CHAPTER-III

AN OVERVIEW OF INDIAN BANKING INDUSTRY AND ITS TECHNOLOGY

3.1 INTRODUCTION

A bank is a financial institution that provides banking and other financial services to its customers. Generally a bank is an institution which provides fundamental banking services like accepting deposits and providing loans. Banks are the main participants of the financial system in India. All the banks safeguard the money and valuables and provide loans, credit, and payment services, such as checking accounts, money orders, and cashier’s cheques. The banks also offer investment and insurance products.

Before the establishment of banks, the financial activities were handled by money lenders and individuals. At that time the interest rates were very high. Also there was no security to public savings and no uniformity regarding loans. So to overcome such problems the organized banking sector was established, which was fully regulated by the government. The following functions of a bank explain the need of the bank and its importance:

- To provide security to the savings of customers.
- To control the supply of money and credit.
- To encourage public confidence in the working of the financial system, increase savings speedily and efficiently.
- To avoid focus of financial powers in the hands of a few individuals and institutions.
- To set equal norms and conditions (i.e. rate of interest, period of lending etc) to all types of customers.
3.2 HISTORY OF INDIAN BANKING SYSTEM

The first bank in India, called The General Bank of India was established in the year 1786. The East India Company established The Bank of Bengal/Calcutta (1809), Bank of Bombay (1840) and Bank of Madras (1843). The next bank was the Bank of Hindustan which was established in 1870. These three individual units (Bank of Calcutta, Bank of Bombay, and Bank of Madras) were called Presidency Banks. Allahabad Bank which was established in 1865 was for the first time completely run by Indians. Punjab National Bank Ltd. was set up in 1894 with headquarters at 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. In 1921, all presidency banks were amalgamated to 22 forms the Imperial Bank of India which was run by European Shareholders. After that the Reserve Bank of India was established in April 1935.

At the time of first phase the growth of banking sector was very slow. Between 1913 and 1948 there were approximately 1100 small banks in India. 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 Banking Regulation Act 1949 as per amending Act of 1965 (Act No.23 of 1965). Reserve Bank of India was vested with extensive powers for the supervision of banking in India as a Central Banking Authority.

After independence, Government has taken very significant steps with regard to Indian Banking Sector reforms. In 1955, the Imperial Bank of India was nationalized and was given the name "State Bank of India", to act as the principal agent of RBI and to handle banking transactions all over the country. It was established under State Bank of India Act, 1955. Seven banks forming subsidiary of State Bank of India were nationalized
in 1960. On 19th July, 1969, major process of nationalization was carried out. At the same time 14 major Indian commercial banks of the country were nationalized. In 1980, another six banks were nationalized, and thus raising the number of nationalized banks to 20. Seven more banks were nationalized with deposits over 200 crores. Till the year 1980 approximately 80% of the banking segment in India was under government’s ownership. On the suggestions of Narasimhan Committee, the Banking Regulation Act was amended in 1993 and thus the gates for the new private sector banks were opened. The following are the major steps taken by the Government of India to Regulate Banking institutions in the country:-

- 1949: Enactment of Banking Regulation Act.
- 1955: Nationalisation of State Bank of India.
- 1959: Nationalization of SBI subsidiaries.
- 1961: Insurance cover extended to deposits.
- 1971: Creation of credit guarantee corporation.
- 1975: Creation of regional rural banks.
- 1980: Nationalisation of seven banks with deposits over 200 Crores.
3.3 PHASES OF EVOLUTION IN INDIAN BANKING INDUSTRY

In the evolution of this strategic industry spanning over two centuries, immense developments have taken place in terms of the regulations governing it, the ownership structure, products and services offered and the technology deployed. The entire evolution can be classified into four distinct phases.

Phase I - Pre-Nationalisation Phase (prior to 1955)
Phase II - Era of Nationalisation and Consolidation (1955-1990)
Phase III - Introduction of Indian Financial & Banking Sector Reforms and Partial Liberalisation (1990-2004)
Phase IV - Period of Increased Liberalisation (2004 onwards)
Phase V - Licensing of new commercial banks, small banks and payment banks
# Figure 3.1 Evolution of Banking Industry

## Evolution of Indian Banking Industry

<table>
<thead>
<tr>
<th>TRIGGER EVENTS</th>
<th>PHASES</th>
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<td>Acceptance of recommendations of the Narasimhan Committee</td>
<td>Phase 3: Introduction of Indian financial &amp; Banking Sector reforms and</td>
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<td>Hike in the FDI ceiling for banking sector and declaration of roadmap for</td>
<td>Phase 4: Period of increased Liberalisation</td>
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<th>MAJOR CHANGES</th>
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<tr>
<td>• Birth of joint stock banking companies</td>
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<td>• Introduction of deposit banking and bank branches</td>
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<tr>
<td>• Presidency banks and other joint stock banks formed setting the foundation of modern banking system</td>
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<td>• SBI formed out of Imperial Bank</td>
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<tr>
<td>• Interest rate deregulated</td>
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<tr>
<td>• Statutory premption of resources eased more private sector players came in strengthened the system as a whole</td>
</tr>
<tr>
<td>• FDI ceiling for the banking sector increased to 74% from 49%</td>
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<tr>
<td>• Roadmap for inclusion of foreign banks declared</td>
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<tr>
<td>• More liberal branch licensing policy followed</td>
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<tr>
<td>• RBI approved to set up 10 Small Finance banks</td>
</tr>
<tr>
<td>• Roadmap for inclusion of payment banks declared</td>
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</tbody>
</table>

