Chapter 1: Conceptual Framework

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1. Introduction to Banking

NECESSITY IS THE MOTHER OF INVENTION

This phrase indicates the importance of any research and the birth of any invention! In our day today life we face so many problems any to solve that problem we find the solution and all that solutions are the new inventions! When walking became troublesome we found wheel. When people become tired they invented replacement of hands and that is machine. For example submersible motors replace hand pumps. Cart, cars, trucks, scooters etc are the replacement of legs or leg duty! Then the invention of water steamer and airplanes makes world very small. The problem of communication has been solved by the invention of telephone! And when brain finds need and necessity to solve mental problem the great gift from our super brain for the brain is Computer! In the history of world there are so many revolutions. Industrial revolution is because of the invention of WHEEL and COMMUNICATION. This invention has changed the scenario of business. And the last but not least, the invention of INTERNET totally rubbed the boundaries between the countries! What a drastic change!

The world become small village and global village dream comes true after the invention of computer and internet. Computer and Internet made huge impact on the way trade and business was carried on. Thousands of manual hours are saved and most complicated tasks are completed with accuracy in few minutes. This is nothing less than a miracle for business, and it showed impact on the growth of trade and business. The invention of computer and Internet has proved a blessing for the mankind by the impact it made on business.
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The invention of internet influenced banking sector also. Internet totally changed the face, figure and the personality of the bank! Internet has challenged the physical identity of Banks. Banking has broken the shackles of time and place, as internet has made banking possible 24hours in every corner of world! Banks are now not big or small by building and banks are now not the meter of few and fix hours of services. The world is changing at a staggering rate and technology is considered to be the key driver for these changes around us. An analysis of technology and its uses shows that it has permeated in almost every aspect of our life. Many activities are handled electronically due to the acceptance of information technology at home as well as at work place. Slowly but steadily, the Indian customer is moving towards the internet banking. Internet Banking transactions are slowly taking over the Physical Banking Transaction happening at the counters. Customer always looks for simplicity and ease in any service he wants to avail and the banking sector is matching its steps to the march of technology to make financial life easy for its customers. E-banking or Online banking is a generic term for the delivery of banking services and products through the electronic channels such as the telephone, the internet, the cell phone etc. The concept and scope of e-banking is still evolving. It facilitates an effective payment and accounting system thereby enhancing the speed of delivery of banking services considerably. Several initiatives have been taken by the Government of India as well as the RBI (Reserve Bank of India); have facilitated the development of e-banking in India. The government of India enacted the IT Act, 2000, which provides legal recognition to electronic transactions and other means of electronic commerce. The RBI has been preparing to upgrade itself as regulator and supervisor of the technologically dominated financial system. It issued guidelines on the
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risks and controls in computer and telecommunication systems to all banks, advising them to evaluate the risks inherent in the systems and put in place adequate control mechanisms to address these risks.

The biggest invention is the invention of internet. The invention of internet changes the personality of bank and banking. It gives the modern touch to the banking services and it carries number of other possibility of modern banking with it.

2. Internet – its basic structure and technology

1 Internet is a vast network of individual computers and computer networks connected to and communicate with each other using the same communication protocol – TCP/IP (Transmission Control Protocol / Internet Protocol). When two or more computers are connected a network is created; connecting two or more networks create ‘inter-network’ or Internet. The Internet, as commonly understood, is the largest example of such a system. Internet is often and aptly described as ‘Information Superhighway’, a means to reach innumerable potential destinations. The destination can be any one of the connected networks and host computers.

2 Internet has evolved to its present state out of a US Department of Defense project ARPA Net (Advanced Research Project Administration Network), developed in the late 1960s and early 1970s as an experiment in wide area networking. A major perceived advantage of ARPA Net was that the network would continue to operate even if a segment of it is lost or destroyed since its operation did not depend on operation of any single computer. Though originally designed as a defence network, over the years it was used
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predominantly in areas of scientific research and communication. By the 1980s, it moved out of Pentagon’s control and more independent networks from US and outside got connected to it. In 1986, the US National Science Foundation (NSF) established a national network based on ARPA protocol using commercial telephone lines for connectivity. The NSF Net was accessible by a much larger scientific community, commercial networks and general users and the number of host computers grew rapidly. Eventually, NSF Net became the framework of today’s Internet. ARPA Net was officially decommissioned in 1990.

3 It has become possible for innumerable computers operating on different platforms to communicate with each other over Internet because they adopt the same communication protocol, via, TCP/IP. The latter, which stands for ‘Transmission Control Protocol / Internet Protocol’, is a set of rules which define how computers communicate with each other. In order to access Internet one must have an account in a host computer, set up by any one of the ISPs (Internet Service Providers). The accounts can be SLIP (Serial Line Internet Protocol) or PPP (Point to Point Protocol) account. These accounts allow creating temporary TCP/IP sessions with the host, thereby allowing the computer to join the Internet and directly establish communication with any other computer in the Internet. Through this type of connection, the client computer does not merely act as a remote terminal of the host, but can run whatever programs are available on the web. It can also run several programs simultaneously, subject to limitations of speed and memory of the client computer and modem. TCP/IP protocol uses a unique addressing scheme through which each computer on the network is identified.
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4 TCP / IP protocol is insecure because data packets flowing through TCP / IP networks are not normally encrypted. Thus, any one who interrupts communication between two machines will have a clear view of the data, passwords and the like. This has been addressed through Secured Socket Layer (SSL), a Transport Layer Security (TLS) system which involves an encrypted session between the client browser and the web server.

5 FTP or File Transfer Protocol is a mechanism for transferring files between computers on the Internet. It is possible to transfer a file to and from a computer (ftp site) without having an account in that machine. Any organization intending to make available to public its documents would normally set up a ftp site from which any one can access the documents for download. Certain ftp sites are available to validated users with an account ID and password.

6 E-mail: The most common and basic use of Internet is the exchange of e-mail (electronic mail). It is an extremely powerful and revolutionary result of Internet, which has facilitated almost instantaneous communication with people in any part of the globe. With enhancements like attachment of documents, audio, video and voice mail, this segment of Internet is fast expanding as the most used communication medium for the whole world. Many websites offer e-mail as a free facility to individuals. Many corporate have interfaced their private networks with Internet in order to make their e-mail accessible from outside their corporate network.

7 World Wide Web (WWW) Internet encompasses any electronic communication between computers using TCP/IP protocol, such as e-mail, file transfers etc. WWW is a segment of Internet, which uses
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Hyper Text Markup Language (HTML) to link together files containing text, rich text, sound, graphics, video etc. and offers a very convenient means of navigating through the net. It uses hypertext transfer protocol (HTTP) for communication between computers. Web documents are referred to as pages, can contain links to other related documents and so on, in a tree like structure. The person browsing one document can access any other linked page. The web documents and the web browsers which are the application programs to access them are designed to be platform independent. Thus any web document can be accessed irrespective of the platform of the computer accessing the document and that of the host computer. The programming capabilities and platform independence of Java and Java applets have further enriched the web. The ‘point and click’ method of browsing is extremely simple for any lay user of the net. In fact, the introduction of web since early 1990 has made Internet an extremely popular medium and its use in business has been enhanced dramatically.

8 Wireless Application Protocol (WAP): WAP is the latest industry standard which provides wireless access to Internet through handheld devices like a cellular telephone. This is an open standard promoted by WAP forum and has been adopted by world’s all major handset manufacturers. WAP is supplemented by Wireless Application Environment (WAE), which provides industry wise standard for developing applications and services for wireless communication networks. This is based on WWW technology and provides for application for small screens, with interactive capabilities and adequate security. Wireless Transaction Protocol (WTP), which is the equivalent of TCP, sets the communication rules and Wireless Transport Layer Security (WTLS) provides the required security by
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encrypting all the session data. WAP is set to revolutionize the commercial use of net.

9 Securities: One of the biggest attractions of Internet as an electronic medium is its openness and freedom. It is a public domain and there is no restriction on who can use it as long as one adheres to its technical parameters. This has also given rise to concerns over the security of data and information transfer and privacy. These concerns are common to any network including closed user group networks. But over the Internet, the dimensions of risk are larger while the control measures are relatively fewer. These issues are discussed in detail in Chapter–5 and Chapter–6 of the report. It will be sufficient to say here that the key components of such concern are, (i) authentication, viz., assurance of identity of the person in a deal, (ii) authorization, viz., a party doing a transaction is authorized to do so, (iii) the privacy or confidentiality of data, information relating to any deal, (iv) data integrity, viz., assurance that the data has not been altered and (v) non repudiation, viz., a party to the deal can not deny that it originated the communication or data.

3. Definitions of Banking:

“Banking means the accepting, for the purpose of lending or investment of deposits of money from the public, repayable on demand or otherwise and withdrawal by cheque, draft, order or otherwise.”

-The Banking Regulation Act, 1949, Section5 (b)

“Bank is a manufacturer of credit and machine for facilitating exchange”

-Horace White
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“The business of banking may be defined as dealing in money and instrument of credit. “

-Kenneth Makenie

“A Bank is an establishment which makes to individuals such advances of money or other means of payment as may be required and safely mode and to which individual entrust money or means of payment when not required by them for use.”

-Prof. Kintey

“By Banking in the most general sense is meant the business of receiving conserving and utilizing the funds of the community or of any special section of it.”

