Chapter: 2
Banking Innovation (Evolution of E-Banking)

2.1. Introduction

Due to globalization & liberalization many significant changes are taking place in various sectors of economy like industry, business & management. To keep pace with these changes, banking industry has also adopted several innovative practices and methods in its day-to-day functioning. Such new changes in the procedures, methods of operation, and management in the day to day working of banks are known as “innovative banking” or e-banking. The changes, that the banking industry has witnessed in the last decade is the outcome of globalization & liberalization, which perhaps were not seen, anywhere, in its entire history. These changes are not only seen in developed countries but they are found in developing countries like India. The financial reforms that were initiated in the early 1990s and globalization & liberalization measures brought in a completely new operating environment to the banking services and products like ‘anywhere banking’, ‘telebanking’, ‘internet banking’ and so on. In this era, Banks are actively looking at centralized core banking solution. The solution that provides one view of the customer across all service lines. Changes in the regulatory regime and the move to participate in the Global banking system, based to look at technologically based solution. Therefore, banking industry is embracing technology in a big way. The development of information technology has been a big boon to the banking industry. The term ‘Information technology’ describes the phenomenon created by the convergence of technologies associated with computing, communication and office systems. In the past, most accounting procedures in bank were paper oriented. With the advent of new technology like computers, electronic equipments and communication networks, the modern accounting systems have under gone a sea-change both in their preparation and presentation. The traditional system of preparing the account at quarterly, half yearly and annually lost their relevance since the information are constantly up-dated and made available at any time and any where. The information technology enables the banking organization to
redesign and restructure their functioning. It has helped the banking industry in several ways, especially improving its customer relation and build up the business development. Banking industry has undertaken various activities under the purview of IT in its operation. Globalization and Liberalization have forced the banks to think in terms of technology benefits and quality services to customers as future is full of challenges and survival will be a difficult task. The entry of IT infrastructure in the corporate world of banks has brought many innovations, in particular the E-banking. The advent of Internet has initiated an electronic revolution. The Internet is one of the major distribution channels of banking products and services. Due to advances in Internet Security and the relevant protocols, banks play their role as financial intermediators of commercial transactions. Banks have chosen a route of establishing a direct web presence as well as owner of financial services. There is a need of simple Internet Commerce Strategy. The E-banking strategies, those banks implement to derive maximum value through the online channel. E-banking transactions, how the Internet has transformed banking transactions, and use of Internet as an information delivery tool are there to improve relationship with customers.

Hence, the use of most modern and advance methods of equipments in banking industries is called ‘E-BANKING’. E-banking has given an opportunity for banks to find solution to management problems like saving time, money and energy, reducing/minimizing paper works, waiting in queues, lack of communication, and lack of efficiency. E-banking has provided ease and flexibility in banking operations. Today, in our country, almost every private as well as nationalized bank, providing IT based products and services to their customer and co-operative banks have recently entered in the same.

2.2. Evolution of E-Banking

The Electronic Banking is not a new concept in the history of banking. “It began in year 1871, when the western union telegram company, headquartered in Rochester, New York, began to offer a national wide money transfer service”.[1]

About 80 years later, there was another major innovation that did not receive as much attention from the public. It was the year 1950 development of magnetic ink
character recognition (MICR) used in connection with regards and sorting checks by both humans and machines. Without MICR, it would not have been possible for our paper-based system to process about 70 billion checks used in the early twenty-first century.

All the major banks in the developed countries, in the year 1958, were using computer technology. Earlier the use of computer in banks was only for data processing purposes. Data processing work was done in batches, which takes long time of processing, generating reports and was prone to certain errors. “In the mid-sixties ‘FIRST GENERATION’ of on-line system (GOLS) was introduced in the banking industry, particularly in Japan, the United State of America (USA), Switzerland.”[2] The use of first GOLS tried to correct the earlier defects of the data processing system i.e. delays and errors. This system was hierarchically two degree remote from the end user (customers). It has data organization operating system on the main frame machine. Communication software was also on data links with only branch offices or near the customer. The communication software was only used for data transfer. Thus, there was no network control centre available. As the numbers of jobs for the first GOLS were increased, the machine was no longer able to handle the work load.

Hence, during “the years 1975-80 second GOLS were used which were one degree remote from the end users. The second GOLS machine helped to enlarge the range of application. Data Base Management System (DBMS) was also developed. The network communication software “data line” was replaced with new network communication software “X.25 protocol”. Branch level computers were connected with Local Area Networks (LAN).[3]

Many projects relating to the use of information technology in banking activities such as credit information system, customers database account query, etc, were initiated. In the late seventies mini-computers (second GOLS) were introduced, in the early eighties banks switched to intelligent work stations supported by personnel computers (PCs), and this was the beginning of the third generation on-line system.
The concept of system architecture was promoted and database at various locations were linked with communication network. Range of application of these networks varied from one country to another and also within the country. This system provided the various facilities to bank as well as the user. With increased use of computer and communication, banks reviewed their methods of fund transfers. Bankers Automotive Clearing Services (BACS) started appearing in the late sixties. These facilities speeded up the bills payments, insurance premium and mortgage repayments, pension and social security benefits payments, etc. “Before such systems were introduced the average clearing per day was three lakhs and the peak clearing was six lakhs but after introduction of such automated devices the average clearing per day was 2.3 million, while peak clearing was 4.8 million”[4]

Once the inter-institutional funds transfer mechanism was successfully introduced, the bank felt the need for establishing a world-wide inter bank financial transactions. This led to the establishment of the society for World-wide Inter bank Financial Telecommunications (SWIFT). This was the period of fourth generation on-line system, (GOLS). Under this system in all member countries ‘Regional processor’ (which are connected by leased telephoned lines to the operating centre) were established (or installed). The countries having heavy traffic of data transfer have multiple regional processors having links with multiple central processing units for achieving better reliability.

