CHAPTER 1

MEANING AND CONCEPT OF MODERN TECHNOLOGY IN BANKING

This chapter is devoted to the historical perspective and organizational structure of Indian banking industry. The chapter also discusses origin and concept of automation, information technology in Indian banking industry, challenges and reforms in Indian banking as well as different types of modern technologies along with their features and advantages.

1.1 INTRODUCTION

The year 1991 marked a decisive changing point in India's economic policy since Independence in 1947. Following the 1991 balance of payments crisis, structural reforms were initiated that fundamentally changed the prevailing economic policy in which the state was supposed to take the "commanding heights" of the economy. After decades of far reaching government involvement in the business world, known as the "mixed economy" approach, the private sector started to play a more prominent role (Acharya, 2002)\(^1\). The enacted reforms not only affected the real sector of the economy, but the banking sector as well. Characteristics of banking in India before 1991 were a significant degree of state ownership and far reaching regulations concerning, among others, the allocation of credit and the setting of interest rates. The blueprint for banking sector reforms was the 1991 report of the Narasimham Committee. Reforms taken since then include a deregulation of interest rates, an easing of directed credit rules under the priority sector lending arrangements, a reduction of statutory pre-emption and a lowering of entry barriers for both domestic and foreign players (Bhide, Prasad and Ghosh, 2001)\(^2\). The regulations in India are commonly characterized as "financial repression". The financial liberalization literature assumes that removal of repressionist policies will allow the banking sector to better perform its functions of mobilizing savings and allocating capital which ultimately results in higher growth rates (Levine, 1997)\(^3\).
The banking sector in India emerged largely unscathed from the global financial crisis of 2007-08, but faced a slowdown in the momentum of growth due to the weakening of trade, finance and confidence channels. However, post crisis, the economic growth in most emerging market economies (EMEs) including India recovered, while growth remained anemic in advanced economies. Instability of sovereign debt markets in the Euro zone, political turmoil in the Middle East and North African (MENA) region, calamities in Japan, sovereign debt downgrade of the United States in August this year and the persistently elevated levels of commodity prices have together led to an accentuation of downside risks to global growth. While these risks are expected to recede gradually over time, the long-term sustainability. Dominated, banks' ability to withstand stress is critical to overall financial stability. A series of stress tests conducted by the Reserve Bank in respect of credit, liquidity and interest rate risks showed that banks remained reasonably resilient. However, under extreme shocks, some banks could face moderate liquidity problems and their profitability could be affected of higher growth in India will depend crucially on the ability of the banking sector to mobilize the savings and meet the credit needs of the growing economy through innovative financial instruments and services that foster financial inclusion and provide efficient and transparent delivery of credit. Despite the challenging headwinds from domestic and international developments, the performance of Indian banks remained robust during 2010-11. The resilience of the banking sector was marked by improvement in the capital base, asset quality and profitability. Commercial banks in India have already adopted standardized approaches under Basel II. It is time for larger banks to seriously consider upgrading their systems and migrating to advanced approaches. Adoption of advanced approaches requires simultaneous use of the underlying processes in the day-to-day risk management of banks. In the background of the recent global regulatory developments, a question often discussed is whether the Indian banks are prepared for Basel III. The building blocks of Basel III, are by now, quite well known: higher and better quality capital; an Internationally harmonized leverage ratio to constrain excessive risk taking; capital buffers which would be built up in good times so that they can be utilized in times of
stress; minimum global liquidity standards and stronger standards for supervision, public disclosure and risk management.

Quick assessments show that at the aggregate level Indian banks will not have any problem in adjusting to the new capital rules both in terms of quantum and quality. Indian banks are comfortably placed in terms of compliance with the new capital rules. One point to note though is that the comparative position is at the aggregate level; a few individual banks may fall short of the Basel III norms and will have to augment their capital. There will be challenges of upgrading risk management systems and meeting the credit needs of a rapidly growing economy even while adjusting to a more demanding regulatory regime. In addition to countercyclical capital buffers, Basel III also envisages countercyclical provisions.

In India, banks have a stock of floating provisions which the Reserve Bank has not permitted to be used, except under a situation of systemic stress. While the floating provisions may serve the purpose of countercyclical provision, a framework is necessary for allowing its use. As an interim measure, the Reserve Bank has been trying to develop a methodology based on the Spanish dynamic provisioning system. This, however, has not been easy given the lack of required data and analytics with the banks. Migration to Basel III requires a high level of liquidity to be maintained through a pool of liquid assets. The definition of liquid assets is very stringent including the requirement that they should be freely available. By and by several measures have been initiated and implemented for improving and strengthening the competitive position of Indian banking industry. Such measures include e-banking, capital adequacy norms, bank entry into mutual funds and insurance sector business, etc. Indian banking system has several outstanding achievements to its credit, the most striking of which is its reach. An extensive banking network has been established in last thirty years and Indian banking system is no longer confined to metropolitan cities and large towns. In fact, Indian banks are now spread out in the remote corners of our country. In terms of branches, Indian banking system is one of the largest in the world.

The major players of Indian financial system are commercial banks. Traditional function of banking is to accept deposits and to make loans and
advances, of late, there has been witnessed a tremendous development in the realm of commercial banks, thanks to the sweeping innovations that are taking place in information technology. Electronic banking is an offshoot of such an innovative development. The Indian banking industry has already started making sufficient progress in automation.

1.2 GENESIS OF INDIAN BANKING INDUSTRY

Bank of Hindustan, set up in 1870, was the earliest Indian bank. Banking in India on modern lines started with establishment of three Presidency banks under Presidency Bank’s Act 1876 i.e. Bank of Calcutta, Bank of Bombay and Bank of Madras. In 1921, all presidency banks were amalgamated to form the Imperial Bank of India. The Imperial bank also carried out limited central banking functions prior to the establishment of Reserve Bank of India. It engaged in all types of commercial banking business except dealing in foreign exchange.

Reserve Bank of India Act was passed in 1934 and the Reserve Bank of India was constituted as an apex bank without major government ownership. Banking Regulation Act was passed in 1949. This regulation brought the Reserve Bank of India under government control. Under this act the Reserve Bank of India got wide ranging powers for supervision and control of banks. The act also vested licensing powers and authority to conduct inspection with the Reserve Bank of India.

