 percent in 2011 from 13.4 percent in the previous year. Organization faces difficulties in retaining the existing employees and attracting potential employees. This study is conducted to find out the main causes behind the increase in attrition in IT Industries and to find out the ways to control attrition. This study was carried out in IT companies in Pune. In this study opinion of 100 employees was taken for the analysis. Primary data & secondary data are used for the study. Opinion of 100 employees reveals that the average age being 24-28 years and the experience between 2 to 4 years having higher percentage of attrition. Findings of studies are attrition rate was increased because of overseas opportunities, better offer in next door, compensation & boss relation. 40% IT professionals left the job due to better offer in next door. Female employees left the job due to marriage & family problem. Majority of IT Industries are using the retention policies for retaining of employees, these are Rewards & Recognition, good training program & work life balance.*

**KEYWORDS**

Attrition, causes, control, Employee, IT industry.

**INTRODUCTION**

**M**anpower attrition is an important problem which the IT industry faces today. Attrition is a fact of organizational life. Almost all the industry sectors have to battle increasing employee attrition rates globally and the Indian industries, too, are finding themselves in the throes of the problem.

With enhanced information technology and booming of the economy the employment opportunities in the business environment are on the increase as well. As the companies are becoming aware of the enhanced opportunities and changing business environment employees in the companies are feeling uncertain about their careers and, in turn, their future. The outcome of the above mentioned change is high employee stress, decreased productivity.

It is a known fact that employees are not inclined to continue in one particular organization, and keep on moving in search of a good career, experimenting on it and their life interests. It is also a fact that employers usually want their star performers to be retained in their organization in their permanent positions, without quitting the company. Every HR managers feel that retaining their talented workforce is one of the challenging task, and it is becoming difficult for them to tackle the problem of excessive attrition in their companies and to find ways of retaining their staff.

Attrition is a reduction in the number of employees through retirement, resignation, reassignment, transfer or means other than layoffs.

Attrition is the major issue in almost all the industries in recent times. Many organizations have started probing this problem in depth and are looking for correlation between aspiration levels & differentiated package of solutions at different stages of one's career. This philosophy centers around the compensation package for juniors and mid-career professionals. Attrition not only reflects the hiring policies of an organization, but also induction / retention strategies, training methodologies, work culture and many other factors.

Beginning 1990s the Indian business environment has undergone remarkable changes. Most organizations viewed the presence of a long serving group of employees as an indication of internal efficiency. However with economic liberalization opening up new career horizons for professionals in most industries, & there by tremendously enhancing their prospects for mobility from one organization to another organization. Employee attrition is high in IT industries. In the backdrop of IT companies in Pune mulling a pact to curb attrition, a study has revealed that rate of attrition in Pune is one of the highest in the country. A recent study by recruiting firm Team Lease points out that in the last one year, Pune, along with Delhi.

According to the, NASSCOM chairman Attrition rate at Infosys had gone up to 15.8 percent during the 2010-2011 fiscal. From just 13.4 percent during the previous fiscal year. At the same time Mittal pointed out that as on March 31 2011 the attrition rate at Tata consultancy services (TCS) the largest software service provider in the country continued to be constant at 11.8 percent. Wipro-15.8 percent, HCL Tech- 15.7 percent. From an employment perspective, Pune shares positive hiring sentiment as well as a relatively high positive business sentiment. "There is a gradual increase in intent to hire from tier II cities, showing that companies are looking well beyond the urban markets for tapping talent," Sangeeta Lala, vice-president, Team Lease Services Pvt Ltd, said.

Information Technology is one of the most important industries in the Indian economy. The IT industry of India has registered huge growth in recent years. In the last ten years the Information Technology industry in India has grown at an average annual rate of 30%. The liberalization of the Indian economy in the early nineties has played a major role in the growth of the IT industry of India. Deregulation policies adopted by the Government of India have led to substantial domestic investment and inflow of foreign capital to this industry.

Some Abundant availability of skilled manpower is the major reasons for the significant growth of the IT industry of India. The software industry has been the sunrise industry in India. The software industry will create millions of new jobs in the years ahead. India more than any other developing nation, is seizing this opportunity, & will become a huge exporter of software expertise. In fact India is likely to be a software superpower in IT map of the world. On account of it being an important source of technically qualified manpower.

One of the most distinctive characteristics of those software organizations is therefore to recruit, train, empower, & retain the best & the brightest professionals. IT sector is one of the major contributors to the service sector growth in India.

In terms of specific sectors, the IT Enabled Services sector may be hit since a majority of Indian IT firms derive 75% or more of their revenues from the United States. 500 companies slash their IT budgets, Indian firms could be adversely affected. Instead of looking at the scenario as a threat, the sector would do well to focus on product innovation (as opposed to merely providing services). If this is done, India can emerge as a major player in the IT products category as well.

**LITERATURE REVIEW**

**Ammu Anantharaja (2009)** said that the highest percentage of attrition is in voice based processing of BPO industries. Career growth, compensation and supervision are the most important reason for attrition. Due to monotonous nature of the job, employees change their jobs.

**Boxall et al (2003)** in New Zealand confirmed the view that motivation for job change is multidimensional and that no one factor will explain it. However, over time there have been a number of factors that appear to be consistently linked to attrition.

**Mobley et al (1979)** revealed that age, tenure, overall satisfaction, job content, intentions to remain on the job, and commitment were all negatively related to turnover (i.e. the higher the variable, the lower the turnover).

**Elangovan (2001)** noted that the notion of job satisfaction and organizational commitment being causally related has not been incorporated in most turnover models. His study indicated there were strong causal links between stress and satisfaction (higher stress leads to lower satisfaction) and between satisfaction and commitment (lower satisfaction leads to lower commitment). He further noted a reciprocal relationship between commitment and turnover intentions (lower commitment leads to greater intentions to quit, which in turn further lowers commitment).



**Morrell et al (2004)** tested the unfolding model by studying the voluntary turnover of nurses in the UK. Their findings indicated that shocks play a role in many cases where people decide to leave. Furthermore, they found that shocks not only prompted initial thoughts about quitting but also typically had a substantial influence over the final leaving decision. They also noted that decisions to quit prompted by a shock are typically more avoidable. The authors suggest that their research illustrates the importance for managers of understanding avoid ability i.e. the extent to which turnover decisions can be prevented

**Palan (2008)** said that in BPO sectors training does not lead to employee attrition as there is no plan to optimize organizational investment. To protect our training investment, a comprehensive plan to retain employees need to be in place. It starts from selection & recruitment & ensuring that training is a process & not an event engagement of the employee by the line manager & a competency based learning culture go a long way to enhance employee retention

**Taplin et al (2003)** conducted a large-scale turnover study in the British clothing industry. Two factors emerged as the most significant reasons for employees leaving the industry. One was the low level of wage rates in the clothing industry relative to other manufacturing sectors. The other reason referred to industry image with staff leaving because of fears relating to the long-term future of clothing manufacture in the UK. In this study, turnover rates were highest among the most skilled workers

## IMPORTANCE OF THE STUDY

The growing and prosperous Information Technology (IT) industry provides multiple job opportunities for the software professionals. Consequently, a large number of people switch from one organization to the other. The National Association of Software and Service companies (NASSCOM) predicts that about 2.5 million new jobs would be created in India. Thus it is evident that, a large number of vacancies would be created because of the high rate of attrition as well as the new opportunities created by the evolving job market. Thus maintaining the supply and demand of professionals in equilibrium would become an important task for HR managers in the near future. Thus it is important to recognize and analyze the primary factors that cause attrition in man power due to "job hopping".

## STATEMENT OF THE PROBLEM

High attrition is big HR challenge faced by industry. Most IT companies suffer high attrition problem. Engaged & satisfied employees are more likely to stay with their companies. Identifying motivation & satisfaction factors for IT consultant High attrition, is therefore of great importance to increase employee retention. The purpose of this research is to investigate what are the main reasons for leaving their companies. Organizations invest a lot on their employees in terms of induction and training, developing, maintaining and retaining them in their organization. Therefore, managers at all costs must minimize employee's attrition. Although there is no standard framework for understanding the attrition process as whole, a wide range of factors have been found useful in interpreting attrition. Therefore, there is need to develop a fuller understanding of the attrition.

## OBJECTIVES

The management of various IT firms encounters challenge of employee attrition, which is beyond control & influence growth of an organization, present research has been undertaken

1. To study the Attrition problem in IT Industries.
2. To understand the causes behind the employee attrition.
3. To propose remedial measures to control the attrition.

## HYPOTHESIS

1. The age affects on attrition.
2. The gender differentiation affects attrition.

## RESEARCH METHODOLOGY

This research is undertaken to assess the causes of attrition and its remedies. The main aim is to ensure that the required data are collected objectively and accurately.

**PRIMARY DATA:** Data regarding the causes of attrition and its remedies was collected directly by interacting with the employees of the organization by a structured questionnaire.

**SECONDARY DATA:** The secondary data was collected from the magazines, journals and the internet.

**SAMPLE SIZE:** Data regarding perception towards employee attrition had been collected from 100 Employees working in different IT Industries. Researcher has used purposive sampling method and collected quantitative data, the data collected from primary source were analyzed by using simple statistical tools viz. tabulation, percentage etc.

## RESULT & FINDINGS

### SPECIFIC FINDINGS

- 1) It is found that the percentage of attrition was the highest (62%) among the respondents of 24-28 age categories and was the lowest (10%) among the respondents of 19-23 age group categories and the 28% among the respondents of 29 and above group. From the analysis it is inferred that there is a close relationship between the ages of respondents. And its impact on attrition.
- 2) It is found that the percentage of attrition was the highest (73%) among the male respondents. And the lowest (27%) among the female respondents. From the analysis it is concluded that there is a close relationship between gender and its impact on attrition.
- 3) It is found that percentage of attrition was the highest (64%) among the respondents of 2-4 years experience and (17%) attrition among the 5 and above year experience respondents. 19% attrition was among the 1-2 years job experience respondents. From the analysis it is concluded that 3-4 years experienced IT professionals having higher percentage of attrition.
- 4) Employees leave organization due to various reasons. 40% IT professionals left the organization due to better offer next door. 25% IT professionals resigned due to overseas opportunities. 8% professionals leaving job for only higher package. 12% IT professional left the job because of boss relation. Very few professionals leave the job due to improper time schedule. From the analysis it is concluded that Majority of IT professionals left the job due to growth opportunity.
- 5) Female IT professionals left the job and they shift the cities due to marriage. 4% IT professionals resign due to personal and family problem. 2% employees shifted other cities due to parent health.
- 6) Majority professionals are leaving the job voluntary and very few professionals leave the job due to company problem means voluntary attrition rate is very high compare to involuntary attrition. Means the 92 percent employees left the job voluntary. And only 8 percent employees left the job involuntary.
- 7) Employees join IT firms with some objectives, they having higher dreams they want higher status for fulfilling their objectives that's why they seek opportunity elsewhere. Majority (67%) employees left the previous company due to better opportunity.
- 8) Qualification of a person impacts his decision regarding companies. High qualified people will always expect a better position suiting their profile and often look for better compensation. They will have high level expectations and will always look for better the best. Switching jobs is their regular job. According to my research study majority of the respondents are skilled.



## GENERAL FINDINGS

These findings are based on researcher's observation and discussions during field work.

1. The most common reasons for which employees leave an organization is salary or compensation. Most employees who have been in the same organization for a while expect to be compensated for their hard work and experience. If they feel that they are not being rewarded or even considered for an increase, they very often look to move somewhere else where they can receive a higher salary.
2. An employer should always keep this in mind that beyond a point, an employee's primary need has less to do with how he is treated and how valued he feels. The first time an employee may not leave, but a thought has been planted, the second time that thought gets strengthened. The third time he starts looking for another job.
3. Another factor which may prompt an employee to leave an organization may be the interpersonal relationships. Much of this depends directly on the immediate managers. Different managers create problems for employees in different ways by being too authoritative, too selfish, too critical, but they forget that employees are not fixed assets. They are free agents.
4. Here the employee chooses to separate himself from the organization because of personal reason such as ill-health, desire to return to the native place for family reasons. The spouse is transferred and the current organization has no branch in the new location and so on. In the Indian context women may have to give up their jobs post marriage to resettle elsewhere in the country or even post-pregnancy.
5. An employee leaves an organization if the fairness of the system does not inspire his confidence. Organization which pays scant regards towards employee safety and care will also have to face the mounting attrition level.
6. High levels of stress and lack of work life balance- companies in their zeal to squeeze out every little ounce of productivity from their employees and further increase profitability may opt for less number of employees. In the immediate context, it may produce palpable results. But in the long run perspective, stress level may soar as employees groan under the weight of excessive workload. Employee's personal life will also go for a toss due to alarmingly high level of work pressure. Employee burn out and steep fall in productivity are the obvious fallout. Sooner than later employees will be constrained to rethink their priorities and join an organization that promises a relaxed pace of work and a breathing space.
7. Sometimes employees have to separate from an organization as they have not completed their probation period successfully or they are being laid off for want of work or their appointment was only on a temporary basis. In fact it is this aspect of separation that is most unpleasant since the earlier once discussed were cases of separation which were employee initiated. Care must be taken by the organizations to ensure that the above be carried out as smoothly as possible else, this could create a lot of negative impressions about the company which could be detrimental for the organizations image in the long run. One major consequence of this type of separation is that it affects the morale of the employees at large and creates a feeling of insecurity in general. Hence retention of talent pool is one of the biggest challenge in front today's organization.

## SUGGESTIONS

By referring above findings few prescriptions have been rewarded that may assist IT firms to retain intellectual, Knowledgeable and educated manpower, which consequently helps organization to prosper.

1. **OFFER FAIR AND COMPETITIVE SALARIES** commensurate with industry. Fair compensation alone does not guarantee employee loyalty, but offering below market wages makes it much more likely that employee will look for work elsewhere. To retain workers, conduct regular reviews of the salaries offer for all job titles like entry level, experienced staff and supervisory –level. These salaries need to be compared with department's salaries with statistically reliable averages. If there are significant discrepancies, then management needs to take steps to ensure that organization is in line with the marketplace.
2. **DEVELOPING A GOOD TRAINING PROGRAM:** Training is a vital function of every organization which helps employees in performing effectively. Providing proper training is essential to both employer and employee in increasing their skills and managing their job more easily. It is essential for both professional performance and organizational development. It helps employees perform effectively and efficiently.
3. **REWARD AND RECOGNITION OF EMPLOYEES:** In the changing business environment the employers should be aware of how they have to be recognized and rewarded as an employee. With the change in the information technology and work culture, employers should be aware of providing innovative recognition and reward programs, and should be reviewed from time to time. Traditionally, employees used to be rewarded once in a year but with the change in the business environment, the way the rewards and recognition is provided to the employees has also changed. Recognition and rewards are considered to be powerful tools for employee motivation, satisfaction and performance management. Rewards can be in monetary and non- monetary terms. Monetary rewards are important for a company that recognizes and rewards its employees. Recognizing and rewarding the employee's performance will help the organization celebrate its success. The different reward system available are variable pay, lump sum merit awards, meeting expectations awards and so on.
4. **STOCK OPTIONS:** Various compensation policies have been evolved at corporate level, as companies started looking for innovative ways of retaining their employees. One of the ways is to use stock options. Stock options are generally the right but not obligation to buy the company's stock at some point in the future at a predetermined price. Granting stock options to employees has a positive effect on the overall performance of the organization. They are offered by both public and privately held companies. They have found their way to India in 1990s and have begun to be used by them as one of the retention tools. Infosys was the first stock option schemes (ESOS). These options were also effectively used by companies in retaining their talented workforce.
5. **STRENGTHEN THE RECRUITMENT PROCESS:** Employee retention invariably depends upon effective recruitment. When an organization hires an employee who has the right mix of skill set and personality, he is pretty much likely to stick to his job. It is quite necessary for an organization to have cleared, accurate and a very transparent recruitment process. It is equally important to be frank and realistic with potential hires.
6. **CAREER OPPORTUNITIES:** World class training, development and career management are effective tools that will help an organization to retain its talent. It makes sense to find out employees expectations vis-à-vis the company and ensure that it is delivered. Companies should provide an opportunity to put the employee's career on high growth trajectory mode. Employee should be encouraged to attend meetings and seminars at regular intervals. Companies should have a constant dialog with employees about their professional aspirations. Companies can financially sponsor and support the employees to pursue higher qualifications without losing their gainful employment.
7. **EXIT INTERVIEWS:** Exit interviews stand out as one of the best option to get into the roots of the attrition problem. Exit interviews provide the HR managers a chance to understand what an employee needs and also to discover workplace issues. Many organizations often find it difficult to unearth the areas where the problem is most severe, pr to expose the specific causes of employee attrition. In such cases exit interviews stand as an ideal platform, where the HR managers gain a clear picture about their employee's demands and take initiatives before they lose their star performers to their competitors. Exit interviews, if conducted properly, can be very effective tools in retaining the employees. The HR managers should know how to diagnose the results obtained from the exit interviews. They also feel that outsourcing exit interviews often reduces the costs. Exit Interviews as a tool for talent retention.
8. **WORK LIFE BALANCE-** In today's competitive world, work life balance has become a buzzword and often people are realizing that they are in need of balancing their work and home life. In efforts to earn more money and to have a good quality of work life, they have been trying hard, there by missing the point of balance between work and home. With the shift of the economy towards knowledge economy, employees have started working for 12-14 hours instead of 8-9 hours per day, and even the meaning and importance of the quality of work life has also changed. There is a need to restructure their work schedule and bring about a balance between the employees work life.

## CONCLUSION

Attrition is becoming a serious problem in today's corporate environment. As employee attrition has been the silent killer for improving the organizational productivity. Attrition cost for many organizations are very high and can significantly affect the financial performance of an organization. From results it can be concluded that there are various reasons behind employee attrition. These reasons are best offer next door, overseas opportunities, Boss relation problem, higher package, further overseas studies, shifting of cities due to marriage, family and personal problem, improper time schedule and parent's health requires moving to other cities. Voluntary attrition rate is high between the ages of 24-28 years. After getting the 2-4 years experience IT professionals got higher opportunity so the growth opportunity is the main reason of the voluntary attrition. This research paper proposed a remedial measure if implemented and executed properly would help concern organization to understand their employees' needs with regard to their career, job, and family and follow the above mentioned remedies and retained their talented workforce, thereby meeting their expectations and requirements, and thus reducing employee attrition.

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## APPENDIX

### DATA ANALYSIS

TABLE NO. 1: IMPACT OF AGE ON ATTRITION

S.N.	Age	No. Of Respondents	Percentage (%)
1	19-23	10	5
2	24-28	62	73
3	29 & above	28	22
	Total	100	100

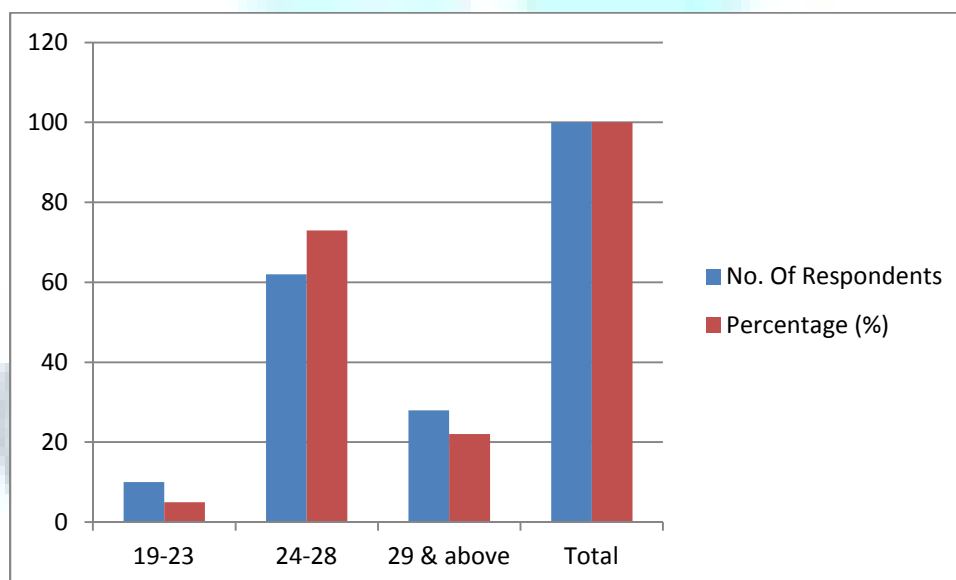
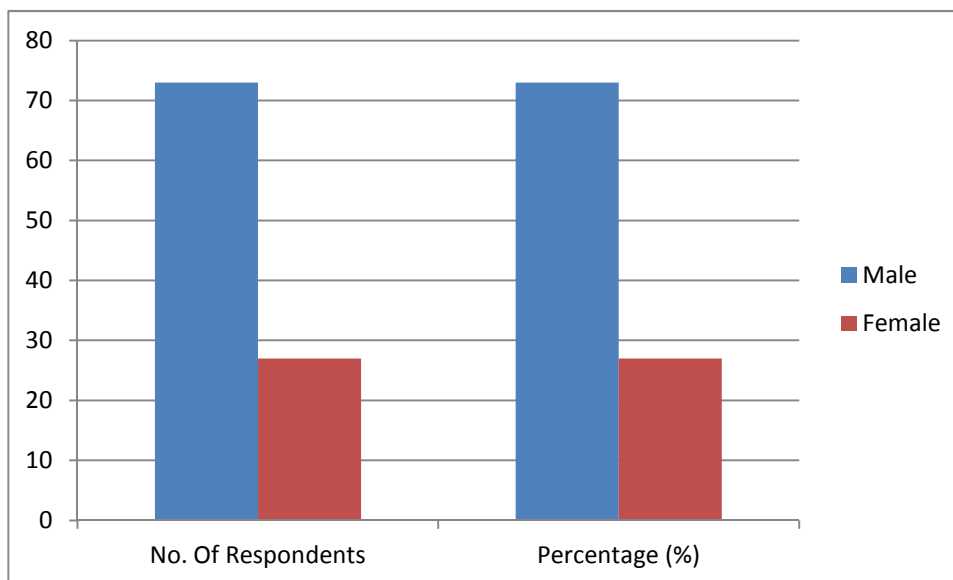
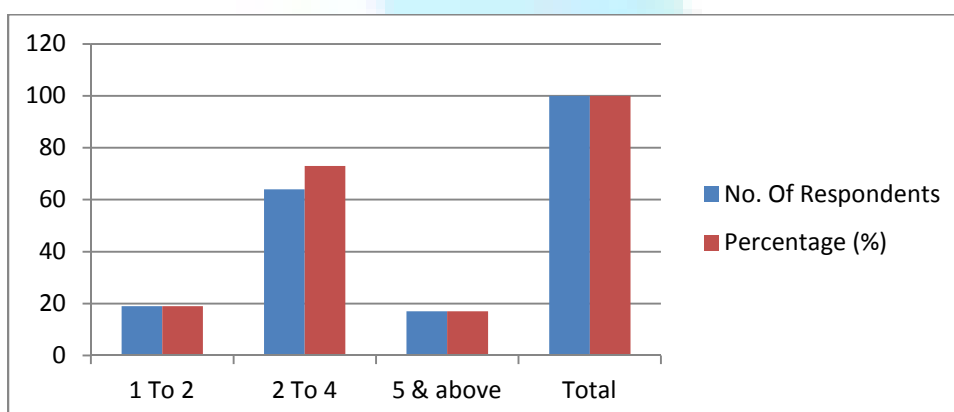


TABLE NO. 2: IMPACT OF GENDER ON ATTRITION

S.N.	Gender	No. Of Respondents	Percentage (%)
1	Male	73	73
2	Female	27	27
	Total	100	100

**TABLE NO. 3: IMPACT OF EXPERIENCE ON ATTRITION**

S.N.	Experience in Years	No. Of Respondents	Percentage (%)
1	1 To 2	19	19
2	2 To 4	64	64
3	5 & above	17	17
	Total	100	100

**TABLE NO. 4: IMPACT ON MARITAL STATUS ON ATTRITION**

S.N.	Marital status	No. Of Respondents	Percentage (%)
1	Married	68	68
2	Unmarried	32	32
	Total	100	100

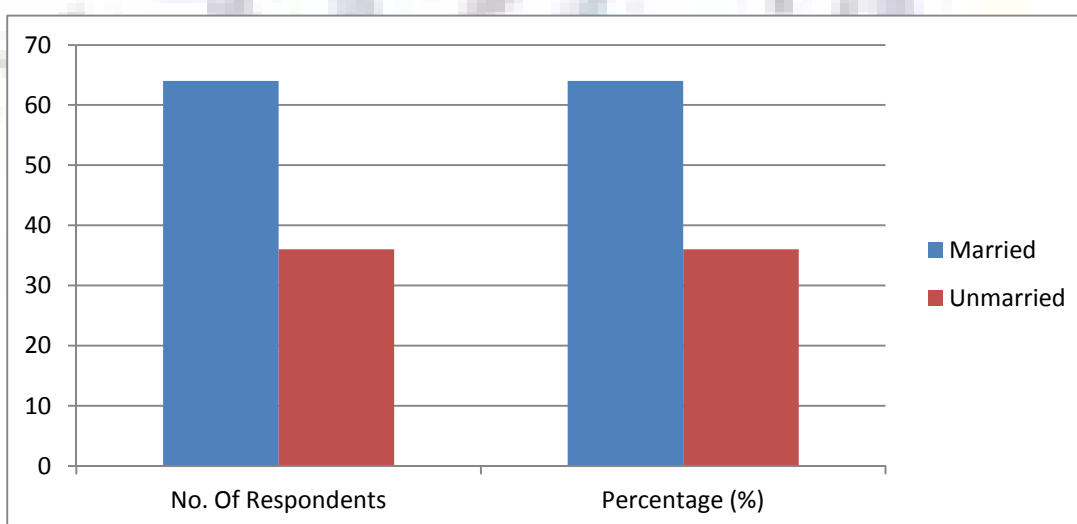


TABLE NO. 5: CAUSES OF ATTRITION

S.N.	Causes of Attrition	No. Of Respondents	Percentage (%)
1	Higher Package	8	8
2	Better offer next door	40	40
3	Overseas opportunities	25	25
4	Further overseas studies	2	2
5	Boss Relation problem	12	12
6	Improper time schedule	2	2
7	Shifting of cities	5	5
8	Parent health requires moving to other cities	2	2
9	Family problem and personal problem	4	4
	Total	100	100

