CHAPTER-1

INTRODUCTION

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1.1. Indian Banking: An Overview:

Indian banking is the lifeline of a nation and its people. Banking has helped in developing energetic sectors of the economy and to usher in a new dawn of progress on the Indian panorama. The sector has explained the beliefs and aspirations of millions of people into reality. Banking in India originated in the first decade of 18th century with the General Bank of India coming into presence in 1786. It was monitored through Bank of Hindustan. Both these banks are now non-operational. After this, the Indian government established three presidency banks in India. The first of the three was the Bank of Bengal in 1809, the other two position bank, viz., the Bank of Madras and Bank of Bombay, were established in 1840 and 1843 respectively. The three presidency banks were subsequently amalgamated into the Imperial Bank of India (IBI) under the Imperial Bank of India Act, 1920 which is now the State Bank of India (SBI). For a long time, foreign banks like Credit Lyonnais started their Calcutta operations in the 1850s. The first fully Indian owned bank is the Allahabad Bank, which was established in 1865. In the 1900s, the market expanded with the establishment of banks such as Punjab National Bank (PNB) in 1895 in Lahore and Bank of India (BOI) in 1906 at Mumbai, together of which were founded beneath private ownership. The Reserve Bank of India (RBI) officially took on the responsibility of regulating the Indian banking sector from 1935. After India’s independence in 1947, RBI was nationalized and given broader powers to the banks. On the eve of independence in August 1947, there were 648 commercial banks, containing 97 scheduled and 551 non-scheduled banks in India. There are three different phases in the history of banking in India such as Pre-Nationalization Era, Nationalization Stage, and Post Liberalization Era. The electronic period has also affected the banking system, foremost to an increase in the number of
electronic transactions. However, the development of e-banking has also led to new areas of risk such as data security and reliability requiring new techniques of risk management.

1.2. Phases of Transformation of Banking Industry:

Banking industry transformed from traditional way of banking, brick, and mortar system to E-Banking, through information technology. This transformation has been described below in 5 major phases, that is, Pre-nationalization of banks (before 1969), Nationalization of banks (1969-1990), Banking sector reforms (1991-2000), Computerization of banks and last is the current stage of e-banking (post-2000).

1.2.1. Pre-Nationalization Era:

In India, the business of banking and credit was practiced even in same early times. The clearance of money through hundies besides indigenous credit instrument was very extensive. The hundies were delivered by bankers known as Shroffs, Sahukars, Shahus or Mahajans in different parts of the country. However, the modern banking was developed by the Agency houses of Calcutta and Bombay after the establishment of Rule by the East India Company in 18th and 19th periods. Throughout the early part of the 19th Century, the volume of foreign trade was comparatively small. Later, the trade was expanded, the need for banks of the European type was felt and the government of the East India Company took interest in having its own bank. The government of Bengal took the initiative and the first presidency bank, the Bank of Calcutta (Bank of Bengal) was established in 1880. In 1840, the Bank of Bombay and the Bank of Madras was also set up in 1843. These three banks also are known as Presidency Bank. The Presidency Banks had their branches in important trading centers but mostly lacked in uniformity in their operational policies. In 1899, the Government was recommended to amalgamate these three banks into one so that it could also function as a Central Bank, but the Presidency Banks did not favor the idea. However,
the conditions obtaining during world war period (1914-1918) emphasized the need for a unified banking institution, as a result of which the Imperial Bank was set up in 1921. The Imperial Bank of India was performed like a Central bank and as a banker for other banks. The RBI (Reserve Bank of India) was established in 1935 as the Central Bank of the Country. The Banking Regulation act was passed in 1949 and the RBI was nationalized and acquired extensive regulatory powers over the commercial banks. In 1950, the Indian Banking system comprised of the RBI, the Imperial Bank of India, Cooperative banks, Exchange banks and Indian Joint Stock banks.

1.2.2. Nationalization Stage:
After Independence, in 1951, the All India Rural Credit survey, a committee of Direction with Shri. A. D. Gorwala as Chairman recommended amalgamation of the Imperial Bank of India and ten others banks into a newly established bank called the State Bank of India (SBI). The Government of India accepted the recommendations of the committee and introduced the State Bank of India bill in the Lok Sabha on 16th April 1955 and it was passed by Parliament and got the president’s approval on 8th may, 1955. The Act came into force on 1st July 1955 and the Imperial Bank of India was nationalized in 1955 as the State Bank of India. The main objective of establishing SBI by nationalizing the Imperial Bank of India was “to extend banking facilities on a large scale more particularly in the rural and semi-urban areas and to diverse other public purposes”. In 1959, the SBI (Subsidiary Bank) act was proposed and the following eight state-associated banks were taken over by the SBI as its subsidiaries. Seven subsidiary banks State Bank of India formed the SBI Group. The SBI Group under statutory obligations was required to open new offices in rural and semi-urban areas and modern banking was taken to these unbanked remote areas. On 19th July 1969, then the Prime Minister Mrs. Indira Gandhi announced the nationalization of 14 major
scheduled Commercial Banks each having deposits worth Rs. 50 crore and above. This was a turning point in the history of commercial banking in India.

<table>
<thead>
<tr>
<th>Sno</th>
<th>Name of the Bank</th>
<th>Subsidiary with effect from</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>State Bank of Hyderabad</td>
<td>1st October 1959</td>
</tr>
<tr>
<td>2</td>
<td>State Bank of Bikaner</td>
<td>1st January 1960</td>
</tr>
<tr>
<td>3</td>
<td>State Bank of Jaipur</td>
<td>1st January 1960</td>
</tr>
<tr>
<td>4</td>
<td>State Bank of Saurashtra</td>
<td>1st May 1960</td>
</tr>
<tr>
<td>5</td>
<td>State Bank of Patiala</td>
<td>1st April 1960</td>
</tr>
<tr>
<td>6</td>
<td>State Bank of Mysore</td>
<td>1st March 1960</td>
</tr>
<tr>
<td>7</td>
<td>State Bank of Indore</td>
<td>1st January 1968</td>
</tr>
<tr>
<td>8</td>
<td>State Bank of Travancore</td>
<td>1st January 1960</td>
</tr>
</tbody>
</table>

Later the Government Nationalized six more commercial private sector banks with deposit liability of not less than Rs. 200 crores on 15th April 1980, viz., Andhra Bank, Corporation Bank, New Bank if India, Oriental Bank of Commerce, Punjab and Sind Bank and Vijaya Bank. In 1969, the Lead Bank Scheme was introduced to extend banking facilities to every corner of the country. Later in 1975, Regional Rural Banks were set up to supplement the activities of the commercial banks and to specially meet the credit needs of the weaker sections of the rural society. Nationalization of banks paved way for retail banking and as a result, there has been an all-round growth in the branch network, the deposit mobilization, credit disposals and of course employment. The first year after nationalization witnessed the total growth in the agricultural loans and the loans made to SSIs by 87 percent and 48 percent respectively. The overall growth in the deposits and the advances indicates the improvement that has taken place in the banking habits of the people in the rural and semi-urban areas where the branch network has spread tremendously. Such credit expansion enabled the banks to achieve the goals of nationalization, it was, however, achieved at the cost of profitability of the banks.
Consequences of Nationalization:
  i. The quality of credit assets fell because of liberal credit extension policy.
  ii. Political interference has been as an additional malady.
  iii. Poor appraisal involved during the loan melas conducted for credit disbursals.
  iv. The credit facilities extended to the priority sector at concessional rates.
  v. The high level of low yielding SLR investments adversely affected the profitability of the banks.
  vi. The rapid branch expansion has been the squeeze on the profitability of banks emanating primarily due to the increase in the fixed costs.
  vii. There was a downward trend in the quality of services and efficiency of the banks.

1.2.3. Post-Liberalization Era—Thrust on Quality and Profitability:
By the beginning of 1990, the social banking goals set for the banking industry made most of the public sector resulted in the presumption that there was no need to look at the fundamental financial strength of this bank. So, they continued undercapitalized. The need for reformation the banking industry was felt greater with the initiation of the real sector reform developed in 1992. The reforms were initiated to enhance the opportunities and challenges for the real sector making them operate in a borderless global market place. However, to harness the benefits of globalization, there should be an efficient financial sector to support the structural reforms taking place in the real economy. Hence, beside the reforms of the real sector, the banking sector reorganization was also addressed. The root causes for the dull performance of banks formed the elements of the banking sector reforms. Several factors that led to the bleak performance of banks were
  i. Regulated interest rate structure,
ii. Lack of focus on profitability,

iii. Lack of transparency in the bank’s balance sheet,

iv. Lack of competition,

v. Excessive regulation on organization structure and managerial resource,

vi. Excessive support from the government.

vii. In contradiction of this background, the financial sector reforms were commenced to bring about a paradigm shift in the banking industry, by addressing the factors for its bleak performance.