In 1955, the Reserve Bank of India acquired control of the Imperial Bank of India, which was renamed as the State Bank of India. In 1959, the State Bank of India took control over eight banks floated in erstwhile princely states, making them its 100 percent subsidiaries. The Reserve Bank of India was empowered in 1960, to force compulsory merger of weak banks with strong ones. The total number of banks was thus reduced from 566 in 1951 to 85 in 1969.

In July 1969, the Government of India nationalized 14 banks having deposits of Rs.50 crores and above. In 1980, the government acquired six more banks with deposits more than 200 crores. Nationalization of banks was to make them play the role of catalytic agents for economic growth. These
banks were now expected to venture into unexplored territories. The pace and pattern of growth witnessed by Indian banking industry over past few decades, especially in the past nationalization period, has no parallel anywhere else in the world. However, the Indian banking "Hare", which was running fast, soon got tired and showed signs of sickness. Complacency crept into banking operations, non-performing assets multiplied, real profit declined, frauds increased and customer services became a casualty. Indian banking made a significant progress after nationalization. There was a complete transformation from class banking to mass banking during the period. The financial sector reforms, which became a universal phenomenon, had influenced the Indian banking system as well. The history of Indian banking can be separated into three distinct phases in post independence era. In phase I, between 1957-69, banks were under private ownership catering to special categories of clients, which did not allow quantitative expansion of business volumes. The second phase between 1969-92 characterized the social banking resulting in the emergence of large public sector banks with rapid expansion of branch network. The third phase 1992 onwards, reflects a prudential higher accounting and disclosure standards according to the best practices of international standards.

Commercial banks play an important role in the development of economy. In fact, it is difficult to imagine our economic system functioning efficiently without many of their services. Banking segment in India functions under the umbrella of the Reserve Bank of India – the regulatory Central Bank. This segment consists of commercial banks, which are classified into Public Sector Banks, Private Sector Banks and Foreign Banks. Public Sector Banks have either the Government of India or the Reserve Bank of India as the majority shareholders. Public Sector Banks comprise of State Bank of India, its associates and nationalized banks.

1.3 ORGANIZATIONAL STRUCTURE OF INDIAN BANKING INDUSTRY

Structure plays an important role in defining the authority and responsibility of particular organizations who will work under whom is defined
by the organization. Banking industry has its own organizational structure. The Reserve Bank of India is the main controller of the banking industry. The structure of Indian banking industry can be classified into two categories i.e. the organized sector and the unorganized sector. It can be explained with the help of Figure-1.1.

**Figure 1.1**

![Diagram showing the structure of Indian banking industry](image)

### 1.3.1 Reserve Bank of India: Origin, Growth and Functions

The reserve bank of India is a central bank and was established in April 1, 1935 in accordance with the provisions of reserve bank of India act 1934. The central office of RBI is located at Mumbai since inception. Though originally the reserve bank of India was privately owned, since nationalization in 1949, RBI is fully owned by the Government of India. It was inaugurated with share capital of Rs. 5 Crores divided into shares of Rs. 100 each fully paid up. RBI is governed by a central board (headed by a governor) appointed by the central government of India. RBI has 22 regional offices across India. The reserve bank of India was nationalized in the year 1949. The general
superintendence and direction of the bank is entrusted to central board of directors of 20 members, the Governor and four deputy Governors, one Governmental official from the ministry of Finance, ten nominated directors by the government to give representation to important elements in the economic life of the country, and the four nominated director by the Central Government to represent the four local boards with the headquarters at Mumbai, Kolkata, Chennai and New Delhi. Local Board consists of five members each central government appointed for a term of four years to represent territorial and economic interests and the interests of cooperative and indigenous banks. The RBI Act 1934 was commenced on April 1, 1935. The Act, 1934 provides the statutory basis of the functioning of the bank. The bank was constituted for the need of following:

- To regulate the issues of banknotes.
- To maintain reserves with a view to securing monetary stability
- To operate the credit and currency system of the country to its advantage.

Functions of RBI as a central bank of India are explained briefly as follows:

- **Bank of Issue:** The RBI formulates, implements, and monitors the monetary policy. Its main objective is maintaining price stability and ensuring adequate flow of credit to Productive sector.

- **Regulator-Supervisor of the financial system:** RBI prescribes broad parameters of banking operations within which the country's banking and financial system functions. Their main objective is to maintain public confidence in the system, protect depositor's interest and provide cost effective banking services to the public.

- **Manager of exchange control:** The manager of exchange control department manages the foreign exchange, according to the foreign exchange management act, 1999. The manager's main objective is to facilitate external trade and payment and promote orderly development and maintenance of foreign exchange market in India.
• **Issuer of currency:** A person who works as an issuer, issues and exchanges or destroys the currency and coins that are not fit for circulation. His main objective is to give the public adequate quantity of supplies of currency notes and coins and in good quality.

• **Developmental role:** The RBI performs the wide range of promotional functions to support national objectives such as contests, coupons maintaining good public relations and many more.

**Related functions:** There are also some of the related functions to the above mentioned main functions. They are such as, banker to the government, banker to banks etc.

• Banker to government performs merchant banking function for the central and the state governments; also acts as their banker.

• Banker to banks maintains banking accounts to all scheduled banks.

**Controller of Credit:** RBI performs the following tasks:

• It holds the cash reserves of all the scheduled banks.

• It controls the credit operations of banks through quantitative and qualitative controls.

• It controls the banking system through the system of licensing, inspection and calling for information.

• It acts as the lender of the last resort by providing rediscount facilities to scheduled banks.

**Supervisory Functions:** In addition to its traditional central banking functions, the Reserve Bank performs certain non-monetary functions of the nature of supervision of banks and promotion of sound banking in India. The Reserve Bank Act 1934 and the banking regulation act 1949 have given the RBI wide powers of supervision and control over commercial and co-operative banks, relating to licensing and establishments, branch expansion, liquidity of their assets, management and methods of working, amalgamation, reconstruction and liquidation. The RBI is authorized to carry out periodical inspections of the banks and to call for returns and necessary information from them. The nationalisation of 14 major Indian scheduled banks in July
1969 has imposed new responsibilities on the RBI for directing the growth of banking and credit policies towards more rapid development of the economy and realisation of certain desired social objectives. The supervisory functions of the RBI have helped a great deal in improving the standard of banking in India to develop on sound lines and to improve the methods of their operation.