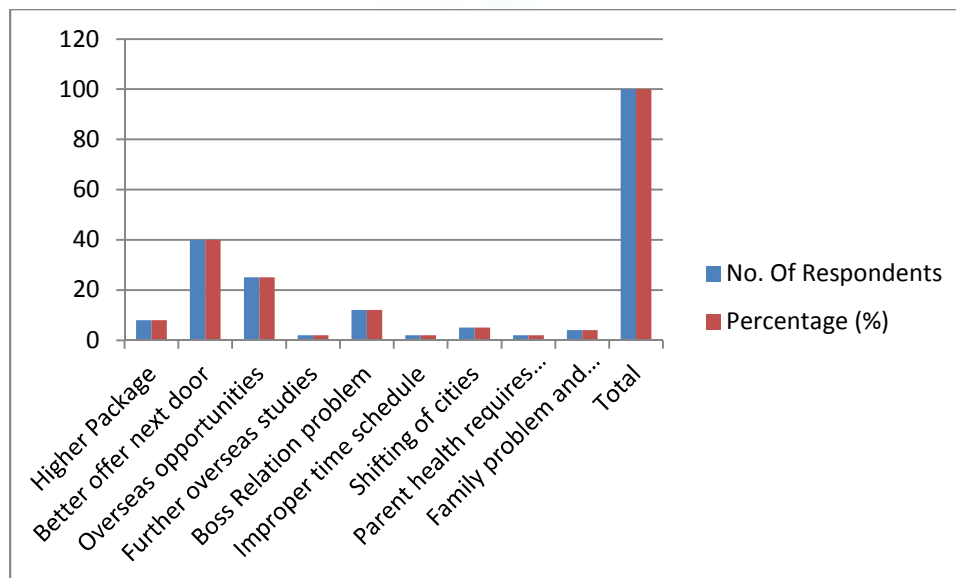
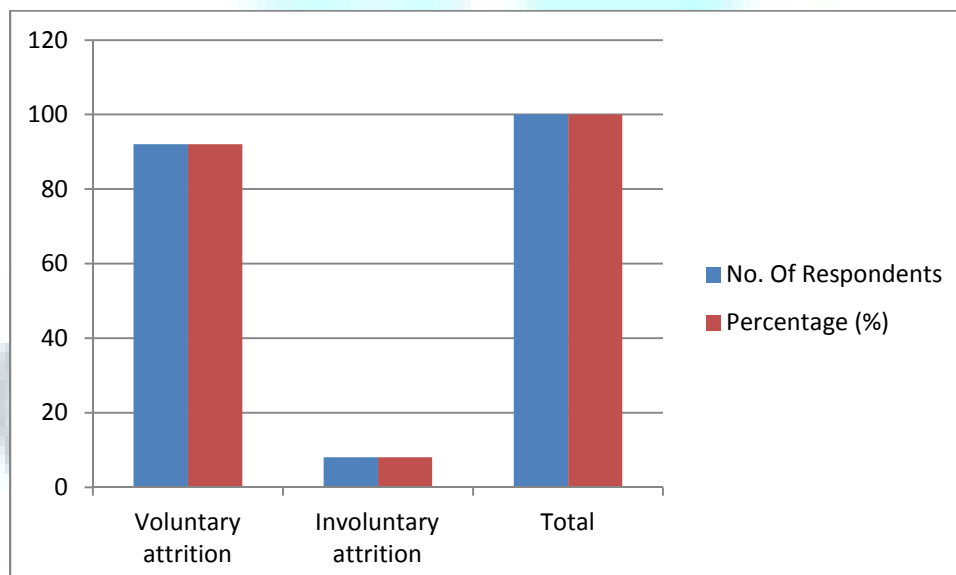


TABLE NO. 6: TABLE SHOWING VOLUNTARY ATTRITION RATE

S.N.	Attrition	No. Of Respondents	Percentage (%)
1	Voluntary attrition	92	92
2	Involuntary attrition	8	8
	Total	100	100



**INFORMATION TECHNOLOGY IN KNOWLEDGE MANAGEMENT**

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**ABSTRACT**

*In the present knowledge era the existence and excellence of any organization merely depends upon its intellectual capital. Knowledge management practices today depend totally on information technology and related tools. This paper is a small attempt to enlighten the usage of information technology in knowledge management practices of business organizations.*

**KEYWORDS**

knowledge management, IT.

**INTRODUCTION**

gnaana Thimiraandhasya....

Gnaanaanjana Shalaakayaath....

Knowledge, the source of development has been well appreciated since from ancient days. The twenty first century is considered the knowledge era where as the previous century was the information era. In the global competitive environment every business organization has to continuously improve its business practices, processes and systems for its survival. Better products or services with more features and innovative approaches are the need of the hour of every company. Managements have to depend on new knowledge to address all these issues. Knowledge is the out come of information. Since information is the base for any form of knowledge, Information Technology plays a vital role in knowledge management.

**KNOWLEDGE MANAGEMENT**

Knowledge management is the process of identifying, gathering, retrieving, dissemination and further development of knowledge. Snowden (1999), maintains that knowledge management is the "identification, optimization, and active management of intellectual assets, either in the form of explicit knowledge held in artifacts or as tacit knowledge possessed by individuals or communities". Knowledge management has been the ancient practice in different forms like scriptures on stones, copper sheets and leaves. The study of knowledge dates back to ancient Greece. Even before that, knowledge was at least implicitly managed as people performed work. Early hunters, for example learned the best skills and practices for a successful hunt. These skills and techniques transferred from one generation to the next. This illustrates the transfer of knowledge, a knowledge management activity (Wiig, 1997).

**INFORMATION TECHNOLOGY**

Information technology's role is emerging as an integrator of communications technology, rather than solely a keeper of information. The critical role for IT lies in its ability to support communication, collaboration, and those searching for knowledge and information" (Mc Campbell et al., 1999, 178). Information technology and the advent of the personal computer have greatly enhanced organizational effectiveness, inter-organizational deployment, and cognitive advance (Grover and Davenport, 2001, p. 6). Another area of communication that information technology has drastically impacted is social activity. Computer networks provide a means to break down stovepipes, or hierarchical barriers, that often inhibit the flow of free thinking, knowledge, and innovation, or the creation of knowledge. Thus Information technology has become a key in the implementation of knowledge management.

**REVIEW OF RESEARCH LITERATURE**

Knowledge management has been a thrust area for research and more than 210 papers were published during the last decade. The papers on impact of IT on knowledge management practices have arrived with very positive findings and conclusions stating that organizations benefit a lot through IT related tools and technology while implementing knowledge management strategies. Even though IT's role in KM is just a supporting one, KM practices could not be imagined today with out information technology especially data bases and networks. Most of the research on knowledge management in relevance to IT has considered knowledge as synonym to information and treated information systems as KM systems. Among the researchers of both Information Technology and management studies the clear distinction between information and knowledge need to be realized.

**INFORMATION TECHNOLOGY IN KNOWLEDGE MANAGEMENT**

"Information technology fosters knowledge exchange among the key parties."

Modest beginnings can be useful; an organization doesn't have to have the latest or the most complex technology. Having a web site and having access to technical personal to assist in planning for technology is important. Visit other organization's web sites. Some organizations being their experience with computers by getting external assistance, sometimes from a donated source. Five years should be forecasted for equipment replacement and three years for software. When considering the purchases of equipment, the organization should prepare a plan that includes identifying the organization's needs analyzing its information requirements, current resources and systems, and developing and circulating a request for proposals (RFP). The most critical elements in vendor selection are its capabilities and the satisfaction of its other users. For creating a contract with vendor, the organization should consult with other organizations and experts. Once the purchases are made, an implementation plan, including staff and user training, must be developed jointly with the vendor. Later an evaluation and an improvement plan will be useful.

In order to have a more clear understanding of information technology for an organization, it can be classified as follows:

1. Hardware
2. Software
3. Groupware

**HARDWARE**

Hardware can be categorizes as:

Memory  
 Storage Devices  
 Video Display Unit



**INTERNET TECHNOLOGIES**

"Internet has helped HR managers to access the organization data from outside locations."

Perhaps the main reason for the current internet popularity is that, because it uses the same technology as the internet, any business or organization, which has internet. The same WWW browsers and E-Mail programs can be used, and this creates a standard format for all on-line documents, whether presets on the organization's intranet or on the wider internet. A WWW server can be configured on a companies existing LAN, and because LANs are much faster than the internet itself, download times to human resource managers PC's are very short, and experimental internet technologies such as real-time audio and video become sensible propositions, if required by the organization.

As most intranets have internet connectivity also, human resource managers can log the network from outside locations, using standard internet dial-up methods, and request information, read their mail, etc. similarly, human resource managers can access the internet without ever leaving their intranet environment.

"Internet can help employees in exchanging their creativity and provide innovative ideas."

Internet "plug-ins" can be acquired for many browsers (Such as Netscape Navigator and MS-Internet Explorer), which enhance its (and therefore the 'nets's) capabilities. Microsoft is currently developing plug-ins, which enable the accurate representation of word-processing and spreadsheet files through a browser; capabilities, which are, at present, beyond the scope of what pure HTML (the language of the web) can achieve.

**INTRANET**

The concept is similar to that of the usage of internet for information about related topics/subjects to the information and data relating to the organizations. There can be several ways the intranet can be implemented in an organization which has already been networked. In order to have a clear understanding of the intranet usage, a simple example of the intranet application helps any human resources managers to understand the underlying need for such a facility for consumption and analysis by executives inside the organization. A simple but relevant example can be the use of electronic travel requisition and settlement from along with the requisite information such as eligibility conditions, financial conditions and the follow through actions.

If the entire application is implemented on a intranet, any executive who is authorized to travel by, can avail of a simple and comprehensive facility built for any human resource manager. One of the major considerations for building an intranet is to have reduced costs and versatile information. The other benefits include:

- Improved productivity
- Quick access to data and information
- Cost effective
- Ease of use
- Requirement of minimum hardware and software.

Intranet components include the development of home page for the organization and providing the necessary hyperlinks to the various subjects' topics concerned. Enlightening, graphic pictures with logically built animal on features.

Another important aspect is the smooth navigability of the entire home page. At the human resource manager and effective, simple and swift browser software needs to be developed. In an human resource information system (HRIS) environment, it is essential that the components of the function links to the home page should be in a sequential manner. Intranet also helps in obtaining updated information or company financial situation, policy

**THE ISSUES CAN BE CATEGORIZED IN AN ORGANIZATION AS FOLLOWS**

- Managing Content From Multiple Authors Is Complex
- Submitting Content Can Be Difficult For Document Authors
- Human Resource Managers Can't Keep Up With The Information Explosion
- Information Stored In Many Different Places
- Human Resource Managers Need To Be Able To Find And Be Notified Proactively For New Information

**IN ORDER TO OVERCOME THE ABOVE ISSUES, IT IS ESSENTIAL TO**

- Co-Ordinate Content From Multiple Authors
- Implement Editorial And Approval Cycle
- Enforce common presentation guidelines
- Deploy content across same or different servers(NT or UNIX)
- Find Information Regardless Of Where Or How It Is Stored
- Receive Notification When New , Relevant Information Becomes Available

A separate analysis can be attributed to the use of intranet for HUMAN RESOURCES FUNCTION:

**THE CHALLENGE IS TO INCREASE EFFECTIVENESS OF THE INTERNAL JOB POSTING PROCESS ACROSS REMOTE SITES**

- Job postings change frequently
- Hard for employees to know when jobs open
- Hard for managers to locate and interview best candidates

The Possible Solution to the Above Challenges Is To Develop and Implement on Intelligent Web-Based Application That Matches Job Openings And Employee Interests

**AFTER, THIS SOLUTION IS IMPLEMENTED THE RESULTS POSSIBLY CAN BE UNDER THE FOLLOWING CATEGORIES**

- Improved information flow in fundamental business process
- Managers have more convenience and faster
- Mechanism for monitoring information
- May be easier to hire from within and
- Reduced the initial costs including training costs.

**OTHER BENEFITS**

Many other benefits of intranets can be summarized briefly:

- Reduced costs- i.e. printing, paper, software, distribution, mailing, and order processing, etc.
- Reduced telephone support expanses.

**USE OF AN INTRANET**

"Education and Learning Can Be Made Accessible and Effective Through Intranet"

- Communication: An intranet increases the capabilities to communicate with all members of the corporate culture.
- Surveys
- Scheduling
- Event registration
- Employee training via HTML from support

Your intranet provides you with the training tool that can be over used and over, and yet, can be updated with relative ease.

- Software distribution
- Publish company documents
- Provide access to company databases such as the company phone book
- Provide departmental home pages where departments can let the rest of the company know what's going on in their area
- Provide individual employee home pages where they can let the rest of the company know of the special events that have happened in their lives.

The major focus on any organizations 'IT policy will include the prominent and

Updating of the software. A brief scenario of software technologies of today and the near future are discussed below software can be categorized as follows:

**SYSTEM SOFTWARE**

- OS (operating system)
- Communication
- Utilities
- Other systems software

**APPLICATION SOFTWARE**

- ASD'S(application software development tools)
- General purpose application
- Development software
- Web based
- Programming
- Case tools

**SYSTEM SOFTWARE**

- Multi user
- Multi tasking
- Symmetric processing.

**APPLICATION SOFTWARE**

- Identify your application needs
- Specify minimum requirements for those needs
- Use survey results to identify a software package suitable for your application functionalities.
- Eliminate packages with critical problems.
- Evaluate trade-offs in implementing the package
- Select software suitable for existing hardware.

Choose the right software vendor of repute for further needs of updation, maintenance and training (minimum).

**SOME OF THE GENERAL FEATURES OF SOFTWARE**

- Ease of use.
- Copy protection.
- Version compatibility.
- Compatibility with other software.
- Network compatibility.
- Portability.
- Cost.
- Licensing policies.

**THE SOFTWARE TRENDS ARE LEADING TOWARDS THE FOLLOWING**

- Enterprise wide computing.
- Web based applications
- Knowledge management

**USING A PACKAGED SYSTEM**

Through modeling, users or human resource manager representatives actually can see what happens in systems operations-what screens look like, how tables are accessed, how edits are performed, and so on. By performing model work assignments, human resource managers have a clearer view-from a functional perspective-of the packaged system's actual capabilities, shortcomings, and ability to meet their functional needs. With a packaged system, it's *possible* and usually desirable to conduct user testing and modeling before engaging in any new programming work. This reversal of the traditional sequence of specifications and testing has the following advantages.

- **Actual product training**, by users, begins earlier in the implementation process, and focuses on the existing system. This earlier more detailed view of the package may reduce the need for modifications.
- By completing user **testing in advance** the need for modifications can be determined before new programming begins. This eliminates the piecemeal delivery of proposed changes to the systems, people and the modifications' syndrome
- If user testing at this stage uncovers and unexpected mismatch between systems capabilities and actual human resource manager requirements, much time, money, and agony can be spared by starting anew. If the system is going to require so many modifications that it's likely to become a maintenance nightmare, or never meet human resource manager needs, the wisest course may be to return to square one and acquire a different system before getting in to costly modifications to the standard software. An effective vendor evaluation process can preclude this problem.

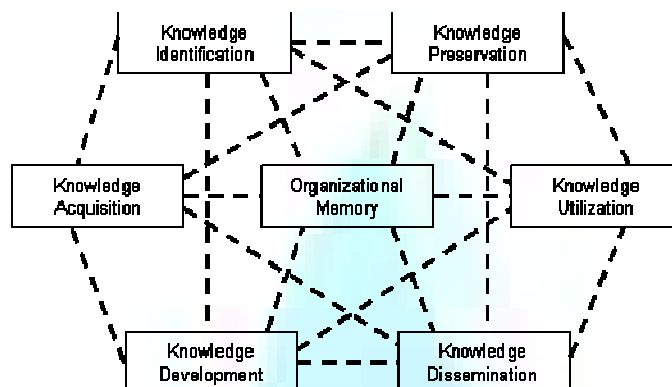
## TECHNOLOGY TOOLS FOR REMOTE COMMUNICATIONS

"Team technologies allow team members to share relevant knowledge and world note team tasks effectively"

Thus, groupware is classified here in to two general categories:

1. Synchronous groupware that enables team interactions at the same time. Examples are desktop and real-time teleconferencing, electronic meeting systems (EMS), electronic display video-conferencing with audio facilities, chatting [coleman-1997]
2. Asynchronous groupware that facilitates delayed interaction among team members. Examples are e-mail, group calendars and schedules, bulletin boards and web pages, non-real-time database sharing and conferencing, and work flow applications.

DIAGRAM FOR MODEL OF ORGAINZATIONAL MEMORY WITH KNOWLEDGE MANGEMENT



## FACTORS THAT AFFECT THE USE OF GROUPWARE TECHNOLOGY

The choice of groupware technology is linked to a number of factors such as whether the team requires a permanent record of the interaction and decisions, the need for symbolic meaning in communication, team members' experience with work virtually, how night the team's schedule is, the team's functional and organizational culture, and the team member's access to technological support and training.

## TECHNOLOGY FOR REMOTE COMMUNICATIONS IN A GLOBAL SOFTWARE TEAM

- People become highly dependent on technologies used for maintaining for remote contact. This implies that users need training and support to integrate technology in their work environment.
- Electronic media support only a limited level of interactivity. People engaged in communication activities in order to reduce uncertainty and equivocally, associated with the information requirements of their assigned tasks. Uncertainty reduction refers to the elimination of the lack of information needed to complete tasks. And equivocally reduction refers to reducing ambiguity associated with a task [Daft and Lengel, 1986a]. Equivocally reduction requires a higher degree of information richness as compared to uncertainty reduction. "Richer" media like videoconferencing and phone transmit a more comprehensive communication experience than textual and asynchronous media like e-mail and voice mail. Yet, with all its wonders technology still cannot transmit a persons' social presence" equivalent to that experienced in face to face settings.
- Remote communications require more efforts than face to face encounters because people are expected to transmit and digest communication intentions with in the constraints of the technology in use.
- Remote communications tend to become more task oriented and formal then common in a collective work setting. This reduces the feasibility of building social and, hence, more complex co-ordination process.

Remote electronic communications also result in inclusion problems. On the one hand, local people may not the included in cross-site exchanges.

## CONCLUSION

Information technology can provide many benefits. Then benefits include fostering better communication and knowledge exchanges among the key parties. Knowledge management practices today depend totally on information technology and related tools.

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## A STUDY OF EMPLOYEE ENGAGEMENT & EMPLOYEE CONNECTS' TO GAIN SUSTAINABLE COMPETITIVE ADVANTAGE IN GLOBALIZED ERA

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### ABSTRACT

*We believe that if employee engagement and the principles that lie behind it were more widely understood, if good practice was more widely shared, if the potential that resides in the country's workforce was more fully unleashed, we could see a step change in workplace performance and in employee well-being, for the considerable benefit across all corporations. Every company needs employees working towards its goals for its success. Motivation has a direct effect on performance. As organizations globalize and become more dependent on technology in a virtual working environment, there is a greater need to connect and engage innovatively with employees to provide them with an organizational identity & to increase productivity as whole. A 'satisfied' employee is not necessarily the 'best' employee in terms of loyalty and productivity. It is only an 'engaged employee' who is intellectually and emotionally bound with the organization, feels passionately about its goals and is committed towards its values who can be termed thus. He goes the extra mile beyond the basic job responsibility and is associated with the actions that drive the business.. The main objective of this paper is giving out some practices to readers who wish to have productive workforce. As per 2011 Microfinance Banana Skin report, today MFI's sector have 10 big challenges & one out of them is Staffing. By highlighting unique work experience, questionnaire, case study author attempt to show significant requirement of employee commitment. Findings help to achieve top two bottom areas of concern which need to address proactively to increase employee integrity & organizational productivity.*

### KEYWORDS

Employee Connectivity, Employee engagement, Employee Productivity, Employee Motivation, Human Capital, Increase Profitability.

### INTRODUCTION

In general, employees don't understand what engagement is; but I'm not sure managers do either what "engagement" means. This has to be broken down and contextualized within their own workplace. I do understand that employees may not be familiar with the term, but they are well aware of how they (and their co-workers) are feeling about coming to work every day, whether they are focused, energized and productive, or not. I think engagement is not just something companies do, but something that employees need to take an active role in as well. This means that they do need to have some understanding of what engagement is - at least the big picture, if not the detail (like, as the research) Many engagement strategies have largely been focused on external incentives, organizational processes, and pep talking the managers to have better relationships with their reports. Many engagement strategies are not backed with the type of programs that fully educate managers/leaders not only on what engagement is, but more importantly how to engage yourself and others. The communications that drive engagement aren't only the larger corporate channels of communication, but the everyday dialogue between manager and employees, between colleagues, within meetings, performance evaluations, at the reception/ water cooler room, etc. Engagement isn't simply a strategy or plan, it's a culture. Basically it's not just formal measures that can clue us in to engagement levels, but the informal ones as well. Employees may not know what "employee engagement" is all about unless the HR action speak louder than words. Engagement is something very challenging to inculcate only if employees "feelings" are well managed. Most of the time, while doing open forums, one on one sessions, employees talk about "how they felt" on different issues and situations where as in very few cases, money is raised as an issue. I believe that HR and Management together, have to design practices that touch hearts of employees positively.

Employee engagement plays a greater role in the current era where every contribution by the employee counts. A 'satisfied' employee is not necessarily the 'best' employee in terms of loyalty and productivity. It is only an 'engaged employee' who is intellectually and emotionally bound with the organization, feels passionately about its goals and is committed towards its values who can be termed thus. He goes the extra mile beyond the basic job responsibility and is associated with the actions that drive the business. The key to employee engagement is creating greater motivation for their work and commitment to their organization. Employee engagement can be revealed in several ways, including 'pulse' to annual surveys, tracking changes in the attrition rate, increase in the number of employee referrals, and growth in productivity and business. Employee engagement is the thus the level of commitment and involvement an employee has towards their organization and its values.

### LITERATURE REVIEW

Employee engagement is derived from studies of morale or a group's willingness to accomplish organizational objectives which began in the 1920s. The value of morale to organizations was matured by US Army researchers during WWII to predict unity of effort and attitudinal battle-readiness before combat. In the post war mass production society that required unity of effort in execution, (group) morale scores were used as predictors of speed, quality and militancy. With the advent of the knowledge worker and emphasis on individual talent management (stars), a term was needed to describe an individual's emotional attachment to the organization, fellow associates and the job. Thus the birth of the term "employee engagement" happens which is an individual emotional phenomenon whereas morale is a group emotional phenomenon of similar characteristics. In other words, employee engagement is the raw material of morale composed of 15 attitudinal drivers.(e.g. Scarlett 2001). An "engaged employee" is one who is fully involved in, and enthusiastic about, his or her work, and thus will act in a way that furthers their organization's interests. According to Scarlett Surveys, "Employee Engagement is a measureable degree of an employee's positive or negative emotional attachment to their job, colleagues and organization which profoundly influences their willingness to learn & perform at work". Thus engagement is distinctively different from satisfaction, motivation, culture, climate and opinion and very difficult to measure. This timely Report sets out for the first time the evidence that underpins what we all know intuitively, which is that only organizations that truly engage and inspire their employees produce world class levels of innovation, productivity and performance.

### OBJECTIVES

#### DO YOU THINK EMPLOYEES UNDERSTAND WHAT EMPLOYEE ENGAGEMENT IS?

This paper aims to share several qualified practices with readers, employees, and HR experts, employers whose mission to build organizational trust, develop culture, integrity and to have productive employees in enterprises.

#### WHY IT IS IMPORTANT?

This paper further intends to highlight the results which will help to address the modern HR Challenges in MFI sector

#### HOW HAS YOUR SENIOR LEADERSHIP/MANAGEMENT COMMUNICATED THIS MESSAGE?

Sharing Importance to Connect with your teams & what are the ways to get more from teams? Business leaders could learn from the Indian companies Way of managing people?



**RESEARCH METHODOLOGY**

In this paper, author is examining key functions of human resource management in Indian firms—recruitment & selection, training and development, employee engagement & welfare and performance management. The actual work experience has been shared along with questionnaire form to show an approach & also by taking a case study name 'Ujjivan Financial Services pvt ltd' & few other practices of HCL Company.

**IMPORTANCE OF SUBJECT NOTE**

Before I attempt to get started with employee engagement activities, we should perhaps understand why this business concept is important. Employee engagement within any business organization is absolutely essential for the simple reason that it is inextricably linked to your business results. As a matter of fact, employee engagement can be taken to be directly proportional to the growth and success of an organization. "Employee engagement is a business management concept." An engaged employee is someone who:

1. Has a belief in the business organization
2. Does the right things to make the business prosper?
3. Understands the business concepts and gets the bigger picture
4. Is respectful towards colleagues?
5. is willing to go the extra mile for the sake of the organization

Engaged employees care about the future of the company and are willing to invest the discretionary effort. Engaged employees feel a strong emotional bond to the organization that employs them. (Robinson) A successful employee engagement strategy helps create a community at the workplace and not just a workforce. When employees are effectively and positively engaged with their organization, they form an emotional bond with the company. This affects their attitude towards both their colleagues and the company's clients and improves customer satisfaction and service levels. It's important to the company because...employers may buy a hand can't buy his/her heart, they can buy brains not souls.

