Strong Information Technology (IT) base has emerged as a key precondition for a developing nation’s enhanced competitiveness and economic and societal modernization. Electronic services, which are driven by IT, have recently received considerable attention as these are located at the intersection of two major developments in the business world: the services growth and IT penetration (Fassnacht and Koese, 2006). IT is dominating in the new service development and delivery channels particularly because the need for interactivity and information intensity (Corrocher, 2002) has been raised profoundly in the changing domains of businesses today. The advent and adoption of IT coupled with communication network by industries has removed the constraint of time, distance, and communication (Khan et al., 2009) making the economy more networked and knowledge driven.

There is ever increasing pressure on the businesses for bringing efficiency and effectiveness in the operational, tactical, and strategic processes. IT is viewed as having the capability to alter core organizational directions, and reorient corporate strategy (Rawani and Gupta, 2002). The businesses are leveraging the benefits of IT (Cooper and Zmud, 1990) for transforming business processes (Drucker, 1988) towards improving quality. However, the level of dependence on Information system (IS) and the potential for using it for strategic purposes vary among business sectors as well as organizations (McFarlan et al., 1983). Banking sector is the area where IT diffusion is rapid as well as critical owing to the unique characteristics of banking services.

The success and effectiveness of IT diffusion may be gauged through improvements in service quality, which is a notion that is taken as a reference point for service evaluation. High service quality positively affects the effectiveness of business processes in terms of market share, reduced cost, positive attitude of customers, customer retention, etc. (Phillips et al., 1983; Zeithaml et al., 1988; Allred and Addams, 2000; and Buzzell, 2004). Indian banking sector is no exception, where measures (under RBI mandate or banks initiative) are being taken to infuse
technology in the system so as to reap the benefits of subsequently improved service quality. The notions of service innovation, technological innovation, IT as a complex activity and service quality concept, first need to be addressed to help identifying the unique characteristics of IT diffusion in Banking.

1.1 Conception of IT

Innovative efforts in services as products or as facilitators to other businesses have become the core of today’s business strategies. Service innovations have become increasingly technological (Barras, 1986; and Amable and Palombarini, 1998) whether it is process or product innovation (Huete and Roth, 1988; and Sundbo, 1997). Productivity, cost, product or market expansion, employment and skills, and service quality were considered to be the major constituents of service innovations.

Today’s technological innovations are widely comprised of Information and Communication Technologies (ICT). Being a part of the knowledge economy, ICTs are replacing the traditional marketplace transactions with marketspace transactions. Rayport and Sviokla (1995) have defined marketspace as a virtual realm where products and services exist as digital information and can be delivered through information based channels. The main impetus of ICT is treating information as the most valuable asset and communicating it for increasing the efficiency and effectiveness of business or social operations. In the virtual realm of marketspace, content, context, and infrastructure can be disaggregated to create new ways of adding value (Bitner et al., 2000). Information Technology as a source of value adds or alters content, changes the context of the interaction, and enables the delivery of varied content and a variety of contexts over different infrastructures (Rayport and Sviokla, 1995). In the physical realm of marketplace, the information only acts as a supporting element in the value chain activities. However, these two realms are mutually dependent (Prescott and Van Slyke, 1997) and the businesses need to integrate these two exploiting the information gathered or created in each activity of the value system.

Miozzo and Soete (2001) defined Information Technology in any business as ‘the interconnected set of technological and organizational innovations in electronic computers, software engineering, control systems, integrated circuits, and telecommunications, that have made it possible to collect, generate, analyze, and
diffuse large quantities of information at a minimal cost’. There is increasing convergence of different technologies (information, communication, web, and computing) in the form of digital convergence that gave rise to multilayered and interdependent industry structure offering benefits to both the businesses and the customers (Mueller, 1999; and Huang et al., 2012).

Defined alternatively, the Information and Communication Technology comprises of two strong technologies, one is Information Technology (IT) which usually deals with the hardware, the software, the methods, and the know-how required or used in acquiring, storing, processing, and displaying data and information by electronic means (Tusubira and Kyeyune, 2001). The second is Communication Technology (CT), which deals with the hardware, the know-how, the programs, and the methods used in ensuring that the message is transmitted correctly, efficiently and cost-effectively (Tusubira and Kyeyune, 2001), for example phones, faxes, modems, networks, etc. (Chauhan and Murthy, 2004). Because of strong cohesion between Information Technologies and Communication Technologies at the application front, ICT is usually referred to as IT in general, so, used interchangeably in the study.

Information Technology (IT) has had significant impact on every stage of service provision, production, delivery, and quality (Okunoye et al., 2007). Information as a resource for service firms (Kandampully, 2002) offers economies of abundance to the firms as knowledge products can be reproduced and distributed for near zero marginal cost (Lee, 2001). In the context of service firms, IT diffusion has also resolved the issue of simultaneity. By collapsing time and space at decreasing costs, the new data technologies make it possible for services to be produced in one place and consumed in another. Several service opportunities made possible by the advances of IT and web like two-way, interactive communication, personalization, real-time adjustments to a firm's offerings, and new forms of consumer access (Rust and Lemon, 2001). In many cases, IT is found to be non driver but still facilitator of service innovation enabling service organizations to adopt changing customer needs and the service user friendliness (Gago and Rubalcaba, 2007).

However, innovation per se does not benefit the firm unless it manifests superior value in the customer-driven marketplace (Kandampully, 2002). The customer perception of service quality and service provider reliability is primarily influenced by the experience of service encounter. The Service Encounter has been defined as the
moment of interaction between a customer and a firm (Bitner et al., 1994). Improving the way service is delivered, technology is widely used in the service encounter to put more information in service encounter, personalize the service, collect data on consumer needs, add value for the customer, differentiate the service and build relationship with customers so as to effectively (1) customize service offerings, (2) recover from service failure, and (3) spontaneously delight customers (Licht and Moch, 1999; and Bitner et al., 2000). There are different roles of technology in service encounters viz. Assistance, Facilitation, Mediation and Service Generation.

IT has potential to be applied to the full range of human activities from personal use to business processes to government. It is global, multifunctional and flexible, allowing for tailored solutions as well as activities can be standardized using technologies to meet the end requirements. Every economic entity has unique demand for and use of IT. Being pervasive in nature, the IT implementation at different levels addresses the need of the respective potential beneficiary. Technologies are characterised as ‘pervasive’ if their applications affect almost all sectors of the economy (Avgerou, 1998). Real time economy, straight through processing, 24x7 services, e-banking, e-education, e-governance, just in time supply and delivery, minimized stock holdings, global marketing, customized products, social networking are all outcomes of IT enabled economy. IT can be framed and applied as a potent tool in reducing poverty, extending health services, expanding educational opportunities and improving the quality of life for many of the world’s disadvantaged.

