

# CHAPTER 1

## INTRODUCTION

### 1.1 Background of the study

Information and Communication Technology (ICT), including the Internet and wireless technologies, has revolutionized the entire world. The rapid growth of ICT has transformed business. According to a report by Internet World Stats (2015), Internet penetration reached 3.08 billion globally by the end of 2014, with India, ranked third worldwide, reaching 190 million Internet users as of June 2014. There is enormous growth in the mobile sector in both developed and developing countries. Total mobile subscriptions reached almost seven billion by the end of 2015, reaching global penetration of 97 per cent (ITU, 2015). As per the report by Telecom Regulatory Authority of India (TRAI, 2015), as of February 2015, the number of wireless subscribers in India surpassed 961 million, and the total number of Internet subscribers, excluding wireless internet access, reached 18 million.

To meet customers' expectations, banks are offering wide-ranging services to their customers through the Internet and mobile technologies, embracing diverse ICT in order to endure the competitive environment, reduce costs, and increase customer convenience. Customers live in a technological cluster, able to access needed banking services through various alternative channels like ATMs, online banking, and mobile banking. Internet connectivity is shifting from wired connectivity with desktop computers to wireless and mobile devices, and banking services, too, are now available through a mobile phone, connected wirelessly. Mobile banking has broad potential in developing countries, where many customers are connected to the Internet primarily through their mobile phones.

The banking sector in India embraced the information technology (IT) revolution way back in the 1980s, based on the recommendations of the Rangarajan Committee report. The IT revolution in banking started with the computerization of bank branches, introduction of electronic clearing services (ECS), national electronic fund transfer (NEFT), real-time gross settlement (RTGS), and new delivery channels such as ATMs, online banking, and mobile banking, accelerating the pace of banks' technology adoption and interconnection. India's public-sector banks faced immense competition from the new generation of private-sector

banks, which are fully technology-driven and launched in the early 1990s after India's economic reforms. The new private-sector banks and foreign banks pulled ahead of the public-sector banks in terms of technology, which spurred technology initiatives at the public-sector banks. The computerization of the branches of the nationalized banks reached 97.8 per cent at the end of March 2010, whereas the State Bank of India (SBI) had already reached full computerization by that time (RBI, 2010). The introduction of new delivery channels (ATMs, online banking, and mobile banking) obviated the need for the customer to visit bank branches. Their introduction commenced in India with the first ATM by HSBC bank in 1985. According to the report of RBI (2012), ATMs outnumber bank branches in India. In 1996, ICICI Bank was the first in India to introduce online banking.

The IDC report estimates that the total number of user registrations for online banking in India is over two million (cited in Dash et al., 2012). The growing popularity of online banking expanded from the ability to conduct banking operations 24/7 and its convenience. Indian banks offered mobile banking services beginning in the late 2000s, with RBI issuing operating guidelines in 2008. The major advantage of mobile banking is that financial transactions may be conducted through a mobile phone, anytime and anywhere. Moreover, Internet penetration is much less in rural areas compared to mobile penetration. It may be easier to offer banking services through mobile phones in rural areas, where bank branches are scarce, than through any other delivery channel. Hence, it is important to study and understand consumer adoption of mobile banking.

## **1.2 Banking Sector in India**

### **1.2.1 History of Indian Banking**

In India from the ancient times, the banking system has prevailed and the western type of commercial banking system established way back in 18<sup>th</sup> centuries. The General Bank of India was the first bank in India established in the year 1786. The East India Company established three banks: Bank of Calcutta (1809), Bank of Bombay (1840), and Bank of Madras (1843). Later in the year 1870, Hindustan Bank was established. The three banks (Bank of Calcutta, Bank of Bombay, and Bank of Madras) were called as Presidency Banks and later in the year 1921, all Presidency Banks were amalgamated to form the Imperial Bank of India. Reserve Bank of India Act passed in 1934 and the Reserve Bank of India was

established in 1935. The Banking Regulation Act was constituted in the year 1949 to streamline the functions and activities of commercial banks in India. The regulation act brought RBI under the control of the Government of India. The Reserve Bank of India empowered as a central banking authority to supervise and control the operations of banks in India. Under the Banking Regulation Act, no new bank or branch of an existing bank could be opened without the license of RBI.

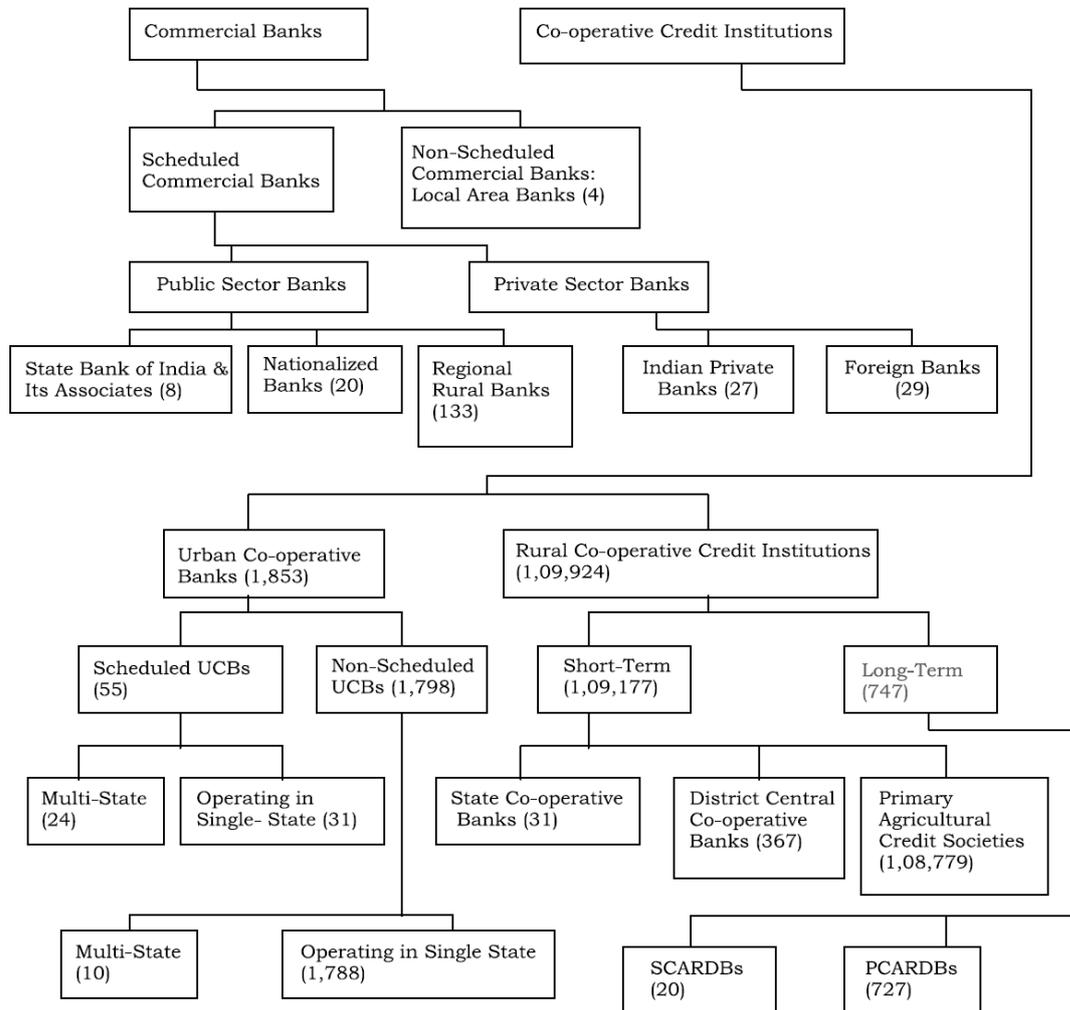
In 1955, the Imperial Bank of India had come under RBI and renamed as State Bank of India. Seven banks, which were forming the subsidiary of State Bank of India were nationalized in 1960, and 14 major commercial banks were nationalized in 1969. Another six more banks were nationalized in 1980; approximately 80% of the banking sector were under government ownership. The stated reason for nationalization was to provide the government for more control of credit delivery. With the second stage of nationalization, 91% of the banking sector were in the control of the Government of India with a total number of nationalized banks reached at 20. Later in 1993, the government merged the New Bank of India with Punjab National Bank, which was the only merger between nationalized banks resulted the reduction of the number of nationalized banks from 20 to 19.