- Our employees are a valuable asset that makes the business possible
- If we are doing the right things to engage our employees our company will be successful
- Companies that have improved their engagement levels also see improvement in:
  - Total shareholder return
  - Customer satisfaction
  - Productivity and retention
  - Sales growth
  - Safety performance

**RATIONAL OF STUDY**

This paper portrays significance to address a considerable area of organization that is 'work culture'. Creating a culture of trust by pushing the envelope of transparency in communication & and information sharing Inverting the organizational hierarchy by making the management and the enabling functions accountable to the employee in the value zone.

**THE FOUR DRIVES THAT BRING ABOUT ENTHUSIASM**

An organization as a whole clearly has to attend to the four fundamental emotional drives, but so must individual managers. In fact, this research shows that individual managers influence overall motivation as much as any organizational policy does. In this article we'll look more closely at the drivers of employee motivation, the levels managers can pull to address them, and the "local" strategies that can boost motivation despite organizational constraints. Because the four drives are hardwired into our brains, the degree to which they are satisfied directly affects our emotions and, by extension, our behavior. Let's look at how each one operates.

**1. THE DRIVE TO ACQUIRE**

We are all driven to acquire scarce goods that bolster our sense of well-being. We experience delight when this drive is fulfilled, discontentment when it is thwarted. The drive to acquire tends to be relative (we always compare what we have with what others possess) and insatiable (we always want more). That explains why people always care not just about their own compensation packages but about others' as well. It also illuminates why salary caps are hard to impose.

**2. THE DRIVE TO BOND**

Many animals bond with their parents, kinship group, or tribe, but only humans extend that connection to larger collectives such as organizations, associations, and nations. The drive to bond, when met, is associated with strong positive emotions like love and caring and, when not, with negative ones like loneliness and anomie. At work, the drive to bond accounts for the enormous boost in motivation when employees feel proud of belonging to the organization and for their loss of morale when the institution betrays them.

**3. THE DRIVE TO COMPREHEND**

We want very much to make sense of the world around us, to produce theories and accounts—scientific, religious, and cultural—that makes events comprehensible and suggest reasonable actions and responses. In the workplace, the drive to comprehend accounts for the desire to make a meaningful contribution. Employees are motivated by jobs that challenge them and enable them to grow and learn, and they are demoralized by those that seem to be monotonous or to lead to a dead end. Talented employees who feel trapped often leave their companies to find new challenges elsewhere.

**4. THE DRIVE TO DEFEND**

We all naturally defend ourselves, our property and accomplishments, our family and friends, and our ideas and beliefs against external threats. The drive to defend tells us a lot about people's resistance to change; it's one reason employees can be devastated by the prospect of a merger or acquisition—an especially significant change—even if the deal represents the only hope for an organization's survival.

Each of the four drives we have described is independent; they cannot be ordered hierarchically or substituted one for another. You can't just pay your employees a lot and hope they'll feel enthusiastic about their work in an organization where bonding is not fostered, or work seems meaningless, or people feel defenseless. Nor is it enough to help people bond as a tight-knit team when they are underpaid or toiling away at deathly boring jobs. You can certainly get people to work under such circumstances—they may need the money or have no other current prospects—but you won't get the most out of them, and you risk losing them altogether when a better deal comes along. To fully motivate your employees, you must address all four drives. Town halls, all hands, skip level meetings, the list goes on. But what happens when they fail to work? When they just don't make the impact which you're looking for? Here's what matters:

**1. WHAT YOU SAY:** While folks appreciate all the meetings, showing up is the half the battle. What you say in these meetings has to have resonance. Have you framed the message right so that it shows what's in it for them? Have you provided a clear sense of what lies ahead organizationally?

**2. HOW YOU SAY IT:** It's all in the delivery. If you think a town hall is your opportunity to get on stage with a big Power Point slide and present from behind the podium, you've lost them. No wonder there's a disconnect. No matter how large these meetings, they are a chance to connect with staff on a personal level. And staffs yearn for a personal connection with leaders.

**3. WHO IS SAYING IT:** Quite simply, folks may not want to hear from you alone. That doesn't mean you should disappear, but think about whom else needs to be heard. In general, the staff wanted to hear from the rest of the leadership team. Why? Given that it was a newly formed team, they wanted to see if it had a unified, aligned voice.



**4. WHERE YOU COMMUNICATE:** Here's the zinger. Staff didn't want our client to stop the all hands meetings. In fact, they wanted more of them. Not because they liked the meetings themselves, but because it provided a way for them to see and hear from leaders on consistent basis. So the real question becomes what can a leader do beyond the meetings to make the organization feel like it's hearing from leadership frequently and consistently? Here are some of the ideas that came up: weekly personal email from the leader, a leader's blog or tweets, the good old fashioned "walk around" of the halls. The take home point is that frequent, small touch points make a huge difference in making others feel engaged with their leadership. And, these things add tremendously to the usual meetings.

#### SEVEN DIMENSIONS OF EMPLOYEE ENGAGEMENT BY DAVE ULRICH

- Build on strengths that strength that strengthens others.
- Determine the directions that matter most to you.
- Build high-relating teams as well as high-performing teams.
- Create a positive work environment.
- Get engaged with challenges that you enjoy.
- Develop personal resilience and learning.
- Cultivate civility and delight.

#### CASE STUDY: HCL'S BEST ENGAGEMENT PRACTICES

During 2000 to 2005, HCLT has fallen back in the pack. It was behind the competitors and competitors were racing past HCL. At that point CEO of HCL Vineet Nayar has made the decision to change & accomplished transformation through unique approach:

The business world largely focused on What of the strategy- New products, new propositions, new markets – and pay less attention to how a business run its teams & companies.

In HCL case the difference is how offers the greatest opportunity to drive transformation & accelerated growth. This is called How approach' Employee comes first customers second'

By putting employees first, you can bring about fundamental change in the way a company creates and delivers unique value for its customers and differentiates from its competitors. Through a combination of engaged employees and accountable management, a company can create extraordinary value for itself, its customers, and for individuals involved in both companies. There were four phases during HCL transformation as employee motivation

**MIRROR MIRROR: CREATING THE NEED FOR CHANGE:** The future image what CEO called 'The romance of tomorrow, and that's what motivates people to press the accelerator to the floor when logic tells them to step on the break.

**TRUST THROUGH TRANSPARENCY: CREATING A CULTURE OF CHANGE:** To transform a company, people must align themselves and work together toward one goal, but this will not happen without a culture of trust. At HCLT, the focus was one specific trust building action: pushing the envelope of transparency. This created tremendous trust between management and employees- trust that benefitted the company when they emerged from the hard times & went for the next level of performance.

**INVERTING THE ORGANIZATIONAL PYRAMID: BUILDING A STRUCTURE FOR CHANGE:** The biggest problem at HCLT was organization structure, that it did not support the people in what they call the value zone: the place where value is truly created for customers. So to shift focus to the value zone, they turned the organization upside down and made management and managers, including those in enabling functions (such as human resource, finance, training and others), accountable to those who create value, not just the other way around.

**RECASTING THE ROLE OF CEO: TRANSFERRING THE RESPONSIBILITY FOR CHANGE:** One of the structural flaws of traditional management system is that the leader holds too much power. If objective is to create sustainable change and to prevent your company from periodically falling out of the race, you must think carefully about the role of the office of the CEO and not just the role of the person who holds the job at the moment.

You as a CEO must avoid urge to answer every question .Instead you must transferring ownership of the organization's growth to the next generation of leaders who are closer to value zone. Only in this way can you begin to create a company that is self run and self govern, one in which employees feel like the owners, are excited by their work and constantly focus on change & disruptive innovation at the very heart of the value zone.

**FIND UNDERSTANDING IN MISUNDERSTANDING: RENEW THE CYCLE OF CHANGE:** It is easy to misunderstand the intent & the method of EFCS, Mr. Vineet Nayar has discussed various objections to this unique approach that he has ever heard:

- This will not work, It is not necessary in good times
- Customers will never see the value, It requires large scale initiatives
- It doesn't improve a company's performance

In fact, the practices adopted at HCL, if employed at any company, bring real value to customers in good times and bad, don't require massive expenditure, and have marked positive effect on corporate performance.

#### ANOTHER CASE STUDY (UJJIVAN FINANCIAL SERVICES PVT LTD) IN INDIA

##### EMPLOYEE'S FAMILY ENGAGEMENT

Meeting and interacting with the parent(s)/guardian(s) of the staff joining Ujjivan Financial Services Pvt Ltd. is not only initiating Employee Family Engagement but also educates the parents/guardian (s) on their wards professional career and extends the relationship of Ujjivan with the employee's family. Joining Ujjivan is then not only an individual's choice but a family decision.

The Manager should personally invite the Employee's family for the branch opening ceremony (in case of a New Branch) and for a Branch Visit (for Branches already in Operation). The team should take them around the branch. The senior official inaugurating the branch (for a New Branch) should address the audience and welcome the staff's family. While thanking them for choosing Ujjivan Pvt Ltd.- must mention its-Mission and Goals- inform them on the contribution their wards would be making to company ABC Financial in reaching its goals. The family should be encouraged to express their views and share their feelings with Ujjivan team. Discuss the various milestones and the celebrations- the staff family events which would be organized to

Celebrate customer milestone. Employee's family must understand the importance of their wards contribution in company and the respect and pride Ujjivan associates with the staff.

#### SURVEY QUESTIONNAIRE TO MEASURE EMPLOYEE SATISFACTION LEVEL

We have used a questionnaire-based survey to examine the intrinsic motivational state of the employees working in company from MFI sector in India. The respondent of the survey includes males and females, married as well as unmarried, in the age group of 23 to 50 years, with varying qualification & sample size was 62. Five intrinsic motivators: Credibility, Respect, Pride, Fairness, Camaraderie, was chosen for study. The main objective was to conduct this survey to identify bottom two reasons of employee demotivating as company has not won the award in top 5 MFI's companies name as last year they have bestowed with this award.

**INSTRUCTIONS:** Please read & rate each of the following statements by placing a check mark in the appropriate box.

Name of Employee:	Age:	Sex:	Designation:
Department:	Status (Married/ Single)	Last Highest Qualification:	Date of Joining:
Branch Location:			

1.Credibility	Statements by dimensions	Score ( 1 to 4 )
Communication	<ol style="list-style-type: none"> <li>1. Management keeps informed me important issues.</li> <li>2. Management makes its expectation very clear</li> <li>3. I can ask management any reasonable question &amp; get Straight answer.</li> <li>4. Management is approachable ,easy to talk with,</li> </ol>	1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4
Competence	<ul style="list-style-type: none"> <li>▪ I am well aware about my work &amp; role</li> <li>▪ I get sufficient feedback about how well I am doing</li> <li>▪ Company give trainings to bridge the gap for existing &amp; prospected role to develop competency</li> <li>▪ I keep informed about training s held in region</li> </ul>	1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4
Integrity	<ol style="list-style-type: none"> <li>1) Company has culture of getting along with team-mates--or professional peers.</li> <li>2) Employee is considered as an Asset</li> <li>3) Do you recommend your friend for employment in your company</li> <li>4) People trust each other in my work group</li> </ol>	1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4
2. Respect	Statements by dimensions	Score ( 1 to 4 )
Support	<ol style="list-style-type: none"> <li>1) Do you get sufficient support from your supervisor</li> <li>2) Do your Boss guides you on your professional queries</li> <li>3) People held responsible for low performance</li> <li>4) I am given my complete JD &amp; sufficient resources also</li> </ol>	1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4
Caring	<ol style="list-style-type: none"> <li>1. Do your queries resolve quickly when they arise</li> <li>2. Do your conflicts resolve when they arise</li> <li>3. Ideas &amp; opinions are appreciated</li> <li>4. I have received good wishes &amp; greetings from my company on my special day</li> </ol>	1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4
3.Fairness	Statements by dimensions	Score ( 1 to 4 )
Equity	<ol style="list-style-type: none"> <li>1. Do your organization have equal opportunity for employment</li> <li>2. Do company believes in secularism</li> <li>3. Do you get equal opportunity for promotions</li> <li>4. I found friendly environment at my work area</li> </ol>	1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4
Impartiality	<ol style="list-style-type: none"> <li>1) Does your company has fair &amp; unbiased Appraisal system in place</li> <li>2) All supervisors are to be given training on how to conduct appraisals</li> <li>3) In my work group, people are assigned tasks that allow them to use their best skills</li> </ol>	1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4
Justice	<ol style="list-style-type: none"> <li>1) Are employee grievances addressed satisfactorily</li> <li>2) Do your company follow all statutory compliances</li> <li>3) I keep informed about changes in organization that affect my work group</li> </ol>	1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4
4.Pride	Statements by dimensions	Score ( 1 to 4 )
Personal Job	<ol style="list-style-type: none"> <li>1. I proud of my work</li> <li>2. I wish to have long association with this company</li> <li>3. I can do more than my current assignment</li> </ol>	1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4
Team	<ul style="list-style-type: none"> <li>• Have been a member of a team that struggled or failed to accomplish its goal?</li> <li>• Do you ever invited for cross functional projects to play a vital role.</li> <li>• My peer group provides me chances to grow &amp; develop</li> </ul>	1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4
Corporate Image	<ul style="list-style-type: none"> <li>• I hide my company's name among social gathering.</li> <li>• Do you feel your internal customers appreciate company's services, Products?</li> <li>• I know companies associations with others organizations &amp; the owners /promoters of company</li> </ul>	1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4
5.Camaraderie	Statements by dimensions	Score ( 1 to 4 )
Intimacy	<ol style="list-style-type: none"> <li>1. Company believes individual dignity has to maintained</li> <li>2. My company has gender bias approach. In its policies</li> <li>3. I am given comp off if I worked on special holidays</li> </ol>	1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4
Hospitality	<ul style="list-style-type: none"> <li>• I treated respectfully when I visit my supervisor</li> <li>• Company provides company transport if delays happen after working hours due to some work</li> <li>• My supervisor always stands by me on my decisions</li> </ul>	1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4
Community	<ol style="list-style-type: none"> <li>1. I am aware about the different departments of my company</li> <li>2. I am equally responsible for its work culture</li> <li>3. My company has its presence in local communities &amp; I am aware about its target customers</li> </ol>	1, 2, 3, 4 1, 2, 3, 4 1, 2, 3, 4

**BROAD AREAS COVERED:** Here's an example of a four item Likert Scale that attempts to estimate the level of commitment esteem a person has on the job. Notice that this survey has no centre or neutral point -- the respondent has to declare agreement on 1 to 4 with the item.

**CREDIBILITY---** Measures the extent to which employees see management as credible (Believable, trustworthy), by assessing employees' perceptions of management's communication practices, competency, and integrity.

**RESPECT:** Measures the extent to which employees feel respected by management, by assessing the level of support, collaboration & caring employees see expressed through management's action towards them.

**FAIRNESS:** Measures the extent to which employees feels that management practices are fair, by assessing the equity, impartiality, justice employees perceive in the workplace.

**PRIDE:** Measures employees 'sense of pride in their work by assessing the feelings employees have towards their job, team or work group & the company.

**CAMARADERIE:** measures employee's sense of camaraderie in the workplace by assessing the quality of intimacy, hospitality & community within the workplace.

Score: 1- Excellent, 2- V. good, 3- Good, 4 Poor

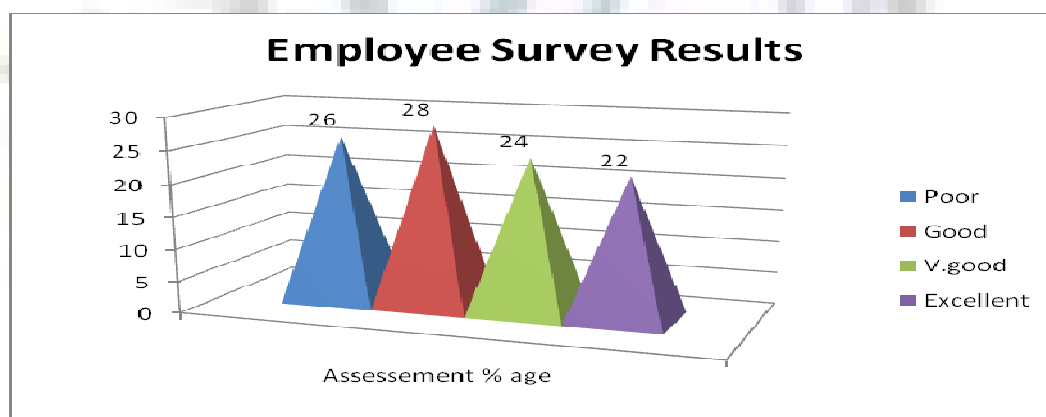
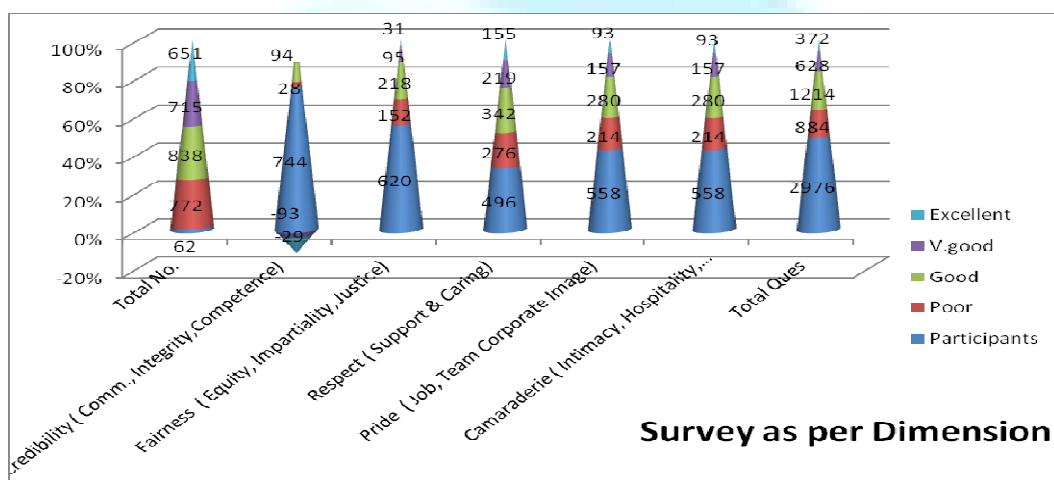
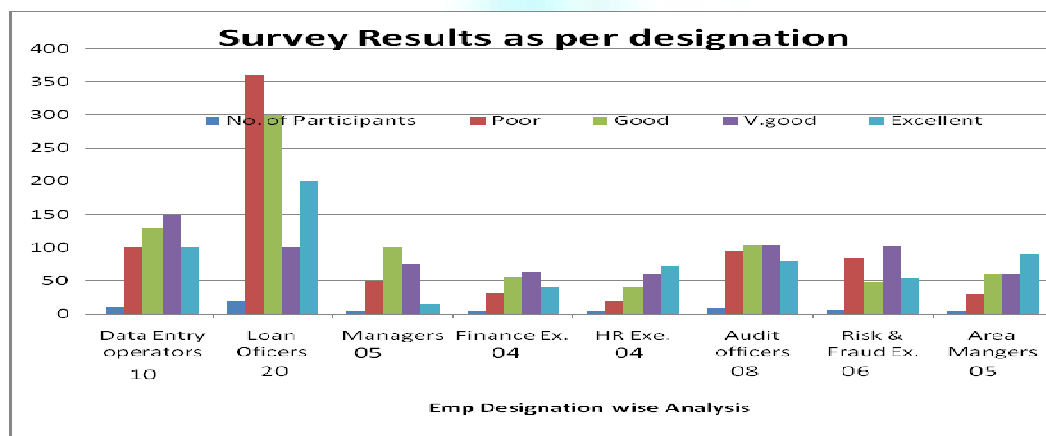
### SUGGESTIVE FINDINGS & OBSERVATIONS

The top 2 areas of concern are **Credibility & Respect** vertical.

AFFECTED STAKEHOLDERS ARE: Loan Officers & Data Entry Operators

### RECOMMENDATIONS

Creating environment through induction/ orientation, Introduction about company's mission/goal, interactive sessions about employee's past and his current role, taking employee out with head and team, Individual attention to be paid to feel him important, Internal customers need to be addressed proactively, understanding of their expectation from HR point of view, conduct timely internal customer satisfaction from different ways e.g. feedback, questionnaires, informal meet etc.



### EMPLOYEE REFERRAL

As you all know any organization's requirement would be in finding the right people for the right available positions. The organization would identify various means of sourcing the right person using help of various consultants/ portals and also through advertisements.

However, in addition to the above, we would like to adopt the practice on an 'employees interest' that definitely encourages staff working across various positions at Ujjivan to apply for positions that they may consider appropriate depending on their skills and aptitude and may also refer people with similar skill sets. The main purpose is to locate talent within the organization as well as popularize 'local referral'

### PROCEDURE

- a) **SELECTION OF STAFF INTERNALLY** – Fill in the "Internal Recruitment Form" through your Department Head and forward it to the HR department - Recruitment
- b) **EMPLOYEE REFERRAL** - When referring an individual, employee must be aware of HR guidelines given in the hand book and:
  - i) Complete the employee referral form which is attached and
  - ii) Forward the completed form to the HR department – Recruitment

### REFERRAL RECOGNITION

Candidates referred by Grade 4 & Grade 3 staffs who have been hired will be awarded an incentive of Rs 500/- & 1000/- respectively, subject to their confirmation.

### CONCLUSIONS

There is a greater need to connect and engage innovatively with employees to provide them with an organizational identity & to increase productivity as whole. Leaders must explore cultural prerequisites & for this approach to management- need for honesty, transparency, trust & dialogue at all levels in the organization. Employee engagement plays a greater role in the current era where every contribution by the employee counts. Employee satisfaction survey findings help to achieve top two bottom areas of concern which need to address proactively to increase employee integrity & organizational productivity. I have met many employees who are only too keen to explain how their working lives have been transformed; and we have read many studies which show a clear correlation between engagement and performance – and most importantly between improving engagement and improving performance. Engagement, going to the heart of the workplace relationship between employee and employer, can be a key to unlocking productivity and to transforming the working lives of many people for whom Monday morning is an especially low point of the week. Individual employees in companies with strong engagement strategies described to us how their working lives have been transformed for the better.

### ACKNOWLEDGEMENT

It was hard to get through the recession without engaging Ujjivan's workforce. I also very grateful for the time and commitment from the practitioners, experts and leaders, who so generously gave their time individually and collectively to greatly enrich this paper.

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**BIG-BOX RETAIL STORE IN INDIA – A CASE STUDY APPROACH WITH WALMART**

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**ABSTRACT**

*The retail industry in India is one of the sunrise sectors in the economy. AT Kearney (2011) has ranked India fourth indicating that the country is one of the most attractive markets for global retailers to enter. It has made India the cause of a good deal of excitement and the cynosure of many foreign eyes. A big-box store is a physically large retail establishment, usually part of a chain. This is also referred to as supercenter, superstore, or megastore. Examples contain large department stores such as Wal-Mart. The purpose of the paper is to study the impact and trends of big-box retail, and to explore strategies used to regulate big-box retailers. This paper also discussed a case study of Wal-Mart. The study is purely based literature reviews. Through the study of the overall research works, concludes "WalMart is always bad for business, if there is no government stringent regulation".*

**KEYWORDS**

Big-box retailing, WalMart, retailing.

**INTRODUCTION**

The retail industry in India is of late often being hailed as one of the sunrise sectors in the economy. AT Kearney (2011) has ranked India fourth indicating that the country is one of the most attractive markets for global retailers to enter. A **big box store** is a physically large retail establishment, usually part of a chain. The term sometimes also refers, by extension, to the company that operates the store. This is also referred to as **supercenter, superstore, or megastore**. Examples include large department stores such as Wal-Mart. A big-box retail chain's success depends heavily on cost efficiency and that includes the cost that consumers incur in reaching a big-box store from their house or workplace.

**BIG BOX RETAIL STORE**

Big box retail is generally defined as a store that is several times the size of a traditional outlet in its category. The list of qualities and characters of big box retail stores have been identified by the Columbia university researchers. The characteristic of big box retail store includes:

- Usually occupy substantially more than 50,000 square feet, with typical ranges between 90,000 and 200,000 square feet;
- Derive their profits from high sales volume rather than price mark-up;
- Large, windowless, rectangular single-story buildings;
- Standardized facades;
- Reliance on auto-borne shoppers;
- Acres of parking;
- No-frills site development that eschews any community or pedestrian amenities;
- Seem to be everywhere and unique to no place, be it a rural town or urban neighborhood.

**CATEGORIES OF BIG BOX RETAIL**

There are numerous ways to categorize big box retail formats, with the following four of the most common:

- Discount department stores: Range in size from approximately 80,000 square feet to 150,000 square feet and offer a wide variety of merchandise including, house wares, home furnishings, apparel, and beauty aids.
- Superstores: These are discount department stores that sell groceries in 25% to 33% of their store area. The largest of the big box stores, they can occupy as much as 200,000 square feet and up.
- Warehouse clubs: Offer a variety of groceries and discount general merchandise in bulk at wholesale prices. There are a more limited number of product items than offered at general discount stores or supermarkets, and annual membership dues are usually charged. Store sizes range from 100,000 to 170,000 square feet.
- Category killers: Offer a large selection of merchandise and low prices in a particular type of product category. Store sizes are typically smaller, ranging from 20,000 to 80,000 square feet.

In light of all of the above, the following criteria are used to define big boxes for purposes of this study:

- Freestanding stores (i.e., not part of a mall) that average at least 100,000 sq. ft.;
- Stores that sell a relatively wide variety of merchandise, including products that fit into at least several of the industries within retail trade;
- Firms that do business nationally.