-Willis and Beogn

“A Bank is a financial intermediary in loans and debt”

-Cairneross

E-banking is defined as the automated delivery of new and traditional banking products and services directly to customers through electronic, interactive communication channels. E-banking includes the systems that enable financial institution customers, individuals or businesses, to access accounts, transact business, or obtain information on financial products and services through a public or private network, including the Internet. Customers access e-banking services using an intelligent electronic device, such as a personal computer (PC), personal digital assistant (PDA), automated teller machine (ATM), kiosk, or Touch Tone telephone. While the risks and controls are similar for the various e-banking access channels, this booklet focuses specifically on Internet-
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based services due to the Internet's widely accessible public network. Accordingly, this booklet begins with a discussion of the two primary types of Internet websites: informational and transactional.

4. Bank, Banking and its history

The word bank was borrowed in Middle English from Middle French banquet, from Old Italian banca, from Old High German banc, bank "bench, counter". Benches were used as desks or exchange counters during the Renaissance by Florentine bankers, who used to make their transactions atop desks covered by green tablecloths.

One of the oldest items found showing money-changing activity is a silver Greek drachm coin from ancient Hellenic colony Trapezus on the Black Sea, modern Trabzon, c.350–325 BC, presented in the British Museum in London. The coin shows a banker's table (trapeze) laden with coins, a pun on the name of the city. In fact, even today in Modern Greek the word Trapeza (Τράπεζα) means both a table and a bank.

Another possible origin of the word is from the Sanskrit words (ब्यय) 'byaya' (expense) and 'onka' (calculation) = byaya-onka. This word still survives in Bangla, which is one of Sanskrit's child languages. ব্যায় + অঙ্ক = ব্যাঙ্ক. Such expense calculations were the biggest part of mathematical treatises written by Indian mathematicians as early as 500 B.C.

The word “Bank” is originally derived from German word “Bank” meaning a joint stock fund which was Italianized into “Banco” when the German’s were masters of a great part of Italy. This appears to be more possible.
Banking activities were sufficiently important in Babylonia in the second millennium B.C. that written standards of practice were considered necessary. These standards were part of the Code of Hammurabi – the earliest known formal laws. Deposits were not of money but of cattle, grain or other crops and eventually precious metals. Nevertheless, some of the basic concepts underlying today’s banking system were present in these ancient arrangements. A wide range of deposits was accepted, loans were made, and borrowers paid interest to lenders.

Similar banking type arrangements could also be found in ancient Egypt. These arrangements stemmed from the requirement that grain harvests be stored in centralized state warehouses. Depositors could use written orders for the withdrawal of a certain quantity of grain as a means of payment. This system worked so well that it continued to exist even after private banks dealing in coinage and precious metals were established.

Modern-day banking can be traced to practices in the Medieval Italian cities of Florence, Venice, and Genoa. The Italian bankers made loans to princes, both to finance wars and their lavish lifestyles, and to merchants engaged in international trade. The Bardi and Peruzzi families were dominant in Florence in the 14th century and established branches in other parts of Europe to facilitate their trading activities.

Much of the international business of the medieval banks was carried out through the use of bills of exchange. At the simplest level, this involved a creditor providing local currency to the debtor in return for a bill stating that a certain amount of another currency was payable at a future date – often at the next big international fair. Because of the church prohibition on directly charging interest, the connection between banking and trade was essential. The bankers would take deposits in one city, make a loan
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to someone transporting goods to another city, and then take repayment at
the destination. The repayment was usually in a different currency, so it
could easily incorporate what is essentially an interest payment,
circumventing the church prohibitions. For example, a Florentine bank
would lend 1000 florins in Florence requiring repayment of 40,000 pence
in three months in the bank’s London office. In London, the bank would
then loan out the 40,000 pence to be repaid in Florence at a rate of 36
pence per florin in three months. In six months, the bank makes 11.1
percent – that’s an annual rate of 23.4 percent. It is also interesting to note
that a double-entry bookkeeping system was used by these medieval
bankers and that payments could be executed purely by book transfer. 9

Banking in the modern sense of the word can be traced to medieval and
early Renaissance Italy, to the rich cities in the north like Florence,
Lucca, Siena, Venice and Genoa. The Bardi and Peruzzi families
dominated banking in 14th century Florence, establishing branches in
many other parts of Europe. One of the most famous Italian banks was
the Medici Bank, set up by Giovanni di Bicci de’ Medici in 1397. The
earliest known state deposit bank, Banco di San Giorgio (Bank of St.
George), was founded in 1407 at Genoa, Italy.

Bank is a financial institution and a financial intermediary that accepts
deposits and channels those deposits into lending activities, either directly
by loaning or indirectly through capital markets. A bank is the connection
between customers that have capital deficits and customers with capital
surpluses. Due to their influence within a financial system and an
economy, banks are generally highly regulated in most countries. Most
banks operate under a system known as fractional reserve banking where
they hold only a small reserve of the funds deposited and lend out the rest
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for profit. They are generally subject to minimum capital requirements which are based on an international set of capital standards, known as the Basel Accords. The oldest bank still in existence is Monte dei Paschi di Siena, headquartered in Siena, Italy, which has been operating continuously since 1472. It is followed by Berenberg bank of Hamburg (1590) and Sveriges Riksbank of Sweden (1668). Banking in its modern sense evolved in rich cities of Renaissance Italy, such as Florence, Venice and Genoa. In the history of banking, a number of banking dynasties—among them notably Medici, Fugger, Welser, Berenberg, Baring and Rothschild—have played a central role over many centuries.

During the 17th and 18th centuries the Dutch and British improved upon Italian banking techniques. A key development often credited to the London goldsmiths around this time was the adoption of fractional reserve banking. ⁹

By the middle of the 17th century, the civil war had resulted in the demise of the goldsmiths’ traditional business of making objects of gold and silver. Forced to find a way to make a living, and having the means to safely store precious metal, they turned to accepting deposits of precious metals for safekeeping. The goldsmith would then issue a receipt for the deposit. At first, these receipts circulated as a form of money. But eventually, the goldsmiths realized that since not all of the depositors would demand their gold and silver simultaneously, they could issue more receipts than they had metal in their vault.

Banks became an integral part of the US economy from the beginning of the Republic. Five years after the Declaration of Independence, the first chartered bank was established in Philadelphia in 1781. ¹⁰
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At first, bank charters could only be obtained through an act of legislation. But, in 1838, New York adopted the Free Banking Act, which allowed anyone to engage in banking business as long as they met certain legal specifications. As free banking quickly spread to other states, problems associated with the system soon became apparent. For example, banks incorporated under these state laws had the right to issue their own bank notes. This led to a multiplicity of notes – many of which proved to be worthless in the all too common event of a bank failure.

The collapse of the Ohio Life Insurance and Trust Company and a bank panic in the fall of 1857 led to an economic crisis. More than 5,000 businesses failed during the first year of the panic.

The collapse of Jay Cooke and Co., the largest bank in the U.S. at that time, in September 1873 triggered a panic on the stock exchange. Cooke’s bank was the exclusive agent for the sale of Northern Pacific Railroad bonds. When the firm could not sell a sufficient number of railroad bonds to investors to cover its obligations, the stock market reacted negatively, and runs on several other large financial institutions led to their failure. The Coinage Act of 1873 depressed the price of silver, hurting the interests of U.S. silver mines and further contributing to the country’s economic problems. This economic crisis led to a recession that lasted until 1879.

Some important dates and events making significant impact on the history of banking:

1837: Michigan and New York pass the first free banking laws
1846: The Independent Treasury System is established.
1863: Congress passes the National Banking Act in USA
1865: The Civil War ends and the nation has a dual banking
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System.

1873: The collapse of a large bank leads to a recession; the country undergoes repeated financial crises through the rest of the century.

1908: Congress sets up the National Monetary Commission to look into the country’s financial system.


5. Indian Banking History

Banking roots in India are found from 1786. From 1786 to this date, we can discuss the history of Indian Banking in some phases:

Phase 1: Early phase of Indian banks, from 1786 to 1969

The first bank in India, the General Bank of India, was set up in 1786. Bank of Hindustan and Bengal Bank followed. The East India Company established Bank of Bengal (1809), Bank of Bombay (1840), and Bank of Madras (1843) as independent units and called them Presidency banks. These three banks were amalgamated in 1920 and the Imperial Bank of India, a bank of private shareholders, mostly Europeans, was established. Allahabad Bank was established, exclusively by Indians, in 1865. Punjab National Bank was set up in 1894 with headquarters in Lahore. Between 1906 and 1913, Bank of India, Central Bank of India, Bank of Baroda, Canara Bank, Indian Bank, and Bank of Mysore were set up. The Reserve Bank of India came in 1935.
During the first phase, the growth was very slow and banks also experienced periodic failures between 1913 and 1948. There were approximately 1,100 banks, mostly small. To streamline the functioning and activities of commercial banks, the Government of India came up with the Banking Companies Act, 1949, which was later changed to the Banking Regulation Act, 1949 as per amending Act of 1965 (Act No. 23 of 1965). The Reserve Bank of India (RBI) was vested with extensive powers for the supervision of banking in India as the Central banking authority.

**Phase 2: Nationalization of banks and the banking sector**

**Reforms, from 1969 to 1991**

The government took major initiatives in banking sector reforms after Independence. In 1955, it nationalized the Imperial Bank of India and started offering extensive banking facilities, especially in rural and semi-urban areas. The government constituted the State Bank of India to act as the principal agent of the RBI and to handle banking transactions of the Union government and state governments all over the country. Seven banks owned by the Princely states were nationalized in 1959 and they became subsidiaries of the State Bank of India. In 1969, 14 commercial banks in the country were nationalized. In the second phase of banking sector reforms, seven more banks were nationalized in 1980. With this, 80 percent of the banking sector in India came under the government ownership.
Phase 3: New phase of Indian banking system, with the Reforms after 1991

This phase has introduced many more products and facilities in the banking sector as part of the reforms process. In 1991, under the chairmanship of M Narasimham, a committee was set up, which worked for the liberalization of banking practices. Now, the country is flooded with foreign banks and their ATM stations. Efforts are being put to give a satisfactory service to customers. Phone banking and net banking are introduced. The entire system became more convenient and swift. Time is given importance in all money transactions.