E-banking is receiving great attention in the banking industry and the regulatory community. This is because e-banking reflects a more general interest in the role of the Internet as a vehicle for commercial activities. However, interest in e-banking may be particularly keen because a strong case can be made, that banking along with other financial services, provides a particularly fertile environment for the development of e-commerce. Banking involves the collection, storage, transfer, and processing of information assets and the Internet is an incredibly powerful and efficient tool for handling these information processes.

“In 1951, the first credit card was issued by Franklin National bank (New York), and in the early 1970s, the first ATM machines came into operations at City National Bank of Columbus, Ohio, the predecessor of Bank. In the year 2000, there
were about 285,000 ATMs in operation in the United State and about 592,000 world wide".[5]

In the history of innovative banking the second time drastic changes took place in the late 1990s. E-Banking has developed from virtual insignificance to tens of millions of users worldwide. However, e-banking is the product of different generations of electronic transactions. The current web-based internet or e-banking is the latest of several generations of systems. Automated teller machines (ATMs) were the first well-known machines to provide electronic access to customers, whereas in phone banking, users call their bank’s computer system on their ordinary phone and use the phone keypad to perform banking transactions. PC banking superseded phone banking and allowed users to interact with their bank by means of a computer with dial-up modem connections to the phone network. Phone and PC banking entailed maintenance costs associated with keeping up to date with diverse modems and with avoiding prohibitively complex installation procedures. After those generations, Deutsche Bank launched the very first Internet banking project in Latin America in 1996 and Citibank was developed a special ‘e-toolkit’ across all its branches worldwide. E-banking uses the web browser for the user interface and the Internet for data transfer and download of software, and so has a potential for reducing maintenance costs. For users, e-banking provides current information and 24-hours a day access to banking services. The primary services provided by e-banks are transferring money among one’s own accounts, paying bills and checks account balance etc. “the Internet banking services are basically divided into three steps:

a) Basic information e-banking – the banks websites just provides the information about their banks, products and services offered to bank customers and the general public;

b) Simple transactional e-banking – Websites that allow bank customers to submit applications for different services, make queries on their account balances and submit instructions to the bank but do not permit any account transfer;
c) Advanced transactional e-banking – Web sites that allow bank customers to electronically transfer funds to/from their accounts, pay bills, and conduct other banking transactions online.

Usually, e-banking refers to type b and c.” [6]

2.3. E-Banking in world

E-banking is widely used in many places across the world. In the year 2001, E-banking was used by more than 25% of the population in Norway, Sweden, & Finland and by 15% of the population in Denmark. In the year 2004, E-banking usage in Denmark had grown to 45%. E-banking has presented regulators and supervisors worldwide with new challenges. The Internet, by its nature, reaches across border and is, for the reason, engaging the attention of regulatory and supervisory authority all over the world. E-banking is spread over the world and each single user can take the benefit of banking services form it.

2.3.1. Asia: Several banks in Asia have started offering e-banking services, most of them offering basic services like human tells (HT) and automated teller machines (ATM). There are some issues regarding the e-banking in Asian Countries, such as security and access to advanced e-banking products/services which are the major deterring factors for the expansion of e-banking in Asia.

“As per Mckinsey’s Proprietary Personal Financial Services 2000 survey of more than 5,500 middle and high income consumers in the Asia-Pacific region (i.e. Australia, China, Hong Kong, India, Indonesia, Malaysia, New Zealand, the Philippines, Singapore, South Korea, Taiwan, Thailand, Brazil and Turkey) prefer to use e-banking services. In India, Indonesia and Thailand, the percentage of its use is very low as 1 percent. In Singapore and South Korea it ranged from 5 to 6 per cent. Overall, e-banking accounted for less than 0.1 per cent of the customers’ banking transactions, this figure remained unchanged since 1999. By contrast, telephone transactions have doubled since then, to 0.6 percent. The internet is used more often for opening new accounts, less than 0.3 per cent of respondents used it for the purpose, except in China and the Philippines, where the figures climbed to 0.7 per cent and 1.0 per cent respectively.” [7]
As per the survey report (table-1), it is found that for trading securities or applying for insurance, credit cards, and loans over the Internet appealed only to more than 13 percent of the lead users and the followers. One third of the lead users and the followers preferred to undertake basic functions, such as ascertaining account balances and transferring money between accounts over the Internet. Bills Payment was the most popular feature cited by 40 per cent of respondents. But on the other hand, banks also face the problems for providing the better services. The major issue was that, it requires a high level of security and involves arranging transactions with a variety of players.