Analyzing the above criteria's, a big-box retail chain's success depends heavily on cost efficiency and that includes the cost that consumers incur in reaching a big-box store from their house or workplace. The technical paper of Thomas J. Holmes, identified the average distance to a Wal-Mart store is approximately 6.9 miles (~11 Kilometers) for census block groups (US) with a population of 500,000 people in a 5 mile (~ 8 Kilometer) radius.

**NEED OF THE STUDY**

This study critically analysis the impact of big box retail outlets and its impact in the country. The study helps to policy maker to concentrate on the discussed issue, to frame rules and regulation on Big box retail stores.



**OBJECTIVE OF THE STUDY**

The primary objective of the study focused on

1. To identify the impact of big box retail stores and its trends in India.
2. To suggest the strategies to regulate big box retail store.

**IMPACT OF BIG BOX RETAIL STORES IN THE ECONOMY**

Many studies that examine the impact of Wal-Mart and Other large retail chains and, in some cases, the benefits of locally owned businesses.

With respect to the impact of entry by big-box stores such as Wal-Mart on retail employment and earnings, evidence from the United States is mixed. Using county-level data, a recent study finds that Wal-Mart entry increases retail employment in the year of entry while contrasting evidence indicates that each Wal-Mart worker replaces approximately 1.4 retail workers representing a 2.7 percent reduction in average retail employment (Neumark, Zhang and Ciccarella, 2008). Yet other work on Wal-Mart expansion suggests that store openings reduced both average earnings of retail workers (Dube, William and Eidlin, 2007). Recent evidence also suggests that having a chain store in a market makes roughly 50% of the discount stores unprofitable and that WalMart's expansion over the 1990s explains about 40–50% of the net reduction in the number of small discount stores (Jia, 2008).

According to AT Kearney's 2011 edition of Global Retail Development Index (GRDI), Organized retail accounts for 7 percent of India's roughly US\$ 435 billion retail market and is expected to reach 20 percent by 2020. Big-box retail, in the form of hypermarkets, has gained prominence a refocus from the burgeoning supermarkets and small formats of several years ago. Food accounts for 70 percent of Indian retail, but it remains under-penetrated by organized retail. Organized retail has a 31 percent share in clothing and apparel and continues to see growth in this sector. The home segment shows promise, growing 20 to 30 percent per year. India's more urban consumer mindset means this sector is poised for growth.

The following are the important aspect of big box retail stores:

**1. Economic impact of local businesses vs. Chains:**

These study have found that locally owned stores generate much greater benefits for the local economy than national chains. Pankaj Ghemawat and Ken A. Mark (2007) studied about the real WalMart effect, the finding of the study is Wal-Mart's treatment of workers and host of other alleged knocks against society. But its overall impact benefits the economy and lower-income consumers. The real conflict is not between the capital and labour. It is a battle involving consumers and cost-efficient producers against traditional retailers, organized labour and community activists.

**2. Retail employment:**

This study examined whether the arrival of a superstore increases or decreases the number of retail jobs in the region. The upstream of a big-box store creates very few jobs for the local economy (i.e., Made in China), and the downstream ripple effects are terrible because retail jobs are overwhelmingly part-time and poverty-wage, with no health care. That means most retail workers have very small disposable incomes: after paying for bare necessities, they have little left with which to stimulate the local economy. Building new retail space just moves sales and lousy jobs around. It doesn't grow the economy. At present 40 million people are employed in Indian retail sector but with the entry of big retail giants we will witness heavy cuts on employment level. The government proposes to open FDI in multi-brand retail in cities with population of more than a million people. But even if that happens 4 lakh people will lose their jobs.

**3. Wages & benefits:**

The study has found that big-box retailers, particularly wal-mart, are depressing wages and benefits for retail employees. Retailing is infamous for its low wages, part-time hours, and lack of health insurance and pension benefits. The only exception are those grocery chains that are unionized, but big-box behemoth Walmart, by entering the grocery business with its Supercenters and aggressively fighting union organizing efforts, is now the top seller of food and a major source of downward pressure on grocery wages. The same pattern is true even in retail segments where there are no unions (Stacy Mitchell). As studies by the Austin, Texas-based consulting firm have found, national retail (including restaurant) chains in general pay lower wages and benefits than do locally owned businesses. By that measure and others, it has found that the chains generate fewer ripple effects in local economies: they procure less, bank less, contribute less, and participate less.

**4. Existing businesses:**

The arrival of a big-box retailer displaces sales at existing businesses, which must then downsize or close. This result in job losses and declining tax revenue, which some of these studies quantify.

Kenneth E. Stone et al (2001) study examines several Iowa communities where big box building supply stores, such as Menards and Home Depot, have opened in the last decade. Sales of hardware and building supplies in the host community and surrounding counties are tracked over several years to test what the authors call the "zero-sum-game theory," namely that the retail sales gains generated by big box stores are offset by sales losses at existing, often locally owned, retail stores. The results confirm the theory, finding that sales of hardware and building supplies grow in the host communities, but at the expense of sales in smaller towns nearby. Moreover, after a few years, many of the host communities experienced a reversal of fortune: sales of hardware and building supplies declined sharply, often dropping below their initial levels, as bigger box stores opened in the surrounding region and saturated the market.

**5. Consumers & prices:**

The survey found that, by "an eye-popping margin," independent drugstores outranked all other pharmacies-- including drugstore chains, supermarkets, mass merchandisers (e.g., wal-mart), and internet companies--in terms of providing personal attention, offering health services such as in-store screenings, filling prescriptions quickly, supplying hard-to-find drugs, and obtaining out-of-stock medications within 24 hours. Prices at independent pharmacies were lower than at chain pharmacies, but higher than at mass merchandisers and internet companies. (Time to switch drugstores? - *consumer reports*, october 2003)

**6. Traffic:**

This study indicates that the manual significantly underestimates the traffic generated by large supercenters (stores that combine general merchandise and a full grocery department) and that traffic analyses based on it are unreliable indicators of the actual traffic impact of a supercenter development.

As big-box stores multiplied in the 1990s, the road miles logged by the average household for shopping increased by more than 40 percent—a total of 95 billion additional miles a year for the country as a whole. (U.S. Dept. of Transportation, National Household Travel Survey). A 2005 study of 3,200 households in King County (greater Seattle), Washington, found that, compared to residents of low density subdivisions that lack neighborhood stores, people who live in traditional neighborhoods with a variety of small scale retail services, schools, parks, and other uses nearby:

- log 26 percent fewer vehicle miles per day;
- generate lower emissions of pollutants such as nitrous oxide, volatile organic compounds, and carbon dioxide, a leading cause of global warming;

**7. Charitable contributions:**

Companies with fewer than 100 employees gave an average of \$789 per employee, compared to \$334 per employee at firms with more than 500 employees. A study of businesses in the mid-coast region of Maine. Funded by the Minneapolis-based Institute for Local Self-Reliance, found that for every \$1 million in sales, big-box stores gave approximately \$1,000 to local charities. Conversely, locally owned businesses gave more than \$4,000 per \$1 million in sales—a fourfold increase. For communities strapped by the current slump, charitable giving is an important component of the local economy.

**8. Other Issues**

- Poverty rates:** Some studies found that WalMart store in certain Counties have fared worse in terms of family poverty rates.
- City costs:** some studies compare the municipal tax benefits of big-box development with the cost of providing these stores with city services, such as road maintenance, police and fire—finding that cities do not always come out ahead.
- State costs:** some studies proved that the big box retailers such as wal mart, the employees in the country no earning enough money to meet their own expenses. The states of the countries are reported that high costs associated with providing healthcare (Medicaid) and other public assistance to big-box employees.

d. **Subsidies:** The expansion of big-box retailers has been financed in part by massive development subsidies and tax advantages provided by local and state governments.

## THE TRENDS OF BIG BOX RETAIL STORES

The trend of big box retailing has expanded to a global level, increasing sales figures and store numbers has fuelled this movement. It revolves around WalMart developing a solid strategy for success. Though expanded sales, employment, and percentage share of the grocery market, WalMart has focused on practices and information sharing in addition to supply chain innovation. They followed alternative formats in capturing significant share of markets, shopping at traditional supermarkets less frequently than in the past has provided opportunities for alternative outlets, where leaders are increasingly extending their reach with new store formats and offerings, including community involvement and innovative promotions. Retailers are also moving towards becoming more sophisticated marketers by fulfilling needs of consumers; strategies revolve around catering to top shoppers through loyalty, signature items, and brand recognition. The retailers are organizing around the need state, this focuses on programs designed to meet consumer lifestyles and needs based on time, family, money, and personal obligations. The retailers are also focused on optimizing the box, including efficiency and allocation through space, packaging, and handling. As a major contributor in consumer decision-making, pricing strategies apply price optimization and management to effectively strengthen a given product's price image. These trends are rounded off by the evolution of developed market and opening up of FDI through new laws allows greater market access. The trends in global retailing explain directional changes of retail on the world market and provide insight to future focuses of retail marketing.

## BIG BOX RETAILING IN INDIA

India has its own 'Big Box Retailers. Currently all major business groups in India have a retail presence – Tata, Aditya Birla, Reliance, RPG, Future. Besides cooperative organizations have been active for quite a while – Sahakari Bhandar, Chintamani etc. While these have made some impact on the retail environment, they are nowhere near the scales operating in other countries.

Delhi-based Indian Council for Research on International Economic Relations looks at the effect organized retailing has on the unorganized retail sector. It shows that, on average, when an organized retailer opens, the kirana stores nearby generally lose about 23% of their sales in the first year, but are back at their original sales figures within five years. About 1.7% close down every year, but, even in the medium to long run, traditional retailers will still control 85% of the market

The factors that are in play influencing role in development of Retailing in India are:

**1. Product diversity:** Consumer market in India, despite its overall size is rather limited in width. The number of Stock Keeping Units available for stocking is simply not sufficient to fill a 15000 sq ft space with adequate diversity. Imported products can help to widen, but despite FMCG imports being permitted now for many years, nationally this has not yet taken off. Food habits of the population at large are also quite conservative. While people may be ready for experimentation, habits are difficult to form. And it will be habits that drive product demand at retail level.

**2. High Real Estate Costs:** Relative to income levels rentals in urban India are very high. Compounding this is the fact that sheer availability of large, well connected spaces in residential areas is poor. Further, many landlords take an advance or deposit to let out space owned by them. All these cumulatively push up the overheads and constrain a big box retailer to operate within the city. Many Shopping Malls especially those that started up early followed the Real Estate model rather than a Facilities model. This has had an impact in maintenance of the common areas and facilities – lifts, escalators, and toilets, parking to name a few. If footfall in the malls is compromised as a result, it will impact those retailers who would have set up shop especially if it is set up on rental (rather than profit / turnover share) basis.

**3. Last Mile Logistics:** As of now this probably is the most important constraint impacting growth of big box retail in India. In Western countries reportedly bulk of the savings in logistics is realised in controlling the last mile i.e. supply from warehouse to the point of sale. In India this cost element is high. For instance traffic restrictions and difficulties result in practically little savings. If suppliers are required to effect deliveries to individual retail outlets, it becomes difficult to realise the benefit of scale. In such cases there may be no difference in logistics cost between servicing a provision shops and a Big Box Player. This dimension is also compounded by fiscal issues. Fiscally India is not one country, although this may change with GST implementation. ICRIER study suggests that those who sell directly to organized retailers get 60% more than they would receive from selling in the "mandi," the traditional Indian market system dominated by middlemen.

**4. Local Competition:** For most groceries in India, operation is not exactly on business principles such as healthy return on investment and opportunity costs. They are run more as a source of livelihood or occupation. The ability of these players to compete by accepting low margins will also affect scale-ups by the big box players. Besides the 'connect' these players have with their Shoppers say through provision of credit is also difficult to match by the big box players. The benefit to consumers is rather obvious: an efficient supply chain and the economies of scale reaped by big-box retailers will lead to lower prices for produce and other basic goods that urban middle class consumers currently purchase from local stores. Lower prices, in turn, mean more disposable income in the pockets of these consumers to spend on other things, to save, to invest in the education of their kids, or whatever else.

**5. Technology / Processes:** For a given system it can be contended that Technology or related processes have not been a constraint for existing players. An existing retail player can implement scanning, for instance. In other words relevance or applicability can be the question – availability is not. However this dimension has another side to it. Infusing technology and processes in this business has been happening at very high level of manpower costs. For instance a Provision Stores does not need a CEO, CFO or a Marketing Manager. The high costs incurred by the organised players need to be recovered from the margins generated.

The Big Players are unable to effect significant reductions in price only the other benefits remain – such as shopping experience and convenience.

It will be certainly possible for a global player to enter and register presence in many markets. But implementation of their traditional business model on a large scale so as to displace the local dynamics may take a while. They deploy an alternative business model it may help. But whether such an alternative model will replace the Provision Stores rapidly remains to be seen.

It must be remembered that the livelihood threat that is often referred to has been existing. India has had its share of Supermarkets for many years, though not as sophisticated as those abroad. The international players will have deeper pockets and the ability to offset losses from India with profits from elsewhere. Still they too will be ultimately accountable to their shareholders – their ability to sustain developmental losses in India may not be infinite, as a result the key business drives are as follows as

- Maintain margins despite tight economy; optimize supply chain
- Avoid stock outs on in demand goods, improve responsiveness to trends/opportunities
- Compete aggressively with volume, category and convenience competitors
- Cost effectively educates consumers (mobile, digital displays, wands....)
- Satisfy demanding consumers and integrate their buying experience across channels
- Deal with regulation and compliance
- Optimize costs including IT
- Seek profitable expansion opportunities
- Manage online reputation risk

## SUGGESTIONS AND CONCLUSION

The Trends Affecting Retail Businesses are mobile marketing and social media, the Flat panel displays are at an all time low cost, demise of some larger chains, economy driven changes in consumer buying power and behavior; slow recovery, reinvigoration of credit card purchasing, Stop'n'Shop are experimenting with shopping wands.

The government has to monitor the foreign investors regarding the transparency of the business. The regulators should frame strict rules and regulation on big-box retailers. They should consider the following points as well before policy making, they are as follows as

1. The big box store should create value to consumers by way of prices.
2. The local retail firm owners should create their own retail business model to win the developing economy.
3. The prices of big box retailers and local shop owners should be comparable in this they can avoid cut-throat competition.
4. The stage of modern approach stores are not identical, shifting of choice of retail outlets and preference of consumer may going forward, it take time to see drastic changes in which as mentioned earlier local owners should create their own model to attract consumers. All big boxes are not identical, as Austin study said.
5. The small shop retailers should create customer value to enhance the local economy.
6. There should be a healthy competition between small and big box retailers in which they country can maintain economic stability and protection towards the local business owners.
7. The local fiscal impact of retail is a function of maintaining a retail base to meet local demand.
8. The City should promote design standards that reflect community values; but those standards should not be so onerous or prescriptive that neither national nor local retailers can justify doing business in India.
9. Big boxes put downward pressure on wages.
10. Lower wages tend to create social costs that are not fully accounted for in the price of the goods that consumers purchase.
11. Local retailers may have stronger linkages, per dollar of revenue, to the local economy than the big boxes
12. The healthiest consumer market is the market that maximizes consumer choice on a sustainable basis, i.e., a market that is competitive.
13. New Urbanism offers the possibility of mitigating some of the concerns associated with the big boxes, as well as potentially creating an opportunity to leverage destination consumers for local businesses which entails pedestrian-friendly scale, mixing a variety of land uses, connectivity with adjacent neighborhoods, facilitation of transportation choice, and a range of retail formats.(Austin Report)

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# IMPACT OF INFORMATION TECHNOLOGY ON ORGANISATIONAL CULTURE OF STATE BANK OF INDIA AND ITS ASSOCIATED BANKS IN SRIGANGANAGAR AND HANUMANGARH DISTRICTS OF RAJASTHAN

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## ABSTRACT

Information Technology has today become a necessity for banking industry. Application of Information Technology in State bank of India and its associated bank has changed the organizational culture of bank in different ways. Now S.B.I. and its associated banks are offering new and better services to its customers which were not possible few years ago. Employee productivity has also increased due to applications of Information Technology in organisation.

## KEYWORDS

Information Technology, Organisational Culture.

## INTRODUCTION

Information Technology has now become a necessity for all organizations. In order to survive in highly globalized, liberalized, privatized and a competitive environment it has become necessity for banks to use IT. IT has introduced new business paradigm. It is increasingly playing a very important role in improving the services of banking sector. Tremendous progress took place in the field of technology which has reduced the world to a global village and it has brought remarkable changes in the banking industry. Branch banking in the brick and mortar mode has been transformed into click and order channel mode. Change in organizational culture of banks due to Information Technology can be easily noticed by anyone dealing with them.

## OBJECTIVES OF THE STUDY

The objectives of the present study are as follows:-

1. To study in detail about impact of I.T. on organizational culture of State Bank of India and its associated banks.
2. To study impact of IT enabled Management Information System (MIS) and Information Technology Applications on Employee Productivity and customer services.

## COLLECTION OF THE DATA

The study was concluded on the basis of primary and secondary data. Primary data was collected from 150 officers of State Bank of India and its associated banks from Sri Ganganagar and Hanumangarh District of Rajasthan State of India. Secondary data was collected from the various websites, books, journals, government publications, Articles published in the magazines and news papers on the subject and various reports like Report on Trends and Progress of Banking in India published by Reserve Bank of India, Mumbai.

## ANALYSIS AND DISCUSSION

**TABLE 1: COMPUTERISATION OF PUBLIC SECTOR BANKS**

Category	(Percent of total branches in March of mentioned year )				
	2005	2006	2007	2008	2009
<b>Full Computerized Branches( i+ ii )</b>	71	77.5	85.6	93.7	95.7
<b>i) Branches under CBS</b>	11	28.9	44.4	67	81.4
<b>ii) Branches already Fully Computerized#</b>	60	48.5	41.2	26.6	14.3
<b>iii) Partially Computerized Branches</b>	21.8	18.2	13.4	6.3	4.3

Source: Report on Trend and Progress of banking in India, Various issues from 2004-05 to 2008-09

# Other than branches under core banking Solution (CBS)

Computerization and adoption of core banking solutions was one of the major steps in improving the efficiency of banking services and it has changed organisational culture of banks. At present almost 98 percent of the branches of public sector banks are fully computerised and within which almost 90 percent of branches are on core banking platform.

**TABLE 2: COMPUTERISATION OF PUBLIC SECTOR BANKS AS ON MARCH 31, 2009**

Name of the Bank	Branches under Core Banking Solution (%)	Fully Computerized Branches (%)	Branches Partially Computerized (%)
<b>Public sector bank</b>	81.4	95.7	4.3
<b>Nationalized Bank</b>	73.4	93.8	6.1
<b>State Bank Group</b>	100	100	NIL

Source: Report on Trend and Progress of Banking in India 2008-09

100% of branches of State Bank Group was fully computerised and were under core banking solutions as on March 31, 2009 whereas in case of public sector banks it was 95.7% and 81.4%. In case of Nationalised banks 93.8% of its branches were fully computerized and 73.4% of its branches were under core banking solutions.



TABLE 3: GROWTH OF ATM'S OF SCHEDULED COMMERCIAL BANKS

ATMs	Year	Bank Group					Total
		Nationalized Bank	SBI Group	Old Private Banks	New private Banks	Foreign Banks	
Total Number Of ATM	2005	4,772	5,220	1,241	5,612	797	17,642
	2006	7,165	5,443	1,547	6,112	880	21,236
	2007	9,888	6,441	1,607	8,192	960	27,182
	2008	13,355	8,433	2,100	9,867	1,034	34,906
	2009	15,938	11,339	2,674	12,646	1,054	43,760

Source: Report on Trend and Progress of Banking in India 2008-09

ATM is has facilitated the customers to have access to money anytime without visiting the bank branches in person. The system is known as 'Any Time Money' or 'Any Where Money' because it enables the customers to withdraw money from the any of bank's ATMs or other bank's ATM round the clock. 11,339 ATM in India belong to SBI group that is 25.91% of total 43,760 ATM's in the country.

TABLE 4: BANK GROUP-WISE AUTOMATED TELLER MACHINES AS ON 31 MARCH 2011

Bank Group/Category	On site ATMs	Percent of total	Off site ATMs	Percent of total	Total Number of ATMs	Percent of Total	On site ATMs as percent of total ATMs	Off site ATMs as percent of total ATMs
Public Sector Banks	29,795	73.15	19,692	58.30	49,487	66.42	60.2	39.8
Nationalised Banks	15,691	38.53	9,145	27.08	24,836	33.33	63.18	36.8
SBI Group	14,104	34.53	10,547	31.23	24,651	33.09	57.21	42.8
Private Sector Banks	10,648	26.14	13,003	38.49	23,651	31.84	45.02	55.0
Old Private Sector Banks	2,641	6.48	1,485	4.39	4,126	5.54	64.01	36.0
New Private Sector Banks	8,007	19.66	11,518	34.10	19,525	26.21	41.01	59.0
Foreign Banks	286	0.70	1,081	3.20	1,367	1.83	20.92	79.1
All Banks	40,729	100.00	33,776	100.00	74,505	100.00	54.67	45.3

Source: Report on Trend and Progress of Banking in India 2010-11 and calculations done by Research Scholar

Up to 31 March, 2011, Public sector banks have installed 49,487 ATM's (66.42%), Nationalized banks have installed 24,836 ATM's (33.33%), SBI Group have installed 24,651 ATM's (33.09%), Private Sector Banks have installed 23,651 ATM's (31.84%), old private sector banks have installed 4,126 ATM's (5.54%), New Private sector banks have installed 19,525 ATM's (26.21%) and Foreign banks have installed 1367 ATM's (1.83%).

TABLE 5: DISTRICT -WISE BREAK - UP OF EMPLOYEES IN STATE BANK OF INDIA AND ITS ASSOCIATES IN HANUMANGARH &amp; SRI GANGANAGAR DISTRICTS OF RAJASTHAN AS ON MARCH 31, 2010

District	Bank Name	Officers	Clerical	Subordinates
Hanumangarh	State Bank of India	21	24	15
	State Bank of Bikaner and Jaipur	91	93	89
	State Bank of Patiala	7	11	4
Total (a)		119	128	108
Sri Ganganagar	State Bank of India	35	41	31
	State Bank of Bikaner and Jaipur	143	168	110
	State Bank of Patiala	15	24	19
Total (b)		193	233	160
Grand Total (a+b)		312	361	268

Source: Unpublished Records of Basic Statistical Return-2 of State Bank of India (2011)

TABLE 6: BANK-WISE DISTRIBUTION OF THE RESPONDENTS

Gender Categories	Frequency	Percentage
State Bank of India	30	20
State Bank of Bikaner and Jaipur	100	67
State Bank of Patiala	20	13
Total	150	100

Source: Field work

Out of 150 bank officers selected for the study from Hanumangarh and SriGanganagar District of Rajasthan 20 percent (30) were from State Bank of India, 67 percent (100) were from State Bank of Bikaner and Jaipur and 13 percent (20) were from State Bank of Patiala.

## FINDINGS

- 142 bank officers (94.67%) out of total 150 bank officers were of opinion that Information Technology (I.T.) enabled Management Information System (M.I.S.) has facilitated quicker flow of information with in the organization and 8 bank officers (5.33%) were not in a position to comment on this topic.
- 142 bank officers (94.67%) out of total 150 bank officers were of opinion that Information Technology (I.T.) enabled Management Information System (M.I.S.) results in strong organisational work culture and quick decision making by officials in organisation and 8 bank officers (5.33%) were not in a position to comment on this topic.
- 147 bank officers (98%) out of total 150 bank officers were of opinion that computerized CBS branches helps in providing better services to its customers and 3 bank officers (2%) were not in a position to comment on this topic.
- 148 bank officers (98.67%) out of total 150 bank officers were of opinion that IT enabled online banking provides more revenue than traditional banking and 2 bank officers (1.33%) were not in a position to comment on this topic.
- 146 bank officers (97.33%) out of total 150 bank officers were of opinion that they have been given sufficient training to handle IT enabled online banking and computerized transactions and 4 bank officers (2.67%) were of the view that they have not been given sufficient training to handle IT enabled online banking and computerized transactions.



6. 144 bank officers (96%) out of total 150 bank officers were of opinion that proper Firewalls and other security hardware and software is in place for security of Management Information System (MIS), online transactions and electronic records and database of bank but, 6 bank officers (4%) were of opinion that Firewalls and other security hardware and software for security of Management Information System (MIS), online transactions and electronic records and database of bank are not adequate.
7. 145 bank officers (96.67%) out of total 150 bank officers were of opinion that Information Technology (I.T.) and computerization has increased productivity (service efficiency) of employees and 5 bank officers (3.33%) were not in a position to comment on this topic.
8. 125 bank officers (83.34%) out of total 150 bank officers were of opinion that attitude of top management is supportive and free expression of ideas, opinions and suggestions are encouraged in organization and organization have development oriented personnel policies and 20 bank officers (13.33%) were not agree to this point and remaining 5 bank officers (3.33%) were not in a position to comment on this topic.
9. 146 bank officers (97.33%) out of total 150 bank officers were of opinion that IT enabled MIS and E-Banking has enabled bank to offer new products and services to its customers and remaining 4 bank officers (2.67%) were not in a position to comment on this topic.
10. 136 bank officers (90.67%) out of total 150 bank officers were of opinion that organization have strong organisational culture and superior support their subordinates and junior respect their seniors and remaining 14 bank officers (9.33%) were not agree to this point.
11. 134 bank officers (89.33%) out of total 150 bank officers were of opinion that employees have sense of satisfaction from their work in present I.T. enabled work environment and 16 bank officers (10.67%) were not satisfied due to increased work pressure.
12. It has been observed that the 24 bank officers (16%) were strongly agree and 83 bank officers (89.33%) were agree that adequate infrastructure and human resource (Employees) has been provided by head quarter to branch for smooth functioning of the branch. However 27 bank officers (18%) were disagree and 16 bank officers (10.67%) were strongly disagree on this point.

