

CHAPTER-1

INTRODUCTION

The Indian banking system was domestically oriented at the time of nationalization of 14 major commercial banks¹ in 1969. National policy objectives were the guiding force and banks were primarily involved in mobilizing domestic savings, lending funds to specific sectors of the economy and raising resources for financing public deficits. Technology in Indian banking has evolved substantially from the days of back office automation to today's online, centralized and integrated solutions. One could witness the rapid changes taking place in the banking industry. Development of international economic and competitive markets has its role in changing the banking scenario. Technology is a major force in this environment which led to the breaking up of geographical, legal and industrial barriers and has created new products and services. The convergence of telecommunication and banking services has created opportunities for the emergence of mobile commerce, in particular mobile banking. S.J Barnes, et al., (2003) defined mobile banking as a channel whereby the customer interacts with a bank via mobile device, such as mobile phone and Personal Digital Assistant (PDA). A broader and more general definition of mobile banking is given by Pousttchi and Schurig (2004) at the 37th Hawaii International Conference on 'System Sciences'. They defined mobile banking as "That type of execution of financial services in the course of which- within an electronic procedure- the customer uses mobile communication techniques in conjunction with mobile devices". Mobile banking (also known as M-Banking, m banking, SMS Banking) is a term used for performing balance checks, account transactions, payments etc. via a mobile device such as a mobile phone. Mobile banking is a way for the customer to perform banking actions on his or her cell phone or other mobile device. It is a popular method of banking that fits in well

¹ 14 major commercial banks with deposits exceeding Rs50 crores each on July 19, 1969 were nationalised They are: Allahabad Bank, Bank of Baroda, Bank of India, Bank of Maharashtra, Canara Bank, Central Bank of India, Dena Bank, Indian Bank, Indian overseas Bank, Punjab National Bank, Syndicate Bank, Union Bank of India, United Bank of India and United Commercial Bank.

with a busy, technologically oriented lifestyle. (<http://www.articlesbase.com/banking-articles/e-banking-recent-trends-in-india-3068370.html>). It is a subset of banking as it allows every one easy access to their banking activities via mobile handset. As Sudalaimuthu et al., (2013) stated 'm-banking is one of the financial inclusion media because it is providing efficient banking services with reasonable cost to all sections of people without discrimination'. With the rapid increase in technology development in the mobile industry, the applications of wireless technology are also increasing with a higher pace of which mobile phones are just one example which had enabled various banks with the opportunity to provide their services anytime and anywhere to the consumers. Koivumaki and Salo, (2002); Mattila, (2003); Suoranta and Mattial, (2004); Laforest and Li (2005); Riivari, (2005); had explored and studied the significance of mobile banking. Silicon India classifies mobile transactions as per Table-1

TABLE-1
MOBILE TRANSACTION CLASSIFICATION

	Push Based	Pull Based
Transaction based		<ul style="list-style-type: none"> * Fund transfer * Bill payment * Other services like share trading.
Enquiry Based	<ul style="list-style-type: none"> * Credit/Debit alerts * Minimum balance alerts * Bill payment alerts 	<ul style="list-style-type: none"> *Account balance enquiry *Account statement enquiry *Cheque status enquiry *Cheque book requests *Recent transaction history

Source: TRAI Report 2011

There has been tremendous growth since 2000 in mobile penetration across the globe. The total number of mobile subscription was 6 billion by the end of 2012 and is expected to grow multi folds (<http://www.itproportal.com/2012/10/15/>). But the Financial Access Initiative (FAI), a research consortium based at New York University has identified that 2.5 billion adults worldwide do not have a savings or credit account with either a traditional (regulated bank) or alternative financial institutions such as a micro finance institution (Chair, et al., 2009). This scenario has emerged because of the high cost of maintaining bank branches and low volume of transactions in the rural areas, given their distance from the nearest urban centers. Penetration of mobile technology is

substantial in that the number of mobile subscription across globe has risen from 1 billion in 2000 to 1.5 billion in 2005 and to 5.3 billion in 2010 and it was 6 billion in 2012 (<http://www.itu.int/net/itunews/issues/2010/10/04.aspx>).

The Government of India along with the Reserve Bank of India (RBI) which is the central bank has taken up many initiatives such as Lead Bank Scheme², Self Help Groups³, Business Correspondent Models⁴, and 'no- frill accounts⁵' for creating productive economic opportunities to all the segments of the sector. Even with near total control over the banking sector for more than two decades, basic financial services are still unavailable for millions of people in India. The total number of rural bank branches as a percentage of total bank branches has dropped from 50 percent in the year 2000 to 38.4 percent in 2010 (http://facultylive.iimcal.ac.in/files/WPS%20692_0.pdf). Financial institutions which have had difficulty in providing profitable services through traditional channels see opportunity in mobile banking as a form of branchless banking. Mobile banking is enjoying a rapid growth in India. The first bank to provide mobile banking facilities in India was ICICI bank in the year 1999 followed by HDFC and IDBI (http://www.streetdirectory.com/travel_guide/133638/phones).The service is being channelised from metropolitan cities to urban areas and semi urban areas and then to the rural areas. About the bank customers, a number of studies have revealed the fact that people select the banks whose branches are nearer to their homes and workplaces.

² Lead bank: The Committee under the Chairmanship of Mr.F.K.F. Nariaman, constituted by the Reserve Bank of India in 1969, recommended that banks should be allotted specific districts where they would take the lead in surveying the potential of banking development in extending branch banking and expanding credit facilities.

³ Government initiatives during seventies and the Fourth Five Year Plan (1969-74) focused on small and marginal farmers and agricultural labourers. Integrated sustainable income generation activity was promoted under Integrated Rural Development Programme. Inadequacies inherent in running programmes focused on individual households called for shift to a group based approach. The first step towards setting up self help groups (SHGs) was taken by Mysore Resettlement and Development Agency (MYRADA) and it built upon rural chit funds and informal lending networks to evolve a credit management group.

⁴ Business Correspondent model (BC) is part of a broad financial inclusion initiative that the Indian Government launched (2006) in response to increasing inequality in India. The Reserve Bank of India's guidelines regarding BCs allows flexibility to banks regarding the use of technology for financial inclusion. This has resulted in innovations to provide inexpensive and efficient technological solutions.

⁵ The central bank had introduced 'no-frills' accounts in 2005 to provide basic banking facilities to poor and promote financial inclusion. The accounts could be maintained without or with very low minimum balance.

Further in the selection of the banks, behaviour of employees has also been considered an important aspect. But the problems can be solved with the help of mobile banking. The growth of mobile banking in India is primarily forced by convenience and promptness.

(<http://drslgupta.in/Research%20Papers/Mobile%20Banking%20in%20India%20Final.pdf>)

In India one can see the penetration of mobile subscription to be highly commendable. The following Table-2 gives the number of mobile subscription in India since 2000.

TABLE- 2
MOBILE SUBSCRIPTION IN INDIA

Year	Mobile subscription (in millions)
2000*	1.88
2005*	52.21
2010**	752.19
2012**	864.72
2013*	886.30
2014***	893

Source:* http://en.wikipedia.org/wiki/Telecommunications_in_India

**<http://www.indiatelecomonline.com/topics/telecomstatistics/page/>

***<http://www./India-Telecoms-Mobile-Broadband-and-Forecasts.html>

As the table reveals, the number of people with mobile phones have significantly increased from about 1.88 millions in 2000 to 893 million in 2014. According to Merrill Lynch Global Research Report (2011), China has the maximum number of mobile phone subscribers i.e., 1112 million and India stands on the second position with 865 million phone subscribers. The available statistical data reveals that about 100 million people in India have mobile phones but with no access to banking services in 2012. Besides the studies of Datta, Pasa & Schnitker (2001) stated that low cost banking and

financial services could bring into its fold a considerable group of consumers who formerly could be served only at too high a cost, yet studies have also shown that there had been bottlenecks in the rate of adoption in mobile financial services (MFS)⁶ (<http://blogs.wsj.com/indiarealtime/2012/11/01/why-few-indians-have-bank-accounts/>).

The banks in India have not faced any downfalls or losses and all of them are well capitalized (Sandeep Bhalchandare saoji et al; 2013), There are mainly three types of banks in India. The first category is nationalised banks. There are 27 nationalised banks⁷ in India. More over there are 22 private sector banks and 43 foreign banks that are operating their business in India as on 2013. Almost all of these banks provide mobile banking to their customers.

The RBI has been trying to provide an impetus to mobile payments through the National Payments Council of India (NPCI). NPCI has developed the Interbank Mobile Payment Service (IMPS) which as defined by NPCI, offers an instant, 24X7, interbank electronic fund transfer service through mobile phones. IMPS enable customers to use mobile instruments as a channel with immediate confirmation features.

