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Technological Change, Financial Innovation, and Diffusion in Indian Banking Sector – A Move towards the Next Orbit

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Abstract
The revolutionary impact brought in banking sector through technological advancement is irresistible. The effective use of technology has a multiplier effect on growth and development. Technology has enabled the banks to conceive deliver, manage and integrate their products in line with the customers' need. It has helped banks to reach the doorsteps of the customer by overcoming the limitations on geographical/ physical reach in branch banking and easing the resource and volume constraints posed by the brick and mortar model Technology enables increased penetration of the banking system, increases cost effectiveness and makes small value transactions viable. Besides making banking products and services affordable and accessible, it simultaneously ensures viability and profitability of providers. It allows transactions to take place faster and offers unparallel convenience through various delivery channels. Technology enhances choices, creates new markets, and improves productivity and efficiency. The Indian banking business is also not untouched by these technological innovations. These, technology, as the differentiator has become the driver of the Indian banking business since the past decade with the financial sector reforms providing firm foundation.

Keeping in view the growing potential of technological innovations, the paper talks out the importance of technological advancement in banking industry. The paper says about the range of services that is being provided to both retail and corporate customers covering different financial products. The various innovative services used in banking industry has been discussed in detail such as Automated Teller Machine, Phone Banking, Electronic payment systems, Internet Banking and Mobile banking. Indian Banking reforms has been talked in brief as the second banking sector reforms gave much importance to the modernization and technology up gradation. Challenges faced by banking industry in adapting technological innovations have been discussed in detail. Reasons for not accepting technological innovations in Indian economy have been talked about. The paper ended with the conclusion that without technology, banking industry cannot think about development and expansion or further growth strategies in the current competitive business world. And banks need to optionally leverage technology to increase penetration, improve their productivity and efficiency, deliver cost-effective products and services, provide faster, efficient and convenient customer service and thereby, contribute to the overall growth and development of the country.

Keywords : Technological, Bank, Industry, Innovations, India, Development

Introduction

The commercial banking business has changed dramatically over the past 25 years, due in large part to technological change. Advances in telecommunications, information technology, and financial theory and practice have jointly transformed many of the relationship focused intermediaries of yesteryear into data-intensive risk management operations of today. Consistent with this, we now find may commercial banks embedded as part of global financial institutions that engage in a wide variety of financial activities. To be more specific, technological changes relating to telecommunications and data processing have spurred financial innovations that have altered bank products and services and production processes. Technology has assisted banks to reach the doorsteps of the customer by overcoming the limitations on geographical/

physical reach in branch banking and easing the resource and volume constraints posed by the brick and mortar model. All the stakeholders have benefited from the expansion of delivery channels, product innovation and efficiency enhancement which have been facilitated by technology adoption. The impact of technology that is so overwhelmingly prevalent today could not have been imagined earlier.

Banks have employed the present day technology very successfully and have pushed the right levers to bring about a tremendous impact to their business potential. The local bank used to be the touchstone of everyday interaction with personal finances. But today, people have higher expectations of personalized service. From the super-connected customer who wants only mobile access to accounts, to unbanked consumers who seek safer alternatives to check cashing and payday lenders, the marketplace is ready for new, innovative services that better meet these changing needs. Moreover, technology has resulted in improved quality of service, any time/any where banking, focused product delivery, cross selling opportunities, multi-channel touch points for consumption of services, etc. The rapid strides made by the technology sector and their swift adoption by the competitors since the middle of the past decade have forced banks also to get into the act by beginning to offer IT-facilitated products and services. Today, almost every commercial bank branch is at some stage of technology adoption, be it Automated Ledger Posting Machines, Total Branch automation or Core Banking Solution (CBS).

The various innovations in banking and financial sector are ECS, RTGS, EFT, NEFT, ATM, Retail Banking, Debit & Credit cards, free advisory services, implementation of standing instructions of customers, payments of utility bills, fund transfers, internet banking, telephone banking, Online banking, mobile banking, Point of Sales terminals, selling insurance products, issue of free cheque books, travel cheques and many more value added services. This technological advancement have all changed the way bank customers are able to transact for their day to day needs, thereby creating a huge eco system of convenient banking facilities which substantially reduces the need for physical proximity and handling of cash.

Review of Literature

Dos et al.(1993) studied statistical correlation between IT spending and performance measures such as profitability or stock's value. It is found that there is an insignificant correlation between IT spending and profitability measures, implying thereby that IT spending is unproductive.

Avasthi & Sharma (2000-01) have analyzed in their study that advances in technology are changing the face of banking business. Technology has transformed the delivery channels by banks in retail banking. It has also impacted the markets of banks. The study also explored the challenges faced by banking industry.

B. Janki (2002) analyzed that how technology is affecting the employees' productivity. It stresses on the fact that public sector banks need to use technology to improve operating efficiency and customer services. The focus on technology will increase like never before to add value to customer services, develop new products, strengthen risk management etc. the study concludes that technology is the only tool to achieve their goals.

Jalan, B. (2003), IT revolution has brought about a fundamental transformation in banking industry. Perhaps no other sector has been affected by advances in technology as much as banking & finance. It has the most important factor for dealing with the intensifying competition & the rapid proliferation of financial innovations.

Jadhav Anil (2004) described various channels of e-banking services such as ATM, Telephone banking (Tele-banking), Mobile banking, Internet banking and its features. The focus is also given on e-banking opportunities, challenges and security aspects while performing the banking transactions on the internet. Comparison of public, private, foreign and co-operative banks and barriers to the growth of e-banking in India are also discussed. Finally the paper discusses an overview of the major private sector banks such as ICICI, HDFC, IDBI, UTI & GTB banks which provides e-banking services.

Rajshekhara K. S. (2004) described the adoption of IT in banking has undergone several changes with the passage of time. The application of information technology in the banking sector resulted in the development of different concepts of banking such as – E-banking, Internet Banking, Online Banking, Telephone Banking, Automated teller machine, universal banking and investment banking etc. Information technology has a lot of influence on banking transaction. In this paper the author has studied customer related aspects only. This paper do not present any study related to the bank employees and their problems regarding bank computerization.

Mittal, R.K. & Dhingra, S. (2007) studied the role of technology in banking sector. They analyzed investment scenario in technology in Indian banks but this study was related to the time period before the Information Technology Act and at that time technology in Indian banks was very low.