### SUGGESTIONS

1. Few of the bank officers from State Bank of Bikaner and Jaipur and State Bank of Patiala were of the view that they have not been given sufficient training to handle IT enabled online banking and computerized transactions, so; bank must arrange special training sessions for such employees.
2. Although majority of bank officers were of opinion that proper Firewalls and other security hardware and software is in place for security of Management Information System (MIS), online transactions and electronic records and database of bank but, some bank officers feel that system is not fool-proof. Bank must pay attention to this aspect and should make its Firewalls and other security hardware and software for security of Management Information System (MIS), online transactions and electronic records and database of bank more strong.
3. Majority of bank officers were of opinion that attitude of top management is supportive and free expression of ideas, opinions and suggestions are encouraged in organization and organization have development oriented personnel policies but, good number of bank officers do not feel so. So, Management must take adequate steps to encourage their participation in various decisions related to organization.
4. Majority of bank officers were of opinion that organization have strong organisational culture and superior support their subordinates and junior respect their seniors but, few bank officers were not agree to this point. So, Management must take adequate steps to resolve any disputes or issues between them and their colleagues/ superiors/ subordinates.
5. Although majority of bank officers were of opinion that employees have sense of satisfaction from their work in present I.T. enabled work environment but, some of them were not satisfied due to increased work pressure due to voluntary retirement taken by employees under V.R. S. scheme. So, Management must take adequate steps to resolve this issue by recruitment of staff for branches where various posts are lying vacant.
6. Although majority of bank officers were of opinion that adequate infrastructure and human resource (Employees) has been provided by head quarter to branch for smooth functioning of the branch but, some of them mainly deputed in rural and semi-urban branches were not satisfied due to lack of proper infrastructure and shortage of staff.

### CONCLUSION

Information Technology (I.T.) enabled Management Information System (M.I.S.) has facilitated quicker flow of information in the State Bank of India and its associated banks. It has also been observed that the majority of bank officers were of opinion that Information Technology (I.T.) enabled Management Information System (M.I.S.) results in strong organisational work culture and quick decision making by officials in organization. Fully computerised CBS branches have helped banks in providing better services to its customers. IT enabled online banking has also provided more revenue than traditional banking to State Bank of India and its Associated banks. Information Technology (I.T.) and computerization has increased productivity (service efficiency) of employees and also enabled bank to offer new products and services to its customers.

### LIMITATIONS OF THE STUDY

1. Study is restricted only to Sri Ganganagar and Hanumangarh Districts of Rajasthan.
2. Chances of personal bias of respondents are there. However, efforts were done to minimize errors by conducting interviews personally.

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## USER PERCEPTION TOWARDS WEB, TELEVISION AND RADIO AS ADVERTISING MEDIA: COMPARATIVE STUDY

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### ABSTRACT

*The Internet revolution is well under way and the online audience is growing rapidly, in many countries. Many companies are coordinating all efforts so that they can send cohesive messages to their customers. Some companies are building brands with little or no use of traditional media advertising. The Web is emerging as a new advertising medium vying their communications strongly with the more traditional media. Despite the Web's capability of becoming a potentially powerful medium, the results explore how viewers perceive the Web site in relation to traditional media. This study is an effort to identify how do viewers perceive the Web vis-à-vis other media? The perception of the viewer's influences the advertisers' selection of the medium. To find the answers to these questions, the study focuses on the opinions of people who use the Web and television as well as the radio. The study primarily focuses on the consumer's perception of advertising media—the television, radio and the Web. Information Collected from the respondents about their reactions towards Web and TV and Radio advertising in all its various forms, and not towards a single advertisement or medium of advertising for a particular type of product or service. The results of a survey comparing the perception of viewers about Web, TV and Radio advertisements, which indicate that the Web is perceived as an efficient medium for conveying information. TV advertisements are not considered to be deceptive, Respondents has positive attitudes towards advertisement on TV and TV is perceived as efficient medium for entertainment, and respondents are very much emotional towards television advertisements.*

### KEYWORDS

Advertising Media, Perception, Radio, TV, Web.

### INTRODUCTION

Advertisers have long used traditional media to build brands; many have now started taking the Web seriously to support their brands, as millions of consumers are now going online to access information. The Web has created a new communication environment for advertising campaigns, thus initiating a new era of firm consumer interaction. The Web has already become a significant Advertising medium and it will soon become a very important component of a company's media-mix. Many companies are now considering Web advertising as a viable alternative to advertising in traditional media.

The chances of an advertisement being carefully processed by the audience are lowered because of the high volume of advertisements competing for an individual's attention on a daily basis in different media. The job is made more difficult by the Web which has resulted in greater growth of online advertising.

In this age of advertising overload, viewers choose to see what they want to see and pay no attention to the rest. How do viewers perceive the Web vis-à-vis other media? Is Web advertising more effective than television and Radio advertising? The perception of the viewers influences the advertisers' selection of the medium. To find the answers to these questions, the study focuses on the opinions of people who use the Web, television as well as Radio.

The respondents in this study were asked to assess the advertisements in media - the Web and television and the radio - and then to evaluate the effectiveness of advertisements in each media. This approach made it possible to collect information from the Respondents about their reactions towards all Web and TV and Radio advertising in all its various forms, and not towards a single advertisement or medium of advertising for a particular type of product or service.

### INTRODUCTION TO ADVERTISING

In modern times advertising prevails in all walks of human life. It has acquired the distinction of being the most visible and glamorous method of marketing communication

"Any paid form of non-personal presentation/promotion of ideas/goods/services by an identified sponsor".

"Advertising is, actually, a simple phenomenon in terms of economics. It is merely a Substitute for a personal sales force -an extension, if you will, of the merchant who cries Aloud his wares.

"Advertising is the ability to sense, interpret to put the very heart throbs of a business into type, paper and ink."

"Advertising -a judicious mixture of flattery and threats."

"Advertising may be described as the science of arresting the human intelligence long Enough to get money from it"

"Advertising is a lot more than just television commercials—it includes branding, packaging, celebrity spokespeople, sponsorships, publicity, customer service, the way you treat your employees, and even the way your secretary answers the phone."

Advertising can be used to build up a long-term image for a product (Coca-Cola advertisements) or trigger quick sales (a Sears's ad for a weekend sale). Advertising can reach geographically dispersed buyers efficiently. Certain forms of advertising (TV advertising) typically require a large budget, whereas other forms (newspaper advertising) can be done on a small budget.

Every year companies spend large amounts of money on advertising in different media. Not all the advertisements are successful in attracting the attention of the right consumers or persuading them to make a purchase. In this age of advertising overload, viewers choose to see what they want to see and pay no attention to the rest.

TABLE 4 : PROFILES OF MAJOR MEDIA TYPES <sup>1</sup>

Medium	Advantages	Limitations
Newspapers	Flexibility; timeliness; good local market coverage; broad acceptance; high believability	Short life; poor reproduction quality; small "pass-along" audience
Television	Combines sight, sound, and motion; appealing to the senses; high attention; high reach	High absolute cost; high clutter; fleeting exposure; less audience selectivity
Direct mail	Audience selectivity; flexibility; no ad competition within the same medium; personalization	Relatively high cost; "junk mail" image
Radio	Mass use; high geographic and demographic selectivity; low cost	Audio presentation only; lower attention than television; no standardized rate structures; fleeting exposure
Magazines	High geographic and demographic selectivity; credibility and prestige; high-quality reproduction; long life; good pass-along readership	Long ad purchase lead time; some waste circulation; no guarantee of position
Outdoor	Flexibility; high repeat exposure; low cost; low competition	Limited audience selectivity; creative limitations
Yellow Pages	Excellent local coverage; high believability; wide reach; low cost	High competition; long ad purchase lead time; creative limitations
Newsletters	Very high selectivity; full control; interactive opportunities; relative low costs	Costs could run away
Brochures	Flexibility; full control; can dramatize messages	Overproduction could lead to runaway costs
Telephone	Many users; opportunity to give a personal touch	Relative high cost unless volunteers are used
Web	High selectivity; interactive possibilities; relatively low cost	Relatively new media with a low number of users in some countries

## THEORETICAL FRAMEWORK ON WEB, TV & RADIO ADVERTISING

### WEB ADVERTISING

The Web has created a new communication environment for advertising campaigns, thus initiating a new era of firm consumer interaction. The Web has already become a significant advertising medium and it will soon become a very important component of a company's media-mix. Many companies are now considering Web advertising as a viable alternative to advertising in traditional media.

Advertising on the Web and in traditional media is not the same, since the Web can extend the function of advertising far beyond what traditional media are able to accomplish. Consumers can not only obtain information about the product or services offered by following the various links within the Web advertisement (ad) but also place orders online and download some products (such as e-books) to their computer. In contrast, these kinds of facilities are not available in traditional advertising media. So the Web provides the means for 'interaction' between buyers and sellers, and gives consumers the flexibility to do things themselves with ease, speed and at their own convenience.

The Web is a relatively new medium and it may be a little too early to set rules and define exactly what works and what doesn't. Many consumers find advertising annoying. The Web has become a proven medium for advertising and a feasible alternative to traditional media like television and billboards. Several different formats of Web advertising are being used currently, including banner advertisements, button advertisements, pop ups and pop under, interstitials or in-your-face advertisements, online advertising gaming and keywords advertisements.<sup>1</sup>

With the emergence of the web, online advertising has received strong interest from both researchers and practitioners. Online advertising has been found to be effective both in communicating corporate messages and in strengthening brand equity. Additionally, the web offers more freedom of action for consumer, who can select a time and place for their website browsing. Thus; they actively manage their interaction with the medium. Due to the growing importance of the web, marketers increasingly are pursuing an integrated multichannel communication strategy to increase advertising effectiveness.<sup>2</sup>

The emergence and ubiquity of the Web has proven itself of having huge potential as an advertising medium. Online advertising has been the fastest growing part inside the whole advertising industry.<sup>3</sup>

### TELEVISION ADVERTISING

The arrival of television advertising in 1955 changed the world of advertising more than anything before or since. For the first time, people were able to see moving images and hear sound in their own living rooms. And, for the first time, advertisers were able not just to communicate but to entertain. In a very short period, it became clear that those companies that used television to advertise their products were running away with market share.

During '50s, it was not surprisingly the message in advertising that was seen as being the key to effectiveness. As Reeves proclaimed, [television] advertising was "the art of getting a unique selling proposition into the advertisements of the most people at the lowest possible cost" (Reeves, 1961). And as Barclay, Doub, and McMurtrey observed in the Journal of Advertising Research a few years later, "Recall of commercial content was the principal measure of communication effectiveness" (1965).<sup>4</sup>

Television has its own strengths—it provides entertainment for the whole family and is easy to use. Advertisers use creativity in developing advertisements in all media. TV commercials use sound, moving images, and pictures, and a commercial on TV varies in duration—ranging from five seconds to ninety seconds. TV on the other hand contains both intensely moving images and sounds that are effective attention grabbing devices. TV advertising is reportedly the most entertaining. TV is mainly an emotional medium.<sup>1</sup>

### RADIO ADVERTISING

Radio advertisement was based on reading aloud a print brochure. Radio advertisements offer little opportunity for the receiver to select or focus on particular relevant or interesting parts of the advertisement, or to control the length of the transmission, or the order of the presentation. Thus, radio advertisements are externally controlled. Consequently, it may be difficult for receivers to perceive the content of the advertisement. The sender risks other parts of the advertisement, such as background music or slogan, dominating the receiver's perception of the advertisement. Hence, radio advertisements might be less useful in changing or influencing consumers' attitudes towards products.<sup>5</sup>

Radio commercials hold a marginal share among the main media categories, for example newspaper and television. However, it is still regarded as an important and useful medium in marketing and advertising in large cities and metropolitans. The broadcast of commercials on radio needs real feel orientation and voice is the single major determinant that draws the attention of listeners. Programs on sales and market news are the principal preferences of urban commuters for large metro radio stations. The majority of short and informative advertisements for consumer products in an urban setting use radio advertising with communication appeal related to the efficacy of products and psychosocial enhancement of consumers at retail outlets. Promotional efforts by manufacturing and retailing companies appear to focus on positive emotional appeal to influence consumers through radio advertisements.

Though the print and television media has taken the major share of revenue from commercials, advertisements on radio still hold audience of large cities. However, little research has been published on the impact of commercial broadcast by AM or FM radio on urban consumers. Most studies did not consider radio and outdoor advertising as principal research agenda, despite their importance in business communication, consumer behavior and towards sale stimulation for retailers.<sup>6</sup>

### LITERATURE REVIEW

The following section discusses various studies that have dealt with advertising media.

**Starch, Daniel (May/Jun 1958)**<sup>7</sup> the research ascertains that what advertisements people do read. Similarly, whether these same people buy the product within some reasonable time period after reading the advertisement. And the main intention of study is to find out to what extent purchases by readers are due to the reading of the advertisement.



**James S. Frideres (Feb1973)**<sup>8</sup> research attempts to address the latter hypothesis; specifically, to study the impact of toy advertising upon young children and their parents' subsequent buying patterns.

**Kent M Lancaster and Peggy J Kreshel and Joya R Harris (May 1986)**<sup>9</sup> Advertising theory and practice require that media plans be developed and evaluated in terms of advertising exposures, or other desired communication effects, rather than media vehicle exposures. This often means that, when evaluating media schedules in terms of effective reach, for example, media vehicle audience ratings must be weighted. Also, optimum levels of message frequency typically must be feasible within an appropriate time frame. This article focuses on how leading advertising agencies implement theoretical constructs concerning effective reach when evaluating media plans. Media executives from 91 leading advertising agencies describe their agencies' procedures for weighting audience ratings, including the magnitude of weights typically applied to vehicle audience estimates in major media categories. Alternative definitions of effective reach and rationale supporting the use of various time intervals for media plan evaluation are also presented.

**Pedrick, James and Zufryden, Fred (Spring 1991)**<sup>10</sup> They proposed a model to analyze the impact of advertising media plans and point-of-purchase marketing variables on a brand's market performance. model integrates brand choice, purchase incidence, and exposure behavior within a non stationary stochastic framework. Moreover, it considers various aspects of consumer heterogeneity including individual differences in loyalty levels, purchase rates, and exposure probabilities for a population of consumers. The integrated model provides a relationship of advertising exposures from media plans, and other marketing variables, to measures of a brand's performance that include market share, penetration and depth of repeat patterns over time. In this paper, they focused on a multi-brand model formulation and stress its application to the analysis of advertising media plans.

**Herbjørn Nysveen and Einar Breivik (2005)**<sup>5</sup> The study compares the effectiveness of web advertisements (pop-ups), print advertisements (posters) and radio advertisements for an airline ticket and for a weekend stay at a hotel. The advertisement copies were developed specifically for this study by a professional agency. Advertisements were developed to utilise specific medium characteristics, and the control of advertisement content was attained through the brief. Furthermore, the relative quality of the advertisements was used as a covariate in the analysis of media effects. The results indicate that both advertising media and the relative quality of the advertisements presented in the various media influence the effectiveness of the advertisements. Web and posters were found to be more effective advertising media than radio.

**Komal Nagar (Sep2009)**<sup>1</sup> The study presents the results of a survey comparing the effectiveness of Web and TV advertisements, which indicate that the Web is perceived as an efficient medium for conveying information. Web advertisements are not considered to be deceptive. However, TV advertisements help in changing and maintaining attitudes towards the advertised products/services better than Web advertisements. Advertising clutter in both the media generate a high level of irritation among users. Web advertisements have come of age, and may soon be comparable to TV on all the factors of advertising effectiveness.

**Wakolbinger, Lea M. and Denk, Michaela and Oberecker, Klaus (Sep2009)**<sup>2</sup> The analyzes advertising effectiveness of print and online media as well as the impact of combining these two media forms on overall advertising effectiveness. Study supports existing findings that print and online advertising feature the same advertising effectiveness. Our experimental data, however, also indicate advantages of cross-media advertising.

**Rajagopal (January 2009)**<sup>1</sup> Study examines the impact of growing congestion of shopping malls in urban areas on shopping convenience and shopping behaviour. Based on the survey of urban shoppers, the study analyses the cognitive attributes of the shoppers towards attractiveness of shopping malls and intensity of shopping. The results of the study reveal that the ambience of shopping malls, assortment of stores, sales promotions and comparative economic gains in the malls attract higher customer traffic to the malls.

**Rajagopal (Jul2011)**<sup>6</sup> study aims at analyzing the impact of radio advertisements on urban commuters towards buying behavior in retail stores and attempts to determine the role of radio advertising on dissemination of information on the sales promotions. The impact of radio advertisements on the store choice and buying preferences are analyzed based on empirical investigation. The study reveals that shopping behavior of urban consumer at retail stores in response to radio advertisements is highly influenced by the physical, cognitive and economic variables.

**ROBERT G. HEATH AND HORST STIPP (March 2011)**<sup>4</sup> Research has been instrumental in supporting new ideas about how advertising works, no matter how unpopular their implications. In 1971, Herb Krugman presented evidence that television watching was low involvement compared to print. Three years later, Andrew Ehrenberg postulated that repetition—not persuasion—was how advertising influenced most people. Received wisdom, however, still holds that television advertising works persuasively and works best at high attention levels. This article critically examines this assumption, concluding that the continued success of television advertising in building strong brands most likely will depend not on its ability to persuade but on how well it is able to influence emotions at low levels of attention.

## RESEARCH DESIGN AND METHODOLOGY

### STATEMENT OF THE PROBLEM

How users perceive the web as a medium of advertising in comparison to other traditional media specifically television and radio.

### OBJECTIVES OF THE STUDY

1. To measure the degree of Informativeness in Web, TV and Radio advertisements.
2. To measure the degree of Consumer Attitudes toward Web, TV and Radio advertisements.
3. To measure the degree of entertainment experience in Web, TV and Radio advertisements.
4. To measure the degree of Irritation in Web, TV and Radio advertisements.
5. To measure the degree of Deceptiveness in Web, TV and Radio advertisements.
6. To measure the degree of Emotions in the Consumption Experience of Web, TV and Radio advertisements.
7. To identify the relationship between variables.

### PURPOSE OF THE STUDY

- This study aims to understand how users perceive the Web as a medium of advertising in comparison to other traditional media i.e. Television and Radio.
- This study analyses the responses of customers who are users of the television, Web and radio.

### VARIABLES AND OPERATIONAL DEFINITIONS

#### ATTITUDE

Fishbein identified an attitude as "a learned predisposition of human beings"<sup>12</sup>.

Kotler stated that "an attitude is a person's enduring favourable or unfavourable evaluations, emotional feelings, and action tendencies toward some object or idea".

#### ENTERTAINMENT

Entertainment consists of any activity which provides a diversion or permits people to amuse themselves in their leisure time. Entertainment is generally passive, such as watching opera or a movie. Active forms of amusement, such as sports, are more often considered to be recreation<sup>13</sup>.

#### DECEPTIVENESS

Advertisements are deceptive when the claim.<sup>14</sup>

- (1) is factually incorrect;
- (2) is subject to multiple interpretations, one of which is false;
- (3) Omits relevant information;
- (4) Is true but the proof is false; and
- (5) is "literally" true but creates a false impression.

#### EMOTION

Emotion is a valenced affective reaction to perceptions of situations ( Clore. and Collins 1988). Emotion is a state in which feeling and sentiments are experienced by the individual (Smith, Sarason, & Sarason, 1978)<sup>15</sup>

**IRRITATION**

Aaker and Bruzzone (1985): the negative, impatient, and displeasing feeling of individual consumers caused by various forms of advertising stimuli.<sup>16</sup>

**INFORMATIVENESS**

Ability of a media to convey information and details about the product/service. And to provide quick and convenient access to information of all kinds on various products and services.<sup>13</sup>

**CONCEPTUAL MODEL****FIGURE 1 CONCEPTUAL MODEL**

Variables: Informativeness, Attitudes, Entertainment, Irritation, Deceptiveness, Emotion.



User Perception Towards Web, Television and Radio as Advertising Media:

**HYPOTHESES**

According to Ducoffe, advertising value is understood as an overall representation of the worth of advertising to consumers, i.e. the value of advertising in general. To understand what makes advertising valuable, Ducoffe identified the dimensions of advertising which include informativeness, irritation, deceptiveness and entertainment.

Ducoffe also found out that these dimensions are predictors of the value of advertising which affects the consumer's attitude towards advertising, and that Web advertising high in value would also tend to hold more favourable general attitudes. Advertising value as defined by Ducoffe is 'a subjective evaluation of the relative worth or utility of advertising to consumers'. The value of advertising is thus understood to be comprised of informativeness, emotions, attitude, entertainment, irritation, and deceptiveness.

The various hypotheses that are tested in this study are then laid out.

**ATTITUDE**

H0: TV is not effective in changing and maintaining attitudes as compared to the Web and Radio advertisements.

H1: TV is more effective in changing and maintaining attitudes as compared to the Web and Radio advertisements.

**ENTERTAINMENT**

H0: Television advertisements are less entertaining than Web advertisements and Radio advertisements.

H2: Television advertisements are more entertaining than Web advertisements and Radio advertisements.

**DECEPTIVENESS**

H0: Consumers consider Web advertisements to be more deceptive than advertisements on TV and Radio advertisements.

H3: Consumers consider Web advertisements to be less deceptive than advertisements on TV and Radio advertisements.

**EMOTION**

H0: Television advertisements are less effective in creating consumer emotions when compared to Web advertisements.

H4: Television advertisements are more effective in creating consumer emotions when compared to Web advertisements.

**IRRITATION**

H0: Advertisements on the Web cause less irritation among users than TV and Radio advertisements.

H5: Advertisements on the Web cause more irritation among users than TV and Radio advertisements.

**INFORMATIVENESS**

H0: Consumers will not perceive Web advertisements to be more informative than advertisements on television and radio.

H6: Consumers perceive Web advertisements to be more informative than advertisements on television and radio.

**METHODOLOGY****RESEARCH TYPE**

Comparative Study and Exploratory Study

**SAMPLING DESIGN****STRATIFIED RANDOM SAMPLING**

Under this sampling design item has an equal chance of inclusion in the sample. All choices are being independent of one another. It gives each possible Sample combination an equal probability of being chosen. A stratified random sample is obtained by separating population elements into non-overlapping groups (strata) and selecting a simple random sample from each stratum.

**SAMPLING UNIT**

The data source is primary and data collected through survey using questionnaires. Respondents are MBA Students of JSSCMS, SJCE, Mysore.

**SAMPLE DESCRIPTION**

As study incorporated stratified sampling total sample size of 90 for different group of respondents formed 30 in each group for each media [i.e. Web, TV, Radio] respondents belong to the age group between 20 - 30.

**DATA COLLECTION METHOD**

Information Collected from the respondents using questionnaire about their reactions towards Web and TV and Radio as advertising media in all its various forms, and not towards a single advertisement or medium of advertising for a particular type of product or service.

**STATISTICAL TOOLS USED FOR ANALYSIS**

- Factor analysis.
- Reliability analysis (Cronbach alpha).
- One Way Anova
- Correlation Using SPSS.



**SCALE DEVELOPMENT**

A total of 58 statements were written for the proposed scale. A 5-interval scale from 'strongly disagree' to 'strongly agree' was employed in the questionnaire to measure the response to each item.

The instrument was administered to 90 [30 respondents for each media] respondents. Subjects were asked to respond to scale statements by taking into consideration their perception of advertising in general, i.e. not a single advertisement or advertising for a particular product.

To empirically test the scale, a factor analysis via SPSS to assess the factors of advertising perception 39 statements were dropped due to either factor loadings less than 0.60, or proportionate factor loading on more than one factor. Thus, 19 statements out of 58 were grouped under six factors. With six underlying factors - Attitude, Entertainment, Deceptiveness, Emotion, and Irritation, Informativeness.

**DATA ANALYSIS AND FINDINGS OF THE STUDY**

In order to find out perception of three media—the Web, TV, Radio, and to test the hypotheses laid out earlier, Anova test and partial correlation was applied. A brief description of the results of the study is presented below.

**TABLE 5 : REACTIONS TO ADVERTISING ON THE WEB AND TELEVISION AND RADIO: MEASUREMENT MODEL**

Variables	Means			Scale Reliability	F- Value	Significance (ANOVA)
	WEB	TV	RADIO			
ATTITUDE	0.11	0.32	-0.44	0.88	5.01	0.01
ENTERTAINMENT	-0.05	0.40	-0.35	0.89	4.66	0.01
DECEPTIVENESS	-0.29	-0.41	0.70	0.73	14.42	0.00
EMOTION	0.15	0.31	-0.46	0.73	5.45	0.01
IRRITATION	0.21	-0.35	0.13	0.82	2.84	0.06
INFORMATIVE	0.54	-0.20	-0.33	0.67	7.59	0.00

**FINDINGS OF THE STUDY****ATTITUDE**

Respondent has different Attitude for all 3 media so the given data is significant therefore null hypothesis rejected and alternative hypothesis accepted.

The respondents consider TV advertisements to be more effective in helping people change their attitude and beliefs and in changing their attitude towards the image of the advertising company.

Respondents has positive attitude towards advertisements on TV followed by web and negative attitude towards radio

i.e. mean of variable Attitude is low (negative) for radio where as for TV it is high (Positive).

**ENTERTAINMENT**

The results reveal that there is significant difference in the entertainment capability of the Web and television and radio.

Therefore null hypothesis rejected and alternative hypothesis accepted.