The Narasimha Committee in early 1990s proposed the economic reforms in the banking sector and amended the Banking Regulation Act in 1993 which introduced the entry of private sector banks in India. These banks were known as new generation technology enabled banks included ICICI Bank, HDFC, Axis Bank (earlier UTI Bank), and Oriental Bank of Commerce (earlier Global Trust Bank). The economic reforms and the relaxation in the norms for Foreign Direct Investment (FDI) visualized a rapid growth in the banking sector which reshaped the outlook of the traditional banks.

The banking evolution in India can be classified into four distinct phases:

- Pre-Nationalization Phase (Prior to 1955)
- Nationalization (1955-1990)
- Introduction of Indian Financial & Banking sector Reforms and partial Liberalization (1990 -2004)
- Period of increased Liberalization (2004 onwards)

**FIGURE 1.1: STRUCTURE OF INDIAN BANKING (SOURCE: MANUAL ON FINANCIAL AND BANKING STATISTICS, RBI, 2007)**



**SCARDBs:** State Co-operative Agriculture and Rural Development Banks.  
**UCBs:** Urban Co-operative Banks  
**PCARDBs:** Primary Co-operative Agriculture and Rural Development Banks.

The banking system in India consists of commercial and cooperative banks. The commercial banks comprise of nationalized banks, state bank of India and its associates, private sector banks, and foreign banks. These banks along with the regional rural banks constitute the public sector banks in India. An outline of the Indian banking structure is depicted in FIGURE 1.1.

According to the RBI report as of 2015, there are 45 foreign banks operating in India with 327 branches. Another 39 banks have their representative offices in India. Among the foreign banks, Standard Chartered had the maximum branches (101 branches), followed by HSBC (50 branches), City Bank (42 branches), and Royal Bank of Scotland (24 branches).

### **1.3 Technological innovations in Indian Banking Sector**

Technology has transformed the functioning of banks and delivery of banking services. The tremendous growth of the ICT (Information and Communication Technology), wireless technology, and large penetration of mobile devices, which made the customers, visit the bank branches occasionally and rather performing the banking operations at his convenient time and place. The process of computerization in the banking sector in India started in the mid - 1980s based on the Rangarajan committee report with the introduction of advanced ledger posting machines. The second report of Rangarajan committee, which was formed in 1988 made a comprehensive plan to computerize the banks and the extension of automation to other areas like fund transfer, ATMs, etc. The Indian banking sector visualized the benefits of IT (Information Technology) initiatives in the late 1990s or early 2000 with the deployment of ATMs, core banking solutions (CBS), automation of branches and the centralization of operations at the CBS.

For enhancing the research and adoption of technology in the banking and financial sector, RBI established IDRBT (Institute for Development and Research in Banking Technology) in 1996. To facilitate secured payment practices in India, technological infrastructures like INFINIT (Indian Financial Network), PKI based electronic data transfer, NFS (National Financial Switch), SWIFT (Society for worldwide Inter-bank Financial Telecommunication), and Structured Financial Management System (SFMS) were created (Rangarajan, 2011). The computerized process of the branches of the nationalized banks reached to 97.8 percent at the end of March 2010 whereas SBI has already reached fully computerized of all its branches (RBI, 2010).

The Indian banking sector has evolved from traditional cash payments to the electronic payments in the late 1990s with the growth of the ECS debit and credit transactions, internet banking in the early 2000s, introduction of RTGS in 2004, introduction of NEFT in 2005, and

the mobile banking which was introduced in the late 2000s. As per the report of RBI, cashless payments are gaining popular by both volume and value of transactions (TABLE 1.1).

**TABLE 1.1: VOLUME AND VALUE OF ELECTRONIC TRANSACTIONS (SOURCE: RBI, 2015a)**

<b>(Volume in million, Value in billions)</b>						
<b>Type</b>	<b>Volume</b>			<b>Value</b>		
	<b>2012-13</b>	<b>2013-14</b>	<b>2014-15</b>	<b>2012-13</b>	<b>2013-14</b>	<b>2014-15</b>
ECS Credit	122.2	152.5	115.3	1,771.3	2,492.2	2,019.1
ECS Debit	176.5	192.9	226.0	1,083.1	1,268.0	1,739.8
Credit Cards	396.6	509.1	615.1	1,229.5	1,539.9	1,899.2
Debit Cards	469.1	619.1	808.1	743.4	954.5	1,213.4
NEFT	394.1	661.0	927.6	29,022.4	43,785.5	59,803.8
RTGS	68.5	81.1	92.8	676,841.0	734,252.4	754,032.4

(Source: Reserve Bank of India, Reports on Payment and Settlement Systems and Information Technology, Pg.no. 115).