**Promotional Functions:** With economic growth assuming a new urgency since independence, the range of the Reserve Bank's functions has steadily widened. The bank now performs a variety of developmental and promotional functions, which, at one time, were regarded as outside the normal scope of central banking. The Reserve bank was asked to promote banking habit, extend banking facilities to rural and semi-urban areas, and establish and promote new specialized financing agencies.

1.3.2 Indian Scheduled Commercial Banks

The commercial banking structure in India consists of scheduled commercial banks, and unscheduled banks.

**Scheduled Banks:** Scheduled Banks in India constitute those banks which have been included in the second schedule of RBI act 1934. RBI in turn includes only those banks in this schedule which satisfy the criteria laid down vide section 42(6a) of the Act. “Scheduled banks in India” means the State Bank of India constituted under the State Bank of India Act, 1955 (23 of 1955), a subsidiary bank as defined in the State Bank of India (subsidiary banks) Act, 1959 (38 of 1959), a corresponding new bank constituted under section 3 of the Banking companies (Acquisition and Transfer of Undertakings) Act, 1980 (40 of 1980), or any other bank being a bank included in the Second Schedule to the Reserve bank of India Act, 1934 (2 of 1934), but does not include a co-operative bank”. For the purpose of assessment of performance of banks, the Reserve Bank of India categories those banks as public sector banks, old private sector banks, new private sector banks and foreign banks, i.e. private sector, public sector, and foreign banks come under the umbrella of scheduled commercial banks.
**Unscheduled Banks**: “Unscheduled Bank in India” means a banking company as defined in clause (c) of section 5 of the Banking Regulation Act, 1949 (10 of 1949), which is not a scheduled bank”.

### 1.3.3 Regional Rural Banks

The government of India set up Regional Rural Banks (RRBs) on October 2, 1975. The banks provide credit to the weaker sections of the rural areas, particularly the small and marginal farmers, agricultural labourers, and small entrepreneurs. Initially, five RRBs were set up on October 2, 1975 which was sponsored by Syndicate Bank, State Bank of India, Punjab National Bank, United Commercial Bank and United Bank of India. The total authorized capital was fixed at Rs. 1 Crore which has since been raised to Rs. 5 Crores. There are several concessions enjoyed by the RRBs by Reserve Bank of India such as lower interest rates and refinancing facilities from NABARD like lower cash ratio, lower statutory liquidity ratio, lower rate of interest on loans taken from sponsoring banks, managerial and staff assistance from the sponsoring bank and reimbursement of the expenses on staff training. The RRBs are under the control of NABARD. NABARD has the responsibility of laying down the policies for the RRBs, to oversee their operations, provide refinance facilities, to monitor their performance and to attend their problems.

### 1.3.4 Co-operative Banks

A co-operative bank is a financial entity which belongs to its members, who are at the same time the owners and the customers of their bank. Co-operative banks are often created by persons belonging to the same local or professional community or sharing a common interest. Co-operative banks generally provide their members with a wide range of banking and financial services (loans, deposits, banking accounts etc.). Co-operative banks differ from stockholder banks by their organization, their goals, their values and their governance. In most countries, they are supervised and controlled by banking authorities and have to respect prudential banking regulations, which put them at a level playing field with stockholder banks. Depending on countries, this control and supervision can be implemented directly by state entities or delegated to a co-operative federation or central body.
Co-operative banking is retail and commercial banking organized on a co-operative basis. Co-operative banking institutions take deposits and lend money in most parts of the world. Co-operative banking, includes retail banking, as carried out by credit unions, mutual savings and loan associations, building societies and co-operatives, as well as commercial banking services provided by manual organizations (such as co-operative federations) to co-operative businesses. The structure of commercial banking is of branch-banking type; while the co-operative banking structure is a three-tier federal one.

- A State Co-operative Bank works at the apex level (ie. works at state level).
- The Central Co-operative Bank works at the Intermediate Level. (ie. District Co-operative Banks ltd. works at district level)
- Primary co-operative credit societies at base level (At village level)

Even if co-operative banks organizational rules can vary according to their respective national legislations, co-operative banks share common features as follows:

**Customer-owned entities:** In a co-operative bank, the needs of the customers meet the needs of the owners, as co-operative bank members are both. As a consequence, the first aim of a co-operative bank is not to maximize profit but to provide the best possible products and services to its members. Some co-operative banks only operate with their members but most of them also admit non-member clients to benefit from their banking and financial services.

**Democratic member control:** Co-operative banks are owned and controlled by their members, who democratically elect the board of directors. Members usually have equal voting rights, according to the co-operative principle of "one person, one vote".

**Profit allocation:** In a co-operative bank, a significant part of the yearly profit, benefits or surplus is usually allocated to constitute reserves. A part of this profit can also be distributed to the co-operative members, with legal or statutory limitations in most cases. Profit is usually allocated to members
either through a patronage dividend, which is related to the use of the co-operative's products and services by each member, or through an interest or a dividend, which is related to the number of shares subscribed by each member.

1.3.5 Types of Co-operative Banks

The co-operative banks are small-sized units which operate both in urban and non-urban centers. They finance small borrowers in industrial and trade sectors besides professional and salary classes. Regulated by the Reserve Bank of India, they are governed by the Banking Regulations Act 1949 and banking laws (co-operative societies) act, 1965.

State co-operative banks

The state co-operative bank is a federation of central co-operative bank and acts as a watchdog of the co-operative banking structure in the state. Its funds are obtained from share capital, deposits, loans and overdrafts from the Reserve Bank of India. The state cooperative banks lend money to central co-operative banks and primary societies and not directly to the farmers.

Urban Co-operative Banks

The term Urban Co-operative Banks (UCBs), though not formally defined, refers to primary co-operative banks located in urban and semi-urban areas. These banks, till 1996, were allowed to lend money only for non-agricultural purposes. This distinction does not hold today. These banks were traditionally centered on communities, localities, work place groups. They essentially lend to small borrowers and businesses. Today, their scope of operations has widened considerably.