The respondents feel that television advertising generate entertaining advertisements followed by web.

i.e. mean of variable entertainment is low for radio whereas for TV it is high.

**DECEPTIVENESS**

Results reveal that there is a significant difference between television and the Web and radio on the deceptiveness level.

Therefore null hypothesis rejected and alternative hypothesis accepted.

The respondents rated radio advertisements to be more deceptive in nature than television advertisements and Web advertisements.

i.e. mean of variable Deceptiveness is high for radio where as for Web it is low.

**EMOTION**

Results reveal that there is significant difference between television and the Web and radio on creating emotional quotient on viewers.

Therefore null hypothesis rejected and alternative hypothesis accepted.

Respondents are more emotional towards advertisements on TV then web followed by radio.

i.e. mean of variable Emotion is high for TV where as low for radio.

**IRRITATION**

The results indicate that there are no significant differences between the Web and television and radio on the irritation dimension.

Therefore null hypothesis accepted and alternative hypothesis rejected.

**INFORMATIVENESS**

Results reveal that there is a significant difference between television and the Web and radio on the degree of Informativeness.

Therefore null hypothesis rejected and alternative hypothesis accepted.

The respondents considered the web to be a more effective medium on the Informativeness scale the respondents feel that web advertising generate more information followed by TV.

i.e. mean of variable Informativeness is high for web where as low for radio.

The findings reveal that the new age consumer is hungry for information, and wants complete and up-to date information which is conveniently available.

**CORRELATIONS ANALYSIS**

		ATTITUDE	ENTERTAINMENT	DECEPTIVENESS	EMOTION	IRRITATION	INFORMATIVENESS
ATTITUDE	Pearson Correlation	1	.328**	.027	.222*	.074	.349**
	Sig. (2-tailed)		.002	.802	.035	.487	.001
	N	90	90	90	90	90	90
ENTERTAINMENT	Pearson Correlation	.328**	1	-.087	.371**	.182	.180
	Sig. (2-tailed)	.002		.416	.000	.086	.089
	N	90	90	90	90	90	90
DECEPTIVENESS	Pearson Correlation	.027	-.087	1	-.107	-.072	.051
	Sig. (2-tailed)	.802	.416		.314	.503	.630
	N	90	90	90	90	90	90
EMOTION	Pearson Correlation	.222*	.371**	-.107	1	.057	.247*
	Sig. (2-tailed)	.035	.000	.314		.593	.019
	N	90	90	90	90	90	90
IRRITATION	Pearson Correlation	.074	.182	-.072	.057	1	.095
	Sig. (2-tailed)	.487	.086	.503	.593		.374
	N	90	90	90	90	90	90
INFORMATIVENESS	Pearson Correlation	.349**	.180	.051	.247*	.095	1
	Sig. (2-tailed)	.001	.089	.630	.019	.374	
	N	90	90	90	90	90	90

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

Variable Attitude is significantly and positively correlated with the variables Entertainment, Emotion and Informativeness.  
 I.e. Attitude of respondents depends upon entertainment, emotion, and informative factors.  
 Variable Entertainment is significantly and positively correlated with the variables Emotion.  
 I.e. Entertainment factor of advertising media will create emotional [PAD] quotient in respondents.  
 Variable Emotion is significantly and positively correlated with the variable Informativeness.  
 I.e. Emotional factor facilitates to perceive advertising media as informative.

## CONCLUSION

Study also reveals that the Web is a good medium for conveying information and detail. There are several possible reasons for this result. The Web as a medium for advertising provides the user with a plethora of information. An information hungry user can search on the links provided on the site and get more information related to the product/service. The same is not possible for television and radio viewers.

"When consumers hear about a product today, their first reaction is 'Let me search online for it.' And so they go on a journey of discovery: about a product, a service, an issue, an opportunity. Today you are not behind your competition. You are not behind the technology. You are behind your consumer."

— Rishad Tobaccowala Chief Strategy & Innovation Officer VivaKi

The results of this study indicate that Web advertisements are less effective in changing attitudes. Web advertisements are not as effective in catching the user's attention as TV advertisements, and therefore are also less effective in changing beliefs and attitudes towards the products and services advertised.

The results of this study indicate that TV advertisements are considered to be more deceptive in comparison to Web advertisements. Web advertisements are designed to include a number of related links that a user can click on to know more about the advertised product/service.

Many viewers find Web advertisements and television & radio advertisements to be irritating. This may be due to the fact that a user is over exposed to advertisements every time s/he visits the site or watches a programme on television. Most of these advertisements may not be of the slightest interest to the viewer. Viewers/ users do not appreciate advertisement clutter either on television or on the Web. The results of this study indicate that Respondents are more emotional towards advertisements on TV then web followed by radio. This is because of respondents may have experienced pleasure, arousal and dominance in television advertisements.

Study also reveals that the Television advertisements are efficient medium for entertainment. There are several possible reasons for this result because television provides entertainment for the whole family and is easy to use.

Advertisers use creativity in developing advertisements in all media. TV commercials use sound, moving images, and pictures, and a commercial on TV varies in duration—ranging from five seconds to ninety seconds. TV on the other hand contains both intensely moving images and sounds that are effective attention grabbing devices.

## LIMITATIONS OF THE STUDY AND SCOPE FOR FUTURE RESEARCH

Although this study provides significant insight into the Perception of advertising in the three media—the Internet, television and Radio - it is not without its limitations. One of the limitations of the current study is that the comparison is made between all Web, TV and Radio ads in general.

The findings of this study may be extended by adding the views of advertising managers. Also, this study focused on only three media of advertising, namely television, radio and the Internet. Future research could make a comparative Analysis of traditional media with all the other media of advertising. The effect of multiple sources of information could also be studied. The results of this study are based on a survey of the users of television, Radio and the Web.

A follow up study is needed in the next two to four years to determine if the recent changes in the three media have further led to a change in the perception of consumers and whether advertisers have been able to exploit the potential of the Internet as a popular advertising media in the future.

Study focused only on opinions of MBA students follow up study is needed by changing the Sampling unit i.e. by considering engineering students, households, professionals as respondents to identify their perception of advertising media.

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## ANNEXURE

### SCALE ITEMS USED IN QUESTIONNAIRE

SL.NO	SCALE ITEMS
1	Advertisements on the internet are good sources of information
2	Advertisements on the internet provide significant information
3	Advertisements on the internet provide timely information
4	Advertisements on the internet are the sources of up-to-date information

5	Advertisements on the internet makes information immediately available
6	Advertisements on the internet are convenient sources of information
7	Advertisements on the internet delivers complete information
8	I pay attention to advertisements on the internet
9	Advertisements on the internet are eye catching
10	Advertisements on the internet are attractive
11	I watch advertisements on the internet
12	Advertisements on the internet are effective in producing attractive messages
13	I often like to recognize myself with advertisements on the internet
14	I am likely to purchase after being exposed to advertisements on the internet
15	Advertisements on the internet have more powerful persuasive influence
16	Exposure to an internet advertisement can have a significant impact on purchase consideration
17	Advertisements on the internet give more specific information that matches my purchase situations is more likely to be processed
18	The information presented in the internet advertisement gave me a useful base to decide whether or not to buy .
19	I feel that the internet advertisement gave me good decision support
20	An advertisement on the internet aggressively helps me to make buying decision
21	Advertisement on the internet are appealing
22	Advertisements on the internet are favourable
23	Advertisements on the internet are affable
24	Advertisements on the internet are pleasant
25	I feel I can trust internet advertising
26	I am more likely to notice and remember advertisements on internet than elsewhere
27	Internet advertisement helps raise my standard of living
28	I am impressed by internet advertisements
29	Internet advertisement is useful.
30	Advertisements on the internet are entertaining
31	Advertisements on the internet are enjoyable
32	Advertisements on the internet are pleasing
33	Advertisements on the internet are funny
34	Advertisements on the internet are exciting
35	Advertisements on the internet are very impressive
36	Advertisements on the internet are overdramatized
37	Advertisements on the internet are annoying
38	Advertisements on the internet are irritating
39	Advertisements on the internet are contrived
40	Advertisements on the internet are phony
41	Advertisement on the internet are provoking
42	Advertisement on the internet are silly
43	Advertisements on the internet lie
44	Important facts are left out from the advertisements on the internet
45	Advertisements on the internet are "literally" true but create a false impression
46	Advertisements on the internet insult my intelligence
47	I often feel that I am offended by advertisements on the internet
48	I feel internet advertisements are factually incorrect
49	I am pleased to watch Advertisements on the internet
50	Advertisements on the internet makes me Happy
51	Advertisements on the internet are Monotonous(boring)
52	Advertisements on the internet makes me feel Relaxed
53	Advertisements on the internet are Calm in nature
54	Advertisements on the internet are Stimulated
55	Advertisements on the internet gives Inspiring feeling
56	Advertisements on the internet makes me Feel free
57	Advertisements on the internet serves as guider
58	Advertisements on the internet are Unconstrained (not limited)

## STUDY OF GROWTH, INSTABILITY AND SUPPLY RESPONSE OF COMMERCIAL CROPS IN PUNJAB: AN ECONOMETRIC ANALYSIS

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### ABSTRACT

*Agriculture is the predominant sector of Indian economy as a source of Indian economy as a source of income, employment and export earnings. In this context, an effort is made here to examine the changes in the composition and growth of commercial crops like cotton, sugarcane and oilseeds in Punjab. This study also analysis the factors responsible for determining the area and production under these crops, which can be used by the policy makers for bringing about desired changes in the crop.*

### KEYWORDS

Agriculture, Growth, Commercial crops, production.

### INTRODUCTION

Agriculture is the predominant sector of Indian economy as a source of Indian economy as a source of income, employment and export earnings. Indian agriculture has made considerable progress in the production of food grains especially of wheat and rice during the last three decades. The performance has not been good in respect of oil seeds, fibers, pulses etc. Commercial crops play a significant role not only in the domestic sector but also in the external trade. These crops contribute significantly to the growth of the Indian economy by meeting the domestic requirements of oils, fiber and sugar as well as earning foreign exchange through exports or import substitution. Their significance has further grown recently due to liberalization and globalization of Indian economy since 1991.

Agriculture is the key to the overall development of the state economy which contributed as much as 17.5 (Q) percent to Gross State Domestic Product at constant prices (1993-94) during 2009-10. As per 2010 census around 37.0 percent of the working population of the state is employed in this sector. Scope of increase in area under agriculture has reached at a saturation level as 98.8 percent of cultivable land in the state is already under plough. The agriculture production can only be increased to some extent through enhanced cropping intensity, change in cropping pattern, improvement in seeds of high yielding varieties, cultivation practices and with the availability of better post harvest technology etc. State Govt. is trying to reorient agriculture through diversification policy and other measures. The specific objectives of the study with respect to the Punjab agriculture were:-

1. To study the composition of agriculture of Punjab.
2. To study the growth in areas, production and yield of crops in Punjab.
3. To study the instability in crops.

### RESEARCH METHODOLOGY

The objectives of the study required an in depth analysis of area, Production and productivity of cotton, sugarcane, oilseeds and their competing crops like wheat and paddy. Time series analysis was done to understand the temporal changes in the area and production and identify the factors affecting them. To achieve objectives, the study employed two main analytical methods as:

- (a) Trend analysis
- (b) Area and supply response

### DATA COLLECTION

The time series data on area, yield and production of important crops of Punjab were taken from the various issues of the statistical Abstract of Punjab. The data on the level of use of modern technological inputs like area under high yielding seeds, consumption of chemical fertilizers. Irrigated area, etc. were also collected to examine their impact on production of commercial crops the data pertained to the agricultural year 1965-66 to 2009-10.

**TABLE 1: Yield of different crops in Punjab (1965-66 to 2009-10)**

Year	Rice	Wheat	Total cereals	Total pulses	Ground nut	Rape-Seed & mustard	Total Oil seed	Desi Cotton	American cotton	Sugar cane	Potato
1965-68	1172	1157	1434	728	1111	462	821	274	338	3214	14733
1972-75	2118	2278	2052	776	993	800	791	309	416	4955	10791
1978-81	2750	2747	2610	679	990	644	783	245	356	5482	19044
1982-85	3091	3103	2983	666	1020	915	850	190	312	6292	19687
1990-93	3156	3599	3341	697	909	1000	924	290	540	5990	19633
2004-06	3304	4069	3697	833	1000	1163	1285	296	481	6176	19242

**Note:-** The average yield of each crop has been worked out by taking three years average at each point of time

**Source :-** Various issues of Statistical Abstracts of Punjab.



Period		Percent per annum					
Crop	Period	1968-69 to 1981-82		1981-82 to 2009-10		1968-69 to 2009-10	
		A	P	Y	A	P	Y
Wheat		2.48**	4.71**	2.17**	0.49**	2.82**	2.37**
						1.69**	4.30**
							2.56**
Paddy		11.55**	17.92**	5.69**	3.36**	4.02**	0.63
						7.51**	10.33**
							2.62**
Sugar Cane		-3.69**	-0.21	3.60**	2.54	2.40	-0.11
						-0.57	1.05*
							1.65**
Desi Cotton		-2.35*	-4.95**	2.91**	-1.91	1.29	3.38*
						-5.20**	-5.23**
							-0.08
American Cotton		7.70**	6.96**	-1.04*	1.70*	5.39**	3.61*
						3.88**	5.48**
							1.40**
Ground nut		-6.06**	-5.42**	0.67	-16.24**	-15.04**	1.32
						-12.49**	-12.57**
							.086
Rapeseed & Mustard		.45	1.71	1.17	-2.72	-0.65	2.19**
						-1.17	1.66*
							2.89**

**Note:- \*\* , significant at 1 and 5 percent level of significance.**

Tables were constructed to examine the shifts in area, productivity (yield) and production of commercial crops over time in the state. The percentages were calculated to estimate the proportional (relative) changes in their area to the total cropped area of the state.

For studying the trends in area, production and productivity of commercial crops the whole period was further divided into two sub periods. The sub periods are bounded as early green revolution period from 1968-69 to 1981-82 termed as Period I and late green revolution from 1981-82 to 2009-10 as Period II.

Y= area, production or yield of the crop

A= constant

t= time period

B= coefficient to be estimated

The CGR was calculated as:

$r = (B-1) \times 100$  = compound growth rate (in percent)

The significance of 'r' was tested by working out t-value as under:

$t' = r / SE(r)$

Where 't' follows student's t- distribution with (n-2) degrees of freedom. For examining instability, the area, production and yield data were determined for each time period separately using exponential equations. The instability measure (I) was constructed based on residuals. It is also denoted as coefficient of variation and is expressed in percentage terms.

Instability measure =

$$\frac{1}{\log y} \sqrt{\frac{n(\log y_t - \log Y_t)^2}{\sum_{i=1}^{n-2} n-2}} \times 100$$

## CONCLUSION

Commercial crops play a significant role not only in the domestic sector but also in the external trade. These crops contribute significantly to the growth of the Indian Economy by meeting the domestic requirements of oils, fiber, and sugar as well as earning foreign exchange through exports or import substitution. The analysis brought out that cereals dominated the cropping pattern in the state. Wheat occupied 42.09 percent and paddy occupied 28.45 percent of the cropped area in the triennium of 1994-97, whereas commercial crops put together accounted for only 13.74 percent of the cropped area. The share of wheat and rice in the cropping pattern has increased over time whereas that of commercial crop declined. Low level of profitability and instability in their yield were the main factors which were found to be responsible for fall in their area and production.

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## DEVELOPMENT AND EMPIRICAL VALIDATION OF A LINEAR STYLE PROGRAM ON 'STRUCTURE OF THE CELL' FOR IX GRADE STUDENTS

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### ABSTRACT

*The present study deals with the development of self-learning material on "Structure of the Cell" in science, and its empirical validation in terms of error rate, program density, and sequence of progression on the basis of data gathered through field try-out operation. The investigator found that the students acquire the science concept at a rapid pace while learning it through linear style programming.*

### KEYWORDS

Linear style programme, self learning, error rate, science teaching.

### INTRODUCTION

Improvement in the teaching learning process has always been a matter of priority among the educationists. Due to the explosion in the information availability and development in educational technology, traditional classroom teaching alone is unable to cater the overall demands of the instruction delivery and understanding of the subject on students' end. Population explosion and hence over-crowded classes is another challenge which hinders qualitative improvement. Research in improving the teaching learning process in different subjects is going on in a great pace in all parts of the world. Individualized teaching is the need of the hour in which Programmed Learning is a new path towards individualized instruction delivery.

Programmed learning is a systematic instructional strategy for classroom as well as self-learning. It works wonderfully in case of courses through distance learning. The programme may be of several physical forms. All these programmes can be prepared by experts and put to use for teaching purposes and its results are bound to be positive. It is a learner centered approach which gives emphasis to the method by which material can be presented so as to be auto instructional. Therefore, it has termed as a software instructional technology.

### CONCEPT OF PROGRAMMED LEARNING

Programmed Learning is the arrangement of materials to be learnt, in graded steps of difficulty, in such a sequence and in such a manner of presentation that it will result in the most efficient rate of understanding and retention. Smith and Moore (1968) defined Programmed Instruction as the process of arranging the materials to be learned into a series of sequential steps; usually it moves the student from a familiar background into a complex and new set of concepts, principles, and understandings.

Programmed Instruction as conceived by Markle (1969) is "a method of designing a reproducible sequence of instructional events to produce a measurable and consistent effect on the behavior of each and every acceptable student."

Thus Programmed Instruction is a technique of converting the live instructional process into self-learning or auto-instructional readable materials in the form of micro-sequences which the learners are required to read, make some right or wrong response, correct the wrong responses or confirm the right responses and attain the complete mastery of the concepts explained in the micro sequences, which form a complex subject matter of some wider instructional sequences for unit of instruction.

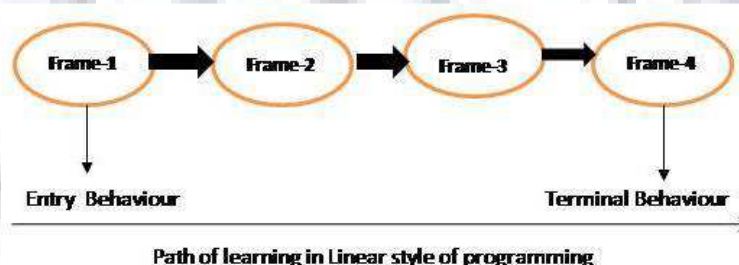
### STYLES OF PROGRAMMING

Various styles of programming techniques have emerged within the last two decades. It is very difficult to have broad classification of the various styles of programming. Basically, programmed material can be presented to the learner either in book form or through teaching machine with the help of following styles:

(1) Linear style      (2) Branching style      (3) Mathetics style

#### LINEAR STYLE

Linear means proceeding in a straight line. A program in which the information proceeds in a straight line is generally called as "Linear Programming". In this style, the student does every frame in the same order no matter how adequate or inadequate his response is. The sequence of frames and path of learning proceed in a systematic and straight line. It may be diagrammatically represented as follows:



As in the above paradigm, in linear style the learner proceeds on a path from entry behavior through the frames to reach the terminal behavior. In a linear format the matter is so arranged in small steps that the learner makes only correct responses throughout the program and receives only positive reinforcement. If a learner responds incorrectly to a particular frame he may have to repeat the frame. In any case he is not allowed to go to the next frame until he responds correctly to the frame in hand.

### SIGNIFICANCE OF PROGRAMMED LEARNING

The programmed learning has proved to be an effective adjunct to other methods of teaching. However, we have miles to go before our teachers begin to use programmed materials in their day-to-day teaching. In U.S.A. while less than 5 percent schools used programmed learning in 1961, by the autumn of 1962, twenty-three per cent were making use of these materials. In India, in order to test the usefulness of program learning materials and implement it in Indian classroom, various studies have been attempted. Desai (1966), and Kapadia (1972) studied the pupils' intelligence in relation to programmed learning. The first

two studies have shown that intelligence did not have much effect on learning through programmed instruction while the study of Kapadia (1972) indicated that higher I.Q. pupil achieve better in programmed learning. Chauhan (1973) developed a programmed text for B.Ed. level to provide auto-instructional material in educational psychology to be used as supplementary material for the course. Bhusan (1973) prepared a liner program in "Educational Statistics" using Hindi as a medium of presentation. The objective of the study was also to prepare a manual for the guidance of the consumers of the program. Gupta (1973) developed a self-instructional program in the basic sentence patterns of English for the undergraduate students and made an empirical study of the program on the basis of field-testing. Govinda (1976) developed a programmed text on "Educational Testing and Techniques of Evaluation" and experimentally validated the effectiveness of the program. Pandey (1980) found that the programmed text is superior to other methods and that the high and low income group students following the program text were distinctively superior to those who had traditional teaching with home assignment and grading. Seshadri (1980) developed a linear program of 2074 frames for mathematics of class IX. She found that the strategy of having Programmed Learning Material (PLM) assist major component worked better than the traditional mode of teaching. Mavi (1981) developed a programmed text in physical geography for high school students and covered 18 topics. PLM was tried on an experimental sample of ninth grade students. The programs were in the English language and had a liner format. Chaudhary (1985) prepared programmed learning material in geography for secondary level. He found that after pursuing PLM, students gained significantly as far as knowledge of the subject is concerned. The material was equally effective for both urban and rural students. Desai (1986) developed programmed material on heat in physics for pupils studying in standard XI and found that pupils took active interest in reading and learning through programmed material. Agashe (1995) developed and empirically validated programmed learning material for ensuring mastery in biology for XI and XII students. Keeping in view the usefulness of programmed learning as an instructional mode and the increasing necessity of such materials in school subjects, the investigator developed linear style program material in science for seventh grade students.

## OBJECTIVES OF THE STUDY

The objectives of the study are:

1. To develop the self-learning material on the topic of "Structure of the Cell" in science for 9<sup>th</sup> class students.
2. Empirical validation of self-learning material in terms of error rate, program density and sequence progression on the basis of data yielded through field tryout operation.

## POPULATION AND SAMPLE

The target population of the present study consisted of student of 9<sup>th</sup> class and the experimental sample for the study consisted of 30 students of Green Field Public School, Kurukshetra, studying in 9<sup>th</sup> class through English medium.

## METHODS OF DEVELOPING THE PROGRAM

The development of self-learning materials on the selected topic underwent the following stages.

- Preparation of the program
- Writing of the program in a linear format
- Try out for modification
- Evaluation of the program

Through these phases/ steps the investigator developed a programmed text on the basis of small group tryout and finally the programmed text was administered on the sample of 30 students. Then on the basis of students' response/score, the program was empirically validated in order to test the effectiveness of the program.

## EMPIRICAL VALIDATION OF THE PROGRAM

Empirical validation of the program is always done by the programmer for improving the quality of instructional material. The small group and final field try out results are often analyzed in terms of error rates, program densities and flow sequence progression. External evaluation in terms of criteria score is also done by the programmer. The program evolved by the investigator has been evaluated on the basis of final field try-out data, in terms of :

- Error rates
- Program density
- Sequence progression
- Criterion test findings

## ERROR RATE

The error rate is applicable mainly in respect of linear and Mathematics style programs. Any frame on which the learner is unable to give a response in accordance with the stipulation of the program is given the name of the error. To calculate error rate, errors committed by all individuals on all the frames are counted and added. The error rate is calculated by applying the following formula:

$$\text{Error rate} = \frac{\text{Total numbers of errors} \times 100}{\text{Total number of responses} \times \text{Total number of pupils}}$$

Percentage of overall errors of the program is mentioned as below.

Total no. of errors	=	60
Total no. of responses	=	59
Total no. of pupils	=	30

**Error Rate = 3.4%**

**Percentage of success = 100 – 3.4 = 96.6%**

The error rate of the program is less than 5%, the criterion suggested by Skinner to check the validity of an effective linear program.

## PROGRAM DENSITY

Another measure to evaluate the effectiveness of a program is to calculate its density. The term 'density' has been borrowed here from physics where it represents mass per unit volume. Density is an independent measure of the difficulty level of the program. It is used to see whether the program is of high, medium or low density. To calculate the density of a program, a tally is made of the number different responses required. The tallies are of programmer's confirmatory responses and not of pupil's responses.

A program would have a density 1.00, if every response required by the program were different. Hence the formula for calculating density of a program is

$$\text{Density of programme} = \frac{Nd}{Nt}$$

Where,

Nd = Total number of different types of responses required in a program.

Nt = Total number of responses required in a program.

Green (1962) has mentioned two types of densities.

**INDEPENDENT DENSITY**

This is the density of a single frame or a group of frames comprising a part of section of a program. Density of each section is independent of one another. The program is therefore divided into section of equal number of frames.

**CUMULATIVE DENSITY**

Cumulative density is the density of the entire program taken as a whole. The entire program is considered as a single section and the total number of different types of responses appearing on the entire program frame is divided by the total number of responses required on the whole program. Cumulative density of the program is an indirect measure of the difficulty level of the program. Hence cumulative density is calculated by:

Cumulative Density =  $N_d/N_t$

Here,  $N_d = 34$

$N_t = 59$

So, Cumulative Density =  $34/59 = 0.58$

**INTERPRETATION**

Cumulative density reveals that the programme has medium density hence it has reasonable difficulty level. It can be easily comprehended by IX graders

**SEQUENCE PROGRESSION**

A program is usually analyzed in terms of progression of sequence. It is considered an important indicator of the authenticity of the program. Sequence progression chart helps the programmer to evaluate the logical arrangement of the parts of the program. A study of sequence progression is made by the programmer by recording the errors made by all the students on each frame. For this purpose a flow chart was prepared. The chart consists frame numbers on vertical line. The frame on which each learner has made an error is shown by marking (x).

Flowchart gives us the information concerning the location and relative frequency of errors. The flowchart for the criterion test revealed that students obtained 98.8% of success on criterion test of the program.