In this background, the recommendations made by a high-level committee on financial sector chaired by M. Narasimham sited the foundation for the banking sector reforms. These reforms tried to enhance the feasibility and dependability of the banking sector. The Narasimham Committee has suggested that there should be functional autonomy, flexibility in operations, reduction of banking obstacles, reduction in reserve requirements and adequate financial infrastructure in terms of supervision, audit, and technology. Further, the committee advocated introduction of prudential norms, transparency in operations and improvement in productivity, only aimed at liberalizing the regulatory framework, but also to keep them in time with the international standards.

**From Independence to Nationalization:** As a result of the expansion of branch banking in the late 1950s, the sheer volume of transactions necessitated the first move towards mechanization in Indian banking sector. State Bank of India (SBI) introduced column punched card equipment to help the reconciliation of the large volume interbank transactions in its Calcutta branch, which soon became absolute. Early 1990s SBI brought its first computer and then followed by most other large nationalized banks. During those periods,
banks were much focused on employment generation rather than technology. In such an environment banks feared that computerization would result in large-scale retrenchment and unemployment.

**From Nationalization to Liberalization:** The banks in this period have given particular attention towards providing banking facilities in the underbanked and unbanked regions. However, the success with resource mobilization was not matched by improvements in profitability and efficiency. The public sector banks were overloaded by the sheer volume of banking business and were suffered by low profitability, rising non-performing assets, and poor quality consumer service. It led to the second phase of Nationalization in 1980. Resulting which the Indian banking sector was completely dominated by public sector banks, and the position of banks still degraded with unprofitable and over staffed banks, which prompted the committee on the mechanization of the banking industry to push for the adoption of computers to streamline the banking business. Banks rapidly installed Automatic Ledger Posting Machines (ALPMs) and minicomputers and began an aggressive program of training. The Rangarajan committee 1989 provided further impetus to technology adoption by recommending full computerization of both front and back office operations of large branches. Thus, the thrust of technology in its early phases was on branch automation (total automation of a bank with its own database).

**Liberalization in the 1990s:**

In the early 1990s, the then government embarked on a policy of liberalization, licensing a lesser number of private banks. These came to be known as New Generation tech-savvy banks and included Global Trust Bank (the first of such new generation banks to be set up), which later amalgamated with Oriental Bank of Commerce, UTI Bank (since renamed Axis...
Bank), ICICI Bank and HDFC Bank. Its interchange along with the rapid growth in the India economy strengthened the banking sector in India, which has seen rapid growth with strong contribution from all the three sectors of banks i.e. government, private and foreign banks. The next stage, Indian banking has been set up with the proposed relaxation in the norms for foreign direct investment, where all foreign investors in banks may be given voting rights which could exceed the present control of 10 percent at present. It has gone up to 74 percent with some restrictions. The new policy shook the banking sector in India completely. Till now bankers were used to the 4–6–4 method (borrow at 4 percent; lend at 6 percent; go home at 4) of functioning. The new trend helped in a modern outlook and tech-savvy methods of working for traditional banks. All this led to the retail boom in India. So people were demanded more from their banks and received more.

1.2.4. Current period:

All banks which are included in the Second Schedule to the Reserve Bank of India Act, 1934 are Scheduled Banks. These banks comprise Scheduled Commercial Banks and Scheduled Co-operative Banks. Scheduled Commercial Banks in India are categorized into four different groups according to their ownership and/or nature of the operation. These bank groups are:

i. Nationalized Banks,

ii. Private Sector Banks,

iii. Regional Rural Banks and

iv. Foreign Banks.

In the bank group-wise classification, IDBI Bank Ltd. is included in Nationalised Banks. Scheduled Co-operative Banks consist of Scheduled State Co-operative Banks and
Scheduled Urban Cooperative Banks. By 2010, banking in India was generally fairly mature in terms of supply, product range and reach—even though reach in rural India still remains a challenge for the private sector and foreign banks. In terms of quality of assets and capital adequacy, Indian banks are considered to have clean, strong and transparent balance sheets relative to other banks in comparable economies in its region.

Table-1.1

<table>
<thead>
<tr>
<th>Indicators</th>
<th>As on 31\textsuperscript{st} March (In Rupees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population per Banks (In 000)</td>
<td>15</td>
</tr>
<tr>
<td>Aggregate Deposits (In billion)</td>
<td>26119</td>
</tr>
<tr>
<td>Bank Credit (In billion)</td>
<td>19312</td>
</tr>
<tr>
<td>Deposit as percentage to GNP (at factor cost in per)</td>
<td>69.00</td>
</tr>
<tr>
<td>Number of Branches</td>
<td>74,653</td>
</tr>
<tr>
<td>Number of Commercial Banks</td>
<td>178</td>
</tr>
<tr>
<td>Per Capita Credit (In Rupees)</td>
<td>17541</td>
</tr>
<tr>
<td>Per Capita Deposit (In Rupees)</td>
<td>23382</td>
</tr>
<tr>
<td>Credit Deposit Ratio (In per)</td>
<td>74.00</td>
</tr>
</tbody>
</table>

Source: Statistical Tables Related to Banks in India - Reserve Bank of India"

By 2016 the Indian Banking Industry employed 1,175,149 employees and had a total of 109,811 branches in India and 171 branches abroad and manages an aggregate deposit of ₹67,504.54 billion and bank credit of ₹52,604.59. The net profit of the banks operating in India was ₹1,027.51 billion against a turnover of ₹9,148.59 billion for the financial year 2015-16, the population per banks reduced from 15 to 12 from 2010 to 2016.

After Liberalization:

As per the recommendation of the Narasimham committee on financial sector reforms, opened new vistas in the Indian banking sector. The emergence of new private banks and
new foreign banks put tremendous pressure on trade unions to permit the adoption of technology within banks. Consequently, in October 1993, the bank unions signed a computerization settlement agreement with the IBA that paved the wave for the introduction of modern technology within public sector banks. As per this agreement, 2,500 to 3,000 branches were computerized in urban and metropolitan areas. In March 1997 banks union signed a new settlement with the IBA that allowed for an extension of new technology in operation and equipment. It is the strategic push towards technology adoption which was also felt by the new entrance because they too released their competitive edge and sustainability over the long run that was dependent on the provision of low-cost service medium such as an Automatic Teller Machines (ATMs). The public sector banks used the information technology for information sharing and technology to facilitate internal operation, the new generation private sector banks relied heavily on technology to increase their market reach. The securities scandal in 1992 was also one of the reasons for a push towards adopting technology in banking. More than 45,000 branches of public sector banks were computerized by the end of September 1998, ALPMs electronic accounting machines and personal computers were installed at a record pace.

1.3. Evolution of Information Technology in India:

In the past two decades, Information communication Technology (ICT) has been the most swiftly changing industry in the world, one industry that has really touched its impact is none other than the banking sector.

a) **Traditional Approach:** Customarily, customers were supposed to visit the physical branch for his/her banking transactions. Then, the bank uses to put the customer’s request into operation with clearing and decision-making responsibilities, which was
done at individual branch level only. The head office was responsible for the overall clearing network, branch network and for imparting regular training to staffs. Senior management monitored the organization’s performance and framing the policies, programs and procedures accordingly, but the information available to both the branch staff and their customers was limited to one geographical location.

b) **Modern Approach:** E-banking in simple terms, does not involve any physical exchange of money, it’s all done electronically, by using the internet. Banks offer Internet banking mainly in two ways: by establishing a “website” and offer Internet banking to its customers along with its traditional delivery channels. A second alternative is to establish a “virtual bank”, which may offer its customers with the ATM facility.