In the IT Vision Document 2011-2017 release, RBI highlighted the need for banks to shift their focus to more advanced technologies in areas like MIS (Management Information System), overall risk management, financial inclusion, CRM (Customer Relationship Management), and enhancing automated data flow within the banks and to the Reserve Bank without manual intervention (RBI, 2012).

### **1.3.1 ATM (Automated Teller Machine)**

The invention of the ATM has been considered as one of the most innovative and revolutionary technological developments in the banking sector. ATM enables the customer to dispense cash by using a debit/credit card issued by the bank. This technology has set off the facility of anytime and anywhere banking to Indian customers.

HSBC Bank introduced the first ATM in 1987 in India. ATM which was initially used to disburse cash to customers has transformed to a touch-point for delivery of wide-variety of banking services at bank branches and convenient off-site locations. The number of ATMs in

India is now 1,84,950(TABLE 1.2), of which 28 percent is owned by private sector banks, 71 percent of public sector banks, and 1 percent of foreign banks (RBI, 2015b).

**TABLE 1.2: ATMS OF SCHEDULED COMMERCIAL BANKS (AS AT END-AUGUST 2015)**  
(SOURCE: RBI, 2015b)

<b>Sr. No.</b>	<b>Bank Group</b>	<b>On-site ATMs</b>	<b>Off-site ATMs</b>	<b>Total Number of ATMs</b>
<b>1.</b>	<b>Public sector banks</b>	<b>75,031</b>	<b>56,323</b>	<b>1,31,354</b>
1.1	Nationalized banks	49,953	29,317	79,270
1.2	SBI group	25,078	31,245	56,323
<b>2.</b>	<b>Private sector banks</b>	<b>19,768</b>	<b>32,754</b>	<b>52,522</b>
<b>3.</b>	<b>Foreign banks</b>	<b>263</b>	<b>811</b>	<b>1074</b>
<b>All SCBs (1+2+3)</b>		<b>95,062</b>	<b>89,888</b>	<b>1,84,950</b>
(Source: Reserve Bank of India, Reports on ATM & Card Statistics for August, 2015).				

### 1.3.2 Internet Banking

Electronic banking experienced tremendous growth in both developed and developing countries and reshaped the banking activities. Electronic banking popularly called as internet banking allows the customers to do the banking services online without visiting the bank branches. The internet banking (e-banking or online banking) uses the Internet as the delivery channel to offer banking products to its customers (Khan et al, 2009). This is one of the new delivery channels offered in the retail banking sector, which provides services like view transaction details, transfer funds, pay utility bills, or shop online through a telecommunication network (Daniel, 1999; Aladwani, 2001). Internet banking or online banking transformed the traditional approach of ‘bricks and mortar’ service to the ‘clicks and mortar’ service with the help of the internet (Chau & Lai, 2003).

ICICI bank was the first one which introduced internet banking in India in 1996 (Malhotra & Singh, 2007). Other banks who followed were HDFC, City bank, IndusInd, and Times bank (now part of HDFC). Nationalized banks of SBI, Canara Bank, Allahabad Bank, Punjab

National Bank, Bank of Baroda, Syndicate Bank, and others followed the bandwagon by introducing online banking (Iyengar & Belvalkar, 2010). To study the different aspects of internet banking, RBI had set up a working group and their major focus were on three major areas such as (1) technology and security issues, (2) legal issues, and (3) regulatory and supervisory issues. Based on the recommendations from the working group, RBI issued the guidelines on 'internet banking in India' for the banks in 2001. As per the guidelines of RBI, banks which have a physical presence in India, which are licensed and supervised are permitted to offer Internet banking. Three levels of internet banking services offered in India: information only systems, electronic information transfer system, and fully electronic transaction system (RBI, 2001).

### **1.3.2.1 Information only systems**

In this type of service, the bank's website provides general purpose information like interest rates, branch locations, product features, FAQs, loan and deposit calculators. The site allows downloading the applications and the interactivity is limited in the form of e-mail. There is no interaction between the banks production system and the customer, and there is no need of any identification which is required from the customer.

### **1.3.2.2 Electronic Information Transfer System**

These types provide customer-specific information like account balances, transaction details, statement of account etc. The identification and authentication of the customer is done through simple mechanisms such as passwords. Most of the information provided is read-only and the information is fetched from the banks production system in either the batch mode or the offline mode and the fund-transfer is not supported in this type of systems.

### **1.3.2.3 Fully Transactional System**

This system allows bi-directional transaction capabilities. These systems allow the customers to operate on their bank accounts for the transfer of funds, bill payments, subscribing other products and services which will directly update their accounts. Most of the banks in India are now offering fully transactional websites to its internet banking customers. Banks such as SBI, ICICI, HDFC, and City bank are in the lead to offer internet banking compared to other banks (Nandan et al, 2008; Sharma, 2009).

According to the report of Internet and Mobile Association of India (IMAI), customers do not prefer to do online transactions due to the various reasons such as security concerns (43%), preference for face-to-face transactions (39%), lack of knowledge about transferring online (22%), lack of user friendliness (10%), and lack of facility in the current bank (2%). The major concerns of this delivery channel are security issues, simplicity of the interface, and better service which all are expected by the customer (Iyengar & Belvalkar, 2010).

### **1.3.3 Mobile Banking**

Mobile banking was introduced in the late 1990s and the beginning of 2000s. Mobile banking or m-banking enables a customer to make banking services through a mobile device. These services were introduced initially through short messaging services (SMS), WAP (Wireless Application Protocol), or GPRS (General Packet Radio Services) enabled mobile devices. Mobile banking (M-Banking or mbanking) is defined as “a channel whereby the customer interacts with a bank via a mobile device, such as a mobile phone or personal digital assistant (PDA) “(Barnes & Corbitt, 2003). Mobile banking services can be categorized two types: transaction based and enquiry based services (TABLE 1.1). Compared to other banking channels (e.g., ATM, Phone Banking, and Internet Banking), the distinct features of mobile banking are ubiquity, mobility, and flexibility. Mobile banking is not an add-on to internet banking instead considered as a better digital alternative to other traditional banking channels such as ATM, internet banking, and physical branches (Puschel et al, 2010) and can reach to wider population due to the high penetration of mobile devices.