TABLE- 3
MOBILE BANKING SERVICES IN 2014

Service providers	Total number of banks	Number providing mobile banking service
Public Sector Banks	27	27 (100)
Private Banks	22	22 (100)
Foreign Banks	43	11 (25.6)

⁶ Mobile Financial Services (MFs): The use of a mobile phone to access financial services and execute financial transactions. This includes both transactional and non-transactional services, such as viewing financial information on a user's mobile phone.

⁷ 14 banks nationalised in 1969; 6 banks in 1980; and 7 SBI associate banks

Cooperative banks	75	27 (36)
Regional rural banks	77	10 (12.9)

Source: <http://www.rbi.org.in>, Figures in brackets denote percentage to total number of banks

The above Table-3 provides data on the number of banks providing mobile banking services to its customers in India. The data in Table-3 reveals that all the public and private sector banks offer mobile banking services. But this figure was dismal in the case of cooperative banks, regional rural banks and foreign banks. Only 25.6 percent of foreign banks, 13.3 percent of cooperative banks and 11.7 percent of regional rural banks provide mobile banking services to its customers in India.

As on 2012, 50 banks support Immediate Payment Service (IMPS) based mobile banking (http://www.rbi.org.in/scripts/BS_SpeechesView.aspx?id=726). These banks have issued over 36.32 million mobile money identifiers (MMIDs); processing 75,236 transactions which are unique user IDs for IMPS based mobile banking. This equates to around 15 percent coverage of banking customers in which private sector bank ICICI (18.09 million), Axis bank (8.58 million) and public sector bank SBI (6.37 million) have issued the maximum number of MMIDs. The adoption seems to be significant considering that the service was launched at the end 2010, and it has taken only 2 years to reach this penetration level. However, the dampener lies in usage levels of the service. Transaction numbers were hovering around 0.7 million transactions amounting to INR 408 crore in July, 2013. Contrast that with 18 million credit cards through which payments worth INR 8,000 crore are processed every month.

Mobile payments have not lived up to expectations in India despite the large mobile subscriber base and reach of the medium to a large unbanked / under-banked population. For the industry to prosper and reach its potential, it will be critical for the regulator (RBI), central node for payment guidelines (NPCI), telecom regulator (TRAI) and mobile payments body (MPFI) to define a policy framework that aligns the interests of banks, payment companies and telecom operators in a way that best serves the interests of consumers (http://www.avendus.com/Avendus_ReportIndia's_Mobile_Internet-2013.pdf). In this the State Bank of India (SBI) group dominates this space in volume terms with an overall share of 67.4 per cent in total volumes. Private and foreign banks follow, with an

overall share of 30.1 per cent in November 2013. Around three per cent of State Bank of India's (SBI) total customer base is in mobile banking transactions. For Industrial Credit and Investment Corporation of India Bank (ICICI), over ten million customers have currently registered for mobile banking. As on October 2012, nearly 1.72 crore customers are utilising the mobile banking services among the 42 banks which provide the facility. (http://articles.timesofindia.indiatimes.com/2012-12-14/telecom/35819133_1_hdfc-bank-icici-bank-state-bank). According to the Reserve Bank of India (RBI) Report, in fiscal 2013, however, 53 million people across 78 banks used m-banking services, and made 5.6 million transactions valued at Rs 625 crore. Any mobile banking must be inexpensive to attract the end customer over existing methods; in 2014 across 97 banks used mobile banking services.

Origin and potential of mobile banking in India

Recognising the potential of mobile banking, Reserve Bank of India issued the first set of guidelines in October 2008. The guidelines defined mobile banking as undertaking banking transactions using mobile phones by bank customers that would involve credit/debits to their accounts. This definition in a sense provided larger canvas to mobile payments which in a narrow sense involved only payment made for a product or service using the mobile phone either remotely or at the point sale (PoS). These guidelines which were very broad based, laid down the technology and security standards pertaining to safety, confidentiality, integrity, authenticity and non-repudiability. As this was a nascent technology and to build up customer confidence in terms of minimizing frauds, the Reserve Bank mandated that all transactions should be encrypted irrespective of the value. The Reserve Bank also made inter-operability a cornerstone of its policy. After that initial set of guidelines, several policy relaxations have been made to further encourage the use of mobile banking taking into account changing economic environment and feedback of the industry and customers.

RBI Guidelines on Mobile Banking

An Inter Ministerial Group (IMG) was constituted by the Government on Department of Electronics and Information Technology DIT's initiative on November 19th in 2009, to enable finalization of a framework for delivery of basic financial services

using mobile phones. The IMG was chaired by the Secretary, DIT and included, among others, representatives from Department of Financial Services, Department of Posts, Ministry of Rural Development, Planning Commission, UID Authority of India, TRAI, RBI, Department of Telecom and the Home Ministry. After extensive discussions among members and other stakeholders involving the banks, telecom providers, security agencies, and the public, and holding three meetings of the full Group and several meetings of the sub-group constituted by it, the IMG finalized its report in March 2010. A Committee of Secretaries constituted under the Chairmanship of the Cabinet Secretary to consider the recommendations of the IMG met on 1st April 2010 and accepted the Report of the IMG and approved the IMG framework as the basis of delivering financial services using mobile technology. The constitution of IMG assumes significance considering the growing number of mobile subscribers among the rural population and the disadvantaged sections. With mobile subscribers in rural areas for outstripping bank account holders, a large section of rural population now has access to mobile telephony but not to financial services. With the rural mobile subscriber base expected to grow significantly over the next few years, a system that enabled provision of basic financial services through the use of mobile phones could be a major step in the direction of reaching out to the unbanked sections of the country.

The IMG reached an agreement on the following key issues relating to delivery of basic financial services using mobile phone

- i. The basic goals for delivery of basic financial services using mobile phone
- ii. The necessary conditions to be satisfied while achieving the set goals
- iii. The key players of the financial delivery mechanism, particularly for unbanked citizens.

Thereafter, the IMG identified the following three elements which would be a key part of the implementation infrastructure and processes and would be shared amongst various service providers as part of an optimal delivery framework.

- i. "Know Your Customer (KYC)" norms, processes and actual data pertaining to enrolment of new customers for services under the proposed framework. The IMG also decided to consult the MHA while arriving at the shareable KYC requirements.

- ii. A ubiquitous infrastructure component (including human resources involved) for 'cash-in' and 'cash-out' operations at the village/local level.
- iii. An additional infrastructure component for facilitating management of large number of small-value accounts and micro-transactions involved in the delivery of basic financial services.

Regulatory initiative of the Reserve Bank of India in mobile banking

October 8, 2008

Mobile banking transactions defined as undertaking banking transactions using mobile phones by bank customers that involve credit/debit to their account.

Some of the significant norms were as under

- Technology and security standards were laid down.
- All transactions to be encrypted irrespective of value limit
- Inter operability was ensured
- Customer complaints and grievance mechanism were laid down
- Daily cap of Rs 5000 per customer for funds transfer and Rs 10,000 per customer for transactions involving purchase of goods and services were prescribed
- Banks to seek one-time prior approval of the Reserve Bank of India after obtaining their respective Board's approval
- Such services could also be offered through the Business Correspondents

December 24, 2009

Raise in the daily cap transaction limits for funds transfer and for purchase of goods and services to Rs 50,000

- Transactions up to Rs 1000 can be facilitated without end to end encryption of messages
- Permitted to provide cash-outs to the recipients through ATMs or Business Correspondents subject to a cap of Rs 5000 per transaction and a maximum of Rs 25,000 per month per customer

May 4, 2011

- Transaction up to Rs 5000 can be facilitated without end to end encryption of messages

December 22, 2011

- Transaction cap limits for funds transfer and for purchase of goods and services of Rs 50,000 per customer per day removed
- Banks may place their own limits based on their risk perception with the approval of their board
- Ceiling on cash to the recipients through ATMs or Business Correspondents rose to Rs10, 000 per transaction subject to the existing cap of Rs 25,000 per month.

June 30, 2013

- Banks which are licensed supervised and having physical presence in India are permitted to offer mobile banking services.
- The services shall be restricted only to customer of banks and/or holders of debit/credit cards.
- Use of mobile banking services for cross border inward and outward transfers is strictly prohibited.
- The guidelines issued by Reserve Bank on “know your customer (KYC)”, “anti money laundering (AML)” and “combating the financing of terrorism (CFT)” from time to time would be applicable to mobile based banking services also.
- Banks shall put in place a system of document based registration with mandatory physical presence of their customers, before commencing mobile banking service.
- Technology used for mobile banking must be secure and should ensure confidentiality, integrity, authenticity and non-reputability.
- The customer/consumer protection issues assume a special significance in view of the fact that the delivery of banking services through mobile phones is relatively new.

- Banks wishing to provide mobile banking services shall seek prior one time approval from reserve bank of India by furnishing full details of the proposal.

