1.1 INTRODUCTION

The banking industry of India has seen more than its fair share of change during the past decade. Deregulation and globalisation have completely transformed banking industry. An influence of technology has stimulated change in the banking industry of India and made remarkable impact on the business of banking. Information technology has emerged as a driver and key differentiator of performance and competitive superiority. Latest technology plays a vital role in satisfying business requirements at home and it also plays an equally critical role in satisfying business requirements out of the country. Technology in Indian banks is easily spreading up fast with the developments around the world and the gap between the Indian bank and their counterparts in the technologically advanced countries is gradually narrowing down. Indian banks seem to be in an advantageous position to a certain extent. Indian banks have a scope to put technological systems into place today and bring themselves rapidly at par with their global counterparts (Kalavathy, 2007).

Entry of technology in the Indian banking industry can be traced back to the Rangarajan Committee report, way back in the 1980s. Indian banks commenced computerizing the front-end operation with the help of advanced ledger posting machines which helped banks to augment the speed and reducing the errors of calculations. The
beginning was made against strong obstacles of lack of adequate technologically trained employees, resistance from organized workforce and insufficient experience in adoption of technology. Total branch automation concept was commenced in the second phase. The network infrastructure was decentralized which has given server(s) to its branches, banking applications, databases and other supporting hardware and software. Banking sector observed various measures of liberalization during the nineties which was the third phase. New private sector and foreign banks emerged, equipped with the latest technology. These banks opted for a different model of having a single centralized database through a network infrastructure, instead of having multiple databases for all their branches. New private sector and foreign banks provided new array of banking services at low costs. New private sector banks and foreign banks used technology as a key differentiator. This was the technological superiority that helped the development of these banks. These technological developments unlocked the Indian banking industry to severe competition and affected the public sector banks to hold the new technologies in a big way for protecting their value and maintaining their market share. Private sector banks depended on their technological power for their existence. There was an obvious difference in the technological prominence of the techno savvy private sector banks and the public sector banks (Kalavathy, 2007).

1.2 Post-Independence Developments in Banking Sector

Pre-nationalisation Period:

During the pre-nationalisation period, the industrial sector claimed the lion’s share in bank credit. Within the industry, the large-scale sector cornered the bulk of credit and the share of small-scale industries was marginal. There were many reasons for the
dominance of large industrial companies in the banking sector. Firstly, many commercial banks were under the ownership/control of big industrial houses. Secondly, through common directors, many commercial banks were connected with industrial and business houses, facilitating the flow of credit to large industries. Thirdly, the established industrial houses could obtain industrial licenses easily and on that basis, appropriate long-term bank credit.

**Post-nationalisation Period:**

Commercial banks of the country were nationalised in 1969 with the following objectives:

- To avoid concentration of wealth and economic power.
- To mobilise savings of the masses.
- To pay greater attention to the credit needs of agriculture and small industries.

**1.3 Banking Sector Reforms since 1991**

Indian banking industry suffered from lack of competition and low productivity during early 1990s. Banking sector reforms were introduced as an inseparable part of the economic reforms. Reforms in the commercial banking sector had two distinct phases which are as follows:

**The First Phase:**

The first phase of reforms executed subsequent to the release of the report of the Committee on Financial System in 1992 and the chairman of the committee was M. Narasimham. The committee was known as Narasimbam Committee I which focussed mainly on enabling and strengthening measures. The Committee was guided by the basis assumption that the resources of the banks come from the general public and held by the
banks in trust. These resources have to be deployed for maximum benefit of their owners, i.e. the depositors.

The Second Phase:

The second phase of reforms, applied subsequent to the recommendations of the committee on banking sector reforms under the Chairmanship of M. Narasimham in 1998 and it was known as Narasimham Committee II which placed greater emphasis on structural measures and improvement in standards of disclosures and levels of transparency in order to align the Indian standards with international best practices.

Objectives of Banking Sector Reforms:

Main objective of reforms in the banking sector in India has been to enhance the stability and efficiency of banks and various reform measures like enabling measures, strengthening measures and institutional measures were initiated (Uppal, 2007).