Mittal R. K. and Dhingra (2006-07) Sanjay discussed the issue that the transaction through technology channels cost much less to the banks than the customers reaching the bank and doing the transactions. In the study authors have identified the different technology issues and challenges such as choice of right channel, justification of IT investment in terms of ROI (Rate of Interest), e-governance, customer relationship management, security 84concerns, penetration of IT in rural areas etc. Banks are required to address these issues and challenges effectively to stay in business and grow.

Padhy, K.C. (2007) studied the impact of technology development in the banking system and he also highlights the future of banking sector. The core competencies will provide comparative advantages.

Research Gap

The review of literature exhibits that in our country a few studies have been conducted about technological innovations in banking industry and its impact on Indian economy. The present paper is effort to highlight the importance of technological innovations in banking sector for the development of economies like India.

Objectives of the Study

- To study the importance of technological developments in banking industry.
- To discuss the various innovative services used by banks.
- To study the challenges faced by banks in adopting the technological advancement.
- To study the reasons for not adopting technological innovations in Indian economy.

Banking Reforms In India

In the beginning of 90's, there were so many deficiencies existing in the Indian economy, particularly in the financial sector and also banking sector. The major inadequacies prevailing at the time of early 90's were productivity and efficiency of the system. Banks were suffering, its profitability has been eroded, several public sector banks and financial institutions have become weak financially, some public sector banks have been incurring losses year after year, their customer service was poor, their work technology was outdated and they were unable to meet the challenges of a competitive environment. Keeping in mind all the above said distortions in the economic, the government of India and the RBI thought it was necessary to introduce reforms in the financial and baking sector also, so as to promote rapid economic growth and development with stability through the process of globalization, liberalization and privatization so that the financial system becomes more competitive and gets integrated with the world economy through internationalizations of financial markets in the world.

Narasimham Committee Recommendations for Banking Sector Reforms - The government of India, under the chairmanship of Sh. M. Narasimham, an Ex-Governor of RBI, appointed the Narasimham Committee-I (NC-I) in April 1991. The committee examined all the aspects relating to the structural organization, functions and procedures of financial system and submitted its report on November 16, 1991.

The NC-I had proposed wide ranging reforms for improving the financial viability of the banks, increasing their autonomy from government directions, restructuring unviable banks, allowing a greater entry of the private sector in banking, liberalizing the capital market, further improving the operational flexibility and competition among the financial institutions and setting up of proper supervisory system.

First Phase of Banking Sector Reforms (1991): A number of reform initiations have been taken to improve or minimize the distortions impinging upon the efficient and profitable functioning of banks, especially reduction in SLR & CRR, transparent guidelines or norms for entry and exit of private sector banks, public sector banks allowed to direct access to capital markets, deregulation of interest rates, branch licensing policy has been liberalized, setting up of Debt Recovery Tribunals, asset classification and provisioning, income recognition and Asset Reconstruction Fund (ARF). These measures helped banking system to transform itself into one characterized by openness, competition, prudential and supervisory discipline.

S**econd Phase of Banking Sector Reforms (1998):** The recommendations of the NC-I in 1991 provided the blueprint for the first generation reforms of the financial sector. The period 1992-97 witnessed the laying of foundations for reforms in the banking system. Cataclysmic changes were taking place in the world economy, coinciding with the movement towards global integration of financial services. Against such backdrop, the committee NC-II, appointed for the said purpose generated its report in 1998, provided the roadmap for the second-generation reform process. The NC-II with Mr. M. Narasimham as the chairman was constituted on December 26, 1997 to review the banking sector reforms since 1991 and to suggest measures of further strengthening the banking sector of India. The NC-II examined the second-generation of reforms in terms of three broad interrelated issues:

(i) action that should be taken to strengthen the foundation of the banking system
(ii) strengthening procedures, upgrading technology and HRD and
(iii) structural changes in the system

The major recommendations of the committee were strengthening banking system, systems and methods of banking, structural issues, integration of financial markets, rural and small scale industrial credit and regulation and supervision. The second banking sector reforms gave much importance to the modernization and technology up gradation. The IT Act, 1999 started the speedy process of e-banking. As a consequence, Indian Banking which was operating in a highly comfortable and protected environment till the beginning of 1990s has been pushed into the choppy waters of intense competition. Every aspect of the functioning of the banking industry, be it customer service, resource mobilization, credit management, asset liability management, investments, human resource development, and forex management underwent dramatic changes with the reform process gathering the momentum and speed.

The second reform paid much importance to technology adoption. Consequently, What started as a mere automation of some routine work processes in banks in the mid 80's has moved on to become business process re-engineering which has resulted in making banking services branchless, anytime and anywhere; facilitated new product development and, enabled near real time service delivery. Overall, technology that began its journey in Indian banking as an enabler, has now become a business driver, and is poised to be an inseparable part of banking business process. The process of computerization and application of information technology in banks has gained momentum.

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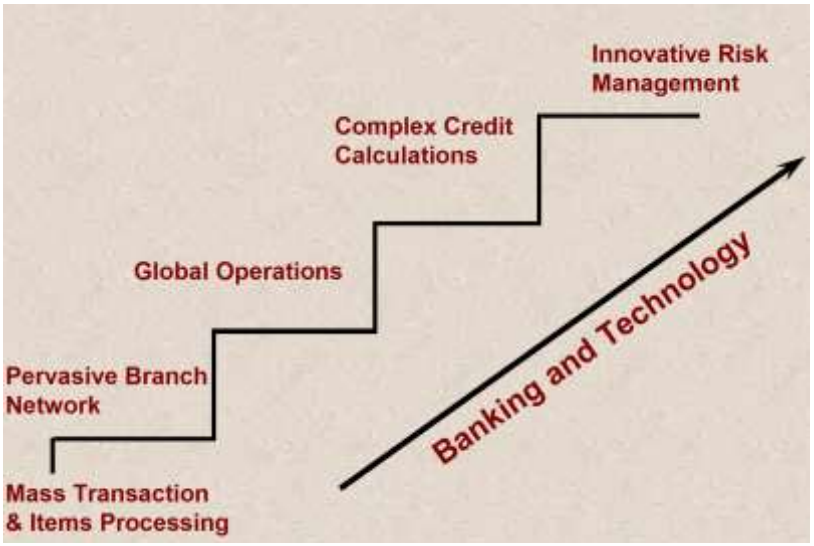

