

Technology Management In Banks : An Empirical Study With Special Reference To State Bank Of India

* *V. Narasimha Rao*

ABSTRACT

The Banking sector is undoubtedly the prime catalyst for economic growth in any country. The key drivers of sea change in banking operations in India are integration of financial markets across the globe, explosion of information and communication technology and management of knowledge. The benefits of technology in Indian banks are quite well known. Banking in India started in the year 1786, with the General Bank of India being the first one. Reserve Bank of India came in 1935 and became the central banking authority in 1965. Prior to the 1990's, the diffusion of Information and Communication Technology (ICT) in the Indian banking industry was mainly on operations, but from the mid 1990's, the use of technology is present in external environment i.e. in products or service offerings to customers. It is to be understood that IT is not yet a very comfortable choice for millions and consumer awareness is a major challenge in our country.

State Bank of India, the premier and the largest commercial bank in the country with a market share of 17% for advances, and 17.98% for deposits is well positioned to capture growth in the dynamic Indian banking market, and is seen as a macro-economic proxy for the Indian economy. SBI is going through a momentous phase of its technology management. The Indian banks have nevertheless, withstood all the challenges at the national and international level and are becoming more adaptive to the changing environment. Technology management is essential for the banking sector in today's knowledge economy. The ultimate objective of using technology in banks should be increasing service quality and thereby enhancing customers' satisfaction. This paper is an attempt to understand technology management in banks with special reference to State Bank of India.

Keywords: Information and Communication Technology, Knowledge, Process, e-banking

JEL Classification: M150

INTRODUCTION

The Banking sector has been the prime catalyst for economic growth, and banks are the backbone of the economy in any country. The banking system in India is significantly different from that of the other nations, because of the country's unique geographic, social and economic characteristics. As opposed to the ancient dictum, the present-day banking operations have undergone a sea change. The key drivers of this change are integration of financial markets across the globe, explosion of information and communication, technology and management of knowledge. However, the diffusion of technology is somewhat slow in public sector banks as compared to the private and foreign sector banks. The visible benefits of IT in the day-to-day banking operations in India are quite well known.

Banking in India started in the year 1786, with the General Bank of India being the first one. Reserve Bank of India was formed in 1935 and became the central banking authority in 1965. The Banking Companies Act was passed in 1941, and the State Bank of India was formulated in 1955. Nationalization of 14 major banks took place in 1969; seven more banks were nationalized in 1980. The post Independence period witnessed a massive growth in the Indian banking system. The first step in this direction was nationalization of the Reserve Bank of India in 1948. Prior to the 1990s, the diffusion of Information and Communication Technology (ICT) in the banking sector was mainly on operations, but from the mid 1990s, the use of technology is present in the external environment, i.e., in products or service offerings to the customers. It is to be understood that IT is not yet a very comfortable choice for millions and consumer awareness is a major challenge. The Banking Industry in India has come a long way to assume its present status. Service quality has become the key factor in view of globalization, liberalization and privatization.

Banks and financial institutions rely on gathering, processing, analyzing and providing information and data in order to meet the needs of the customers. Banks were among the early adopters of automated information-processing technology. There's 'Anywhere Banking' through Core Banking Systems, 'Anytime Banking' through the new 24/7/365 delivery channels such as Automated Teller Machines (ATMs), Net and Mobile Banking. Indian Banks are continuously striving for enhancing service quality through Technology Management. The past few years saw some major milestones in the payment and settlement systems. The introduction of the Real Time Gross Settlement (RTGS) system has resulted in the compliance with Basle core principles for systematically important payment

* *Professor & Director*, P.G. Department of Business Administration, Akkineni Nageswara Rao College, Gudivada - 521301, Andhra Pradesh. E-mail : drvnr_62@yahoo.co.in

systems of the Bank for International Settlements. E-Banking in the banking sector mainly comprises of ATM, EDI, EFT, EMT, Internet Banking, Online Banking, Tele-banking and E-cheques.

The Institute for Development and Research in Banking Technology, set up by the RBI in 1997, implemented the Indian Financial Network aimed at sharing expensive IT services for achieving economies of scale. One of the notable achievements of IDRBT has been the Public-Key Infrastructure (PKI) based electronic data transfer with high-security levels. IDRBT also invited research in the field of banking technology and has been the centre for excellence in providing training. IT has become an inevitable part of the reforms process in the banking system, with gradual development of sophisticated instruments and innovations in market practices. The process of computerization in Indian banks started in the early 1980s. Although the Indian banking system is not directly exposed to the global financial crisis, it has come under pressure, mainly because of what has been called as the 'Substitution Effect'.