Mobile banking services allow customers to check account balances, transfer funds between accounts and order for electronic bill payments. There is a vast market potential for mobile banking due to its always-on functionality and the option to bank virtually anytime and anywhere (Kleijnen et al, 2004; Herzberg, 2003; Rivari, 2006; Laukkanen, 2007).

The Reserve Bank of India has granted approval to 69 banks to offer mobile banking services as on June 2012, where in which 49 banks have already started operations. Mobile banking in India is presently driven by a bank-led model insisted by RBI. The mobile banking guidelines issued by the RBI being modified on December 2011, which removed the daily cap, which was earlier set for fund transfer for both personal remittance and for purchase of goods and services. Fund transfer of small value transactions up to Rs.5000/- can be done without end-

to-end encryption. In addition to this, banks have permitted in money transfer facility up to Rs.5000 from a bank account to beneficiaries who is not having bank accounts with a cash payout facility at an ATM or by a banking correspondent.

**TABLE 1.3: TYPES OF MOBILE BANKING SERVICES (SOURCE: INFOGILE, 2007)**

<b>Types</b>	<b>Push Based</b>	<b>Pull Based</b>
<b>Transaction based</b>		<ul style="list-style-type: none"> <li>• Fund transfer</li> <li>• Bill payment</li> <li>• Other financial services like stock trading</li> </ul>
<b>Enquiry based</b>	<ul style="list-style-type: none"> <li>• Credit/Debit Alerts</li> <li>• Minimum balance alerts</li> <li>• Bill payment alerts</li> </ul>	<ul style="list-style-type: none"> <li>• Account Balance Enquiry.</li> <li>• Account statement Enquiry.</li> <li>• Cheque Status Enquiry.</li> <li>• Cheque Book Requests.</li> <li>• Recent Transaction History.</li> </ul>

RBI (Reserve Bank of India) had set up the operational guidelines for banks for mobile banking transactions in October 2008 under the Payments and Settlements Act 2007 with fewer revisions and clarifications in further releases. The key points are highlighted:

- Only banks who implemented core banking solutions (CBS) can provide mobile banking to its customers.
- The services are restricted to banking customers and debit/credit holders issued as per RBI guidelines.
- Only banks which are licensed and have a physical presence in India can offer mobile banking services.
- Only INR based transactions allowed and cross border inward and outward transfers are prohibited.
- Mobile banking services should be offered through any mobile phone independent of the network operator.
- To ensure interoperability between banks, and between their mobile service providers, the message formats like ISO 8583, with suitable modifications were to be adopted.

### **1.3.3.1 Inter-bank Mobile Payment Service (IMPS)**

Inter-bank Mobile Payment Service (IMPS) was launched on November 2010 under the National Payment Corporation of India (NPCI). IMPS are a unique, 24X7 inter-bank electronic fund transfer system through mobile phone systems. This service allows money transfer instantaneous, and both the remitter and the beneficiary receive SMS confirmation from their respective banks immediately after the transaction. The operational guidelines set up by the NPCI are as follows:

- Customers are required to register with the participating banks and obtain a unique seven digit MMID (Mobile Money Transfer Identified Number)
- There is no requirement of Internet connectivity instead the customer need to download the software and activate the same (one-time).
- The service can be operated via SMS or the application installed in the mobile handset.

With the growing acceptance of IMPS, RBI waived of the transaction limit set up earlier for mobile banking, allowed the banks to fix their own transaction limit based on the risk perceptions with the approval of their respective Boards.

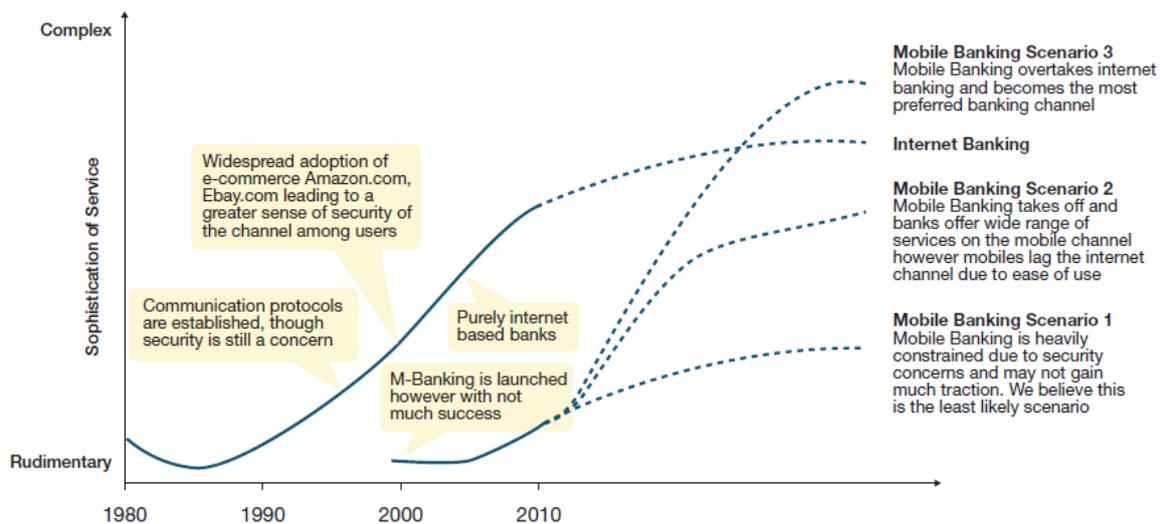
## **1.4 Internet Banking and Mobile Banking: Current Trends**

Current trends of banking channels preferred by customers indicate that both branch and internet banking remain popular all over the world (Capgemini, 2012). Internet banking customers are expected to carry out all types of transactions and have a holistic view of their account information.

The usage rate of mobile banking is increasing leaps and bounds in both developed and developing countries (Khraim et al, 2011; Dasgupta et al, 2011). The revenue generated by mobile payments and banking could exceed US\$ 4.5 billion in India and US\$350 billion in World by 2015 (IDRBT, 2011). Based on the forecast of Juniper Research, worldwide, the number of consumers using mobile banking will exceed 860 million globally by 2016 which was 300 million in 2011 more than double. Mobile banking is gaining popular all over the world. For example, in North America and Western Europe, mobile will be used to do banking which is combined with near-field communication (NFC) for contactless payments.

In Asia Pacific and the Middle East/Africa, it will be used to target unbanked customers and person-to-person banking (Capegemini, 2012)(FIGURE 1.2).