1.4 E-Banking Services

E-Banking or electronic banking is a generic term encompassing internet banking, telephone banking, mobile banking etc. 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. Government of India has taken several steps and Reserve Bank of India has supported the development of e-banking in India. The Government of India enacted the IT Act, 2000 with effect from October 17, 2000 and this act provides legal recognition to electronic transaction. India does not have specific regulatory laws for e-banking. The existing regulatory framework over banks has been extended to internet banking as well. However, certain guidelines have been issued to banks to recognize the risks arising from electronic modes and to
devise control mechanisms that are needed to mitigate such risks. Banks offering the E-banking services in India comply with these guidelines (Uppal, 2007). More and more people are using electronic banking products and services and because a larger section of the banks’ future customer base will be made up of computer literate customers, the bank must be able to offer these customers’ products and services that allow them to do their banking by electronic means. If they fail to do this they will, simply, not survive (Palsokar, 2007).

E-Banking is the banking of new era. Making banking services and products available to wholesale and retail customers with the help of an electronic distribution channel is called e-banking. This facility is a result of technological development and competition prevailing in Indian banking industry. In fact, banks have been using electronic and telecommunication networks for delivering a wide range of value added products and services. The devices have been telephone, personal computers including ATM. The delivery channels have been direct dial up connections, private and public networks. To this newer edition of e-banking are being added e.g. Internet banking and mobile banking. The use of ATM’s lead to the concept of ‘anywhere’ and ‘anytime’ banking. Through the use of ATM cards, one can operate his bank account to withdraw money from any of the bank’s ATM installed or available at the nearest site. This had broken down the time and space barriers. The new banks are providing some of the services exclusively through ATM’s. The growing popularity of personal computers, easy access to internet and World Wide Web (WWW), has increased the use of internet by banks as a channel for receiving instructions and also delivering their products and services to the customers. This is generally referred to as ‘Internet banking’ or I-banking
or Net banking. This is one of the newer forms of e-banking which is gaining popularity and its other popular name is on line banking (Gupta et. al., 2013).

(A) Electronic Banking Services for Customers:

(i) Automated Teller Machines (ATM): ATM provide the ability to withdraw or deposit funds, check account balances, transfer funds and check statement information to customers. ATM was one of the earliest electronic banking products. The first ATM, being introduced in the mid-1970 and it took time before customers became familiar with the ATM and came to accept it as an alternative way of doing their banking.

(ii) Electronic Fund Transfer (EFT): It is also electronic banking product that facilitates transfer of funds from any branch of a bank to any other branch of any bank in the shortest time.

(iii) Mobile Banking: A widespread use of mobile communications and their improving functionality means that stage is set for wider mobile banking adoption. There are still many hurdles in the way of mobile banking such as call costs, security and user’s resistance, but need for mobile banking, to support an increasingly mobile life style is such that many users will adopt it. Mobile banking also promises to be an answer to internet connectivity problems in some rural areas and developing countries (Shah & Clarke, 2009).

(iv) Personal Computer Banking: Personal Computer Banking or PC Banking is also a fast growing area in electronic banking. PC Banking lets customer’s access information on their accounts through a dial-up connection with their bank. Customers can perform basically all the transactions that are available with telephone banking. They
also have the ability, in some cases, to download information and process it in their own financial management software.

**(vi) Internet Banking:** Internet banking is an improvement over PC banking. Internet banking facility offers convenience of 24X7 banking to its customers. The bank can set up their system, much the same as PC Banking. It is accessible to anyone using the internet, not just the bank’s customers (Palsokar, 2007).

**(B) Inter-Banking Electronic Banking:** There are various inter-banking electronic banking services like RENTAS (Real Time Electronic Transfer of Funds and Securities), SWIFT (Security for Worldwide Interbank Financial Transfer), EDI (Electronic Data Interchange) and EFT (Electronic Fund Transfer).

**(C) Products (Cards):** There are various products which come under products of e-banking like Smart Card, Credit Card, Debit card etc.