![Pie chart showing the percentage of respondents who preferred different services.](image-url)

**TABLE-1**
(Source: E-Banking by Dr. Vasu Deve)

The problem in Asia, and throughout the emerging market, is security, which more than half of the respondents reported as their main reason for declining to open online banking or investment accounts. Respondents also said that they preferred to have personal contact with their banks. Access to high-quality products is an issue as well. Most banks in Asia are not only beginning to offer e-banking services, but many of these services are basic, compared with those available in other parts of
the world. In Asia one of the most impressive records has been achieved by the Republic of Korea. Internet banking in that country has increased at a rapid pace, the number of online users having risen from 2 million in 2000 to 5.3 millions in December 2001. The country is a leader in the region with 54 percent of users having multiple online banking relationships.

2.3.2. U.S.A: The Banks are developing e-banking capabilities at a very rapid pace, with many of the largest banks in the US adopting the delivery of services over the Internet as a major component of their business strategy.

“In the U.S.A, the number of thrift institutions and commercial banks with transactional web-sites is 1275 or 12% of all banks and thrifts. Approximately 78% of all commercial banks with more than $5 billion in assets, 43% of banks with $500 million to $5 billion in assets, and 10% of banks under $ 500 million in assets have transactional web-sites. Of the 1275 thrift/commercial banks offering transactional Internet banking, 7 could be considered ‘virtual banks’. Ten traditional banks have established Internet branches or divisions that operate under a unique brand name” [8]. Several new business process and technology advances such as Electronic Bill Presentment and Payment (EBPP), handheld access devices such as personal digital Assistants (PDA’s), Internet Telephone & Wireless Communication channels and phones are emerging in the US market. A few banks have become Internet Service Providers (ISPs), and banks may become Internet portal sites and online service provider in the near future. Reliance on third party vendors is a common feature of electronic banking ventures of all sizes and degrees of sophistication in the US. Despite popular impressions, and the rapid growth in the number of banks offering e-banking, only a minority of banks in the U.S.A. offered transactional e-banking as 2001 begin. A Bank as offering ‘transitional’ e-banking if its customers can transact business over the Internet (e.g. access accounts and transfer funds, apply for an account or a loan, etc.). The Interpretive Ruling of the Office of the Comptroller of Currency (OCC) authorizes a national bank to ‘perform’ and provide or deliver through electronic means and facilities any activity, functions, product or services that it is otherwise authorized to perform, provide or deliver. “Mexico is another leader of Internet banking in the
Latin America. In Mexico, the numbers of online bank users are more than tripled from 700,000 in 2000 to 2.4 million in 2001, and it could reach 4.5 million in 2005. One of the reasons for the success of Latin American banks’ online ventures seem to be the attention they have paid to providing retail customers with multiple ways to access their account i.e. Internet, telephone and wireless. [9]

2.3.3. Europe: The Internet is accelerating the reconfiguration of the European banking industry into three separate businesses: production, distribution and advice. The objective is to position oneself as a ‘state-of-the-art factory’ capable of issuing high-volume products at the best price, to distribute and offering a comprehensive product and service solution to meet customer needs and it is also possible to maintain access to customer by advising them on the selection of comparable products. In early 2001, approximately 60 percent of e-business in the UK was concentrated in the financial services sector, and with the expected 10 fold increase of the British e-business market by 2004. Most of the banks in U.K. are offering transactional services through a wider range of channels including Wireless Application Protocol (WAP), mobile phone and T.V. The Financial Services Authority (FSA) is the regulatory authority in the UK. It has issued Electronic Banking guidelines for the supervisors. The RBI’s Report of Internet banking reveals about the FSA provides the framework for customer protection, promotion of customer awareness and reduction of financial crises etc. According to the report “the Financial Services Authority (FSA) is neutral on regulations of electronic banks. The current legislation, viz the Banking Act 1987 and the Building Societies Act, provides it with the necessary powers and the current range of supervisory tools. A new legislation, the financial services and Market bill, offer a significant addition in the form of objectives requiring the FSA to promote public understanding of the financial system. There is, therefore, no special regime for electronic banks. A draft Electronic Banking Guidance for supervisors has, however, been developed. A guide to Bank policy has also been published by the FSA (Financial Services Authority) which is technology neutral specifically covers outsourcing and fraud. The FSA also maintains bilateral discussions with other national supervisors and monitors developments in the European Union (EU)
including discussions by the Banking Advisory committee and Group de Contract. New legislation on money laundering has been proposed and both the British Banker Associations and the FSA have issued guidance papers in this regard. The FSA is actively involved in the Basle Committee e-banking group which has identified authorization, prudential standards, transparency, privacy, money laundering and cross borderer provisions as issues where there is need for further work. The FSA has been supporting the efforts of the G7 Financial Stability Forum, which is exploring common standards for financial market, which is particularly relevant to the Internet, which reaches across all borders”[10]. The other countries in Europe are also promoting the e-banking services. Sweden has the highest rate of Internet banking usage in the world. The basic on-line activity is payment of bills. Swedbank was the first bank in the world to introduce electronic Bill Presentment and payment (EBPP) and now handles 2 million bill payments a month. E-shopping is another major Internet banking service. No specific guidelines have been issued for Internet banking in Sweden. The general guidelines applicable to financial institutions are applicable to Internet banking. “According to a report by Finansinspektionen titled ‘criminal attacks on internet banking’ released in 2007, large banks in Sweden conduct 20 million Internet transactions a month. The report claims that the number of attacks on customer accounts in Sweden rose from 10 in 2005 to about 300 in 2006. The report suggests that banks should effectively communicate the risk associated with the Internet, security measures adopted by them, need for protection and disclaimers to the customers. Scandinavian countries have implemented Public Key Infrastructure (PKI) to facilitate and secure Internet banking operations”[11] As per the RBIs, Report on Internet banking, “Swedish and Finnish markets lead the world in terms of Internet penetration and the range and quality of their online services. Merita Nordbanken (MRB) (Now Nordic Bank Holding, a merger between Finland’s Merita and Nordbanker of Sweden) leads in “log-ins per month” with 1.2 million Internet customers, and its penetration rate in Finland (around 45%) are among the highest in the world for a bank of ‘brick and mortar’ origin’ Standinaviska Easkilda Banken (SEB) was Sweden’s first Internet bank, having gone on-line in December 1996. It gas 1,000 corporate clients for its
Trading Station, an Internet based trading mechanism for forex dealing, stock-index futures and Swedish treasury bills and government bonds. Swedbank is another large sized Internet bank. Almost all of the approximately 150 banks operating in Norway had established “net banks”. In Denmark, the Internet banking services of Den Danske offers funds transfer, bill payments etc. The role of the Banks of Finland has been, as part of general oversight of financial markets in Finland, mainly to monitor the ongoing development of Internet banking without active participation. “Finland was the first country in the world to offer Internet banking services in 1996. It has one of the highest proportions of Internet banking users in the world. The percentage of adult population using Internet banking in 2007 is over 70%. Finland is the pioneer in banking innovations. Suomen Pankki, or the Bank of Finland, is the regulatory authority for banking services in Finland. Due to the technological point of view Norway is one of the rich country in the world. There is an increase in the number of customers using the Internet to carry out their banking services in Norway. “According to the annual report in May 2007, NOK 585bn was transferred using Internet banking services by retail customers in 2006. The report further adds that retail customers paid 82% of their bills electronically in 2006. The Norwegian banking industry has introduced a new security infrastructure called bank ID for authentication of Internet banking customers.”

