ADOPTION OF TECHNOLOGY-ENABLED BANKING SELF-SERVICES: ANTECEDENTS AND CONSEQUENCES

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By

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CERTIFICATE

*This is to certify that the research work for the thesis entitled "**Adoption of Technology-Enabled Banking Self-Services: Antecedents and Consequences**" by Mr. Joshua A. J., part time research scholar, under my supervision and guidance at the School of Management Studies, CUSAT, is adequate and complete for the requirement of the Ph. D thesis.*

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DECLARATION

I, Joshua A J, hereby declare that the thesis entitled "Adoption of Technology-Enabled Banking Self-Services: Antecedents and Consequences" is a bonafide record of research work done by me under the supervision of Dr. Moli P. Koshy (Reader, School of Management Studies, Cochin University of Science and Technology) for the Ph.D. programme in the School of Management Studies, Cochin University of Science and Technology. I further declare that this work has not formed the basis for the award of any Degree, Diploma, Associateship, Fellowship or any other title for recognition.

Kochi-22 **Joshua A J**

Date……..

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Kochi-22 *Joshua A J*

Date……..

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LIST OF ABBREVIATIONS

ANOVA	-	Analysis of variance
ATM	-	Automated Teller Machine
AVE	-	Average variance extracted
B I	-	Behavioural Intention
BOB	-	Bank of Baroda
BOI	-	Bank of India
CBS	-	Core Banking Solutions
CFA	-	Confirmatory Factor Analysis
CFI	-	Comparative Fit Index
C R	-	Critical Ratio
ERNET	-	Education and Research Network
IFI	-	Incremental Index of Fit
INET	-	International Networking for Education and Trandsformation
IB	-	Internet Banking
IT	-	Information Technology
ITes	-	Information Technology-enabled services
IVRS	-	Interactive Voice Response System
MB	-	Mobile banking
KMO	-	Kaiser-Meyer-Olkin
MSA	-	Measure of Sampling Adequacy
NFI	-	Normated Fit Index
NICNET	-	National Informatic Centre Network
PC	-	Personal Computer
PIN	-	Personal Identification Number
PEOU	-	Perceived Ease of Use

PU	-	Perceived Usefulness
RBI	-	Reserve Bank of India
RMSEA	-	Root Mean Square Error of Approximation
RTGS	-	Real Time Gross Settlement
SBI	-	State Bank of India
SEM	-	Structural Equation Modeling
SIRNET	-	Society of Insurance Research Network
SPSS	-	Statistical Package for Social Sciences
SMS	-	Short Messaging Service
SSTs	-	Self-Service Technologies
SWIFT	-	Society for Worldwide Inter-bank Financial Telecommunication
TAM	-	Technology Acceptance Model
TB	-	Tele banking/Telephone banking
TEBSS	-	Technology-Enabled Self-Services
TLI	-	Tucker-Lewis Index
TPM	-	Theory of Planned Behaviour
TRA	-	Theory of Reasoned Action
TRI	-	Technology Readiness Index
WAP	-	Wireless Application Protocol

Part One: Introduction, Literature Review, and Research Design

Chapter 1

INTRODUCTION

1.1 Background of the study

The banking and financial services sector is in a position to benefit most by leveraging technology and is a sector that has absorbed the technology to a great extent. Now-a-days a condition has reached in which this sector cannot survive without the support of information and communication technology. Banks, world over, have been effectively deploying information and communication technology as a strategic resource to achieve speed, efficiency, cost reduction, customer service and competitive advantage. Technology-enabled banking services offer value to customers providing them with anywhere, anytime and anyway banking. Though these technological changes have been pioneered in India by new private sector and foreign banks, now such a situation has reached where even the traditional banks in the public sector and old private banks are increasingly pursuing technology-enabled services.

All banks in India have realized in the post-liberalisation era that in order to remain competitive and provide the best services to their customers, they need to have the latest technology in place. Irrespective of their ownership status (public sector or private sector), almost all of them have given maximum importance to technological development and deployment. ATMs, plastic money, online collection and payment services, electronic fund transfer and

clearing services, mobile ATMs, document management systems, smart cards, core banking solutions, branch networking and internet banking are all outcomes of their initiative of technological upgradation (Upadhyay, 2007).

In banking, in the past, the technology strategy was considered as subordinate to business strategy. But now with so much advancement in technology it has become as important as business strategy. Technology has provided an altogether new way of interacting and providing service to bank customers rather than merely replicating activities of the bank employees (Godse, 2005).

Impetus to IT in this sector was based on the Rangarajan Committee Recommendations (second - 1989), the Saraf Committee Recommendations (1993) and the Vasudevan Committee Recommendations (1998). The new private sector banks have started their operations laying great emphasis on information and communication technology as it was used as a primary competitive tool to surmount the limitations of less number of branches and their compulsion to compete with the public sector bank behemoths. Most of the foreign banks and a few of the old private sector banks have followed the same strategy as the new private banks (Financial Sector Technology Vision Document, 2005, RBI website).

The focus of this research is on technologies that customers independently use for banking without any interaction with or assistance from employees. They are termed as Self-Service Technologies or SSTs (Meuter, M.L et al., 2000). Even though these technologies have been prevalent in the Indian banking sector for over a decade and a half, very few studies have been carried out regarding the Indian bank consumers' experience in using them and their concerns with these technologies. These modes of banking transactions using technology-enabled self-services, have great potential to benefit both the

customers as well as the banks. The Technology-Enabled Banking Self-Services covered under this study include Automated Teller Machines (ATMs), Internet banking, Telephone banking and Mobile banking.

Persuading customers to use new technologies in service encounters is generally more challenging than employees' use of new technologies as far as banks are concerned. In the delivery of the services, since technology can replace a firm's employees, the use of technology is immensely beneficial to the service provider in that it can standardize service delivery, reduce labor costs and expand the options for provisioning of services. On the other hand it could be wastage of resources if not widely accepted by consumers**.** Thus, it is essential that we find out best ways to design, manage and promote new technologies in order to have the best chance of consumer acceptance (Curran and Meuter, 2005).

The introduction of technology-enabled banking service delivery probably started off with HSBC bank introducing ATM for the first time in India way back in 1987 (N. Thamaraiselvan and J.Raja, 2007) . Internet banking was introduced in India in 1996 by ICICI bank with the launch of 'infinity' (Rajneesh De and Padmanabhan, 2002). Even though these electronic delivery channels were introduced by foreign banks and new private banks in order to surmount their limitation of fewer branches, of late even the public sector banks are also aggressively investing in these services. So the action in this field really got heated up during the last 5- 6 years.

This thrust on computerization and automation has led to massive investments in the banking sector in India. For instance as on March 31st, 2005, public sector banks in India had incurred an expenditure of Rs 9,487 crores on computerization and development of communication network (Manoharan, 2007).

1.2 Statement of the Problem

Worldwide the way in which banks deliver services has undergone a paradigm shift with the banks increasingly going in for electronic provisioning of services in the self service mode through the various electronic channels.

In India too this trend is visible. Tough competition and increasing customer expectations have forced all major commercial banks, irrespective of the sectors, to adopt the provision of banking services through ATMs, internet banking, tele banking and mobile banking.

The services through these channels offer tremendous advantage both to the banks and their customers. For the banks, the advantages are reduced transaction costs and lesser crowding in their branches. For the customers, these channels offer the convenience of doing bank transactions from the places of their choice, even homes and conducting them any time of the day they want.

Despite the huge investments made by the banks in providing the services through these electronic channels and the aforementioned benefits it offers, it has been found that except for ATMs, adoption i.e., the acceptance and continued use of a product or service, of other channels like internet banking, tele banking and mobile banking are yet to pick up in a big way among the bank customers.

The widespread adoption and usage of ATMs is testified by the Banknet India's ATM User Survey Report 2006 in which 95% of the respondents preferred banking via ATMs over the conventional branch banking. According to Internet & Mobile Association of India's (IAMAI) Report – Online Banking 2006, only about 12% of the internet users avail internet banking facility, which shows that the internet banking has not really picked up in India.

The previous studies in other countries and a few studies conducted in India have shown various reasons for the apathy of the bank consumers towards these services such as security concerns and lack of confidence in using them.

But meanwhile, there is evidence in the literature and other sources that certain segments of the bank customers, especially those belonging to the well-educated, young, relatively well-off and residing mainly in urban areas, taking to internet banking and other forms of electronic banking self-services. This is also evident from the reduction in the branch transactions and the increase in the net transactions in many of the banks. For instance ICICI bank's net transactions as a percentage of its total transactions rose from 2 percent in the year 2000 to over 18 percent in 2006 and HDFC bank's net transactions grew to 16 percent in 2006 from 3 percent in 2001.

Examination of published works revealed that even though several studies were conducted mainly in developed countries and a few in developing countries about the adoption of technology enabled banking self services - Mols (1999) in Denmark, Minna Mattila (2006) in Finland, Patricia et al. (2003) in France, Daniel. E (1999) in U K, Line Ricard (2001) in France, Milind Sathye (1999) in Australia, Laforet & Li (2005) in China, Polatoglu and Ekin (2001) in Turkey, Erikson et al. (2005) in Estonia to name a few such studies - the studies pertaining to this topic done in India are limited in number. Hence there is a gap in the understanding of how Indian bank customers, users as well as non-users, perceive the services delivered through these self service delivery channels and the level of satisfaction of users. There is a need to understand and analyse the antecedent factors which include demographic, beliefs and attitudinal aspects of the respondents that aid the adoption of these self services as well as those which hinder the adoption. There is also a requirement to find out the relationship of these antecedent factors and the resultant adoption

consequences. The level or degree of adoption by the users, extent of usage satisfaction, the respondents' usage of each type of electronic banking channel, and the intensity of usage of various functions provided through each electronic self-service channel could all be considered as a consequence of adoption of these technology-enabled banking self-services.

