Applications of Information Technology in Banking Sector
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Abstract

Last few decades witnessed the proliferation of financial reforms, liberalisation and globalisation of Indian economy coupled with rapid revolution in information technology (IT). The business applications of various tools of IT have brought a paradigm shift in banking sector around the globe. Banking sector is now no more confined to the narrower territory of a particular region, state or a country. Introduction of computerized application has brought a new concept of click banking (popularly known as internet banking or electronic banking). Indian banking industry, the backbone of Indian economy, is the second largest spender to the IT which is surely in the line of current needs for improved efficiency and productivity. The application of IT in banking sector provides enormous benefits to the banks as well as its consumers. But the flip side of this changed financial landscape from brick banks to click banks; the traditional banking risks have also been exacerbated. In this reference, the present study painstakingly attempts to bestow the evolution of computerisation of banking sector in India. It analyses some of the recent IT applications and associated risks with such applications.

Keywords: Banking sector, Benefits, IT applications, Obstacles

Introduction:

Advent of information technology and cyber devices heralded a new world and brought tremendous change in all the sectors of the economy. Banking sector always stand at the forefront of the economy and innovation has paramount concern to the application of modern technical devices. Electronic delivery channels, ATMs, variety of cards, web-based banking, and mobile banking are the names of few outcomes of the process of automation and computerization in Indian banking sector. Technical inventions, automation and IP based network have amplified bank's productivity and efficiency manifold. This has further led to the move from brick banking to concept of 'click banking'. The present paper attempts to analyse the applications of IT in banking sector. The paper describes the evolution of IT in banking sector. It unfolds the recent usage of IT in banking sector. The paper also attempt to analyse the obstacles and risks exposed due to application of this technical boon to the sector. In the concluding section paper suggest some measures to mitigate the risks in order to reap best benefits from IT applications.

Review of related literature:

The application of IT in banking sector has always been a debatable issue. Some studies reveal that implementation of IT devices in banking requires heavy investment expenditure without any substantial return. For instance, England et al. (1998) found that there are no major differences in the performance of internet banks as compared to traditional banks in terms of profitability, efficiency or credit quality. However the study noted the difference between transactional Internet banks from other banks primarily by size. Sullivan (2000) reported that the use of internet technology has no significant impact on the profitability of banks. On average, this study found that neither banks were helped nor harmed by offering the internet delivery channel. The study pointed out that the profitability of internet banks and non-internet banks are almost similar to each other. Carlson et al., (2001) studied 2,517 US National Banks during 1998 - 2000. The study suggested that internet banking is not having an independent impact on bank profitability.

In contrast to the above results Jalan (2002) pointed out that information and communication technology (ICT) has bought the fundamental revolution in banking sector. Due to the enormous benefits of IT application, now banks seem to perceive internet banking as a substitute for the existing branching structure (Corrocher 2002). Some studies like Janice et al., (2002) observed that banks view internet as a good supplementary distribution channel for their products.

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ISSN 2229-5984
and services. Poatoglu and Ekin (2001) found that modern banking with internet techniques leads to better results regarding customer's satisfaction and is a good tool for attaining their retention. In some countries banks have also applied wireless application protocol telephony technique which allows the building of a single platform for competing network technologies such as GSM and IS-95 networks. Further it is an effective tool for downsizing the cost of operations through cheaper transaction costs, lesser paper work, less requirement of man-power and physical branches (Cheng et al., 2006). Hasan (2002) found that internet banking is highly preferred by larger banks and banks having higher branching networks. The study also noted that online home banking could be used as a strong incentive to have customer's penetration. Chang (2003) also examined the behaviour of Korean customers towards the introduction of internet banking. The study further revealed that largest bank in commercial banking remains dominant in internet banking.

**Evolution of IT usage in Banking Industry:**

Indian banking sector opened its door for computerised applications and development of communication network basically due to the sheer compulsion and necessity to cope up demand from its customers from different countries. Increasing number of bank branches, growing volume of banking operations, problems inherent in manual system and increasing incidence of frauds made it imperative for banks to signalise favourable response for the need of hour. During the first phase of introduction computer applications in banking, around 4776 Advanced Level Posting Machines (ALPMs) and 233 minicomputers have been installed. In 1993, employees of banks signed agreement with management regarding computerisation of banking industry in India. Committees headed by C. Rangarajan have given landmark reports strongly recommending the IT applications in banking business. In 1994 Reserve Bank of India (RBI) constituted a committee for technical up gradation of the banks. The committee worked with the representation of different members from banks, technical institutions and government. Based on the recommendations of the committee the Institute for Development and Research in Banking Technology (IDRBT) was established in 1996. The core research areas of the institute include financial network, application architecture, web based technology, payment system, multi media, data mining, data warehousing and risk management. In 1999 the collaborative efforts of IDRBT and RBI developed a satellite based wide area network known as Indian Financial Network (INFINET). The network is restrictive to be used by the banks and financial institutions only. Presently, the network consists of over 950 Very Small Aperture Terminal (VSATs) located in 127 cities of the country and utilises one full transponder on INSAT 3B. Realising the importance of payment system RBI constituted an operational group and payment system advisory committee in 2000. The prime task assigned to the committee was to develop an efficient and well-integrated system which could serve the purpose of Real Time Gross Settlement.