1.2 IT diffusion in the Indian Economy

IT/ICT supports socio-economic development (Solow, 1957; and Avgerou, 1998) of any nation through simplifying and integrating activities or processes at multi-sectoral levels of global supply chains. It aids in bridging economic and social divides and reducing poverty (Dutta and Mia, 2011). Society or economy fully benefits from a product or process innovation only when it gets diffused enough to enhance firm productivity and consumer utility (Davies, 1979; and Sullivan and Wang, 2005). The economic effects of IT investment depend upon its widespread diffusion, and support of organizational and social structure. Moreover, its diffusion in the multi-sectoral activities provides competitiveness to face the global challenges.
The IT industry is one of the biggest contributors as well as biggest beneficiaries of Innovation realm in emerging economies. The relation of IT with the economy and its subsequent contribution can be viewed at two different but interrelated levels—IT growth and IT diffusion (Joseph, 2002). The former refers to the contribution in output, employment, export earning, etc., resulting from the production of IT related goods and services that are limited to just one segment of the economy. Moreover, there are gains to the whole economy from investment in IT use in other sectors rather than emphasizing on one sector for IT production. This refers to IT induced development through enhanced productivity, competitiveness, growth and human welfare resulting from the use of this technology by different sectors of the economy and society (Joseph, 2002).

The contribution of IT towards national development is immense. In addition to direct positive impact on national income and foreign exchange when considered as a sector encompassing IT & ITeS (IT enabled services), it has matured enough to be the biggest employment generator. The total number of IT and ITeS professionals employed in India has grown from 0.52 million in 2001-02 to 2.97 million in 2012-13. The contribution of this sector to India’s GDP rose to approximately 8% in 2012-2013 from 1.2 % in 1997-1998. The Indian IT services and BPM (Business Process Management including hardware) sector generated revenues of $108 billion in 2012-2013 as compared to $100.9 billion in 2011-2012 a growth of 7.4%.

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Wireless</th>
<th>Wireline</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Subscribers (million)</td>
<td>867.80</td>
<td>30.21</td>
<td>898.02</td>
</tr>
<tr>
<td>Urban Subscribers (million)</td>
<td>525.30</td>
<td>23.50</td>
<td>548.80</td>
</tr>
<tr>
<td>Rural Subscribers (million)</td>
<td>342.50</td>
<td>6.71</td>
<td>349.22</td>
</tr>
<tr>
<td>Tele Density</td>
<td>70.85</td>
<td>2.47</td>
<td>73.32</td>
</tr>
<tr>
<td>Urban Teledensity</td>
<td>140.67</td>
<td>6.29</td>
<td>146.96</td>
</tr>
<tr>
<td>Rural Teledensity</td>
<td>40.23</td>
<td>0.79</td>
<td>41.02</td>
</tr>
</tbody>
</table>

Source: TRAI (2013)
Communication Technology is a key driver for development and growth. The overall Tele-density in India reached 73.32 in 2013 with overall urban and rural tele-densities being 146.96 and 41.02 respectively. The total internet subscriber base of India has been recorded at 164.81 million in March 2013 (TRAI, 2013) as shown in Table 1.1.

No doubt, IT is rewarding and being diffused in the Indian economy but on the flip side the e-readiness ranking of India is still not very impressive when compared to other economies in the world. As indicated in The Global Information Technology Report 2013 compiled in collaboration between World Economic Forum and INSTEAD, the score for networked readiness for India has slipped down to 3.88 (refer Table 1.2) after being stable (at around 4.1) for some years.

<table>
<thead>
<tr>
<th>Edition (No. of economies)</th>
<th>Score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-2013 (144)</td>
<td>3.88</td>
<td>68</td>
</tr>
<tr>
<td>2011–2012 (142)</td>
<td>3.88</td>
<td>69</td>
</tr>
<tr>
<td>2010–2011 (138)</td>
<td>4.0</td>
<td>48</td>
</tr>
<tr>
<td>2009–2010 (133)</td>
<td>4.1</td>
<td>43</td>
</tr>
<tr>
<td>2008–2009 (134)</td>
<td>4.0</td>
<td>54</td>
</tr>
<tr>
<td>2007–2008 (127)</td>
<td>4.1</td>
<td>50</td>
</tr>
<tr>
<td>2006–2007 (122)</td>
<td>4.1</td>
<td>44</td>
</tr>
</tbody>
</table>


The networked or e- readiness shows the ability to pursue value creation opportunities for inclusive economic development facilitated by ICT (WEF, 2013). The scores (refer annexure-I) of India (2012-2013) in this regard indicate that infrastructure, skills and individual usage are some factors which need immediate redressal. India is still far behind other countries on account of mobile network coverage, secure internet servers, electricity production, adult literacy rate, infrastructure and digit content, procedural bottlenecks, and most importantly individual usage of technologies.

1.3 IT in banking

The Financial sector has IT as its major medium for transformation encompassing e-banking, e-broking, e-insurance, e-governance, e-money, e-finance, e-exchange, and e-supervision. Improvements in IT have the promise to reduce asymmetric
information, as investors or customers can monitor the processing of financial corporations (Mishkin and Strahan, 1999). Within financial sector, banking sector is one field where the role of technologies is very significant and vibrant. Although there is no panacea for banks to stay competitive, technology has become the lifeline of excellence and efficiency for banking institutions (Thomas, 2004). Today, the question is not of who is providing e-services but who is not. Technology has become an enabler of global branding of financial services through the removal of geographic and cost barriers to global distribution and through the stimulation of a global convergence in benefits sought by banking consumers (Wright, 2002).

e-Banking is considered as a system that provides an electronic linkage enabling banks to offer their customers access to their accounts and the bank itself in order to prepare, manage, and control financial transactions through transferring information (Daniel, 1999; and Pikkarainen et al., 2006). Alternatively, e-services are defined as services delivered via Information and Communication Technology where the customer interacts solely with an appropriate user interface (e.g., Automated Teller Machine or Web site) in order to retrieve desired benefits (Fassnacht and Koese, 2006).

Electronic Banking has the potential and to some extent providing services to the customers wherever, whenever, and however they want, loosening time-and-space restrictions or increasing just in time nature of banking services (Licht and Moch, 1999; Daghfous and Toufaily, 2007). There are basically two forms of electronic models that the banks are adopting: e-banks and e-branches (Nath et al., 2001). E-bank is defined as a banking institution offering banking services exclusively over electronic channels (internet, mobiles, or ATMs) without any branch network. However, e-branch model implies offering electronic banking services through traditional branch networking apart from other media like ATMs.