Source: D&B Industry Research Service
3.4 CLASSIFICATION OF INDIAN BANKING SECTOR

Indian banking industry has a diverse structure. The present structure of the Indian banking industry has been analysed on the basis of its organised status, business as well as product segmentation. The entire organised banking system comprises of scheduled and non-scheduled banks. Largely, this segment comprises of the scheduled banks, with the unscheduled ones forming a very small component. Banking needs of the financially excluded population is catered to by other unorganised entities distinct from banks, such as, moneylenders, pawnbrokers and indigenous bankers.

Figure 3.2 Indian Banking Industry

Source: D&B Industry Research Service
3.4.1 Scheduled Banks

A scheduled bank is a bank that is listed under the second schedule of the RBI Act, 1934. In order to be included under this schedule of the RBI Act, banks have to fulfill certain conditions such as having a paid up capital and reserves of at least 0.5 million and satisfying the Reserve Bank that its affairs are not being conducted in a manner prejudicial to the interests of its depositors. Scheduled banks are further classified into commercial and cooperative banks. The basic difference between scheduled commercial banks and scheduled cooperative banks is in their holding pattern. Scheduled cooperative banks are cooperative credit institutions that are registered under the Cooperative Societies Act. These banks work according to the cooperative principles of mutual assistance.

3.4.1.1 Scheduled Commercial Banks (SCBs)

SCBs in India are categorized into the five groups based on their ownership and/or their nature of operations. State Bank of India and its six associates (excluding State Bank of Saurashtra, which has been merged with the SBI with effect from August 13, 2008) are recognised as a separate category of SCBs, because of the distinct statutes (SBI Act, 1955 and SBI Subsidiary Banks Act, 1959) that govern them. Nationalised banks (10) and SBI and associates (7), together form the public sector banks group and control around 70% of the total credit and deposits businesses in India.

Private sector banks include the old private sector banks and the new generation private sector banks- which were incorporated according to the revised guidelines issued by the RBI regarding the entry of private sector banks in 1993. As at March end 2015, there were 12 old and 7 new generation private sector banks operating in India.
Foreign banks are present in the country either through complete branch/subsidiary route presence or through their representative offices. At the end of December 31st, 2015 totally 32 foreign banks were operating in India with 325 branches. Besides, 39 foreign banks were also operating in India through representative offices.

Regional Rural Banks (RRBs) were set up in September 1975 in order to develop the rural economy by providing banking services in such areas by combining the cooperative specialty of local orientation and the sound resource base which is the characteristic of commercial banks. RRBs have a unique structure, in the sense that their equity holding is jointly held by the central government, the concerned state government and the sponsor bank (in the ratio 50:15:35), which is responsible for assisting the RRB by providing financial, managerial and training aid and also subscribing to its share capital. Between 1975 and 1987, 196 RRBs were established. RRBs have grown in geographical coverage, reaching out to increasing number of rural clientele. At the end of December 2015, totally 56 RRBs was operating in India.

3.4.1.2 Scheduled Cooperative Banks

Scheduled cooperative banks in India can be broadly classified into urban credit cooperative institutions and rural cooperative credit institutions. Rural cooperative banks undertake long term as well as short term lending. Credit cooperatives in most states have a three tier structure (primary, district and state level).

3.4.2 Non-Scheduled Banks

Non-scheduled banks also function in the Indian banking space, in the form of Local Area Banks (LAB). As at March end 2009 there were only 4 LABs operating in India. Local area banks are banks that are set up under the scheme announced by the government of India in 1996, for the establishment of new private banks of a local nature;
with jurisdiction over a maximum of three contiguous districts. LABs aid in the mobilisation of funds of rural and semi-urban districts. Six LABs were originally licensed, but the license of one of them was cancelled due to irregularities in operations, and the other was amalgamated with Bank of Baroda in 2004 due to its weak financial position.

3.5 NATIONALISED BANKS VS PUBLIC SECTOR BANKS

Before discussing the difference between Nationalised banks and public sector banks one must know what is nationalization and public sector banks? Nationalization is a process whereby a national government or State takes over the private industry, organisation or assets into public ownership by an Act or ordinance or some other kind of orders. This strategy has been frequently adopted by socialist governments for transition from capitalism to socialism.