The RBI which is supportive of mobile banking in India has put many regulations which are given below. (http://www_academia.edu/2958786/Mobile_Banking_in_India_Practice_Challengesand_SecurityIssues)

- Only such banks which are licensed and supervised in India and have a physical presence in India will be permitted to offer mobile payment services to residents of India.
- The services should be restricted to only to bank accounts/ credit card accounts in India which are KYC/AML compliant.
- Only Indian Rupee based services should be provided.
- Banks may use the services of business correspondents for extending this facility, to their customers. The guidelines with regard to use of business correspondent would be as per the RBI circulars on business correspondents issued from time to time.
- The 'Risks and Controls in Computers and Telecommunications' guidelines will equally apply to mobile payments.
- The "Know Your Customer (KYC)" and "Anti Money Laundering (AML)" as prescribed by the RBI from time to time would be applicable to customers opting for mobile based banking service.

Transaction Limits in Mobile Banking

- Only Indian rupee transactions and these transactions are allowed within India only.
- Per day transaction cap of Rs.50, 000 has been removed by the RBI, and every bank can change this cap depending upon their risk.
- Transaction without end-to-end encryption is Rs.5000/- (SMS Based).

Security and Authentication

The highlights of security and authentication guidelines provided by the RBI on Mobile Banking:

- The M PIN or higher standard of mechanism should be used to authenticate the mobile banking customer.
- End-to-end secure encryption mechanism should be followed in transactions.
- The bank should conduct regular information security audits on the mobile banking systems to ensure complete security.

Despite many initiatives taken in the field of mobile banking there are only 12 percent (17 million) users out of 143.2 million mobile phone internet subscribers who are using banking services on their mobile phones (Alpesh Patel, 2013).

The following sections in the light of the above stated details give in brief the benefits and problems of using mobile banking.

Benefits of Mobile Banking

Mobile banking has lots of advantages for both service providers and those who avail services. It has really become multi beneficial. Banks do not require much investment and they need not modify their existing infrastructure. Banks can send the message in fewer efforts to huge number of people. Mobile banking also helps banks to make good relations with their customers. In mobile banking the banks get valuable database of the customers which helps them in effective customer relationship management practices. It facilitates in quick feedback and help in customer retention and customer loyalty. Mobile phone provides a way to reach out to people in isolated areas. When banks have database of their customers they can use SMS advertising to give information about their services to their existing customers. This also solves the purpose of promotion and may also help in communicating new services. Customers enjoy anytime anywhere banking with the help of their mobiles. They need not stand in queues or to face the employees whom they don't want to face or need not be worried if the branch is not at convenient location. As mobile banking is cost effective for bankers, it is cost effective for customers also. The information can also be stored automatically in mobile as a proof in the form of SMS whether sent or received.

According to the Reserve bank of India (RBI) data, a total of 3.7 crore mobile transactions took place between February and November 2012, jumping around 1.7 times in volumes over this ten month period. These transactions saw nearly a three-fold

increase in value over the same period. Increasing smart phone adoption and initiatives such as media promotions and customer education programmes for mobile banking have led to this uptrend.

Mobile banking as the name suggests is basically using a mobile phone to do banking activities for customers like checking account balance, account transactions and payments etc. Generally, mobile banking is done through SMS or the mobile internet. Mobile banking enables banks to offer services like fund transfer, updates on stock prices, stock trading while being on the move. Thus, it greatly improves the ease of doing business from the point of view of customer. Mobile Banking has significant advantages over online banking. Customers do not require a computer to carry out the desired transaction or activity. The potential of mobile banking in India can be corroborated through the estimates of Cellular Operators Association of India (COAI) which says that the mobile base in India in 2013 was 674.41 million. Thus, there has been an explosion in the consumer base of mobile phone users and mobile banking is largely untapped and unexplored giving rise to huge possibility of market demand and access. Doing internet banking on cyber café is not safe and is suggested to be prohibited by all banks for security reasons because the cyber café network may store confidential information of the customers' bank account. Further customers have to pay some amount to use internet. Moreover if one does not have the facility with himself/herself it is not possible to do anytime banking with internet. These difficulties have been solved by mobile banking. Huge growth in mobile phones, affordability of handsets and well designed rates and tariffs by telecommunication companies have made mobile phone available for everybody. Considering convenience as a parameter for customers (Lichtenstein and Williamson, 2006), mobile phone bring a personalized asset these days can be used anytime, anywhere for transactions to be made and therefore it will prove to be a better channel than internet banking in near future for transactions globally (Behl and Singh 2014).

Barriers to M-banking implementation

M-banking implementation, apart from having benefits has limitation too. This section discusses the barriers in the implementation of m-banking in general and particularly in India. M-banking is subject to KYC (Know Your Customer), CFT

(Combating the Financing of Terrorism), AML (Anti Money Laundering) and all other RBI guidelines issued from time to time (Singh, Manju et al., 2014); which act as a hurdle for its growth.

The rural tele density according to Performance Indicator reports for quarter ending March 2013 (TRAI 2013) account for only 38 percent of the overall tele density. Even though formal banking channels like mobile banking are available but their trend for failure continues because of insufficient telecom network coverage.

The presence of different telecom partners working on diverse technology and using a different set of vendors and customers using different set of mobile platforms, acts as a deterrent in mobile banking implementation. Uniformity in some sense is the key requirement to maintain the “quality” to the end users. Else, heterogeneous interests of stakeholders (Lim 2007), lack of technology standards (Juniper Research 2008) and technology stability issues (DFID 2006) are likely to be the barriers in early stages of mobile banking implementation.

The impact of failure in creation of critical mass and revenue using a range of available payment systems (Van Hove 1999) and decision of end users to adopt mobile payments is also dependent on merchants and others using the system (Mallat 2007). New consumers adopting a payment system have a positive correlation indirectly with network for all consumers as they provide a launch pad for new merchants to be a part of the delivery force and if adequate retailers and consumers do not adopt the system, non-formation of critical mass of users can leave it a non-starter.

Only short message service (SMS) and interactive voice response (IVR) are the practical options for m-banking in India. Also, Innovation resistance studies suggest that usage barrier has proved to be one of the prime sources of end user resistance to innovations that demand radical changes to established habits (Laukkanen et al. 2007). Therefore, non availability of SMS/IVR options in a language of users’ choice could become a direct barrier for end user adoption of mobile banking services in India.

Poor financial literacy and alienation from banks; lack of steady and substantial source of income has been a major reason for financial inclusion in India (BCG 2007). According to the RBI, nearly 72 percent of those earning less than INR 50,000 per annum (USD 1,000 pa), largely depend on cash transactions and do not have any bank

account. A summary of bank account ownership as a percentage of urban and rural populations for five categories of income highlights such a lack of need for banking by low-income groups.

From consumers' perspective, transactions by any mode other than cash involve some additional costs for payment. Therefore, cost of transaction, is not only important in one-time choice of payment instrument (RBI 2007) but is continuously evaluated by consumers (Ondrus and Pigneur 2006) and migration to any new payment channel like internet or mobiles is based on consumer's assessment of the costs involved, inclusive of service charges levied by banks and other service providers (Mallat 2007). Direct costs to consumer in a highly competitive Indian market may not be prohibitive, but these costs together with charges payable by merchants/retailers would determine the pool of revenue to be shared by banks, telcos and PSPs and consumers' perception of costs, rather than the actual cost could become a barrier to growth of mobile banking/payments.

Trust, is the extent of consumer belief in systems, processes and procedures of the service provider and its channel. It has proved to be an important variable that squeezes perceived risk (Manzano et. al, 2009) but lack of it can become a serious block for acceptance of any service. Given that a million retailers selling prepaid recharges in a fiercely competitive telecom market are spread much wider than limited banking network of 69,160 branches and 60,153 ATMs (RBI 2009-10), 'quality' of service interaction is not maintainable across so many touch-points. Therefore, poor experience at any outlet could lead to destruction of consumer trust on telco operations and turn into a barrier for adoption of mobile banking.

Customer service with respect to payment systems includes 'service level at the point of service', 'information dissemination' and 'grievance redressal' (RBI 2007) and poor response at any stage, particularly for financial information/transaction could lead to a serious dissatisfaction and loss of consumer trust in services of telcos and its channel.