2.4. E-Banking in other countries:

Many other countries in world wide are providing an e-banking service, is presented below:

2.4.1. Malaysia:
The electronic revolution in the Malaysian banking sector is claimed by pang (1995) to have started in the 1970’s. However, the first visible form of electronic innovation in the Malaysian banking industry was the introduction of Automated Teller machines (ATMs) in 1981. The ATMs to a large extent released banks from the constraints of time and geographical location. The presented banks with a more economical substitute for brick and mortar branches. In the early 1990’s telebanking was introduced in Malaysia, which provided another delivery channel
for branch financial services via telecommunication devices connected to an automated system of the bank by utilizing Automated Voice Response (AVR) Technology. Advances in telecommunication and information technology then culminated in banks offering their services through personal computers located at the customer’s premises through the use of Internet proprietary software. Hence, PC-banking or desktop banking was mainly popular among banks’ corporate customers rather than their retail customers. “On June 1, 2000, the Malaysian Central bank gave green light for locally owned commercial banks to offer e-banking services. On June 15, 2000, Maybank, the largest domestic bank in terms of assets as well as network distribution, the first bank to offer e-banking services in Malaysia. In December 2000, the Hong Leong Bank commenced its electronic banking operations known as ‘e-banking’. Another domestic bank, which has introduced e-banking, is the Southern Bank, which offers its e-banking services. The Multi-Purpose bank is reported to have plans to launch its own e-banking services towards the end of 2001. The banks intend to provide its electronic banking services via its Multi Link account. [15]

2.4.2. Australia:

Internet banking in Australia is offered in two forms: web-based and through the provision of proprietary software. Initial web-based products have focused on personal banking whereas the provision of proprietary software has been targeted at the business/corporate sector. Most Australian –owned banks and some foreign subsidiaries of banks have transactional or interactive web-sites. Online banking services range from FIs websites providing information on financial products to enabling account management and financial transactions. Customer services offered online include account monitoring (electronic statements, real-time account balance), account management (bill payments, funds transfers, applying for products on-line) and financial transactions (securities trading, foreign currency transactions). Electronic Bill Presentment and Payment (EBPP) are at an early stage. Features offered in proprietary software products, enabling business and corporation customers to connect to the financial institutions ( via dial-up/leased line/extranet) include account reporting, improved reconciliation, direct payments,
payroll functionality and funds transfer between accounts held at their own or other banks. The Electronic Transactions Act 1999 has facilitated the use of electronic signatures as well as acceptance of electronic transactions. “A Study conducted by A.C.Noelson in 2007 revealed that 68% of Internet users in Australia were availing themselves of Internet banking services. The growing threat of spam e-mails led to the adoption of the spam Act. The spam act of 2003 laid down procedures for sending commercial electronic messages. The Code of Banking Practices contains provisions related to safeguarding various types of information”[16]

2.4.3. New Zealand:
Major Banks offer E-banking services to customers operate as a division of the bank rather than as a separate legal entity. Reserve bank of New Zealand applies the same approach to the regulation of both Internet banking activities and traditional banking activities. There are, however, banking supervision regulations that apply only to Internet banking. Supervision is based on public disclosure of information rather than application of detailed prudential rules. These disclosure rules apply to Internet banking activity also. The New Zealand Banking Associations released a banking code of conduct in July 2007.