In India, since the independence following major nationalizations have taken place:

- 1949: RBI was nationalized (RBI was state owned at the time of Indian independence).
- 1953: Air India was nationalised under the Air Corporations Act 1953
- 1955: Control of Imperial Bank of India was acquired by RBI
- 1969: 14 Indian private banks were nationalised
- 1972: 106 Insurance companies were nationalised into four Insurance companies
- 1973: Coal Industry and Oil companies were nationalised
- 1980: 6 more Indian private banks were nationalised

Thus, now it becomes easier to understand that all those banks which were taken over through banking companies (Acquisition and Transfer of Undertaking) Bill are
called nationalised banks. Government of India (GoI) issued an Ordinance (Banking Companies acquisition and Transfer of Undertakings) 1969, and nationalised 14 largest commercial banks in India from the midnight of 19th July, 1969. These banks at that time contained 85% of bank deposits in India. Similarly in 1980, Government of India again nationalised 6 more banks. Thus, in total 20 banks were nationalised. Out of these New Bank of India was merged with PNB in 1993. Thus, now strictly speaking 19 nationalized banks exist. RBI on its website also lists under "Nationalised Banks" category only these 19 banks (Refer Appendix).

Public Sector Banks (PSBs) in India are banks where a majority stake (i.e. more than 50%) is held by a government. Thus at present all the nationalised banks are Public Sector banks. In addition to these, we can also say that IDBI Bank Ltd and SBI are also Public Sector Banks (though not nationalised bank) as Government of India has over 50% stake in these bank too.

3.5.1 Status of State Bank of India

At the time of independence, this bank was known as Imperial Bank of India and was a Joint Stock Company. In 1955, by provisions of the State Bank of India Act 1955, Reserve Bank of India acquired a controlling interest in the Imperial Bank of India. On 30th April 1955, the Imperial Bank of India became State Bank of India. RBI continued to have controlling interest in SBI till recently when Government of India decided to acquire RBI's stake in SBI so as to remove any conflict of interest (as RBI is the regulatory authority of even SBI).
3.5.2 Status of SBI Subsidiaries

It was in 1959 that government passed State Bank of India (Subsidiary Banks) Act and made certain princely state level Banks as associates of SBI. The seven banks that became the associate banks originally belonged to princely states until the government took over them between 1959 and May 1960. This was done to expand the base of SBI into rural areas. These seven subsidiaries continued till 2008, when the process of consolidation of SBI began with the merger of subsidiaries. State Bank of Saurashtra was merged with SBI in 2008 and State Bank of Indore was merged in 2010. Thus, at the end of 2012, there are 5 State bank subsidiaries. In 2013, State Bank of Hyderabad or some other subsidiary may be merged into SBI. (Refer Appendix)

SBI has controlling interest in these subsidiaries ranging from 75% to 100%. As on 30th June 2013, the five Associate Banks had a combined network of 5737 branches in India which are on core banking and 22668 ATMs networked with SBI ATMs providing value added services to clientele. Thus, we can say SBI was taken over by government much before the nationalisation of private sector, it is usually not classified as Nationalised Bank, and it is treated as a separate SBI group for the purpose of statistics. Five remaining (at the end of 2012) Subsidiaries of SBI are not separate and thus need not be counted as separate Banks as slowly they are likely to be merged with SBI. For the purpose of statistics, we should consider SBI as a separate Group (along with its five subsidiaries). But SBI will certainly be a Public Sector Bank as Government of India holds more than 50% of its shares.
3.5.3. Status of IDBI Bank Ltd

Industrial Development Bank of India (IDBI) came into being on 1st July, 1964 as a Development Financial Institution under IDBI Act 1964. It was regarded as a Public Financial Institution in terms of Companies Act. It continued as DFI till 2004, when it was transformed into a Bank. To convert this into Bank, Industrial Development Bank (Transfer of Undertaking and Repeal) Act 2003 was passed. In terms of provisions, a new company under the name of Industrial Development Bank of India Ltd. was incorporated as a Government company under the Companies Act on 27th September, 2004, and thus now it came to be known as IDBI Ltd with effect from 1st October 2004, but it also works as a Bank (in addition to the role of Financial Institutions) in terms of the Repeal Act.