STATE BANK OF INDIA

State Bank of India, the premier and the largest commercial bank in the country has a very strong presence in the Indian Banking Sector, with 17% market share for advances and 17.98% market share for deposits (2011). SBI is on the 1st position as far as its activities, i.e., total deposits, total credits, total assets and total shareholders' equity are concerned. The State Bank of India came into being by nationalizing the then Imperial Bank of India in 1955. The SBI was born with a new sense of social purpose and was destined to act as pacesetter to lead the Indian banking sector towards national development.

Today, SBI is well positioned to capture growth in India's dynamic banking market, and is seen as a macro-economic proxy for the Indian economy. SBI today is going through a momentous phase of its technology management. It has been forging ahead with cutting-edge technology and innovative practices for achieving total customer experience. The 75-year-old public sector behemoth has been stirring out of its public sector legacy, and is moving with agility to give the private and foreign banks a run for their money. SBI has gone beyond the usual domains of technology in an aggressive manner, and it believes that good Corporate Governance is much more than complying with legal and regulatory requirements.

RATIONALE OF THE STUDY

This paper is an attempt to understand the technology management in banks through a case study of the State Bank of India. The study examines mainly the technology management in banks in general and SBI in particular. The pace of introduction of information technologies in India has varied from bank to bank. The slow rate of diffusion of ICT in the Indian banking sector has been due to many reasons. By the mid 1990s, the mere monopoly of public sector banks started to get eroded by the more customer-focused private sector entrants. Due to the advent of new products and options for various channels of delivery through ICT, service delivery emerged as an important attribute in satisfying customers. The bank services have become more liable after the introduction of technology management in banks. After two decades of economic reforms, the Indian banking sector is gradually emerging stronger. The Indian banks have, nevertheless, withstood all the challenges at the national and international level and are becoming more adaptive to the changing environment. There are several successful examples of technology management in the banking sector, such as, World Bank, Bank of Montreal, Deutsche Bank, Reserve Bank of India. Knowledge management is essential for the banking sector in today's knowledge economy, and the banks should strive to increase their performance through better use of technology and human resources. Demand for a greater variety of banking software has prompted many Indian IT companies to become product developers and not only solely software service providers. The ultimate objective of technology management in banks should be increasing service quality, and thereby enhancing customers' satisfaction.

SURVEY OF LITERATURE

Michel J.L. Pommier, Senior Advisor, Network Operations and Knowledge Sharing Program, The World Bank Group drew from the lessons of experience for launching a broad knowledge management program in a global organization like the World Bank by considering eight pillars that are instrumental to support the Bank's initiative :

- ❖ Defining a clear strategy based on the business needs of the organization ;
- ❖ Keeping small the central KM unit which oversees overall implementation ;
- ❖ Making available a budget to allow communities to function ;
- ❖ Supporting the development of communities of practice ;
- ❖ Keeping information technology user-friendly and responsive to its users' needs ;
- ❖ Orchestrating systematic communications to explain what knowledge means and to keep everyone informed ;
- ❖ Introducing new incentives to accelerate the shift towards a knowledge culture ; and
- ❖ Developing a set of metrics to measure progress.

Ali and Ahmad, University Utara Malaysia highlighted the concept of KM and the importance of KM integration in the banking sector as a strategy for banks to maintain their competitive advantage. A research model, Banking Knowledge Management Model (BKMM) based on the KM concept was developed and to study its extent, this model was adopted by two Malaysian commercial banks, Tiger Bank and Camel Bank, and based on their findings, the two leading commercial banks integrated the concepts of KM as incorporated in the model.

Tandon in his article "Knowledge Management in Indian Banks" highlighted Technology as a tool that has strategic importance. The key objectives are exploiting internal and external skills and intangible assets in attaining leadership status. Banks being an important pillar of the service sector have a special place for KM. Furthermore, they detailed the various areas where KM can be suitably fitted, the approach that needs to be taken to implement and nurture it and also the challenges that banks may face in sustaining the use of KM as a tool. Srinivasan, in his report on Currency & Finance, (Business Line, September 16, 2008 entitled "Banking on Big Change") considered that the Indian Banking system seldom had it so good as today with the RBI - the custodian of the Industry and the central bank proclaiming that "a well calibrated and gradual approach to the banking sector reforms led to the emergence of a strong and resilience banking system over the years." The RBI reminds commercial banks that they, rather than the regulator or supervisor, are mainly responsible for their performance as well as financial health.