Nationalization Process

- 1955: Nationalization of State Bank of India
- 1959: Nationalization of SBI subsidiaries
- 1969: Nationalization of 14 major banks
- 1980: Nationalization of seven banks with deposits over Rs 200

Banks in India

In India, banks are segregated in different groups. Each group has its own benefits and limitations in operations. Each has its own dedicated target market. A few of them work in the rural sector only while others in both rural as well as urban. Many banks are catering in cities only. Some banks are of Indian origin and some are foreign players.

Banks in India can be classified into:

- Public Sector Banks
- Private Sector Banks
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- Cooperative Banks
- Regional Rural Banks
- Foreign Banks

One aspect to be noted is the increasing number of foreign banks in India. The RBI has shown certain interest to involve more foreign banks. This step has paved the way for a few more foreign banks to start business in India. Reserve Bank of India (RBI) The central bank of the country is the Reserve Bank of India (RBI). It was established in April 1935 with a share capital of Rs 5 crore on the basis of the recommendations of the Hilton Young Commission. The share capital was divided into fully paid shares of Rs 100 each, which was entirely owned by private shareholders in the beginning. The government held shares of nominal value of Rs 220,000. The RBI commenced operation on April 1, 1935, under the Reserve Bank of India Act, 1934. The Act (II of 1934) provides the statutory basis of the functioning of the Bank. The Bank was constituted to meet the following requirements:

- Regulate the issue of currency notes
- Maintain reserves with a view to securing monetary stability
- Operate the credit and currency system of the country to its advantage

6. History and Evolution of E-Banking

Internet banking has actually been around longer than most people think. It was introduced in the 1980's, but it really did not become popular until the mid 1990's.

The term online became popular in the late '80s and refers to the use of a terminal, keyboard and TV (or monitor) to access the banking system using a phone line. ‘Home banking’ can also refer to the use of a numeric keypad to send tones down a phone line with instructions to the bank.
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Online services started in New York in 1981 when four of the city’s major banks (Citibank, Chase Manhattan, Chemical and Manufacturers Hanover) offered home banking services. Services never became popular except in France where the use of videotex (Minitel) was subsidised by the telecom provider and the UK, where the Prestel system was used.

The UK’s first home online banking services were set up by the Nottingham Building Society (NBS) in 1983 ("History of the Nottingham" Retrieved on 2007-12-14.). The system used was based on the UK’s Prestel system and used a computer, such as thebe Micro, or keyboard (Tan data Td1400) connected to the telephone system and television set. The system (known as 'Home link') allowed on-line viewing of statements, bank transfers and bill payments. In order to make bank transfers and bill payments, a written instruction giving details of the intended recipient had to be sent to the NBS who set the details up on the Home link system. Typical recipients were gas, electricity and telephone companies and accounts with other banks. Details of payments to be made were input into the NBS system by the account holder via

There have been significant developments in the e-financial services sector in the past 30 years. According to Devlin (1995), until the early 1970s functional demarcation was predominant with many regulatory restrictions imposed. One main consequence of this was limited competition both domestically and internationally. As a result there was heavy reliance on traditional branch based delivery of financial services and little pressure for change. This changed gradually with deregulation of the industry during 1980s and 1990s, whilst during this time, the increasingly important role of information and communication technologies brought stiffer competition and pressure for a faster pace of change.
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The Internet is a relatively new channel for delivering banking services. Its early form ‘online banking services’, requiring a PC, modem and software provided by the financial services vendors, were first introduced in the early 1980s. However, it failed to get widespread acceptance and most initiatives of this kind were discontinued. With the rapid growth of other types of electronic services since mid 1990s, banks renewed their interest in electronic modes of delivery using the Internet. The bursting of the Internet bubble in early 2001 caused speculation that the opportunities for Internet services firms had vanished. The “dot.com” companies and Internet players struggled for survival during that time but e-commerce recovered from that shock quickly and most of its branches including e-banking have been steadily, and in some cases dramatically, growing in most parts of the world. One survey conducted by the Tech Web News in 2005 (Tech Web News, 2005) found e-banking to be the fastest growing commercial activity on the Internet. In its survey of Internet users, it found that 13 million Americans carry out some banking activity online on a typical day, a 58 percent jump from late 2002.

The spread of online banking has coincided with the spread of high-speed broadband connections and the increasing maturation of the Internet user population. Another factor in e-banking growth is that banks have discovered the benefits of e-banking and have become keener to offer it as an option to customers.

The fast advancing global information infrastructure (including information technology and computer networks such as the Internet and telecommunications systems) enable the development of electronic commerce at a global level. The nearly universal connectivity which the Internet offers has made it an invaluable business tool. These developments have created a new type of economy, which many call the
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‘digital economy’. This fast emerging economy is bringing with it rapidly changing technologies, increasing knowledge intensity in all areas of business, and creating virtual supply chains and new forms of businesses and service delivery channels such as e-banking.

As a direct consequence of the emergence of the ‘digital economy’, the balance of power seems to be shifting to the customers. Customers are increasingly demanding more value, with goods customized to their exact needs, at less cost, and as quickly as possible. To meet these demands, businesses need to develop innovative ways of creating value which often require different enterprise architectures, different IT infrastructures and different way of thinking about doing business. This transformation of business from an old company to a new agile electronic corporation is not easy and requires a lot of innovative thinking, planning and investment.

7. Internet Banking in India

In this internet age, internet banking is the most preferred choice of banking for majority of customers. Be this customer be an individual or a body corporate. The financial products and services have become available over the Internet, which has thus become an important distribution channel for a number of banks. Banks boost technology investment spending strongly to address revenue, cost and competitiveness concerns. 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. Until the advent of ATMs, people
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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. In the study by IAMAI, it was 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%).

The Reserve Bank of India constituted a working group on Internet Banking. The group divided the internet banking products in India into 3 types based on the levels of access granted. They are:

• **Information Only System:**
  General purpose information like interest rates, branch location, bank products and their features, loan and deposit calculations are provided in the banks website. There exist facilities for downloading various types of application forms. The communication is normally done through e-mail. There is no interaction between the customer and bank’s application system. No identification of the customer is done. In this system, here is no possibility of any unauthorized person getting into production systems of the bank through internet.

• **Electronic Information Transfer System:**
  The system provides customer-specific information in the form of account balances, transaction details, and statement of accounts. The information is still largely of the 'read only' format. Identification and
authentication of the customer is through password. The information is fetched from the bank's application system either in batch mode or offline. The application systems cannot directly access through the internet.

• **Fully Electronic Transactional System:**
This system allows bi-directional capabilities. Transactions can be submitted by the customer for online update. This system requires high degree of security and control. In this environment, web server and application systems are linked over secure infrastructure. It comprises technology covering computerization, networking and security, inter-bank payment gateway and legal infrastructure.

The six primary drivers of Internet banking is very well defined by Dr. Mishra (Mishra, 2002), in order of primacy are:
- Improve customer access
- Facilitate the offering of more services
- Increase customer loyalty
- Attract new customers
- Provide services offered by competitors
- Reduce customer attrition

As of 2013, India has the third largest number of Internet users. It is next to the United States and China in terms of sheer number of users. While there is no concrete data available, India is expected to have in excess of 125 million users by 2013 end.

Due to large population of India, there are a significant number of users of Internet in India, which shows the possibilities of Internet Banking in India. Although percentage wise the number is too low compared to developed countries of the world. This table speaks all about that:
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Table 1.1
Internet Penetration in
Selected Countries of the world 4

<table>
<thead>
<tr>
<th>Countries</th>
<th>Internet Penetration in %</th>
<th>Active users (in Millions) 2013 (Estimate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>40</td>
<td>511</td>
</tr>
<tr>
<td>United States</td>
<td>78</td>
<td>240</td>
</tr>
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<td>India</td>
<td>11</td>
<td>120</td>
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<td>89</td>
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<tr>
<td>Russia</td>
<td>50</td>
<td>70</td>
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<tr>
<td>Germany</td>
<td>84</td>
<td>67</td>
</tr>
<tr>
<td>France</td>
<td>80</td>
<td>52</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>84</td>
<td>51</td>
</tr>
</tbody>
</table>

E- Banking play a pivotal role in E-Commerce but it has tremendous challenges as well as noted by Saleh M. Nsouli and Andrea Schaechter (Nsouli and Schaechter, 2002) 5 in their article Challenges of the "E-Banking Revolution" of Finance and Development (September 2002, Volume 39, Number 3)

If we talk about financial inclusion in India, then as per RBI Bulletin published in February 2013, there are about 95,000 bank branches, about equal number of ATMs across the country and 278 million debit cards. Yet a large proportion of our population remains financially excluded. Data indicates that only about 40 percent of the adult population in the country has a bank account; only 25,000 plus villages have a bank branch out of the 600,000 villages in the country. Only 13 percent of the people have a debit card and only two percent have a credit card.
Table – 1.2

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of branches (per 0.1 million adults)</th>
<th>Number of ATMs (per 0.1 million adults)</th>
<th>Bank loan as per cent of GDP</th>
<th>Bank deposits as per cent of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>10.64</td>
<td>8.90</td>
<td>51.75</td>
<td>68.43</td>
</tr>
<tr>
<td>Australia</td>
<td>29.61</td>
<td>166.92</td>
<td>128.75</td>
<td>107.10</td>
</tr>
<tr>
<td>Brazil</td>
<td>46.15</td>
<td>119.63</td>
<td>40.28</td>
<td>53.26</td>
</tr>
<tr>
<td>France</td>
<td>41.58</td>
<td>109.80</td>
<td>42.85</td>
<td>34.77</td>
</tr>
<tr>
<td>Mexico</td>
<td>14.86</td>
<td>45.77</td>
<td>18.81</td>
<td>22.65</td>
</tr>
<tr>
<td>U.S.</td>
<td>35.43</td>
<td>-</td>
<td>46.83</td>
<td>57.78</td>
</tr>
<tr>
<td>Korea</td>
<td>18.80</td>
<td>-</td>
<td>90.65</td>
<td>80.82</td>
</tr>
<tr>
<td>Philippines</td>
<td>8.07</td>
<td>17.70</td>
<td>21.39</td>
<td>41.93</td>
</tr>
</tbody>
</table>

(Source: Report on Trend & Progress of Banking in India, Reserve Bank of India 2011-12)

8. Concept of Innovative Banking

CHART – 1.1

- E-Commerce
- E-finance
- E-money
- E-banking
  - ATM
  - Smart Card
  - Tele-Banking
  - EFT EBP
  - Internet Banking
  - Mobile Banking
Chapter 1: Conceptual Framework

1) **E-Commerce**: E-commerce refer to conduct through electronic network, divided into Two parts E-finance and E-money.