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 banks now can provide more diverse services to customers with less manpower. With the help of innovative information technology, banks are able to reduce the transaction cost and handle a large number of transaction in no time. Now banks can provide customized products easily and customers could access many services through the internet by sitting at home. To provide better services to their customers, banks are embracing Customer Relationship Management facilitated by the availability of conductive technology. Innovation in technology is also helping banks to cross-sell the products of insurance and securities which are swelling their fee-based income in the total income. Innovative
technology not only brings benefits but risks too. Major impediments and risks associated with the implementation of innovative technology are;

- The cost associated with adoption of new technology might not bring cash flows required to cover that cost.
- Increased capacity due to a new technology could result in excess capacity in the financial institution.
- Another problem banks face with the implementation of latest technology is the integration of the existing system with the new one.
- Banks could face cost overrun or cost control problems.
- Innovative technology has brought new risks like overdraft risk.

Banks today operate in a highly globalized, liberalized, privatized and a competitive environment. In order to survive in this environment, banks have to use IT. Indian banking industry has witnessed tremendous development due to sweeping changes that are taking place in the information technology. E-banking has emerged from such an innovative development. The following table-1.2 analyses the progress made by Indian banking industry in the adoption of technology. The progress in e-banking in Indian banking industry is measured through various parameters such as Computerization of branches, Automated Teller Machines, Transactions through Retail Electronic Payment Methods etc.

Table-1.2 indicates computerization in scheduled commercial banks over four years period from 2012-2016. In an average 93.02 percent of branches are fully computerized, 70.2 percent branches are under core banking solutions and 6.73 percent of branches are partially computerized during the periods from 2012-13 to 2015-16. The growth rate in case of fully computerized branches and branches under core banking solutions has increased
whereas in the case of partially computerized branches has declined during the period from 2012-13 to 2015-16.

Table-1.2

<table>
<thead>
<tr>
<th>Year</th>
<th>Fully Computerized Branches</th>
<th>Growth Rate</th>
<th>Banking Under the CBS</th>
<th>Growth Rate</th>
<th>Branches already fully Computerized</th>
<th>Growth Rate</th>
<th>Partially Computerized Branches</th>
<th>Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-13</td>
<td>85.60</td>
<td>-</td>
<td>44.40</td>
<td>-</td>
<td>41.20</td>
<td>-</td>
<td>13.40</td>
<td>-</td>
</tr>
<tr>
<td>2013-14</td>
<td>93.70</td>
<td>9.46</td>
<td>67.00</td>
<td>50.90</td>
<td>26.60</td>
<td>35.40</td>
<td>06.30</td>
<td>52.90</td>
</tr>
<tr>
<td>2014-15</td>
<td>95.00</td>
<td>10.98</td>
<td>79.40</td>
<td>78.80</td>
<td>15.60</td>
<td>62.10</td>
<td>05.28</td>
<td>62.60</td>
</tr>
<tr>
<td>2015-16</td>
<td>97.80</td>
<td>14.25</td>
<td>90.00</td>
<td>102.70</td>
<td>07.80</td>
<td>81.10</td>
<td>02.20</td>
<td>83.50</td>
</tr>
<tr>
<td>Average</td>
<td>93.02</td>
<td>70.20</td>
<td>91.20</td>
<td>91.20</td>
<td>06.73</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: *Report on Trends and Progress of Banking in India, RBI, Mumbai, Various Issues.*

ATMs are the mostly preferred e-channel which is very famous among all the customers because it is easily available and very important to avail the facility by the bank customers. Table-1.3 shows that the number of ATMs to branches in public and private sector commercial bank groups in India. From the table it is clear that the percentage of ATMs to branches between sectors are varying and noticed an increasing share of public sector bank ATMs constantly growing whereas private sector banks remain same position and attained its best position during the period from 2012-13 to 2015-2016.

Table-1.3

<table>
<thead>
<tr>
<th>Years</th>
<th>Public</th>
<th>Private</th>
<th>Foreign banks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Branches</td>
<td>ATMs</td>
<td>%</td>
</tr>
<tr>
<td>2012-13</td>
<td>55438</td>
<td>27277</td>
<td>49.2</td>
</tr>
<tr>
<td>2013-14</td>
<td>58825</td>
<td>40680</td>
<td>69.2</td>
</tr>
<tr>
<td>2014-15</td>
<td>62211</td>
<td>49487</td>
<td>79.5</td>
</tr>
<tr>
<td>2015-16</td>
<td>197342</td>
<td>184929</td>
<td>82.6</td>
</tr>
</tbody>
</table>

Source: [www.rbi.org.in](http://www.rbi.org.in)  
Note: *Percentage of ATMs to Branches*
Table-1.4 shows Bank Group-wise outstanding number of credit cards issued by scheduled commercial banks at the end of March 2012-13 to 2015-16. The number of credit cards issued has declined from 03.93 million in 2012-13 to 3.08 in 2015-16.

<table>
<thead>
<tr>
<th>Cards</th>
<th>Years/ Sector</th>
<th>2012-13</th>
<th>2013-14</th>
<th>2014-15</th>
<th>2015-16</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>Credit</td>
<td>Public</td>
<td>03.93</td>
<td>14.26</td>
<td>03.44</td>
<td>13.93</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>13.29</td>
<td>48.24</td>
<td>12.18</td>
<td>49.31</td>
</tr>
<tr>
<td></td>
<td>Foreign</td>
<td>10.33</td>
<td>37.49</td>
<td>09.08</td>
<td>36.76</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>27.55</td>
<td>100.00</td>
<td>24.70</td>
<td>100.00</td>
</tr>
<tr>
<td>Debit</td>
<td>Public</td>
<td>64.33</td>
<td>62.79</td>
<td>91.70</td>
<td>66.72</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>34.10</td>
<td>33.29</td>
<td>41.34</td>
<td>30.08</td>
</tr>
<tr>
<td></td>
<td>Foreign</td>
<td>04.02</td>
<td>03.92</td>
<td>04.39</td>
<td>03.19</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>102.44</td>
<td>100.00</td>
<td>137.43</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: [www.rbi.org.in](http://www.rbi.org.in)

In 2015-16 the percent of total cards issued in the case of private sector banks was highest that is 51.66 percent in the case of which major share was of new private sector banks i.e., 51.44 and that of old private sector banks is 0.22. The share of public sector banks was just 17.07 percent and that of foreign banks is 31.26 percent. It is also clear from the number of debit cards issued by scheduled commercial banks at the end of March 2012-13 to 2015-16. In the year 2015-16, Public sector banks issued the highest number of debit cards (170.34) which is 74.76 percent of total debit cards issued by the industry. Nationalized Banks (35.23) and SBI group (39.53) recorded a high percent of cards issued as compared to Private sector banks (23.52). The share of new private sector banks is higher as compared to old private sector banks. Foreign banks have recorded 1.72 percent of total debit cards issued.
### Table-1.5
Volume of Transactions through Retail Electronic Payment System Indicators

(Volume in Millions)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EFT/ NEFT</td>
<td>132.33</td>
<td>226.10</td>
<td>394.13</td>
<td>661.01</td>
<td>295.9</td>
<td>238.3</td>
<td>0.14</td>
<td>14.80</td>
</tr>
<tr>
<td>RTGS</td>
<td>49.28</td>
<td>55.05</td>
<td>68.52</td>
<td>81.11</td>
<td>57.45</td>
<td>18.29</td>
<td>0.08</td>
<td>8.17</td>
</tr>
<tr>
<td>ECS Dr</td>
<td>156.74</td>
<td>164.74</td>
<td>176.53</td>
<td>192.91</td>
<td>168.0</td>
<td>17.18</td>
<td>0.0097</td>
<td>0.97</td>
</tr>
<tr>
<td>ECS Cr</td>
<td>117.31</td>
<td>121.50</td>
<td>122.18</td>
<td>152.54</td>
<td>122.3</td>
<td>19.52</td>
<td>0.036</td>
<td>3.63</td>
</tr>
<tr>
<td>Debit Cards</td>
<td>265.16</td>
<td>322.16</td>
<td>399.23</td>
<td>512.03</td>
<td>346.5</td>
<td>111.7</td>
<td>0.0251</td>
<td>2.51</td>
</tr>
<tr>
<td>Credit Cards</td>
<td>222.28</td>
<td>211.84</td>
<td>222.35</td>
<td>227.30</td>
<td>228.6</td>
<td>18.06</td>
<td>-0.03</td>
<td>-3.03</td>
</tr>
<tr>
<td>ATMs</td>
<td>237.06</td>
<td>5409.45</td>
<td>5775.25</td>
<td>6707.1</td>
<td>3659.5</td>
<td>3190.4</td>
<td>0.068</td>
<td>6.85</td>
</tr>
<tr>
<td>Internet</td>
<td>3.54</td>
<td>4.00</td>
<td>4.52</td>
<td>4.75</td>
<td>3.92</td>
<td>0.78</td>
<td>0.048</td>
<td>4.80</td>
</tr>
<tr>
<td>Mobile</td>
<td>-</td>
<td>25.56</td>
<td>53.30</td>
<td>94.71</td>
<td>57.86</td>
<td>34.79</td>
<td>0.27</td>
<td>27.76</td>
</tr>
<tr>
<td>PoS</td>
<td>265.16</td>
<td>319.96</td>
<td>396.72</td>
<td>509.08</td>
<td>345.0</td>
<td>110.5</td>
<td>0.025</td>
<td>2.51</td>
</tr>
</tbody>
</table>

Source: Compiled data from RBI Report from 2000-13 to 2015-16.