Dalkir provided a comprehensive overview of the field on knowledge management with an emphasis on translating theory into practice in his book "Knowledge Management in Theory and Practice". Using everyday language and clear illustrations, Dalkir integrated theory and practice in a highly accessible manner to provide students with a comprehensive and practical knowledge management based on Case Studies from IBM, Xerox, Siemens, Ericsson Canada, ICL, Thomas and Betts, Chevron/Texaco, British Petroleum, CIDA, Hughes Space and Communications, SUN, British Telecommunications, J.P. Morgan Chase, Buckman Labs, Nokia, GE, Viant, Xerox, Sigma, Hill and Knowlton, Teamware, U.A. Army, Price Waterhouse Coopers, Lybrand, KPMG, Mercedes-Benz, Monsanto, Northrup Grumman, Ford Motor Company, Accenture, Dell, Siemens Medical Systems. Morey, Maybury and Thuraisingham in their work "Knowledge Management, Classic, Contemporary Works" evaluated the field of knowledge management by taking a learning centric rather than information centric approach, emphasizing that the continuous acquisition and application of knowledge covered the concepts in three parts each, opening with a classic work from a leader in the field.

OBJECTIVES OF THE STUDY

The broad objective of the study is to analyze the Technology Management in banks with special reference to the State Bank of India. In view of this, the following specific objectives were framed and undertaken, which are as follows :

- ❖ To appraise the technology management trends in banks.
- ❖ To examine the deployment of technology for operations in SBI.
- ❖ To offer suggestions based on the study for more effective technology management in SBI.

DATA SOURCES AND METHODOLOGY

The study is based on primary as well as secondary data. Primary data was obtained through administering a pre-tested questionnaire among the employees of selected SBI Branches. The researcher's individual observations, discussions with bank officials and also with the customers of SBI helped in examining the technology management in SBI. The geographical area of sample for the present study were selected SBI branches in Vijayawada, Krishna

District Zonal office, Andhra Pradesh. The secondary data was extracted from the Annual Reports of SBI and journals and other databases like Prowess, Ebsco Business Premier, Blackwell Synergy and Emerald. The sample selection is as per purposeful sampling method. The latest six-year period, i.e., 2006-07 to 2011-12 was considered for this study.

❖ **Hypotheses** : The purpose of the study is to examine technology management in State Bank of India. As the State Bank of India has been taking a lead in Information and Communication Technology with the aim of achieving efficiency in operations, a study on State Bank of India was undertaken for this research paper. The null hypotheses framed for the study are as follows :

H0 : There is no significant difference between senior and junior-level employees on the awareness of the following parameters: E-banking policies and plans ; Knowledge of PC/Internet banking ; Knowledge regarding functioning of the bank's website ; Knowledge of customers' information levels regarding e-banking ; Knowledge of the banking services ; Knowledge on options available to e-banking users ; Knowledge of outsourcing ; Knowledge of password procedure ; Knowledge of corrective measures for fraudulent transactions and ; Knowledge of online marketing practices.

H1 : There is a significant difference between senior and junior-level employees with reference to the awareness levels of the aforementioned parameters.

❖ **Statistical Tools** : The information and data extracted from the sources mentioned above were thoroughly analyzed for arriving at meaningful conclusions. The data obtained from the survey was tabulated within appropriate categories. The Arithmetic mean, Averages and Percentages were applied to the tabulated data for conducting Chi-square test for testing the stated Hypotheses. Based on the insights of the analysis, suitable suggestions are made for more effective use of technology and HRM in SBI.