**FIGURE 1.2: POTENTIAL EVOLUTION OF MOBILE BANKING VS. INTERNET BANKING**  
(SOURCE: CAPGEMINI ANALYSIS, 2012)



The market for mobile phones and handheld devices is exploding given the low costs, increasing computational power and ease of use. The current estimates of mobile device connections are around 4 billion worldwide. In India mobile penetration is very high and growing rapidly. India had around 961 million mobile subscribers with 556 million in urban and 403 in rural by the end of February 2015, and by the end of 2015, will cross 1 billion mobile subscribers mark (TRAI, 2015). With the rapid growth of smart phones, PDAs (Personal Digital Assistant), tablets, and iPhones and the development of technologies like 2.5G (GPRS), 2.75G (EDGE), 3G, and 4G, mobile banking will emerge as a potential channel for banking. Hence, it will be a profitable option for financial institutions to offer banking services through mobile devices rather than setting up a new bank branch in both rural and urban India.

### 1.5 Need for the Study

Technology has made a paradigm shift in the banking operations all over the world. Today’s major challenge of the banking sector is to exploit the potential, for profiting from the

investments made in technology. The success of the new technology-enabled delivery channel like mobile banking solely depends upon the acceptance of customers. Many researchers identified that consumer adoption plays a major role in the acceptance and success of new technology or service (Davis et al, 1989; Venkatesh & Davis, 2000; Venkatesh et al, 2003; Wixom & Todd, 2005).

However, compared to the advantages of mobile banking only a few percentages of customers are actually using these services. Currently, the adoption of mobile banking is in a nascent stage, expected to increase or surpass the rate of adoption of internet banking. Many studies have been conducted in the developed and developing countries to understand the adoption of mobile banking (Kleijnen et al., 2004; Riihari, 2005; Suoranta & Mattila, 2004; Laforet & Li, 2005; Luarn & Lin, 2005; Laukkanen & Cruz, 2009; Lee & Chung, 2009; Wessels & Drennan, 2010). Although, there are many advantages of mobile banking, when compared to developed countries like USA, UK, Finland, the adoption of mobile banking in India is at its infancy rate. Even though, the RBI has removed the cap of daily transaction limit per day per customer, apart from SBI and ICICI Bank, other banks have to go still further based upon the volume and value of transaction of mobile banking (IDRBT, 2011).

Compare to the 961 million mobile subscribers, a little over 22.51 million bank customers have registered for mobile banking services in India (RBI, 2014). These details point out that technological advancements and availability of services do not automatically lead to the acceptance of mobile banking by the customer. There are very limited research studies related to the adoption of mobile banking in India, which indicates the need for further research for understanding the motivators and inhibitors of mobile banking adoption (Dasgupta et al, 2011; Ketkar et al, 2012; Rejikumar & Ravindran, 2012; Samudra & Phadtare, 2012).

The service-delivery process of internet banking, where the customer is interacting with the bank's website is very different from the traditional brick-mortar service of banking operation (Daniel, 1999; Jayawardhena & Foley, 2000; Pikkarainen et al, 2006.). The usage of internet banking is increasing steadily worldwide. It is important to understand the quality perceptions of internet banking users. Measuring the service quality of internet banking services and customer satisfaction is crucial for banks to stay competitive in the market place, retain their

customers, and increase the profitability. Customers do not prefer to do online transactions due to the various reasons such as security concerns (43%), preference for face-to-face transactions (39%), lack of knowledge about transferring online (22%), lack of user friendliness (10%), and lack of facility in the current bank (2%)(IMAI,2006). Taking these details into consideration, measuring the quality attributes of internet banking and customer satisfaction seems to be very appropriate and relevant in the Indian banking context. In India, internet banking is used by 7 percent of the account holders in 2010-11 according to a report by global management consultancy McKinsey & Company (2011). Considering the low percentage of adoption of internet banking, it is necessary to measure the satisfaction level of the customers, and to verify that, do they have any intention to switch over to other alternative channels like mobile banking. The awareness of how customers perceive service quality is essential, to understand what customers' value in an online transaction for attracting new customers and retaining the existing customers. Apart from this, there is a need to understand the factors that influence the adoption of mobile banking among the current internet banking customers, due to their preference of using multiple channels rather than a single channel to obtain banking services (Howcroft et al, 2002; Chung & Kwon, 2009; Riquelme & Rios, 2010).

## **1.6 Benefits of the Study**

The study has a number of contributions to both theory and management practice. The outcomes from this study can be used by bank managers to identify the tech-savvy customers and their major characteristics. The understanding of various adoption factors and barriers will enable them to devise strategies to promote the mobile banking adoption in India. The demographic characteristics identified by this study can be used to devise strategies effectively to promote the adoption to various identified segments. The study provides guidelines to banks and other financial institutions to know the key drivers influencing mobile banking usage intention. For this, the study attempted to find the quality of internet banking services, which is gaining popularity in India. The quality attributes and measuring their satisfaction will help the banks to improve the service quality of internet banking services, which will increase the satisfaction level and continued use of this service. The quality attributes identified from this study can be used to improve the internet banking products of their banks.

This study attempted to analyze the factors that influence the intention of using mobile banking in an integrated manner in terms of the technical characteristics of mobile banking and user characteristics. The major theoretical contribution is the development of an adoption model for mobile banking in Indian Banking context. The study identified the adoption factors and inhibitors of mobile banking. The study also identified the antecedents of the service quality of internet banking.

### **1.7 Statement of Problem**

The success of a new, technology-enabled delivery channel like mobile banking solely depends on customers' acceptance. Despite the advantages of mobile banking, only a small percentage of customers actually use these services. Currently, the adoption of mobile banking is in a nascent stage, though it is expected to surpass the rate of adoption of online banking. When compared with developed countries like the United States, the UK, or Finland, Indian adoption of mobile banking is in its infancy. Although the RBI has removed its daily per customer transaction limit, apart from SBI and ICICI Bank, other banks still have further to go to capture the volume and value mobile banking transactions. Very few research studies concern the adoption of mobile banking in India, which indicates the need for further research in order to understand the motivators and inhibitors of mobile-banking adoption. The purpose of this study is to understand the factors contributing to the adoption of mobile banking in India.

The use of online banking is way ahead in urban areas in India compared to mobile banking, which is still in a very nascent stage. Increased use of online banking will enhance customers' expectations and perceptions about the quality of this new delivery channel. Thus, understanding the service quality of online banking and measuring customer satisfaction is an important area of research. There is a need to understand the factors that influence the adoption of mobile banking by current online banking customers, who prefer to use multiple channels to obtain banking services.