In search of excellence, the banks striving to improve performance are restructuring the businesses from strategic level going down to operational details. E-banking as financial innovation (Stamoulis et al., 2002; and Liao and Cheung, 2002) has transformed banking institutions in the way they organize financial product development, delivery, and marketing via the Internet (Wu et al., 2006). E-banking technology is regarded as disruptive innovation leading to changes in both
technological knowledge and business models. Disruptive technologies are those that initially tend to degrade performance but promise greater long-term potential for performance improvement (Bower and Christensen, 1995).

The essence of any technology diffused in the banks would lie in business efficiency in terms of improving service quality (process as well as product) and most importantly in its acceptance by customers. Online service delivery is based on interactive information flow between customers and service providers (Li and Suomi, 2007).

1.3.1 The Indian Banking Sector - An overview

As far as India is concerned, there has been a phenomenal growth in the banking sector. 1991 was the watershed year in the Indian banking history, after which deregulation, privatization, amalgamations, and technology advancements became certain keywords in the banking industry strengthening spirit, structure, and competitiveness of the Indian Banking System. Today, banks have diversified their businesses to other avenues like insurance and investments in the wake of competition and deregulation. In India, every banking institution provides financial services through electronic medium (referred as e-banking), however the range of services may vary widely in content, capability, and sophistication (Salehi and Alipour, 2010). The foreign and private sector banks have an edge with regard to range of IT enabled services. However, picking up the pace, public sector banks reported cumulative expenditure on ‘computerisation and development of communication networks’ a growth of 23.2 per cent in 2009-10.

The history of automation of banking records the shift in the IT-infrastructure from mainframe, to PCs, to Client/Server, before the emergence of the Internet and Mobile Telephony. Now the banks have technological driven delivery channels that provide convenience to customers in terms of accessibility and transacting with banks. IT/ICT products include Automated Teller Machines (ATMs), Plastic Cards, MICR, Internet Banking, Mobile Banking, Telebanking, e-Banking, Electronic Fund Transfer (EFT), Electronic Clearing System (ECS), Real Time Gross Settlement (RTGS), Electronic Data Interchange (EDI), and the list is still amending. Apart from these, Kiosks, Mobile ATMs and Biometric ATMs are being used by many banks especially in rural areas to realize the vision of financial inclusion. In rural areas Business
Correspondence models have been implemented to outreach the banking services to rural masses.

1.3.2 Technological Changes in the Indian Banking Industry over time

The recommendations of prominent committees under chairmanship of Dr. Rangarajan (1984, 1988) on Computerization in Banks followed by Saraf (1994), Shere (1995), and Vasudevan (1999) triggered and structured transformation in the Indian banking industry through proposing various technological, system, and legislative changes in the banking regime. The reformatory phase triggered by Narasimham Committees (1991, 1998) brought a hype in the competitive and innovative business strategies that led to increased awareness amongst banks on the role and importance of technology in banking. Some major milestones in the Indian banking Industry in the wake of IT have been summarized below:

- The major breakthrough started with use of Advanced Ledger Posting Machines (ALPM) in 1980s.

- In September 1983, an agreement was made between the Indian Banks' Association and the All India Bank Employees' Association on the installation of electric/electronic machines (other than computers), microprocessors, and mainframe computers to support specified functional areas in branches, zonal offices, and head offices.

- In late 1980s banks Total Bank Automation (TBA) which means total automation of a particular branch with its own database, was introduced at both the front-end and back-end operations within the same branch.

- Mechanized cheque processing systems have been established which used the Magnetic Ink Character Recognition (MICR) technology.

- HSBC set up the first ATM machine in India in 1987.

- In 1997, an autonomous centre for development and research in banking technology, the Institute for Development and Research in Banking Technology (IDRBT) was set up.

- The INdianFIancialNETwork - INFINET, a wide area satellite based network (WAN) using VSAT (Very Small Aperture Terminals) technology, was jointly set up by the Reserve Bank and Institute for Development and Research in
Banking Technology (IDRBT) in June 1999 aimed at sharing expensive IT resources so as to achieve economies of scale

• The Government of India enacted the Information Technology Act, 2000 (generally known as IT Act, 2000), with effect from 17 October 2000 to provide legal recognition to electronic transactions and other means of electronic commerce.

• Introduction of electronic payment products such as Electronic Clearing Service and Electronic Funds Transfer, which over the years have metamorphosed into National ECS and National EFT (in November 2005) and RTGS have ushered in new ways of payment processing.

• The introduction of the Real Time Gross Settlement (RTGS) System in March 2004 has resulted in compliance with the Basle Core Principles for Systemically Important Payment Systems of the Bank for International Settlements.

• The Payment and Settlement Systems Act, 2007 (the PSS Act, 51 of 2007) and the two regulations (i) Board for Regulation and Supervision of Payment and Settlement Systems Regulations 2008 and (ii) Payment and Settlement Systems Regulations, 2008 have come into effect from August 12, 2008.

• To improve the efficiency of clearing system, Cheque Truncation System was operationalised in the National Capital Region, New Delhi in February 2008.

• The operating guidelines for mobile banking were issued in October 2008 which were later relaxed in December 2009 and December 2011, facilitating mobile banking transactions both for e-commerce and money transfer purposes.

• RBI paved way for operationalising Mobile ATM’s without prior permission from the Reserve Bank, subject to reporting in July 2010.


• March 2011, circular on Security Issues and Risk mitigation measures - Online alerts to the cardholder for usage of credit/debit cards was issued.
Introduction

- The service charges (including membership fees, transaction fees, and time varying tariff) for RTGS members came into effect from October 1, 2011.

- Recommendations of the IT Vision document 2011-17 guided commercial banks to move forward from their core banking solutions to enhanced use of IT in areas like MIS, regulatory reporting, financial inclusion and customer relationship management.

- National Payments Corporation of India (NPCI) has been set up as an umbrella organisation for retail payments with focus on electronic payments.

- *Aadhaar Enabled Payment System or AEPS* - an Indian payment system developed by NPCI based on unique identification number, the AADHAAR.

- NPCI introduced RuPay, an indigenous domestic card scheme for use at ATMs and Micro ATMs under AEPS.

- The RBI is replacing the existing RTGS with the NG-RTGS system which would be using the latest technology and several new features such as advanced liquidity management facility; extensible markup language (XML)/ISO 20022/SWIFT Compatible based messaging system conforming to international standards; and real time information and transaction monitoring and control system.