ANALYSIS AND INTERPRETATION

The information as well as data collected for the study was thoroughly analyzed in light of the objectives of the study. An evaluation of technology management in SBI is done on pertinent information extracted from different sources. The analysis and interpretation covers the following key focus areas:

- 1) Opinion on written policies and plans ; 2) Knowledge of PC banking / Internet banking ;
- 3) Opinion regarding the bank's website ; 4) Customers' knowledge of e-banking ;
- 5) Knowledge of the transactional website ; 6) E-banking users' options ;
- 7) Knowledge of outsourcing ; 8) Knowledge of password procedures ; 9) Corrective measures of fraudulent transactions ; 10) Knowledge of online marketing practices

It can be inferred from the Table 1 that out of the six policies and plans, all the respondents were aware of the first four plans as depicted in the Table 1. Whereas, knowledge regarding email / internet and privacy policy was not possessed by 25% of the junior category employees. At 5% level of significance, the tabulated value of χ^2 at 5 degrees of freedom

S.No.	Options	Senior Category (n=10)	Junior Category (n=20)	Total (N=30)
1.	Strategic/Business Plan	10 (100%)	20 (100%)	30 (100%)
2.	Security	10 (100%)	20 (100%)	30 (100%)
3.	Contingency & Business Resumption	10 (100%)	20 (100%)	30 (100%)
4.	Password	10 (100%)	20 (100%)	30 (100%)
5.	Email / Internet	10 (100%)	15 (75%)	25 (83.34%)
6.	Privacy Policy	10 (100%)	15 (75%)	25 (83.34%)
	Total	60 (100%)	110 (91.67%)	170 (94.95%)

Source: Primary Data

is 11.0705. As the calculated χ^2 is greater than the critical value for the senior level, there existed a significant difference between senior level and junior level employees on the awareness of e-banking policies and plans. The calculated mean values reveal that the senior level employees had more awareness regarding e-banking policies and plans than the junior level employees. Hence, H₀ is rejected and H₁ is accepted.

It can be inferred from the Table 2 that all the senior level employees were aware of PC and internet banking. 75% of the junior level employees were aware of PC banking and 25% of the employees were aware of Internet banking. χ^2 is 3.841. As the calculated χ^2 is less than the critical value, H₀ is accepted and H₁ is rejected.

The Table 3 reveals that all the senior level employees possessed knowledge regarding the functioning of SBI's website. About 50% of the junior level employees were aware that the website undergoes periodic review, 75% were aware that the applications are available and 75% were aware of the firewall's location on SBI's website. At 5% level of significance, the tabulated value of χ^2 at 4 degrees of freedom is 9.487. As the calculated χ^2 is less than the critical

S.No.	Type	Senior Category (n = 10)	Junior Category (n = 20)	Total (N = 30)
1.	Idea of PC Banking	10 (100%)	15 (75%)	25 (83.34%)
2.	Idea of PC Banking as Internet Banking	10 (100%)	5 (25%)	15 (50%)
	Total	20 (100%)	20 (50%)	40 (66.67%)

Source : Primary Data

S.No.	Opinion	Senior Category (n = 10)	Junior Category (n = 20)	Total (N = 30)
1.	Website undergoes periodic review	10 (100%)	10 (50%)	20 (66.67%)
2.	Links included	10 (100%)	20 (100%)	30 (100%)
3.	Applications are available	10 (100%)	15 (75%)	25 (83.34%)
4.	Firewalls located	10 (100%)	15 (75%)	25 (83.34%)
5.	Updates virus protection software on servers and workstations	10 (100%)	20 (100%)	30 (100%)
	Total	50 (100%)	80 (80%)	130 (86.67%)

Source : Primary Data

S. No.	Statement	Senior Category (n = 10)	Junior Category (n = 20)	Total (N = 30)
1.	Customers over internet are considered under OFAC (Office of Foreign Asset Control) restrictions	5 (50%)	15 (75%)	20 (66.67%)
2.	Legal counsel review literature distribution to the public	5 (50%)	15 (75%)	20 (66.67%)
3.	Informing about risks involved with E-banking (strategies, reputation, transaction, compliance)	5 (50%)	15 (75%)	20 (66.67%)
4.	Review of E-banking in the annual directors' exam	10 (100%)	10 (50%)	20 (66.67%)
5.	Exceptions found (in review)	Not aware	5 (25%)	5 (16.67%)
6.	Have they been addressed ?	Not aware	5 (25%)	5 (16.67%)
7.	Chance for computer related crimes	5 (50%)	15 (75%)	20 (66.67%)
8.	Ensure that the customers understand they are leaving the bank's website	5 (50%)	15 (75%)	20 (66.67%)
	Total	35 (43.75%)	95 (59.375%)	130 (54.167%)

Source : Primary Data

value, H0 is accepted and H1 is rejected.