2) **E-Finance**: E-finance is providing financial services through electronic channels.

3) **E-Money**: E-money means store value or prepaid payment mechanism.

4) **E-banking**: E-Banking which providing banking products and services through Electronic delivery channels.

5) **Other Financial Services**: Other financial services includes insurance, online brokering And other E-commerce related services.

Implies a service that allows customers to use some form of computer to access account Specific information and possibly conduct transactions from a remote location. (Such as at home or at the workplace)

Electronic banking is a generic term encompassing internet banking, telephone banking, mobile banking tec. I ref. (E-banking in India challenges and opportunities edited by R.K. Uppal and Rimpi Jatana) In other words; it is a process of delivery of banking services and products through electronic channels such as telephone, internet, cell phone etc. The concept and scope of E-banking is still evolving.

The world is changing at a staggering rate and technology is considered to be the key driver for these changes around us. An analysis of technology and its uses show that it has permeated in almost every aspect of our life. Many activities are handled electronically due to the
acceptance of information technology at home as well as at workplace. Slowly but steadily, the Indian customer is moving towards the internet banking. The ATM and the Net transactions are becoming popular. But the customer is clear on one thing that he wants net-banking to be simple and the banking sector is matching its steps to the march of technology. E-banking or Online banking is a generic term for the delivery of banking services and products through the electronic channels such as the telephone, the internet, the cell phone etc. The concept and scope of e-banking is still evolving. It facilitates an effective payment and accounting system thereby enhancing the speed of delivery of banking services considerably. Several initiatives have been taken by the Government of India as well as the RBI(Reserve Bank of India); have facilitated the development of e-banking in India. The government of India enacted the IT Act, 2000, which provides legal recognition to electronic transactions and other means of electronic commerce. The RBI has been preparing to upgrade itself as regulator and supervisor of the technologically dominated financial system. It issued guidelines on the risks and controls in computer and telecommunication systems to all banks, advising them to evaluate the risks inherent in the systems and put in place adequate control mechanisms to address these risks.

Internet banking (or E-banking) means any user with a personal computer and a browser can get connected to his banks website to perform any of the virtual banking functions. In internet banking system the bank has a centralized database that is web-enabled. All the services that the bank has permitted on the internet are displayed in menu. Once the branch offices of bank are interconnected through terrestrial or satellite links, there would be no physical identity for any branch. It would be a borderless entity permitting anytime, anywhere and anyhow banking.
Chapter 1: Conceptual Framework

The network which connects the various locations and gives connectivity to the central office within the organization is called intranet. These networks are limited to organizations for which they are set up. SWIFT is a live example of intranet application.

E-banking provides enormous benefits to consumers in terms of ease and cost of transactions, either through Internet, telephone or other electronic delivery. Electronic finance (E-finance) has become one of the most essential technological changes in the financial industry. E-finance is the provision of financial services and markets using electronic communication and computation. In practice, e-finance includes e-payment, e-trading, and e-banking. Electronic banking is one of the truly widespread avatars of E-commerce the world over.

9. Types of Internet Banking:
Understanding the various types of Internet banking will help examiners assess the risks involved. Currently, the following three basic kinds of Internet banking are being employed in the marketplace.

1) **Informational**: This is the basic level of Internet banking. Typically, the bank has marketing information about the bank’s products and services on a stand-alone server. The risk is relatively low, as informational systems typically have no path between the server and the bank’s internal network. This level of Internet banking can be provided by the banks or outsourced. While the risk to a bank is relatively low, the server or web site may be vulnerable to alteration. Appropriate controls therefore must be in place to prevent unauthorized alterations to the bank’s server or web site.
Chapter 1: Conceptual Framework

2) **Communicative:** This type of Internet banking systems consists of the interaction between the bank’s system and the customer. The interaction maybe limited to electronic mail, account enquiry, loan applications, or static file updates (name and address change). Because these servers may have a path to the bank’s internal networks, the risk is higher with this configuration than with informational systems. Appropriate controls need to be in the place to prevent, monitor, and alert management of any unauthorized attempt to access the bank’s internal networks and computer systems. Virus controls also become much more critical in this environment.

3) **Transactional:** This level of Internet banking allows customers to execute transactions. Since a path typically exists between the server and the bank or outsourcer’s internal network, this is the highest risk architecture and must have the strongest controls. Customer transactions can include accessing accounts, paying bills, transferring funds etc.

Various authors define E-Banking differently but the most definition depicting the meaning and features of E-Banking are as follows.

1. Banking is a combination of two, Electronic technology and Banking.
2. Electronic Banking is a process by which a customer performs banking Transactions electronically without visiting a brick-and-mortar institutions.
3. E-Banking denotes the provision of banking and related service through Extensive use of information technology without direct recourse to the bank by the customer.
Chapter 1: Conceptual Framework

E-banking is a borderless entity permitting anytime, anywhere and anyhow banking. This facilitates us with all the functions and many advantages as compared to traditional banking services. During this step of the process, controls that could mitigate or eliminate the identified risks, as appropriate to the organizations operations, are provided. The goal of the recommended controls is to reduce the level of risk to the IT system and its data to an acceptable level.

10. Internet Banking Services:
Online banking facilities offered by various financial institutions have many features and capabilities in common, but also have some that are application specific.

1) ATM
Automated Teller Machine (ATM): These are cash dispensing machine, which are frequently seen at banks and other locations such as shopping centers and building societies. Their main purpose is to allow customer to draw cash at any time and to provide banking services where it would not have been viable to open another branching. An automated teller machine or automatic teller machine (ATM) is computerized telecommunications device that provides a financial institution’s customers a method of financial transactions in a public space without the need for a human clerk or bank teller. On most modern ATMs, the customer identifies him or herself by inserting a plastic ATM card with a magnetic stripe or a plastic smartcard with a chip that contains his or her card number and some security information, such as an expiration date or CVC (CVV). Security is provided by the customer entering a personal identification number (PIN). Using an ATM, customers can access their bank accounts
Chapter 1: Conceptual Framework

in order to make cash withdrawals (or credit card cash advances) and check their account balances. Many ATMs also allow people to deposit cash or checks, transfer money between their bank accounts, pay bills, or purchase goods and services.

Table 1.3
The Following table shows Total Number of ATMs Installed by each and every Bank in India.

<table>
<thead>
<tr>
<th>Name of Bank</th>
<th>On-site</th>
<th>Off-Site</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Bank of India</td>
<td>12327</td>
<td>10142</td>
<td>22469</td>
</tr>
<tr>
<td>Axis Bank Ltd.</td>
<td>2096</td>
<td>8241</td>
<td>10337</td>
</tr>
<tr>
<td>HDFC Bank Ltd.</td>
<td>3905</td>
<td>5804</td>
<td>9709</td>
</tr>
<tr>
<td>ICICI Bank Ltd.</td>
<td>3074</td>
<td>6292</td>
<td>9366</td>
</tr>
<tr>
<td>Punjab National Bank</td>
<td>3009</td>
<td>3050</td>
<td>6059</td>
</tr>
<tr>
<td>Union Bank of India</td>
<td>2209</td>
<td>1930</td>
<td>4139</td>
</tr>
<tr>
<td>Canara Bank</td>
<td>1541</td>
<td>1566</td>
<td>3107</td>
</tr>
<tr>
<td>Bank of Baroda</td>
<td>1449</td>
<td>681</td>
<td>2130</td>
</tr>
<tr>
<td>Central Bank of India</td>
<td>1005</td>
<td>836</td>
<td>1841</td>
</tr>
<tr>
<td>Bank of India</td>
<td>876</td>
<td>851</td>
<td>1727</td>
</tr>
<tr>
<td>IDBI Ltd.</td>
<td>831</td>
<td>750</td>
<td>1581</td>
</tr>
<tr>
<td>Indian Overseas Bank</td>
<td>957</td>
<td>567</td>
<td>1524</td>
</tr>
<tr>
<td>State Bank of Hyderabad</td>
<td>1061</td>
<td>358</td>
<td>1419</td>
</tr>
<tr>
<td>Oriental Bank of Commerce</td>
<td>950</td>
<td>342</td>
<td>1292</td>
</tr>
<tr>
<td>Indian Bank</td>
<td>930</td>
<td>359</td>
<td>1289</td>
</tr>
<tr>
<td>Corporation Bank</td>
<td>738</td>
<td>541</td>
<td>1279</td>
</tr>
<tr>
<td>Syndicate Bank</td>
<td>1036</td>
<td>205</td>
<td>1241</td>
</tr>
<tr>
<td>Andhra Bank</td>
<td>501</td>
<td>562</td>
<td>1063</td>
</tr>
<tr>
<td>State Bank of Bikaner &amp; Jaipur</td>
<td>621</td>
<td>437</td>
<td>1058</td>
</tr>
<tr>
<td>Federal Bank Limited</td>
<td>684</td>
<td>358</td>
<td>1042</td>
</tr>
<tr>
<td>State Bank of Travancore</td>
<td>667</td>
<td>281</td>
<td>948</td>
</tr>
<tr>
<td>UCO Bank</td>
<td>562</td>
<td>354</td>
<td>916</td>
</tr>
<tr>
<td>Karur Vysya Bank Ltd</td>
<td>472</td>
<td>406</td>
<td>878</td>
</tr>
<tr>
<td>Kotak Mahindra Bank Ltd</td>
<td>338</td>
<td>520</td>
<td>858</td>
</tr>
<tr>
<td>State Bank of Patiala</td>
<td>642</td>
<td>215</td>
<td>857</td>
</tr>
<tr>
<td>State Bank of Mysore</td>
<td>584</td>
<td>237</td>
<td>821</td>
</tr>
<tr>
<td>United Bank of India</td>
<td>320</td>
<td>488</td>
<td>808</td>
</tr>
<tr>
<td>Vijaya Bank</td>
<td>596</td>
<td>156</td>
<td>752</td>
</tr>
<tr>
<td>IndusInd Bank Ltd</td>
<td>383</td>
<td>352</td>
<td>735</td>
</tr>
</tbody>
</table>
Chapter 1: Conceptual Framework