Even the few published studies done in India deal with only aspects pertaining to any one of the technology-enabled banking self-services such as ATM (Thamaraiselvan and Raja, 2007) or internet banking (Singh and Malhotra, 2005; Mukherjee and Nath, 2003). As the customers tend to use the various services of the different banking channels in a complimentary manner, the research confined to aspects pertaining to only one channel is deemed incomplete to capture the banking transaction-specific consumer behaviour in totality. Hence there is a strong agenda for the study taking multiple self service banking delivery channels together such as ATMs, internet banking, telebanking and mobile banking.

1.3 Objectives of the study

The objectives of the study are the following:

- To study the usage pattern of technology-enabled banking self-services such as ATMs, internet banking, tele banking and mobile banking by bank customers.
- To study the effect of demographic factors on the adoption levels of these technology-enabled banking self-services by bank customers.
- To develop a framework to understand the perceived beliefs and the consumer attitudinal factors that influence the adoption levels of the users of these services.

- To study the relationships among the beliefs, attitudes and the usage intentions about them, and relate them to the usage of the technology-enabled self-services.
- To find out the factors which facilitate and hinder the adoption of these services.
- To study the satisfaction level and quality perceptions of bank customers who are using these services.
- To compare the customer perceptions across various categories of banks and geographical locations.

1.4 Hypotheses

The following hypotheses which are linked to the objectives of the study are proposed:

- **H1.**The adoption levels of technology-enabled banking self-services by bank customers vary with the type of bank group (foreign, private or public sectors) they deal with.
- **H2.**The adoption levels of the technology-enabled banking self-services by bank customers vary significantly with the variation in their demographic factors such as gender (H2a), age (H2b), income (H2c) and occupation (H2d).
- **H3.**The adoption levels of technology-enabled banking self-services by bank customers are related to their *self efficacy* in using them.
- **H4.**The adoption levels of technology-enabled banking self-services by bank customers are related to their perception of *relative advantage* in using them.

- **H5**.The adoption levels of technology-enabled banking self-services by bank customers are related to their *perception of risk* in using them.
- **H6.**The adoption levels of technology-enabled banking self-services by bank customers are related to their *innovativeness*.
- **H7.**The adoption levels of technology-enabled banking self-services by bank customers are related to their *need for personal contact*.

1.5 Potential Contributions of the study

The study has brought out some significant contributions to management practice and academic literature. The practising bank managers can use outcomes of this study for identifying the appropriate segments for targeting the technology-enabled self services such as internet banking, tele banking and mobile banking, which are yet to attain wide spread usage and adoption. They can devise effective strategies for promoting these services to the identified segments. The understanding of the antecedent factors will help them to design suitable training programs for employees to motivate customers to adopt these services.

This study will help to analyse the quality perceptions about technology based banking and help banks devise strategies to improve the quality of service processes through better design and provisioning of services and thereby improving customer satisfaction.

Further, this study finds out the potential problem areas by way of factors inhibiting the adoption of these services, the understanding of which can help banks plan and implement measures to overcome them and increase the number of users of these services.

As far as the academic contributions of the present study are concerned, the study has identified various relevant constructs from the literature including those from established frameworks on technology adoption such as Diffusion of Innovation theory by Rogers (1995) and Technology Acceptance Model by Davis (1989). These constructs, along with the discussions with experts, have led to development of a framework for understanding the adoption levels of the technology-enabled banking self-services. This framework has been operationalised in the study and empirically and statistically tested to examine the validity of the proposed constructs. In future, further studies could be carried out on adoption using the framework developed in the study. Relationship between beliefs, attitude and intentions to use technology-enabled banking self-services has been analysed and tested statistically and models developed in case of ATM and internet banking services usage. This gives an understanding of the antecedent beliefs which affect the attitude and also of how the attitude creates an impact on the intention to use these services, which in turn influences their actual usage.

1.6 Scope and Limitations of the Study

1. The study is restricted to the technology-enabled (electronic) banking services such as Automated Teller Machine (ATM) services, Internet banking services, Tele banking services and Mobile banking services. These services are deemed to be self services as customer himself/herself produces the service without the direct involvement of bank employees (Meuter et al., 2000). No other electronic services provided by banks are considered in this study.
2. The study is confined to *retail banking customers* of select scheduled commercial banks and the geographical area of the study is confined to

the metro and sampled urban 'banked centres' in the Karnataka State. Metro and urban banked centres were chosen for the study due to the following reasons:

a. Newer technology-enabled banking services such as tele banking and mobile banking are provided only by the metro and urban branches of banks.

b. In the study it was required to have cross sections of respondents using each of the above services and the probability of finding the users of internet banking, tele banking and mobile banking is greater in metro and urban banked areas.

3. Only respondents from the bank groups- public sector banks, new private sector banks and foreign banks are considered for the study. The respondents from old private sector banks are not taken due to the fact that their operations resemble those of public sector banks.

1.7 Chapter Scheme

The thesis is divided into two parts, part one deals with the introduction to the study and the part two deals with data analysis, findings and conclusions.

Part one: introduction to the study, the literature review and the study design

Part one is divided into four chapters as follows:

Chapter one: deals with the introduction to the study, gives a brief detail about its background, problem statement, objectives, research hypotheses, potential contributions and its limitations.

Chapter two: discusses the background of the Indian banking sector in general and the technological development that has taken place in this sector in particular.

Chapter three: shows the review of the related literature including the aspects for similar studies and it also explains the theoretical concepts and frameworks used in the study.

Chapter four: depicts the various details regarding the research design used in the study including the research approaches used, data sources, the sampling plan, the research instrument used and statistical techniques used.

Part two: data analysis, findings and conclusions.

Part two is divided into six chapters as follows:

Chapter five: presents the demographic profile of the respondents and findings pertaining to overall aspects regarding the banks such as bank choice criteria, overall satisfaction, core service quality perception, price value perception and so on.

Chapter six: explains the usage patterns of respondents, which includes their computer and internet usage, awareness levels about electronic banking services, frequency and duration of technology-enabled banking services usage, percentage of usage of different TEBSS and the commonly used functions in the electronic banking modes.

Chapter seven: discusses the adoption level measurements, inter bank group comparison of the adoption levels, the effect of demographic factors on the adoption levels and examines the perceptual and attitudinal determinants of adoption levels. The predictors of internet banking usage are also found out.

Chapter eight: deals with the satisfaction of the users of the different TEBSS, the relationship of customer satisfaction with service quality of the individuals TEBSS options and its influence on adoption levels.

Chapter nine: examines the relationships among antecedent beliefs, attitudes, intentions of usage and actual usage of ATMs and internet banking of the respondents through the means of structural equation modeling.

Chapter ten: concludes the report by presenting the summary of findings, managerial implications and suggestions, significant contributions that emerged from the study and recommendations for future research.

Chapter 2

EVOLVING TECHNOLOGY TRENDS IN THE INDIAN BANKING SECTOR

2.1 Brief History of Indian Banking

Three distinct phases can be identified in the history of Indian banking. They are:

1. Pre-Nationalisation period prior to 1969
2. Nationalisation of banks and the period prior to banking sector reforms up to 1991
3. New phase of Indian banking with the advent of financial and banking sector reforms after 1991.

2.1.1 Pre-Nationalisation period prior to 1969

The banking system of India was started with the establishment of the first joint stock bank, The General Bank of India, in the year 1786. After this, banks such as Hindustan Bank and Bengal Bank came into existence. East India Company established three banks- The Bank of Bengal in 1809, The Bank of Bombay in 1840, and the Bank of Madras in 1843. These three Presidency Banks were reconstituted under Presidency Banks Act, 1876. After the First World War the Presidency Banks were amalgamated as 'The Imperial Bank of India' in 1921. In 1935, the Reserve bank of India was constituted as the country's central bank under the RBI Act of 1934.

When the country attained independence in 1947 Indian Banking was exclusively in the private sector, relatively small and extremely weak. It was mainly characterized by the following:

- The banks were largely confined to urban areas, extending loans mainly to trading sector dealing with agricultural produce. Virtually no banking services were available at rural and semi urban areas.
- These institutions did not play their due role in the planned development of the country.
- Deposit mobilization was slow as public lacked confidence in banks on account of frequent bank failures.

The Government of India, concerned by frequent failures and the resultant miseries faced by small depositors and others enacted the Banking Companies Act 1949 and the title was changed as 'Banking Regulation Act, 1949' as per amendment in 1965.

2.1.2 Nationalisation of banks

In the year 1955 Imperial Bank of India was nationalized to form State bank of India with the stated objective of 'extension of banking facilities on a large scale, more particularly in the rural and semi urban areas and for diverse other public purposes'. The seven banks now forming subsidiaries of SBI were nationalised in the year 1960. This brought one-third of the banking segment under the direct control of the Government of India.

The first phase of financial reforms resulted in the nationalization of 14 major banks in 1969 and resulted in a shift from class banking to mass banking. This, in turn, resulted in a significant growth in the geographical coverage of banks. Every bank had to earmark a minimum percentage of its loan portfolio to sectors identified as 'priority sectors'. The manufacturing sector also grew

during the 1970s in protected environs and the banking sector was a critical source. The next wave of reforms saw the nationalization of 6 more commercial banks in 1980 taking the number of nationalized banks to 27. Since then the number of scheduled commercial banks increased four-fold and the number of bank branches increased eight-fold.

2.1.3 Problems faced by the banks prior to 1991-92

Before 1991-92, the financial sector was characterised by segmented and under-developed financial markets as well as by the paucity of instruments. The structure of interest rates was complex and their levels were regulated by the administration. The sector lacked transparency, accountability and prudential norms, while information on debtors and the ability to recover doubtful assets was very weak, leading to an increasing number of non-performing assets (www.delind.cec.eu.int, 2008).

Before 1991 banking sector in India was facing several problems such as:

i. Eroding productivity and efficiency of public sector banks which led to continuous losses,
ii. Increasing NPAs and deteriorated portfolio quality,
iii. Poor customer service and obsolete work technology,
iv. Inability to face competition effectively.

In order to remove the above-mentioned deficiencies, Narasimham committee was appointed in 1991 and it submitted its report within three months in November 1991 with measures to improve productivity and efficiency of the banking sector (Uppal and Kaur, 2007). The aim was to improve efficiency, productivity and profitability of the Indian financial sector. The recommendations among other things laid emphasis on revitalizing overall

monetary policy framework, strengthening financial institutions and integrating the financial system with the global economy to attract capital and modern technology (Rajneesh De and Padmanabhan, 2002).