1.4 DEVELOPMENT OF BANKING TECHNOLOGY IN INDIA

In these paragraphs, origin and concept of automation in Indian banking industry has been discussed.

1.4.1 Origin of Automation in Banking

Automation in office is becoming common place and is steadily and surely advancing into dominant position in performing office work. Since 1900,
office practices have gone through several phases due to growth in size of business enterprise and the resulting increased volume of office work, the increased cost of services and material and rapid technological and progress scientifically.

The word "automation" first appeared in print about 1948 AD. Since that time, this word has stimulated much discussion and controversy. It has been accorded different meanings. "Some consider automation as a synonym for technological change, while others believe it denotes mechanization". Automation is said to be complete in a particular area or field when these three components or ingredients are operating simultaneously in an integrated fashion (integration, feedback, control and computer technology).

1.4.2 Adoption and Diffusion as Concept

The contribution of new technology to economic growth can only be realized when and if the new technology is widely diffused and used. Diffusion itself results from a series of individual decisions to begin using the new technology, decisions which are often the result of a comparison of the uncertain benefits of the new invention with the uncertain costs of adopting it.

According to Margaret Souries and Sanjay Kaushik in the Dictionary of Information Technology automation comprises four things, (1) the implementation of process by automatic means, (2) conversion of a procedure, process or equipment to automatic operation, (3) theory, art or technique of making process more automatic and (4) the investigation, design, development and application of methods rendering the process automatic, self-moving or self-controlling.

In today's technologically advanced environment, Core Banking Solution (CBS), has not remained an edge anymore, but has become the basic prerequisite for any bank. Building on this, banks need to move on to adapting higher technology in order to provide better products and upgrade their risk management systems. As we become global, banks would need to become technologically more sophisticated in diverse areas, whether it is
moving towards adopting advanced approaches in Basle II or in upgrading their delivery channels for providing better customer service. Whether large or small, traditional or non-traditional, regional or global, all banks now face a similar competitive imperative. Short-term survival and long-term success require simultaneous focus on often conflicting priorities: reducing operating costs, driving new sources of revenue and building capital. Growth can be achieved through innovative customer friendly strategies to stem the reduction of customer base and to grow deposits. This all must be accomplished in a market which is getting extremely competitive. While the competition is a fact of life and banks need to be geared up for the same, the competition is going to intensify in the coming days, both from traditional competitors (banks) and also from non-bank entities. Though the regulatory focus is on reducing the arbitrage, the current crisis has taught us that the shadow banking system is increasingly becoming an important constituent of the financial system. Banks need to innovate and improve their efficiency to remain competitive and the role of technology, in this regard, is very critical.

Indian banking industry, today, is in the midst of an IT revolution. The Indian Banking fraternity is adopting latest technological advances to address the threat of competition and to meet customer expectations. A combination of regulatory and market forces has supported the implementation of technology and automation in the Indian banking industry. The time is now ripe for banks to look at initiatives beyond their core banking. Banks have adopted Core Banking Solutions which are comprehensive, integrated yet modular and effectively address the strategic and day-to-day challenges faced by banks. They provide much-needed flexibility to innovate and adapt to a dynamic environment. So to speak, banks have reached a certain level of maturity as far as adoption of Core Banking Solutions is concerned. it is time for them to look for strategies that would assist them in moving to the next level. They need to innovate appropriately in terms of products, services and strategies so as to stand out from the competition that is prevalent today. Banks will also need to align their IT and business perspectives to fully leverage on the benefits of technology.
Production activities have become increasingly knowledge intensive rather than resource intensive. Banks have turned to "thinking" rather than merely producing organizations. Information technology has emerged as the core of new changes. Information technology covers all activities and technologies that involve handling of information by electronic means i.e. information acquisition: search, retrieval, processing, transmission and control. The present state of art of information technology has allowed organizations to completely erase the difference of time as well as distance. There are networks everywhere at global level, country level and in various regions within the country. Communication through satellite has become fast and effective. Some have described it as the end of geography.\footnote{13}

India's banking operations are dominated by 19 nationalized banks, the State Bank of India (India's largest bank) together with 7 of its associate banks called SBI group and 8 new private sector banks, popularly known as 'new generation' banks, owing to their coming into existence and prominence past 1994, coinciding with an era of liberalized economy and financial sectors reforms. The comparison of these, groups of banks is given in the appendix.

Table-1.1

<table>
<thead>
<tr>
<th>Bank Group</th>
<th>Assets</th>
<th>Deposits</th>
<th>Advances</th>
<th>Investments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSU Bank</td>
<td>19.2</td>
<td>18.4</td>
<td>22.4</td>
<td>44.9</td>
</tr>
<tr>
<td>Private sector banks</td>
<td>21.5</td>
<td>11.7</td>
<td>26.1</td>
<td>22.3</td>
</tr>
<tr>
<td>New Private Sector</td>
<td>23.5</td>
<td>24.6</td>
<td>28.1</td>
<td>18.0</td>
</tr>
<tr>
<td>Banks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old private banks</td>
<td>14.9</td>
<td>14.9</td>
<td>19.8</td>
<td>10.9</td>
</tr>
<tr>
<td>Foreign banks</td>
<td>12.9</td>
<td>3.7</td>
<td>19.8</td>
<td>3.9</td>
</tr>
<tr>
<td>SCB</td>
<td>19.2</td>
<td>18.3</td>
<td>22.9</td>
<td>10.8</td>
</tr>
</tbody>
</table>

Source: "Report on Trend and Progress of Banking in India 2010-11"

In tune with the global trends, these banks have been investing heavily in technology infrastructure, solutions and manpower. An indication of the
extent of investments and percolation of IT in these groups of banks is evident from the data in the above mentioned RBI report, as presented in Table-1.2

**Table-1.2**

Status of Electronic Transactions* by Scheduled Commercial Banks
(As at end-March 2011)
(Volume in million, Value in crores)