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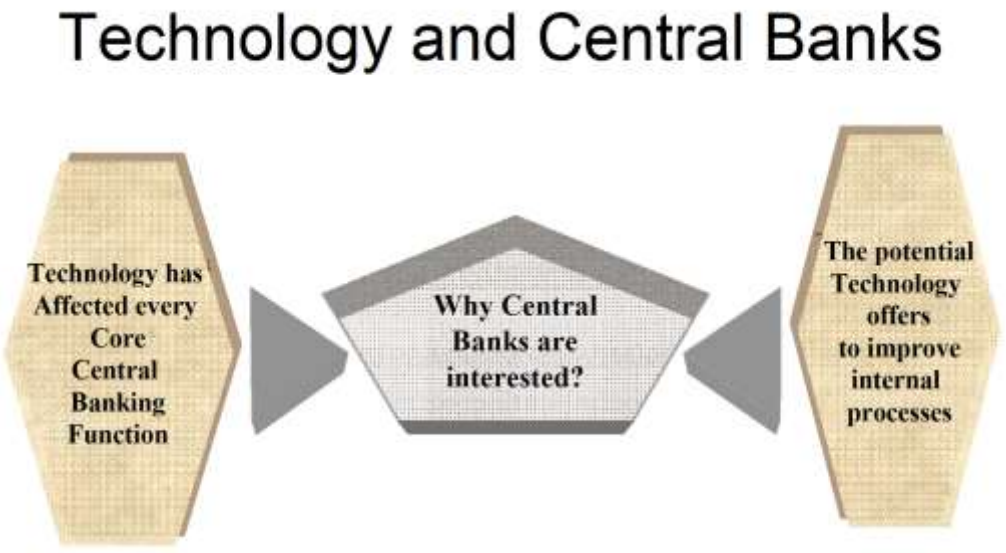
Reserve Bank of India started this push with the Rangarajan Committee Report I & II on Computerization in Banks, followed by Saraf and Vasudevan Committee Reports. Some of the significant developments during this journey have been introduction of MICR based cheque clearing, automation of bank branches, computerization of Govt. business, setting up of IDRBT, commissioning of INFINET, launching of IT based delivery channels, providing guidelines for internet banking, implementation of NFS etc. part RBI has created the INFINET & BANKNET for connecting different banks and financial institutions within the country and SWIFT which serves to connect Indian banks with International Banking Institutions. RBI has recently released an IT vision document 2011–17, which identifies the key focus areas for banks in India. The document indicates the significance to be accorded to the enhanced use of IT in areas like MIS, regulatory reporting, financial inclusion along with the need for appropriate risk mitigation measures and business continuity management. It envisages banks to work towards utilising technology for cost reduction of small value transactions, improved customer services and effective flow of information within the banks and to the regulator. The document emphasizes the need to move towards integrated IT environment for tapping the synergistic benefits of holistic system implementation.



Setting Up Of IDRBT – Contribution in Banking Technology & Research- Setting up of the Institute for Development and Research in Banking Technology (IDRBT), Hyderabad in the mid nineties, as a research and technology centre for the banking sector was a major step to facilitate and support the "technological revolution" in banking. It was set up in the year 1994 as an apex level institute for spearheading technology absorption in the Indian Banking and the financial sector. It focuses on the training, research and development activities in the field of information technology. The commissioning of INFINET as the backbone for financial communication has been a major achievement for IDRBT. IDRBT also acts as a Certifying Authority (CA) for issuance of digital certificates for players in the banking and financial sector. Structured Financial Messaging System (SFMS), a secure and common domestic financial messaging solution for intra-bank and interbank applications, developed on the lines of SWIFT was the brainchild of IDRBT. IDRBT has also been active in dynamically assessing the needs of the banking community and in organizing trainings and workshops in relevant IT related areas to address such needs. It has been performing its designated role as an important component of RBI's banking technology push and continues with its endeavor.

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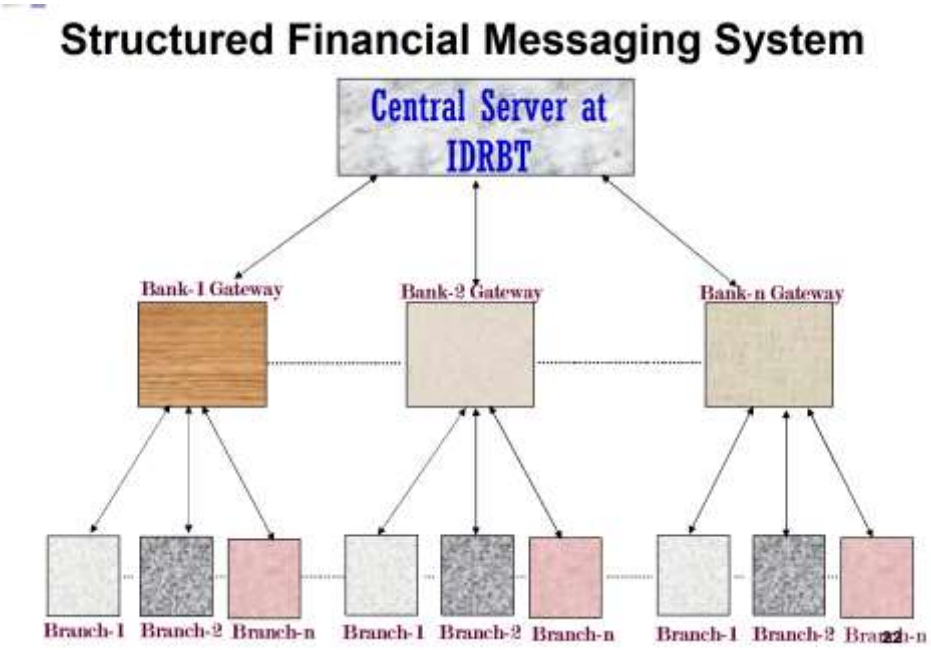

After a decade of reforms, the Indian banking sector is slowly emerging stronger. Regulations are forcing the banks to adopt better operational strategies and upgrade their skills. The system is also witnessing the integration of the financial markets. Externally, the happening in the international markets are having their implications on the markets and the players. All these are making the operational environment more volatile and hence challenging for the Indian banks. The Indian banks have nevertheless, withstood all these challenges and are becoming more adaptive to the changing environment. In the last few years, it is no wonder that the banking sector has seen a virtual cornucopia of new products: credit cards, tele-banking, ATMs, quick collection facilities for outstation cheques, retail EFT, Electronic Clearing Services - ECS - Debit and Credit for repetitive payments like dividend, interest, utility bills, Internet Banking, etc. Now there are indications of moving towards the introduction of smart cards, debit cards, on-line banking for e-commerce and financial EDI for straight through processing.