2.1.4 Narasimham Committee Report and Banking Sector Reforms

Several changes have taken place following the recommendations made by the Narasimham committee, some of which are as follows:

- Free entry of new private sector/foreign banks
- Introduction of prudential accounting norms
- Prescription of capital adequacy requirements
- Increasing trend towards deregulation of interest rates
- Diversification of activities
- Emphasis on fee-based services
- Increasing competition
- Increasing customer expectations

These rapid developments have become new challenges for the banks. And in the post liberalization era the banking sector has truly become one in which the survival of the fittest has become the norm (Ramakrishnan, 1999).

V. Leeladhar (2006), the Deputy Governor of Reserve Bank of India (RBI) had identified a few broad challenges faced by the Indian banks. They are enhancement of customer service; application of technology; implementation of Basel II; improvement of risk management systems; implementation of new accounting standards; enhancement of transparency and disclosures; and compliance with Know Your Customer (KYC) aspects.

The Narasimham Committee felt that computerization and mechanization is a means to improve customer service efficiency in a competitive environment of highly computerized financial companies. Some of the major technology-based networks under government include NICNET, ERNET, SIRNET, INDONET and I NET. BANKNET, a telecommunication network of Indian banks went in for membership of the international network of SWIFT (Society for Worldwide Inter bank Financial Telecommunication) a few years ago.

2.2 Technology in Indian Banking Sector

Information and communication technology incorporation by the banks have changed the way in which banking is being done, worldwide. These changes have been pioneered in India by new private sector and foreign banks to enable them to reach a wider customer base as they had limited number of branches. However the public sector and the old private sector banks which were following the traditional method of banking till a few years ago have also realized the benefits that could be reaped through the introduction of technology in their day-to-day operations. So they are also of late increasingly pursuing a technology-centric strategy in banking operations and services delivery as manifested by their adoption of core banking solutions and the introduction of technology-enabled banking solutions (Sambrani and Suryanarayana, 2007).

Banks in India have therefore realized that technology strategy has become the corner stone of their business strategy and it provides totally new ways of effecting customer transactions and interactions (Godse, 2005).

Thrust on the usage of IT in the financial sector in India was heralded by the report of Rangarajan Committee on Mechanisation in Banks, 1984. This report, which is a land mark one, was prepared by the committee constituted

under the chairmanship of Dr.Rangarajan in September 1988 to draw up a prospective plan of computerization for a five year period commencing from 1990 to 1994 for the banking industry. This committee identified the purposes of computerization as improvement in customer service, housekeeping, decision-making, profitability and productivity.

V.Leeladhar (2006), Deputy Governor, RBI has described technology as a key driver in the banking industry, the infusion of which has led to new business models and processes. This has revolutionized the provisioning of banking services through introduction of new distribution channels. Banks which have not made enough investments in technology are at peril as they will soon find their customer base eroding. Those banks which have invested in technology have gained great mileage through improved competitive advantage and are potentially poised to attract increased market share. Technology adoption has also improved the quality of risk management systems in banks.

In India at present considerable divergence exists in the adoption and usage of technology by banks for internal operations as well as for customer interface, as shown below (Financial Sector Technology Vision Document, 2005, RBI):

- The public sector banks are the ones that are facing the greatest challenge since they have to get over their traditional way of functioning and have to change over to latest technology which will have to encompass all their vast branch networks including those at rural centres.
- The foreign banks have systems which are generally of international standards.

- With regard to old private banks, core banking solutions are being implemented in their metro and urban branches.
- As far as co-operative banks are concerned the bank customers are mostly yet to feel the benefits of IT, as the IT usage is restricted with computerization comprising essentially of accounts related activities
- In case of Regional Rural Banks IT usage is confined to usage of computers as standalone machines.

2.2.1 Evolution of delivery channels

Traditionally, banks in India relied extensively on their reach afforded by their vast branch network to effectively put emerging banks out of competition. This was a high cost strategy considering the high real estate and bank operating expenses. This forced new banks to develop strategies that could help them reach out to end-customers in cost-effective ways. The solution came in the form of delivery channels such as Automated Teller Machines or ATMs, and internet banking. They turned out to be the growth drivers for private banks in India (Srikanth and Padmanabhan, 2002).

With the infusion of technology into the banking systems it is now possible for the banks to provide multiple delivery channels for provisioning of banking products and services. In India the traditional 'brick and mortar' banks are complimenting their operations with 'brick and click' strategy. The changed strategy on delivery channels is faced with attendant problems little known before.

2.3 Electronic Banking or Technology-Enabled Banking Self-Services (TEBSS)

In the present study the terms 'Technology-Enabled Banking Self-services' and 'Electronic Banking' have been used interchangeably. Several definitions of electronic banking exists in the literature. According Daniel (1999), it means the

provisioning of information and services by a bank to its customers via computer, telephone or television. According to her, it can also mean the access to the banking services via kiosks or ATMs located in work places or at public locations such as an airport or a railway station. This definition holds good for the retail electronic banking purposes, as it is the scope of the present study.

Uppal (2007) takes a broader definition to include all the services provided by banks through all types of electronic delivery channels such as telephone, internet, cell phone and so on. Hence as per this definition banking services such as internet banking, telephone banking, mobile banking and services provided through ATMs are all brought under its purview.

Sharma (2007) gave a rather interesting definition of electronic banking when he equated it as 'providing banking service to customer at his/her office/home or at any other place or time wherever the person is- be it traveling , shopping or even in a stadium through the usage of electronic technology'.

The new delivery channels such as ATMs, Telephone Banking and Internet Banking along with better access to customer information have reformed the relationship between banks and customers. Banks are now able to process the customer information for a number of purposes. They have the opportunity to market their products and services online and additional financial services like bancassurance can be targeted at the existing customers and prospects, thus facilitating customization to suit the needs of individual customers (Godse, 2005).

2.3.1 Automated Teller Machines (ATMs)

Automated Teller Machine or ATM as it is popularly known, is a device that allows customers who have an ATM card to perform routine transactions without interacting with a human teller. In addition to cash withdrawals, ATMs can handle deposits and enquiries, arrange loans and insurance, arrange buying and selling of

stocks and advise customers on different savings and investment schemes (Manoharan, 2007).

HSBC was the first bank to introduce the ATM concept in India way back in 1987. New private sector banks have taken the lead in introducing ATMs initially in a big way to supplement their branch network and to compete with large public sector banks with many branches. ICICI, UTI, HDFC and IDBI together used to account for more than 50% of the total ATMs in India about two years ago. ICICI Bank was the first bank to cross the 1000 mark in India (Thamaraiselvan and Raja, 2007).

But the current scenario has entirely changed with the banks in the public sector like SBI and its associates, Corporation Bank and Syndicate Bank aggressively pursuing the installation of ATMs across the country.

It can be seen from table 2.1 that the total number of ATMs installed by the banks was 27088 as on 31st March 2007 whereas by the same period in 2006 it was 21,147 registering a growth rate of 28 percent over the previous year. Nationalised banks constituted the largest share of installed ATMs, followed by the new private sector banks, SBI group, old private sector banks and foreign banks. While new private sector banks and foreign banks had more off-site ATMs, nationalized banks, SBI group banks and old private sector banks had more on-site ATMs. Understandably foreign banks and new private sector banks depend on off-site ATMs to overcome the limitation of having less number of branches. It is also worth noting that the number of ATM installations as compared to the number of their branches is 3.28 times more for the new private banks and 3.5 times more for the foreign banks.

Table 2.1: Branches and ATMs of Scheduled Commercial Banks

(As on 31st March 2007)

Bank Group	Number of Bank Branches					No of ATMs			Off-site ATM as percentage of total ATMs	ATM as percentage of branches
	Rural	Semi-Urban	Urban	Metro	Total	On-site	Off-site	Total		
1	2	3	4	5	6	7	8	9	10	11
Nationalised Banks	12,986	7573	7612	7465	35,636	6634	3254	9888	27.4	27.7
State bank group	5126	4155	2556	2193	14030	3655	2786	6441	43.3	45.9
Old Private Sector banks	855	1510	1294	947	4606	1104	503	1607	31.3	34.9
New Private sector banks	130	554	824	989	2497	3154	5038	8192	61.5	328.1
Foreign Banks	-	2	44	227	273	249	711	960	74.1	351.6
Total	19097	13794	12330	11821	57042	12796	12292	27088	42.3	47.5

Source: *Reserve Bank of India, Report on Trends and Progress of banking in India, 2006-07, p 97*

Ref Appendix 3 section A3.2 for RBI classification of Banks

When compared to the previous year 2005-06, the maximum progress in the installation of the new ATMs in 2006-07 was achieved by nationalised banks (38 percent). This growth rate was slightly lower when compared to growth rate of 50 percent in the earlier year. It is also interesting to observe that during May 2005 it was the new private sector banks that had the largest share of ATMs. Now it is seen that the nationalised banks have bridged the gap and even overtaken the new private ones.

With the installation base of more than 27,000 ATMs (as on 31st March 2007) all over the country, ATMs are going to play greater role in day-to-day banking transactions. Future ATMs will be more than just cash dispensing machines; they will be providing additional value added services including several non-banking and non-cash ones (Mohanty, 2007). The common non-banking services provided by most banks via ATMs are payment of electricity, telephone, cellular and credit card bills, payment of insurance premiums, and refilling/recharging pre-paid mobile phone connections.

In addition, Citibank and ICICI Bank permit mutual fund transactions through ATMs. Citibank ATMs also let their customers place orders for demand drafts and fixed deposits. ICICI Bank, IDBI Bank and SBI allow their customers to make donations to specific temples or charitable trusts. Customers can also purchase a new internet connection or buy renewal packs via ICICI Bank ATMs, apart from buying calling cards for domestic/overseas calls. SBI ATMs allow their customers to pay fees for select colleges at specified ATM centres, while IDBI ATMs even let you pay your gas bills and subscription payments for select magazines. Apart from payment services, IDBI ATMs let their customers view news headlines, stock quotes, horoscopes and movies running at theatres (Israni, 2006).