**CRITERION TEST FINDINGS**

The program has also been evaluated on the basis of student's performance on the criterion test.

The error rate of the criterion test and overall percentage of success was calculated as follows:

$$\text{Error rate} = \frac{\text{Total numbers of errors} \times 100}{\text{Total number of test items} \times \text{Total number of pupils}}$$

In criterion test:

Total no. of test items = 30

Total no. of Pupils = 30

Total no. of errors = 70

Hence percentage of error in criterion test was: 7.7%

Percentage of success in criterion test =  $100 - 7.7 = 92.3\%$

The percentage of success on the criterion test was 92.3%. Success on criterion test shows that students are able to acquire the science concepts at a rapid pace while learning it through linear style programming.

**MAIN FEATURES OF THE FINAL DRAFT AND DISCUSSION**

Linear style has been followed at the time of developing the program and the investigator selected the topic from his area of interest. After writing the objectives in behavioral terms, the criterion test was prepared.

The program was edited by the subject expert, programming technique expert and language expert; the program was also modified on the basis of individual try-out and small group try-out. The program at the end of second try-out consisted of 59 frames.

The program was then administered on the sample of 30 students. On the basis of students' responses and scores on the criterion test, error rate and program density were calculated and sequence progression charts were prepared to inspect the flow of information. Study of sequence progression chart revealed that the flow of information through the frames was quite smooth.

**EVALUATION**

The error rate of the entire program comes to 3.4%; cumulative density is 0.58. The percentage of success on the criterion test comes to be 92.3%.

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# PERFORMANCE APPRAISAL OF INDIAN BANKING SECTOR: A COMPARATIVE STUDY OF SELECTED PUBLIC AND FOREIGN BANKS

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## ABSTRACT

*In the present study, an attempt is made to analyze the performance of selected public and foreign banks in India on the basis of parameters recommended in CAMEL Model, i.e. C-capital adequacy, A-asset quality, M-management efficiency, E-earnings quality and L-liquidity, which is divided into seven sections. First section includes a brief review of some of the earlier studies. Second section covers the scope, objectives, hypotheses and research methodology of the study. In third, fourth, fifth, sixth and seventh section, an attempt is made to analyze the capital adequacy, asset quality, management efficiency, earnings quality and liquidity of six banks in all selecting 3 banks from each category i.e. SBI, PNB and BOB from public sector and Citibank, Standard Chartered and HSBC from foreign banks in India for a period of 12 years, i.e. 2000 to 2011. To achieve the objectives of the study, the use is made of secondary data collected mainly from the various sources like Report on Trends and Progress of Banking in India, Performance Highlights of Public and Foreign Banks in India, and various journals such RBI Bulletin, IBA Bulletin, Professional Banker, etc. It is found that the ability of the management to meet the need for additional capital is better in BOB and Citibank in their groups as the capital adequacy ratio in these banks is better than other banks. The quality of assets indicates what types of advances the bank has made to generate interest income, which is better in PNB and HSBC in their groups as the ratio of net NPAs to total assets/advances is better in these banks than other banks. Management efficiency is better in SBI and Standard Chartered bank in their groups as the credit-deposits ratio is better in these banks than other banks. The quality of earnings is a very important criterion which explains the sustainability and growth in earnings in the future. Therefore, from the investors' point of view, PNB and Standard Chartered are in a better position as their earnings quality is better in their respective groups which is evident from the ratio of operating profits to average working funds. On the other hand, from the depositors' point of view, SBI and Citibank followed by BOB and HSBC are in a better position in their respective groups as is evident from the ratio of liquid assets to total deposits/total assets.*

## KEYWORDS

Capital adequacy, Asset Quality, Efficiency, Earnings quality, Liquidity.

## INTRODUCTION

After the set back of early nineties when the Government of India had to pledge the gold to acquire foreign currency to meet the severe problem of balance of payment temporarily, the Government planned to liberalize the Indian economy and open its door to the foreigners to speed up the development process as a long-term solution for the ailing economy. The economic liberalization move, which was initiated in 1991 when the new government assumed office, has touched all the spheres of national activity. Perhaps one area where the deregulatory policies had the maximum impact was the banking sector. Until 1991, the banking in India was largely traditional. The bankers were prudent and cautious people who seldom took risks and were content with the normal banking activities i.e. accepting of deposits and lending against them. Labeled as "Agents of Social Change", their outlook was rigidly controlled by the policies of the Government, which were centered more on the alleviation of poverty and the upliftment of the downtrodden. The 1969 and 1980's nationalization of banks, bringing private banks under the state control, had the objective of realizing this government dream. Even as late as 1991-92, the profitability was a forbidden word in banking business. The banks were established to fulfill social objectives and their performance was evaluated on their 'task fulfillment' initiatives. Lending to the priority sectors, opening of rural branches, achievements in the implementation of Government sponsored schemes and adherence to the policies and programmes of the Government were the parameters considered for judging the performance of a bank. Indian banking system has made commendable progress in extending its geographical spread and functional reach. The nationalization of banks helped in increasing the number of branches, volume of deposits and ensured wider dispersal of the advances. Despite impressive quantitative achievements in resource mobilization and in extending the credit reach, some deficiencies have, over the years, crept into the financial system such as decline in the productivity and efficiency of the system, erosion of the profitability of the system, directed lending played a critical role in depressing the profits, the directed investments in the form of SLR and CRR hindered income earning capability and potentials, portfolio quality suffered due to political and administrative interference in credit decision-making, increase in cost structure due to technological backwardness, average ratio of capital funds to RWAs remained low which created problems in international operations and the system remained de-linked from sound international banking practices. Realizing all these ill effects, the efforts were made to bring reforms in the financial system of the country. The seed of the reforms in India were sown by the Narasimham Committee appointed by the RBI under the chairmanship of M. Narasimham, the former Governor of RBI, to examine the aspects relating to the structure, organization, functions and procedures of the financial system and suggest remedial measures. The Committee submitted its reports in November 1991 and thus, began a new chapter in Indian banking. The financial system reforms were based on the principles of operational flexibility and functional autonomy so that the efficiency, productivity and profitability of the financial institutions can be enhanced continuously. It also aimed at providing a diversified, efficient and competitive financial system with the ultimate objective of improving the efficiency of available resources, increasing the return on investments so that an accelerated growth of all the sectors of the economy can be promoted. The specific goals of the reforms were the development of transparent and efficient capital and money markets, promotion of competition through free entry/exit in financial sector, improvement in access of financial savings, improvement of financial health of banks by recapitalizing, restructuring etc. of weaker banks, improvement in the managerial competence and quality of human resources, and building the financial institutions and infrastructure to improve the supervision, audit, technology and legal framework.

## LITERATURE REVIEW

The articles published on different facets of Indian banking reforms are restrictive in nature and have been found wanting in terms of the assessment of the impact of the reforms on the banking sector. A brief review of some of them is as follows:

**Reddy and Yuvaraja (2001)** were of the view that the adoption of international capital adequacy standards, deregulation of interest rates and entry of private and foreign banks underlined that the speed and sequencing of the financial sector reforms should be as per the requirements of the Indian economy. **Rao (2002)** concluded that the international regulations are forcing the Indian banks to adopt better operational strategies and upgrade the skills. The system requires new technologies, well-guarded risk and credit appraisal system, treasury management, product diversification, internal control, external regulation as well as skilled human resources to achieve the international excellence and to face the global challenges. **Muniappan (2003)** focused on two areas - firstly, challenges faced by the Indian banks and secondly, the management of these challenges. Every aspect of the banking industry, be it profitability, NPA management, customer service, risk management, HRD etc., has to undergo the process of transformation of aligning with the international best practices. He concluded that the future of Indian banking system needs a long-term strategy, which should cover areas like structural aspects, business strategies, prudential control systems, integration of markets, technology issues, credit delivery mechanism and information sharing, etc. **Ghosh and Das (2005)** highlighted the ways

how market forces may motivate banks to select high capital adequacy ratios as a means of lowering their borrowing costs. If the effect of competition among banks is strong, then it may overcome the tendency for bank capitalization. If systemic effects are strong, regulation is required. Empirical tests for the Indian public sector banks during the 1990s demonstrated that better capitalised banks experienced lower borrowing costs. **Mohan (2006)** focused on the changes in efficiency and productivity in Indian banking and stated that the patterns of efficiency and technological change witnessed in Indian banking can be viewed as consistent with expectations in an industry undergoing rapid change in response to the forces of deregulation. In reaction to evolving market prospects, a few pioneering banks might adjust quickly to seize the emerging opportunities, while others respond slowly and cautiously. **Sharma and Nikadio (2007)** presented an analytical review of the capital adequacy regime of the banking sector in India and concluded that in the regime of Basel I, Indian banking system performed reasonably well, with an average CRAR of about 12 per cent, which was higher than the internationally accepted level of 8 per cent as well as India's own minimum regulatory requirement of 9 per cent. **Fred, Stephen and Arthur (2009)** used a multivariate discriminant model to differentiate between low efficiency and high efficiency community banks (less than \$1 billion in total assets) based upon the efficiency ratio, a commonly used financial performance measure that relates non-interest expenses to total operating income. The discriminant model was applied using data for 2006-2008 and also included the periods of high performance as well as the deteriorating industry conditions associated with the current financial crisis. The model's classification accuracy ranges approximately from 88-96 per cent for both original and cross-validation data sets. **Dwivedi and Charyulu (2011)** analyzed the impact of various market and regulatory initiatives on efficiency improvements of Indian banks with the help of Data Envelopment Analysis (DEA) and found that national banks, new private banks and foreign banks have showed high efficiency over a period of time than the remaining banks. **Uppal (2011)** analyzed the performance of major banks in terms of productivity and profitability in the pre and post e-banking period and concluded that performance of all the banks under study is much better in post-e-banking period and further foreign banks are at the top position, whereas the performance of the public sector banks is comparatively very poor. **Ghosh and Ghosh (2011)** emphasized on management of non-performing assets in the perspective of the public sector banks in India under strict asset classification norms, use of latest technological platform, recovery procedures and other bank specific indicators in the context of stringent regulatory framework of the Reserve Bank of India and concluded that the reduction of non-performing asset is necessary for improving the profitability of banks and to comply with the capital adequacy norms as per the Basel Accord(s). **Thiagarajan, Ayyappan and Ramachandran (2011)** analysed the role of market discipline on the behaviour of commercial banks with respect to their capital adequacy and concluded that the commercial banks are well capitalized and the ratio is well over the regulatory minimum requirement. The private sector banks show a higher percentage of tier-I capital over the public sector banks. However the public sector banks show a higher level of tier-II capital. The study also indicated that market forces influenced the banks' behaviour to keep their capital adequacy well above the regulatory norms. The Non-Performing Assets influenced the cost of deposits for both public and private sector banks in a significant manner. The return on equity had a significant positive influence on the cost of deposits for private sector banks. The public sector banks can reduce the cost of deposits by increasing their Tier-I capital.

Induced by the forgoing revelations, an attempt is made to analyze the performance of selected public and foreign banks in India on the basis of parameters recommended in CAMEL Model, i.e. C-capital adequacy, A-asset quality, M-management efficiency, E-earnings quality and L-liquidity, which is divided into seven sections. First section includes a brief review of some of the earlier studies. Second section covers the scope, objectives, hypotheses and research methodology of the study. In third, fourth, fifth, sixth and seventh section, an attempt is made to analyze the capital adequacy, asset quality, management efficiency, earnings quality and liquidity of six banks in all selecting 3 banks from each category i.e. State Bank of India (SBI), Punjab National Bank (PNB) and Bank of Baroda (BOB) from public sector and Citibank, Standard Chartered and HSBC from foreign banks in India.

## OBJECTIVES, HYPOTHESES AND METHODOLOGY

### OBJECTIVES OF THE STUDY

The present study is conducted to achieve the following objectives:

1. To study the present position of capital adequacy of selected public and foreign banks in India.
2. To analyze the asset quality of selected public and foreign banks in India.
3. To appraise the management efficiency of selected public and foreign banks in India.
4. To examine the earnings quality of selected public and foreign banks in India.
5. To analyze the liquidity of selected public and foreign banks in India.

### RESEARCH HYPOTHESES

To achieve the objective of the study, the following hypotheses are formulated and tested:

1. There is no significant difference in the bank/group-wise capital adequacy of the selected public and foreign banks in India.
2. There is no significant difference in the bank/group-wise asset quality of selected public and foreign banks in India.
3. There is no significant difference in the bank/group-wise management efficiency of selected public and foreign banks in India.
4. There is no significant difference in the bank/group-wise earnings quality of selected public and foreign banks in India.
5. There is no significant difference in the bank/group-wise liquidity of selected public and foreign banks in India.

### RESEARCH METHODOLOGY

The present study covers the performance analysis of selected public (State Bank of India, Punjab National Bank and Bank of Baroda) and foreign banks (Citi Bank, Standard Chartered Bank and HSBC Bank) for a period of 12 years, i.e. 2000 to 2011. To achieve the objectives of the study, the use is made of secondary data which were collected from the various sources like Report on Trends and Progress of Banking in India, Performance Highlights of Public and Foreign Banks in India, various journals such RBI Bulletin, IBA Bulletin, Professional Banker, ICFAI Journal of Bank Management. To test the statistical significance of the results, one-way ANOVA technique has been used.

### MANAGEMENT OF CAPITAL ADEQUACY

It is important for a bank to maintain depositors' confidence and preventing the bank from bankruptcy. Capital may be taken as a cushion to protect depositors and promote the stability and efficiency of financial system of any country. Capital adequacy reflects the overall financial condition of the banks and also the ability of the management to meet the need for additional capital whenever required. It also indicates whether the bank has enough capital to absorb the unexpected losses or not. Capital Adequacy Ratios act as indicators of bank leverage. The following ratio measures the Capital Adequacy:

#### CAPITAL ADEQUACY RATIO

The banks are required to maintain the Capital Adequacy Ratio (CAR) as specified by RBI from time to time. As per the latest RBI norms, the banks in India should have a CAR of 9 per cent. It is arrived at by dividing the sum of Tier-I and Tier-II capital by aggregate of Risk Weighted Assets (RWAs). The higher the CAR, the stronger is a bank as it ensures high safety against bankruptcy. Tier-I Capital includes equity capital and free reserves. Tier-II Capital comprises of subordinate debt of 5-7 years tenure revaluation reserves, general provisions and loss reserves, hybrid debt capital instruments and undisclosed reserves and cumulative perpetual preference shares. As is evident from the Table-3.1, average capital adequacy ratio is highest in BOB and Citibank in public and foreign banks respectively. There is no significant difference in the average capital adequacy ratio of selected public and foreign banks group-wise and when all the banks taken together as the calculated value is less than the critical value in all the cases during the period under study.

#### ADVANCES TO TOTAL ASSETS

The ratio of the advances to total assets indicates a bank's aggressiveness in lending, which ultimately results in better profitability. Higher ratio of advances to total assets is preferred to a lower one. Total advances also include receivables. The value of total assets is excluding the revaluation of all the assets. As is

evident from Table-3.2, average ratio of advances to total assets is highest in BOB and Citibank in public, private and foreign banks respectively. There is no significant difference in the average ratio of advances to total assets in selected public sector banks. However, the difference between the average ratios of advances to total assets in selected foreign banks is found significant at 5 percent level of significance. As a whole, there is a significant difference in the average ratio of advances to total assets in selected public and foreign banks at 5 per cent level when all the banks taken together during the period under study.

#### **GOVERNMENT SECURITIES TO TOTAL INVESTMENTS**

The percentage of investment in government securities to total investments is a very important indicator, which shows the risk-taking ability of the bank. It indicates a bank's strategy as being high profit-high risk or low profits-low risk. It also gives a view as to the availability of alternative investment opportunities. Government securities are generally considered as the most safe debt instrument, which as a result, carries the lowest return. Since government securities are risk-free, the higher the G-Securities to investment ratio, the lower the risk involved in a bank's investments. As is evident from Table-3.3, average ratio of government securities to total investments is highest in SBI and Citibank in public and foreign banks respectively. There is no significant difference in the average ratio of government securities to total investments in selected public sector banks. However, the difference between the average ratios of government securities to total investments in selected foreign banks is found significant at 5 percent level of significance. As a whole, there is a significant difference in the average ratio of government securities to total investments in selected public and foreign banks at 5 per cent level when all the banks are taken together during the period under study.

From the above analysis, it is concluded that there is no significant difference in the capital adequacy ratio of selected public and foreign banks. However, a significant difference is found in average ratio of advances to total assets and government securities to total investments of foreign banks and when all the individual banks are considered together. But this difference is found insignificant in case of selected public sector banks during the period under study. Therefore, the null hypothesis i.e. there is no significant difference in the bank/group-wise capital adequacy of the selected public and foreign banks in India can be partially accepted.

#### **MANAGEMENT OF ASSET QUALITY**

The quality of assets is an important parameter to gauge the strength of bank. The prime motto behind measuring the assets quality is to ascertain the component of net NPAs as percentage to total assets/net advances. This indicates what types of advances the bank has made to generate interest income. Thus, assets quality indicates the type of the debtors the bank is having.

##### **GROSS NPAs TO TOTAL ADVANCES**

This ratio is arrived at by dividing the gross NPAs by total advances. Lower the ratio better is the performance of the bank. As is evident from the Table-4.2, average ratio of gross NPAs to total advances is lowest in PNB and Citibank in public and foreign banks respectively. There is no significant difference in the average ratio of gross NPAs to total advances in selected public sector banks. However, the difference between the average ratios of gross NPAs to total advances in selected foreign banks is found significant at 5 percent level of significance. As a whole, there is a significant difference in the average ratio of gross NPAs to total advances in selected public and foreign banks at 5 per cent level when all the individual banks are considered together during the period under study.

##### **NET NPAs TO TOTAL ASSETS**

This ratio indicates the efficiency of the bank in assessing credit risk and, to an extent, recovering the debts. This ratio is arrived at by dividing the net NPAs by total assets. Total assets are considered net of revaluation reserves. Lower the ratio better is the performance of the bank. As is evident from the Table-4.2, average ratio of net NPAs to total assets is lowest in PNB and HSBC in public and foreign banks respectively. There is no significant difference in the average ratio of net NPAs to total assets in selected public sector banks and foreign banks. However, there is a significant difference in the average ratio of net NPAs to total assets in selected public and foreign banks at 5 per cent level when all the individual banks are considered together during the period under study.

##### **NET NPAs TO NET ADVANCES**

It is the most standard measure of assets quality. In this ratio, Net NPAs are measured as a percentage of net advances. Net NPAs are gross NPAs net of provisions on NPAs and interest in suspense account. As is evident from the Table-4.3, average ratio of net NPAs to net advances is lowest in PNB and HSBC in public and foreign banks respectively. There is no significant difference in the average ratio of net NPAs to net advances in selected public and foreign banks. However, there is a significant difference in the average ratio of net NPAs to net advances in selected public and foreign banks at 5 per cent level when all the individual banks are considered together during the period under study.

From the above analysis, it is concluded that there is no significant difference in the asset quality of selected public sector banks and foreign banks. However it is found significant when all the individual banks are considered together during the period under study. Therefore, the null hypothesis i.e. there is no significant difference in the bank/group-wise asset quality of the selected public and foreign banks in India can be partially accepted.

#### **MANAGEMENT OF EFFICIENCY**

Management efficiency is another important element of the CAMEL Model. The ratio in this segment involves subjective analysis to measure the efficiency and effectiveness of management. The management of the bank takes crucial decisions depending on its risk perception. It sets vision and goals for the organization and sees that it achieves them. This parameter is used to evaluate management efficiency as to assign premium to better quality banks and discount poorly managed ones. The ratio used to evaluate management efficiency is described as under:

##### **TOTAL ADVANCES TO TOTAL DEPOSITS (CREDIT-DEPOSITS RATIO)**

This ratio measures the efficiency and ability of the bank's management in converting the deposits available with the bank (excluding other funds like equity capital, etc.) into high earning advances. Total deposits include demand deposits, savings deposits, term deposits and deposits of other banks. Total advances also include the receivables. As is evident from Table-5.1, average ratio of total advances to total deposits is highest in SBI and Standard Chartered in public and foreign banks respectively. There is no significant difference in the average credit-deposits ratio of selected public sector banks. However, the difference between the average credit-deposits ratio in selected foreign banks is found significant at 5 percent level of significance. As a whole, there is a significant difference in the average credit-deposits ratio of selected public and foreign banks at 5 per cent level when all the individual banks are considered together during the period under study.

##### **BUSINESS PER EMPLOYEE**

This ratio shows the productivity of human resource of the bank. It is used as a tool to measure the efficiency of all the employees of a bank in generating business for the bank. It is arrived at by dividing the total business by total number of employees. Higher the ratio, the better it is for the bank. By business, we mean the sum of Total Deposits and Total Advances in a particular year. As is evident from Table-5.2, average business per employee is highest in BOB and Citibank in public and foreign banks respectively. There is no significant difference in the average business per employee of selected public sector banks. However, the difference between the average business per employee in selected foreign banks is found significant at 5 percent level of significance. As a whole, there is a significant difference in the average business per employee of selected public and foreign banks at 5 per cent level when all the individual banks are considered together during the period under study.

##### **PROFITS PER EMPLOYEE**

This ratio shows the surplus earned per employee. It is arrived at by dividing the Profit after Tax earned by the bank by the total number of employees. Higher the ratio better is the efficiency of the management. As is evident from Table-5.3, average profits per employee are highest in BOB and Citibank in public and foreign banks respectively. There is no significant difference in the average profits per employee of selected public sector banks. However, the difference between the average profits per employee in selected foreign banks is found significant at 5 percent level of significance. As a whole, there is a significant difference in the average profits per employee of selected public and foreign banks at 5 per cent level when all the individual banks are considered together during the period under study.



From the above analysis, it is concluded that there is no significant difference in the management efficiency of selected public sector banks. However it is found significant in foreign banks and when all the individual banks are considered together during the period under study. Therefore, the null hypothesis i.e. there is no significant difference in the bank/group-wise management efficiency of the selected public and foreign banks in India can be partially accepted.

## MANAGEMENT OF EARNINGS QUALITY

The quality of earnings is a very important criterion that determines the ability of a bank to earn consistently, going into the future. It basically determines the profitability of the banks. It also explains the sustainability and growth in earnings in the future. This parameter gains importance in the light of the argument that much of a bank's income is earned through non-core activities like investments, treasury operations, and corporate advisory services and so on. The following ratios try to assess the quality of income in terms of income generated by core activity- income from lending operations:

### OPERATING PROFITS TO AVERAGE WORKING FUNDS

This ratio indicates how much a bank can earn from its operations net of the operating expenses for every rupee spent on working funds. This is arrived at by dividing the operating profits by average working funds. Average Working Funds are the total resources (total assets or liabilities) employed by a bank. It is the daily average of the total assets/liabilities during a year. The higher the ratio, the better it is. This ratio determines the operating profits generated out of working funds employed. The better utilization of funds will result in higher operating profits. Thus, this ratio will indicate how a bank has employed its working funds in generating profits. Banks which use their assets efficiently will tend to have a better average than the industry average. As is evident from Table-6.1, average ratio of operating profits to average working funds is highest in PNB and Standard Chartered in public and foreign banks respectively. There is no significant difference in the average ratio of profits to average working funds of selected public sector banks. However, the difference between average ratios of profits to average working funds in selected foreign banks is found significant at 5 percent level of significance. As a whole, there is a significant difference in the average ratio of profits to average working funds of selected public and foreign banks at 5 per cent level when all the individual banks are considered together during the period under study.

### SPREAD OR NET INTEREST MARGIN (NIM) TO TOTAL ASSETS

NIM, being the difference between the interest income and the interest expended, as a percentage of total assets shows the ability of the bank to keep the interest on deposits low and interest on advances high. It is an important measure of a bank's core income (income from lending operations). The interest income includes dividend income and interest expended includes interest paid on deposits, loan from the RBI, and other short term and long term loans. As is evident from Table-6.2, average ratio of spread to total assets is highest in PNB and Citibank in public and foreign banks respectively. There is a significant difference in the average ratio of net interest margin to total assets of selected public and foreign banks. As a whole, there is also a significant difference in the average ratio of net interest margin to total assets of selected public and foreign banks at 5 per cent level when all the individual banks are considered together during the period under study.

### NON-INTEREST INCOME TO TOTAL INCOME

Fee-based income accounts for a major portion of a bank's other income. The bank generates higher fee income through innovative products and adapting the technology for sustained service levels. This stream of revenue is not dependent on the bank's capital adequacy and consequent potential to generate income is immense. Thus, this ratio measures the income from operations, other than lending, as a percentage of the total income. Non-interest income is the income earned by the banks excluding income on advances and deposits with the RBI. The higher ratio of non-interest income to total income indicates the fee-based income. As is evident from Table-6.3, average ratio of non-interest income to total income is highest in SBI and HSBC in public and foreign banks respectively. There is no significant difference in the average ratio of non-interest income to total income of selected public sector banks and foreign banks. However, there is a significant difference in the average ratio of non-interest income to total income of selected public and foreign banks at 5 per cent level when all the individual banks are considered together during the period under study.

### NET PROFITS TO TOTAL INCOME

This ratio is calculated by dividing the net profits by total income, which includes interest income and other income. As is evident from table 6.4, average ratio of net profits to total income is highest in PNB and Citibank in public and foreign banks respectively. There is no significant difference in the average ratio of net profits to total income of selected public sector banks. However, the difference between the average ratios of net profits to total income in selected foreign banks is found significant at 5 percent level of significance. As a whole, there is a significant difference in the average ratio of net profits to total income of selected public and foreign banks at 5 per cent level when all the individual banks are considered together during the period under study.