Security issues in mobile banking

The existing literature shows that possibility of security threat exists for transaction of payments using mobile device (Jin Nie and Xiabing Hu, 2008). Due to

advanced technology, it is now necessary to provide end-to-end security. It implies that if a customer uses his /her mobile devices for mobile banking then the data transacted are secure at the bank end and not at the user end. It is difficult to provide end-to-end security through Wireless Application Protocol (WAP)⁸ (C. Narendiran et al., 2009). It is stated that the data is not encrypted at gateway⁹ during the switching of protocol process, which leads to security concern for mobile banking WAP. Banks follow security mechanisms in mobile banking by identifying the customer's phone number, SIM card number, Pin number etc. These measures face many security issues like being attacked by unauthorized users. If the mobile device gets stolen from them the hackers or unauthorized persons could find the password from the log files or saved draft files. As many customers save their password in the mobile or under auto fill settings of the form, this loophole could be easily used by the unauthorized person (Suraj- Sankaran, 2007

If a mobile bank customer wishes to process the transaction of money from one account to another account he/she must first authenticate themselves to the bank server through firewall. The security application at the server has to verify the user through pass word or pin number and the server allows the customer to do transactions (Dian yan Liou, 2008). In this some security such as server failure, system crash and malevolent intrusion (H.Wu et al., 2003) occurs. As these are serious problems which will not make the server come back in normal form, the banks outsource their facility to third party service provider. This method also has authentication issues like verifying the PIN or password with the data base and it also involves third party server. There is no trust in securing the data of customers such as bank account details and customer addresses as they are managed by third party service provider (R.Fisher, 1999). SMS based mobile banking a convenient and easy way for accessing bank, also has end-to-end security problems. This approach is not fully secure as data is transmitted and the network operator has full access to the data (C. Narendiran et al., 2009). SMS banking is also subject to spoofing attack where attacker can send messages on network by manipulating senders number (H.Harb et al., 2008). Some of the precautions which are

⁸ WAP is used for communication between devices like digital mobile phones, internet, PDA.

⁹ Gateway is a ROUTER or a PROXY SERVER that routes between networks

suggested by the financial institutions to overcome the security problems in using mobile banking are listed below.

1. Resetting password or Pin over SMS to customer should not be used as the only method of accessing accounts or changing sensitive information.
2. If WAP is used, the devices should be capable of encryption and all other devices should be denied access.
3. There should be proper means to verify the customers' device prior to transactions being accepted.
4. There is mostly partial encryption of information in a transaction. Additional data encryption should be implemented and also existing encryption should be checked for possible cracks.
5. Most banking applications have been subject to hacking or malware attacks. The technology used should be able to tackle such hacking attacks and prevent the leakage of important and sensitive information.
6. Wireless technology, if not password protected or encrypted, can easily be broken into and used to steal information.
7. Dynamic keys should be used for mobile users which give a unique ID to users to prevent possible theft.

With the background on the benefits and limitations in the usage of banking, the following section gives a brief review of the various theoretical models in the adoption and usage of mobile banking.

Theoretical models on adoption of technology

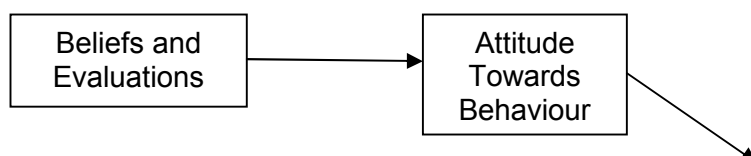
Since the late 1980s, technology adoption research has focused on exploring the determinants of users' intentions to use new technologies. Many theories have been developed to study Information Technology (IT) adoption issues, including the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975), the Technology Acceptance Model (TAM) (Davis, 1989), the Extended Technology Acceptance Model (TAM2) (Venkatesh and Davis, 2000), the Theory of Planned Behaviour (TPB) by (Ajzen 1991), the Innovation Diffusion Theory (Rogers, 1995) and the Unified Technology Acceptance User Technology (UTAUT) (Venkatesh *et al*, 2003). The models that have been most

frequently quoted in the technology acceptance and adoption literature are discussed in this section.

Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (Fishbein and Ajzen 1975; Ajzen and Fishbein 1980) is considered to be a general theory and has been applied to explain behaviour beyond adoption of technology. This model proposes that an individual's actual behaviour is determined by the person's intention to perform the behaviour, and this intention is influenced jointly by the individual's attitude and subjective norms. Attitude is defined as "a learned predisposition to respond in a consistently favourable or unfavourable manner with respect to a given object". A person's attitude towards behaviour is largely determined by salient beliefs about the consequences of that behaviour and the evaluation of the desirability of the consequences. Subjective norm is defined as the person's perception that most people who are important to them think that they should or should not perform the behaviour in question. In brief, TRA asserts that attitude and subjective norm and their relative weights directly influence behavioural intention. Studies carried out on e-business showed that individual's attitude directly and significantly influences behavioural intention to use a particular e-business application (George, 2002; Cribbins et al; 2003. Moon and Kim, 2001). Puschel et al., (2010) reported that attitude significantly affects intention to adopt mobile banking.

Theory of Reasoned Action



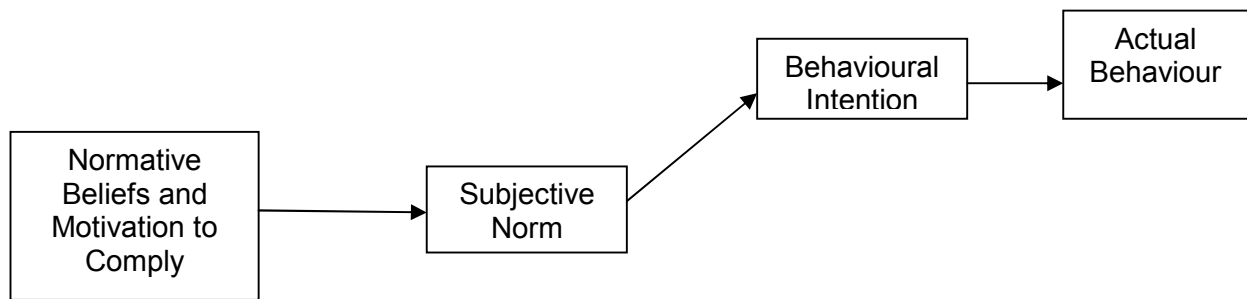


Fig-1

Source: Fishbein and Ajzen, 1975

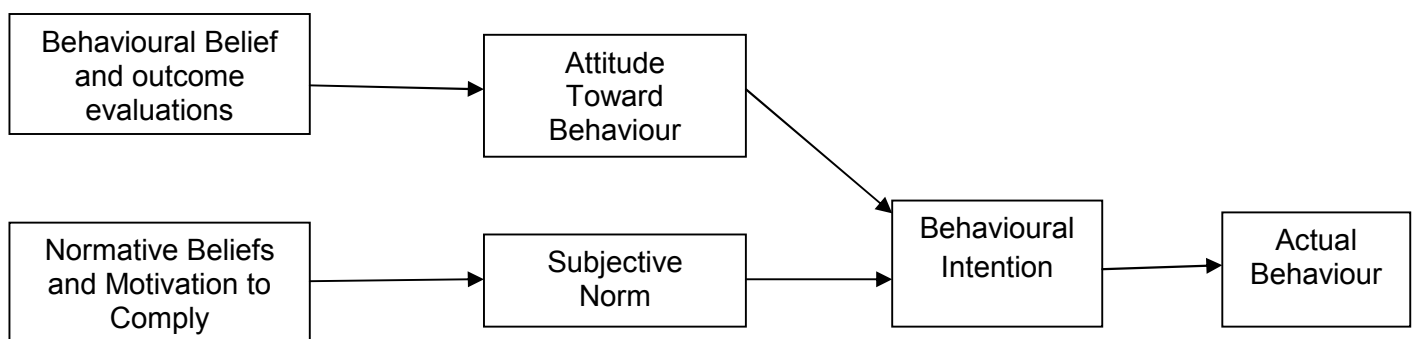
Theory of Planned Behaviour (TPB)

As an extension to the Theory of Reasoned Action, Theory of Planned Behaviour (TPB) and Technology Acceptance Model (TAM) were developed (Armitage and Conner, 2001; Venkatesh and Davis, 2000) to understand end users intention to use new technology and system. The Theory of Planned Behaviour (TPB) was intended to explain all behaviours over which people have the ability to exert self-control. The key component to this model is behavioural intent. Behavioural intentions are influenced by the attitude about the likelihood that the behaviour will have the expected outcome and the subjective evaluation of the risks and benefits of that outcome. The TPB has been used successfully to predict and explain a wide range of health behaviours and intentions including smoking, drinking, health services utilization, breastfeeding, and substance use, among others. The TPB states that behavioural achievement depends on both motivation (intention) and ability (behavioural control). It distinguishes between three types of beliefs - behavioural, normative, and control. The TPB is comprised of six constructs that collectively represent a person's actual control over the behaviour.

- Attitudes - This refers to the degree to which a person has a favourable or unfavourable evaluation of the behaviour of interest. It entails a consideration of the outcomes of performing the behaviour.
- Behavioural intention - This refers to the motivational factors that influence a given behaviour where the stronger the intention to perform the behaviour, the more likely the behaviour will be performed.