The electronic payment systems such as Electronic Clearing Service (ECS) credit and debit and National Electronic Fund Transfer (NEFT) have improved the speed of financial transactions across the country. Electronic Clearing Service (ECS) is one of the new electronic banking services. It is a non-paper based movement of funds which is encouraged by the RBI on a wide scale. It consists of- Electronic Credit Clearing Service & Electronic Debit Clearing Service. It brings down administration cost and ensures profitability and productivity to the banks. National Electronic Fund Transaction (NEFT) is a different net settlement system and is an improvement over other models in terms of security and processing efficiency. This facility is currently available at over 46,300 bank branches throughout the country.

Table-1.5 shows increase in the adoption of ATMs, RTGS, NEFT, electronic clearing debit transactions, debit cards, internet banking than the POS, credit cards, mobile banking and electronic clearing credit transactions. It indicates that adoption of information
and communication technology improved the banks’ image and leads to a wider, faster and more efficient market. It is imperative for bank management to intensify investment in information and communication technology products to facilitate speed, convenience, and accurate services, or otherwise lose out to their competitors.

The satisfied customer is the best guarantee for stability of the organization in the long-run. Banks can satisfy their customers only by providing customized, cost-effective and timely services. With the help of technology, banks are able to provide a plethora of products and services to their customers which suit them. Major services provided by the Indian banks that are of international standards includes anytime banking, anywhere banking, Global ATM and Credit Cards, Internet banking facility etc. Tremendous progress took place in the field of technology which has reduced the world to a global village and it has brought remarkable changes in the banking industry. Branch banking in the brick and mortar model has been transformed into click and order channel mode. Banking Sector Reforms also took care of the technology upgradation and its related measures. The RBI has started RTGS, Core Banking solution, INFINET as the communication backbone for the banking sector. The Negotiated Dealing System (NDS) for screen-based trading in government securities and Real Time Gross Settlement (RTGS) System have been the boon for the customers and bankers. All the success stories of banks and innovative services being offered by the banks are the gift of financial reforms. The smooth functioning of the payment and settlement system is a pre-requisite for financial stability. The Reserve Bank, therefore, has taken several measures from time to time to develop the payment and settlement system in the country along sound lines. The Board for Regulation and Supervision of Payment and Settlement Systems (BPSS) set up in March 2005 as a
committee of the Central Board of the Reserve Bank for giving policy direction in the area of payment and settlement systems. Real-time gross settlement (RTGS) was operationalized in 2004. Its usage for transfer of funds, especially for large values and for systemically important purposes, has increased since then. With the introduction of RTGS, whereby a final settlement of individual inter-bank fund transfers were effected on a gross real time basis during the processing day, a major source of systemic risk in the financial system has been reduced substantially.

The role of technology in banking in creating new business models and processes, in maintaining competitive advantage, in enhancing the quality of risk management systems in banks, and in revolutionizing distribution channels, cannot be overemphasized. Recognizing the benefits of modernizing their technology infrastructure, banks are taking the right initiatives. While doing so, banks have four options to choose from: they can build a new system themselves, or buy best of the modules, or buy a comprehensive solution, or outsource. A further challenge which banks face in this regard is to ensure that they derive maximum advantage from their investments in technology and avoid wasteful expenditure which might arise on account of uncoordinated and piecemeal adoption of technology; adoption of inappropriate/ inconsistent technology and adoption of obsolete technology. As the same time, Globalization challenges are not restricted only to global banks, India banks also need to face them. Overcoming these challenges makes them more competitive and will also equip them to launch themselves as global players.

1.4. Various Committees on Banking Technology in India:

The foundation for large-scale induction of IT in the banking sector was provided by the recommendations of the committees headed by Dr. C. Rangarajan, in 1984 and 1989.
Subsequently, in 1994 the Reserve Bank constituted a committee on 'Technology Upgradation in the Banking Sector'. The committee made a number of recommendations covering payment systems including setting up of an autonomous center for development and research in banking technology. The IDRBT was created as a sequel. The institute has established and operates the Indian Financial Network (INFINET), performs research in banking technology and products consultancy services apart from providing educational and training facilities for the banking sector.
### Table-1.6
**Various Committees on Computerisation**

<table>
<thead>
<tr>
<th>Name of the Committee</th>
<th>Head of the Committee</th>
<th>Recommendations</th>
</tr>
</thead>
</table>
| Working Group to consider feasibility of introducing MICR/OCR Technology for Cheque Processing (1982) | **Dr. Y.B. Damle,** Adviser, Management Services Department, Reserve Bank of India. | ➢ The introduction of ‘item processing’ (sorting and listing of cheques with the help of computers) in three phases.  
 ➢ In the first phase at the four metropolitan cities viz. Mumbai, New Delhi, Chennai and Calcutta, with the help of MICR technology.  
 ➢ In the second phase all state capitals and important commercial centers.  
 In the final phase national clearing to be introduced by dividing the country into four Regional Grids with headquarters at Mumbai, New Delhi, Chennai, and Calcutta.  
 a) to act as a clearing house for intra-grid instruments, and  
 b) Participate in a national clearing on behalf of the grid for extra-grid outstation cheques. |
| Committee on Computerization in Banks (1988)                                            | **Dr. C. Rangarajan,** Deputy Governor, Reserve Bank of India | Computerisation of the settlement operations in the clearing houses managed by Reserve Bank of India at Bhubaneshwar, Guwahati, Jaipur, Patna, and Thiruvananthapuram.  
 ➢ Operationalisation of MICR technology and the National Clearing of inter-city cheques at the four metropolitan cities.  
 ➢ The introduction of a one-way collection of cheques drawn on the 4 metros received from Ahmedabad, Bangalore, Nagpur and Hyderabad.  
 ➢ Branch level computerisation and the establishment of connectivity between branches.  
 ➢ Improvements in customer service - the introduction of on-line |

20
<table>
<thead>
<tr>
<th>Committee on Technology Issues relating to Payments System, Cheque Clearing and Securities Settlement in the Banking Industry (1994)</th>
<th><strong>Shri W.S.Saraf,</strong> Executive Director, Reserve Bank of India</th>
<th>➢ Establishment of an Electronic Funds Transfer (EFT) system, with the BANKNET communications network as its carrier. Enactment of suitable legislation on the lines of the Electronic Funds Transfer Act 1978, the USA and Data Protection Act 1984, UK.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issues related to up gradation of Information Technology in the First Banking Sector Reforms (1991)</td>
<td><strong>Mr. M. Narasimham,</strong> Deputy Governor, Reserve Bank of India</td>
<td>➢ Improving the financial viability of the banks; ➢ Improving the macroeconomic policy framework for banks; ➢ Increasing their autonomy from government directions; ➢ Allowing a greater entry to the private sector in banking; ➢ Liberalizing the capital markets; ➢ Improvement in the financial health and competitive position of the banks; ➢ Transparent guidelines or norms for entry and exit of private sector banks ➢ Public sector banks have been allowed for direct access to capital markets ➢ The regulated interest rates have been rationalized and simplified. ➢ Branch licensing policy has been liberalized ➢ A board for Financial Bank Supervision has been established to strengthen the supervisory system of the RBI.</td>
</tr>
</tbody>
</table>