<table>
<thead>
<tr>
<th>Bank Name</th>
<th>ATMs</th>
<th>Debit Cards</th>
<th>Credit Cards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citibank</td>
<td>58</td>
<td>643</td>
<td>701</td>
</tr>
<tr>
<td>South Indian Bank Ltd</td>
<td>545</td>
<td>155</td>
<td>700</td>
</tr>
<tr>
<td>Yes Bank Ltd.</td>
<td>255</td>
<td>388</td>
<td>643</td>
</tr>
<tr>
<td>Lakshmi Vilas Bank Ltd.</td>
<td>174</td>
<td>388</td>
<td>562</td>
</tr>
<tr>
<td>Dena Bank</td>
<td>433</td>
<td>112</td>
<td>545</td>
</tr>
<tr>
<td>Jammu &amp; Kashmir Bank</td>
<td>353</td>
<td>175</td>
<td>528</td>
</tr>
<tr>
<td>City Union Bank Ltd</td>
<td>246</td>
<td>277</td>
<td>523</td>
</tr>
<tr>
<td>Bank of Maharashtra</td>
<td>360</td>
<td>142</td>
<td>502</td>
</tr>
<tr>
<td>ING Vysya Bank</td>
<td>234</td>
<td>212</td>
<td>446</td>
</tr>
<tr>
<td>Dhanalaxmi Bank Ltd.</td>
<td>172</td>
<td>225</td>
<td>397</td>
</tr>
<tr>
<td>Karnataka Bank Ltd.</td>
<td>232</td>
<td>147</td>
<td>379</td>
</tr>
<tr>
<td>Development Credit Bank Ltd.</td>
<td>87</td>
<td>244</td>
<td>331</td>
</tr>
<tr>
<td>Tamilnadu Mercantile Bank Ltd.</td>
<td>175</td>
<td>155</td>
<td>330</td>
</tr>
<tr>
<td>Allahabad Bank</td>
<td>207</td>
<td>109</td>
<td>316</td>
</tr>
<tr>
<td>Standard Chartered Bank</td>
<td>97</td>
<td>203</td>
<td>300</td>
</tr>
<tr>
<td>Catholic Syrian Bank Ltd.</td>
<td>127</td>
<td>57</td>
<td>184</td>
</tr>
<tr>
<td>HSBC</td>
<td>69</td>
<td>73</td>
<td>142</td>
</tr>
<tr>
<td>RBS (ABN AMRO)</td>
<td>35</td>
<td>88</td>
<td>123</td>
</tr>
<tr>
<td>Punjab and Sind Bank</td>
<td>101</td>
<td>17</td>
<td>118</td>
</tr>
<tr>
<td>Ratnakar Bank Ltd.</td>
<td>57</td>
<td>44</td>
<td>101</td>
</tr>
<tr>
<td>Deutsche Bank</td>
<td>13</td>
<td>53</td>
<td>66</td>
</tr>
<tr>
<td>DBS Ltd.</td>
<td>5</td>
<td>31</td>
<td>36</td>
</tr>
<tr>
<td>American Express Bkg. Corp.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Barclays Bank</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Source – CardBhai.Com

2) Electronic Funds transfer (EFT)

Between the customers own checking and savings accounts, or to another customer's account. Without personal visit to bank through internet customer can transfer the money to his or her own account or to the person account. In 1994, RBI appointed a committee to review the mechanization in the banks and also to review the Electronic Clearing Service (ECS) –credit clearing facility should be made available to all
corporate bodies for making repetitive low value payment like dividend, interest, refund, salary, pension or commission.

**NEFT – National Electronic Fund Transfer**

NEFT full form is National Electronic Fund Transfer, and it is a system of transfer between two banks on net settlement basis which means that each individual transfer from one account to another account is not settled or processed at that same moment, it is done in batches. A lot of transactions are settled in one go in each batches. Presently, NEFT services are available from 8:00 am to 6:30 pm on weekdays (Mon – Fri) and from 8:00 am – 12:30 pm on Saturday.

Any NEFT Transfer done between 8 am – 5 pm generally gets settled on the same day, but if you deposit the money after 5 pm, then that will be settled the next working day. In case of Saturday, any money deposited between 8 am – 12 noon can be expected to reach the beneficiary account the same day.

**RTGS – Real Time Gross Settlement**

RTGS full form is Real Time Gross Settlement and it is a system of money transfer between two banks in real time basis, which means the moment one bank account transfer the money to another bank account, its settled at that time itself on real time basis between the banks, but the beneficiary bank has to make the final settlement to the bank account within two hours of getting the money. RTGS is the fastest
possible money transfer between two banks in India through a secure channel.

### Table 1.4

<table>
<thead>
<tr>
<th>Criteria</th>
<th>NEFT</th>
<th>RTGS (Retail)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Settlement</td>
<td>Done in batches (Slower)</td>
<td>Real time (Faster)</td>
</tr>
<tr>
<td>Full Form</td>
<td>National Electronic Fund Transfer</td>
<td>Real Time Gross Settlement</td>
</tr>
<tr>
<td>Timings on Mon – Fri</td>
<td>8:00 am – 6:30 pm</td>
<td>9:00 am – 4:30 pm</td>
</tr>
<tr>
<td>Timings on Saturday</td>
<td>8:00 am – 12:30 pm</td>
<td>9:00 am – 1:30 pm</td>
</tr>
<tr>
<td>Minimum amount of money transfer limit</td>
<td>No Minimum</td>
<td>2 lacs</td>
</tr>
<tr>
<td>Maximum amount of money transfer limit</td>
<td>No Limit</td>
<td>No Limit</td>
</tr>
<tr>
<td>When does the Credit Happen in beneficiary account</td>
<td>Happens in the hourly batch Between Banks</td>
<td>Real time between Banks</td>
</tr>
<tr>
<td>Maximum Charges as per RBI</td>
<td>Upto 10,000 – Rs 2.5 from 10,001 – 1 lac – Rs 5 from 1 – 2 lacs – Rs 15 Above 2 lacs – Rs 25</td>
<td>Rs 25-30 (Up to 2 – 5 lacs) Rs 50-55 (Above 5 lacs) (Lower charges for first half of day)</td>
</tr>
<tr>
<td>Suitable for</td>
<td>Small Money Transfer</td>
<td>Large Money Transfer</td>
</tr>
</tbody>
</table>

(Source: Jagoinvestor.com)
3) Electronic Bill payment (EBP):

*Bill Payment Service* Banks Bill Pay is the easiest way to manage bills. A/c holder can pay their regular monthly bills i.e. telephone, electricity, mobile phone, insurance etc. at anytime, anywhere for free. Saves time and effort. Make bill payments at customer’s convenience form their home or office. Lets a/c holders check their bill amount before it is debited form their account. No debits to account without their knowledge. No more missed deadlines, no more loss of interest – a/c holder can schedule their bills in advance, avoid missing the bill deadlines as well as earn extra interest on their money. Track payment history – all payments to a biller are stored automatically for future reference. No queuing up at collection centers or writing cheque any more! Just a few clicks and customers account will be debited for the exact amount they as EBP attracts the customers because of the fast and efficient bill payment. Most of the Indian banks are trying to adopt the EBP portal. ICICI started a portal called Billjunction.com. Banks tie up with MTNL, Airtel, Orenge, Vodafone, reliance etc.

4) Phone Banking:

Customer can now dial up the bank’s designed telephone number and by dialing ID number will be able to get connectivity to bank’s designated computer. The software provided in the machine interactive with the computer asking him to dial the code number of the service required by the customer and suitable answers to the customer. By using automatic voice recorder (AVR) for simple queries and transactions and manned phone terminals for complicated queries and truncations, the customer can actually do entire non-cash relating banking on telephone…anywhere anytime!
5) Tele-Banking:

Tele banking is another innovation which provided the facility of 24 hour banking to the customer. Tele banking is based on voice processing facility available on bank computers. The caller usually a customer calls the bank anytime and can inquire balance in his account or other transaction history. In this system, the computers at bank are connected to a telephone link with the help of a modem. Voice processing facility is provided in the software. This software identifies the voice of caller and provides him suitable reply. Some banks also use telephonic answering machine but this is limited to some brief functions. This is only telephone answering system and now Tele banking. Tele banking is becoming popular since queries at ATMs are now becoming too long.