2.4.4. Japan:
Japan is a technology oriented country and very advance in providing the electronic banking products and services. Banks in Japan are increasingly focusing on e-banking transactions with customers. Internet banking is an important part of their strategy. While some banks provide services such as inquiry, settlement, purchase of financial products and loan application, others are looking at setting up finance portals with non-finance business corporations. The current regulations of the Bank of Japan on physical presence of bank branches are undergoing modifications to take care of licensing of banks and their branches with no physical presence. “The Report of the Electronic Financial Services Study Group (EFSSG) has made recommendations regarding the supervision and regulation of electronic financial services. Financial institutions are required to take sufficient measures for risk management of service providers and the authorities are required to verify that such measures have been taken” [17].
2.4.5. Canada:
There are number of e-banking users in Canada. As per the study conducted by Transaction Network Service (TNS) in year 2006, six out of ten Canadians with Internet access were using Internet banking services, in which over 50% of all bill payments, account transfers and account enquiries were being conducted online.

2.4.6. Germany:
Germany has one of the highest numbers of Internet banking users in the world. According to a Data Monitor report on Online Banking strategies in Europe released in 2006, the number of consumers using Internet banking rose from 8.6 million in 2002 to 15.4 million in 2005.

2.4.7. Bangladesh:
In Bangladesh there is a large gap between the computerization of foreign banks and that of local commercial banks, the gap is particularly great in respect of local public commercial banks, and as regards the state of their- and inter-branch online network. However 75% of local banks are planning to introduce E-Banking, which implies very dynamic improvements in their ICT use indicators. Virtually all banks use banking software at their head offices and during the past few years around one third of local banks have become SWIFT members. Credit Card and point of sales (POS) are already provided by a quarter of local banks, while ATM and internet banking are expanding rapidly especially in major cities. [18]

2.4.8. China:
The Administration of online banking services (procedures) announced in 2001 allows all financial institutions authorized by the people’s Bank of China to undertake business in China to offer banking services though the Internet. Therefore, World wide, Electronic Banking is making rapid strides due to evolving communication technology. Penetration of Internet banking is increasing in most countries.

2.5. E-Banking in India
The Indian Banking system has been operating successfully over the last two centuries. Several major banks in India are either offering e-banking services or planning to do so in the near future. With the growing Internet awareness among
customers, increase in role of banks in e-business and growing reach of the internet, e-banking would become an important part of the Indian banking sector in the years to come. Hence in this section we can discussed as below, the journey of computerization in Indian banks to e-banking era in India:

**2.5.1. Computerization in banks**

It was in 50s that the Government of India evolved the policy of using the Banking system as an instrument of economic development and social change and, as a first step, nationalized the then Imperial Bank of India and re-christened it as State Bank of India (SBI). The SBI was given the mandate of a massive branch expansion programme and was asked to open branches in various areas of the country and assist in their development. This resulted an explosion of sorts in volumes of transactions and posed a severe strain on all resources. More particularly, the inter-branch reconciliation becomes one area that defied manual handling. It was in this background that the first step towards mechanization was taken by installing i.e. 40 column punched card equipment in late 50s, early sixties in the Calcutta office of the SBI for reconciliation of inter-branch transactions.

As time passed, Indian banks have gone through certain stages of computerization or mechanization. “Since 1966 there have been several negotiations between the Indian Bankers Association (IBA) and the various trade unions of the banks. Under the settlement reached between IBA and trade unions in 1966 accounting machines could be used for ledger posting of current accounts, inter-branch or agency accounts and salary and provident fund accounts, etc. provided there is no retrenchment and displacement of workers”.[19]

“There was a change in banking scenario in India in 1969, 14 major banks were nationalized and there was subsequent explosion of banks region wise and service wise the need for varied information system was realized i.e., house keeping and control and macro level information for policy formulation and control by central banking authority”[20]

Major significant development was in 1975, when the “Working group of customer’s services headed by T.R. Vardarchay suggested introduction of modern technology in specific banking areas to improve the customer’s services”[21]

Another Land Mark in the History of Computerization was, “In 1966 the first bipartite settlement was signed between Bankers Association and Employees union on computerization. This agreement permitted use of certain machines for banking transactions. The second bipartite agreement/settlement on computerization and mechanization was signed in 1988. The agreement specified the area of computerization and the number of computers and machines that could be used [23].

“ In the 1980’s banks set up, Computer Policy and Planning Department (CPPD) under the charge of senior executives and about 2,300 officers in programming / system analysis, over 11,000 staff in terminal operations and 20,000 officers in computer appreciation programmers [24]. Like most of other activities in banking, RBI got into the act for IT also and set up two committees in quick succession to hasten the pace of mechanization of operations in the banking sector that was Rangarajan Committee peruse. In the early 80s, a high level committee (Rangarajan-I) was formed under the chairmanship of Dr. C Rangarajan, then Governor of the Reserve Bank of India, to draw up a phased plan for computerization and mechanization in the Banking Industry over a five year time frame of 1985-89. The focus by this time (justifiably) was on customer services and two models of branch automation were developed and implemented:

a) Front office mechanization where front desk operations were computerized while back office work was done manually and

b) Back office automation covering mechanization of General Ledger and back office operations while the front office work was done manually. Both the models provided the customer with error-free accounting, regular statements of accounts etc [25]
“According to Rangarajan committee and various agreements with the union, the areas to be covered by mechanization and computerization were to be on the basis of:

a) Banks whose aggregate deposits were Rs.1,500 crores or more and branches with more than 1,000 vouchers (average) per day.

b) The number of centers to be mechanized is 100 and the number of branches to be mechanized in the first phase is 2,500 and in the second phase 6000.

c) The number of ledger posting machines to be introduced in the first phase is 10,000 and in the second phase are 20,000.

d) The number of micro-processor to be introduced in the first phase is 200 and in the second phase 100.

e) The number of mainframe purchased is 25.

f) The total cost of hardware alone would be Rs.1,350 cores and Rs.150 cores would be needed for providing infrastructure facilities.”