The respondents' opinion on customers' knowledge of e-banking is depicted in the Table 4. The Table 4 reveals that above 50% of the senior level and 75% of the junior level employees felt that customers possessed knowledge on Office of Foreign Asset Control (OFAC) restrictions, legal counsel literature and the risk involved in e-banking. Majority of the senior and junior category employees were in the dark regarding the customers' knowledge on redressal of their problems. At the same time, 75% of the junior level employees and 50% of the senior level employees were of the opinion that customers possessed good knowledge of computer related crimes and were well versed with the proper way of using the bank's website. At 5% level of significance, the tabulated value of χ^2 at 7 degrees of freedom is 14.067. As the calculated χ^2 is less than the critical value, H0 is accepted and H1 is rejected. It can be understood from the Table 5 that all the senior category employees and about 75% of the junior category

S.No.	Type of Transaction	Senior Category (n = 10)	Junior Category (n = 20)	Total (N = 30)
1.	Internet Banking	10(100%)	20 (100%)	30 (100%)
2.	Insurance Services	10(100%)	15 (75%)	25 (83.34%)
3.	Trust Services	10(100%)	15 (75%)	25 (83.34%)
4.	Brokerage Services	10(100%)	15 (75%)	25 (83.34%)
5.	Small business services	10(100%)	15 (75%)	25 (83.34%)
6.	Bill payment	10(100%)	20 (100%)	30 (100%)
7.	Commercial business services	5 (50%)	15 (75%)	20 (66.67%)
8.	Portal services	Not aware	10 (50%)	10 (33.33%)
9.	Aggregation Services	5 (50%)	15 (75%)	20 (66.67%)
10.	SMS Services	5 (50%)	5 (25%)	10 (33.33%)
	Total	75 (75%)	145 (72.5%)	220 (66.67%)

Source: Primary Data

S. No.	Options	Senior Category (n = 10)	Junior Category (n = 20)	Total (N = 30)
1.	Viewing of A/c. balances	10 (100%)	20 (100%)	30 (100%)
2.	Transfer of funds between A/c.'s	10 (100%)	20 (100%)	30 (100%)
3.	Bill Payment	10 (100%)	20 (100%)	30 (100%)
4.	Bill Presentment	No idea	20(100%)	20 (66.67%)
5.	24/7 service by phone / email	10 (100%)	20(100%)	30 (100%)
6.	Online application for checking and savings a/c's	5 (50%)	20(100%)	25 (83.34%)
7.	Online mortgage & CD applications	Not aware	Not aware	- (0%)
8.	Viewing of loan status and credit card a/c. information	10 (100%)	20 (100%)	30 (100%)
9.	IRA & brokerage a/c. information access	5 (50%)	10 (50%)	15 (50%)
10.	Checkbook reconciliation	10(100%)	15 (75%)	25 (83.34%)
11.	Viewing of a/c. history	10(100%)	20(100%)	30 (100%)
12.	Viewing of digital cheques online	5(50%)	15 (75%)	20 (66.67%)
13.	Ordering cheques online	10(100%)	20(100%)	30 (100%)
14.	Issuing stop payment orders online	10(100%)	15 (75%)	25 (83.34%)
15.	Others (SMS FD's alters through net banking)	5 (50%)	10 (50%)	15 (50%)
	Total	110 (73.33%)	245 (81.67%)	355 (78.89%)