- Subjective norms - This refers to the belief about whether most people approve or disapprove of the behaviour. It relates to a person's beliefs about whether peers and people of importance to the person think he or she should engage in the behaviour.
- Social norms - This refers to the customary codes of behaviour in a group larger cultural context. Social norms are considered normative, or standard, in a group of people.
- Perceived power - This refers to the perceived presence of factors that may facilitate or impede performance of behaviour. Perceived power contributes to a person's perceived behavioural control over each of those factors.
- Perceived behavioural control - This refers to a person's perception of the ease or difficulty of performing the behaviour of interest. Perceived behavioural control varies across situations and actions, which results in a person having varying perceptions of behavioural control depending on the situation. This construct of the theory was added later, and created the shift from the Theory of Reasoned Action to the Theory of Planned Behaviour.

Theory of Planned Behaviour



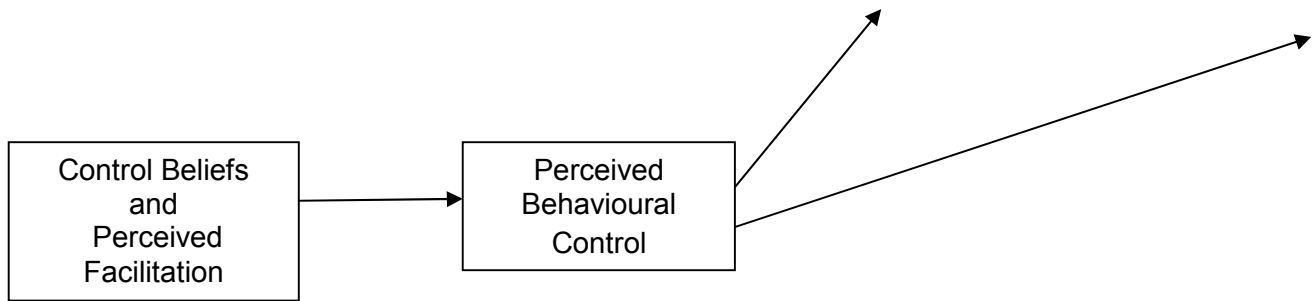


Fig-2

Source: Adopted from Pavlou, 2001

The theory of Planned Behaviour has been successfully applied to various situations in predicting the performance of behaviour and intentions, such as predicting user intentions to use new software (Mathieson, 1991), to perform breast self examination (Young et al., 1991), to avoid caffeine (Madden et al., 1992), to perform unethical behaviour (Man, 1998), and to understand wastepaper recycling (Cheung et al., 1999). All found the TPB has a better predictive power of behaviour than TRA.

Technology Acceptance Model (TAM):

Technology Acceptance Model (TAM) is the most commonly used framework to examine factors influencing the adoption of information systems. TAM examines the factors that influence user's intentions to accept or reject information systems (Wu and Wang, 2005). The model suggests that the user adoption of a new information system is determined by two factors i.e., perceived usefulness and perceived ease of use (Davis, 1989). Perceived usefulness is defined as the extent to which a person believes that using a particular system will enhance his or her job performance, and perceived ease of use is defined as the extent to which a person believes that using a particular system will be free of effort. These perceptions form the attitude and attitudes develop into intentions which in turn drive the actual system usage. One of the main reasons for wide acceptance of TAM is due to its specific approach to address the factors that influence usage of information system while TRA is a general theory of human behaviour (Mathieson, Peacock, and Chin, 2001). Another reason is its parsimony due to the vast amounts of data and empirical studies conducted that reaffirmed the validity of this theory. TAM has been extensively tested and validated and is a widely accepted model,

which can be modified or extended using other theories or constructs (Taylor & Todd, 1995; Davis & Venkatesh, 2000; Wu and Wang, 2005; Luarn and Lin, 2005; Zhang, Gou and Cheng, 2008; Yen, Wu, Cheng and Huang, 2010).

Technology Acceptance Model

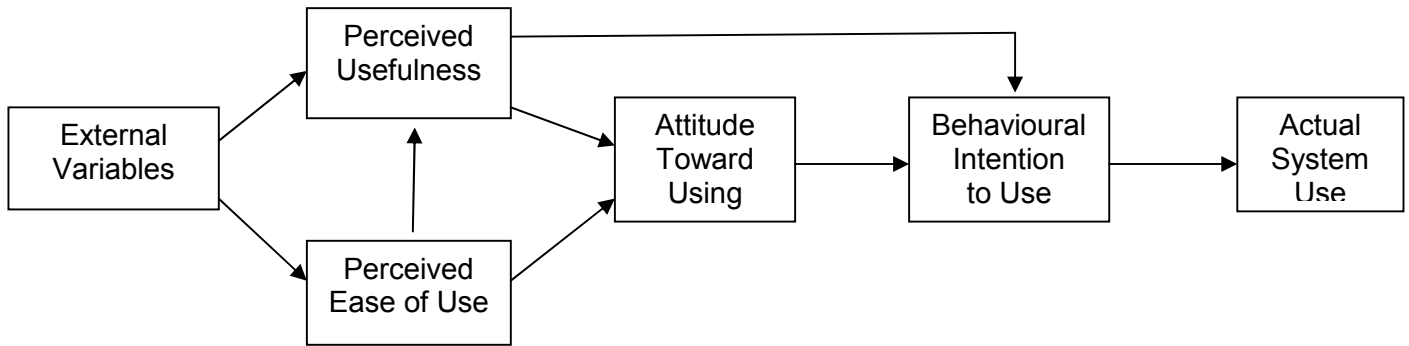
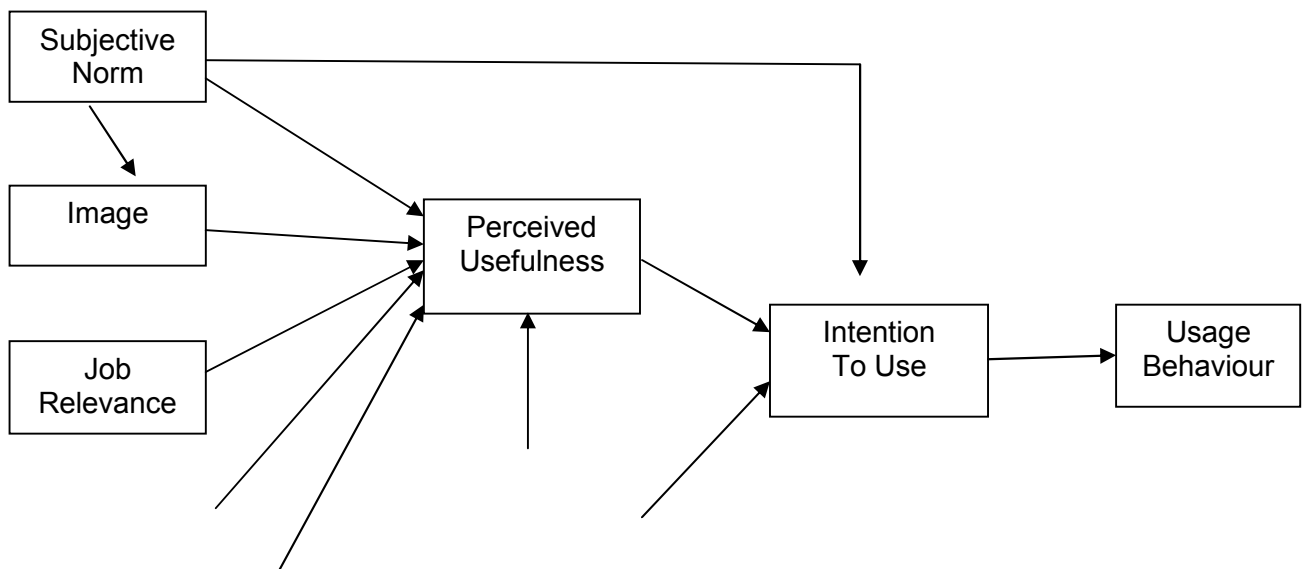


Fig-3
Source: Davis, 1989

Extended TAM

Venkatesh and Davis (2000) introduced social and organisational factors such as subjective norms, impression, quality of output and work relevance into the TAM model, and proposed the Extended TAM model (TAM). It is a theoretical extension of the Technology Acceptance Model that explains perceived usefulness and usage intentions in terms of social influence processes (subjective norm, voluntariness and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability and perceived ease of use).