- Standardization and rigorous security features to ensure an efficient and risk-free transfer of funds electronically.
- Setting up a network of Automated Teller Machines (ATMs)
- The introduction of a single 'All Bank' credit card.
| Committee on Technology Issues relating to Payments System, Clearing and Securities Settlement in the Banking Industry (1994) | Smt.K.S.Shere, Principal Legal Adviser, Reserve Bank of India. | ➢ MICR clearing is introduced at all centers with more than 100 bank branches. • Introduction of a Delivery versus Payment (DvP) system for SGL transactions, with settlement on gross basis both for securities transactions in PDO and funds transactions in current
➢ The introduction of Electronic Clearing Service Credit for low-value repetitive transactions such as interest, dividend, salary, pension payments and an Electronic Debit Clearing for payments to utility companies.
➢ Switch over to on-line inter-bank clearing on a gross basis.
➢ Large-scale induction of computers and communication technology in service branches
➢ Optimal usage of SWIFT. |
| --- | --- | --- |
| Committee on Customer service, technological up gradation, Second Banking Sector Reforms (1998) | Mr. M. Narasimham, Deputy Governor, Reserve Bank of India | ➢ Merge strong banks, close weak banks unviable ones
➢ Two or three banks with international orientation, 8 to 10 national banks and a large number of local banks
➢ Rationalize branches and staff, review recruitment
➢ De-politicize Bank Boards under RBI supervision
➢ Integrate NBFCs activities with banks.
➢ Information Technology. |
| Report of the Committee on Technology Upgradation in the Banking Sector | Dr A.Vasudevan | ➢ Report of the Working Group on Technology Upgradation of Banks  
➢ ICT in rural banks for improved banking service as perceived by the agricultural customers.  
➢ The potential and constraints in implementing ICT in rural bank branches. |
| --- | --- | --- |
| Report of Working Group on Screen Based Trading In Government Securities(2004) | Dr.R.H.Patil | ➢ The contribution of ICT to improved rural bank management and facilitate enhanced banking service to agriculturists, in terms of quicker service, identifying the deserving beneficiaries, expediting the scrutiny of credit applications and advancements & recovery of agricultural credit.  
➢ Separate trading platform and Ensure authenticity. |

Sources: Various issues of RBI reports.
Major Landmarks in Banking Technology and Transformation in India:

- The introduction of MICR based cheque processing- this is the first step during the year 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 standalone computer systems which metamorphosed 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;

- Setting up of the Institute for Development and Research in Banking Technology (IDRBT), Hyderabad in the mid-nineties, as a research and technology center for the Banking sector;

- The commissioning of the Indian Financial Network in 1999, 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 are now planning to implement.

- Commencement of Certification Authority (CA) functions of the IDRBT for ensuring that e-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.

 Providing detailed specifications to banks on the configuration of systems relating to critical inter-bank payment system applications such as Real Time Gross Settlement (RTGS) System, Negotiated Dealing System (NDS), Centralized 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 secure 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 is 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) and

Introducing a secured website for internet based data transfer to Central and State Government. Government Departments may populate the data from the secured website to their own systems based on their requirements.

1.5. Legal framework for Electronic banking:

1.5.1. Indian Evidence Act (IEA)-1872:

The Indian Evidence Act, 1872 is largely based on the English law of Evidence. The Act does not claim to be exhaustive. Courts may look at the relevant English Common Law for interpretation as long as it is not inconsistent with the Act. The Act consolidates, defines and amends the laws of evidence. It is a special law and hence, will not be affected by any other enactment containing provisions on the matter of evidence unless and until it is expressly stated in such enactment or it has been repealed or annulled by another statute. Parties cannot contract to exclude the provisions of the Act. Courts cannot exclude relevant evidence made relevant under the Act. Similarly, evidence excluded by the Act will be inadmissible even if essential to ascertain the truth. Indian Evidence Act, 1872 was amended to give legal recognition to electronic records as documents produced for inspection in the Court as "evidence", to include special provisions as to evidence relating to an electronic record and admissibility of electronic records and for acceptance of opinion of the certifying authority for proving the digital signature. Indian Evidence Act was amended to include electronic documents within the meaning of documentary evidence which can be produced in a court of law. The object of every judicial investigation is the enforcement of a right or liability that depends on certain facts. The law of evidence can be called the system of rules
whereby the questions of fact in a particular case can be ascertained. It is basically a procedural law but it has shades of substantive law. For example, the law of estoppel can defeat a man’s right. Law of Evidence is one of the fundamental subjects of law. The term ‘evidence’ owes its origin to the Latin terms ‘evident’ or ‘evidence’ that mean ‘to show clearly, to discover, to ascertain or to prove.

The main objective of the law of Evidence refers to anything that is necessary to prove a certain fact. Thus, Evidence is a means of proof. Facts have to be proved before the relevant laws and its provisions can be applied. It is evidence that leads to authentication of facts and in the process, helps in rationalizing an opinion of the judicial authorities. Further, the law of evidence helps prevent long drawn enquiries and prevents admission of excess evidence than needed. The facts it may include Direct, Circumstantial, Hearsay, Documentary, Oral, Scientific, Real and Digital Law related to evidence and proof is nothing but rules that must be observed in particular situations before certain forums.

1.5.2. The Bankers' Books Evidence Act (BBEA)-1891:

It was amended to stipulate that ‘Bankers' books’ include ledgers, daybooks, cash-books, account-books and all other books used in the ordinary business of a bank whether kept in the written form or as printouts of data stored in a floppy, disc, tape or any other form of electromagnetic data storage device “While dealing with offences and punishments relating to computer crimes, the IT Act 2000 has defined various computer crimes which are detailed below:

a) **Contaminant:** Computer contaminant as explained in the IT Act (Section 43 of Chapter IX) means any set of computer instructions that are designed
➢ To modify, destroy, record, transmit data or program residing within a computer, computer system or computer network; or

➢ By any means appropriate the normal operation of the computer, computer system or computer network.

b) **Data:** ‘data’ means a representation of information, knowledge, facts, concepts or instructions which are being prepared or have been prepared in a formalized manner, and is intended to be processed, is being processed or has been processed in a computer system or computer network and may be in any form (including computer printouts magnetic or optical storage media, punched cards, punched tapes) or stored internally in the memory of the computer (Chapter I-Section 2 (o)).

c) **Virus:** IT Act 2000 explains a computer virus as any computer instruction, information, data or programme that destroys, damages, degrades or adversely affects the performance of a computer resource or attaches itself to another computer resource and operates when a programme, data or instruction is executed or some other event takes place in that computer resource (Chapter IX –Section 43 (III)).

d) **Damage:** Under the IT Act 2000, damage means to destroy, alter, delete, add, modify or rearrange any computer resource by any means (Chapter IX –Section 43 (IV)).

e) **Hacking:** According to the provisions of IT Act 2000, hacking is committed by a person when that person, with the intent of causing or knowing that he is likely to cause wrongful loss or damage to the public or any person, destroys or deletes or alters any information residing in a computer resource or diminishes its value or utility or affects it injuriously by any means. The punishment prescribed under
section 66 of IT Act 2000 for hacking includes imprisonment up to three years or a fine up to Rs. Two lakhs or both (Chapter XI – Section 66 (1&2).

f) **Electronic Record:** An electronic document is any document that is generated or stored on a computer, such as a letter, a contract, or a will. In addition, an electronic document can be an image, such as a blueprint, a survey plat, a drawing, or even a photograph. A Digital signature can be used to sign these documents. IT Act defines the electronic record as "data, record or data generated, image or sound stored, received or sent in an electronic form or micro film or computer generated micro fiche" (Chapter I – Section 2(t)).

g) **Secure Electronic Record:** Under the IT Act 2000, a record shall be deemed to be a secure electronic record where any security procedure has been applied (As prescribed from time to time by the Central Government – Section 16) to an electronic record at a specific point in time. It will remain as a secure electronic record from the point of time of application of security procedure to the time of verification ((Chapter I – Section 2(ZF)).