As per the experience gained from the first committee for computerization, “the second Rangarajan Committee constituted in 1988 drew up a detailed perspective plan for computerization of Banks and for extension of automation to other areas like funds transfer, electronic mail, BANKNET, SWIFT(Society for world-wide inter-bank financial telecommunication), ATMs etc. The committee recommended the following road map for computerisation over the next five years: a) around 2000 to 2500 large branches located at high activity (urban and metropolitan) centers to be fully computerized. b) Regional offices/ Zonal offices / Head offices are computerized c) Inter- and intra bank transitions using the BANKNET set up by the RBI; and d) Installation of a network of cash dispensers / ATM’s at strategic locations such as airports/ railways stations etc., on a shared basis by banks. The committee also made steady recommendations on the “single window concepts”, “all bank credit cards”, credit clearing/ GIRO system, office automation, etc.”

The Present level of computerization in public sector Banks is a result of these initiatives. RBI has also gone ahead in creating of nation wide and localized networks for integration of the entire financial system. “As on 30th June 1994, was the period of rapid computerization in banking sector. There are more than 10,000
machines ALPMs, (Advanced Ledger Positing Machines) basically personnel computers, LANs, used in more than 5,000 branches of Indian commercial and co-operative banks. Many banks have used MIS i.e. (Banking Information System) for performing Internal banking activities. About 300 mini-computers have been installed at Zonal/ Regional offices of these banks. 2000 personnel computers, 300 minicomputers and other machines used for foreign exchange dealing, inter-branch reconciliation, word-processing, MIS reports, software development, consolidation of annual accounts etc. activities are performed. The network “Banknet” was implemented in two phases: In phase-I, the RBI has installed 4 computer systems for cheque processing in Mumbai, Delhi, Chennai and Calcutta. X.25 based packet switched network is proposed to be commissioned to connect these nodes. In the first phase of BANKNET, network architecture was designed for independent data operation for data communication only. For linkages with public sector banks, the proposed arrangements are to have separate links from head offices to the nearest RBI centre. In phases-II Banknet was to provide wide range a communication capabilities between head office and their zonal/Regional and from individual banks to the RBI centers and other banks. The network facility is extended to branch level for number of centers in present days.” [28]

Indian Banking Industry today is in the midst of an IT revolution. A combination of regulatory and competitive reasons has led to increasing importance of total banking automation in the Indian Banking Industry. “As on 31" March 2002, out of the over 50,000 branches of public sector banks, only 11,578 branches have been fully computerized. Lack of computerization among over 50,000 branches of public sector Banks provides a huge market for players in IT Industry”[29]. As per the norms worked out by Rangarajan Committee-II, in India, “7827 branches of public sector were identified for full branch computerization up to March 2000 of which around 4620 were computerized as on March 99”[30]. Meanwhile, the networking of the already-computerized branches also assumed urgency and some of the Banks have stated inter-connecting their computerized branches using leased telephone lines or Very Small Aperture Terminals (VSATS). Banks provides a more comprehensive service to customers and at the same time give banks better
centralized control over the branch operations. New Private Sector and Foreign banks have an edge over public Sector Banks as far as implementation of technological solutions is concerned. The Financial Reforms that were initiated in the early 90s and the globalization and liberalization measures brought in a completely new operating environment to the Banks that were till then operating in highly protected milieu. The arrival of foreign Banks and Financial Institutions, the setting up of a number of private banks and the measures of de-regulation that encouraged competition has led to a situation where the survival of those who do not join the race will become difficult. Unless the state-of-the-art IT was introduced as early as possible, winning new business and even holding on to the old one will become increasingly difficult. Services and Products like “Anywhere Banking”, “Tele-Banking”, “Internet Banking”, “Web Banking”, “E-Banking”, “e-commerce”, “e-business “, etc. have become the buzzwords of the day and the Banks are trying to cope with the competition by offering innovative and attractively packaged technology-based services to their customers. Simultaneously, the importance of effective MIS for control of operations and of maintaining customer and business/industry data bases for strategic planning has also surfaced; while banks are looking at Data warehousing, Data mining, Business Restructuring etc. as most essential things to have as early as possible, they are taking urgent steps to computerize the operations in their administrative and controlling offices (head/zonal/ regional offices) as well as the data collection machinery, so as to evolve an effective MIS. In this phase, the new communication revolution sweeping the nation and the world has come in extremely handy, as the communication infrastructure has improved significantly and the Internet technologies are available to network branches at a relatively low and affordable cost with a high degree of reliability. The present level of MIS covers, basically, information needed for control, performance monitoring, decision making etc. and encompasses most activities in administrative offices like processing of statutory returns under Reserve Bank of India Act, monthly/quarterly performance reports from branches, credit information, inter-branch transactions, personnel inventory, provident fund accounting, profit and loss accounts, cash and investment
management, stationery stock accounting, and branch keeping etc. “There are 48.5% branches already fully computerized, 28.9% branches under core banking solutions, 77.5% both fully computerized and under banking solution, 18.2% partially computerized branches and 4.3% non computerized branches as on March 31, 2006”[31]