  (Compiled from different RBI publications - Padmanabhan, 2011; and Khan, 2011)

The evolution of electronic banking products in the country has progressed through two phases: (i) introductory phase and (ii) rationalisation phase. During the introductory phase, electronic products like Electronic Clearing Service (ECS) and Electronic Funds Transfer (EFT) were introduced by the Reserve Bank. These systems were decentralised and initially introduced in specific areas. During the rationalisation phase, these electronic products have been centralised introducing pan-India payment solutions like the Real Time Gross Settlement (RTGS), National Electronic Funds Transfer (NEFT) and National Electronic Clearing Service (NECS) that enable servicing customers spread throughout the country with settlement at a central location. This phase also coincided with the implementation of Core Banking Solutions (CBS)/Centralised liquidity management solutions in banks.
Table 1.3: Percent of ATM to branches of Scheduled Commercial Banks in India

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>Change Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scheduled Commercial Banks</td>
<td>39.3</td>
<td>47.5</td>
<td>56.9</td>
<td>67.6</td>
<td>87.0</td>
<td>100.5</td>
<td>117.8</td>
<td>128.7</td>
<td>227.5</td>
</tr>
<tr>
<td>Public Sector Banks</td>
<td>27.0</td>
<td>32.9</td>
<td>41.2</td>
<td>49.2</td>
<td>69.2</td>
<td>79.5</td>
<td>86.2</td>
<td>95.8</td>
<td>254.8</td>
</tr>
<tr>
<td>Private Sector Banks</td>
<td>117.5</td>
<td>138</td>
<td>150.1</td>
<td>172.6</td>
<td>184.0</td>
<td>203.9</td>
<td>268.2</td>
<td>276.8</td>
<td>135.6</td>
</tr>
<tr>
<td>Foreign Banks</td>
<td>339.8</td>
<td>351.6</td>
<td>377.4</td>
<td>359.7</td>
<td>333.1</td>
<td>431.2</td>
<td>439.1</td>
<td>379.8</td>
<td>11.7</td>
</tr>
</tbody>
</table>


The rapid expansion of ATMs in India during the last 6 years indicates that, for the range of services provided (cash withdrawal, account transfer, balance inquiry), ATMs have complemented if not replaced the traditional banking office for a large and growing segment of depositors. Evidence of this shift can be seen in Table 1.3, which shows that the number of ATMs per branch office increased 227.5% over 2006-2013 in India or from about 2 ATMs per 5 offices (approx.) in 2006 to 1 ATM per office in 2011 and further to 6 ATMs per 5 offices (approx.) in 2013. As the growth in the number of branch offices (from 54791 to 88562, RBI) in India over 2006-2013 was minuscule (at only 61%), the number of ATMs (from 21523 to 114014, RBI) grew at 430% during this period.

With more than 350 million cards (debit, credit) issued in the country, a spurt in the usage of these cards across various delivery channels like Automated Teller Machines (ATMs), Points of Sale (POS), e-commerce, m-commerce, Interactive Voice Response (IVR), etc. has been observed (RBI, 2013). As indicated in RBI reports, debit card is a more popular mode of electronic money than credit cards (RBI, 2013). Table 1.4 indicates that the number of outstanding debit cards is much higher than that of credit cards.
### Table 1.4: Credit and Debit Cards Issued by Scheduled Commercial Banks
(As at end-March)
(in million)

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Bank group</th>
<th>Outstanding Number of Credit Cards</th>
<th>Outstanding Number of Debit Cards</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I Public sector banks</td>
<td>3.1</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>Nationalised banks*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SBI Group</td>
<td>2.2</td>
<td>2.6</td>
</tr>
<tr>
<td>2</td>
<td>II Private sector banks</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Old private sector banks</td>
<td>0.04</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>New private sector banks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>III Foreign banks</td>
<td>4.9</td>
<td>5.0</td>
</tr>
<tr>
<td>4</td>
<td>IV All SCBs (I+II+III)</td>
<td>17.7</td>
<td>19.5</td>
</tr>
</tbody>
</table>

Notes: 1. *: Excluding IDBI Bank Ltd.
2. Figures may not add up to the total due to rounding off.

Source: RBI (2013)

### Table 1.5: Volume of Electronic Transactions by SCBs
(Volume in million)

<table>
<thead>
<tr>
<th>Type of transaction</th>
<th>Volume</th>
<th>Percentage Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECS Credit</td>
<td>117</td>
<td>121.5</td>
</tr>
<tr>
<td>ECS Debit</td>
<td>157</td>
<td>165</td>
</tr>
<tr>
<td>Credit cards</td>
<td>265</td>
<td>320</td>
</tr>
<tr>
<td>Debit cards</td>
<td>237</td>
<td>328</td>
</tr>
<tr>
<td>NEFT</td>
<td>132</td>
<td>226</td>
</tr>
<tr>
<td>RTGS</td>
<td>49</td>
<td>55</td>
</tr>
</tbody>
</table>

Note: Percentage variation could be slightly different as absolute numbers have been rounded off to million.

Source: RBI (2012, 2013)
Table 1.6: Value of Electronic Transactions by SCBs

<table>
<thead>
<tr>
<th>Type of transaction</th>
<th>Value</th>
<th>Percentage Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECS Credit</td>
<td>1,817</td>
<td>1,838</td>
</tr>
<tr>
<td>ECS Debit</td>
<td>736</td>
<td>834</td>
</tr>
<tr>
<td>Credit cards</td>
<td>755</td>
<td>966</td>
</tr>
<tr>
<td>Debit cards</td>
<td>387</td>
<td>534</td>
</tr>
<tr>
<td>NEFT</td>
<td>9,321</td>
<td>17,903</td>
</tr>
<tr>
<td>RTGS</td>
<td>4,84,872</td>
<td>5,39,307</td>
</tr>
</tbody>
</table>

Note: Percentage variation could be slightly different as absolute numbers have been rounded off to ₹ billion.

Source: RBI (2012, 2013)

All types of electronic transactions (Except ECS credits in terms of value) of Scheduled Commercial Banks (SCBs) in India posted sustained growth in both value and volume terms in recent years that continued in 2012-2013 (RBI, 2013) (refer Table 1.5, 1.6).

Table 1.7: Trends in Payment Systems

<table>
<thead>
<tr>
<th>Year</th>
<th>Non-cash retail payments*</th>
<th>Non-cash retail payments to GDP ratio</th>
<th>Currency in circulation as a percentage of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-08</td>
<td>3,05,382</td>
<td>6.12</td>
<td>11.85</td>
</tr>
<tr>
<td>2008-09</td>
<td>3,29,736</td>
<td>5.91</td>
<td>12.38</td>
</tr>
<tr>
<td>2009-10</td>
<td>4,06,116</td>
<td>6.29</td>
<td>12.38</td>
</tr>
<tr>
<td>2010-11</td>
<td>4,76,291</td>
<td>6.21</td>
<td>12.36</td>
</tr>
<tr>
<td>2011-12</td>
<td>5,16,332</td>
<td>5.83</td>
<td>12.04</td>
</tr>
</tbody>
</table>

* Cheques, ECS, NEFT, Cards, RTGS Customer transactions.