With effect from 2nd April, 2005, IDBI Bank Ltd. (a wholly owned subsidiary of IDBI Ltd.) was finally amalgamated with IDBI Ltd. in terms of the provisions of Section 44A of the BR Act 1949. Thus, now it was known as IDBI Ltd. In order that the name of the Bank truly reflects the functions it is carrying on, it was decided to change the name into "IDBI Bank Limited" and it became effective from 7th May, 2008. Thus, now it is functioning as “IDBI Bank Limited”. As it was already a government company since its inception, it is wrong to call it a nationalized bank, but it certainly is a Public Sector Bank as GoI has above 70% shareholding in this Bank

3.6 BUSINESS SEGMENTATION

The entire range of banking operations are segmented into four broad heads- retail banking businesses, wholesale banking businesses, treasury operations and other banking activities. Banks have dedicated business units and branches for retail banking, wholesale banking (divided again into large corporate, mid corporate) etc.
3.6.1 Retail Banking

It includes exposures to individuals or small businesses. Retail banking activities are identified based on four criteria of orientation, granularity, product criterion and low value of individual exposures. In essence, these qualifiers imply that retail exposures should be to individuals or small businesses (whose annual turnover is limited to Rs. 0.50 billion) and could take any form of credit like cash credit, overdrafts etc. Retail banking exposures to one entity is limited to the extent of 0.2% of the total retail portfolio of the bank or the absolute limit of Rs. 50 million. Retail banking products on the liability side include all types of deposit accounts and mortgages and loans (personal, housing, educational etc) on the assets side of banks. It also includes other ancillary products and services like credit cards, demat accounts etc.
The major component of the retail portfolio of banks is housing loans, followed by auto loans. Retail banking segment is a well-diversified business segment. Most banks have a significant portion of their business contributed by retail banking activities. The largest players in retail banking in India are ICICI Bank, SBI, PNB, BOI, HDFC and Canara Bank. Among the large banks, ICICI bank is a major player in the retail banking space which has definitive strategies in place to boost its retail portfolio. It has a strong focus on movement towards cheaper channels of distribution, which is vital for the transaction of intensive retail business. SBI's retail business is also fast growing and it has a strategic business unit for the bank. Foreign banks have a somewhat restricted retail portfolio till recently. However, they are fast expanding in this business segment. The retail banking industry is likely to see a high competition scenario in near future.

3.6.2 Wholesale Banking

Wholesale banking includes high ticket exposures primarily to corporates. Internal processes of most banks classify wholesale banking into mid corporate and large corporates according to the size of exposure to the clients. A large portion of wholesale banking clients also account for off balance sheet businesses. Hedging solutions form a significant portion of exposures coming from corporates. Hence, wholesale banking clients are strategic for the banks with the view to gain other business from them. Various forms of financing, like project finance, leasing finance, finance for working capital, term finance etc. form part of wholesale banking transactions.

Most banks have a presence in wholesale banking. But this vertical is largely dominated by large Indian banks. While a large portion of the business of foreign banks comes from wholesale banking, their market share is still smaller than that of the larger Indian banks. A number of large private players among Indian banks are also very active.
in this segment. Among the players with the largest footprint in the wholesale banking space are SBI, ICICI Bank, IDBI Bank, Canara Bank, Bank of India, Punjab National Bank and Central Bank of India. Bank of Baroda has also been exhibiting quite robust results from its wholesale banking operations.

3.6.3 Treasury operations

Treasury operations include investments in debt market (sovereign and corporate), equity market, mutual funds, derivatives, and trading and forex operations. These functions can be proprietary activities, or can be undertaken on customer’s account. Treasury operations are important for managing the funding of the bank. Apart from core banking activities, which comprise primarily of lending, deposit taking functions and services; treasury income is a significant component of the earnings of banks. Treasury deals with the entire investment portfolio of banks and provides a range of products and services that deal primarily with foreign exchange, derivatives and securities. Treasury involves the front office (dealing room), mid office (risk management including independent reporting to the asset liability committee) and back office (settlement of deals executed, statutory funds management etc).

3.6.4 Other Banking Businesses

This is considered as a residual category which includes all those businesses of banks that do not fall under any of the aforesaid categories. This category includes Para banking activities like hire purchase activities, leasing business, merchant banking, factoring activities etc.
3.7 PRODUCTS OF BANKING INDUSTRY

The products of the banking industry broadly include deposit products, credit products and customized banking services. Most banks offer the same kind of products with minor variations. The basic difference is attained through quality of service and the delivery channels that are adopted. Apart from the generic products like deposits (demand deposits – current, savings and term deposits), loans and advances (short term and long term loans) and services, there have been innovations in terms and products such as the flexible term deposit, convertible savings deposit (wherein idle cash in savings account can be transferred to a fixed deposit), etc. Innovations have been increasingly directed towards the delivery channels used, with the focus shifting towards ATM transactions, phone and internet banking. Product differentiating services have been attached to most products, such as debit/ATM cards, credit cards, nomination and demat services.