According to latest estimates, the Core Banking solution (CBS) covers around 40% of the bank branches accounting for nearly 70% of the business volume. ATMs (including shared ATMs aided further by the National financial Switch initiative of RBI), internet banking, any branch banking, credit cards, debit cards, etc, are being increasingly offered. There are over 11,000 ATMs across the country and 11 million net connections with around 23 million user. It also provides access to a large number of global retail markets to our citizens. While the foreign banks operating in India made the beginning, the new private sector banks aggressively started pursuing technology-based service offering. However, the public sector banks had to move over from the load of the past legacy.

Technological Innovations In Indian Banking Industry

The various innovations of banking industry are-

Automated Teller Machine - On 27th June 1967 the first "Cash Machine" colloquially called as "Hole on the walls" and was described as "Mini-Banks" which was designed to allow customers access to cash 24 hours a day, outside of the restrictive opening times of banks. This is the origin of the Alternate delivery Channel for Banks services, via ATM which is the first such delivery channel Bank's started using. Until the advent of ATMs, people were unaware and/or not directly affected by the technological revolutions happening in the banking sector. ATMs became the major revelation for customers, since it offered the facility to avoid long queues in front of the cashiers in banks. It also provided them the flexibility of withdrawing money— anytime, anywhere. On the 40th Birthday of the "Cash machines" John Shepherd Barron, the inventor of the ATM, said: "I am delighted that the cash machine is still going strong". " John

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Warren, head of ATMs for Barclays Bank, said: "The hole in the wall or cash machine, more than any other banking innovation, has had a major impact on the way we all conduct our lives, not just our banking. Forty years ago cash was only available from 9-3 pm Monday to Friday and Saturdays from 9 -12.30 pm, and as cash was king queues outside branches on a Saturday morning to get weekend money were common. Now you can get money anytime, anywhere."

Card based payment Transaction Value (Rupees Crores)

Item	2005- 06	2006- 07	2007- 08	2008- 09	2009-10
Credit Cards	33,886	41,361	57,985	65,356	62,950
Debit Cards	5,897	8,172	12,521	18,547	26,566

Source: RBI, Annual Report 2009-10

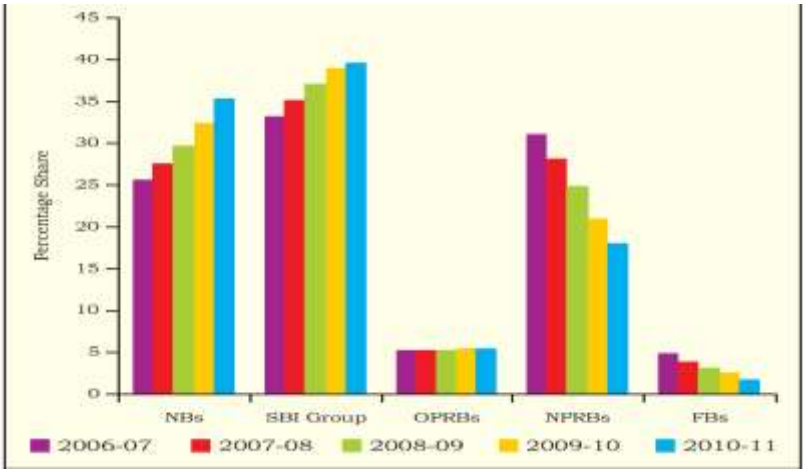
ATMs of Scheduled Commercial Banks
(As at end-March 2011)

Sr. No.	Bank group	On-site ATMs	Off-site ATMs	Total number of ATMs	Off-site ATMs as per cent of total ATMs
1		2	3	4	5
I	**Public sector banks**	**29,795**	**19,692**	**49,487**	**39.8**
	1.1 Nationalised banks*	15,691	9,145	24,836	36.8
	1.2 SBI group	14,104	10,547	24,651	42.8
II	**Private sector banks**	**10,648**	**13,003**	**23,651**	**55.0**
	2.1 Old private sector banks	2,641	1,485	4,126	36.0
	2.2 New private sector banks	8,007	11,518	19,525	59.0
III	**Foreign banks**	**286**	**1,081**	**1,367**	**79.1**
	All SCBs (I+II+III)	**40,729**	**33,776**	**74,505**	**45.3**

*: Include IDBI Bank Ltd.

Source- RBI Report 2010-2011

Share of Bank Groups in Outstanding Debit Cards



Source- RBI Report 2010-2011

Phone Banking (Call Centre) - Next major alternate channel is the CALL centers. Telephone banking is a service feature offered by many banking institutions. The process involves using the keypad on a touch-tone telephone to perform a variety of banking functions. Along with traditional banks, phone banking is also

utilized extensively by online banking institutions, including banks that conduct business primarily with the use of telephone technology. The concept of telephone banking has been around for several decades. Initially, the process required manual intervention by a bank employee. Customers would call into the bank, answer questions to verify their identities, and submit queries to the service representative. While somewhat labour intensive, this approach did make it possible to conduct a number of banking transactions from the comfort of home. With the advent of touch-tone services, the idea of telephone banking took on a new direction. Instead of connected with a live bank representative, customers could use the keypad on a touch-tone phone to enter an automated system and obtain information on bank accounts as of the latest posting day. One advantage of this newer approach is that bank customers could call any time of the day or night and check the status of their accounts. As technology continued to progress, the scope of functions that could be performed with the automated system expanded, making the service even more valuable to customers. There are several ways that a telephone banking service may be configured. Some function off a validation process that includes voice recognition before access to the customer accounts is granted. Other systems make use of login credentials such as user names and pass codes that must be entered using the telephone keypad. Once the customers enter the correct data, the automated system makes it possible to perform a wide range of functions in relation to the accounts connected with the login credentials. The typical bank telephone customer can access his or her accounts to perform a variety of functions. Balances can be checked and the latest activity can be reviewed. The customer can also transfer funds between accounts using telephone banking, as well as order more checks, make loan payments, or request information on other services the bank offers. In addition to use by traditional banks, telephone banking is also utilized by virtual banks that rely heavily on telephone and Internet access to process transactions and provide information to customers. Telephone banks generally function primarily by establishing access credentials that can be used on any telephone with touchtone service. In addition, the transactions or queries can be conducted around the clock, an advantage that allows the telephone bank to seek clients in any area of the world where the bank is authorized to conduct business.