<table>
<thead>
<tr>
<th></th>
<th>2009-10</th>
<th>10-11</th>
<th>2009-10</th>
<th>10-11</th>
<th>2009-10</th>
<th>10-11</th>
<th>2009-10</th>
<th>10-11</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Volume</td>
<td></td>
<td>Percentage</td>
<td>Variation</td>
<td>Volume</td>
<td></td>
<td>Percentage</td>
<td>Variation</td>
</tr>
<tr>
<td>1</td>
<td>98.1</td>
<td>151.3</td>
<td>11.0</td>
<td>19.5</td>
<td>117613</td>
<td>181686</td>
<td>20.6</td>
<td>54.5</td>
</tr>
<tr>
<td>ECS Credit</td>
<td>149.3</td>
<td>156.7</td>
<td>-6.7</td>
<td>5.0</td>
<td>69524</td>
<td>73646</td>
<td>3.8</td>
<td>5.9</td>
</tr>
<tr>
<td>ECS Debit</td>
<td>66.3</td>
<td>132.3</td>
<td>106.3</td>
<td>99.5</td>
<td>409507</td>
<td>939149</td>
<td>62.5</td>
<td>129.3</td>
</tr>
<tr>
<td>NEFT</td>
<td>33.2</td>
<td>49.3</td>
<td>148.5</td>
<td>48.2</td>
<td>39453359</td>
<td>48487234</td>
<td>22.2</td>
<td>22.9</td>
</tr>
</tbody>
</table>

Source: RBI, "Report on Trend and Progress of banking in India 2010-11

Electronic payment systems such as Electronic Clearing Service (ECS) for credit and debit, National Electronic Fund Transfer (NEFT) for retail transactions and Real Time Gross Settlement (RTGS) for large value have improved the speed of financial transactions, across the country.

The expansion of banking industry has led to a manifold increase in the intricacies of banking industry, which has necessitated appropriate, timely and speedy decision making. A main requirement for this is precise and up to date information storage, processing and retrieval systems, which in turn can be achieved by using computers. The computerization of banking should be pursued with great caution and circumspection."14
Developments in the field of information technology (IT) strongly support the growth and inclusiveness of the banking sector by facilitating inclusive economic growth. IT improves the front end operations with back end and helps in bringing down the transaction costs for the customers.

Important Events in India

- Arrival of card-based payments- Debit, Credit card in late 1980s and 1990s
- Introduction of Electronic Clearing Services (ECS) in late 1990s
- Introduction of Electronic Fund Transfer (EFT) in early 2000s
- Introduction of RTGS in March 2004
- Introduction of National Electronic Fund Transfer (NEFT) as a replacement to Electronic Fund Transfer/Special Electronic Fund Transfer in 2005/2006
- CTS in 2007
Computerization in Banks:

Technology has changed the face of public sector banks and foreign banks have an edge in this regard. Among the total number of public sector bank branches, 97.8 percent were fully computerized at end-March 2010 whereas all branches of SBI are fully computerized.

Automated Clearing House (ACH):

In clearing house, computers are employed to handle cheques. The nature of work involved in clearing operations is voluminous, repetitive, routine in nature. It is complex to clear, exchange and settle the transactions among several banks. Computers are deployed in clearing house to speed up the process and clearing the operations quickly and efficiently which is voluminous work. Automated clearing house (ACH) is an electronic network for financial transactions. ACH processes large number of debit and credit transactions in batches.

National Automated Clearing House Association (NACHA):

It helps to debit transfers for point-of-purchase (POP) check conversion. Both government and the commercial sectors use ACH payment. Business are also increasingly using ACH to collect payments online from customers, rather than accepting credit or debit cards. Rules and regulations governing the ACH network are established by NACHA and Federal Reserve. The Federal Reserve banks are collectively the nation's largest automated clearing house operator. FEDACH is the Federal Reserve's centralized application software used to process ACH transactions.

Electronic Clearing Services (ECS):

ECS is a mode of electronic funds transfer from one bank account to another bank account using the services of a clearing house. This is used for bulk transfers from one account to many accounts or vice-versa. There are two types of ECS called ECS (credit) and ECS (debit).

National Electronic Fund Transfer (NEFT):

National Electronic Fund Transfer (NEFT) is an online system for transferring funds of Indian Financial Institution (especially loans). This facility
is used mainly to transfer funds below Rs. 2, 00,000/- The NEFT system in came into with effect from 21 November 2005. NEFT was sent to cover all banks which were participating in the special electronic funds transfer (NEFT) clearing. NEFT was made on the structured financial messaging solution (SFMS) platform. Public key infrastructure (PKI) technique used in NEFT for maintaining security

**Electronic Funds Transfer (EFT):**

*Electronic Funds Transfer (EFT) is the electronic exchange or transfer* of money from one account to another. The exchange takes place between a single financial or across multiple institutions, through computer based systems. RBI introduced EFT to help banks offering their customers money transfer service from one account to another account of any bank branch to any other bank branch. The EFT system presently covers all the branches of the 27 public sector banks and 55 scheduled commercial banks at the 15 centers viz: - Ahmadabad, Bangalore, Bhubaneswar, Kolkata, Chandigarh, Chennai, Guwahati, Hyderabad, Jaipur, Kanpur, Mumbai, Nagpur, new Delhi, Patna, and Thriu vananthpuram.

**Cards Transaction:**

Debit card is a plastic card which provides an alternative payment method for cash when making transaction. Using debit card cardholder can see balance available on account. Debit card is mainly used for cash withdraw from ATM, at point of sale (POS), also on the internet for online purchase, funds transfer, paying bills, accessing detail account information, charging PIN etc. Bank provides debit card free of cost at the time of opening account. From 1st Jan 2011, RBI declared that for every transaction with debit card on ATM user has to enter password for every transaction. This is done for security purpose.

**Core Banking**

Presently, technological development is closely related to computerization in bank branches for adoption of core banking solution (CBS). An important development was the increase in the percentage of branches of public sector banks implementing CBS. The percentage of such
branches increased from 79.4 % at end of March 2009 to 90% at the end of March-2010

Automated Teller Machine (ATM):

Even though ATM was originally developed for cash dispenses, now it performs many other bank related functions such as- Cash withdrawal, Paying routing bills fees and taxes., Printing bank statement., Funds transfer., Purchasing online products, Train ticket reservations, buying Products from shopping mall, Donating to charities, Cheque processing module, Adding pre-paid cell phone/mobile phone credit, Advertising channels for own or third party products and services, Paying premium. Out of the ATMs installed In the country at end-March 2011, new private sector banks had the largest share in off-site ATMs, while nationalized banks had the largest share in on-site ATMs.