Figure 3.4 Products of Banking Industry

<table>
<thead>
<tr>
<th>Deposits</th>
<th>Credit</th>
<th>Other customised services and products</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Time Deposits</td>
<td>• Bill purchased and</td>
<td>• Guarantee and advisory services</td>
</tr>
<tr>
<td>• Fixed deposits</td>
<td>discounted</td>
<td></td>
</tr>
<tr>
<td>• Recurring deposit</td>
<td>• Cash credit, overdrafts and loans</td>
<td>• Derivatives and other treasury products</td>
</tr>
<tr>
<td>• Demand deposit</td>
<td>• Term deposits</td>
<td></td>
</tr>
<tr>
<td>• Current Account</td>
<td></td>
<td>• Insurance and investments</td>
</tr>
<tr>
<td>• Savings Account</td>
<td></td>
<td>• Para banking products</td>
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<tr>
<td>• CASA deposit</td>
<td></td>
<td>• Other services</td>
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CASA Deposits refer to Current Account Saving Account Deposits. As an aggregate the CASA deposits are low interest deposits for the Banks compared to other types of the deposits. So banks tend to increase the CASA deposits and for this they offer
various services such as salary accounts to companies, and encouraging merchants to open current accounts, and use their cash-management facilities. The Banks’ with high CASA ratio (CASA deposits as % of total deposits) are in a more comfortable position than the Banks with low CASA ratios, which are more dependent on term deposits for their funding, and are vulnerable to interest rate shocks in the economy, plus lower spread they earn.

Other banking products include fee-based services that provide non-interest income to the banks. Corporate fee-based services offered by banks include treasury products; cash management services; letter of credit and bank guarantee; bill discounting; factoring and forfeiting services; foreign exchange services; merchant banking; leasing; credit rating; underwriting and custodial services. Retail fee-based services include remittances and payment facilities, wealth management, trading facilities and other value added services.

3.8 EVOLUTION OF BANKING TECHNOLOGY IN INDIA

The usage of information technology (IT), broadly referring to computers and peripheral equipment, has seen tremendous growth in service industries in the recent past. The most obvious example is perhaps the banking industry, where through the introduction of IT related products in internet banking, electronic payments, security investments, information exchanges (Berger, 2003), banks now can provide more diverse services to customers with less manpower.

3.8.1 Phases of Banking Technology in India

Technological innovation in general and information technology (IT) applications in particular, have had a major effect in banking and finance. Outstanding IT-based
innovations are considered and grouped into four distinct periods: early adoption, specific application, emergence and diffusion and their periods based on Indian scenarios are:

- Early adoption (1960-1980),
- Specific application (1980-1990),
- Emergence (1990-2000) and
- Diffusion (2000-till date).

**Table 3.1 Use of Technology in the organisation**

<table>
<thead>
<tr>
<th>Impact on the provisions of Retail Finance</th>
<th>Use of Technology in the organisation</th>
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<tbody>
<tr>
<td>Innovation in Service Offering</td>
<td>Reduce inter-market price differentials</td>
</tr>
<tr>
<td></td>
<td>• Automated bank statements</td>
</tr>
<tr>
<td></td>
<td>• Cheque guaranty cards.</td>
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<tr>
<td>Operational Function Innovation</td>
<td>Increased coordination between head office and branches</td>
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</tbody>
</table>
3.8.2 Major Landmarks Banking Technology and Transformation in India

- The introduction of MICR based cheque processing – a first for the region, during the years 1986-88;
- Computerisation of branches of banks – an activity which commenced from the late eighties with the introduction of ledger posting machines (LPMs), advanced ledger posting machines (ALPMs), followed by stand alone computer systems which metamorphosised into network based systems and the latest development pertaining to the installation of Core Banking solutions;
- Facilitating computerisation of Government business – from the late nineties which has now resulted in all branches handling Government business perform their functions using technology;
- The setting up of the Institute for Development and Research in Banking Technology (IDRBT), Hyderabad in the mid nineties, as a research and technology centre for the Banking sector
- The commissioning in 1999, of the Indian Financial Network as a Closed User Group based network for the exclusive use of the Banking sector with state-of-the-art safety and security. The network supports applications having features such as Public Key Infrastructure (PKI) which international networks such as S.W.I.F.T. are now planning to implement;
- Commencement of Certification Authority (CA) functions of the IDRBT for ensuring that electronic banking transactions get the requisite legal protection under the Information Technology Act, 2000;
- Ensuring Information Systems Audit (IS Audit) in the banks for which detailed guidelines relating to IS Audit were formulated and circulated
Enabling IT based delivery channels which enhance customer service at banks, in areas such as cash delivery through shared Automated Teller Machines (ATMs), card based transaction settlements etc.

Providing Guidelines for Internet Banking, which facilitated the banks to ensure that common minimum requirements relating to Internet Banking offerings were provided for;

Providing detailed specifications to banks on the configuration of systems related to critical inter-bank payment system applications such as Real Time Gross Settlement (RTGS) System, Negotiated Dealing System (NDS), Centralised Funds Management System (CFMS) etc.;

Implementation of the National Financial Switch (NFS) to ensure interconnectivity of shared ATMs and to provide for funds settlement across various banks.

Establishment of e-payment gateways for the benefit of customers (such as the gateways for funds transfers and other account related transactions) and for facilitating e-commerce.