1.5.3. **Information Technology Act (ITA)-2000:**

Several initiatives have been taken by the Government of India as well as the RBI (Reserve Bank of India); for the development of e-banking in India. The government of India enacted the IT Act, 2000, which provides legal recognition to electronic transactions and other means of electronic commerce. Compliance and legal issues arise out of the rapid growth in usage of e-banking and the differences between electronic and paper-based processes. E-banking is a new delivery channel where the laws and rules governing the electronic delivery of certain financial institution products or services may be ambiguous or still
evolving. Specific regulatory and legal challenges include Uncertainty over legal jurisdictions and laws governing a specific e-banking transaction, Retention of required compliance documentation like applications, statements, disclosures and notices; and Establishment of legally binding electronic agreements. Further important elements of a national payment system will include laws, standards, rules and procedures set by legislators, courts and regulators that define and govern the mechanics of the payment transfer process and the conduct of payment service markets.

In India, E-banking and electronic payment systems preceded enactment of any law that governed digital e-commerce. Whenever legal support has been felt necessary, in the absence of availability of proper legislation, contractual legal support has been resorted to by execution of various complex agreements between the parties and application of analogous laws and the general principles of common law. Efforts have been made by the institutions concerned and the Reserve Bank of India to examine various legal issues involved and identify the existing laws to be amended and new laws to be enacted. Besides, Information security is also essential to a financial institution’s ability to deliver e-banking services, protect the confidentiality and integrity of customer information and ensure that accountability exists for changes to the information and the processing and communications systems. Therefore appropriate laws to keep pace with developments in technology, as well as legal recourse against computer crimes, are essential for the promotion of e-banking activity. Another important requirement would be the existence of suitable policies and procedures to support the legal framework to ensure the safety of the information asset. As e-commerce gained wider acceptance the world over, the United Nations in 1996 felt the need for giving legal protection to these transactions and the United Nations Commission on
International Trade Law (UNCITRAL) drafted a Model Law on E-Commerce in 1996. The United Nations passed a resolution in 1997 adopting this Model Law and recommending that all member states refer to this Model Law when enacting or revising their local laws.

The Indian Government felt that it was necessary to provide legal recognition for transactions carried out by electronic communication and to give effect to efficient delivery of the Government services by means of reliable electronic records. As a result, the Information Technology Act, 2000 (IT Act) was enacted. The IT Act, provides legal recognition for transactions carried out by means of electronic data interchange and other means of electronic communication, commonly referred to as "electronic commerce", which involve the use of alternatives to paper-based methods of communication and storage of information, to facilitate electronic filing of documents with the Government agencies and further to amend the Indian Penal Code, the Indian Evidence Act, 1872, the Bankers' Books Evidence Act, 1891 and the Reserve Bank of India Act, 1934 and for matters connected therewith or incidental thereto was enacted on 7th June 2000 and was notified in the official gazette on 17th October 2000. IT Act 2000 has XIII chapters and four schedules. The Act shall extend to the whole of India and, save as otherwise provided in this Act, it applies also to any offense or contravention there under committed outside India by any person. The adoption and usage of information technology is becoming an essential feature in today’s development, especially in the banking sector. The use of Internet banking allows customers to access their accounts, make necessary inquiries and undertake banking transactions.

1.5.4. The Banking Ombudsman Scheme (BOS)-2006:
The Banking Ombudsman Scheme, 2006, of Reserve Bank of India was introduced with mainly two objectives; first, to resolve complaints relating to banking services and
facilitating satisfaction accordingly. Secondly, to resolve disputes between a bank and its constituents as well as amongst banks, through the process of conciliation, meditation, and arbitration. Banking Ombudsman is a quasi-judicial authority functioning under India's Banking Ombudsman Scheme and the authority was created pursuant to the decision by the Government of India to enable resolution of complaints of customers of banks relating to certain services rendered by the banks. The Reserve Bank of India announced the revised Banking Ombudsman Scheme with enlarged scope that included customer complaints on certain new areas, such as, credit card complaints, deficiencies in providing the promised services even by banks' sales agents, levying service charges without prior notice to the customer and non-adherence to the fair practices code as adopted by individual banks.

1.6. Electronic Banking-An Overview:

E-banking is dedicated on customer orientating, increasing of speed, growing of quality, alteration of banking services and reducing of banking expenses. Banks were the first places which used modern technologies related to the processing of data. Modern technologies such as bookkeeping in the 1950s, computerization in 1960s, and technologies related to electronic payment in 1970s were used first in the banking industry. In 1994, banks started to use the internet in their teller sections. Subsequently, the internet was expanded in its scopes in the banking industry. Tehran Bank was the paramount bank which set up Automated teller machines (ATM) in its branches limitedly in 1972. In late 1982 serious actions in the field of computerizing banking operations were done. Hence the widespread plan for automation of banking system was approved and implemented in 1994. In 1995, the internet for electronic connecting among Melli Bank and Shahrvand stores was established. In 2002, officials in-charge approved a regulation related to the center of information
interaction internet needed for e-banking (Ibrahimi, 2002) Banks are able to achieve an everlasting competitive pleasure in the process of banking services in addition to their developed activities through e-banking. Through continuous development of e-banking, the costs related to interactions of national and international transactions have significantly reduced, productivity and effectiveness of economy will promote. E-banking in comparison with traditional banking.

1.6.1. The concept of Electronic Banking:

E-banking is defined as banking via an electronic device such as computer, mobile phone, telephone or digital television (Karjaluoto, 2002), Electronic banking, also known as e-banking, cyberbanking, virtual banking, home banking and online banking, includes a range of banking activities conducted from either user’s or customer's office, home or even on the road using an internet connection (Turban, 2004). The term e-banking is used to describe the provision of information and products or services by a bank to its customers via a computer or television (Daniel 1999). Though, to be specific, the electronic device is only one end of the whole telecommunication system that actually delivers the banking transactions and operations. E-banking is often more convenient and accessible than the traditional banking. It makes it easier to customize their services faster and more efficiently. Financial institutions can save considerable operating and market costs by encouraging their clients to use e-banking (Nexhmi Rexha, 2003). It is an automated delivery of new and traditional banking products and services directly to customers through electronic, interactive communication channels. It includes the systems that enable financial institution customers, individuals or businesses, to access accounts, transacts business or to obtain information on financial products and services through public or private networks including the Internet.
Customers access to e-banking services using an electronic device, such as a Personal Computers (PC), Personal Digital Assistant (PDA), Automated-Teller Machine (ATM), kiosk, or Touch telephone. E-banking is an umbrella term for the process by which a customer may perform banking transactions electronically without visiting a brick-and-mortar institution.

Traditional banking offer many services to their customers, including accepting customer money deposits, providing various services to customers and making loans to individuals and companies. Compared with the traditional channels of offering banking services through physical branches, e-banking uses the Internet to deliver traditional banking services to their customers, such as opening accounts, transferring funds and electronic bill payment. In addition to traditional banks that have both a physical and online presence. There are several e-banks that exist only on the Internet, allowing users to work with a “virtual” bank. Net Bank can cut operating costs and can potentially offer higher deposit rates to its customers and waive many fees normally charged by a bank with a large network of physical branches. The challenge for Internet-only banks is to provide quality customer services without physical offices. One way in which Net Bank is dealing with this issue is via an agreement with the MAC ATM Net Work, thus providing its customer’s access to nearly 18,000 ATMs across the United States. Net Bank customers can deposit and withdraw funds from their Net Bank accounts through these ATMs, and in addition, customers can also deposit and receive funds through wire transfer.

E-banking can be offered in two main ways. First, an existing physical office can also establish an online site and offer e-banking services to its customers in addition to the regular channel. For example, Citibank is a leader in e-banking, offering walk-in, face-to-
face banking at its branches through the World Wide Web. Citibank customers can access their bank accounts through the Internet, and in addition to the core e-banking services such as account balance enquiry, funds transfer, and electronic bill payment, Citibank also provides premium services including financial calculators, online stock quotes, brokerage services, and insurance. E-banking from banks like Citibank complements those banks’ physical presence. Generally, e-banking is provided without extra cost to customers. Customers are attracted by the convenience of e-banking through the Internet, and in turn, banks can operate more efficiently when customers perform transactions by themselves rather than going to a branch and dealing with a branch representative.

E-banking services are delivered are to customers through the Internet and the web using Hypertext Markup Language (HTML). In order to use e-banking services, customers need Internet access and web Browser software. Multimedia information in HTML format from online banks can be displayed in web browsers. The heart of the e-banking application is the computer system, which includes web services, database management systems, and web application programme that can generate dynamic HTML pages. Bank customers’ account and transaction information is stored in a database, a specialized software that can store and process large amounts of data at high speed. The function of the web server is to interact with online customers and deliver information to users through the Internet. In India where we have such a large reservoir of human capital trained and skilled in Information Technology, and we are aware of the fact that a number of countries have developed their financial sector through an extensive use of IT as the medium of growth. The sharp growth of computer use in new consumer goods of durable nature has also given rise to the need for use of computers in the service sector as well. The banking industry as a service provider
can’t naturally lag behind in this movement toward the new techno-age. Hence the development of e-banking became inevitable.