With the aggressive deployment of ATMs, enormous enhancement in productivity could be achieved as the banks in India were able to shift 50 to 80 percent of their respective cash transactions to this channel. This has resulted in a substantial cost savings for the banks as the cost of transactions using ATM is only about 25 to 30 percent of the cost of branch transactions. The experience of The Federal Bank, a prominent old private bank testifies this fact as the new ATMs installed managed to breakeven within six months of their installation. The same bank could shift more than 60 percent of its cash transactions over this channel, even in rural areas within two years of the introduction of ATM networks by it (Nair, 2005).

2.3.2 Internet banking

Internet banking involves the use of Internet for delivering banking products and services which include transfer of funds, ordering demand drafts, payment of utility bills, stop payments on cheque, obtain account balance, view one's statement of account online and applying for loan.

Some of the advantages of using internet banking as far as customers are concerned are:

- The customers can have access to internet banking 24 hours a day and seven days a week.
- It is cheaper than physically going to the bank branch and they don't have to wait in a queue to receive services.
- Customisation of banking needs to suit the user is possible
- Customer can avail the banking services without any geographical constraints.
- A multitude of different banking products and services are provided to the customers.

Internet banking provides certain benefits to the bankers as well such as reduced cost of provision of service, savings on manpower, increased productivity and opportunity to target new customer segments.

Dinz (1998) developed a model to classify the services delivered through internet banking into three roles having different levels like basic, intermediate and advanced levels of services under each role. The different roles mentioned for internet banking are:

1) Informational : for providing information
2) Transactional : for conducting transactions
3) Relationship : for improving customer relationship

As per the RBI's classification in their Report of Internet banking (2001) the levels of banking services offered through internet can be categorized into three types:

i. The *basic level service* is the banks' websites which disseminate information on different products and services offered to customers and members of public in general. It may receive and reply to customers' queries through e-mail.
ii. In the next level are *simple transactional websites* which allow customers to submit their instructions, applications for different services, queries on their account balances etc; but do not permit any fund-based transactions on their accounts.
iii. The third level of internet banking services are offered by *fully transactional websites* which allow the customers to operate on their accounts for transfer of funds, payment of different bills, subscribing to other products of the bank and to transact purchase and sale of securities etc.

The above forms of internet banking services are offered by traditional banks, as an additional method of serving the customer or by new banks, who deliver banking services primarily through internet or other electronic delivery channels as value added services.

ICICI bank was the first one to offer online banking way back in 1996 with the launch of 'infinity' and other banks especially those belonging to new private sector and foreign banks followed suit. ICICI Bank kicked off online banking way back in 1996 and a host of other banks soon followed suit. The period from 1996 to 1998 marked the adoption phase even for the internet as a whole. The usage increased only by 1999 as a result of lower online charges and increased PC penetration combined with a tech- friendly atmosphere. After ICICI Bank, Citibank, IndusInd Bank, HDFC Bank and Timesbank (now part of HDFC Bank), were the early ones to introduce online banking (Rajneesh De and Padmanabhan, 2002). At first the online banking facility was used as a vehicle for meeting the information requirements of the customers and gradually transaction facilities like fund transfer and third party transfers were introduced.

The proposed setting up of a Credit Information Bureau for online collection and sharing of credit information on borrowers has boosted internet banking. The deadline set up by the Chief Vigilance Commissioner for computerization of not less than 70 per cent of the bank's business by end of January, 2001 also gave a thrust to development of banking technology. The recommendations of Vasudevan committee on technological upgradation of banks in India also gave impetus to the implementation on a large scale (Mann and Sahni, 2007).

Malhotra and Singh (2004) had studied the status of internet banking offered by the private, public and foreign banks operating in India during the

year 2004. Their finding at that time was that even though 90 out of 93 of these banks were having websites only 48 of the banks had transactional websites of which they could classify only 34 as fully transactional websites. Of late many public sector banks and scheduled commercial banks like State Bank of India, Bank of India, Bank of Baroda, Syndicate Bank, Allahabad Bank, Punjab National Bank and so on have taken a lead in this area and set up fully transactional websites.

2.3.2.1 Internet banking issues

The main issues in internet banking today relate to security, authentication, non-repudiation, internet banking business continuance plan, customer awareness creation about security aspects and security awareness breach detection and reporting. These issues are not only important for the banks but also they are essential to build customer confidence and satisfaction (Kumar et al., 2007).

*Security***:** Information is an important asset in internet banking, so proper measures have to be taken to protect it through information technology infrastructure and software.

*Authentication***:** there has to be a method of identifying and verifying the identity of the user, so that unauthorised persons cannot gain access.

*Non-Repudiation***:** to verify whether the transactions have been effected through proper encryption measures and digital signature.

Business Continuity planning **:** to ensure transaction despite any interruptions.

*Customer security awareness creation***:** educating customers about preventive measures.

These measures are essential as there is increased threat of *phishing or* online identity theft according to a study by Gartner, as cited by Balaraju and Balakrishnan (2008). They also found that most of the senior bankers surveyed by them (97%) felt that *phishing is* a threat to their online banking services and they also felt that most of the customers have low knowledge levels about it.

Stronger authentication such as two factor authentication, usage of biometrics, quantum cryptology along with proper customer sensitization are required to increase security and reduce stealing of customer data (Joshi, 2008).

2.3.3 Tele banking

Telephone banking which is still another form of technology-enabled banking providing various banking services in the self-service mode through the telephones to its customers. A customer can carry out transactions by accessing his/her account through telephone at any time or from any place throughout the country with the same Telebanking PIN. Telebanking is offered by the banks (Kunjukunju, 2008) through a technology known as Interactive Voice Response System (IVRS). To guarantee security the customer must first authenticate through a numeric or verbal password or through security questions asked by a live representative, a process known as authentication. With the obvious exception of cash withdrawals and deposits, it offers virtually all the features of an automated teller machine account balance information and list of latest transactions, electronic bill payments, funds transfers between customers' accounts and so on.

Another variant of tele banking is sometimes called the phone banking in which a customer talks to a phone banking officer for transacting a banking business. But in the present study this particular service is not being considered as it does not come under the purview of the technology-enabled self-service.

Here the service encounter is a telephonic encounter in which services are being provided by the service employee who interacts with the customer over phone.

2.3.4 Mobile banking

Mobile banking is the latest addition to the technology-enabled banking. As the mobile phone penetration in India is quite high with an annual growth rate of about 83.17% mobile banking has immense potential to be a cost-effective method of conducting banking transactions by the Indian customers including the rural population.

Asian countries such as China, Indonesia, India and Philippines are high growth markets for mobile telephones. The Indian mobile sector crossed the 16.5 crore subscriber base at the end of the financial year 2006-07. The number of mobile subscribers has become 405.18 percent of the basic landline subscribers as on March 31, 2007 (Srivastava, 2008).

Mobile banking refers to the provisioning and availability of banking and financial services through the mobile technology. Mobile banking can be provided as a value-added service for the existing customers and at the same time it has the potential to be used as a means to bring into the banking fold the unbanked and underbanked segment of the population.

The pioneering bank to offer mobile banking services in India was ICICI bank in the year 1999, followed by HDFC bank and IDBI bank (Aithal , 2008) . Among the 11 prominent private sector banks, seven are providing mobile banking facility to their customers. State Bank of India, Bank of Baroda and Corporation Bank are some of the public sector banks which have started offering this service to their customers.

The classification of the services offered through mobile banking can be done depending on who originates the service '*Alerts*' and '*Request*' services.

Alerts or push services happen when bank sends out information based on an agreed set of rules, for instance the bank sends out an alert when a client's account goes below a threshold level, or when a debit or credit occurs above a certain limit and so on. Request or pull happens when a customer explicitly initiates a service or information from the bank. Last three transactions, bill payments, cheque book request are all examples of the request services.

Another way to classify the services is based on the nature of services, whether it is transaction-based or enquiry-based. So a request for bank statement is enquiry-based service and a request for fund transfer to some other account is a transaction-based service.

Mobile banking can be enabled through two technologies of which one is SMS (short messaging service) based and the other one being WAP (wireless application protocol). In India, mostly SMS based mobile banking is provided by the banks offering mobile banking since in a country like India majority of the mobile phone users' hand sets have only SMS based services and it is easier and economical to provide the service. But the disadvantage is that the SMS based mobile banking will not be able to support the full breadth of transaction-based services. Mobile banking enabled with the SMS technology uses text messages to initiate mobile application based banking. The customer requests for information by sending an SMS containing a service command to a pre-specified number and the bank responds with a reply SMS containing the specified information.

WAP is similar to internet banking in its operation and it offers secure online access of web using mobile phones. Banks maintain WAP sites which customers access using a WAP compatible browser on their mobile phones. WAP site offers similar form based interface and allows the customers to access

all enquiry and transaction-based services and addition they can also access more complex transactions like trading in securities.

Services such as *account balance enquiry*, *account statement enquiry*, *cheque status enquiry*, *cheque book request*, *fund transfer between accounts*, *credit/debit alerts*, *minimum balance alerts*, *bill payment alerts*, *bill payments*, *recent transaction history*, *information requests on interest rates*/ *exchange rates* and so on are offered through mobile banking.

2.4 The Technology-Enabled Banking Self-Services scenario

Reflecting on the developments that have taken place during the past three years in the banking technology field in the Indian banks, the RBI has stated the following in its latest Financial Sector Technology Vision Document, 2007:

1) Core Banking Systems (CBS) implementation is in full swing with all banks at varying stages of implementation of the same in their branches.
2) This has resulted in the computerization and networking of branches on a larger scale as it is a necessary and essential condition for the implementation of CBS.
3) Even a few of the older banks have now fully implemented CBS across all their branches.
4) There has also been tremendous growth in the use of payment and settlement systems for fund transfers using electronic means, which shows a welcome shift from traditional paper-based transaction flows.
5) Most importantly, one of the major developments during the period was the introduction of new delivery channels for customers. Internet banking, mobile banking, mobile automated teller machines, multi-functional ATMs, shared ATM services, large scale usage of Real Time

Gross Settlement (RTGS) for quick, immediate funds transfer and smart card-based transactions as part of initiatives aimed at financial inclusion are some of the landmark developments during this period.