Electronic payment systems - One of the areas where technology has facilitated significant revolution is payment systems. It started with the mechanization/ automation of certain processes by introduction of cheque sorters and readers, MICR based clearing etc. and has moved on to use information technology for efficient funds transfer mechanisms such as ECS, NEFT, CTS, RTGS. The focus has shifted from the initial needs of capacity management for handling increasing volumes, to efficiency enhancement in transaction processing for the benefit of businesses, markets as well as retail customers. The increasing utilization of these delivery mechanisms leads think about the next higher level of technology and sophistication to meet the rising expectations of the market participants. RBI has already initiated work towards introduction of new generation RTGS, which will be able to handle rising volumes, provide better functionalities and has better technological adaptability.

Volume and Value of Electronic Transactions* by Scheduled Commercial Banks

(Volume in million, Value in ` crore)

Year	2009-10	2010-11	2009-10	2010-11	2009-10	2010-11	2009-10	2010-11
	Volume		Percentage Variation		Value		Percentage Variation	
1	2	3	4	5	6	7	8	9
ECS Credit	98.1	117.3	11.0	19.5	1,17,613	1,81,686	20.6	54.5
ECS Debit	149.3	156.7	-6.7	5.0	69,524	73,646	3.8	5.9
NEFT	66.3	132.3	106.3	99.5	4,09,507	9,39,149	62.5	129.3
RTGS	33.2	49.3	148.5	48.2	3,94,53,359	4,84,87,234	22.2	22.9

*: Excluding transactions carried out through cards

Source- RBI Report 2010-2011

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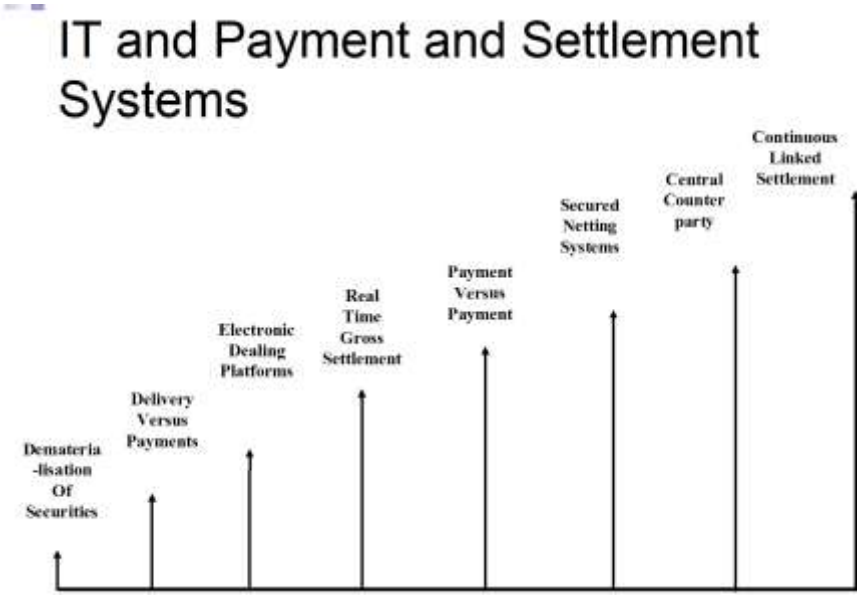


Internet (Online) Banking - The latest wave in IT is Internet banking. It is becoming more obvious that the Internet has unleashed a revolution that is affecting every sphere of life. Internet is an interconnection of computer communication networks spanning the entire globe, crossing all geographical boundaries. Touching lifestyles in every sphere the Net has redefined methods of communication, work, study, education interaction, health, trade and commerce. The Net is changing everything, from the way we conduct commerce, to the way we distribute information. Being an interactive two-way medium, the Net, through innumerable websites, enables participation by individual in B2B and B2C commerce, visits to shopping malls, books-stores, entertainment sides, and so on cyberspace. Internet banking (IB) is a radical technological innovation with potential to change the structure and nature of banking. To sustain business competitiveness, more and more banks are transforming from their traditional approach of "bricks and mortar" into a "clicks and mortar" one under the recent emergence of electronic commerce and business. Customer satisfaction and customer retention are increasingly developing into key success factors in e banking stated that the diffusion of IB is more determined by customer acceptance than by seller offerings. Banks know that the Internet opens up new horizons for them and moves them from local to global frontiers. IB refers to systems that enable bank customers to get access to their accounts and general information on bank products and services through the use of bank's website, without the intervention or inconvenience of sending letters, faxes, original signatures and telephone confirmations. It is the types of services through which bank customers can request information and carry out most retail banking services such as balance reporting, inter-account transfers, bill-payment, etc., via telecommunication network without leaving their home/organization. It provides universal connection from any location worldwide and is universally accessible from any internet linked computer. Information technology developments in the banking sector have sped up communication and transactions for clients. It is vital to extend this banking feature to clients for maximizing the advantages for both clients and service providers. Internet is the cheapest delivery channel for banking products as it allows the entity to reduce their branch networks and downsize the number of service staff.

Computerization in Public Sector banks

Category	**2007**	**2008**	**2009**	**2010**
Fully computerized Branches (%)	85.6	93.7	95.0	97.8