Table 1.3
ATMs of Scheduled Commercial Banks
(As on March 2011)

<table>
<thead>
<tr>
<th>Sr No.</th>
<th>Bank Group</th>
<th>Total number of ATM'S</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nationalized Banks</td>
<td>24836</td>
<td>33.33</td>
</tr>
<tr>
<td>2</td>
<td>SBI Group</td>
<td>24651</td>
<td>33.08</td>
</tr>
<tr>
<td>3</td>
<td>New Private Sector Banks</td>
<td>19525</td>
<td>26.20</td>
</tr>
<tr>
<td>4</td>
<td>Old Private Sector Banks</td>
<td>4126</td>
<td>5.53</td>
</tr>
<tr>
<td>5</td>
<td>Foreign Banks</td>
<td>1367</td>
<td>1.86</td>
</tr>
<tr>
<td>6</td>
<td>Total</td>
<td>74505</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 1.3
The use of electronic payment has witnessed manifold increase, partly reflecting increased adoption of technology. The growth of volume of ATMs indicates that customers most prefer ATMs for transactions. ATMs provide different kinds of services per customer. The volume of ECS credit and more significantly ECS debit continued to show an increasing trend during 2010-11 in line with the trend witnessed during past few years.

**Magnetic Ink Character Recognition (MICR):**

In India, MICR introduced in 1987 in four metros cities. MICR clearing is now in operation in 14 centers viz- Hyderabad, Bangalore, Ahemadabad, Kanpur, Jaipur, Nagpur, Baroda, Pune, Gauhati, Trivandrum. It is proposed to be extended to a total 22 centers were volume of clearing transactions in large. Recently the paper-based system still continue to dominated in terms of volume, and therefore are categorized as system wide important payment system(SWIPS), its share has; however, been declining both in volume and value terms in recent years. Speed clearing, introduced in 2008, operating on the core banking infrastructure of banks has now been made available as a part of MICR.

**Real Time Gross Settlement (RTGS):**

Real time means payment transaction is not subject to any waiting period. In RTGS, transactions are settled as they are processed. Gross settlement means the transaction is settled on one to one basis without bunching or netting with any other transaction. "RTGS is funds transfer system where transfer of money or securities takes place from one bank to another on a "real time" and on "gross basis". Once processed, payments are final and irrevocable.

**INFINET:**

Working of e-banking requires various components like-communication channels, servers, connecting networks etc. Reserve Bank of India (RBI) has prime control on e-banking services. RBI monitor, control of e-banking by establishing and connecting various service providers in India. Following are some of services providers- INFINET stands for Indian Financial Network. There is a satellite based wide area network using VSAT (Very
Small Aperture Terminal) technology set up by the RBI in June 1999. The hub and the Network Management System of the INFINET are located in the Institute for Development and Research in Banking Technology, (IDRBT) Hyderabad (an institute set up by the RBI). Services provided by INFINET: Among the major applications identified for porting on the INFINET in the initial phase are e-mail, Electronic Clearing Service - Credit and Debit, Electronic Funds Transfer and transmission of Inter-city Cheque Realisation advices. Later, other payment system related applications as well as Management Information System (MIS) applications are proposed to be operationalised.

BANKNET:

BANKNET is a internet based communication network. It provides speed of financial transaction. BANKNET was set up in 1991 by the RBI. This backbone is meant to facilitate transfer of inter-bank (and inter-branch) messages within India by Public Sector banks who are members of this network. Service Centers - At present, service centers are viz. Mumbai, Delhi, Calcutta, Madras, Nagpur, Bangalore, Pune, Ahmedabad, Kanpur, Lucknow, Chandigarh, Kochi, Jaipur, Bhopal, Patna, Bhubaneshwar, Thiruvananthapuram, Guwahati, Panaji, Jammu.

Society for Worldwide Inter-bank Financial Telecommunication (S.W.I.F.T):

S.W.I.F.T provides reliable and expeditious telecommunication facilities for exchange of financial messages all over the world. The gateway is in Mumbai and efforts are on to other cities through leased lines/public data network. The majority of international inter bank messages use the SWIFT network. As of September, Institute for Development and Research in Banking Technology (IDRBT): The main purpose of IDRBT is to adopt research and development as well as consultancy in the application of technology to the banking and financial sector in the country. Reserve Bank of India (RBI) established IDRBT in 1996.
Structured Financial Messaging Solution (SFMS):

Structured Financial Messaging Solution (SFMS) is helpful for inter-bank and intra-bank messaging. This messaging is useful for applications like Electronic Funds Transfer (EFT), Real Time Gross Settlement (RTGS), Delivery versus Payment (DVP), Centralised Funds Management System (CFMS). The SFMS was launched in India on December 14, 2001 by RBI.

National Payment Corporation of India (NPCI)

NPCI consolidates and integrates multiple systems with varying service levels to nation-wide uniform and standard business process for all retail payment systems. Also it helps to facilitate an affordable payment mechanism to benefit the common man across the country and help financial inclusion.

Mobile Banking

Mobile banking (also known as M-Banking, mbanking, SMS Banking etc.) is a term used for performing balance checks, account transactions, payments, credit applications etc. via a mobile device such as a or Personal Digital Assistant (PDA).

Demat Card

Demat account has to be treated virtually like a account with the difference being that instead of actual cash there are shares in the account. A beneficiary account is an account opened by the investors or broker with a Depository Participants (DP) of his choice to hold shares in dematerialised (demat) form and undertake scripless trading. The investors must open a demat account with a DP.

1.6 REFORMS IN INDIAN BANKING INDUSTRY

Adoption of technology in Indian banks was a process, which stemmed out of the recommendation of three Committees formed by the Reserve Bank of India. The first two Committees were set up under the Chairmanship of Rangarajan, the then Deputy Governor of Reserve Bank of India. The third Committee was formed in 1994 under the Chairmanship of Saraf, Executive Director of the Reserve Bank of India. In the meantime, the issue of technology adoption in banks was also examined in detail by a high
powered Committee set up by the Government of India in 1992 and 1997 on restructuring of banking industry in India under the Chairmanship of Narasimhan. The first Rangarajan Committee was set up in 1983 to

(a) Identify functional areas for computerization in banks.
(b) Recommend appropriate equipment.
(c) Recommend proper infrastructure.
(d) Draw phased programmes of implementation.
(e) Suggest method of data exchange on computerized media.
(f) Suggest standardized procedures and have common processing arrangements. These recommendations were to be implemented between 1984-1989.