Source: Various RBI publications and Database on Indian Economy (DBIE).
In India, despite widespread diffusion of electronic services in banking, cash is still pre-dominating mode of payment. Due to persistent banks’ policy initiatives and RBI stance focused on technology upgradation of banks, the average ratio of non-cash retail payment to GDP hovered around 6 per cent over years (refer Table 1.7).

1.4 RATIONALIZATION OF IT ADOPTION

*Service Technologies* have radically reordered the power relationships, competitive environments, and leverageable opportunities in most industries (Quinn and Paquette, 1990). The success and effectiveness of these technologies depend upon the way these are implemented or adopted (Berger, 2003). Adoption of Information and Communication Technologies at the organizational level is a highly strategic decision having the tendency to pave way for a multitude of different products to be innovated (Prescott and Van Slyke, 1997). It involves comprehensive analysis of the environmental factors and deciding whether or not to introduce the innovations in the existing organizational setup (Bouwman *et al*., 2005). In the context of banking, the environment within which banks operate is so turbulent that it may provide many opportunities as well as create hindrances for IT adoption by the banking institutions.

1.4.1 Value of e-Banking for Banks

The strategic IT deployment is essential within organizational setup for managing interdependencies of relationship assets – customer assets, employee assets, partner assets and supplier assets- to enhance its overall value as well as performance (Galbreath, 2007).

The benefits of e-banking are numerous. It provides *competitive edge* to the banking institutions in terms of cost, better customer service, wider distribution area and development of sophisticated product offerings as it facilitates better *asset – liability management and advanced market research* (Sullivan, 2001; Berger, 2003; and Shastri, 2005). e-Banking has offered banks a new and improved *distribution channel* that does not restrict banks to physical locations or historical geographical areas (Mols, 1998; Daniel, 1999; Dabholkar and Bagozzi, 2002; Gan *et al*. 2006; Lichtenstein and Williamson, 2006; Hernandez and Mazzon, 2007; Yiu *et al*., 2007; and Wong *et al*., 2008). However, this electronic distribution channel is complementary to the existing branch banking (Dannenberg and Kellner, 1998; Mols, 1998; and Vaithilingam *et al*., 2006).
IT results in mass customization which implies that each individual user perceives that the service they receive is personalised or customised to their needs and uses (Dannesnberg and Kellner, 1998; and Jayawardhena and Foley, 2000). With the increased level of customer sophistication and the need for continuous service, IT plays a learning link between the bank and the customers resulting in Customer lock-in and improved CRM (Customer Relationship Management) performance of the bank system (Jayachandran et al., 2005; and Chen and Ching, 2007).

e-Banking offers significant cost advantage to the banks (Prescott and Slyke, 1997; Jayawardhena and Foley, 2000; and Nitsure, 2003). Despite the high investment in setting up the infrastructure for IT implementation, it decreases the marginal cost (Suominen, 2001) for the businesses because of low or nil content replication (information) and low cost distribution (through internet) and communication media (Parker, 2000). There are both supply-side and demand-side economies of scale that further strengthen each other in the network economy (Lee, 2001). Electronic commerce (e-Com) can significantly lower both order-taking costs up front and customer service costs after the sale by automating processes. With the proliferation of broadband and mobile technologies, the banks can realize twin benefits of providing better customer service at significantly reduced costs.

Due to increased reach and reduced cost, the profitability of the bank (except for small and de novo banks offering internet banking) increases with the use of IT (Brynjolfsson and Hitt, 1996; and Furst et al., 2000). However, some researchers (Dos et al., 1993; Lichtenberg, 1995; Sullivan, 2000; and Malhotra and Singh, 2007) found no association between IT adoption and performance of financial firms. Justifying it, DeYoung (2001) argued that profitability depends on the quality of the service provided and not necessarily on the channel used for service delivery. Moreover, high returns to the investment made in IT might be achieved with shifting focus from capital to labour (Prasad and Harker, 1997). In the Indian context, some researchers (Sharma, 2011) even found negative correlation between technology and bank productivity. However, in any case, IT investments increase the value of the firm (Dos et al., 1993). But, its value is realized only when these technologies are perceived and utilized by their intended users in a manner that contributes to the strategic and operational goals of the firm (Agarwal and Karahanna, 2000).
IT also causes disintermediation (Howells, 2000). By establishing direct linkage between producer and consumers; IT shrinks the role of intermediaries. The consumers are now able to access the services or information which otherwise mediated by other service firms (Singh et al., 2002). On the flip side it shrinks the role of service organizations in both the service and manufacturing units. The firms can interact directly with their customers or their customers being able to interact with them, the role of middlemen as retailers, sales agents, market researcher and marketing operators tends to reduce. However, the intermediation in terms of transport and logistics functions will expand to cater needs of geographically dispersed customers ordering products online.

With the realization and acceptance of Marketspace steered by IT, many products as well as processes in the value matrix have become virtual (Zwass, 1996) removing the constraints of time, place and form. Now the banks are offering - virtual tour of their products or services, virtual meetings or conferences, virtual learning centers, virtual products/services to be cited among many.

1.4.2 Value of e-Banking for Bank Customers

The foremost privilege the customers are enjoying with e-banking is ‘convenience’ in carrying out banking activities (Lichtenstein and Williamson, 2006). For the consumer, electronic banking channels comprise decision support systems, because they enable individuals to make real-time financial decisions conveniently independent of time and location (Burstein et al., 2008). It also empowers customers with greater control of their accounts (Jayawardhena and Foley, 2000). With the mushrooming of ATMs and netbanking/mobile banking gaining steam, the customers are not very much bothered about the branch timings of the bank as well as the location of the branch for most of the services. IDBI Bank and Standard Chartered Bank have even introduced a 24* 7 locker facility enabled by biometric access in some selected cities for the customers who are ready to pay more.

e- Banking offers more value to the customers in terms of information, servicability, wider assortment of offerings, and much more. Talking about customization of services for meeting customers requirements, the banks are adding flares to the Debit/ATM card by offering overdraft facility, reward points or discounts at some merchant establishments, and surcharge waivers on payment through credit card to be
cited among many. The customers are also getting facility to choose currency denomination among ₹100, ₹500, and ₹1000 on withdrawal from ATM. Some banks (prominently SBI) are unveiling green channel counters at their branches equipped with handheld swipe machines for depositing/withdrawing cash and fund transfers.