**Recent IT applications in Banking Sector:**

Information Technology is a concomitant for promoting the growth and development of economy. Globalisation and liberalisation have fuelled the applicability of IT in banking sector. Jeevan (2000) pointed out that with rigid controls giving way to deregulation; banks are gearing up their communications infrastructure to obtain a competitive edge from E-Banking, which is fast becoming a reality in India. IT applications in business have bought tremendous change in cost and access equation. It has made banking products and services affordable and accessible even to remote areas at no loss of time. The Electronic Banking Group of the Basel Committee on Banking Supervision (2003) has noted that continuing technological innovation and competition among existing banking organizations and new entrants have allowed for a much wider array of banking products and services to become accessible and delivered to retail and wholesale customers through an electronic distribution channel collectively referred to as e-banking. Some of the recent IT devices may be described as follows:

- **Electronic Clearing and Settlement System:** The most common media of receipts and payment through banks are negotiable instruments like cheques. These instruments could be used in place of cash. The inter bank cheques could be realised through clearing house systems. Initially there was a manual system of clearing but the growing volume of banking transaction emerged into the necessity of automating the clearing process. Automated Clearing System (ACS) processed with Magnetic Ink Character Recognition (MICR) and Optic Character Recognition (OCR). MICR overcomes the limitation of clearing the cheques within banking hours and thus enables the customer to get the credit quickly. OCR further eliminates the manual encoding of cheques. Further instead of presenting the negotiable instrument physically, the presenting banker may also send its electronic copy through the system known as 'Truncation System'. However, in the lines of Banker's Book Evidence Act the physical presentation of instrument is also required in case of any dispute.

- **Debit and Credit Clearing System:** Debit clearing system is a service commonly used for making payments in lieu of utility services like telephone bill or payment of electricity bill. Under this system, customer authorises the service provider to debit his bank account periodically for the units consumed by him. This authority letter is being submitted by the service provider to the respective bank which makes payments on due date. Periodical payment to a large number of groups by the customer is usually made by credit clearing system. Under this system customer hands over the amount and the list of proposed recipient to the bank who further makes payment on customer's behalf. This service is mainly used by corporate houses for making periodic payment of dividend or interest. Such electronic clearing systems bring savings in terms of efforts as well as cost to all concern parties.
Real Time Gross Settlement (RTGS): RTGS is a well accepted international media for transfer of large value interbank funds. The central banks of the European Union have recommended the linkage of EU member's domestic RTGS systems to form a pan-EU RTGS system. RTGS facilitates final settlement of individual funds transfers on a continuous basis and thus serves a purpose of good mechanism for limiting settlement and systemic risks. First automated RTGS system in G-10 countries was Fed wire. The following table provides the summary for applicability of RTGS system in G-10 countries.

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>System</th>
<th>Network Operator</th>
<th>Shape of Message flow Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>1996</td>
<td>ELLIPS</td>
<td>SWIFT</td>
<td>Y</td>
</tr>
<tr>
<td>France</td>
<td>1997</td>
<td>TBF</td>
<td>SWIFT</td>
<td>Y</td>
</tr>
<tr>
<td>Germany</td>
<td>1988</td>
<td>EIL-ZV</td>
<td>CB</td>
<td>V</td>
</tr>
<tr>
<td>Italy</td>
<td>1997</td>
<td>BI-REL</td>
<td>SIA</td>
<td>V</td>
</tr>
<tr>
<td>Japan</td>
<td>1988</td>
<td>BOJ-NET</td>
<td>CB</td>
<td>V</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1997</td>
<td>TOP</td>
<td>CB/ACH</td>
<td>V</td>
</tr>
<tr>
<td>Sweden</td>
<td>1986</td>
<td>RIX</td>
<td>CB</td>
<td>V</td>
</tr>
<tr>
<td>Switzerland</td>
<td>1987</td>
<td>SIC</td>
<td>Telekurs AG</td>
<td>V</td>
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<tr>
<td>UK</td>
<td>1984</td>
<td>CHAPS</td>
<td>CHAPS</td>
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<tr>
<td>USA</td>
<td>1918</td>
<td>Fed wire</td>
<td>CB</td>
<td>V</td>
</tr>
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</table>

Society for Worldwide Inter-bank Financial Telecommunications (SWIFT): SWIFT as a cooperative society formed in 1973 with 239 member banks from 15 countries. It provides highly cost effective, reliable, secure and rapid mode of transmitting financial messages worldwide. The network was upgraded in 80s and its revised version is SWIFT II. SWIFT provides 24x7 hour services to the financial institutes and the selected range of its users. It ensures its users against any loss of mutilation against transmission.