2.5 Global E-banking scenario- glimpses from select countries

Finland was the first country in the world to take a lead in e-banking. Online banking was launched in Finland in the year 1996. It has become common place across that country with penetration rates of over 50 per cent, with penetration rates of over 60 per cent among private bank customers and in some age categories (35-49) in the year 2004 according to the Finnish Banking Association's survey of usage of credit, the penetration rate is over 70 percent (Pikkarainen et al., 2006)

As per the latest results about 84 percent of the Finns use internet today with the usage of internet banking at 67 percent for activities such as bill payments. This is a tremendous leap from only 4 percent of the interviewees using internet for bill payments in the year 1992. The usage of ATMs and Telebanking is found to be coming down according to the Finnish Banking Association survey Spring 2007 report on 'Saving and borrowing in Finland'. The number of people paying bills on ATMs has decreased further as compared to the previous year (2006). Use of direct debit has increased slightly in the past year while use of payment service has decreased a little. Telephone is used for paying bills by a very small number of Finns, only one per cent of the respondents. According to this report while 88% of respondents aged between 18 and 34 years pay their bills on the internet, the corresponding figures for age groups 55 to 64 years and 65 to 74 years stand at 50% and 20% respectively.

More than 50 million of the US adult population is banking online according to a new survey by the Pew Internet & American Life Project

(Susannah Fox and Jean Beier, 2006). This is a major growth considering the fact that in the year 2000 only about 14 million people used online banking sites. This has been facilitated by the growth in broadband connections, as it is found that broadband users are twice more likely to use internet banking than dial up connection users.

Survey on internet banking in U. K. by Forrester Research during 2007 showed that about 31 percent of British adults use online banking. This is despite the fact that about two thirds (67%) of the British are regular users of the internet. Only about 46 percent of the internet users in Britain bank online. The main reason why non-users are not going for net banking is because they are happy with the other channels, with 44% of them stating that they are happy to visit their branch, while others preferred banking through ATMs (33%) and telephones (11%). Security as a reason of non-usage was cited by only 31% of the nonusers.

The study by Laforet and Li, 2005 in China shows that most of retail banks were providing online banking as add-on services to the existing branch activities and the mobile banking was in the initial stages. From their survey among six major cities in China among the relatively wealthy and youth segment who were the potential target segments for online/mobile banking they found that only 33% and 14% used internet and mobile banking respectively. These findings however, they said, were not representative of the Chinese population as a whole since the population in rural areas was not included in the survey considering the lack of accessibility and internet infrastructure.

2.6 Conclusion

A brief overview of the Indian banking, its history with the changes that have taken place, the post liberalization period reforms and how it has culminated in the infusion of technology into the banking system with a view to improving-efficiency and productivity has been dealt with in this chapter. The various aspects regarding each technology-enabled banking self-service such as ATMs, internet banking, tele banking and mobile banking have been given. Finally, experiences of e-banking from select countries have been explored.

Chapter 3

REVIEW OF THE LITERATURE AND THEORETICAL FRAMEWORKS

3.1 Services

As defined by Zeithmal and Bitner (2000) "*services are deeds, processes and performances*". The characteristics that distinguish them from physical goods as identified by Parasuram et al. (1985) are their "*intangibility, heterogeneity and inseparability*". All these pose different challenges to a manager in a service firm, which is true in the case of banking industry also as banks are essentially delivering services with the above characteristics.

Traditionally, banking services have been delivered by human tellers or frontline employees of a bank branch and hence this, as classified by Lovelock (1996), is a relatively 'high contact' service in which employees are a part of the service along with the facilities and equipments in a bank branch. In traditional banking, as people are delivering the services there are chances that their performance vary day to day or even hour to hour leading to heterogeneity or variability in the services provided. Another aspect which leads to variability in these kinds of services is the presence of the other customers who are invariably unavoidable in a bank branch context. Because of this heterogeneity in services, ensuring quality in services becomes difficult as a number of uncontrollable factors are involved such as moods and emotions of customers

as well as the employees are involved (Zeithmal and Bitner, 2000; Lovelock, 1996).

An important implication of delivery of services by employees is that, the services cannot be mass produced, as evident in the context of branch banking in which the customers are offered services only during the banking hours and the resulting crowding and queuing in the bank branches (Parasuram et al., 1985).

Another important aspect as far as services are concerned is that depending on the kind of services, customer partnership is required to varying extent in the creation and delivery of services (Lovelock and Young, 1979; Bettencourt, 1997). Since customers do have some role to play in service production, they can be rightly considered as 'partial employees' of a service firm and they are contributors to their own satisfaction and service quality perception (Zeithmal and Bitner, 2000; Mills and Morris, 1986). This is true in the traditional branch banking services also in which the customer has to fill the forms pertaining to transactions and in case of taking a loan he/she needs to produce documents to prove his/her creditworthiness. These are but a few examples of what a customer does in course of banking in bank branches.

3.1.1 Service Encounters

Service encounters in a service firm, defined as the moment of interaction between a customer and a firm, are described as 'critical moments of truth' during which customer forms an impression about the service firm (Bitner, 1990; Bitner et al., 2000; Bitner et al., 1994). These encounters irrespective of whether they are face-to-face in a service setting, over the phone or even over the internet are crucial in forming customers' perception regarding

quality and determining customers' satisfaction (Parasuram et al., 1985; Parasuram et al., 1994).

3.1.2 Services Marketing Triangle

The Services Marketing Triangle, one of the prime frameworks in the services marketing literature, depicts the interrelationships between the important players in a service setting such as the service firm, the customers and the frontline service employees (Kotler, 2000; Bitner, 1995). The importance of service encounters is brought out in this by way of the 'interactive marketing side' of the triangle. The company promises made during the external marketing part is kept or broken in this part of the service process. Interactive marketing takes place essentially through a service encounter or a sequence of encounters usually face-to-face as in the case of a traditional branch banking service. In order to facilitate proper interactive marketing, internal marketing by way of appropriate training, motivational measures are to be given to the service employees (Berry, 1981).

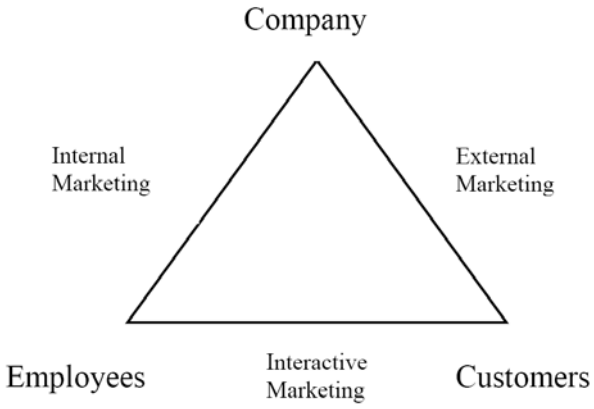

Figure 3.1: Services Marketing Triangle

Source: *Adapted from Bitner, Mary Jo (1995) and Kotler, Philip (2000)*

3.2 Technology in service delivery: benefits and challenges

Technology has been increasingly introduced in the provisioning of services, some of the pioneering works in this area have been done by Dabholkar, (1994a & 1999), Parasuram, (1996 & 2000) and Meuter et al. (2000). With the infusion of technology in the service delivery it is found that many of the shortcomings faced are because of the human element in the traditional service delivery. Those short comings which could be overcome are as follows:

- Heterogeneity of the service delivery could be taken care and uniform standardized services could be provided, if required.
- Alternatively, with the inclusion of technology in the service delivery 'mass customization' (Pine II, 1993) of services can be achieved, by creating customizable services like ATMs or interactive computer services.
- Services provisioning could be freed of time and place constraints and with advances in information technology and telecommunication it could even be delivered at customers' homes.
- As lesser number of service employees is required, service could be delivered at lesser cost.
- There is greater perceived control on the part of a given customer when the customer is in direct contact with the technology, as per Dabholkar (1996) like in internet banking, but in the absence of direct contact like that in telephone banking, there will be less perceived control on the part of a customer.

But at the same time some of the challenges of the technology infusion in services delivery are:

- The customers have increased role in service delivery especially in case of technology-enabled self services as it involves self-creation of services.
- Increased concerns pertaining to security aspect and trust especially incase of services offered over internet.
- Service recovery or response to a service failure becomes complicated due to the absence of service employees.

3.2.1 Services Pyramid model

In order to incorporate the technology dimension into the purview of service encounter and to reflect the resultant complexities Parasuram (1996 & 2000) modified the Services Marketing Triangle Model by adding a fourth end point to represent the all important technology thereby proposing Services Marketing Pyramid Model.

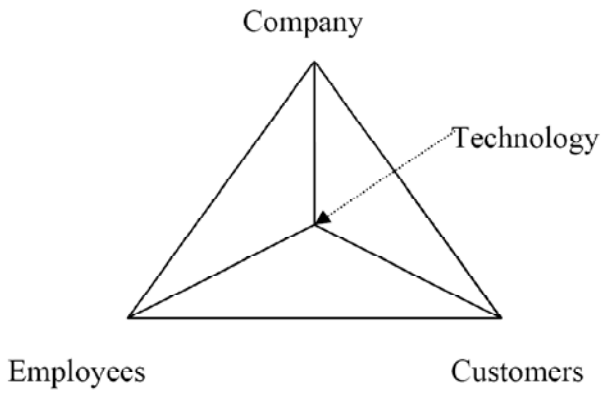

Figure 3.2: Services Pyramid model

Source: *Adapted from A. Parasuram(1996)*

Through this model he brought out the importance of managing three more important linkages; company-technology, technology-employee and technology-customer.

From the studies conducted by Bitner, et al (1990) on interpersonal service encounters it is found that there are three key drivers of service encounter satisfaction. They are:

1. Response to customer needs and request
2. Service recovery handling or the kind of response to service delivery systems failure
3. Unprompted or unsolicited actions by service employees.