IT fosters network building. Technology facilitates the maintenance of networks with customers and partners inside and outside the firm (Kandampully, 2002). With the presence of network among customers, these business networks benefit the users with network effect or network externalities (Katz and Shapiro, 1985; and Economides and Salop, 1992). Network effect occurs when a user’s utility from using a technology directly increases with the total size of the network (Hall and Khan, 2003). This effect is largely seen in the case of use and adoption of ATMs (Saloner and Shepard, 1995) in the banking system.

For the users of these technologies there may be a concern of technical problems, risk of hackers, security threats, unsolicited information, etc. Complexity of the transaction and the perceived risk associated with the transaction has a significant impact on whether customers use technology based service systems in a banking context (Roberts and Carter, 2003).

1.4.3 Risk and Security associated with IT in Banking

Information and the knowledge based on it have been recognized as ‘information assets’ for processing business operations (Sung and Su, 2013). In this telematic society, there is tendency of overproduction of information when advanced information technology appears (Styhre, 2002). Although technology is advancing, the need for relevant, timely information remains constant (Parker, 2000).

In the context of banking, the Basle Committee (1998, 2003) stated the recognition that along with the benefits, electronic banking and electronic money activities carry risks for banking organisations, and it is important that these risks are recognised and managed by banking institutions in a prudent manner. While observing IT phenomenon in the banking arena, it has been observed that technology in general acts as both source and tool for control of risks.

During the pre- internet period (traditional banking), the banks were predominantly exposed to risk in internal activities of the business and these activities or programs were equipped with built in security with the installed software or applications
Transactions that are directed from the branch to the main server were encrypted; there were individual passwords, and numerous functions had two levels of authorization.

With the opening of banking business through a medium like Internet, the traditional banking risks are magnified and modified for banks offering transactional electronic banking, thereby influencing the overall risk profile of banking (Pennathur, 2001; and Basle, 2003). The risks associated with IT installation in banking can be categorized as: IT environment risks, IT operation risks, and product/service risks.

Customers appreciate the convenience and efficiency of electronic payment system but at the same time, they are very apprehensive about the security of this system. There are hackers and fraudsters who have chased the banking system in the IT domain too. The power of electronics, it can make a marginal farmer billionaire (although for 40 minutes because of bank mistake) (Mukherjee, 2012) or a billion Rupee account can be emptied in few seconds through insider or outsider attacks. It has been observed that just news about these frauds in newspapers or television has adverse effect on the same day card usage (Kosse, 2013). Many frauds are committed by fraudsters through identity thefts like Card cloning, phishing and pharming etc. According to the data compiled by the Reserve Bank of India (RBI, 2012), the money lost to such scams has doubled in the past four years. In the year 2010-2011 banks lost Rs.2,289 crore (till December), while the loss was Rs.1,057 crore in 2007-08 (Sharma, 2011). However, the share of phishing attacks on India is very less (less than 2% of total attacks on the whole world) as compared to that of US (43%) in the month of January, 2012 (Phish tank, 2012).

Many measures have been taken by RBI and the banks to control and make customers aware about these fraudulent activities. Effective authentication can help banks reduce fraud, reputation risk, disclosure of customer information, and promote the legal enforceability of their electronic agreements.

Banks are also faced with the strategic risk with the emergence of new and/or subsequent obsolescence of old technologies. Banks have strong need to ascertain and frame an optimal combination of traditional and electronic banking services. Uncertain pace of change and evolving standards also exposed banks to strategic risk. Many organizations face a problem of lack of strategic focus and training of
employees for required knowledge and skills. Maintaining public confidence and building trust in the technology based services are also the basic ingredients for effective IT implementation. Moreover, as e-business solutions are more susceptible to commoditization, investments in e-business have become a competitive necessity rather than a source of competitive advantage (Troshani and Rao, 2007).

Robust information is at the heart of risk management processes in a bank. To ensure quality of data and the information, it is imperative on the part of banks to build and maintain processes, procedures, and techniques for managing information security involved in the electronic transactions. In the behest of IT revolution, the basic principles of Internet security have been evolved from the so called CIA (Confidentiality, Integrity, and Availability) triad to a more rigorous and time tested list of principles (Table 1.8) as presented by the committee on ‘Information Security, Electronic Banking, Technology Risk Management and Cyber Frauds’.

**Table 1.8: Basic Principles of Information Security**

<table>
<thead>
<tr>
<th>Principle</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confidentiality</td>
<td>The key information remains private to the bank and is not viewed or used by those unauthorised to do so.</td>
</tr>
<tr>
<td>Data and Transaction Integrity</td>
<td>The information that is in-transit or in storage is not altered without authorisation.</td>
</tr>
<tr>
<td>Availability</td>
<td>The information must be available when it is needed.</td>
</tr>
<tr>
<td>Authenticity</td>
<td>Validation that both parties involved are who they claim they are to ensure that the data, transactions, communications or documents are genuine.</td>
</tr>
<tr>
<td>Non repudiation</td>
<td>Creating proof of the origin or delivery of electronic information to protect the sender against false denial by the recipient that the data has been received, or to protect the recipient against false denial by the sender that the data has been sent.</td>
</tr>
<tr>
<td>Identification</td>
<td>The process by which a subject professes an identity and accountability is initiated.</td>
</tr>
<tr>
<td>Authorization</td>
<td>Determine that a customer or an employee has legitimate access to the bank account or the authority to conduct associated transactions on that account</td>
</tr>
<tr>
<td>Accountability</td>
<td>Linking a human to the activities of an online identity through the security services and mechanisms of auditing, authorization, authentication, and identification.</td>
</tr>
<tr>
<td>Auditability</td>
<td>Ensuring that a clear audit trail exists for e-banking transactions.</td>
</tr>
</tbody>
</table>
Focused to provide continuous and reliable services for global organizations in the 24x7 hours culture, it is imperative on the part of banks to maintain business continuity through proper Business Continuity Planning. As defined by RBI, *Business Continuity Planning* forms a part of an organisation's overall Business Continuity Management (BCM) plan, which is the ‘preparedness of an organisation’, which includes policies, standards and procedures to ensure continuity, resumption and recovery of critical business processes, at an agreed level and limit the impact of the disaster on people, processes and infrastructure (includes IT); or to minimise the operational, financial, legal, reputational and other material consequences arising from such a disaster. The events like 9/11, Mumbai floods and NIMDA virus underscore the importance of robust business continuity planning. Operational risk mitigation through development of business continuity plans which are focused on core banking solutions, disaster recovery sites, back-up systems, and enhanced security system is now a common practice for the banks.