Source: RBI, Annual Report 2009-10

Mobile Banking - Over the last few years, the mobile and wireless market has been one of the fastest growing in the world. Mobile phones have become an essential as well as conveniently available

communication tool for almost every individual. Using this technology for funds transfers as well as retail payments holds a huge potential. As such, mobile banking is the most happening area of development in the banking sector and is expected to complement, and to an extent replace, the credit/debit card system in future. While it has the potential to overcome issues relating to cost, infrastructure and resources; it does pose some new issues of its own. The main amongst these pertain to the dependence on service providers, network availability and security. It would also require deep appreciation of management aspects which relate not only to appropriate technology deployment and performance at backend but also to issues such as front end contact with the customer to provide necessary confidence and convenience. All these issues are receiving due attention for prioritized resolution. RBI has also established National Payment Corporation of India for focused attention on development and implementation of requisite technologies for enabling new modes of delivery. On 17 April 2010 Mr. Syed Salim Raza, Governor of the State Bank of Pakistan, at the Pakistan Branchless Banking Conference 2010, Karachi, highlighted few points about Mobile Banking: "In addition to significant cost reduction, alternative delivery channels expand outreach to areas in which the traditional bricks and mortar approach is unfeasible, and also increases product diversification by making savings and remittance products convenient, efficient and profitable. On the client side, such delivery channels provide unprecedented convenience through remote payments." And he also quoted few examples as "Take for example, Kenya where the largest mobile service provider, Safaricom launched M-PESA in 2007. It now has nearly 7 million clients in a country of 38 million people. It records an average of 10,000 new registrations per day. M-PESA offers mobile phone-based services to clients across the country through a network of more than 10,000 agents for account opening, handling of deposits and withdrawals into the customer's virtual "wallet," and customer support services. These agents can take cash from customers and credit it to their mobile account, and transfer money to other registered users. M-PESA has significantly reduced many of the spatial and temporal barriers to money transfer. The important outcome of M-PESA is the penetration of money flows to rural and hard-to-reach areas. According to a recent study, the income of Kenyan household using M-PESA has increased by up to 30% since they started mobile banking. In Asia, Philippines were an early user of mobile banking initiatives. The central bank of Philippines (BSP) has played an active role in the emergence of mobile banking. The BSP allowed two models for mobile banking. In first model i.e. bank-based model, the BSP allowed banks to outsource functions to one mobile operator i.e. Smart Money in 2001. In the second model i.e. nonbank-based model, BSP registered G-Xchange (a subsidiary of a giant telecom, Globe) as a remittance agent in 2004. Under both the models, merchants were allowed to conduct KYC." Retail banking is still the main force in banking. A Boston Consulting Group survey earlier this year showed that 57% of global revenue for banks came from retail banking. "Within that, technology is helping to keep revenues growing, especially with the steady trend to online and direct banking, away from branches," said Mr. Michael Imeson, contributing editor of "The Banker". "But that doesn't detract, entirely, away from the need for branches, because branches are still necessary as sales points. "The second point about retail banking and technology is the fact that it boosts processing efficiency, and third, it helps reduce costs".

Challenges Faced By Banking Industry In Adopting Technological Innovations

While development in technology have thrown-up an array of opportunities for the banks, they have also brought along a whole set of challenges to deal with**.** One of the major challenges has been the requirement to integrate several islands of applications developed on varied platforms for catering to different services over a period of time. There is, realistically speaking, no single banking solution available to take care of the enterprise-wide requirements like SAP in the manufacturing sector. In the circumstances, the option seems to be to go for the best of breed solutions. As the life cycle of the technological products is becoming shorter, banks have to consider the costs of huge investments made in the hardware and software vis-à-vis their expected benefits. Unfortunately, the response of the customers to the services offered through the new channels can be fickle. For example, as per a survey conducted sometime ago by C Fore for Outlook Money in the four metros and Bangalore, 63% of the respondents used ATMs while 80% went to branches. The utilization of tele/net banking was just around 4%. The insufficient penetration may be attributable to lack of awareness, fear, need for personalized service, unrealistic expectations and, in some cases (like need for java

enabled mobile hand sets), up gradation cost of equipments with the customer**.** All these point to the need for appropriate publicity and education exercise. Further, the new dispensations should be carefully planned to prevent channel cannibalization unless otherwise they benefit in the long run. The technological up gradation necessitated by obsolescence in due course would call for fool-proof mechanism for migration to the new system to ensure complete data integrity. Considering the need to maintain 42x7 real time capabilities, the switch-over to the new system should also be non-disruptive and totally transparent to the customers.

Dependency on third party service providers for provision of certain services (say, for example, ATMs) does pose certain limitations on the range and level of services offered to the customers. An appropriate Service Level Agreement (SLA) with the vendors should cover the service needs of the banks. Security is another major issue in a technology-based, networked environment. As per a study conducted by the Research International, 81% of the surveyed business units agreed that information/data I a key business asset and 86% perceived impact of crisis caused by failure of systems, etc. as drastic. An insecure system can expose a bank to serious operational, regulatory and reputational risks. While some frauds may require computer expertise, most losses are caused by simple methods like identity theft through social engineering. An analysis of computer-related frauds leads one to the conclusion that most computer criminals are employees of the same organization**.** Bugs in system or application software also cause insecure environment. While it may be difficult to altogether avoid the limitations caused by the system software, proper support agreement with the application vendor and through user acceptance testing should be done.

Lastly, Human Resources (HR) can be an important limiting factor in the IT-based delivery initiatives of any bank and, particularly so, of the Indian public sector banks. The average age profile of (he employees in these banks is back to around 48 years (as against about 30 years in new private sector banks) after the marginal initial dip consequent to the implementation of the VRS earlier. The process reengineering and change management aspects require motivation and intensive training of the staff.

Barriers to wider adoption of new technology can also be grouped under seven themes: technological, financial, institutional, operational, attitudinal, political and legislative.

Technological barriers include limitations in agent coverage and cash flow for e-payments systems; gaps in mobile network coverage; difficulties in technical integration with existing systems; and error rates of biometric technology. Financial barriers identified were lack of resources for investment in new technologies; and lack of a business case to justify the expansion of services by the private sector into remote areas.