### **1.8 Variables of the Study**

The definitions of the main variables used in the study, which is identified from the literature review are listed in TABLE 1.4.

**TABLE 1.4: OPERATIONAL DEFINITION OF KEY VARIABLES IN THE PRESENT STUDY**

<b>Variable Name</b>	<b>Definition</b>
Behavioral Intention	“The strength of one’s intention to perform a specified behavior” (Fishbein & Ajzen, 1975).
E-Service Quality	Consumers overall assessment and judgment of the excellence and quality of e-services in the virtual environment (Santos, 2003).
Customer Satisfaction	“The contentment of the customer with respect to his or her prior purchasing experience with a given electronic commerce firm” (Anderson & Srinivasan, 2003).
Perceived ease of use (PEOU)	“The degree to which a person believes that using a particular system would be free of effort” (Davis, 1989).
Social Influence (SI)	An individual's perception of other people's opinions on if he/ she should perform a particular behavior (Venkatesh et al, 2003).
Computer Self-efficacy	“Conviction that one can successfully execute the behavior required to produce the outcomes” (Bandura, 1977). Computer self-efficacy (CSE) defined as one’s perception of his/her ability to use a computer (Compeau & Higgins, 1995).
Perceived Financial Cost	The extent to which a person believes that using mobile banking would be costlier (Luarn & Lin, 2005).
Security	“A threat which creates circumstances, condition, or event with the potential to cause economic hardship to data or network resources in the form of destruction, disclosure, modification of data, denial of service and/or fraud, waste, and abuse” (Kalakota & Whinston, 1997).
Trust	Trust in mobile banking as “ the belief that allows individuals to willingly become vulnerable to the bank, the telecommunication provider, and the mobile technology after having the bank’s and the telecommunication provider’s characteristic embedded in the technology artifacts” (Masrek et al, 2012).

<b>Variable Name</b>	<b>Definition</b>
Access	“It empowers customers to utilize the service through a number of points of entry and the ability to carry out a wide range of transactions” (Jayawardhena, 2004).
Web Interface	“The maintenance of a web site that enhances the overall browsing experience of customers” (Jayawardhena, 2004).
Attention	Referred as “provision of an accurate, personalized service to customers” (Jayawardhena, 2004).
Credibility	Referred as “delivering the promised service to customers at all times” (Jayawardhena, 2004).

## 1.9 Key Terms used in the Study

The key terms used in the research study is presented in TABLE 1.5.

**TABLE 1.5 KEY TERMS USED IN THE PRESENT STUDY**

<b>Key Terms</b>	<b>Description</b>
Mobile Banking	Mobile banking is a channel in which a customer conducts banking operations through a mobile phone or a handheld device using wireless technology.
Internet Banking	Internet Banking (e-banking or online banking) uses the Internet as a delivery channel to offer banking products to its customers.
Consumer Adoption of Technology	It is a process of adopting a new technology/innovation by a consumer which is influenced by various consumer characteristics such as personality traits, demographic/socioeconomic factors, new product characteristics, and social influence.
E-Service	Services delivered electronically via information and communication technologies where the customer interacts solely with an appropriate user interface.
E-Service Quality	Consumers’ overall assessment and judgment of the excellence and quality of e-services in the virtual environment.

Key Terms	Description
Customer Satisfaction	It covers the entire customer experience cycle from information retrieval through purchase, payment, receipt, and service.
Behavioral Intention	An individual's subject probability of performing a specified behavior which is the major determinant of actual usage behavior.

### 1.10 Objectives of the Study

The purpose of the study is to understand the impact of consumer adoption factors on mobile banking in India. The primary objectives of this study are the following,

- **Identify the various factors which influence the adoption of mobile banking.** The success of the fairly new technology-enabled delivery channel like mobile banking solely depends on the acceptance of customers. Many researchers identified that consumer adoption plays a major role in the acceptance and success of new technology or service (Davis et al, 1989; Venkatesh & Davis, 2000; Venkatesh et al, 2003; Wixom & Todd, 2005).
- **Develop and empirically validate a model to explain the behavioral intention to use mobile banking in the Indian banking context.** There were very limited research studies related to the adoption of mobile banking in India. This indicates the need for further research for understanding the motivators and inhibitors of mobile banking adoption (Dasgupta et al, 2011; Ketkar et al, 2012; Rejikumar & Ravindran, 2012; Samudra & Phadtare, 2012).
- **To study the influence of demographic factors such as gender and age on the adoption of mobile banking services by Indian bank customers.** Previous studies on mobile banking empirically proved that, gender difference exists in which male were more willing to use mobile banking than female (Ainin et al, 2007; Koenig-Lewis et al, 2010). Existing studies on mobile banking identified that age had a major influence on the usage of mobile banking (Suoranta & Matilla, 2004; Laukkanen & Pasanen, 2008; Koenig-Lewis et al, 2010).
- **To study the quality perceptions towards Internet banking and satisfaction level of Internet banking customers.** It is important to understand the quality perceptions of Internet banking users. Measuring the service quality of Internet banking services

and customer satisfaction is crucial for banks to stay competitive in the market place, retain their customers, and increase the profitability.

- **To examine the perception of current online banking customers' in India towards the adoption of mobile banking** Previous studies on Internet banking user's perception towards mobile banking showed mixed results. Some researchers argued that current Internet banking users would be likely to stick with Internet banking, and others pointed out that Internet banking users were more probable to adopt mobile banking (Suoranta & Matilla, 2004; Koenig-Lewis et al, 2010).

### **1.11 Hypotheses of the Study**

The hypotheses of the present study are formulated based on the theoretical framework discussed in Chapter 3. The null hypotheses  $H1_0$  to  $H6_0$  is used to measure the influence of adoption factors such as perceived ease of use, social influence, computer self-efficacy, perceived financial cost, security, and trust on behavioral intention to use mobile banking. The null hypotheses  $H7_0$  and  $H8_0$  are used to measure the influence demographic factors such as gender and age on intention to use mobile banking. The null hypotheses  $H9_0$  is used to measure the variance exists in different type of bank centres in behavioral intention to use mobile banking and  $H10_0$  is used to measure the difference between customers who wish to enable mobile banking and their intention to use mobile banking. The null hypotheses  $H11_0$ ,  $H12_0$ , and  $H12a_0$  are used to test the internet banking e-service quality, customer satisfaction and their intention to use mobile banking. The null hypotheses  $H13_0$  is used to measure the variance exists between bank customers who frequently use internet banking and their intention to use mobile banking

#### **Hypothesis H1**

The hypothesis H1 proposes if the mobile banking service is easy to learn and use, it will positively influence the customer to use this service. It is necessary that mobile banking technology should be simple and easy to understand by the customer. Through this hypothesis, this study investigates the impact of perceived ease of use on intention to use mobile banking.