### 1.5 Advantages of Electronic Banking for the Bank and the Customer

Electronic banking has assisted the banks in retain their customers and their market share by reducing costs in many areas, especially those associated with providing service to the customer and also to enhance their image. One of the main reasons electronic banking products were introduced was that the banks were losing their market share. If a customer comes into a branch to perform a routine task such as checking a balance or withdrawing funds, it passes on a cost to the bank. The cost of providing these routine transactions in a traditional branch environment is far greater than proving the same service by electronic means. Another benefit of electronic banking is that the ability to obtain accurate information quickly and easily has increased noticeably. It is beneficial for the banks as it increases their productivity and it also improves the delivery of quality
service to the customer. The availability of the services can be extended to 24 hours a day. Customer can make informed decisions due to the accuracy of the information available to him. However, the cost of implementing electronic banking products is also a deterrent for some banks. Though the costs are eventually recovered when the electronic banking product is up and running, the banks must still have the initial funds available to make it happen (Palsokar, 2007).

1.6 Development in IT related to bank activities

There are various developments of information technology related to banking activities like introduction of national electronic funds transfer, branch automation & networking, sharing of payment system delivery points, information security (IS) on the network in the banking and financial sector, real time gross settlement system, extension of membership of Indian Financial Network (INFINET) to banks and financial institutions. The brief details of these information technology related developments are as follows:

1) Introduction of National Electronic Funds Transfer :

Reserve bank of India had highlighted the usage of electronic funds transfer (EFT) on a huge scale to bring about greater effectiveness in the movement of funds with the annual policy statement of April, 2002 which has given reduction in risks in funds transfer. In order to ensure that the benefits of electronic modes of funds transfer are available across almost all the locations of the country and to provide for transfer of messages relating to EFT in a safe and secure manner, it is proposed to commence a national EFT (NEFT) using the facilities available under the structured financial messaging solution (SFMS) over the Indian financial network (INFINET).
2) Branch Automation and Networking:
Reserve bank of India had highlighted the need for banks bestowing special attention on the computerization and networking of the branches on a time-bound basis, in order to fully prepare themselves to participate effectively in the new products aimed at better payment and settlement services. Integration and consolidation have immense benefits for customers in terms of 'anytime banking' and 'anywhere banking' facilities.

3) Sharing of Payment System Delivery Points:
Progress in the delivery channels in Indian banking sector demonstrate the production of multiple payment delivery points such as branch banking, Automated Teller Machines (ATMs), Tele-banking, Internet-banking, Mobile-banking etc. While such separate efforts by individual banks ensure competition and product differentiation. In respect of providing ATM services, these efforts have very often been proved to be sub-optimal and high cost services. Banks which are maintaining sub-optimal ATMs are encouraged to join shared and strong network of ATMs operated by a service provider or other banks.

4) Information Security on the Network in Banking and Financial Sector:
In order to protect information on the networks, a variety of tools like firewalls, intrusion detection, anti-virus authentication, public key infrastructure etc. are available. The secured network was established by Institute for Development and Research in Banking Technology for the financial sector uses for enhancing information security, banks are encouraged to use the public key infrastructure by creating the required registration authority.
5) **Real Time Gross Settlement System (RTGS):**

The RTGS solution comprises of the software for arriving at real-time settlement of transactions using a queuing mechanism which would also take care of potential gridlock situations. It would also provide for temporary intra-day liquidity to participating members on the basis of collateralized repo facility. The RTGS solution would also provide for replacement of the existing accounting software in the deposit accounts department, RBI. The initial testing of the modules with the members was expected to commence during the second quarter of 2003.

6) **Extension of Membership of INFINET to Banks and Financial Institutions:**

The Indian Financial Network (INFINET) has appeared as a secure inter-bank financial communication backbone. The members of the INFINET constitute a closed user group comprising initially of public sector banks. The network was opened to other banks as well, encompassing old and new private sector banks, foreign banks and urban co-operative banks. (Kaptan and Choubey, 2003).

1.7 **E-Banking Risks**

E-Banking using the internet as an added delivery channel may shift bank risk profiles to some degree and create new risk control challenges for banks. There are various risks associated with e-banking. A brief description of those risks is as follows:

i. **Strategic risk:** Strategic risk differs from other risk categories in that it is more general and broad in nature. Strategic decisions to be taken by a bank’s Board of Directors and executive management will have implications for all other risk categories. Some of the strategic risks involved with E-Banking are directly linked with timing issues. There can be significant strategic risk