6) Mobile Banking:

With the increase in mobile penetration among masses, banking activities can be transacted easily through mobile banking. This is the latest and most innovative platform offered for banking for the customers. A versatile multifunctional, free service that is accessible and viewable on the monitor of mobile phone. According to Reserve bank of India (RBI) data, a total of 3.7 crores mobile transactions took place between February and November 2012, jumping around 1.7 times in volumes over this 10-month period. These transactions saw nearly a three-fold increase in value over the same period.

Increasing Smartphone adoption and initiatives such as media promotions and customer education programs for mobile banking have led to this uptrend. For customers, mobile banking is convenient while banks benefit
Chapter 1: Conceptual Framework

through a low-cost channel. From the following table statistics of mobile transaction in India for the year 2012 is presented:

Table 1.5

<table>
<thead>
<tr>
<th>Month</th>
<th>Volume (actual)</th>
<th>Value (in Rs'000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>February</td>
<td>2,799,554</td>
<td>1,960,417</td>
</tr>
<tr>
<td>March</td>
<td>3,123,105</td>
<td>2,325,321</td>
</tr>
<tr>
<td>April</td>
<td>3,178,405</td>
<td>2,345,678</td>
</tr>
<tr>
<td>May</td>
<td>3,346,743</td>
<td>2,865,454</td>
</tr>
<tr>
<td>June</td>
<td>3,437,074</td>
<td>3,067,107</td>
</tr>
<tr>
<td>July</td>
<td>3,705,690</td>
<td>3,379,715</td>
</tr>
<tr>
<td>August</td>
<td>3,968,226</td>
<td>3,548,628</td>
</tr>
<tr>
<td>September</td>
<td>3,897,614</td>
<td>4,104,519</td>
</tr>
<tr>
<td>October</td>
<td>4,437,342</td>
<td>7,790,473</td>
</tr>
<tr>
<td>November</td>
<td>4,720,871</td>
<td>5,389,548</td>
</tr>
</tbody>
</table>

(Source: RBI)

With mobile phone penetration of over 80 per cent, India has a huge potential for mobile banking. But on the global landscape, mobile payments have a long way to go in India. According to the MasterCard Mobile Payments Readiness Index (MPRI), India ranked 21st among 34 countries with the score of 31.4 on a scale of 100. The index is a data-driven survey of the global mobile payments landscape. It relies on an analysis of 34 countries and their readiness to use three types of mobile payments: person to person, mobile e-commerce and mobile payments at the point of sale (POS).

CHART 1.2
Chapter 1: Conceptual Framework

(Source: http://businesstoday.intoday.in/story/mobile-banking-on-the-rise-in-india/1/191851.html)

7) Net Banking / On-line Banking:
The advent of the Internet and the popularity of personal computers presented both an opportunity and a challenge for the banking industry. For years, financial institutions have used powerful computer networks to automate millions of daily transactions; today, often the only paper record is the customer’s receipt at the point of sale. Now that their customers are connected to the Internet via personal computers, banks envision similar advantages by adopting those same internal electronic processes to home use. Banks view online banking as a powerful” value added” tool to attract and retain new customers while helping to eliminate costly paper handling and teller interactions in an increasingly competitive banking environment. In India, the first one to move into this area was ICICI Bank. They started web-based banking as early as August 1997. Net banking is a web-based service that enables the banks authorized customers to access their account information. It allows the customers to log on to the banks website with the help of bank’s issued identification and personal identification number (PIN). The banking system verifies the user and provides access to the requested services, the range of products and service offered by each bank on the internet differs widely in their content. Most banks offer net banking as a value-added service. Net banking has also led to the emergence of new banks, which operate only through the internet and do not exist physically. Such banks are called “virtual” banks or “Internet Only” banks. A couple of years ago, there was a belief even among bankers that customers opening new accounts wanted the online banking facility, just to ‘feel good’ and very few of them actually used
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that services. Today, bankers believe that the trend from ‘nice to have’ is changing to ‘need to have’. After all it depends on how busy a person is. Services provided through Internet Banking: 1) Account information 2) E-cheques (Online Fund Transfer) 3) Bill Payment Service 4) Requests And Intimations 5) Demat Account share trading.

8) Credit Card:

Credit cards introduced in America in 1950, a businessman Frank Menomara invited some of his friends for dinner in a hotel. At the time of payment he realizes that the wallet is not in his pocket! He forgot it at home. That day he decided to search a full proof system to avoid such troublesome situation. In India it is introduced in 1966 as a branch of “Dinner Club”. In 1980 credit card facility provided by central bank first time in India.

Credit card is a small piece of plastic which gives the facility to purchase anything without money with particular limit of amount. According to the category of credit card the cash withdrawal limit, the limit of purchase and the credit period is dependents. It works like plastic money. The risk of pick pocketing and the money lost risk is totally rubbed by credit card. Credit card avoids the tension of carrying lot many money in the pocket. Customer feels free while journey or while purchase. Credit card gives us facility to use money without sufficient balance in the customer’s bank account. After a month customer has to pay. So credit card not only gives as security but also provides the money in advance!
9) **Debit Card:**
Debit card works same as credit card. Customer can purchase anything by it. Cash withdrawal is also possible. The only difference is that debit card can use with the customer’s own account balance. According to account balance the customer can use his own money and purchase the goods. If the sufficient balance is not in the bank account then customer cannot use it. Now almost every bank providing Debit card facility and almost every customer can have credit card but the credit card facility is not provided to every customer or not free of charge. Of course there are number of categories for debit card also like master card, VISA card. At present plastic money and all types of cards are very popular and it is in a increasing way!

10) **DIGI Cash (Digital Cash):**
Devid Chaum, a mathematician and banking privacy expert found the DIGI cash. This is known as E-cash, which is equivalent as Cash. Customer has to open his account at a Digi-cah licensed bank. Once the account is established, the customer can use E-cash that is stored on the user’s computer hard drive. By using proprietary software, E-cash can be spending with net merchant or anybody whose computer is set up to deal with E-cash. With public key cryptography, the digital cash made secured. It register and verified while every transaction. Digital cash is the fastest way for on line purchase.

11) **Net Cash:**
This concept is similar to E-cash or Digital cash, except it does not require any special software to use. Net Cash can transmit across the internet user by using encryption scheme known as PGP (Pretty Good
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Privacy). To use net cash, a party must send a cheque or money order to
the company’s headquarters. The company returns coupons via e-mail.

12) E-Zwich:
E-Zwich is the brand name and electronic the common platform that
enables loading and spending of E-cash and also allows the settlement of
interbank claims in addition to on-line transactions. Customers are able to
use offline transactions in under develop area where electricity and
communication infrastructure is lacking. All transactions includes
between customer card and another card in a POS (Point of scale) or
ATM.

13) MICR Clearing:
MICR means magnetic ink character reader or recognition. It is a
recognition technology adopted mainly to facilitate the processing of
cheque in the banks. The process was demonstrated to the American
Bankers Association in July 1956 and it was almost universally
implemented by 1963. MICR characters are printed with magnetic ink or
toner. Magnetic printing is issued so the characters can be reliably read
through the computer system.

In India MICR was introduced in 1987 in four metro cities of the country.
NMICR is now available in almost every banking center where volume of
clearing transaction is large.
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14) Account information:
Bank provides summary of all bank accounts. Allow transaction tracking which enables retrieval of transaction details based on cheque number, transaction amount, and date.
Provide account statement and transaction reports used on user-defined criteria. Customers can even download and print the statement of accounts.

15) E-Cheques (Online Fund Transfer)
An electronic cheque is an electronic copy (scanned image) of a real cheque, which is then transferred by email. In addition to the cheque's 'real' signature, the transfer must be digitally signed using the sender's private key to authenticate the transfer.

Customer can transfer funds: Transfer funds between accounts, even if they are in different branches’ cities Customer can also transfer funds to any person having an account with the same bank anytime, anywhere, using third party funds transfer option.

16) Requests and Intimations
Can electronically submit a request for: Cheque-book Stop payment instructions Opening a fixed deposit Opening a recurring deposit Intimate for the loss of ATM card Register online for phone and mobile banking Cheque status Online application for debit card Issue a DD or a Banker’s cheque form account at special rates. Just select the account to be debited form and give details of the amount, location and beneficiary. The demand draft will be couriered to a/c holder at their mailing address.
Customers can get their applications for issuance of Letters of Credit and Bank Guarantees processed online Book your Railways Ticket Online

17) Demat Account and Share Trading:
Demat is commonly used abbreviation of ‘Dematerialization’, which is a process whereby securities like share, debentures are converted from the ‘material’ (paper documents) unto electronic data and stored in the computer of an electronic Depository. A depository is a security ‘banks,’ where dematerialized physical securities are held in custody, and form where they can be traded. This facilitates faster, risk-free and low cost settlement.

18) Share Trading:
In share trading a customer can buy and sell securities online without stepping into a broker’s office. Once the share is dematerialized then the trading can be done from home or office. As demat a/c are directly linked to the customer’s bank a/c, so there is no need to write cheque for the payments or to fill up the slips to deposit the cheque. Amount for the purchase and sale of securities is automatically debited or credited to their bank a/c. it also brings the same convenience while investing in Mutual funds also Hassle free and Paperless.