Sharing of information through the secured internet website for the Centralised Data Based Management System-Internet (CDBMSI) project.

Providing a platform for transmission of electronic messages across banks using common standards, for facilitating ‘Straight Through Processing’ (STP) in the form of the Structured Financial Messaging System (SFMS), which will be similar to the SWIFT messaging pattern;

Setting up connectivity of all clearing houses of the country so as to enable the introduction of the National Settlement System (NSS)
Introducing a secured web site for internet based data transfer to Central and State Government. Government Departments may populate the data from the secured web site to their own systems based on their requirements.

3.8.3 Current Information Technology Tools

Apart from the already mentioned technology, banks adopt various Information Technology Tools. They are:

- Electronic Clearing and Settlement System
- Plastic Money
- Electronic Banking

3.8.3.1 Electronic Clearing and Settlement System

Some of the electronic and settlement system are OCR clearing, MICR clearing, Debit Clearing, RTGS, SFMS, and SWIFT.

Optical Character Recognition (OCR)

Optical Character Recognition is the machine recognition of printed characters. OCR systems can recognize many different OCR fonts, as well as typewriter and computer-printed characters. Advanced OCR systems can recognize hand printing. When a text document is scanned into the computer, it is turned into a bitmap, which is a picture of the text. OCR software analyzes the light and dark areas of the bitmap in order to identify each alphabetic letter and numeric digit. When it recognizes a character, it converts it into ASCII text (see ASCII file). Hand printing is much more difficult to analyze than machine-printed characters. Old, worn and smudged documents are also difficult to handle. Scanning documents and processing them with OCR is sometimes as much an art as it is a science.
When text documents are scanned, they are "photographed" and stored as pictures in the computer. OCR software analyzes the symbols in the image and converts each letter and digit into an ASCII character.

**Magnetic Ink Character Recognition**

Magnetic Ink Character Recognition is the machine recognition of numeric data printed with magnetically charged ink. It is used on bank cheques and deposit slips. MICR readers detect the characters and convert them into digital data. Although optical methods (OCR) have become as sophisticated as the early MICR technology, magnetic ink is still used. It serves as a deterrent to fraud, because a photocopied cheque will not be printed with magnetic ink.

**MICR clearing**

MICR (magnetic ink character recognition) is a technology used to verify the legitimacy or originality of paper documents, especially cheque. Special ink, which is sensitive to magnetic fields, is used in the printing of certain characters on the original documents. Information can be encoded in the magnetic characters.

The use of MICR can enhance security and minimize the losses caused by some types of crime. If a document is forged - for example, a counterfeit cheque is produced using a color photocopying machine, the magnetic-ink line will either not respond to magnetic fields, or will produce an incorrect code when scanned using a device designed to recover the information in the magnetic characters. Even a legitimate cheque can be rejected if the MICR reader indicates that the owner of the account has a history of writing bad cheques. The MICR clearing during the period from 2011-12 to 2014-2015 has been discussed in the Table 3.2. With its volume and value.
Table No.3.2 Performance of Magnetic Ink Character Recognition (MICR)

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume (million)</th>
<th>Value (in billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011-12</td>
<td>111.4</td>
<td>8,020</td>
</tr>
<tr>
<td>2012-13</td>
<td>823.3</td>
<td>57,504</td>
</tr>
<tr>
<td>2013-14</td>
<td>440.1</td>
<td>30,942.8</td>
</tr>
<tr>
<td>2014-15</td>
<td>22.1</td>
<td>1,850.4</td>
</tr>
</tbody>
</table>

Source: Reserve bank of India Annual reports, Aug 2015.

From the table it is clearly understood that the volume and value of MICR clearing got reduced for the past three years and this is because of the introduction of Cheque Truncated system (CTS).

Electronic Cheques

Electronic cheques are another form of Electronic tokens. They are designed to accommodate many individuals and entities that might prefer to pay on credit or through some mechanism other than cash. Once registered, a buyer can then contact sellers of goods and services. To complete a transaction, the buyer sends a cheque to the seller for a certain amount of money. These cheques may be sent using Email or other Transport methods. When deposited, the cheque authorises the transfer of account balances from the account against which the cheque was drawn to the account to which the cheque was deposited. The electronic cheques are modeled on paper cheques, except that they are initiated electronically. They use digital signatures for signing and endorsing and require the use of digital certificates to authenticate the payer, the payer’s bank and bank account. They are delivered either by direct transmission using telephone lines or by public networks such as the Internet.
Benefits of electronic Cheques

- It is well suited for clearing micro payments. Conventional cryptography of e-cheques makes them easier to process than systems based on public key cryptography (like digital cash).
- Firms can use them in more cost-effective manner.
- E-Cheques create float and the availability of float is an important requirement of Commerce.