Extended Technology Acceptance Model



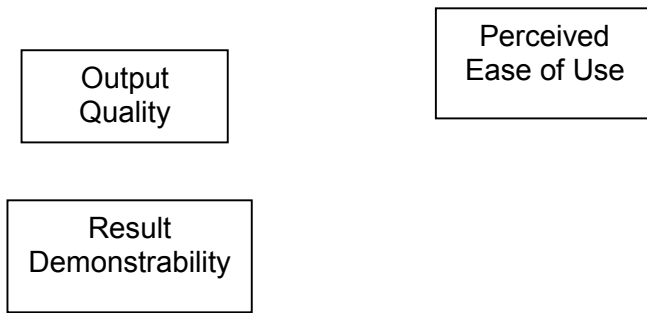


Fig-4

Source: Venkatesh and Davis, 2000

Diffusion of Innovation (DOI)

Diffusion of Innovation (DOI) Theory, developed by E.M. Rogers in 1962, is one of the oldest social science theories. It originated in communication to explain how, over time, an idea or product gains momentum and diffuses (or spreads) through a specific population or social system. The end result of this diffusion is that people, as part of a social system, adopt a new idea, behaviour, or product. Adoption means that a person does something differently than what they had previously (i.e., purchase or use a new product, acquire and perform a new behaviour, etc.). The key to adoption is that the person must perceive the idea, behaviour, or product as new or innovative. It is through this that diffusion is possible. Adoption of a new idea, behaviour, or product (i.e., "innovation") does not happen simultaneously in a social system; rather it is a process whereby some people are more apt to adopt the innovation than others. Researchers have found that people who adopt an innovation early have different characteristics than people who adopt an innovation later. When promoting an innovation to a target population, it is important to understand the characteristics of the target population that will help or hinder adoption of the innovation. There are five established adopter categories, and while the majority of the general population tends to fall in the middle categories, it is still necessary to understand the characteristics of the target population. When promoting an innovation, there are different strategies used to appeal to the different adopter categories.

- Innovators - These are people who want to be the first to try the innovation. They are venturesome and interested in new ideas. These people are very willing to take risks, and are often the first to develop new ideas. Very little, if anything, needs to be done to appeal to this population.
- Early Adopters - These are people who represent opinion leaders. They enjoy leadership roles, and embrace change opportunities. They are already aware of the need to change and so are very comfortable adopting new ideas. They do not need information to convince them to change.
- Early Majority - These people are rarely leaders, but they do adopt new ideas before the average person. That said, they typically need to see evidence that the innovation works before they are willing to adopt it. Strategies to appeal to this population include success stories and evidence of the innovation's effectiveness.
- Late Majority - These people are skeptical of change, and will only adopt an innovation after it has been tried by the majority. Strategies to appeal to this population include information on how many other people have tried the innovation and have adopted it successfully.
- Laggards - These people are bound by tradition and very conservative. They are very skeptical of change and are the hardest group to bring on board. Strategies to appeal to this population include statistics, fear appeals, and pressure from people in the other adopter groups.

Theory of Innovation Resistance

At a very general level, an innovation has been defined as an “idea, practice or object that people see as different” (Zaltman & Wallendorf. 1983). From a marketer's point of view the definition needs to be more focused. Thus, an innovation is defined as a product which is perceived by the consumer as new. This perceived newness may be due to changes in just one attribute of the product or radical change in the product concept. A firm may come up with an “intended” innovation however, if the consumer fails to perceive newness then the firm has a different problem on its hand. The lack of adoption; in this case is not due to consumer resistance to the new product but due to

failure on the part of the firm to stimulate optimal newness; however what is perceived to be new by a firm need not necessarily be an innovation to the consumer. Yet, every product in the market will be a potential innovation for consumers who perceive it to be so. Further innovation resistance is triggered off only if the consumer perceives a product to be an innovation. "Resistance to change may be defined as any conduct that serves to maintain status quo in the face of pressure to alter the status quo"(Zaltman & Wallendorf, 1983) and is associated with the degree to which individuals feel themselves threatened by change. Innovation Resistance is the resistance offered by consumers to changes imposed by innovations. To the extent that consumers can suffer changes in the way they acquire information about purchase use or dispose of new products. Innovation resistance is but a special version of resistance to change. Several theories in psychology explicitly deal with resistance to change (Newcomb., 1953; Osgood & Tannenbaum., 1955; Heider, 1958). All these theories suggest that consumers have an intrinsic desire for psychological equilibrium. Any change imposed on their behaviour has the potential to disturb this equilibrium the consumer thus more often opts for resisting the change than going through a disturbing process of readjustment. In other words resistance would seem to be a normal response of consumers when confronted with innovations. The model of Innovation Resistance is set in the context of cultural, situational and social factors, since a variation in each of these can affect resistance.

Unified Theory of Acceptance and Use of Technology (UTAUT)

It is argued through the UTAUT framework that factors surrounding user effort expectancy, performance expectancy, social influence, and facilitating conditions all markedly impact the acceptance of users concerning information technology (Dulle & Minishi-Majanja, 2011). Performance expectancy is acknowledged as being similar to the perceived usefulness of TAM and the relative advance of IDT (San Martín & Herrero, 2012). Moreover, it is known that there is similarity between effort expectancy and Technology Acceptance Model's perceived ease of use and Innovation Diffusion Theory's complexity (San Martín & Herrero, 2012). The social influence derives from Theory of Planned Behaviour (TPB) and Theory of Reasoned Action's subject norm, whilst facilitating conditions are linked with TPB's perceived behavioural control (Tao

Zhou, 2008). Furthermore, the framework of UTAUT introduces a number of moderating factors, such as age, experience, gender, and voluntariness. Such moderating factors are known to help deal with and manage the inconsistency and weak explanation power related problems associated with previous frameworks, and to further describe the groups of people's behavioural differences (Dulle & Minishi-Majanja, 2011).

Unified Theory of Acceptance and Use of Technology

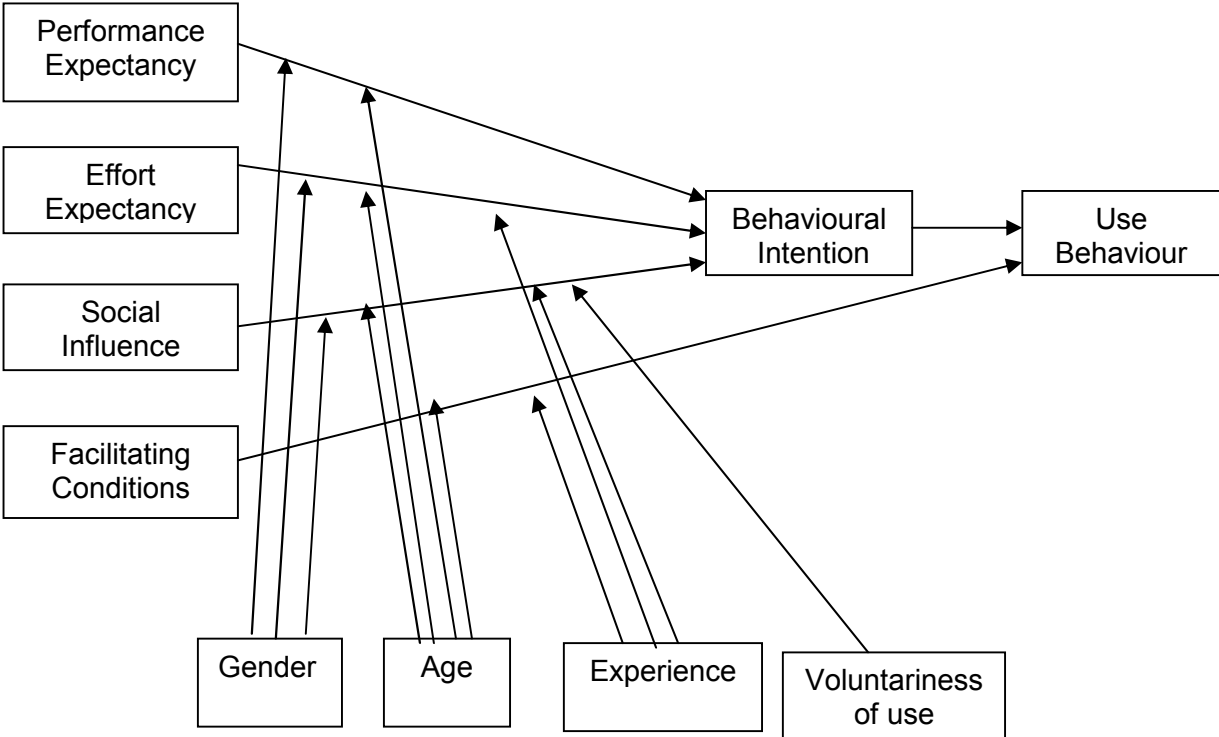


Fig-5

Source: Venkatesh et al. (2003)

Triandis Model

Similar to TRA, TPB and TAM, Triandis model assumes an attitude-intention-behaviour relationship. Triandis model, however, include a number of relevant variables. The model, as presented in Fig-6, takes into account the important constructs such as habit, social factors and facilitating conditions. It postulates that the probability of performing an act is a function of (a) habits; (b) intention to perform the act; and (c) facilitating conditions. The intention of performing a particular behaviour is a function of the (a) perceived consequences; (b) social factors (including norms, roles and the self-concept); and (c) affect (Chang and Cheung, 2001). Facilitating conditions refer to the necessary resources and supports to perform a behaviour, for example, time, money, expertise, hardware, software, network connection, etc. The inclusion of this construct has made up the deficiency of TAM, which assumes that usage is volitional and that no barriers would prevent an individual from using an information system (Mathieson et al., 2001). Triandis model has been widely adopted in the studies of social and health behaviour, and consumer behaviour. In recent studies, the Triandis model has been applied to technology adoption researches including the adoption of personal computer, internet/www and Executive Information System (EIS) (Chang and Cheung, 2001; Cheng et al., 2002; Cheung et al., 2000). For example, Triandis model and its extensions were used to understand the determinants of users' intention for using the internet/www in working environments and for shopping (Chang and Cheung, 2001; Cheung et al., 2000).