Second Rangarajan Committee was constituted in 1988 to prepare a perspective plan for computerization in banks during 1990-1994. The Committee identified 30 business centers with 51 percent banking business and suggested total computerizations of around 2500 bank branches having over 750 vouchers per day, installation of mini computers in all zonal and regional offices and installation of mainframe computer in the head offices of the banks.

The third Committee on technology issues in banking was constituted in 1994 under the Chairmanship of Saraf and made the following recommendations:

- Introduction of an electronic network for inter bank payments.
- Enactment of legislation for EFT and data protection.
- Introduction of DVP System in Reserve Bank of India for securities transactions.
- Use of NICNET for government and chest transactions.
- Extension of MICR clearing and inter city collection of cheques.
- Establishment of VSAT network for inter bank payments.
• Setting-up of institutions for research and development in banking technology and training.

Further, the Reserve Bank of India set up another Committee on legal issues of electronic fund transfer under the Chairmanship of Smt. Shere, Principal Legal Adviser, Reserve Bank of India. The Committee examined different legal acts, proposed draft amendment to these act, which could be taken up by the Parliament. The Indian Parliament has enacted Information Technology Act in 2000, which has legalized digital and electronic records.

1.7 AUTOMATION IN INDIAN BANKING INDUSTRY

The Indian banking industry today is in the midst of an information technology revolution. A combination of regulatory and competitive reasons have led to increasing the importance of total bank automation in the Indian banking industry. As on 31st March 2002, out of over 50000 branches of public sector banks, only 11578 branches have been fully computerized. Lack of computerization among over 50000 branches of public sector banks provides a huge market for information technology player in the information technology industry.¹⁶

The Indian system has been operating successfully over the last two centuries. It was in 1950's that the Government of India evaluated the policy of using the banking system as an instrument of economic development and social change.

The first step towards mechanization was taken by installing what was known as ICL 40 column punch card equipment in late 50's and early sixties in Calcutta office of the State Bank of India for the reconciliation of inter branch transactions.

The pace of branch expansion given to the SBI went in for the first computer – an/BMI/40/ supported by a battery of about one hundred 80 column punched card machines for data input. The whole system of reporting and recantation of transactions was revamped and modernized.

The next five years saw a sea change in banking industry, with more focus on the quality of customer services. The adoption of a specialized
customer oriented focus is fast getting wider acceptability. A phased plan was prepared on computerization and mechanization in banking industry over a five year time.

Another phased plan was prepared for electronic extension of automation to other areas like fund transfer, automatic clearing house (ACH) magnetic ink character recognition (MICR), automatic ledger pasting machine (ALPM), point of sale electronic mail, BANK NET, SWIFT, ATM and single window concept.

1.8 SIGNIFICANCE OF MODERN TECHNOLOGY

- Technology reduces a bank’s cost in two fundamental ways – it minimizes the cost of processing transactions and reduces the number of branches required to provide service to an equivalent number of customers.

- With 24x7 availability, it gives the customer the highest degree of convenience and the Indian users are more likely to depend on the internet as they start demanding quality service. Like ATMs, internet banking empowers customers to choose when and where they want to conduct banking.

- Though not happening in India at the moment, as banking companies cannot offer other financial services from their banking operations, internet can offer a lot of services like brokerage, mutual funds, insurance loans and credit cards – either directly or indirectly through their websites.

- Banks often lose customers as they relocate. As the technology shrinks time and space, it has become a very useful tool to retain customers.

- Again with modern technology destroying geographic barriers, it can increase customers’ base even in areas whereas it does not have brick and mortar branches. Private Banks are banking on the same and intend to move in the other areas with huge dependence on internet and ATMs.
Technology gives the possibility of collecting useful data in ways that are virtually impossible to collect through any other medium. Tracking software allows a bank to monitor which web pages customers and prospective customers view and how long they spend viewing them. This information when combined with customer database allows financial institutions to target banking products and services more effectively.¹⁷

1.9 INDIAN BANKING INDUSTRY: CHALLENGES, OPPORTUNITIES AND COMPETITION

The challenges faced by the Indian banking are evident from the figure 1.4 given below.

![Figure 1.4](image)

**Opportunities**

Although a lot of reforms have been made in public sector banks, still there is a need to modify their policies. At present they are facing many internal and external challenges, which are hindering their performance, but these banks can convert these challenges into opportunities with care and some modifications. With globalization and changes in technology, financial markets, the world over have become closely integrated. Customers can access their accounts anywhere and banks' customer base has also spread across the world. Deregulation and liberalization has opened up new opportunities for banks but at the same time the pressure of competition has led to narrowing spreads, shrinking margins, consolidation and restructuring. Increasingly, banks are focusing on core competencies, synchronizing strengths and shedding activities that are not remunerative. The winds of change sweeping across global markets will impact India also, and the Indian
financial sector is set to see tremendous transformation in the coming millennium. The face of banking is set to change as banks adopt technology to reduce costs, widen product range for customer convenience and to manage risks. Greater market access to foreign banks, post-WTO will increase competition and as we move towards full capital account convertibility, banks will need to be equipped to handle large and sensitive volatile capital flows.

**Competition**

Due to LPG, banks are facing a severe competition. To stay ahead in the race, therefore, banks will have to leverage technology for innovative product development including developing sophisticated financial products. While some banks have taken lead in developing new tech-savvy products to beat the competition, the public sector banks in particular will have to speed up their efforts in this area.