Cheque Truncation System (CTS)

CTS stands for Cheque Truncation System and essentially means that instead of sending the cheque in physical form by the collecting bank to the paying bank, an electronic image of the cheque is transmitted to the drawee branch for payment through the clearing house, thereby eliminating the cumbersome physical presentation of the cheque to the paying bank, thus saving time and costs involved in traditional clearing system. This was introduced as a pilot project in the National Capital Region in 2008 and in Chennai from September 2011. With the movement of cheques from one bank to another having been stopped, there is no fear of loss of cheques in transit and chances of cheques being lost due to mishandling, etc are totally avoided.

Benefits to customers

Customers can do real time tracking. Reconciliation of accounts will be much easier for all customers and it is very secure as compared to current system. All types of cheques can be accessed for clearing as it will work in the same traditional system.
Table No.3.3 Performance of cheque Truncation System

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume (million)</th>
<th>Growth (in %)</th>
<th>Value (in billion)</th>
<th>Growth (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-13</td>
<td>275</td>
<td>-</td>
<td>21,799</td>
<td>-</td>
</tr>
<tr>
<td>2013-14</td>
<td>591.4</td>
<td>114.9</td>
<td>44,691</td>
<td>105</td>
</tr>
<tr>
<td>2014-15</td>
<td>964.9</td>
<td>63.1</td>
<td>66,770</td>
<td>49.4</td>
</tr>
</tbody>
</table>

Source: Reserve bank of India Annual reports, Aug 2015.

The table 3.3 clearly shows the performance of Cheque Truncation System of commercial banks from 2012-13 to 2014-15. The volume and value of Cheque Truncation System clearing are shown in the table. The annual growth of volume in the year 2013-14 is 114 percent and in value the growth rate is 105 percent.

3.8.3.2. Plastic Money

- Credit Card
- Debit Card
- Pre-Paid payment Instruments

Credit card

Credit card is a plastic card issued by any bank which is ready to lend money to its customer or user. Basically, credit card is a synthetic card made from a laminated plastic sheet and other materials like paints, magnetic stripe, microchip (IC), gelatin, hologram, etc., Credit card entitles the customers to buy goods and services from merchants, traders and other parties, based on the credit sanctioned to them. Credit should be used within a prescribed credit limit. This limit is based on the earning capacity and credit worthiness of a credit card holder as communicated by the bank to their customers. The customers should repay the amount of credit-card transactions within the credit
period i.e. 30-45 days otherwise interest will be imposed along with the credit amount. If the customers want to withdraw cash from the automated teller machine using credit card, they can but the interest would be very high in that case.

**Debit card**

A debit card (also known as a bank card or cheque card) is a plastic card that provides an alternative payment method to cash when making purchases. Functionally, it can be called an electronic cheque, as the funds are withdrawn directly from either the bank account or from the remaining balance on the card. In some cases, the cards are designed exclusively for use on the Internet, and so there is no physical card.

The use of debit cards has become widespread in many countries and has overtaken the cheque and in some instances cash transactions by volume. Like credit cards, debit cards are used widely for telephone and Internet purchases, and unlike credit cards the funds are transferred from the bearer's bank account instead of having the bearer to pay back on a later date. Debit cards can also allow for instant withdrawal of cash, acting as the ATM card for withdrawing cash and as a cheque guarantee card. Merchants can also offer "cash back"/"cash out" facilities to customers, where a customer can withdraw cash along with their purchase.

**Difference between Credit Card and Debit Card**

For consumers, the difference between a "debit card" and a "credit card" is that the debit card deducts the balance from a deposit account, whereas the credit card allows the consumer to spend money on credit to the issuing bank. In other words, a debit card uses the money you have and a credit card uses the money you don't have. "Debit cards" which are linked directly to account have sometimes dual-purpose, so that they can be used as a credit card, and can be charged by merchants using the traditional credit
networks. A merchant will ask for "credit or debit?" if the card is a combined credit + debit card. If the payee chooses "credit", the credit balance will debit the amount of the purchase; if the payee chooses "debit", the bank account balance will be debited the amount of the purchase. The "debit" networks usually require a personal identification number be supplied. The "credit" networks typically require that purchases be made in person and often allow cards to be charged with only a signature, and/or picture ID. However, most merchant agreements in the United States forbid picture ID as a requirement to use a Credit Card.

**Types of debit card**

A typical debit card contains Issuing bank logo, EMV chip, Hologram, Card number, Card brand logo, Expiration date, Cardholder's name. The reverse side of a typical debit card contains Magnetic stripe, Signature strip, Card Security Code. There are currently three ways that debit card transactions are processed: online debit (also known as PIN debit), offline debit (also known as signature debit) and Electronic Purse Card.