**H1<sub>0</sub>: Perceived ease of use (PEOU) has no positive effect on the behavioral intention to use mobile banking.**

**H1: Perceived ease of use (PEOU) has a positive effect on the behavioral intention to use mobile banking.**

### **Hypothesis H2**

The hypothesis H2 proposes that social influence has a positive effect on mobile banking. An individual's decision and behaviors are not made solely by him/her, but influenced by the opinions, recommendations and suggestions of other important people (friends, colleagues' family and society). Through this hypothesis, this study investigates whether the social influence has any effect on customers' decision to use mobile banking.

**H2<sub>0</sub>: Social influence (SI) has no positive effect on the behavioral intention to use mobile banking.**

**H2: Social influence (SI) has a positive effect on the behavioral intention to use mobile banking.**

### **Hypothesis H3**

The hypothesis H3 proposes that computer self-efficacy (CSE) has a positive effect on mobile banking. In the context of mobile banking, if the customer believes that they have the required knowledge, skill or ability to operate mobile banking, then there is a higher chance to attempt the service. Through this hypothesis, the study investigates whether a customer has the self-confidence to use mobile banking. The sub-hypothesis H3a investigates the causal link between perceived ease of use and computer self-efficacy.

**H3<sub>0</sub>: Computer self-efficacy has no positive effect on behavioral intention to use mobile banking.**

**H3: Computer self-efficacy has a positive effect on behavioral intention to use mobile banking.**

**H3a<sub>0</sub>: Computer self-efficacy has no positive effect on perceived ease of use of mobile banking.**

**H3a: Computer self-efficacy has a positive effect on perceived ease of use of mobile banking.**

#### **Hypothesis H4**

The hypothesis H4 proposes that the perceived financial cost (PFC) has a significant relation with intention to use mobile banking. Through this hypothesis, the study investigates the influence of financial cost which might impact their intentions to use mobile banking.

**H4<sub>0</sub>: Perceived financial cost has no significant effect on behavioral intention to use mobile banking.**

**H4: Perceived financial cost has a significant effect on behavioral intention to use mobile banking.**

#### **Hypothesis H5**

The hypothesis H5 proposes that security mechanism of mobile banking has a positive effect on intention to use. Security is an important concern which is to be considered while carrying out mobile banking transactions. Through this hypothesis, the study investigates the impact of security challenges on mobile banking adoption.

**H5<sub>0</sub>: Security will have no positive effect on behavioral intention to use mobile banking.**

**H5: Security will have a positive effect on behavioral intention to use mobile banking.**

#### **Hypothesis H6**

The hypothesis H6 proposes that trust will have a significant role in the adoption of mobile banking. Trust plays a major role in the adoption of mobile banking since it helps the customers overcome the fears of security/privacy risks and fraudulent activities, which take place in the mobile environment. Through this hypothesis, the study investigates the influence of trust on behavioral intention to use mobile banking. Trust is enhanced by the security mechanisms provided in the mobile banking services. Customers will be more likely to trust the new service if adequate security is provided to their transaction data. The sub-hypothesis H6a investigates the causal link between trust and security.

**H6<sub>0</sub>: Trust will have no significant effect on behavioral intention to use mobile banking.**

**H6: Trust will have a significant effect on behavioral intention to use mobile banking.**

**H6a<sub>0</sub>: Security has no positive effect on customer trust to use mobile banking.**

**H6a: Security has a positive effect on customer trust to use mobile banking.**

### **Hypothesis H7**

The hypothesis H7 proposes that adoption of mobile banking significantly differs among the banking customers of different gender. Through this hypothesis, the study identifies whether to differentiate the perception of mobile banking adoption among gender.

**H7<sub>0</sub>: There is no significant difference exist between gender in behavioral intention to use mobile banking.**

**H7: There is significant difference exist between gender in behavioral intention to use mobile banking.**

### **Hypothesis H8**

The hypothesis H8 proposes that age is an important predictor of mobile banking adoption. Through this hypothesis, the study investigates whether a significant difference exists between diverse age categories while adopting mobile banking.

**H8<sub>0</sub>: There is no significant difference across different age categories in behavioral intention to use mobile banking.**

**H8: There is a significant difference across different age categories in behavioral intention to use mobile banking.**

### **Hypothesis H9**

This hypothesis test that the intention to use mobile banking significantly varies with the different type of bank centre like metro, urban, or rural. The null hypothesis **H9<sub>0</sub>** states that

**H9<sub>0</sub>: There is no significant variance exists in different type of bank centres in behavioral intention to use mobile banking.**

The corresponding alternative hypothesis **H9** proposes that

**H9: There is a significant variance exists in different type of bank centres in behavioral intention to use mobile banking.**

### **Hypothesis H10**

This hypothesis proposes that there is significant difference exists between customers who wish to enable mobile banking in their mobile device and intention to use mobile banking.

The null hypothesis H10<sub>0</sub> states that

**H10<sub>0</sub>: There is no significant difference exists between customers who wish to enable mobile banking and their intention to use mobile banking.**

The corresponding alternative hypothesis H10 proposes that

**H10: There is a significant difference exists between bank customers who wish to enable mobile banking and their intention to use mobile banking.**

### **Hypothesis H11**

The hypothesis H11 proposes that user satisfaction of internet banking positively influences the behavioral intention to use mobile banking. Existing internet banking customers who are satisfied by the internet banking services will be likely to stick to the existing bank and exhibit positive behavioral intentions towards using mobile banking services. Customer satisfaction of internet banking depends on the service quality of internet banking. The service quality of internet banking comprises of dimension access, web interface, attention, and credibility. Through the hypothesis H11, the study investigates the relationship between customer satisfaction and behavioral intention to use mobile banking. The sub-hypothesis H9a investigates the relationship between service quality and customer satisfaction of internet banking.