- Greater customer-orientation is the only way to retain customer loyalty and stay ahead of competition. In a market-driven strategy of development, consumer preference is paramount. Gone are the days when customers used to come to the doors of the banks. Now banks are required to chase the customers. Thus, only those banks that are customer-centric and extremely focused on the needs of their clients will succeed and there is a need to change the mindset of banks at all levels on this issue. Public sector banks in particular need to bring about total customer-orientation not only in their products/services but their policies and strategies should also be customer-focused. In fact, they must realize that customer is the only profit center and all others are overheads. Identification of profitable customers, understanding their needs and preferences, improving the delivery systems and reducing the transaction costs for them should become important strategic issues for banks, if they want to survive in the fiercely competitive environment. Enhancing the customer base, cross selling of products/services and strengthening customer relationship management will be the most important aspects.
• So far, the focus of attention in the Indian banking industry has largely been extending finance to agriculture and manufacturing sectors covering small, medium and large industries. But now banks should capture service class also. Therefore through IT, banks, have to sharpen their credit assessment skills and lay more emphasis on providing finance to the wide range of activities in the services sector.

• The new Basel Accord to modify the existing capital adequacy framework is currently under discussion. Under the revised capital adequacy framework, banks will have to provide for market risk and operational risk besides credit risk. Against the background of government decisions to reduce its shareholding in nationalized banks to 33%, maintaining the required level of capital adequacy by the banks could come under strain. Strong banks will be able to access the capital markets for raising additional equity, but weak banks could face severe problems. In any case, there will be tremendous pressure on banks to improve their financial performance if they have to attract additional capital. Profitability will, thus, have to be improved so that higher dividends are paid to the shareholders, capital market perception about public sector banks changes and there is a positive impact on the valuation of shares so that the shares of public sector banks fetch attractive market prices.

• As WTO provisions came into force, countries including India have to provide greater market access to other countries by eliminating Quantitative Restrictions (QR), regarding tariff barriers and liberalizing the market for financial services. The impact of these developments on various sectors of the Indian economy would be critical. The banks will have to keep themselves updated on sector specific developments taking place in the world, particularly in countries that are India’s major trading partners and advise their corporate clients to help them to prepare for competition with multinational companies.

• Deregulation and self-regulation go hand-in-hand. RBI has also asked banks to set up specialized committees like Risk Management Committee, Audit Committee, Compensation Committee, Narasimhan
Committee etc., to ensure the uppermost standards of corporate governance and development of best practices. A good fiscal management and clear-cut policies affecting various sectors of the economy can promote corporate governance. Public sector banks, new private sector banks & foreign banks should ensure corporate governance in all activities to win the heart of shareholders.

- In the ultimate analysis, it is public perception that will decide the future of public sector banks. The perception of customers regarding public sector banks is very poor. Public sector banks should improve their perception by all means to remain competitive in the market. All these changes require vision, determination and extensive communication across all levels in the organization so that the vision and mission of the bank is communicated and understood down the line and receives unqualified support.

- Today 'size' has become an important issue in financial market world over. Merger on commercial considerations and strategic of the possible ways to remain in competition would be mergers and acquisitions. The privately/foreign banks have already set in the trend. We can say that a constructive and serious measure should be initiated for: Better and cheaper access to basic infrastructure requirements such as power, telecommunications i.e. VSAT, leased lines etc. creation of customers' awareness and education for technology adoption are imperative.

The IT, Act 2000 should be implemented in totality to handle legal issues. Converting branches into boutiques catering to the requirements of clients and re-engineering the functions of branch banking using technology and delivery channels. Setting up an e-banking group to provide grid principles for risk management of e-banking activities.

In nutshell it can be sum up that after the set back of early nineties when the Government of India had to pledge the gold to acquire foreign currency to meet the severe problem of balance of payment temporarily, the Government planned to liberalize the Indian economy and open its door to the
foreigners to speed up the development process as a long-term solution for the ailing economy. The economic liberalization move, which was initiated in 1991 when the new government assumed office, has touched all the spheres of national activity. Perhaps the one area where the deregulatory policies had the maximum impact was the banking sector. Until 1991, the banking in India was largely traditional. The bankers were prudent and cautious people who seldom took risks and were content with the normal banking activities i.e. accepting of deposits and lending against them. The 1969 and 1980's nationalization of banks, bringing private banks under the state control, had the objective of realizing this government dream. The profitability was a forbidden word in banking business even as late as 1991-92. The banks were established to fulfill social objectives and their performance was evaluated on their ‘task fulfillment' initiatives. Indian banking system has made commendable progress in extending its geographical spread and functional reach. The nationalization of banks helped in increasing the number of branches, volume of deposits and ensured wider dispersal of the advances. Despite impressive quantitative achievements in resource mobilization and in extending the credit reach, certain deficiencies have, over the years, crept into the financial system such as decline in the productivity and efficiency of the system, erosion of the profitability of the system, directed lending played a critical role in depressing the profits, directed investments in the form of SLR and CRR hindered income earning capability and potentials, portfolio quality suffered due to political and administrative interference in credit decision-making, increase in cost structure due to technological backwardness, average ratio of capital funds to RWAs remained low which creating problems in international operations and the system remained de-linked from sound international banking practices. The seed of the reforms in India were sown by the Narasimham Committee appointed by the RBI under the leadership of M. Narasimham, the former Governor of RBI, to examine the aspects relating to the structure, organization, functions and procedures of the financial system and suggest remedial measures. The Committee submitted its reports in November 1991 and thus, began a new chapter in Indian banking. It aimed at providing a diversified, efficient and competitive financial system with ultimate objective of improving the efficiency of available resources, increasing the
return on investments in promoting an accelerated growth of the real sector of
the economy. In the present scenario, technology is the only factor that can
provide the edge to the public sector banks over the private sector banks in
providing better and quick services to the customers. So the banking scenario
in the Indian context is changed to get success according to new changes,
one would need a vision. Such long-term visions all within the realm of a
futuristic forecast about the likely shape of banking. Therefore, this fact should
bear in mind when there is talk of the Vision for 2030. In this backdrop, we try
to visualize the global trends in the future and say about the next two
decades.

- The digital society, networking, e-commerce virtual reality will continue
to change consumer behavior and change economic, social, technology and political sphere.

- Major demographic and social shifts will occur and there will occur and
there will be ageing, wealthy population.

- Tribalism will be created through successful products and successful
organizations.

- Emergence of global super-brand and huge pressures to manage
global operations through new technologies, virtual teams etc.

- Global ethics will be powerful force and organizations will have to prove
that they serve not only individuals but also provide for betterment of
whole society
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