**1.5 SERVICE QUALITY**

Service quality in terms of adding accuracy and driving defects out of service operations is a new wave prevalent among major service organizations to become more competitive in the market (Thakur *et al*., 2008). The success in the customer centered businesses is dictated by offering high and continually improving service quality. Firstly, regarding customer adoption of new services, customers would readily adopt innovative services if these are perceived to be of high quality. Secondly, high service quality leads to customer satisfaction and continual use of the services. Delivering high service quality produces measurable benefits in profit, cost savings, and market share (Phillips *et al*., 1983; Zeithaml *et al*., 1988; and Buzzell, 2004). Quality is provided to avoid dissatisfaction among customers that may occur out of differences between customer perceptions or expectations and service offer's attributes. This way, service quality has direct implications for customer behavioural intentions (Cronin and Taylor, 1992; Zeithaml *et al*., 1996; and Olorunniwo and Hsu, 2006) and subsequent retention (Rust *et al*., 1995; Zeithaml *et al*., 1996; and Allred and Addams, 2000).
In the following text the concept of service quality and its dimensions have been discussed. This would help in identifying the influence of IT on service quality which is relevant to the banking sector.

### 1.5.1 Conceptualization of Service Quality

Service quality is a notion that has varied aspects and perspectives and conceptualized by many academicians, practitioners, and researchers in different ways. The two schools of thought for defining and understanding the services quality are presented below:

**Nordic perspective** (originated in Europe and propounded by Grönroos, 1984) classified the service quality into two dimensions: technical quality and functional quality. Technical quality is related to the outcome of the service and functional quality implies the way the service is delivered to customers. Later on, the image of an organization as corporate image was also identified as a dimension of service quality.

**US perspective** (originated in North America and propounded by Parasuraman et al., 1985) defines service quality as the difference between perceptions and expectations and used service encounter characteristics to describe service quality in 5-10 dimensions (e.g. reliability, responsiveness, empathy, assurances, etc.). They proposed a method for measuring service quality known as SERVQUAL (Ennew and Waite, 2007). The American perspective describes service quality based on the attributes of services (Brady and Cronin, 2001).

Others define quality as ‘fitness for use’ (Juran, 1986), ‘Conformance to requirement’ (Crosby, 1989), the ability to satisfy the needs and expectations of the customers” (Bergman and Klefsjö, 1994). Perceived service quality, according to Parasuraman et al. (1985), is “a global judgment of, or, attitude relating to the superiority of the service”. “Quality is the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs” (ISO 8402/ISO 9000).

Dimensions of service quality imply how customers evaluate the quality of any service. These determinants of service quality are the bases of customer expectations (before consumption) and customer perception (after consumption). The service
quality literature shows conflicting views on the determinants of service quality. Some researchers emphasize functional quality yet others consider both functional and technical quality. The most popular and widely used set of service quality dimensions as propounded by Parasuraman et al. (1985) for measuring service quality are as follows:

- **Reliability**: The first time made promises and consistency in discharging and deliverance of the products/services
- **Responsiveness**: Willingness, readiness and timeliness in discharging of services by the employees
- **Competence**: Skill mix in the context of employees
- **Access**: Ease of contact
- **Courtesy**: Respect, politeness, consideration and friendliness
- **Communication**: Convenient and pleasing language
- **Credibility**: Honesty, trustworthiness and believability
- **Security**: Services with minimum risks
- **Understanding the customer**: Understanding the construct of customer
- **Tangibles**: Physical evidence

Later on, this 10 dimensional framework was reduced to 5 dimensions as RATER model involving Reliability, Assurance, Tangibles, Empathy, and Responsiveness. Avkiran (1994) identified the following four discriminating factors of service quality in the banking sector.

- **Staff Conduct**: Responsiveness, civilised conduct and presentation of branch staff that will project a professional image to the customers.
- **Credibility**: Maintaining bank staff-customer trust by rectifying mistakes, and keeping customers informed.
- **Communication**: Fulfilling banking needs to customers by successfully communicating financial advice and serving notices timely.
• **Access to Teller Services**: The adequacy of number of branch staff serving customers throughout business hours and during peak hours.

Evaluation of quality is not made solely on the outcome service; it also involves the evaluation of the process of service delivery (Parasuraman *et al.*, 1985; Zeithaml *et al.*, 1988).

### 1.5.2 e- Banking and Service Quality

Being a part of personalised service oriented industry, banks' primary aim is creation, maintenance, and satisfaction of customer-needed service (Bhattacharyay and Ghose, 1989). Customer service quality is expected to be a major determinant of branch banking performance and potential (Avkiran, 1994). Researching customer expectations and determining customer desires are vital for providing high level of customer service and creating effective customer relationship environment. Every member of the organization needs to ensure that every bit of customer information is recorded, analysed, understood and then re-used to address the needs of that particular customer (Rao, 2008).

With the advent of technology, there are shifts in consumer expectations in basically three areas: the importance of the buying experience, the importance of control, and the role of personalization (Rust and Lemon, 2001). For many customers, the present level of services has become a necessity and customers are seeking even more. Customers have a basic minimum level of expected service delivery to their satisfaction (patience threshold) and a higher level of service delivery to bring in delight (delight breakpoint) (Pradhan, 2009). Service anywhere between these points would not appeal to an average customer but a bank has to expend a lot in moving to next higher level. The prudent use of IT releases some burden of variable cost in making this move despite the huge initial setup cost. According to a survey, Technological upgradation is identified as one of the most successful strategy in Customer Acquisition and Retention (FICCI, 2006).

Tools and technologies are deployed by service organizations to fill the quality gaps that may arise during service delivery. IT is one of these technologies that fills the information gap and automates the services to enhance its speed and accuracy thereby
enhancing the service quality. IT innovations in processes or service delivery have positive impact on product output and quality (Mukhopadhyay et al., 1997).

Because of depersonalization of e-banking services, one of the major issues in e-banking adoption is how e-service quality is perceived by the customers. This prompted a proliferation of research into how service quality may be examined and managed for electronic service deliveries (such as Parasuraman et al., 1991, 2005, Zeithaml et al. 2001, 2002; and Bauer et al., 2005).

Overall, the impact of IT may be visualized in enhancing the quality of the clearing, payment and settlement systems of the banks. Now the banks have technological driven delivery channels that provide convenience to customers in terms of accessibility and transacting with banks. Technology enabled clearing and settlement systems ensure better quality of internal processes or operations thereby providing quicker services to the customers and other transacting bodies (inter banks and other institutions).