The findings in Chang and Cheung's study (2001) show that theoretical constructs in the Triandis model are useful in explaining the intention to use the internet/www. Whereas, the modified model, which includes the constructs of perceived complexity, near-term and long-term consequences, provides a better fit. The new model shows that affect, social factors, facilitating conditions and perceived near-term consequences all have positive impacts on the intention to use the internet/www. Firstly, the modified model assumes that perceived complexity (in contrast to perceived ease of use in TAM) is a person's perception, which is an 'internal' factor, and should therefore

be put under the construct of perceived consequences. Secondly, while the Triandis model posits that facilitating conditions only affect the actual behaviour, the modified model postulates that facilitating conditions can have significant impacts on intention. It is similar to TPB that perceived behavioural control affects both the behavioural intention and actual usage. Thirdly, on the basis of the past studies on TAM, the modified model postulates that perceived complexity has positive impact on affect. That is, the users will feel happier if they perceive the computer technology is easy to use. Fourthly, consistent with the TRA that intention is a function of the subjective norm, the modified model assumes that social factors (including social norms and perceptions of the significant others) have positive impact on affect (Chang and Cheung, 2001).

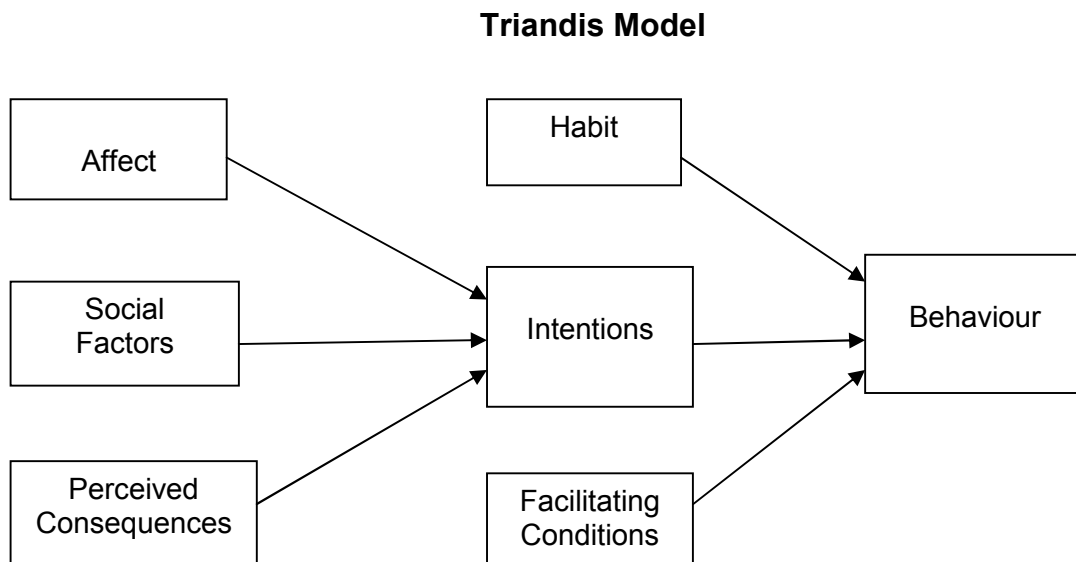


Fig-6

Source: Chang and Cheung, 2001

Other theories

In a study focused on investigating the drivers of mobile commerce, Wu and Wang (2005) combined TAM2 with Rogers' Innovation Diffusion Theory (IDT) (1995). The PU and PEOU constructs from the TAM2 model were combined with the 'perceived risk' and 'cost' constructs. Wu and Wang (2005) also added the compatibility constructs

from the IDT model. Luarn and Lin (2005) conducted a study in Taiwan, where TAM and the theory of planned behaviour (TPB) by Ajzen (1991) were combined. The study investigated the possible factors affecting the behavioural intentions of mobile banking users. These factors include perceived usefulness (PU) which was defined by Davis as “the degree to which a person believes that using a particular system would enhance his or her job performance”. Perceived ease of use (PEOU) was defined as “the degree to which a person believes that using a particular system would be free from effort”. Perceived credibility is a determinant of behavioural intention to use an information system. Perceived credibility consists of two important elements: privacy and security (Luarn & Lin 2004). Self-efficacy refers to the degree to which a person’s confidence in her/his ability to use banking (Bandura 1982), and perceived financial cost empirically identified perceived financial cost as a negative effect on behavioural intention to use mobile banking. (Luarn & Lin, 2005).

In a study by Lee (2009) in Taiwan which investigated the factors influencing the adoption of internet banking, the TAM and TPB were integrated and perceived risk and perceived benefit constructs were added to the research model. Lee discussed the following five antecedents of perceived risk: viz- performance risk, social risk, financial risk, time risk and security risk. Performance risk refers to losses incurred by deficiencies or malfunctions of mobile banking servers (Lee, 2009). According to Littler & Melanthiou (2006), a malfunction of a banking server would reduce customers’ willingness to use internet banking services, and the same applies for mobile banking. Social risk refers to the possibility that using mobile banking may result in disapproval by one’s friends/family/work group (Lee, 2009). Financial risk was defined as the potential for monetary loss due to transaction errors or bank account misuse (Lee, 2009). Time risk refers to a loss of time and any inconvenience incurred due to delayed payments or difficult navigation (Lee, 2009) and security risk was defined as a potential loss due to fraud or a hacker compromising the security of a mobile banking user.

With the significance of mobile banking adoption the current research work is aimed at studying the adoption of mobile banking behaviour among customers in Coimbatore District, There exists series of studies which list the factors affecting the adoption of mobile banking services (vide discussion in Chapter III). But, not much

study has been carried out in Coimbatore city on the adoption behaviour of mobile banking users. Further, the analytical framework of the models of the various study conducted so far on adoption behaviour of mobile banking users consist of Technology Acceptance Model and these studies are different in terms of employed independent variables in examining the association between the used antecedents and behavioural intention. These studies have produced varied results with regard to m-banking adoption and the study of adoption of mobile banking usage is remained inclusive.

Given, the above background, the development and criticality of the financial services, it becomes necessary to collect the existing findings in the area of mapping the drivers and inhibitors and understand the critical aspects of mobile banking adoption.

Enablers and Drivers for m-banking implementation

The following are the factors, drivers and other developments that will enable Indian electronic and mobile banking to grow exponentially in the coming years (www.csulb.edu/web/journals/jecr/issues/20121/Paper5.pdf).

• Policy related issues by Government

The RBI issued the operative guidelines for mobile banking transactions, for adoption by banks in India, in October 2008. At that time, the daily cap was fixed at INR 5,000 for fund transfers and INR 10,000 for purchases. Later, in December 2009, the daily limit was liberalized to INR 50,000 per customer for both payment transactions and fund transfer. Also, realizing the immense potential of mobile phones for improving financial inclusion, Government constituted an Inter Ministerial Group (IMG) in November 2009, to workout relevant norms and modalities for mobile based delivery of financial services and accepted the IMG recommended framework for implementation, in April 2010. The framework envisages creation of “Mobile linked No-Frills Accounts” by the Banks, which will have various transaction limits. The basic financial transactions on these accounts (cash deposit, credit customer’s mobile linked no-frills account, cash withdrawal, peer to peer transfer & balance inquiry) can be executed through a mobile based PIN system using “Mobile Banking POS” or through bio-metric based “micro

ATMs" of the BCs (or the sub-agents of BCs). The IMG has identified the different stakeholders in the framework and has defined the roles of each of these stakeholders.

- **Focus on growth of revenue and retention of customer by Telecom companies**

With 886.30 million wireless subscribers (GSM and CDMA together), urban teledensity (number of phones subscribed by 100 persons living in urban area) in India has reached 138.94 percent. Average Revenues per User (ARPU) have hit new low of INR 112 and INR 80 for GSM and CDMA services respectively (TRAI 2013) and competition is leading to further pressure on ARPUs. Moreover, given that most service areas have as many as eight telcos, subscribers frequently switch from one provider to another and churn rates continue to be in excess of 3 percent per month. Therefore, telcos are continuously on the lookout for new services to enhance their revenues and improve customer retention.