Source: Primary Data

Table 7: Employees' Knowledge With Reference To Outsourcing

S. No.	Type of vendor Service	Senior Category (n = 10)	Junior Category (n = 20)	Total (N = 30)
1.	Banks have written contract with the vendor	10 (100%)	20 (100%)	30 (100%)
2.	Access, ownership and control of customer data & other information	10 (100%)	15 (75%)	25 (83.34%)
3.	Liability for data & confidential treatment of information	10 (100%)	15 (75%)	25 (83.34%)
4.	Reasonable assurances for continuation of service through backup arrangements	10 (100%)	15 (75%)	25 (83.34%)
5.	Includes subcontractor's and other supporting vendors if applicable in the written contract	10 (100%)	5 (25%)	15 (50%)
6.	Privacy of information with subcontractors	10 (100%)	5 (25%)	15 (50%)
7.	Reasonable control & update of content & capabilities in a timely manner	10 (100%)	10 (50%)	20 (66.67%)
8.	Opportunities to review financial information, independent annual audits & similar reports	10 (100%)	10 (50%)	20 (66.67%)
9.	Security precautions on the part of the service provider	10 (100%)	10 (50%)	20 (66.67%)
10.	Does any vendor prohibit assignments due to security precautions ?	-No- (0%)	5 (25%)	5 (16.67%)
11.	Hardware & software updates	10 (100%)	10 (50%)	20 (66.67%)
12.	Price changes due to inflation	10 (100%)	10 (50%)	20 (66.67%)
	Total	110 (91.67%)	130 (54.171%)	240 (66.67%)

Source: Primary Data

Table 8: Employees' Knowledge Regarding Setting Up Passwords

S. No.	Password procedure	Senior Category (n = 10)	Junior Category (n = 20)	Total (N = 30)
1.	Requirement for setting up passwords	5 (50%)	15 (75%)	20 (66.67%)
2.	Other procedures (mobile link)	5 (50%)	10 (50%)	15 (50%)
	Total	10 (50%)	25 (62.5%)	35 (58.33%)

Source: Primary Data

Table 9 : Employees' Knowledge On Corrective Measures Of Fraudulent Transactions

S. No.	Corrective Measures	Senior Category (n = 10)	Junior Category (n = 20)	Total (N = 30)
1.	Procedures to prevent transfer of uncollected funds	5 (50%)	15 (75%)	20 (66.67%)
2.	Safeguards to detect and prevent duplicate transactions	10 (100%)	20 (100%)	30 (100%)
3.	Guarantee or warranty when a payment is not properly made through the bill payment system	5 (50%)	15 (75%)	20 (66.67%)
4.	Warranty / guarantee reviewed by legal counsel	5 (50%)	5 (25%)	10 (33.33%)
5.	Digital signatures	5 (50%)	20 (100%)	25 (83.34%)
6.	Digital certificates	5 (50%)	20 (100%)	25 (83.34%)
	Total	35 (58.3%)	95 (79.17%)	130 (72.22%)

Source: Primary Data

S. No.	Online Marketing Practices	Senior Category (n = 10)	Junior Category (n = 20)	Total (N = 30)
1.	Target market for internet	10 (100%)	15 (75%)	25 (83.34%)
2.	Trade area for internet	10 (100%)	15 (75%)	25 (83.34%)
3.	Policies & procedures to address activities beyond the trade area	5 (50%)	10 (50%)	15 (50%)
4.	Guidelines for retention of source documents supporting e-banking activities in place	5 (50%)	15 (75%)	20 (66.67%)
	Total	30 (75%)	55 (68.75%)	85 (70.83%)
Source : Primary Data				