19) Electronic Clearing Service
ECS is an electronic mode of funds transfer from one bank account to another. It can be used by institutions for making payments such as distribution of dividend interest, salary, pension, among others. It can also be used to pay bills and other charges such as telephone, electricity, water or for making equated monthly installments payments on loans as well
as SIP investments. ECS can be used for both credit and debit purposes. The Electronic Clearance Service (ECS) scheme provides an alternative method of effecting bulk payment transactions like periodic (monthly/quarterly/half-yearly/yearly) payments of interest/salary/pension/commission/dividend/refund by Banks/Companies/Corporations/Government Departments. The transactions under this scheme move from a single User source (i.e. Banks/Companies/Corporations/Government Departments) to a large number of Destination Account Holders (Customers/Investors). This scheme obviates the need for issuing and handling paper instruments and thereby facilitates improved customer service by the Banks and Companies/Corporations/Government Departments effecting bulk payment.

20) CTS-2010:

Cheque Truncation System (CTS) or Image-based Clearing System (ICS), in India, is a project undertaken by the Reserve Bank of India–RBI, for faster clearing of cheques. CTS is basically an online image-based cheque clearing system where cheque images and Magnetic Ink Character Recognition (MICR) data are captured at the collecting bank branch and transmitted electronically.

Truncation means, stopping the flow of the physical cheques issued by a drawer to the drawee branch. The physical instrument is truncated at some point en route to the drawee branch and an electronic image of the cheque is sent to the drawee branch along with the relevant information like the MICR fields, date of presentation, presenting banks etc.

Cheque truncation, would eliminate the need to move the physical instruments across branches, except in exceptional circumstances. This would result in effective reduction in the time required for payment of
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cheques, the associated cost of transit and delays in processing, etc., thus speeding up the process of collection or realization of cheques.

Benefits:

For Banks: Banks can expect multiple benefits through the implementation of CTS, like faster clearing cycle means realization of proceeds of cheque possible within the same day. It offers better reconciliation/verification process, better customer service and enhanced customer window. Operational efficiency will provide a direct boost to bottom lines of banks as clearing of local cheques is a high cost low revenue activity. Besides, it reduces operational risk by securing the transmission route. Centralized image archival system ensures data storage and retrieval is easy. Reduction of manual tasks leads to reduction of errors. Customer satisfaction will be enhanced, due to the reduced turnaround time (TAT). Real-time tracking and visibility of the cheques, less fraudulent cases with secured transfer of images to the RBI are other possible benefits that banks may derive from this solution.

For Customers: CTS / ICS substantially reduces the time taken to clear the cheques as well enables banks to offer better customer services and increases operational efficiency by cutting down on overheads involved in the physical cheque clearing process. In addition, it also offers better reconciliation and fraud prevention. CTS / ICS uses cheque image, instead of the physical cheque itself, for cheque clearance thus reducing the turnaround time drastically.

Source: http://en.wikipedia.org/wiki/Cheque_truncation_system
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21) Other General Features (Non-Transactional) of Internet Banking

A bank customer can perform some non-transactional tasks through online banking, including -

- Viewing account balances
- Viewing recent transactions
- Downloading bank statements, for example in PDF format
- Ordering cheque books
- Download periodic account statements
- Download applications for M-banking, E-banking etc.
- Loan applications and transactions, such as repayments of enrollments

11. Security of E-Banking

Security of a customer's financial information is very important, without online banking could not operate. Financial institutions have set up various security processes to reduce the risk of unauthorized online access to a customer's records, but there is no consistency to the various approaches adopted.

The use of a secure website has become almost universally adopted. Though single password authentication is still in use, it by itself is not considered secure enough for online banking in some countries. Basically there are two different security methods in use for online banking.

Security methods for online banking:

1- The PIN system.
2- Signature based online banking.
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(1) The PIN/TAN system where the PIN represents a password, used for the login and Tans representing one-time passwords to authenticate transactions. TANs can be distributed in different ways, the most popular one is to send a list of TANs to the online banking user by postal letter. The most secure way of using TANs is to generate them by need using a security token. \[\text{citation needed}\] These token generated TANs depend on the time and a unique secret, stored in the security token (two-factor authentication or 2FA). Usually online banking with PIN/TAN is done via a web browser using SSL secured connections, so that there is no additional encryption needed.

Another way to provide TANs to an online banking user is to send the TAN of the current bank transaction to the user's (GSM) mobile phone via SMS. The SMS text usually quotes the transaction amount and detail, the TAN is only valid for a short period of time. Especially in Germany, Austria and The Netherlands, many banks have adopted this "SMS TAN" service as it is considered very secure.

(2) Signature based online banking where all transactions are signed and encrypted digitally. The Keys for the signature generation and encryption can be stored on smartcards or any memory medium, depending on the concrete implementation.

Attacks:
Most of the attacks on online banking used today are based on deceiving the user to steal login data and valid TANs. Two well known examples for those attacks are phishing and pharming. Cross-site scripting and key logger/Trojan horses can also be used to steal login information.
A method to attack signature based online banking methods is to manipulate the used software in a way, that correct transactions are shown on the screen and faked transactions are signed in the background. A 2008 U.S. Federal Deposit Insurance Corporation Technology Incident Report, compiled from suspicious activity reports banks file quarterly, lists 536 cases of computer intrusion, with an average loss per incident of $30,000. That adds up to a nearly $16-million loss in the second quarter of 2007. Computer intrusions increased by 150 percent between the first quarter of 2007 and the second. In 80 percent of the cases, the source of the intrusion is unknown but it occurred during online banking, the report states.\[5\]

The most recent kind of attack is the so-called Man in the Browser attack, where a Trojan horse permits a remote attacker to modify the destination account number and also the amount.

**Countermeasures**

There exist several countermeasures which try to avoid attacks. Digital certificates are used against phishing and pharming, the use of class-3 card readers is a measure to avoid manipulation of transactions by the software in signature based online banking variants. To protect their systems against Trojan horses, users should use virus scanners and be careful with downloaded software or e-mail attachments.

In 2001 the U.S. Federal Financial Institutions Examination Council issued guidance for multifactor authentication (MFA) and then required to be in place by the end of 2006. Tap, click and swipe-these are the new sounds of money. Modern technology is fast replacing paper
with computer files, bank tellers with automated teller machines (ATMs) and file cabinets with server racks. And banks too have come a long way from the old days of manually recording transactions in registers and tallying them up at the end of the day. Bank branches, the interface between banks and customers, have also changed drastically from being operations-centric to servicing clients. "The shift during this period has been from branch to alternative delivery channels such as ATM, Internet and mobile," says TM Bhasin, chairman and managing director, Indian Bank, and author of E-commerce in Indian-Banks Customers can now perform several banking operations such as fund transfers, opening deposit accounts, ordering cheque books and demand drafts, paying utility bills, applying for loans, and getting account statements without visiting a branch. "We are seeing more and more people shifting to alternative delivery channels, which account for nearly 30-40% of customers at present. Over the next few years this is likely to go up to 70-80%," says Bhasin.

ICICI Bank, the country's second largest bank, has seen a big jump in transactions outside the branches. Chanda Kochhar, MD and CEO of the bank, says only 15% of transactions on average take place through the branches. "The rest are happening outside,"-she-says. ATM is the oldest of the alternative banking channels and enjoys the highest level of acceptance among customers. The number of ATMs in India has doubled in the past three years. Currently, there are more than 100,000 ATMs; around 70% of them in urban locations (see New Age Banking). Global research firm Celent expects the number of ATMs to double by 2016, with more than 50% being set up in small towns.

"Today, ATM provides more than cash withdrawal. Apart from fixed
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deposits, cheque book requests and balance enquiries there are also enhanced banking services," says Shivaji Chatterjee, vice-president, Hughes Communications India, which helps banks create their ATM networks.

Banking has also seeing a change due to efforts of the Reserve Bank of India (RBI) to inculcate a habit of paperless payments such as credit and debit cards, electronic fund transfers and mobile banking.

During 2011-12, the volume of online fund transfers through NEFT (National Electronic Funds Transfer, used for low-value transactions) and RTGS (Real Time Gross Settlement, used for high-value transaction) grew by 71% and 11.7 %, respectively, according to RBI data. Though cheque is still the dominant mode of payment; the value of cheque-based transactions has been on a gradual decline between 2007-8 and 2011-12. Paper-based payments accounted for 52.4% of non-cash transactions in terms of volume, but it accounted for only 8.4% in terms of value. Mobile phones are seen as a big enabler of electronic payments as the costs are low. Mobile transactions have increased in the past few years, but the use of mobile banking services is quite low. Most of the transactions carried out using mobile phones are non-financial in nature. "The potential of mobile banking technology is yet to be fully exploited," says G Padmanabhan, executive director, RBI.

Even so, cash remains the preferred payment mode in the Indian economy. "Currently, only 2% of the entire payments go through the electronic system in India," says Pralay Mondal, senior group president, Retail and Business Banking, Yes Bank. Acceptance of electronic payments and cards is very low in the country. The cost of using
electronic payment modes is also a hurdle. Moving out of the metros, people are more comfortable with cash. Only 0.6 million of the 10 million-plus retailers in India accept card payments, according to the RBI's vision document on payment systems for 2012-15. "For small transactions, cost of using credit or debit cards is very high, both for banks and vendors. This is a bottleneck in expansion of electronic payments," says Mondal. "Once we have cheaper alternatives for small payments and increased awareness, the acceptance will go up," adds Mondal.

The government is trying to promote electronic payments by pushing the subsidisation delivery network online and making many government payments mandatorily done electronically. With collective efforts of banks, the RBI and the government, the share of electronic payments is expected to rise to 5% in two to three years.