- **Immediate requirement by banks to broaden their reach and controlling cost of service delivery**

Given that costs associated with branch operations have been on the rise (Kamesan 2003), bank managements have been opting for technology tools to improve their reach and lower their cost of service delivery. Therefore, 350 million rural mobile phones (RBI 2014) offer a big opportunity for banks to reach out to the remote areas. At the same time, urban teledensity of 137.25 percent presents an attractive target for banks to replace the plastic money by mobile-based credit/debit cards.

- **Perceived Ease of Use (PEOU)**

PEOU is a belief that use of technology will be free of effort and it has been one of the two planks of Technology Acceptance Model (TAM) for predicting behavioral intention of users to adopt new technologies. While TAM has been modified with inclusion of other variables such as Trust, Cost (Wei et al. 2009); Credibility, Expressiveness (Amin 2008) and Perceived Risk (Manzano et al. 2009), PEOU has been a common 'enabler' in most

studies relating to adoption of internet and mobile banking. Information systems that users perceive easier to use and less complex will increase the likelihood of its adoption and usage (Teo et al. 1999).

- **Convenience and experience of customer**

Consumer studies conducted in a southern state of India found that convenience in choosing a channel, control of channel and its security play a vital role in selection of channel by the consumers (Srivatsa and Srinivasan 2007). However, for e-banking customers in China, easy accessibility and convenience are the sources of satisfaction (Poon 2008). Researchers have examined convenience and usage efficiency as attributes of 'Perceived Usefulness Construct' and found these to be the key drivers of m-commerce (Wei et al. 2009), internet banking (Gounaris and Koritos 2008) and m-shopping intentions (Manzano et al. 2009).

- **Effective marketing mix of m-banking in rural area**

Buchenau (2003) reported that some MFIs are experimenting with technical innovations to reduce operating costs and improve the quality of service in rural areas. Factors affecting the choice of payment instrument can be classified as 'sociological', 'instrument specific' and 'service provider related' factors. Marketing, mass media advertising and promotion fall under 'service-provider' category and have a significant influence on consumer's decision making process (RBI 2007). While marketing and advertising are generally considered important from producers' perspective (Carlsson and Walden 2002), mobile banking spans across three sectors – banking, telecom and support (from Payment Service Providers) and is expected to witness a lot of co-promotion efforts from all providers.

- **Reach of telecom distribution network**

Of about 14 million retail outlets spread across the country in organized and unorganized sectors, nearly a million are estimated to be associated with the telecom sector. All those outlets either 'stock and- sell' the physical recharges vouchers or do recharges by electronic transfer of talk-time to subscribers. Such a reach of nearly one

million telecom outlets is much wider than the coverage achieved by formal banking system through 83,055 bank branches and 99,218 ATMs (IFC Report 2013). Therefore, the vast network of consumer touch-points of telecom service providers can work as a significant enabler for reaching of m-banking/payment services to many areas, including those yet to be reached adequately by the country's banking network.

- **Easy and quick access to information and transaction updates**

Service level at the point of contact and quick information dissemination are vital for banking services and customer satisfaction (RBI 2007). By using the internet and mobiles for banking, consumers gain considerably by way of quick and unassisted access to their accounts and instantaneous updates from bank on emails/SMS. Timely communication from bank and flexibility to obtain the required information on various financial products as per consumer convenience actually contribute to the perceived usefulness and can work as drivers of m-banking services (Ho and Ko 2008). There is faster delivery of information from the customer and service provider, thus differentiating internet enabled electronic banking system from the traditional banking operation (Singhal and Padhmanabhan, 2008; Salawu et al. 2007).

- **Improving Turnaround Time for transactions using m-banking**

M-banking process has to depend on the global network provided by various communication channel providers for offering services in a personalized manner to customers. The use of such an open public network develops scope for security concerns about the ability of the banks to securely store and protect their privacy and monetary information from hackers (Pavlou, et al., 2007). Use of mobiles as a tool for banking is observed as a time saver on three counts. Anytime-anywhere access does away with the time to reach a bank branch or ATM. It saves 'waiting time' in case of crowding at the branch/ATM and it makes most transactions faster as these can be completed without any human intervention. Such time saving benefit, which can be an important driver of m-banking, has been studied as one of the dimensions of perceived usefulness construct in several consumer studies relating to acceptance of internet

banking (Gounaris and Koritos 2008), m-commerce (Wei et al. 2009), m-learning (Huang et al. 2007), and m-shopping (Manzano2 et al. 2009).

- **Reduction in transaction cost using m-banking**

Financial institutions, which have had difficulty providing profitable services through traditional channels to poor clients, see m-banking/m-payments as a form of “branchless banking” (Ivatury & Mas, 2008), which lowers the costs of serving low-income customers. Banks have experienced that deployment of technology brings down their ‘effective cost’ of delivering service and have been encouraging consumers to use ATMs, phone-banking and internet banking as means of access. For consumers, use of mobiles for financial transactions saves cost of commuting to a bank/ATM and given that cost of mobile usage is very competitive, mobiles bring down the total cost associated with every transaction. Therefore, lower transaction cost forms a key dimension of ‘perceived usefulness’ to drive the acceptance of m-banking.

- **Winning trust of consumer by telecom partners**

The role of trust is a crosscutting issue because multiple research traditions examine economic transactions in their social context—not as discrete acts but as markers and reinforcements of a set of interrelated responsibilities, roles, and transactional networks in which trust plays a central role (Burt, 1992; Geertz, 1978; Granovetter, 1985). In order to reduce perceived risk, trust appears to be a vital variable and thereby increasing perceived ease of use (Manzano et al. 2009). Therefore, perceived reliability of telco systems to handle large volume of transactions with minimal errors is a key factor for consumer’s trust on m-payment system and is expected to be its important driver. They can trust the interface, the network across which their funds travel, the representatives of the institutions (channels) who control their money, and/or trust the institutions themselves (Maurer, 2008).

Regardless of all the benefits of mobile banking, the adoption of this service is still low in India. According to studies conducted across the globe, the adoption of mobile banking has been low because consumers are resistant (Kuisma et al., 2007). Such study on adoption of mobile banking in India is limited as discussed in chapter II.

But, informations on the adoption parameters will be useful in enabling the bank authorities to formulate effective marketing strategies and hence increase customer's utilization of mobile banking services. The question to be probed this context was 'what are the factors that influence the intention to adopt mobile banking?'. The present research work has made an attempt to find out the factors which influence the customers' intention to adopt mobile banking. The present study on 'Adoption and Usage of Innovative Techniques: A Study on Mobile Banking in Coimbatore City' is carried out with the following objectives

Objectives

1. To find out the relationship between the frequency in the usage of mobile banking and the socio, economic and demographic characteristics of the sample respondents.
2. To analyse the expectations of the sample respondents on mobile banking.
3. To explore the relationship between the frequency in the usage of mobile banking and the usage of mobile phones.
4. To study the problems of the customers in the usage of mobile banking and
5. To explore the factors which influence the customer's adoption of mobile banking.

The following null hypotheses were tested in the study

Hypotheses

1. Frequency of usage of mobile banking is independent of socio, economic and demographic characteristics of the customers.
2. There is no association between the frequency of usage of mobile banking and the purpose of using mobile banking.
3. Frequency of usage of mobile banking is independent of perceived usefulness/perceived ease of use/trust/privacy/compatibility/social influence/perceived relative advantage and perceived financial cost.

4. Intention to adopt mobile banking is independent of perceived usefulness/perceived ease of use/trust/attitude and compatibility

Significance of the study

The study contributes to the adoption literature in the area of mobile banking in India; especially the study provides the necessary inputs for Indian banks to improve mobile banking facilities. It also identifies the factors that can either contribute to the failure or success of the mobile banking industry which could be further used for decision making.

Thesis has been structured to five chapters. Chapter I gives the introduction of the work, where the researcher has brought out the statistics on mobile banking adoption in India, its uses, barriers in mobile banking adoption, theoretical models on mobile banking adoption, objectives and hypotheses and significance of the study.

Chapter II reviews the literature pertaining to the thesis topic “Mobile Banking Adoption and Consumer Behaviour in Coimbatore City” under the following headings viz., (i) Scope of M-banking, (ii) Adoption of M-banking, (iii) Problems of M-banking and (iv) General Studies on M-banking.

Chapter III brought out the methodology based on which data for the study were collected, the quantitative tools applied in the study, the various terminologies used in the study and limitations of the study.

Chapter IV provides the analysis and interpretation of the data. It also compares the findings of the present research work with the results of the earlier studies.

The final chapter V gives the summary and conclusions of the study and also suggestions and areas for future research.