2.5.2. E-Banking era in India

The Internet came to India in the year 1985 with the introduction of ERNET (Educational and Research Network) which was a project of the department of Electronics. Initially it linked only IITs, but slowly some research organizations and educational institutions were also included in the list. Later on, VSNL (Videsh Sanchar Nigam Ltd.) started providing Internet services to individuals. Realising that no Indian traffic, the Government of India permitted ISP (Internet Service Provider) business to private companies as well in the year 1998. While the world over, the Internet has already became a mass media and crossed the limit of 50 million users, the growth of Internet in India, even through impressive has not reached the expected level. In September 2000, there were 20,45,500 Internet connection in India. The Internet is a cyber space allotted to various fields like e-business, e-banking, e-learning, e-taxation etc. The E-Banking is changing the banking industry and is having the major effects on banking relationships. E-banking involves the use of electronic devices for delivery of banking products and services. The Internet banking is one of electronic media of providing services to their customers. It falls into four main categories, from level-1 minimum functionality sites that offer only access to deposit account data to level-4 sites, highly sophisticated offerings enabling integrated sales of additional products and access to other financial services such as investment and insurance.

In other words a successful e-banking solution offers the following e-banking products and services:

1. ATM (Automated Teller Machines)
2. Cards - Credit card/Debit cards/Smart card
3. Mobile banking
4. Phone banking
5. Internet/online banking
6. Electronic fund system (EFT)
7. Electronic clearing services (ECS)
8. Electronic data interchange (EDI)
9. D-mat account
10. Digital signature
11. Society for world wide interbank financial tele communication (SWIFT)
12 Corporate Banking Terminals
13. Core banking solutions (CBS)

The banking industry in India is facing unprecedented competition from non-traditional banking institutions, which now offering banking and financial services over the Internet. Indian banks are going for the retail banking in a big way. “Throughout the country, The Internet Banking is the nascent stage of development (only 50 banks are offering varied kind of Internet banking services). In general, these Internet sites offer only the most basic services. 55% are so called ‘entry level’ sites, offering little more than company information and basic marketing materials. Only 8% offer ‘advanced transactions’ such as online funds transfer, transactions & cash management services. Foreign & Private banks are much advanced in terms of the number of sites & their level of development”[32] E-Banking as a medium of delivery of banking services and as a strategic tool for business development, has gained wide acceptance international and is fast catching up in India with more and more banking entering the fray. India can be said to be on the threshold of major banking revolution with net banking having already been unveiled. In 2001, a Reserve Bank of India survey revealed that of “46 major banks operating in India, 11 banks in India are providing Internet banking services at different levels, 22 banks proposed to offer Internet banking in near future while the remaining 13 banks have no immediate plans to offer such facility.”[33] According to a Reserve Bank research report, while 2001, “the total Internet user in the country was estimated at 9 lakh. However, this is expected to grow exponentially to 90 lakh by 2003. Only about 1% of Internet users did banking online in 1998. This increased to 16.7 % in March 2000”[34]
The growth potential is, therefore, immense. Further incentives provided by banks would dissuade customers from visiting physical branches, and thus get ‘hooked’ to the convenience of arm-chair banking. The facility of accessing their accounts from anywhere in the world by using a home computer with Internet connection, is particularly fascinating to Non-Resident Indians and High Net worth Individuals having multiple bank account. Banks in India have been up-scaling the automation during the last 15 years, with varying degree of accomplishments. The thrust in the initial years on data processing, inter-branch reconciliation and management information system. Later, the effort has become customer-centric, with accent on provision of automated products and services to the customers in the form of cash dispensation machines, pass book printers, demand draft printers etc. “During the transition phase, there was pruning of staff in the form of a voluntary retirement scheme of the year 2000, wherein, over a lakh of employees in the public sector banks, predominantly in the age group of 45 to 54 have been retired, due to their in adeptness to an automated environment”[35]. The phase in the last five years may be termed as one devoted to the provision of alternate channels like ATMs, Internet banking, tele-banking, mobile banking, anywhere and any time banking. Young urban professionals and employees besides high net worth individual have been using these channels at a satisfactory pace. The era of convenience banking arrived. But many banks are not successful in providing e-banking services to customers. New generation private banks like ICICI Bank and HDFC banks could claim 100% net banking. Public sector banks with huge population of branches have a long way to go. Banks also have been joining hands in sharing ATMs and co-branding credit cards. “State Bank claims having completed computerization of over 9,000 branches, 6,000 of them in the last one year. Number of ATMs has been doubled to 4,000, all inter connected. Punjab National Bank, with a network of over 4,000 branches, a late starter in the computerization race, now claims that 97% of the branches have been computerized”[36] As per the survey report of the Internet & Mobile Association of India (IAMAI), “There are 38.5 million Internet users in India and the number is set to grow to 100 million by 2007-08. As estimated 4.6 (Estimate is based on information from limited banking sources and is not a
complete representation) million Indian users are Banking online today and the efforts of the government and the industry the number is expected to grow to 16+ million by 2007-08 including both Internet and Mobile banking. Most banks have Web Sites, but only a few offer Online Banking services, it includes checking statements details, paying bills, transferring funds, ordering checks, setting up direct deposit authorizations, making stop payments etc. It also includes Interactive services such as applying for credit or debit cards, mortgages, and auto and personal loans etc.