**COST BENEFIT**

Technology is not only making banking convenient for customers, it has also allowed banks to expand their businesses faster and bring down costs. The cost of servicing a customer is the highest at a branch followed by ATMs, online and mobile phones. When a customer walks into a branch to withdraw money, the cost to the bank may be as high as Rs 200 whereas an ATM transaction would cost around Rs 20 or even less, says Shyamal Saxena, general manager, Integrated Distribution, South Asia, Standard Chartered Bank. Economies of scale will only bring down the cost further.

"There is a tendency to discourage customers from visiting branches since it adds to the cost of the bank and is also inconvenient for
customers. Moving to alternative channels is a win-win for both sides,” says Indian Bank's Bhasin. Banks are also discouraging direct interface with customers by levying charges for some transactions such as payment of credit card bills through cash or depositing cheques at bank counters instead of putting them in drop boxes. Technology-based banking has also reduced the space required to set up bank branches. "Earlier, the physical infrastructure needed for a branch was, on an average, around 4,000 to 5,000 square feet. Now, we are managing with an average of 1,000 to 1,500 square feet," says Bhasin. However, modern electronic payment systems are still concentrated in metros and large towns (Tier-I and II locations). A large chunk of the Indian population still does not have access to formal banking channels, let alone the newer alternatives. According to RBI, there were around 1, 47,000 bank outlets for more than 6, 00,000 villages in India. Some banks though are using the business correspondent model (where a third party serves as the interface between a bank and its customers) to expand their reach and bring more people under formal banking using technologies such as handheld devices and micro-ATMs. With mobility and customer convenience seen as keys to growth, banks are busy exploring new technologies. Experiments with near-field communication technology (where the transaction is completed by simply bringing a hand-held device, say a phone, in contact with a terminal) have failed to provide a mass-scale payment solution, but the industry is buzzing with terms like cloud computing and mobile solutions.

Similar to the central customer identification system (Know Your Customer, or KYC) used by mutual funds, a common database may soon do away with the need for physical verification of new customers. Banks have already been asked to issue unique identification numbers to their
customers as the first step towards a centralised KYC directory. The Unique Identification Authority of India (UIDAI) has also rolled out an online identification database (electronic KYC service) and biometric verification. In end-October, RBI paved the way for use of UIDAI's biometric database for authenticating banking transactions. Globally, experiments are on to enable ATM and other banking transactions through biometric verifications.

Despite this, branches are unlikely to die, despite ATMs, laptops and smartphones becoming primary platforms for daily banking. Branches will continue even after the new modes spread to rural areas. The experience of advanced economies with high volumes of electronic payments confirms this.

"In-branch banking is never going to be out of fashion. However, branches will eventually handle just sales with banking services being taken care of by alternative channels, at least in urban centres," says Pralay Mondal, Senior Group President, Retail and Business Banking, YES Bank. Besides, the human touch matters. "As a banker, I would love to have a customer visit our branch because that allows us to build a better relationship through active engagement with him and promote our services beyond basic banking." ICICI Bank's Kochhar agrees, saying interaction with customers at branches is essential for bank executives to spread awareness about products and services on offer.

Even as technology transforms banking as we know it, branches will continue to play a crucial role in moulding the industry. As collective brains of indefatigable computer servers handle daily business, customers will find banking more efficient and access far easier. Different services,
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queries in their account balances, etc. but do not permit any fund-based transactions on their accounts; 3. The third level of Internet banking service are offered by Fully Transactional Web sites which allow the customers to operate on their accounts for transfer of funds, payment of different bills, subscribing to other products of the bank and to transact purchase and sale of securities, etc. The above forms of Internet banking service are offered by new banks, who deliver banking service primarily through Internet or other electronic delivery channels as the value added services. Some of these banks are known as ‘Virtual’ banks or ‘Internet only’ banks and may not have physical presence in a country despite offering different banking services.

12. Challenges of E-banking

Although a lot of reforms have been made in the personality of the banks, there is a need to modify polices of the bank. At present they are facing many internal and external challenges, which are hindering their performance, but the banks can convert these challenges into opportunities with care and some modifications. With globalization and change in the technology, world over have become closely integrated. Customers can access their accounts anywhere and anytime across the world! Deregulation and liberalization has opened up new opportunities for banks but at the same time the pressure of competition have led to narrowing spreads, shrinking, consolidation and restructuring. Banking practices have undergone significant changes since the advent of the Internet. Banks provide many services online, which are extremely convenient for banking customers. However, Internet banking (also known as electronic or e-banking) also poses some risks to the banks and
banking customers who choose to use it. There are so many challenges like ……

**Psychological:** Our society is conservative and the people usually habit to use traditional banking and they do not want to accept the changes immediately. After a long experience of using traditional banking, they form the habits and that is why they need some time to change their habit. Due to lack of knowledge or the technological unawareness, customers have hesitation to use internet banking. Sometimes they are suffering from frustration due to lack of technical knowledge. Typical mind set and tradition also a big challenge!

**Technological:** Popularity of E-banking has a challenge because of insufficient technology! Poor network create lot many disturbances while using the internet or net-banking. So the customer loses their confidence and avoids the use of e-banking services. Less awareness regarding technical knowledge is also a barrier between the e-banking services and the customer. There are many fault in the technical design, implementation and monitoring bank’s information system and it will makes the e-banking service slow and sometime difficult for the users.

**Socio-Economic:** Banks have a challenge of the cost factor and its effect on the use and popularity of e-banking services. Customers not ready to pay the charges for using banking services. Vast rural branch network of banking is also a big challenge because rural customer slowly accepts the e-banking. Concept of social banking is also creating the barrier from the customer side and low profitability creates challenge.
Lack of customer relationship management is also one of the big challenges against the popularity of e-banking services.

**Regulation and Legalities:** Internet banking makes it possible for banks and their customers to do business from anywhere in the world. This greatly increases the bank's potential client base. Nevertheless, according to Andrea Schaechter of All Business, the global approach to banking that e-banking permit makes it extremely difficult for regulatory authorities to enforce finance laws. Additionally, regulations differ from nation to nation and banks are not always proficient in the financial laws for every nation in which they have business this lack of proficiency opens banks and their clients up to law violations and lawsuits.

**Digital and Financial Divide:** Rupa Rege Nitsure, author of "E-banking: Challenges and Opportunities," claims that a digital divide exists between banks -- i.e., not every bank has access to the hardware and software necessary to make e-banking possible. A study led by Jiaquin Yang of Georgia College and State University showed that this problem may be related to size and financial support a bank has. Smaller banks tend not to use e-banking because it is not cost-effective for them. To make Internet banking more commercially fair to banks and customers, all banks would need a sufficient funding source so that banks could eliminate this digital divide.

**Security:** E-banking increases convenience, but as it also opens a bank to security issues.
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For example, a criminal might hack into the bank's server in order to acquire bank account data, or a software glitch might cause the bank to unwittingly distribute personal data to the wrong person. To make matters worse, technology is not static. Banks that use Internet banking have to constantly update their software and hardware to make sure that compatibility issues and increased knowledge of security systems do not increase their security risks. This can be expensive over time.

**Reputation:** Problems such as governance and security have the potential to make a bank look bad to clients. Additionally, the more a bank relies on Internet banking, the more the bank may gain an impersonal feel. Both of these problems may discourage clients from choosing a bank that relies on e-banking, regardless of how convenient e-banking may be.

**Operational challenges:**

1. Frequent challenges in technologies used focusing up grades in hardware and software, Attending to that implementation issues and timely role out.
3. System re-engineering to enable defined and implemented efficient processes to be Able to reap benefits off technology to its fullest potential.
4. Upgrading the skill of work force spread across the country.

**How to meet challenges?**

At corporate level to meet the challenges, various initiated have been taken and implementation is in process beside up gradation of data center facility:
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1. Centralization of function:
   - Inward clearing data uploading and processing.
   - Cheque-book issues.
   - MIS-On-Line monitoring of statements by controlling offices
   - Audit from the remote location
   - Sending mails and statement of account to customers and completion of non mandatory field in newly opened account.

2. Single window system.

3. Revised account opening from for capturing complete customer/account data as per CBS requirement.

4. Call centers for customers.

5. Customer relationship management (CRM) application.

6. Data warehousing.

7. Organize Awareness program

8. Sound technological side

9. Improve security standard

10. Create customer orientation

11. Encourage e-banking users

13. Conclusion:
Information technology allows the banking industry to establish a direct link to customers. Bank customers can bank online, including viewing their accounts balances and transaction histories, paying bills, transferring funds between accounts, requesting credit cards advances and ordering cheques. The banking industry also recognizes that the internet must be secure to achieve a high level of confidence with both the customer and business. Internet banking creates new challenges for bank, which must
be ready to adopt the new technology. Regulatory action will ensure that the efficiency of the banks. Banks must be aware of the risk involved and have proper built-in safeguards, machinery and system to manage the challenges. No system or institution can hope to benchmark it against international standards without making optimal use of technology. They can be no doubt about the enormous potential and opportunities offered by advance in technology. However there are perquisites and preparations which have to be made before the fill benefits of the technology can be harvested.

Researcher may conclude that transformation is taking place almost in all categories of the banks. This will helpful to cope up with new and the latest financial polices of the banks. IT is playing a crucial role to create the drastic changes in the banking industry in the new private sector and foreign banks. The immense opportunities are also available for the banks if they change or modify and adopt new policies to combat the different recent challenges. A lot of technological changes are happening in Banking Services in India and abroad, the ultimate objective is to offer better services at affordable rates to the last customer.
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