**H11<sub>0</sub>: The customer satisfaction of internet banking has no positive effect on intention to use mobile banking.**

**H11: The customer satisfaction of internet banking has a positive effect on intention to use mobile banking.**

**H11a<sub>0</sub>: The e-service quality of internet banking is not positively related to customer satisfaction of internet banking.**

**H11a: The e-service quality of internet banking is positively related to customer satisfaction of internet banking.**

### **Hypothesis H12**

Measuring customer satisfaction of internet banking is important which leads to the continued usage of internet banking and trying out the similar kind of technologies like mobile banking. Customer satisfaction measures the overall satisfaction of internet banking by banking customers. The null hypothesis **H12<sub>0</sub>** states that

**H12<sub>0</sub>: The e-service quality dimensions of internet banking comprising of responsiveness, efficiency, and perceived credibility is not significantly influencing the customer satisfaction of internet banking.**

The corresponding alternative hypothesis **H12** proposes that

**H12: The e-service quality dimensions of internet banking comprising of responsiveness, efficiency, and perceived credibility is significantly influencing the customer satisfaction of internet banking.**

The service quality of internet banking is perceived to be an antecedent of customer satisfaction of internet banking. This leads to the development of the sub hypothesis H12a. The null hypothesis **H12a<sub>0</sub>** propose that

**H12a<sub>0</sub>: The e-service quality dimensions of internet banking comprising of responsiveness, efficiency, and perceived credibility are not positively related to customer satisfaction of internet banking.**

The corresponding alternative hypothesis **H12a** proposes that

**H12a: The e-service quality dimensions of internet banking comprising of responsiveness, efficiency, and perceived credibility are positively related to customer satisfaction of internet banking.**

### **Hypothesis H13**

This hypothesis proposes that there is significant variance exists between customers who frequently use internet banking and their intention to use mobile banking. This resulted in the formulation of the Hypothesis H13. The null hypothesis **H13<sub>0</sub>** states that

**H13<sub>0</sub>: There is no significant variance exists between bank customers who frequently use internet banking and their intention to use mobile banking.**

The corresponding alternative hypothesis **H13** proposes that

**H13: There is a significant variance exists between bank customers who frequently use internet banking and their intention to use mobile banking.**

**TABLE 1.6: HYPOTHESES SUMMARY**

<b>H.No.</b>	<b>Hypotheses</b>
H1 <sub>0</sub>	Perceived ease of use (PEOU) has no positive effect on the behavioral intention to use mobile banking.
H1	Perceived ease of use (PEOU) has a positive effect on the behavioral intention to use mobile banking.
H2 <sub>0</sub>	Social influence (SI) has no positive effect on the behavioral intention to use mobile banking.
H2	Social influence (SI) has a positive effect on the behavioral intention to use mobile banking.
H3 <sub>0</sub>	Computer self-efficacy has no positive effect on behavioral intention to use mobile banking.
H3	Computer self-efficacy has a positive effect on behavioral intention to use mobile banking.
H3a <sub>0</sub>	Computer self-efficacy has no positive effect on perceived ease of use of mobile banking.
H3a	Computer self-efficacy has a positive effect on perceived ease of use of mobile banking.
H4 <sub>0</sub>	Perceived financial cost has no significant effect on behavioral intention to use mobile banking.
H4	Perceived financial cost has a significant effect on behavioral intention to use mobile banking.
H5 <sub>0</sub>	Security will have no positive effect on behavioral intention to use mobile banking.
H5	Security will have a positive effect on behavioral intention to use mobile banking.
H6 <sub>0</sub>	Trust will have no significant effect on behavioral intention to use mobile banking.
H6	Trust will have a significant effect on behavioral intention to use mobile banking.
H6a <sub>0</sub>	Security has no positive effect on customer trust to use mobile banking.
H6a	Security has a positive effect on customer trust to use mobile banking.
H7 <sub>0</sub>	There is no significant difference exist between gender in behavioral intention to use mobile banking.
H7	There is a significant difference exist between gender in behavioral intention to use mobile banking.

H8 <sub>0</sub>	There is no significant difference across different age categories in behavioral intention to use mobile banking.
H8	There is a significant difference across different age categories in behavioral intention to use mobile banking.
H9 <sub>0</sub>	There is no significant variance exists in different type of bank centres in behavioral intention to use mobile banking.
H9	There is a significant variance exists in different type of bank centres in behavioral intention to use mobile banking.
H10 <sub>0</sub>	There is no significant difference exists between customers who wish to enable mobile banking and their intention to use mobile banking.
H10	There is a significant difference exists between customers who wish to enable mobile banking and their intention to use mobile banking.
H11 <sub>0</sub>	The customer satisfaction of internet banking has no positive effect on intention to use mobile banking.
H11	The customer satisfaction of internet banking has a positive effect on intention to use mobile banking.
H12 <sub>0</sub>	The e-service quality dimensions of internet banking comprising of responsiveness, efficiency, and perceived credibility is not significantly influencing the customer satisfaction of internet banking.
H12	The e-service quality dimensions of internet banking comprising of responsiveness, efficiency, and perceived credibility is significantly influencing the customer satisfaction of internet banking.
H12a <sub>0</sub>	The e-service quality dimensions of internet banking comprising of responsiveness, efficiency, and perceived credibility are not positively related to customer satisfaction of internet banking.
H12a	The e-service quality dimensions of internet banking comprising of responsiveness, efficiency, and perceived credibility are positively related to customer satisfaction of internet banking.
H13 <sub>0</sub>	There is no significant variance exists between bank customers who frequently use internet banking and their intention to use mobile banking.
H13	There is a significant variance exists between bank customers who frequently use internet banking and their intention to use mobile banking.

## **1.12 Limitations of the Study**

This study, however, has some inherent limitations. It did not study the influence of the moderating factors such as, the availability of alternative channels, technology readiness, and demographic factors. The demographic factors, gender and age were not added as a construct in the theoretical model and their influence was not measured in the structural model. The study had not used other additional independent variables, which can predict the usage more accurately. This study focused both kinds of technology enabled banking services, which were mobile and internet banking. Another limitation is that, it had not focused on the relationship between intention to use these services and actual use of these services. Another limitation related to internet banking is that, there is a possibility of not capturing all e-service quality dimensions, to measure the service quality of internet banking. Another limitation of this study is that, the sampling method used was a convenience sampling. Given that, a convenience sampling method is not considered an effective method of representation of the population, the results may be interpreted cautiously, especially when generalized. The method used for data collection was a survey method using a questionnaire. Researchers have limitations with this kind of data collection, because of low response rate, complex and confusing questions and surveys that might be too long (Cooper & Schindler, 2003). Hence it is hard to decide whether the theoretical model proposed is applicable in other technology enabled banking services.