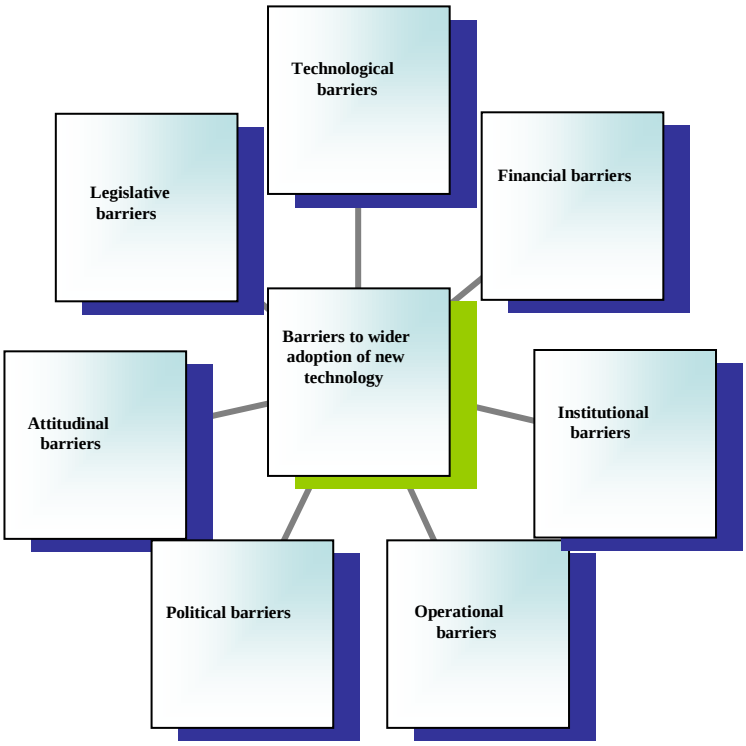
Institutional barriers within humanitarian agencies include: lack of awareness about new technologies; time and effort required to adopt new systems; and limited resources and capacity to adopt new ways of working. The low capacity of private sector actors to scale-up and low levels of recipient literacy and education also remain important constraints. Operational constraints in adopting new technologies include the limited availability of time and resources to research, cost and select an appropriate technological solution, and the time required to negotiate contracts, set up and test new systems, and train staff.

Political barriers include aid agencies' concerns about data protection issues and, more broadly, wariness of the risks of involving private sector actors in the humanitarian sphere and suspicions about their underlying motives. Aid agencies may also be unwilling to share technological innovations between themselves, resulting in incompatible of custom-built technological solutions to the same problem, which may have a detrimental impact on aid effectiveness. Attitudinal barriers from senior decision makers within all stakeholders can constrain the wider adoption of new technologies. Senior managers of humanitarian organizations may perceive new technologies as being too risky or expensive, may not be familiar with the potential benefits that new technologies can offer, may fear that technology will lead to exploitation of recipients by the private sector, and may be hesitant to commit resources to adopting new systems. Donor

mind-sets and requirements for aid and recipient attitudes to new technologies can also present barriers to using e-payments systems to transfer cash.

Legislative barriers in the regulatory environment vary from country to country. National governments can act as promoters of or as barriers to adoption of particular e-payment mechanisms or the use of digital gathering technology. There is also generally a lack of clear national policies on data protection in both donor and host countries as well as proprietary concerns around custom-designed solutions

However, the research found that some of these barriers are already reducing as technology continues to advance in low income countries and donors and aid agencies gain more knowledge and experience of technological solutions. The growing adoption of cash transfer programming has pushed donors and aid agencies to forge alliances with private sector partners and adopt or develop technological solutions which have wider potential gains for humanitarian programming as a whole.



India and Banking Innovations

In India the growth is not that phenomenal but among the emerging economies, India is picking well. Technology is rapidly transforming the banking industry- and expanding its ability to reach the unbanked. It has become the driver of the Indian banking business since the past decade with the financial sector reforms providing firm foundation. In a country like America, Debit cards accounted for nearly one-third (31%) of in-store purchases, up from 21% only four years ago. Reliance on credit cards held steady during that time, at about 21%. Cash and checks, which accounted for 57% of in-store purchases in 1999, dropped to about 47% last year. In India, if we see then, people still prefer to pay by cash. The reason behind this mindset is safety for money. Still we are far behind in terms of Internet security and E-money security. This is one area where perhaps India needs to do significant 'catching up', notwithstanding the rapid strides made over the last few years, though data on this score are difficult to come by. India happens to be a world leader in information technology, but its usage by our banking system is somewhat muted. It is wise for Indian banks to exploit this globally state-of-art expertise, domestically available, to their fullest advantage.

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Though the technology has revolutionized the way banking is looked at and the way it is conducted in our country. It is growing in stature from a business enabler to becoming a part of the business process itself. It has opened new avenues for the industry in terms of business opportunities as well as their role in supporting inclusive growth for the Indian economy. However, more than 50 per cent of the adult population in our country is still excluded from the financial sector. It is not just people in the rural areas; many of the lower income categories of the urban population are also excluded from the banking fold. This is largely because of the way the supply of such services is organized. Our existing banking business model has done laudable work in some of the areas, but has not been able to adequately address these specific challenges. For instance, transaction costs of financial services to the poor are much larger in comparison to their revenue generation potential in the short term. From the demand side too, there is financial illiteracy and the consequent fear of approaching formal institutions. A study on the Internet users, conducted by Internet and Mobile Association of India (IAMAI), found that about 23% of the online users prefer IB as the banking channel in India, second to ATM which is preferred by 53%. Out of the 6,365 Internet users sampled, 35% use online banking channels in India. This shows that a significant number of online users do not use IB, and hence there is a need to understand the reasons for not using it.

In the study by IAMAI, also found that the people are not doing financial transactions on the banks' Internet sites in India because of reasons such as security concerns (43%), preference for face-to-face transactions (39%), lack of knowledge about transferring online (22%), lack of user friendliness (10%), or lack of the facility in the current bank (2%).With this huge chunk of our populace being deprived of basic economic facilitators, or alternatively seen, with this huge resource base remaining untapped, it would not be feasible to achieve our growth potential. Technology has the potential to influence financial inclusion in a big way and help resolve the problems.