1.6.2. Features of E-Banking:

On the foundation of websites, the e-banking products, and services are allocated into two categories:

**Transactional:** Transactional websites provide customers with the ability to conduct transactions through the financial institution's website by initiating banking transactions or buying products and services. Banking transactions can range from something as basic as a retail account balance inquiry to a large business-to-business funds transfer. (e.g. performing a financial transaction such as an account to account transfer, paying a bill or applications like applying for a loan, new account, etc.)

   a) Funds transfer between customers' own checking and savings accounts,

   b) Investment purchase or sale,

   c) Loan application and transactions such as repayments and

   d) Electronic Bill Presentment and Payment (EBPP).

**Non-Transactional:** Non-transactional or Informational websites provide customers access to general information about the financial institution and its products or services. The customer can get any sort of information about the bank from websites (e.g. online statements, Check links, Chat, Co-browsing etc.)

   a) Financial Institution Administration- features allowing financial institutions to manage the online experience of their end users.

   b) ASP/Hosting Administration – features allowing the hosting company to administer the solution across financial institution.
1.6.3. E-Banking Products and Services:

E-banking is an umbrella term for the process by which a customer may perform transactions electronically without visiting a brick and mortar institution. It could be in form of personal computer banking, internet banking, home and phone banking, etc. Electronic banking also known electronic fund transfer (EFT), uses personal computer and electronic technology as a substitute for checks and other paper transactions. EFTs is initiated through devices like cards or codes that let the customer to authorize access of his account. Many financial institutions use ATM or debit cards and personal identification numbers (PINs) for this purpose. The federal Electronic fund transfer Act (EFT Act) covers some electronic consumer transactions. Following are the electronic medium by which services generally provided by the banks as a part of e-banking products or services:

i. ATM (Automatic Teller Machine),

ii. Phone or Mobile Banking,

iii. Internet or Online Banking and

iv. E-Payment Methods (Debit/ Credit cards).

All the above mediums provide services, which can also be known as ‘Anytime anywhere banking’. This facilitate the customer of the bank to operate their account from any corner of the world, without visiting local or any subsidiary branch of their banks. Efforts are made by the bank not only to provide the facility to the customer but also to reduce the operational cost of the bank by providing e-banking services. So with this, banks have to employ less staff and still would be able to deliver services to the customer round the clock.

i). Automated Teller Machine (ATM): E-banking has become one of the most revolutionized components of today’s economic growth. It has become ideal for banks to
meet customer expectation. ATM card is a document that enables an individual to withdraw cash at specified branches through debt to their saving or current accounts by use of Automatic Teller Machines. The introduction of the ATM cards brought up dramatic changes in withdrawing money. The nationalized banks, private sector banks, and foreign banks are playing an important role by attracting number of people to become ATM cardholders through different facilities, and so the number of ATM cardholders is increasing and is expected to increase much more. An ATM is a machine built into a wall with a computerized system connected to the bank that is providing it. To use the machine a person must acquire a card called ATM card to be issued by providers of such services. This card enables the holder to withdraw cash, make deposits or transfer funds between accounts. When this card has inserted a pin (personal identification number) is entered to give the customer access to cash all day long. The ATM is popularly referred to as a cash dispensing machine. It allows the customer to withdraw cash and perform other banking transactions at any time of the day without going to the bank branch. They are usually built outside banks branches, malls, stations, and airports etc. (Antony and Juliana, 2011). ATMs are the e-channels which are very famous among all the customers as it is easily available and very important to the bank customers. Some of the advantages of ATM to customers are:

- Ability to draw cash after normal banking hours
- Quicker than normal cashier service
- Complete security as only the card holder knows the PIN
- Does not just operate as a medium of obtaining cash, but also provices other servcies.
- The customer can sometimes use the services of another bank through ATM’s.
ii). **Mobile or Phone Banking**: Telephone banking is relatively new e-banking product. However, it is firstly becoming one of the most popular products. It is a service that enables customers to access banking services through the telephone anywhere, anytime and in whatever the manner they want. To avail this customer requires a telephone. The Bank requires an information system that is configured to respond and act on the customer's instructions initiated through the telephone. The system presents its output in the form of an Interactive Voice Response (IVR), where the text is converted to voice (sound). It allows a link to direct connection either as private networks lines or public networks. It allows the customer's request to account balances or make fund transfer or another personalized customer service. Mobile banking solution on the other hand operates over Global System for Mobile Communication (GSM) or other digital wireless devices such as Smartphones and communication. The technology solutions are based on the latest mobile application technology like Wireless Application Protocol (WAP) and Short Messaging Services (SMS). The advantages of mobile banking include status balance enquiry, access to prompt and effective communication and billing services (Antony and Juliana, 2011). This facility is available with the help of Voice Response System (VRS). This system basically, accepts only TONE dialed input. Like the ATM customer has to follow a particular process. Initially, account number and telephone PIN are fed for the process to start. VRS system provides the users within additional facilities such as changing existing password with the new, desired information about new products, current interest rates etc. Customers can avail the following through mobile/ phone banking.

- Check balances and statement information
- Transfer funds from one account to another
➢ Pay certain bills
➢ Order statements or cheque books
➢ Demand draft request etc.,

Telebanking implements automated banking solutions for speeding the task of query handling at the branches. A telephone line is connected to the telebanking computer system. Whenever there is a call the system picks up the call and attends the call. The customers are able to find the balance in the account, a few last transactions and status of particular debits or credits and may even requisition statements on tax. With an increase in usage of mobile phones and cellular services, several banks have introduced mobile banking which allows customers to perform banking transactions using their mobile phones through the internet. Mobile banking is very helpful to people who travel frequently and enables them to keep track of their banking transaction.

iii). The Internet or Online Banking: Banks are becoming increasingly virtual. They are harnessing the power of the internet to deliver round the clock service to their customer at lowest possible costs. The customer can operate their account anywhere in the world through the internet. It resulted in considerable growth in the number of registered users of net banking over the years. Internet Banking belongs to the financial services variously known as home banking, remote e-banking, self-service banking and other names inciting that customers do their banking at home/at work. Internet Banking refers to a situation where customers can make use of computers connected to the internet to have access to their bank accounts, such that they can conduct most of their usual banking transactions over the internet. The user makes enquiries and the responses of these enquire from a computer-based system are displayed on the computer screen and viewed by the enquirer. The result of
such enquiry can be printed out on paper or saved on the computer for future use. In India the first bank to move into this area was ICICI Bank. ICICI bank started web based banking as early as August 1997. Bank customer must have all the following listed devices for availing services.

- A computer system, be it a desktop, laptop or palm-top
- The computer system must have an internal/external modem.
- The user must be connected to the Internet through an Internet Service Provider.
- The computer system must have the enabling software needed for this e-service.
- Customer must have an account with a bank operating or offering i-Banking.

iv). **Electronic Payment Channels:** These electronic payment channels enable an efficient, secure, economical and reliable system of transfer of funds from remitter’s account in a particular bank to the beneficiary account at another bank across the country. RTGS and NEFT are the two schemes for transferring funds instantly to other bank branches electronically at cheaper rates. The following are some of the terms used commonly in e-banking.

a) **RTGS:** An electronic payment system in which payment instructions between banks are processed and settled individually and continuously, on a real time basis during business hours. Real time means payment transaction is not subjected to any waiting period. The gross settlement means the transaction is settled on one to one basis without bunching or netting with any other transaction. RTGS is fund transfer system where the transfer of money or securities takes place from one bank to another on a real time and gross basis. Once RTGS transaction processed, payment is final and irrevocable.
b) **NEFT**: National Electronic Fund Transfer (NEFT) is an online system for transferring funds loan and payments of all over Indian financial institutions. It’s effect from 21\(^{st}\) November 2005. NEFT was made on the structured financial messaging solutions (SFMS) platform. This facility is used to transfer amounts below Rs.2,00,000/-. Electronic payments system in which payment instructions between banks are processed and settled on deferred net settlement (DNS) basis at fixed times during the day.