**Prepaid payment instrument**

Prepaid payment instruments are those which facilitate purchase of goods and services against the value stored on such instruments. The value stored on such instruments represents the value paid for by the holder, by cash, by debit to a bank account, or by credit card. The Prepaid instruments can be issued as smart cards, magnetic stripe cards, internet accounts, internet wallets, mobile accounts, mobile wallets, paper vouchers and any such instruments which can be used to access the prepaid amount (collectively called Payment Instruments hereafter). The detailed definition of mobile wallet and its functions would be discussed in the next chapter of this study.
3.8.3.3 Electronic Payment Services

Real Time Gross Settlement (RTGS)

Real Time Gross Settlement system, introduced in India since March 2004, is an Interlink Research Analysis system through which electronics instructions can be given by banks to transfer funds from their account to the account of another bank. The (RTGS) Real Time Gross Settlement system is maintained and operated by the RBI and provides a means of efficient and faster funds transfer among banks facilitating their financial operations. As the name suggests, funds transfer among banks takes place on a ‘Real Time’ basis. Therefore, money can reach the beneficiary instantaneously and the beneficiary’s bank has the responsibility to credit the beneficiary’s account within two hours.

Table No 3.4 Performance of Real-Time Gross Settlement

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume (million)</th>
<th>Growth (in %)</th>
<th>Value (in billion)</th>
<th>Growth (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-13</td>
<td>68.5</td>
<td>-</td>
<td>676,841.0</td>
<td>-</td>
</tr>
<tr>
<td>2013-14</td>
<td>81.1</td>
<td>18.9</td>
<td>734,252.4</td>
<td>8.4</td>
</tr>
<tr>
<td>2014-15</td>
<td>92.8</td>
<td>14.4</td>
<td>754,032.4</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Source: Reserve bank of India Annual reports, Aug 2015.

Table 3.4 shows the performance of Real-Time Gross Settlement transactions of commercial banks from the year 2012-13 to 2014-15. The Real-Time Gross Settlement volume and value of the transactions is given in the table 3.3 for three years. The volume of Real-Time Gross Settlement is good and its annual growth is 18.9 percent between the years 2013-14 whereas for 2014-15 it was 14.4 percent. It shows that the utilization of
this technology is on the increasing trend and its annual growth is high in 2013-14. The value of the Real-Time Gross Settlement shows an average of 5 percent growth.

**National Electronic Funds Transfer (NEFT)**

NEFT stands for National Electronic Fund Transfer & it was launched in November 2005 by RBI. It's 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 but it’s done in batches. A lot of transactions are settled in one go in each batch. 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 on 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.

**Table No.3.5 Performance of National Electronic Fund Transfer**

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume (million)</th>
<th>Growth (in %)</th>
<th>Value (in billion)</th>
<th>Growth (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-13</td>
<td>394.1</td>
<td>-</td>
<td>29,022.4</td>
<td>-</td>
</tr>
<tr>
<td>2013-14</td>
<td>661.0</td>
<td>67.7</td>
<td>43,785.5</td>
<td>50.9</td>
</tr>
<tr>
<td>2014-15</td>
<td>927.6</td>
<td>40.3</td>
<td>59,803.8</td>
<td>36.6</td>
</tr>
</tbody>
</table>

*Source: Reserve bank of India Annual reports, Aug 2015.*

Table3.5 shows the performance of National Electronic Fund Transfer transactions of commercial banks from the year 2012-13 to 2014-15. The National Electronic Fund Transfer volume and value of the transactions are given in the table 3.5 for three years. The volume of Real-Time Gross Settlement is good and its annual growth
is 67.7 percent between the years 2013-14 whereas for 2014-15 it was 40.3 percent. It shows that the utilization of this technology is on the increasing trend and its annual growth is high in 2013-14. The value of the Real-Time Gross Settlement shows an average of 43.8 percent growth.

**Difference between NEFT and RTGS**

The fundamental difference between RTGS and NEFT is that while RTGS is based on gross settlement, NEFT is based on net-settlement. In Gross settlement a transaction is completed on a one-to-one basis without bunching with other transactions. As for a Deferred Net Basis (DNS), or net-settlement, transactions are completed in batches at specific times. Here, all transfers will be held up until a specific time. RTGS transactions are processed throughout the working hours of the system.

RTGS transactions involve large amounts of cash; basically funds above Rs 100,000 may be transferred using this system. For NEFT, any amount below Rs 100,000 may be transferred, and this system is generally for smaller value transactions involving smaller amounts of money. RTGS processes in real-time (‘push’ transfer), while NEFT processes in cycles during the given working day. This causes a NEFT transaction that is initiated later than the last cycle to be completed the next day.

**3.9 CONCLUSION**

A brief overview of the Indian banking, its history with the changes that have taken place, the post liberalisation period reforms and how they have culminated in the infusion of technology into the banking system with a view to improving efficiency and productivity have been dealt with in this chapter. The business segmentation of Indian banking industry was clearly mentioned. The various Information technologies used in the commercial banks and their performance statistics were also discussed in this chapter.
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