Share of India in Total Assets of Top 100 Global Banks

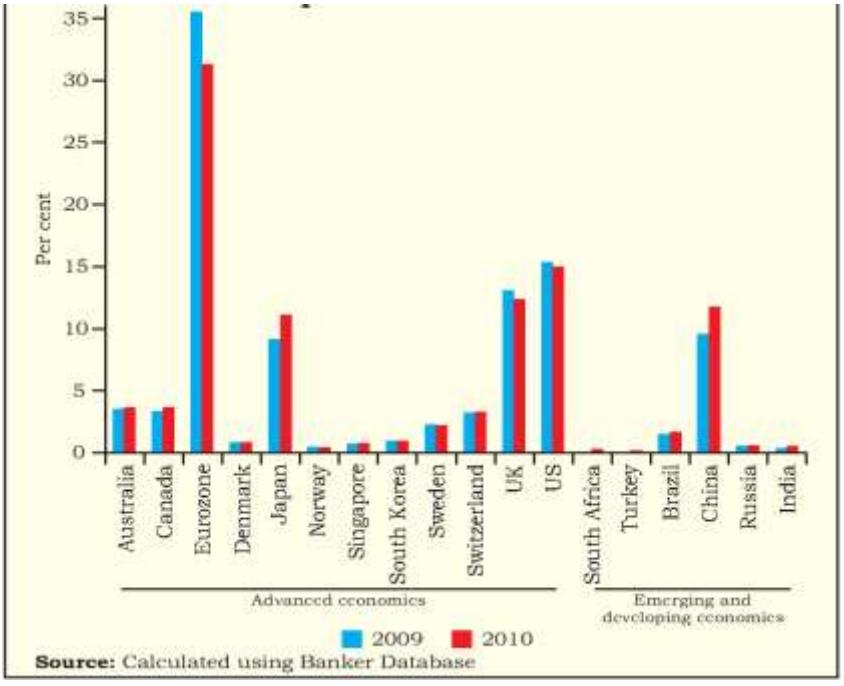

Chart Depicting The Reasons For Not Accepting Technological Innovtions In Indian Economy

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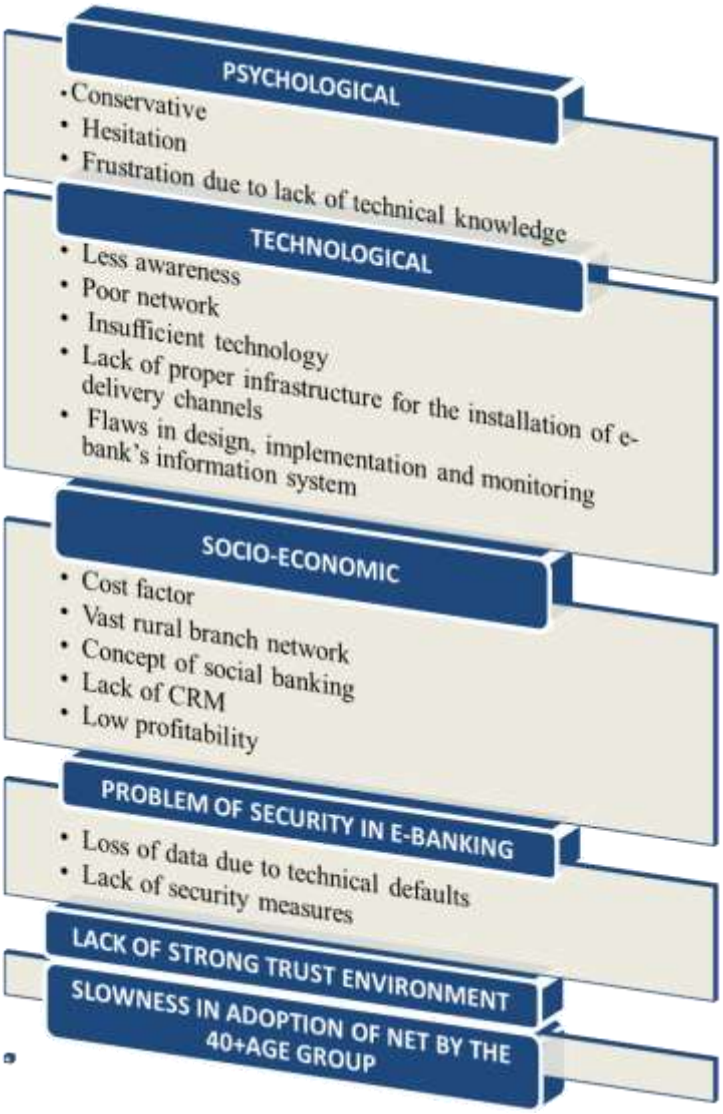

Conclusion

The paper concludes with the fact that transformation is taking place almost in all categories of the banks. This transformation will helpful to cope with new economic and financial policies of the banks. Innovations are playing a crucial role to create the drastic changes in the banking industry. The private banks take a big share of cake; our public sector banks are still lagging behind regarding the various financial parameters. The immense opportunities are also available for the public sector banks if they change/modify and adopt new policies to combat the different recent challenges. It can be concluded that mere introduction of IT alone will no be sufficient to bring necessary performance improvement and to get the competitive edge. Intelligent people are required to use such intelligent tools. Thus, even though IT management is a challenge flow in future banking scenario, marketing new technology is going to be the challenge. Apart from this, the technological solutions should also take care of other regulatory requirements such as, Know Your Customer (KYC), Anti-Money Laundering (AML), etc. Banks would be increasingly required to maintain a profile of each and every customer and filter the transactions not matching the profile in a straight through transaction processing (STP) environment. Further, regulatory issues concerning e-banking and risk management need to be kept in view.

Without Technology, banking industry cannot think about development and expansion or further growth strategies in the current competitive business world. Now the people specifically customers think beyond

about the services and satisfaction. So banking industry is having compulsion to rely on the technology, otherwise they pulled out from the competition. Earlier technology has been followed industry, but now a day industry should follow the technology and its advancement. Due to severe competition and to stay ahead in the race, therefore, banks will have to leverage technology for innovative product development including developing sophisticated financial products. The challenges in the new millennium for the banking industry are, therefore, enormous and can be met effectively only when the banking institutions also make knowledge as engine for growth. Embedding knowledge into products can enhance value. Connecting different knowledge sources can create innovative products.

Thus, the use of technology in extending banking outreach is an area of contemporary focus in India. Thanks to the versatility of information technology, innovation is giving us the hope that new business models like Banking Correspondents (BCs), innovative payment devices, Unique Identification number allocation etc. will enable us to achieve financial inclusion, while addressing some of the cost and beneficiary identification issues. Ultimately, the objective is to lower the operating costs through technological innovations whereby, financial inclusion becomes a profitable business. This will result in a huge upside to the bank in the form of stable deposits. Financial inclusion would be a catalyst to growth and would also contribute indirectly to financial stability. We hope that the initiatives in this space, encouraged by Government as well as Reserve Bank, shall get enthusiastic support from the banking fraternity and help us achieve the dream of inclusive growth, which can catapult India into the next orbit of development in the foreseeable future.

Here I am inspired by a quotation of Carly Fiorina, former CEO of Hewlett Packard (HP) and that quotes: ***"I believe we are now entering the Renaissance phase of the Information Age, where creativity and ideas are the new currency, and innovation is a primary virtue, where technology truly has the power to transform lives, not just businesses, where technology can help us solve fundamental problems."***

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