c) **EFT**: It stands for Electronic fund transfer, RBI introduced Electronic fund transfer to help banks offering their customers amount transfer service from their account to different account holders 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 bank at the 15 centers. Electronic fund 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 system.

d) **ACH**: Automated Clearing House (ACH) is a computer-based clearing and settlement facility established to process the exchange of electronic transactions among participating depository institutions. ACH processes large volumes of credit and debit transactions in batches. ACH credit transfers include direct deposit payroll and vendor payments. ACH direct debit transfers include consumer payments on insurance premiums, mortgage loans, and other kinds of bills. Debit transfers also include new applications such as the point-of-purchase (POP) check conversion pilot program sponsored by NACHA.
e) **Electronic cards**: Electronic cards are plastic cards which provides an alternative payment method for cash when making a transaction. Electronic cards are designed to reflect customer’s bank account. By having electronic cards customers need not to visit their banks physically in order to access their account. These are mostly cut out of hard plastic material to make them allow durable. The cards will have a magnet strip that allows the machines to be able to gain access to customer bank account electronically. They will come in three major types viz., Debit, Credit, Smart and Prepaid cards. All that the vendor has to do is to swap their card across the payment system where a message will be sent to customer’s bank and immediately reply with a confirmation message. All this is done in a matter of seconds.

f) **The point of Sales Machines (POS)**: A point of sale machine (POS) is the payment method that allows debit or credit cardholders make payments at purchase or sales channels. It permits customers to perform the succeeding services: Retail payments, cashless payments, cash back balance enquiry, anytime vending, loyalty redemption, printing mini statement etc. This method means the transformation of sums electronically in the point of sales and also the purchaser can surely transfer the sums from their account to seller’s account electronically in time and place point that he/she has bought goods or services (Ibrahimi, 2002).

g) **Green Banking**: Green banking is like a normal bank, which considers all the social and environmental factors with an aim to protect the environmental and natural resources. It is also called as an ethical or sustainable bank. The main purpose of green banking is to avoid as much paperwork as possible.
These are the electronic channels, initiatives taken by banks to improve the services to customer. The technological changes changed the modes of payment in different ways. But it is important to take note that this change is on a positive note and not negative one. These systems are designed to make money transfer from one account to other in seconds. The electronic period has also affected the banking system, foremost to an increase in the number of electronic transactions. However, the development of e-banking has also led to new areas of risk such as data security and reliability, requiring new techniques of risk management.

1.6.4. E-Banking: A Contrast between New and Old Competencies:
Banks are going under fast transformation in response to the forces of competition, efficiency in operations, cost reduction, management of assets and liabilities, risk management, service quality, customer satisfaction, anytime and anywhere banking. So bankers are progressively aware of the importance of e-banking for their survival, growth, performance and development. Currently, the technology has thoroughly transformed the way of business. The following table shows a comparison between old and new competencies.

<table>
<thead>
<tr>
<th>S.no</th>
<th>New Competencies</th>
<th>Old Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ability to operate in the ill-defined and ever-changing environment.</td>
<td>Ability to operate in well-defined and stable environment.</td>
</tr>
<tr>
<td>2</td>
<td>Capacity to deal with repetitive straight forward and concrete work process.</td>
<td>Capacity to deal with routine and abstract work process.</td>
</tr>
<tr>
<td>3</td>
<td>Ability to handle decisions and responsibilities.</td>
<td>Ability to operate in a supervised work environment.</td>
</tr>
<tr>
<td>4</td>
<td>Group and interactive work.</td>
<td>Isolated work.</td>
</tr>
<tr>
<td>5</td>
<td>Ability to operate within expanding geographical and time horizons.</td>
<td>Ability to operate within narrow geographical and time horizons.</td>
</tr>
</tbody>
</table>

Source: Kaushal, R (2012), Punjabi University, Patiala.
1.6.5. Risks Associated with Electronic Banking:

E-banking is cost effective and time-saving, very convenient for the customers, but it also has a new preference towards risks. An important and unique fact about technology is that it sets a significant part both as source and tool to control risks. As Information and communication technology (ICT) is energetic and possesses on changing, for that reason the varieties of risks or their control measures is not determined, that is why both are continuous in nature. The drive of severe action to control the risk to identify the risks and to certify that banks have defined systems in place to address the same is required. These risks, which often overlap, are briefly described below.

a) **Information Security Risk:** It is the risk to earnings and capital arising out of slack information security processes, thus exposing the institution to a malicious hacker or insider attacks, viruses, denial-of-service attacks, data theft, data destruction and fraud. The speed of change of technology and the fact that the Internet channel is accessible universally makes this risk especially critical (Ganesh, 2001). Banks using the internet as a moderate for financial transactions must have proper technology and systems in place to build a secure environment. The security risk arises on account of illegitimate access to a bank’s critical information (Rashmi Sharma, 2013).

b) **Reputational Risk:** A bank's reputation can be damaged by Internet banking services that are poorly executed e.g., limited availability, buggy software, poor response (Ganesh, 2001). Reputational risk causes major loss of the public assurance in or customer loyalty on the bank's ability to perform a critical function. For this either the bank or any third party can be responsible. The main reason can be system or product, which is below customers’ expectations, system loopholes, and security breach,
inadequate information provided to the customers about product usage and problem resolution procedures. This is the current and prospective risk to earnings and capital arising from negative public opinion. Customers are less forgiving of any problems and thus there are more stringent performance expectations from the Internet channel (Rashmi Sharma, 2013).

c) **Transactional Risk:** Operational risk or transactional risk, that is the risk associated while doing any transaction. It is also the most common form of risk associated with internet banking. It is the present and potential risk to earnings and capital arising from fraud, error, negligence and the inability to maintain expected service levels. A high level of transaction risk may exist with Internet banking products, because of the need to have sophisticated internal controls and constant availability. Further most of the internet banking platform is based on new platforms which use complex interfaces to link with legacy systems, thereby increasing the risk of transaction errors (Ganesh, 2001).

d) **Legal Risk:** Legal risk arises from violation of guidelines, policy, procedures, laws, rules, regulations or prescribed practices. Certain relatively new nature of Internet banking, in particular cases the rights and obligations are uncertain and applicability of laws and rules is unclear, thus causing legal risk (Rashmi Sharma, 2013).

e) **Money Laundering Risk:** In place of Internet banking transactions are conducted at remote areas, banks may face difficulty to apply the traditional method for the detection of undesirable criminal activities. Application of money laundering rules may also be inapt for some forms of electronic payments. Banks must follow proper Know Your Customer (KYC) policy designed by RBI and ensure updating of the
Strategies Associated with Electronic Banking: New strategic considerations for e-banking initiate a dialogue for a new era of services and required infrastructures. All the forecasts concerning e-banking are very optimistic. A very promising future for e-banking sector sets new challenges for the strategic management of e-banking divisions within banking organizations. Strategic management of e-banking is the endowment of banking products and services to customers through Internet technology (Ovia (2005). Basically, through the use of Information and Communication Technology (ICT) banks now offering different channels such as internet/online banking, mobile or phone banking and Automated Teller Machine (ATM) to deliver their services.

1.7. Conclusion:

E-banking offers their services with faster, accessible convenient and readily available services to the customers. For bankers, e-banking is much more efficient and cost saving and has facilitated change in the banking business (Turner, 2002). The attempt to catch a greater share of the market coupled with the quest for easy, convenient, cost saving and readily available banking, most banks are now focusing one banking instead of opening more branches at different geographical locations. In spite of the introduction of e-banking, most customers still queue in banking halls struggling to transact business. In a developing economy, Impact has become quite clear that the advent and spread of e-banking have played a sizeable and significant role in promoting economic growth and development in India. One of the major and observable benefits of the increased use of e-banking is that of supporting in financial inclusion from customer’s perspective. The main reason for
migration to e-banking from traditional paper-based banking is that of the improved operational efficiency brought about by its use. E-banking will require two-fold upshot, firstly, it will spread the remote customers and secondly it will create the awareness among customer about advantages of investment in different financial services and schemes. Investment in turn boost the financial markets and economy. A research shows that a large urban population uses Internet for gathering information about different financial products and services like personal loan, credit card, insurance etc., thus reducing the cost of printing, promotion, and distribution (Subramanian S, 2009).