1.6 NEED OF THE STUDY

IT has opened new avenues for research in service sector domain. It has proved beneficial for service organizations in terms of improved efficiency (process) and effectiveness (product/service). In the Indian banking context, almost all banks have incorporated IT in their strategies and operations but at different levels depending upon the driving forces and obstacles for its successful implementation. Moreover, success of service innovations depends to a great extent on the perceptions and consumption patterns of the intended users of such services. Service quality is a notion that is taken as reference point for service evaluation. When new services are introduced, these are first evaluated for the quality against different aspects that form the dimensions of service quality. These perceptions of quality dimensions form the basis for a person’s overall service quality perception, that further become the base for predicting person’s behavioral intentions (Boulding et al., 1993). Direct relation has been found between improved service quality and intentions to purchase (determining service usage) (Zeithaml et al., 1996). However, pursuing and maintaining the highest level of service quality often costs too much at the front level (Nam et al., 2006). The critical decision for the firm is to determine and maintain desired rather optimal level of service quality. So the purpose of the intended research involves determining bank
adoption pattern of electronic media, factors constituting drivers and inhibitors for bank adoption, dimensionality of e-banking services quality as affected by IT, and customer adoption of such services.

The review of the extant literature shows that extensive research on traditional service quality has been conducted for over 3 decades in the past, and a growing body of literature has been dealing with electronic service quality. This highlights the importance of service quality construct. The theories of services marketing, service quality, customer satisfaction, behavioural intentions, Information technology, adoption theories have been converging creating need for restructuring business models and marketing paradigms. This convergence inhibits building consensus on critical issues (like dimensionality of the service quality) and provides scope for further research in different contexts (countries/regions as well as industries). The applicability of traditional models of service quality has been questioned by researchers (Sureshchandar et al., 2001; and Kaul, 2007).

Some research gaps in the extant literature identified in the related fields are:

- Earlier studies on electronic front mostly focused on the user interface (website, web portals) or a single service (mobile or internet). This study intends to capture the domain of electronic banking more fully by considering all the electronic services offered by banks (ATM, internet, mobile, fund transfer, etc.).

- Regarding the adoption of new technologies, almost all the previous studies have focused on adoption as a binary variable; that is consumers or firms either have adopted or have not adopted the innovation under study. In this study, the focus is placed on the adoption continuum indicating the extent of adoption and technology upsurge.

- With regard to information technology adoption, only a handful of studies focused on actual usage of such technologies (in contrast to adoption intention). The set of beliefs that influences an individual to continue using the technology may not be the same as the set of beliefs that leads to his or her initial adoption (Venkatesh et al., 2003; and Yang et al., 2012).

- There are not many research works documented on the preferences of the customers of the Indian banks. Apart from customer perception about electronic
service quality dimensions, this work intends to bridge this ‘gap’ through identifying which factors are important for their preference.

The review of existing literature also reveals that very little work has been done in relation to adoption of Information Technology (IT) in the Indian banking sector at regional level. The intention behind this research, therefore, is to fill this gap by exploring thoroughly and comprehensively this field of research. Moreover, there is very little work existing on the relationship between IT and banking services quality as far as India is concerned. Cultural differences and the level of development across countries cause different dimensions to have different impacts on behavioural intention across countries (Al-Hajri and Tatnall, 2008; and Bandyopadhyay and Bandyopadhyay, 2010). Given the lack of literature and knowledge on this subject, it is a modest attempt to examine how information technology and services quality interrelate in the banking context as perceived by the bank customers and the likely impact of such quality perceptions on the usage or adoption of new technologies. The study would also highlight which determinants of service quality are directly influenced by IT and to explore what are the enabling and retarding factors for effective implementation and upsurge of IT system in banks.

1.7 OBJECTIVES OF THE STUDY

On reviewing the available literature in the context of IT, a need was felt to analyze whether the inclusion of IT in banks is really customer friendly, what is the real impetus behind its implementation, and what will be the future outlook of this IT enabled drive. In the behest of technological advancements in banking sector and the presence of literature gaps, the following objectives are proposed to be fulfilled through this research:

1. To examine the nature and degree of IT adoption in the selected banks.
2. To determine the drivers and barriers for successful IT implementation and propagation in banking institutions.
3. To gauge the level of acceptance of IT based banking services by the customers.
4. To assess the major technologically influenced determinants of service quality in banking sector.
5. To determine various factors influencing actual customers’ adoption of e-banking services.
1.8 ORGANIZATION OF THE STUDY

The whole study has been structured into eight chapters, each covering a different aspect of the study. The first (current) chapter is introductory, wherein the concept of technological innovations, IT sector overview, IT diffusion, consequences of IT in banking, service quality concepts have been discussed in detail. Along with conceptualization, need and objectives of the study are also given in this chapter.

The review of existing literature directly or indirectly related to the study has been presented in the second chapter. The literature is grouped into three sections on the basis of broad issues they cover as IT adoption in banking sector, Customers’ assessment of IT based banking services, and IT and Service Quality. Both Indian and Foreign studies falling under broad categories have been reviewed.

The third chapter details out the research methodology applied to realise the set objectives or to examine the hypotheses set thereon. In this chapter extensive discussion on sampling design, data collection methods, questionnaire structure, and various statistical techniques used for data analysis have been presented. Demographic profile of respondent customers is also given in this chapter.

The fourth chapter deals with the analysis of bank adoption pattern of e-banking in terms of extent and content of e-services provided by banks. Various e-products/services provided by sample banks, proportion of customers availing these services, and their bank group wise (private vs public) comparison have been presented in the first section of this chapter. In the second section, various factors acting as drivers and barriers have also been explored and their differences have been reported bank group wise.

The fifth chapter deals with the analysis of bank customers’ assessment of e-banking services in terms of their preference, motives, perceptions, and nature and extent of usage. Technical profiling of respondents is presented along with their e-banking behavior vis a vis traditional banking in this chapter. Also, factors influencing their e-banking acceptance and use behaviour have been explored and examined employing factor analysis technique.
In Chapter 6, Customers’ responses towards factors relevant to service quality as determinants have been explored and examined using factor analysis. Further, these factors have been assessed as antecedents to overall service quality using multiple regression analysis. Bank group wise comparisons have also been made for factors as antecedents to service quality.

In chapter 7, the impact of various demographic and perceptual factors on customers’ e-banking usage signifying adoption level has been examined. For comparing means of e-banking usage, t-test and ANOVA have been employed for examining the individual influence of demographic variables. Further, both demographic and perceptual factors have been entered into regression model to examine their combined effect on predicting e-banking usage.

Summary, major findings, managerial implications along with recommendations and scope for further research are given in chapter eight.