All these key drivers of encounter satisfaction could be achieved in a much better manner through the effective usage of technology in service encounters (Bitner et al., 2000).

The response to customer needs and request can only be met through customization and flexibility in the service delivery and services are especially amenable to customization as service providers, if empowered, can adjust to fit customers' individual needs (Kelley, 1993).

One of the major benefits of technology is that it enables the customization of service offerings either through the front-office automation like powerful databases or call management and so on (Hart, 1996). Alternatively customization can be done by the customers themselves while using technology-based self-creative services like ATMs (Mueter et al., 2000).

As far as service recovery is concerned, technology can encourage and enable proper registration of complaints, increasing accessibility of customers to service firms' employees through different communication channels (Brown, 1997). With the means of technology, frontline employees can affect faster

service recovery initiatives through better knowledge of customer and their problems, thanks to databases and other software tools.

Finally, technology is also capable of providing unexpected pleasant surprises to the customers thereby delighting them (Meuter et al., 2000).

3.2.2 Classification of technology-based service delivery options

Dabholkar (1994b) had classified the technology-based delivery options based on different criteria. First classification depends on 'who' uses the technology to deliver 'what' services whether it is the employee using the technology in a face-to-face service encounter or the customer's interface with technology like that in an ATM service. The second categorization is based on the 'location' as to where the service is to be delivered. Does the service delivery take place at the service firm's premises or the customer's home or office using a PC or is the delivery taking place at a 'neutral location' like a shopping mall or airport. The final categorization is based on the contact with the technology, direct as in online banking or indirect as in a telephone banking situation.

3.2.3 Market Space Transactions replacing Market Place transactions

The idea of '*Market Space Transactions*' replacing the traditional '*Market Place Transactions*' as a result of the usage of technology, specifically with the electronic distribution of goods and services has been proposed through the works of Rayport and Sviokla (1994 & 1995). The market space is defined by them as "a virtual realm where product and services exist as digital information and can be delivered through information based channels". According to them, in the market space the content, the context and the infrastructure are different as the customers learn about products, buy and have them delivered differently. In the conventional market place, value and brand

equity are created by manipulating the content, context and infrastructure through the traditional marketing mix. But in the newer arena of market space the technology changes the content, the context of interaction and the infrastructure of delivery.

3.3 Technology-Enabled Self-Services

In case of self-service options, customer does the creation of services all by himself/herself with minimum intervention of service employees.

Some of the studies investigating the use of self-services are done by Bateson (1983), Darian (1987) and Greco & Fields (1991). These studies tried to identify the profile of the users and the motivating factors that made them prefer these options. Key findings from these studies are that there is a significant segment of customers who opt for these services even without the added monetary or time saving benefits. The main motivators are convenience, time saving, increased options and better perceived control.

3.3.1 Self –Service Technologies (SSTs)

Meuter et al. (2000) have defined self-service technologies as 'technological interfaces that enable customers to produce a service independent of direct customer service employee involvement'.

According to them, the range of Self-Service Technology (SST) options available today can be classified as in table 3.1 based on whether it is customer service, direct transactions or self-help which is being provided and also depending upon the type of technology interface which is used such as telephone/interactive voice response, online/internet , interactive kiosks or Videos/CD.

Table 3.1: Types of SSTs in Use

		Interface			
		Telephone/Interactive Voice Response	**Online/ Internet**	**Interactive Kiosks**	**Video/CD***
Purpose	Customer Service	1) Telephone banking 2) Flight information 3) Order status	1) Package Tracking 2) Account information	1) ATMs 2) Hotel Checkout	
	Transactions	1) Telephone Banking 2) Prescription refills	1) Retail purchasing 2) Financial transactions	1) Pay at pump 2) Hotel checkout 3) Car rental	
	Self Help	1) Information telephone lines	1) Internet information search 2) Distance learning	1) Blood pressure machines 2) Tourist information	1) Tax preparation software 2) Television/ CD-based training

* *Video/CD is typically linked to other technologies to provide customer service and transactions*

Source: *Meuter et al. (2000)*

3.3.2 Satisfactions and dissatisfactions while using SSTs

Using Critical Incidents Technique (CIT) Bitner et al. (1991) had analysed 823 incidents- satisfactory encounters (56%) and dissatisfactory encounters (44%). The results showed that the customers were most satisfied when:

- SSTs solved intensified (urgent) needs. When SSTs came to the help of customers in troubling situations, for example immediate requirement of cash at night time, the customer can go to an ATM.
- SSTs were better than the interpersonal alternatives, better perceived relative advantages like easiness of usage, can be done by oneself, saved time, any time usage, anywhere usage and saved money
- It was reliable and did the job for which it was intended

The dissatisfaction of the customers occurred when:

- Technical failures occurred when customers used SSTs and thereby customers were prevented from using the service.
- Process failures happened, which occured after the service encounter, like in an online shopping example, non-arrival of item after ordering and paying money.
- The SSTs are difficult to use and understand due to improper designs.

Bitner et al. (2002) also pointed out that in course of their research on SSTs one of the major findings is that service recovery systems are almost absent for SSTs in most cases. This might be due to the fact that in many cases when technical or process failure occurs there is no way to recover on the spot. The customers are forced to call up or go in person to have the problem rectified. For instance while using ATM service at night suppose the customer's ATM card gets stuck in the machine, she has to approach the concerned bank branch to recover the ATM card.

So the kind of service recovery is a crucial factor especially with the SSTs which determines the customer satisfaction and quality perceptions.

3.3.3 Reasons why organizations are introducing SSTs

One of the primary reasons why firms introduce SSTs is cost saving by way of labour costs, but the customers will be motivated to use them only if the cost savings are passed on to them.

Another reason could be to increase customer satisfaction and loyalty, especially if the new technology is perceived to be better than the interpersonal alternative. Further more organizations might want to reach new customer segments that may not have been reachable earlier, thereby expanding their customer base (Bitner et al., 2002).

3.3.4 Stages of adoption of SSTs

Adoption has been defined by Loudon and Della Bitta (2002) as the acceptance and continued use of a product by an individual. The six stages of adoption process of SSTs, as shown in fig 3.3 shows the various stages of the adoption process through which consumers go through.

First the consumer must be aware that the SST exists. Then they are likely to collect additional information about the SST which becomes the basis of forming evaluative criteria about it. If the SST is found to be advantageous, consumer will try it and while trying if the outcome is satisfying it might lead to repeat use and commitment.

Even if some consumers develop positive attitude towards an SST, their propensity to try it depends on the 'consumer readiness' according to Meuter et al. (2005). In their work, Meuter et al. (2005) have shown the predictive capability of 'consumer readiness' in determining the consumer trial, the first time usage by the consumer.

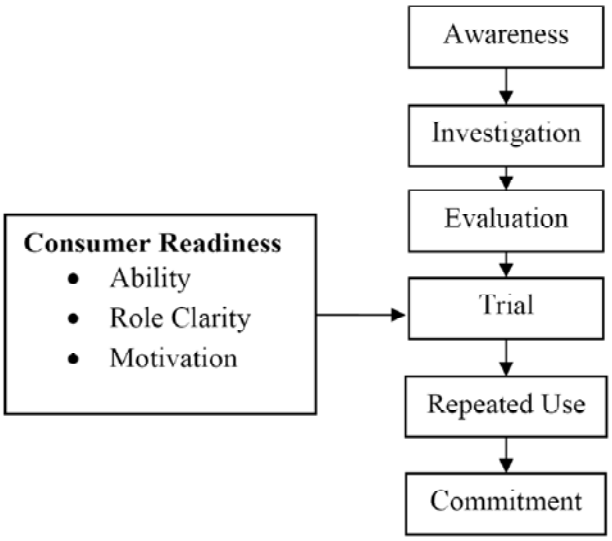

Figure 3.3: Stages of Adoption of SSTs

Source: *Bitner et al., (2002)*

Customer readiness shows how much a customer is prepared and willing to use an innovation for the very first time. It depends on:

- The perceived capability of a customer to perform a task, which in this case is the use of innovation, is called *ability* (Hoffman and Novak, 1996). The ability also includes the infrastructure needed to engage the SST, for instance the computer and internet connectivity in case of internet banking (Bitner et al., 2002).
- *Role Clarity* (Larsson and Bowen, 1989) which is the clear idea regarding what to do.
- Finally *Motivation (*Barczak et al., 1997) which is perceiving benefits while using SSTs as compared to interpersonal options and this motivation varies from individual to individual.

In their original model they had included the antecedent predictor variables which were categorized into '*Innovation Characteristics*' and '*Individual Differences*'. Some of the variables' effect on the trial of SSTs was partially mediated by consumer readiness, according to their study.

The variables classified under *Innovation characteristics* were *compatibility*, *relative advantage*, *complexity*, *observability*, *trialability* and *perceived risk*. These constructs are also propounded in the Rogers' (1995) diffusion of innovation theory and the explanations are given in the latter part of this chapter. The individual differences variables were *inertia*, *technology anxiety*, *need for interaction*, *previous experience* with similar SSTs and *demographic variables* such as age, sex and income. The *demographic variables* and *previous experiences* had been included in their study as they were widely found in adoption studies such as those of Rogers (1995). *The need for interaction* with the service employees, *inertia* towards technology products and *technology anxiety* were included as they were found to be used in the services technology studies such as those done by Dabholkar (1996 & 2000) and Parasuram (2000).

Meuter et al., (2005) had conducted two studies in the context of consumers' prescription refill ordering through a mail-order pharmacy, first one involving the adoption of automated interactive voice response (IVR) telephone system and the second one on the adoption of automated internet based SST of the same company. The studies were conducted within a year of introduction of these services on samples of customers who had used the SSTs and those who were yet to try them.

In the study, many of the above mentioned variables are taken into consideration for analysing the prediction of adoption and determinants of adoption levels of technology-enabled banking self-services. These variables

were selected after reviewing the related studies from the literature along with the underlying theories such as Rogers' Diffusion of Innovation theory and Davis' technology acceptance model. These will be explained in the subsequent portions of the thesis.