From the above analysis, it is concluded that there is no significant difference in the earnings quality of selected public sector banks except in case of spread to total assets, where the difference is considered significant. On the other hand, the difference is found significant in case of operating profits to average working funds and spread to total assets in foreign banks. Therefore, the null hypothesis i.e. there is no significant difference in the bank/group-wise earnings quality of the selected public and foreign banks in India can be partially accepted.

## MANAGEMENT OF LIQUIDITY

Liquidity is very important for any organization dealing with money. Banks have to take proper care in hedging liquidity risk while at the same time ensuring that a good percentage of funds are invested in higher return generating investments so that banks can generate profit while at the same time provide liquidity to the depositors. Among a bank's assets, cash investments are the most liquid. The ratios used to measure the liquidity are as follows:

### LIQUID ASSETS TO TOTAL ASSETS

Liquid Assets include cash in hand, balance with the RBI, balance with other banks (both in India and abroad), and money at call and short notice. Total assets include the revaluations of all the assets. The proportion of liquid assets to total assets indicates the overall liquidity position of the bank. As is evident from table 7.1, average ratio of liquid assets to total assets is highest in BOB and Citibank in public and foreign banks respectively. There is no significant difference in the average ratio of liquid assets to total assets of selected public sector banks. However, the difference between the average ratios of liquid assets to total assets in selected foreign banks is found significant at 5 percent level of significance. As a whole, there is a significant difference in the average ratio of liquid assets to total assets of selected public and foreign banks at 5 per cent level when all the individual banks are considered together during the period under study.

### LIQUID ASSETS TO TOTAL DEPOSITS

This ratio measures the liquidity available to the depositors of the bank. Total deposits include demand deposits, savings deposits, term deposits, and deposits of other financial institutions. Liquid assets include cash in hand, balance with the RBI, balance with other banks (both in India and abroad), and money at call and short notice. As is evident from table 7.2, average ratio of liquid assets to total deposits is highest in SBI and Citibank in public and foreign banks respectively. There is no significant difference in the average ratio of liquid assets to total deposits of selected public sector banks. However, the difference between the average ratios of liquid assets to total deposits in selected foreign banks is found significant at 5 percent level of significance. As a whole, there is a significant difference in the average ratio of liquid assets to total deposits of selected public and foreign banks at 5 per cent level when all the individual banks are considered together during the period under study.

From the above analysis, it is concluded that there is no significant difference in the management of liquidity of selected public sector banks. Therefore, the null hypothesis i.e. there is no significant difference in the bank/group-wise liquidity of the selected public sector banks can be accepted. On the other hand, the difference is found significant in case of in foreign banks and when all the individual banks are considered together during the period under study. Therefore, the null hypothesis i.e. there is no significant difference in the bank/group-wise liquidity of the selected public and foreign banks in India cannot be accepted.

## CONCLUSION

As a whole, it is concluded that overall financial condition and also the ability of the management to meet the need for additional capital is better in BOB and Citibank in their groups as the capital adequacy ratio in these banks is better than other banks. The quality of assets indicates what types of advances the bank has made to generate interest income, which is better in PNB and HSBC in their groups as the ratio of net NPAs to total assets/advances is better in these banks than other banks. The management of the bank takes crucial decisions depending on its risk perception. It sets vision and goals for the organization and sees that it achieves them. This parameter is used to evaluate management efficiency as to assign premium to better quality banks and discount poorly managed ones. Management efficiency is better in SBI and Standard Chartered bank in their groups as the credit-deposits ratio is better in these banks than other banks. The quality of earnings is a very important criterion that determines the ability of a bank to earn consistently, going into the future. It basically determines the profitability of the banks. It also explains the sustainability and growth in earnings in the future. Therefore, from the investors' point of view, PNB and Standard Chartered are in a better position as their earnings quality is better in their respective groups which is evident from the ratio of operating profits to average working funds. On the other hand, banks have to take proper care in hedging liquidity risk while at the same time ensuring that a good percentage of funds are invested in higher return generating investments so that banks can generate profit while at the same time provide sufficient liquidity to the depositors. Therefore, from the depositors' point of view, SBI and Citibank followed by BOB and HSBC are in a better position in their respective groups as is evident from the ratio of liquid assets to total deposits/total assets.

## SIGNIFICANCE AND LIMITATIONS

The results obtained from the present study will be helpful to the policy makers, depositors, investors and other stakeholders to take decisions about the capital adequacy, asset quality, management efficiency, earnings quality and liquidity of the selected public and foreign banks in India. As the present study covers the performance analysis of selected public and foreign banks (only three banks from each category) for a period of 12 years only, therefore results drawn cannot be applied to the banking sector as whole for the entire period especially after the reforms. Availability of time and lack of experience on the part of the researcher may be considered a stumbling block in achieving the objectives of the study.

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## TABLES

TABLE 3.1: CAPITAL ADEQUACY RATIO (Percent)

Years	Public Sector Banks			Foreign Banks		
	SBI	PNB	BOB	Citibank	Standard Chartered	HSBC
2000	11.49	10.31	12.10	10.62	9.50	10.30
2001	12.79	10.24	12.80	11.25	9.63	12.37
2002	13.35	10.70	11.32	11.04	9.28	10.92
2003	13.50	12.02	12.65	11.30	10.56	18.10
2004	13.53	13.10	13.91	11.11	10.87	14.54
2005	12.45	14.78	12.61	10.78	10.46	14.03
2006	11.88	11.95	13.65	11.33	9.93	10.61
2007	12.34	12.29	11.80	11.06	10.44	11.06
2008	13.54	12.96	12.91	12.13	10.59	10.59
2009	12.97	12.59	12.88	14.81	11.56	15.31
2010	12.00	12.97	12.84	20.76	14.81	15.58
2011	10.69	11.76	13.02	18.32	14.48	N.A.
Average	12.54	12.14	12.70	12.88	11.01	11.95
ANOVA	1.01 (Critical Value-3.28)			1.41 (Critical Value-3.28)		
Overall ANOVA	0.879 (Critical Value -2.35)					

Note: Axis Bank was renamed in 2006 before that it was UTI Bank.

Source: Data Compiled from the Performance highlights of Various Banks.



TABLE: 3.2 - ADVANCES TO TOTAL ASSETS (Percent)

Years	Public Sector Banks			Foreign Banks		
	SBI	PNB	BOB	Citibank	Standard Chartered	HSBC
2000	37.51	41.7	41.61	44.38	45.26	33.37
2001	35.99	44.15	43.3	45.21	40.39	37.72
2002	34.66	47.09	47.47	52.96	47.76	40.94
2003	37.65	54.13	67.3	50.03	44.49	39.22
2004	38.70	46.13	41.83	51.55	47.07	37.97
2005	44.01	47.84	45.85	53.57	53.56	45.23
2006	52.99	51.37	52.83	53.82	52.39	44.86
2007	59.54	59.47	58.41	49.52	51.15	42.08
2008	57.76	60.04	59.41	45.76	45.41	39.44
2009	56.25	62.65	63.31	37.92	38.48	29.15
2010	59.99	62.91	62.89	38.38	46.80	25.96
2011	61.84	63.99	63.80	36.38	46.11	30.06
Average	48.07	53.45	54.00	46.62	46.57	37.17
ANOVA	1.40 (Critical Value-3.28)			10.81* (Critical Value-3.28)		
Overall ANOVA	7.168* (Critical Value -2.35)					

\*Significant at 5 percent level of significance.

Note: Axis Bank was renamed in 2006 before that it was UTI Bank.

Source: Data Compiled from the Performance highlights of Various Banks.

TABLE: 3.3 - GOVERNMENT SECURITIES TO TOTAL INVESTMENTS (Percent)

Years	Public Sector Banks			Foreign Banks		
	SBI	PNB	BOB	Citibank	Standard Chartered	HSBC
2000	74.08	72.81	62.09	77.33	60.69	58.27
2001	78.47	73.4	60.69	81.82	57.46	61.38
2002	80.83	68.46	64.46	80.14	57.65	70.96
2003	88.36	99.99	86.67	80.48	64.05	80.58
2004	85.06	78.52	73.88	80.58	71.62	84.97
2005	87.24	81.30	78.24	81.79	76.69	83.45
2006	85.60	81.41	78.35	90.08	79.84	70.87
2007	82.11	81.06	81.16	92.42	84.14	72.42
2008	76.35	82.23	83.22	94.99	92.67	75.51
2009	83.95	86.87	82.58	96.79	90.32	57.37
2010	78.84	85.66	85.89	97.83	80.88	67.99
2011	80.79	84.39	87.62	97.09	85.66	55.41
Average	81.81	81.34	77.07	87.61	75.14	69.93
ANOVA	1.375 (Critical Value-3.28)			9.120* (Critical Value-3.28)		
Overall ANOVA	5.375* (Critical Value -2.35)					

\*Significant at 5 percent level of significance.

Note: Axis Bank was renamed in 2006 before that it was UTI Bank.

Source: Data Compiled from the Performance highlights of Various Banks.

TABLE: 4.1-GROSS NPAs TO TOTAL ADVANCES (Percent)

Years	Public Sector Banks			Foreign Banks		
	SBI	PNB	BOB	Citibank	Standard Chartered	HSBC
2000	15.54	13.85	15.98	1.82	8.47	9.95
2001	13.98	12.34	15.26	1.37	8.12	7.05
2002	12.82	12.05	13.34	0.94	3.57	5.70
2003	8.57	4.79	1.04	1.96	3.27	5.31
2004	8.02	9.89	11.18	2.57	2.99	4.35
2005	6.15	6.19	7.65	2.04	2.77	3.24
2006	3.67	4.21	3.99	1.60	2.84	1.89
2007	2.96	3.51	2.50	1.61	2.65	1.71
2008	3.08	2.78	1.86	2.06	2.17	2.33
2009	2.87	1.79	1.28	4.52	2.82	5.58
2010	3.09	1.72	1.37	3.48	2.64	7.17
2011	3.35	1.81	1.38	2.06	2.33	3.63
Average	7.07	6.24	6.40	2.16	3.72	4.82
ANOVA	0.074 (Critical Value-3.28)			5.458* (Critical Value-3.28)		
Overall ANOVA	2.739* (Critical Value -2.35)					

\*Significant at 5 percent level of significance.

Note: Axis Bank was renamed in 2006 before that it was UTI Bank.

Source: Data Compiled from the Performance highlights of Various Banks.

TABLE-4.2: NET NPAs TO TOTAL ASSETS (Percent)

Years	Public Sector Banks			Foreign Banks		
	SBI	PNB	BOB	Citibank	Standard Chartered	HSBC
2000	0.48	0.35	0.53	0.47	0.92	0.34
2001	0.44	0.49	0.72	0.31	0.62	0.36
2002	1.95	2.48	2.69	0.21	0.19	0.93
2003	1.64	1.77	2.22	0.58	0.13	0.40
2004	1.33	0.44	2.07	0.72	0.24	0.27
2005	1.16	0.09	0.65	0.53	0.60	0.23
2006	0.99	0.14	0.46	0.51	0.82	0.26
2007	0.93	0.45	0.35	0.50	0.73	0.18
2008	1.03	0.38	0.27	0.56	0.47	0.23
2009	0.99	0.10	0.20	1.00	0.53	0.41
2010	1.03	0.33	0.22	0.82	0.65	0.60
2011	1.00	0.54	0.22	0.44	0.12	0.27
Average	1.08	0.63	0.88	0.55	0.50	0.37
ANOVA	1.21 (Critical Value-3.28)			1.899 (Critical Value-3.28)		
Overall ANOVA	2.963*(Critical Value -2.35)					

\*Significant at 5 percent level of significance.

Note: Axis Bank was renamed in 2006 before that it was UTI Bank.

Source: Data Compiled from the Performance highlights of Various Banks.

TABLE: 4.3 - NET NPAs TO NET ADVANCES (Percent)

Years	Public Sector Banks			Foreign Banks		
	SBI	PNB	BOB	Citibank	Standard Chartered	HSBC
2000	6.41	8.52	6.95	1.05	2.04	1.04
2001	6.03	6.69	6.77	0.70	1.53	0.99
2002	5.63	5.32	4.98	0.40	0.40	2.27
2003	4.50	3.86	3.72	1.17	0.31	1.03
2004	3.48	0.98	2.99	1.40	0.52	0.70
2005	2.65	0.20	1.45	1.00	1.12	0.50
2006	1.88	0.29	0.87	0.95	1.57	0.58
2007	1.56	0.76	0.60	1.02	1.43	0.43
2008	1.78	0.64	0.47	1.23	1.04	0.58
2009	1.76	0.17	0.31	2.63	1.37	1.42
2010	1.72	0.53	0.34	2.14	1.40	2.31
2011	1.63	0.85	0.35	1.21	0.27	0.91
Average	3.25	2.40	2.48	1.24	1.08	1.06
ANOVA	0.42 (Critical Value-3.28)			0.31 (Critical Value-3.28)		
Overall ANOVA	3.07*(Critical Value -2.35)					

\* Significant at 5 percent level of significance.

Note: Axis Bank was renamed in 2006 before that it was UTI Bank.

Source: Data Compiled from the Performance highlights of Various Banks.

TABLE-5.1: TOTAL ADVANCES TO TOTAL DEPOSITS (Percent)

Years	Public Sector Banks			Foreign Banks		
	SBI	PNB	BOB	Citibank	Standard Chartered	HSBC
2000	49.84	47.54	47.57	64.85	86.18	50.66
2001	46.78	49.93	50.79	65.99	101.93	62.77
2002	44.65	53.60	54.47	74.69	95.84	63.49
2003	46.52	53.06	53.26	71.18	72.44	64.07
2004	49.57	53.72	48.79	74.56	80.97	59.18
2005	55.14	58.56	53.36	84.30	88.67	74.18
2006	68.89	62.35	63.97	87.62	84.60	67.37
2007	77.46	69.07	66.94	86.76	88.09	66.45
2008	77.55	71.79	70.18	83.20	90.13	70.26
2009	73.11	73.75	74.84	77.25	89.75	55.21
2010	78.58	74.84	72.55	67.32	86.22	42.11
2011	81.03	77.38	74.87	71.64	84.22	50.64
Average	62.43	62.13	60.96	75.78	87.42	60.53
ANOVA	0.048 (Critical Value-3.28)			31.92* (Critical Value-3.28)		
Overall ANOVA	13.425* (Critical Value -2.35)					

\* Significant at 5 percent level of significance.

Note: Axis Bank was renamed in 2006 before that it was UTI Bank.

Source: Data Compiled from the Performance highlights of Various Banks.

TABLE: 5.2 - BUSINESS PER EMPLOYEE (Rs. in Lakhs)

Years	Public Sector Banks			Foreign Banks		
	SBI	PNB	BOB	Citibank	Standard Chartered	HSBC
2000	111.20	106.48	142.82	1,160.64	570.01	467.44
2001	136.58	141.95	166.11	1,336.24	617.78	528.67
2002	173.01	167.76	222.76	1566.82	794.41	595.80
2003	190.77	195.64	237.67	1660.19	840.54	622.78
2004	210.56	228.22	252.51	1666.92	780.11	820.91
2005	243.08	276.87	310.37	1359.91	786.36	779.45
2006	299.23	330.92	396.00	1607.92	837.29	975.65
2007	357.00	407.41	555.00	1360.48	924.20	979.68
2008	456.00	504.52	710.00	1763.78	817.35	1012.34
2009	556.00	654.92	914.00	1880.10	971.77	961.81
2010	636.00	809.85	981.00	1979.89	1083.45	1135.52
2011	704.00	1017.80	1333.00	1745.94	1345.62	1221.70
Average	339.45	403.53	518.44	1382.83	864.04	841.81
ANOVA	1.082 (Critical Value-3.28)			40.337* (Critical Value-3.28)		
Overall ANOVA	35.377* (Critical Value -2.35)					

\* Significant at 5 percent level of significance.

**Note:** Axis Bank was renamed in 2006 before that it was UTI Bank.

**Source:** Data Compiled from the Performance highlights of Various Banks.

TABLE: 5.3 - PROFITS PER EMPLOYEE (Rs. in Lakhs)

Years	Public Sector Banks			Foreign Banks		
	SBI	PNB	BOB	Citibank	Standard Chartered	HSBC
2000	0.87	0.45	1.07	19.22	10.27	4.36
2001	0.70	0.63	0.59	19.34	11.21	6.62
2002	1.16	0.97	1.40	22.14	20.38	5.00
2003	1.48	1.43	1.92	24.26	25.15	4.50
2004	1.77	1.88	2.43	28.33	13.37	6.32
2005	2.08	2.42	1.71	21.75	11.50	8.90
2006	2.17	2.48	2.13	21.71	14.50	12.07
2007	2.37	2.68	2.73	17.33	19.62	14.32
2008	3.73	3.66	3.94	37.33	20.22	16.69
2009	4.74	5.64	6.05	45.12	23.82	16.06
2010	5.34	7.31	8.00	18.32	26.31	11.73
2011	6.44	8.35	11.00	28.61	26.36	23.20
Average	2.74	3.16	3.58	25.29	18.56	10.81
ANOVA	0.312 (Critical Value-3.28)			13.13* (Critical Value-3.28)		
Overall ANOVA	39.072* (Critical Value -2.35)					

\* Significant at 5 percent level of significance.

**Note:** Axis Bank was renamed in 2006 before that it was UTI Bank.

**Source:** Data Compiled from the Performance highlights of Various Banks.

TABLE: 6.1 - OPERATING PROFITS TO AVERAGE WORKING FUNDS (Percent)

Years	Public Sector Banks			Foreign Banks		
	SBI	PNB	BOB	Citibank	Standard Chartered	HSBC
2000	1.55	1.61	1.79	3.87	4.15	2.85
2001	1.33	1.59	1.64	4.05	4.07	3.18
2002	1.83	2.11	1.84	4.24	5.44	2.77
2003	2.27	2.87	2.25	3.76	4.93	2.49
2004	2.50	3.26	3.00	4.42	4.95	3.54
2005	2.61	2.25	2.45	3.81	3.50	3.79
2006	2.27	2.18	1.92	4.02	4.74	3.77
2007	1.86	2.15	1.94	3.98	5.25	4.09
2008	1.87	2.25	1.96	4.04	5.54	4.23
2009	1.99	2.59	2.22	3.72	5.66	4.39
2010	1.75	2.69	2.03	3.66	6.14	3.73
2011	2.17	2.72	2.22	3.16	4.60	3.08
Average	2.00	2.35	2.10	3.89	4.91	3.49
ANOVA	2.32 (Critical Value-3.28)			18.464* (Critical Value-3.28)		
Overall ANOVA	62.794* (Critical Value -2.35)					

\* Significant at 5 percent level of significance.

**Note:** Axis Bank was renamed in 2006 before that it was UTI Bank.

**Source:** Data Compiled from the Performance highlights of Various Banks.

TABLE: 6.2 - SPREAD TO TOTAL ASSETS (Percent)

Years	Public Sector Banks			Foreign Banks		
	SBI	PNB	BOB	Citibank	Standard Chartered	HSBC
2000	2.65	2.99	2.85	4.55	4.24	2.75
2001	2.61	3.21	3.06	3.97	3.73	3.03
2002	2.61	3.15	2.65	3.76	3.76	2.63
2003	2.65	3.62	2.75	3.76	3.87	2.88
2004	2.74	3.54	3.02	4.58	4.23	3.29
2005	3.03	3.17	3.15	4.29	3.72	3.52
2006	3.16	3.21	2.80	4.53	4.06	3.67
2007	2.83	3.40	2.64	4.05	4.06	4.17
2008	2.17	2.78	2.18	4.36	3.74	3.90
2009	2.21	2.85	2.25	4.19	3.24	3.87
2010	2.25	2.87	2.13	4.25	4.38	3.60
2011	2.66	3.12	2.46	3.65	3.75	3.66
Average	2.63	3.15	2.66	4.16	3.90	3.41
ANOVA	11.17*(Critical Value3.28)			11.565* (Critical Value-3.28)		
Overall ANOVA	39.139* (Critical Value -2.35)					

\* Significant at 5 percent level of significance.

**Note:** Axis Bank was renamed in 2006 before that it was UTI Bank.

**Source:** Data Compiled from the Performance highlights of Various Banks.

TABLE: 6.3 NON-INTEREST INCOME TO TOTAL INCOME (Percent)

Years	Public Sector Banks			Foreign Banks		
	SBI	PNB	BOB	Citibank	Standard Chartered	HSBC
2000	13.85	12.37	11.65	20.65	19.17	20.45
2001	13.38	11.72	10.93	22.97	21.07	23.07
2002	12.28	12.82	14.29	29.59	23.90	24.18
2003	15.59	14.31	17.14	27.63	19.69	24.56
2004	19.99	19.35	21.85	28.01	21.70	26.47
2005	18.00	16.53	16.87	30.00	17.41	28.89
2006	11.77	11.73	13.79	25.39	25.71	29.65
2007	10.25	8.29	11.30	23.49	25.00	25.68
2008	12.60	12.28	14.79	29.09	32.25	29.83
2009	12.53	13.12	15.45	34.37	35.41	29.91
2010	17.41	14.24	14.39	20.77	33.33	29.25
2011	16.28	11.81	11.38	23.35	28.01	25.61
Average	14.49	13.21	14.48	26.27	25.22	26.46
ANOVA	0.748 (Critical Value-3.28)			0.25 (Critical Value-3.28)		
Overall ANOVA	35.073*(Critical Value -2.35)					

\* Significant at 5 percent level of significance.

**Note:** Axis Bank was renamed in 2006 before that it was UTI Bank.

**Source:** Data Compiled from the Performance highlights of Various Banks.

TABLE: 6.4 - NET PROFITS TO TOTAL INCOME (Percent)

Years	Public Sector Banks			Foreign Banks		
	SBI	PNB	BOB	Citibank	Standard Chartered	HSBC
2000	7.96	6.94	8.58	10.82	13.93	9.74
2001	5.34	6.98	4.25	12.55	13.00	11.70
2002	7.16	7.37	7.86	12.00	18.97	8.42
2003	8.43	9.64	10.50	14.31	30.02	7.66
2004	9.67	11.49	12.29	18.05	18.51	9.33
2005	10.88	13.91	8.75	19.07	19.93	14.72
2006	10.15	13.25	10.11	17.17	21.99	16.45
2007	10.03	12.24	9.88	15.71	25.31	17.91
2008	11.67	12.60	10.35	21.45	23.70	16.80
2009	11.93	13.89	12.48	20.85	21.80	14.30
2010	10.66	15.60	15.68	11.23	24.98	11.09
2011	8.50	14.49	17.18	17.34	23.34	21.87
Average	9.36	11.53	10.65	15.88	21.29	13.33
ANOVA	1.7007 (Critical Value-3.28)			10.611*(Critical Value-3.28)		
Overall ANOVA	16.883* (Critical Value -2.35)					

\* Significant at 5 percent level of significance.

**Note:** Axis Bank was renamed in 2006 before that it was UTI Bank.

**Source:** Data Compiled from the Performance highlights of Various Banks.

TABLE: 7.1 - LIQUID ASSETS TO TOTAL ASSETS (Percent)

Years	Public Sector Banks			Foreign Banks		
	SBI	PNB	BOB	Citibank	Standard Chartered	HSBC
2000	18.03	11.51	21.28	12.46	9.94	15.73
2001	19.23	9.55	19.64	15.69	5.29	13.69
2002	18.63	8.77	12.62	12.46	6.41	16.99
2003	10.68	8.62	8.54	15.15	4.67	5.65
2004	9.91	18.6	8.53	17.59	4.82	5.71
2005	8.55	8.78	9.78	14.12	4.15	7.39
2006	9.02	17.06	11.87	13.93	10.42	7.67
2007	9.17	9.63	12.77	13.56	6.84	14.63
2008	9.35	9.46	12.41	13.90	7.72	12.10
2009	10.82	8.67	10.59	15.25	4.33	11.87
2010	8.18	7.91	12.74	15.90	5.38	9.02
2011	10.04	7.85	13.93	19.06	6.38	9.01
Average	11.80	10.53	12.89	14.92	6.36	10.79
ANOVA	1.09 (Critical Value3.28)			28.016* (Critical Value-3.28)		
Overall ANOVA	8.529* (Critical Value -2.35)					

\*Significant at 5 percent level of significance.

**Note:** Axis Bank was renamed in 2006 before that it was UTI Bank.

**Source:** Data Compiled from the Performance highlights of Various Banks.

TABLE: 7.2 - LIQUID ASSETS TO TOTAL DEPOSITS (Percent)

Years	Public Sector Banks			Foreign Banks		
	SBI	PNB	BOB	Citibank	Standard Chartered	HSBC
2000	23.95	13.12	24.33	18.21	18.93	23.87
2001	25.00	10.81	23.00	22.91	13.35	22.79
2002	24.00	10.65	14.48	17.58	16.73	26.35
2003	13.43	20.81	9.66	21.55	7.61	9.23
2004	13.67	10.03	9.96	25.45	8.30	8.90
2005	10.71	10.75	11.38	22.22	6.88	12.12
2006	11.72	20.71	14.37	22.68	16.82	11.52
2007	11.93	11.19	14.63	23.76	11.78	23.10
2008	12.55	11.31	14.67	25.26	15.32	21.55
2009	14.07	10.21	12.52	31.07	10.09	20.48
2010	10.72	9.41	14.70	27.89	9.92	14.63
2011	13.16	9.49	16.35	37.54	11.64	15.18
Average	15.41	12.37	15.01	24.68	12.28	17.48
ANOVA	1.459 (Critical Value3.28)			16.488* (Critical Value-3.28)		
Overall ANOVA	10.026* (Critical Value -2.35)					

\*Significant at 5 percent level of significance.

**Note:** Axis Bank was renamed in 2006 before that it was UTI Bank.

**Source:** Data Compiled from the Performance highlights of Various Banks.



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