“Cross Tab Marketing Services, a pioneer in the field of online research, conducted the survey on behalf of IAMAI. The study was conducted online in December 2005. It was undertaken with a view to understand the Internet user who banked online or e-banking. The Survey was on Internet user in top 8 Cities in India. As per the survey report it is found that in year 2005-06 in Mumbai 22.5 % are internet users, 17.3 % in New Delhi, 7.01% in Chennai, 5.07% in Bangalore, 4.01% in Calcutta, 3.03% in pune and very few i.e. 1.6 % internet user are in Kanpur, Lucknow and Ahmadabad.”

Another survey was on E-banking services in top 8 cities (Outside of top 10) by %:

“The Survey was conducted in 8 other cities of India and the result was in Patna 1.1%, Jaipur 1.0%, in Cochin and Indore 0.8% , in Guwhati and Bhopal 0.7% , Vadodhara 0.6 , Chandigarh 0.5% and in other cities 26.3% users are accessing e-banking services. And as per the Online banking services by days are, in weekends 16%, weekdays 39% and all days 45% user are accessing e-banking services in India.”

A Study conducted by the National Association of Software and Services companies (Nasscom) indicates that “Internet banking transaction cost is only 12 per cent of the cost of traditional transaction at the branch. The customer enjoys the benefits of reduced costs, convenience and better cash management”. The ICICI bank and HDFC bank have taken a lead in introducing E-banking for a limited range of services 1996. ICICI is also getting into e-trading and fund transfer between in branches, thus offering a broader range of integrated services to the
customer. After ICICI, Citibank, IndusInd Bank and HDFC Bank were the early once to adopt the technology in 1999. The Adoption rates of Internet banking are:

<table>
<thead>
<tr>
<th>Banks</th>
<th>No. of banks</th>
<th>No. of banks with websites</th>
<th>No. of banks with transactional sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public sector banks</td>
<td>27</td>
<td>27</td>
<td>13 (48.1%)</td>
</tr>
<tr>
<td>Private sector banks</td>
<td>29</td>
<td>27</td>
<td>13 (44.8%)</td>
</tr>
<tr>
<td>New</td>
<td>08</td>
<td>08</td>
<td>8(100%)</td>
</tr>
<tr>
<td>Old</td>
<td>21</td>
<td>19</td>
<td>5(23.8%)</td>
</tr>
<tr>
<td>All Banks</td>
<td>56</td>
<td>54</td>
<td>26(46.4%)</td>
</tr>
</tbody>
</table>

(Table-2  Adoption Rates of Internet Banking as on August end 2003)
(Source: www.banknetindia.com.)

However, public sector banks lagged behind in adoption of the e-banking technology presently in few public banks like SBI, Corporation Bank, Syndicate Bank, Bank of India, Punjab national bank, Canara bank etc are providing the e-banking in its true sense. HFDC bank is the first bank in India to introduce mobile banking services. The services started for January 2000 using Short Message Services (SMS) system. Thereafter, the bank also became the first Indian bank to launch entire range of mobile banking and mobile commerce services using Wireless Application Protocol (WAP) technology. This services offered by HDFC banks over SMS and WAP includes accounts information, balance inquiry, cheque status inquiry, inquiry on fixed deposits etc. The ICICI bank has also launched mobile banking services in March, 2000. Oct.18, 2006 in an International seminar in Hyderabad, Mr. N. R. Narayan Murthy, Chief mentor of Infosys, said about the widening the reach of electronic payment system to rural areas in India. He is a former member of the central board of RBI. “According to RBI, there are about 48,000 public sector bank branches in India of which over 63 per cent are in semi-urban and rural areas. Though over 70 per cent of the branches have attained 100 per cent computerization, real time gross settlement is available only in 23,500 branches while national electronic funds transfer covers less than 5000 branches. The estimates of electronic payment systems, there could be annual savings of about $6.3 billion in India. Among the retail payment system, electronic clearing accounted for less than 1.5 per cent of the total value of transactions in 2004-05. The non-magnetic ink character recognition cheques and rolling out of the cheque truncation system, which basically replaces the paper-based cheques.
clearing process with imaging technology. RBI intends to eliminate non-MICR cheques- which accounted for over 25 per cent of the cheques transacted in 2004-05. By March 2007 while the CTS technology is slated to commence as a pilot by the end of this year”[41].

It is found that, at present maximum number of banks in private as well as public (nationalized) banks offer the electronic banking services i.e. ATM, Debit and Credit Cards, Mobile banking, Phone banking, payments through electronic media, and Internet banking to their customers. But as per the Indian scenario the usability of e-banking as compared to banks in abroad is very poor. To reach e-banking services to a critical mass, there has to be need for sufficient number of users and the sufficient infrastructure in banking place.
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