3.4 Key findings from the previous studies on adoption and usage of Technology-Enabled Banking Self-Services

Key findings from the previous studies conducted regarding the adoption and usage of technology-enabled banking self-services are compiled in table 3.2

Table 3.2: Key findings from the previous studies

ATM Studies	
Zeitaml and Gilly (1987)	The study compared the adoption of retailing technology by elderly and non-elderly customers. They found the main reason for not using the ATMs to be the preference for human tellers.
Marshall and Heslop (1988)	They found that consumers' motives for use of technology are useful for predicting subsequent usage. Demographic factors such as higher education levels and employment status are positively related to usage of ATMs. Age was negatively related to adoption of ATMs.
Leblanc (1990)	He found out that main consumer motivation for using ATMs was its accessibility benefits. The users tended to be highly educated. They also believed that this technology improved service quality, presented little security risk and fulfilled their need for simple and fast transactions. However non-users preferred interacting with human tellers and perceived ATM usage to be complex and risky.
Marr and Prendergast (1991)	According to this paper, the main reasons for technology adoption by customers were convenience of hours, speed and convenient locations. They found out that non-usage was mainly due to the preference for human contact, and enjoyment of personal visit to the bank.

Lewis (1991)	This study found that users mainly used ATMs for withdrawal of cash and obtaining account balances. Negative factors regarding ATM usage were concern over personal safety, lack of privacy and operational problems such as machine being regularly out of cash or out of order and cards getting stuck in it.
Marr and Prendergast (1994)	In this study, they concluded that despite the technological advancements conventional bank branches will not loose their importance, as they are major barriers for potential competitors. But the role of the employees inside the branches will change as more and more customers move towards self-service technologies. They will become more involved in other functions like selling or business development as they will have additional free time. In order to attract customers the banks will have to first attract them to branch. In branches also there will be increasing placement of in-branch self service technology to complement the remote location self-service technology.
Rugimbana and Iversen (1994)	In their study in Australia they found that ATM customers mostly used it for cash withdrawal and conducted less than 50% of their transactions through it, hence they concluded that most users perceived ATMs to be just convenient cash dispensers, while the non-users preferred contact with human tellers and had a need for personal service.
Rugimbana (1995)	The study amongst retail bank consumers in South Australia sought to determine the most important predictor of ATM usage patterns by identifying those variables which distinguish users and non-users. He assessed these in relation to perceptual and demographic factors and found that perceptual variables are far more powerful in predicting the usage patterns. Hence he concluded that a strategy of concentrating on the most important perceived attributes, in particular relative advantage (convenience), is of prime importance to increase the ATM usage amongst consumers. However demographic and psychographic profiles are important to identify the right customer segments.

Filotto et al. (1997)	Conducted a study among Italian bank customers and distinguished between the characteristics of ATM users and non-users. They found that even though the adoption rate among the younger users is more in general the public has been largely reluctant to adopt more innovative service delivery mechanisms offered.
Phone Banking Studies	
Lockett and Littler (1997)	The study was conducted in UK on Direct Banking customers (Phone Banking). It found that risk averse house holds were less likely to adopt direct banking and households that used other technologies (ATMs and online shopping) were more likely to adopt direct banking. This research concludes that 'perceived innovation attributes' appear to be better predictors of adoption behaviour than 'personal characteristics'.`
Al-Ashban and Burney (2001)	In their study among the Saudi Arabian consumers regarding the usage of tele-banking services, found that the Saudi consumers' age, income levels and education are prime factors determining their adoption and usage. In addition to this they found that customers tend to increase their usage of tele-banking services depending on their past experience. They concluded that tele-banking has resulted in substantial cost savings for the banks and has given rise to increasing convenience for the increasingly discerning consumers.
Internet Banking Studies	
Sathye (1999)	The study conducted in Australia investigated the adoption of Internet banking. Security concerns and lack of awareness about the internet banking were the two main obstacles identified for the non-adoption. It was also pointed out that the young, educated and wealthy groups of customers were the most relevant customer segments for the rapid development of Internet banking market.
Jayawardhena and Foley (2000)	They did a longitudinal study of 12 Internet Banking websites of UK banks from October 1998 to July 1999. They listed the advantages for banks through using IB as cost savings, increased customer base, mass customization and marketing & communication opportunities,

	innovation and development of non-core businesses. They categorized internet banking functions into four: view-only functions, account control functions, applying for new services and reconciliation functions. While the first two are offered by almost all the banking sites the third and fourth functions are offered only by a few sites. They also identified bank websites' evaluative criteria such as speed, content and design, website navigation, interactivity and security.
Mattila (2001)	They found out in Finland that typical users of internet banking were well-educated male professionals between the ages of 35 to 40. Elderly people especially females over 50 were reluctant to use the IB service. Elderly people associated a bank transaction with human transaction. Experience with computers was a major driver for IB use. Surprisingly security was not a major concern for non-use.
Polatoglu and Ekin (2001)	They listed nine factors, some of them were derived from Rogers (1995), which according to them influenced the diffusion of Internet banking(IB). These factors were 'relative advantage', 'observability', 'trialability', 'complexity', 'perceived risk', 'type of group', 'type of decision', and 'marketing effort'. They found that those who use the internet banking services for the longest time or who use more of its services find internet banking to be very reliable. Internet banking not only reduces operational costs to banks but also increases customer satisfaction and retention.
Bradley and Stewart (2002)	Using a Delphi study they analysed various drivers and inhibitors of the banks adopting internet banking. The key drivers were the external factors such as competition and industry adoption, low risk, enhanced ability to deal with customers and the availability of technology. The key inhibitors were mostly internal like resistance to change, internal attitudes, internal resources and legal issues.
Karjaluoto et al. (2002)	The findings of their research conducted amongst Finnish bank customers showed that 'prior experience' with computer and technology along with 'attitudes' towards computer, influence both

	attitude and behaviour towards online banking. Since it is found that prior computer experience had a strong influence on internet banking usage it is advised by them that banks should give training to its customers not only in the usage of internet but also in the usage of computers.
Gerrard and Cunningham (2003)	The study which is done among Singapore bank customers identified eight characteristics relating to the adoption of internet banking such as social desirability, compatibility, convenience, complexity, confidentiality, accessibility, economic benefits and PC proficiency as eight influential factors of adoption. The results show that adopters of IB perceive the service to be more convenient, less complex and more compatible to them and more suited to those who are PC proficient.
Mattila et al. (2003)	This study conducted among mature customers in Finland showed that they are late adopters with more than 75 % of them having never used internet banking. The reasons for non-adoption are problems in using e-banking, expensive start up costs, security aspects and lack of personal services.
Akinci et al. (2004)	The study conducted in Turkey examines the distinguishing demographic, attitudinal and behavioural characteristics of Internet banking users and non-users. It was found that there are significant differences between the two groups with respect to demographic profiles and attitudes along with different service channel preferences. Users were mid-aged male, more technology-oriented and convenience minded consumers. It also segmented the IB users into 'speed seekers', 'cautious users' and 'exposed ones'.
Eriksson et al. (2005)	The study modifies the Technology Acceptance Model (TAM) proposed by Davis (1989) and applies it to study the adoption of internet banking in Estonia. The findings are that perceived usefulness of IB is the main reason why bank customers use internet banking. While the perceived ease of use does not directly increase adoption rate, it leads to greater perceived usefulness.

Laforet and Li (2005)	They examined demographic, attitudinal and behavioural characteristics of online and mobile bank users in China. Their findings showed that unlike in the west, level of education and age did not influence online/mobile banking adoption. More males were using them, and of the urban population surveyed 33% and 14% respectively were using online banking and mobile banking. Lack of usage by non-users was because of factors like perceptions of risk, lack of computer and technological skills along with the Chinese tradition of cash-carry banking.
Multiple electronic banking distribution channels- Studies	
Daniel (1999)	In her research on the UK and Republic of Ireland banks offering online transactional services to customers in their homes, it was found that 25 per cent of the banks already offer such services while 50 per cent of them are on the verge of offering the same. The study has shown that the 'Vision of the Future' in which it is envisaged that market will be more competitive and customers requirement for increased accessibility, functionality and service at lower price is the main driver for adoption of these services by banks.
Black et al. (2002)	Consumers' channel choice in financial services was determined by consumer characteristics, product characteristics, channel characteristics and organizational characteristics, out of which product channel interactions and consumer channel interactions were of particular importance
Howcroft et al. (2002)	The results of this study conducted involving U K bank customers show that the consumers have a preference for a mix of channels rather than exclusive reliance upon one channel. The choice of delivery channels is based on the socio-economic factors and the nature of the financial service sought. The factors encouraging the use of home-based banking were lower fees and improved levels of service, while the factors discouraging were security, fear of likelihood of errors and complexity of websites.

Patricio et al. (2003)	The results of the qualitative study done among Portugese bank customers, shows that in the context of multi-channel service the customers tend to use the channels available in a complimentary way. Implications are that banks should focus on integrated management of service delivery systems. Customer characteristics and the type of financial service influence the channel usage. So in a multiple channel context performance of each channel should not be viewed in isolation but from the point of view of how it contributes to the overall service offering to provide customer satisfaction.
Wan et al. (2005)	In their study among Hong Kong bank customers they found that ATM was the most frequently adopted channel, followed by internet banking and branch banking, and telephone banking was the least frequently adopted. Beliefs about possession about certain positive attributes of the channels were predictive about the adoption of ATM and internet banking than adoptions of branch banking and telephone banking. Demographic factors were associated with the adoption of all channels except ATM. One of the most important implications from the research is that the Theory of Reasoned Action is less predictive in habitual behaviours as in the case of branch banking and telephone banking.

The key findings from the above studies regarding adoption of various self-service banking delivery channels are given in following sections.

3.4.1 Demographic factors and adoption of TEBSS

Demographic factors do influence adoption of banking delivery channels. These demographic characteristics were categorized under the *individual differences* variables in the study by Meuter at al. (2005). However the findings are mixed.