employees possessed knowledge regarding insurance, brokerage, small business and trust services offered by SBI online. About 50% of the senior category employees and 75% of the junior category employees were trained in carrying out commercial business transactions and aggregation services. All the respondents were aware of internet banking and bill payment services. However, no senior level employee was aware of portal services, and only 50% of the junior category employees were aware of the portal services. At 5% level of significance, the tabulated value of χ^2 at 9 degrees of freedom is 16.918. As the calculated χ^2 is less than the critical value, H₀ is accepted and H₁ is rejected. The Table 6 depicts that all the senior and junior category employees were aware of the fact that SBI is offering the web options viz., viewing account balances, transfer of funds between A/cs, bill payment, 24/7 service by e-mail, viewing of A/c. history, viewing of loan status and ordering cheques online. 50% of the junior as well as senior level employees were aware that the bank is providing IRA & brokerage a/c. information access and SMS alerts through net banking. All the senior level executives and about 75% of the junior level executives possessed knowledge of cheque book reconciliation and issuing stop payment orders online. At 5% level of significance, the tabulated value of χ^2 at 14 degrees of freedom is 23.684. As the calculated χ^2 is less than the critical value, H₀ is accepted and H₁ is rejected. The Table 7 depicts that all the senior category of employees possessed knowledge on services offered by the outsourcing agencies. In the case of junior level employees, 75% were trained in carrying out the responsibilities associated with controlling customer data, liability and confidentiality, and taking care of backup arrangements provided by the outsourcing vendors. At the same time, only 50% of the junior category employees possessed knowledge regarding updating capabilities, review of financial information, security precautions, updating of hardware and software by the vendors. At 5% level of significance, the tabulated value of χ^2 at 11 degrees of freedom is 19.675. As the calculated χ^2 is less than the critical value, H₀ is accepted and H₁ is rejected. It can be inferred from the Table 8 that only 50% of the senior category employees possessed the know-how for generating passwords, and 75% of the junior category employees were trained in generating passwords, and 50% were trained in generating passwords through mobile links. At 5% level of significance, the tabulated value of χ^2 at 1 degree of freedom is 3.841. As the calculated χ^2 is less than the critical value, H₀ is accepted and H₁ is rejected. The Table 9 reveals that 50% of the senior category employees possessed the knowledge of detecting and correcting the procedure to prevent transfer of uncollected funds, improper bill payment system, guarantee reviewed by legal counsel, digital signature and certificates. All the junior category employees were trained in detecting and preventing duplicate transactions, digital signatures and digital certificates and 75% were trained in the procedure to prevent transfer of uncollected funds and warrant against improper bill payment. However, the knowledge on legal counsel was possessed by only 25% of the junior category employees. At 5% level of significance, the tabulated value of χ^2 at 5 degrees of freedom is 11.0705. As the calculated χ^2 is less than the critical value, H₀ is accepted and H₁ is rejected. It can be inferred from the Table 10 that all the senior and 75% of the junior category employees possessed knowledge about the target market for online users. Only 50% of the senior and junior category employees were aware of the policies and procedures used to address activities beyond the trade area. About 50% of the senior and 75% of the junior category employees were in possession of knowledge for retention of documents supporting e-banking practices. At 5% level of significance, the tabulated value of χ^2 at 3 degrees of freedom is 7.81. As the calculated χ^2 is less than the critical value, H₀ is accepted and H₁ is rejected.

LIMITATIONS OF THE STUDY

The current research paper confines to technology management in SBI only. Hence, the conclusions may not apply to the entire banking sector. The primary data was compiled from the responses of officials of selected SBI branches in Vijayawada only. Due to subjectivity and prejudice of a few respondents, answers of the questionnaire may differ from the reality. The survey was conducted considering the time and space constraints, and the sample size was very limited.

IMPLICATIONS FOR MANAGERS

The Banking sector mainly focuses on customer service. This empirical analysis has a number of managerial implications on the technology management in banks. Whatever technology is followed in banks, that shall ensure enhancement of quality banking services for the customers. Studies in this area reveal that, until now, a significant percent of bank customers did not have proper access to the existing technology. By maintaining strong positive technology and quality service relationship with the customers, the real benefits from ICT will be ensured. Creating awareness among the customers to utilize the available e-banking services is also an important factor. Challenges ahead for the managers lie in leveraging technology management in banks for improving efficiency.

CONCLUSION

The Indian banking system is in a critical and radical transition phase of its existence. In fact, there has to be interdependency of the three factors of knowledge management viz., people, process and technology, but the crucial factor for successful knowledge management resides in the people and organizational culture. At present, the Indian banking sector is in the state of growth and flux, and new sections and links are being added to the knowledge management in banks. Indian banks have not optimally leveraged technology to increase banking penetration and improve productivity and efficiency. There is a paucity of empirical evidence backed by hard data to conclusively establish the above. Challenges of IT in banks are related to change management, lack of process re-engineering, money laundering and frauds, and misuse of technology and selection of appropriate delivery channels. It is the need of the hour for the banks to continuously identify the changing requirements of the customers.

Banks must be able to transform the benefits of reduced costs from technology-based services to their customers as the entire institution of banking has been built on consumer trust. Proper alignment of IT and banking operations, IR and HRM, IT and organization structure is essential for realizing the benefits of technology implementation in banking. In this process, security concerns have become critical, which requires the validations of transactions. Each employee has different experience with the customers, which should be communicated to all. Online Conferencing and instant messaging system helps collaborate more people. It may be noted that the problems faced in effective technology management processes are mostly related to human behavioural aspects. Hence, SBI has to focus on knowledge wealth, free communication, participative management, innovative attitude and professionalism. There is a lack of readily available services for the users on software-related problems. SBI may consider establishing more help centres for providing necessary guidance to the branches. Some of the main stumbling blocks in the technology in SBI have been diversity of culture, geographical factors and large number of regional languages spoken in India, because so far only English Language Software is used for computerization, the Internet, etc. SBI has to introduce strategies to solve the difficulties and problems experienced by existing customers of certain off-site modes of ATMs, Debit Cards, Credit Cards. It may consider recruiting technological savvy employees to enhance the customer services. As SBI is being geographically distributed, it is expected that the individual community members will have different preferences as to when and how to interact, so it is suggested to the facilitators regarding the accommodating time and space differentials of its community members.