Bank net: Bank net is the first communication network established by Reserve Bank of India in 1991. This network allows the flow of coded messages from one place to another at no loss of time. It is of great use in foreign exchange dealings and settlement of transactions. Bank net has two phases viz., Bank net I and Bank net II. It also facilitates the use of SWIFT technology for transmission of financial information relating to foreign exchange, interest, debit-credit transactions etc.

Automated Teller Machine (ATM): ATM is perhaps most revolutionary aspect of virtual banking. It is a self vendor machine providing excess of transaction services to the customers of bank around the clock. The facility to use ATM is provided through plastic cards with magnetic strip containing information about the customer as well as the bank. In today's world ATMs are the most useful tool to ensure the concept of "Any Time Banking" and "Any Where Banking". Many banks are now installing ATMs even off-site for wider reach at lower cost. ATM usually have shared network which is beneficial for both big as well as small banks. The Indian Bank Association introduced "Swadhan" (a shared ATM network of public sector and some private sector banks) for the shared payments.

Tele Banking: Tele banking is based on voice processing technology provided by specialised software. This software identifies the voice of the caller and responds back to him. This facility is primarily used to enquire account balances and summary of transactions. At present this technology is in nascent stage and under the process of enrichment.

Phone Banking and Mobile Banking: Telephone banking refers to the access of account, transfer funds, summary sheet and other banking services through dialling one telephone number. In case of mobile banking, the banking services are provided to the customers having the credit card accounts with bank. In mobile banking, the services are provided by the association of banks and cellular service providers through SMS or WAP enabled mobile instruments. HDFC bank, ICICI bank and Citi banks are offering mobile banking in India in association with cellular service provider such as Orange Tel, Airtel, Sky Cell and BPL mobile.

These technical devices have improved the level of efficiency and profitability of banks and enable them to meet the new challenges. The emerging applications of IT enable banks to process increased volume of customer's requirements more efficiently and rapidly. IT application in banking sector is now almost substituting conventional brick and mortar banking system. However, the application of IT is not free from the obstacles and risks. These obstacles and risks may be summarised in the following section.

Obstacles and Risk associated with IT applications

The usage of IT in banking sector has bought ample number of benefits to banks as well as its customers. But at the flip side of changing financial landscape from brick to click banking, the application of IT in banking, exacerbates traditional banking risks and raised many threats to banking authorities. These amplified risks persist even if the system uses closed networks instead of open networks (as in case of closed network programs also, the possibility of insecure telephone connections, password violations, and system attacks exist). Lockett and Littler (1997) also identified risk as a very crucial aspect of electronic banking. The risk involved in using IT in banking operations include security risk, legal risks, strategic risk, money laundering risk, reputation risk etc. Some other obstacles associated with IT applications include requirement of heavy investment in hardware and software with comparative long gestation period. It may lead to problems concerning cost control, integration of traditional system to new system and chances of excess capacity. Further due to the exponential growth in the number of technical inventions, there is always a fear of getting the implemented technique outdated shortly.
**Conclusion**

Information technology offers enormous potential and emancipated various opportunities to the banking sector. It provides cost-effective, rapid and systematic provision of services to the customers. Applications of IT in banks enables sophisticated product development, reliable techniques for risk management, brings transparency to the system and helps banking sector reach geographically distant and diversified markets. IT and communication networking system have crucial impact on money, capital and foreign exchange market. However, extensive adoption of IT techniques may excavate the conventional banking risks. Large scale computerisation may also require huge investment in hardware and software and subsequent maintenance. The fear of being outdated due to the rapid technical innovations further leads to some obstacle in adaptability. Banks should educate its customers regarding precautionary measures and frame suitable guidelines for safety measures. Banks should have a clear strategy driven from the top and should ensure proper management of risks involved in internet banking through adopting effective polices, procedures, and controlling measures. Policy makers and supervisors must continuously assess the existing framework and should introduce required modification in it. In order to make best possible use of prevalent techniques domestic requirements are also subject to be analysed by the regulators. To avoid the probability of failure regularly monitoring of its functions regular security trials are also required. Banks must ensure proper back-up and recovery plans so as to ensure full faith in technology.

**References**