The current economic situation provides a lot of opportunities as well as challenges to the banks. It is up to the banks to leverage the opportunities to meet the challenges to the best of their abilities. Thus, to retain the State Bank of India position as the premier Indian Financial Services Group, technology management shall continue. As India remains among the fastest growing countries of the world, SBI shall see this as an opportunity and challenge and try to capitalize and blaze a new trail of growth in the future.

SCOPE FOR FUTURE RESEARCH

The influence of Information and Communication Technology (ICT) permeates every sphere of life and activity. Knowledge and technology assume crucial role in today's business environment. An effective banking system requires technology management in its operations. A globally competitive banking sector in India is based on achievement of competitive advantage mainly through technology management. The technology management in banks offers a vast scope for further research in the following areas :

- (i) Technology management and enhancement of service quality in banks ;
- (ii) Technology management and practical difficulties faced in banking services ;
- (iii) Technology management in public sector banks and private sector banks ; and
- (iv) customers' perception on banking technology.

REFERENCES

- 1) Ammannayya, K.K. (2008). "Transforming In Indian Banking: Post Reform Developments And Challenges Ahead." *The Indian Banker*, 3(10), pp. 28-31.
- 2) Das, Kamal (2008). "The Knowledge Paradigm Key Success Factor For The Century." *The Indian Banker*, 3(10), pp. 47-48.
- 3) Davenport, T.H. (1993). "*Process Innovation: Reengineering Work Through Information Technology*." HBR Press, Ernst & Young, USA, pp. 56-63.
- 4) Felicita, J. & Jayanthi, J. G. (2012). "Mobile Commerce: The Next Driver Of Market Growth." *Prabandhan: Indian Journal of Management*, 5(4), pp. 23-31.
- 5) Fiona, Fui-Hoon Nah, Keng, Siau, Yuhong, Tian (2005). "Knowledge Management Mechanics of Financial Service Sites." *Communications of The ACM*, 48(2), pp. 85- 90.
- 6) Husain, M. (2012). "A Significant Role Of Knowledge Management To Improve The Service Sector Industry." *Prabandhan: Indian Journal of Management*, 5(5), pp. 20-28.
- 7) Jain, C.S. (2008). "Financial Planning For Customer Delight Challenges For Public Sector Banks." *Financial Planning Journal*, April June 2008, pp. 38-40.
- 8) Jain, Sheenu (2009). "Modern Knowledge Management and Computer-Based Technology: The Inseparable Phenomenon." *Global Business Review*, 10(2), 159-171.
- 9) Jeykumar, S., Subbaiah, A. (2009). "India's Scheduled Commercial Banks A Study." *Facts For You*, 30(5), pp. 36-42.
- 10) Malik, A.K. (2011) . "Socio Economic Impact of Information and Communication Technology: A Study of Indian Banking Sector." *Finance India*, 25(1), pp. 189-194.
- 11) Nonaka, I., Von Krogh, G. and Ichijo, K. (2000). "*Enabling Knowledge Creation*." Oxford, University Press, New York.
- 12) Prabakhar, Rajeev & Tripathi, Purushotham (2009). "Effectiveness of Online Banking With Special Reference To The ICICI Bank." *Global Journal of Business Management*, 3(2), pp. 67-80.
- 13) Sonkeng, G., Nguezet, P. M. D. & Tidjani, B. (2012). "The Restructuring of Human Resource Management (HRM) Through The "Intranet" As Part of ICT: A Case Study On Internal Communication In Cameroonian Banks." *Prabandhan: Indian Journal of Management*, 5(10), pp. 4-11.
- 14) Uppal, R.K. & Chawla, Rosy (2008). "Customer Service In Banks: Meeting Customer Expectations." *The Indian Banker*, 3(11), pp. 21-24.