Generally more males than females tend to adopt these channels especially online banking channels like internet and mid-aged customers are

more likely than younger or older customers to use internet banking according to the study by Akinci et al. (2004).

From other studies it is found that customers who are younger, more educated and wealthier are more likely to use internet banking (Sathye, 1999; Mattila et al., 2001 ; Karjaluoto et al., 2001). Those who belong to the upper middle class and have high-level occupations are more likely to use internet banking (Jayawardhena and Foley, 2000; Karjaluoto et al., 2001).

Adoption of telebanking is negatively associated with age and positively associated with income and educational levels as per the study conducted in Saudi Arabia by Al-Ashban and Burney (2001).

3.4.2 Perceived attributes and adoption of TEBSS

Perceived attributes or characteristics of the self-services through the technology-enabled channels by the customers determine whether they adopt the services through them or not (Rugimbana, 1995; Lockett and Littler, 1997; Polatoglu and Ekin, 2001; Gerrad and Cunningham, 2003; Erickson et al., 2005; Laforet and Li, 2005; Wan et al., 2005). A review of the literature shows that most of these attributes have the constructs identified by Rogers' (1962) in the diffusion of innovation theory such as relative advantage, compatibility, complexity, trialability and observability or those identified by Davis (1989) in technology acceptance model such as perceived usefulness and perceived ease of use as their basis. In addition to the above other characteristics such as perceived risk (Ostlund, 1974) and trust (Errickssson et al., 2005) are also found to be included in the adoption studies of technology-enabled banking services in one form or another. In the study by Meuter at al. (2005) these variables were included under the classification of *innovation characteristics.*

3.4.3 Additional factors and adoption of TEBSS

Other important factors which determined the consumer adoption of technology-enabled banking self-services are *consumer innovativeness* in this particular domain, which are the technology products (Lassar et al., 2005). Consumer expectations regarding accuracy, security, transaction speed, user-friendliness and involvement factors also determined whether they adopted e-banking or not (Lassar et al., 2005; Liao and Cheung, 2002) . Prior experience with computers, internet and technology products also had an impact on adoption and level of usage of these electronic banking services (Mattila, 2001; Karjaluoto et al., 2002; Gerrard and Cunnigham 2003; Lassar et al., 2005).

Although the related studies have pointed out a number of important factors which influence the adoption and its rate, all of them have not been utilized in the present study in the interest of the manageability and parsimony of the study. Only those constructs have been selected after careful scrutiny and consultation with the academic and industrial experts, which are most relevant and applicable in the Indian context.

3.5 Frameworks for understanding adoption of TEBSS

Many of the adoption studies of self-service technologies in the banking sector have used the concepts from Rogers' (1962) 'Diffusion of Innovation Theory'. Usually constructs are modified suitabily to fit the context of the respective studies. For instance the studies by Lockett and Littler (1997), Rugimbana and Iversen (1994), Mattila et al. (2003) , Polatoglu and Ekin (2001) and Gerrard and Cunningham (2003) are only but a few of the studies reviewed in which this theory has been used after suitable modification.

Other studies like those by Eriksson et al. (2005), Pikkarainen (2004), Curran and Meuter (2005) and Wang et al. (2003) were found to be utilizing the Technology Acceptance Model (TAM) proposed by Davis (1989) with appropriate modifications. Interestingly a few studies like Lasser et al. (2005) and Kolodinsky et al. (2004) have integrated both the theories to come up with a framework combining constructs from each of them.

A limited number of adoption studies have used 'Theory of Planned Behaviour (TPB)' proposed by Ajzen (1991). For instance Lia et al (1999) have used TPB along with diffusion theory in their study on 'virtual banking adoption' and found that TPB only partially explains adoption.

3.5.1 Rogers' Diffusion of Innovation theory

Rogers' (1995) Diffusion of Innovation theory had identified five key characteristics of innovations: relative advantage, compatibility, complexity, observability and trialability. Adopters are found to have different perceptions about these characteristics in comparison with non-adopters. However these five characteristics are not an exhaustive list but have been found commonly in a wide range of studies.

We will consider these from the perspective of the adoption of technology-enabled banking self-services.

Relative Advantage

It is defined as (Rogers, 1995) "the degree to which an innovation is perceived as being better than the idea, product or service it supersedes". The relative advantage of an innovation is highly innovation-specific (Rogers, 1995). The relative advantages of the electronic banking or self-service banking services as compared to traditional branch banking can be taken to include: economic advantages (Lockett and Littler, 1997; Gerrard and Cunningham,

2003), convenience (Marr and Prendergast, 1991; Rugimbana, 1995; Al-Ashban and Burney 2001; Polatoglu and Ekin, 2001; Gerrad and Cunningham, 2003), improved service level or accessibility (Lockett and Littler, 1997; Polatoglu and Ekin, 2001), elimination of the need to rely on others (Black et al., 2001) and so on.

Compatibility

It is defined as (Rogers, 1995) "the degree to which an innovation is perceived as being consistent with the existing values, past experiences and the needs of potential adopters". From the literature it is found that those customers who had prior experience with computers (Mattila et al., 2001; Karjaluoto et al., 2002), high P C proficiency (Jayawardhena and Foley, 2000), and comfortable with internet usage (Black et al., 2001) would take to online banking faster. While in developing countries like Turkey where there is preference for using over-the-counter banking (Polatoglu and Ekin, 2001) and in China (Laforet and Li, 2005) where there is culture of 'cash and carry' banking the diffusion of services like internet banking will be slower.

Complexity

It is defined as (Rogers, 1995) "the degree to which an innovation is perceived as difficult to understand and use". This is related to whether the customer finds the e-banking services "easy to use" (Sugahthi et al., 2001). People who are familiar with internet, computers etc. may not find e-bankig difficult to use (Polatoglu and Ekin, 2001; Black et al., 2001).

Trialability

It is defined as (Rogers, 1995) "the degree to which an innovation may be experimented with on a limited basis". In response to this some banks are

developing websites which allow potential users to try out internet banking on a demonstration mode (Jayawardhena and Foley, 2000; Black et al., 2001).

Observability

It is described as (Rogers, 1995) "the degree to which the results of an innovation are visible to others". It is concluded that depending on the type of e-banking services its influence varies; observability does not appear to be a contributor of the adoption of internet banking and telephone banking as they are done in the privacy of a home or office, hence it may not be a major factor (Jayawardhena and Foley, 2000; Black et al., 2001).

Perception of Risk

In addition to the above-mentioned characteristics, a further refinement of the Rogers' original model is the additional dimension of perception of risk as a characteristic which influences the rate of adoption. This was defined by Ostlund (1974) as the "degree to which risks are perceived as associated with the innovation**".** Risk has been identified as important innovation characteristic in the study on the adoption of phone banking by Locket and Littler (1997). As per Black et al. (2002) the errors and the security provided might be considered as measures of risk in the context of internet banking. Polatoglu and Ekin (2001) consider risk on the basis of financial, physical and social characteristics. Suganthi et al. (2001) considered risk in terms of security concerns and risk in the context of trust in the background of trust in one's bank.

3.5.2 Technology Acceptance Model (TAM)

Davis (1989) introduced a modification of the Theory of Reasoned Action (Ajzen and Fishbein, 1980; Ajzen, 2001) called Technology Acceptance Model (TAM) which they proposed would be capable of explaining why people

accept or reject new technologies. In his work Davis extended the attitude towards behaviour (B) and behavioural-intention (BI) relationship established in Theory of Reasoned Action (TRA), to the adoption of computers in workplace (Davis et al., 1989). The key factors of this model were 'perceived usefulness' and 'perceived ease of use' of the innovation, these were key constituents in influencing an individual's attitude towards using the innovation.

Perceived Usefulness (PU) is defined (Doll et al., 1998) as "the extent to which a person finds that using a system will enhance his/her job performance". The perceived usefulness depends upon the capacity of something to act as a means to a desired end or purpose. This means-end relationship shows the reasons for customers using a product or a service (Barczak, 1997).

Perceived Ease of Use (PEOU) is defined (Doll et al., 1998) as "the extent to which a person believes that using a system will be free of effort". The innovation is easy to use if it is compatible or its operations are similar to the existing ones. Ease of learning is also an important constituent of ease of usage (Erickson et al., 2005). This has been validated through researches done by Adams et al. (1992) and Doll et al. (1998).

Numerous studies found that TAM consistently explains a major portion of variance in the usage behaviour and intentions (Venkatesh and Davis, 2000). Even though the original TAM study was conducted in organizational context where people make more rational choices, there are certain similarities of people adopting self-services technologies for accessing banking services, which is a personal matter. Both are implying low levels of entertainment and high efficiency (Erickson et al., 2005).

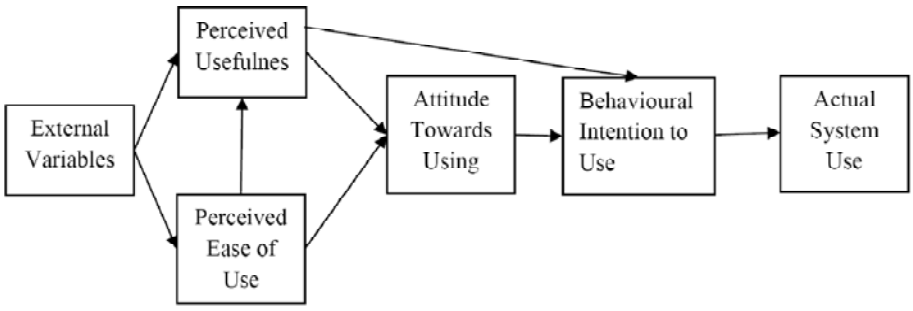

Fig 3.4: Technology Acceptance Model

Source: *Davis et.al, (1989)*

From the survey of literature it is found that the framework of TAM has been widely used for the purpose of studying self-service banking services adoption studies especially those pertaining to internet banking (Erickson et al., 2005; Pikkarainen et. al., 2004; Curran and Meuter, 2005). But it is also found that this framework has been suitably modified by adding additional constructs to capture the peculiarities of the electronic banking services adoption. Some studies have also combined some of the aspects from the Rogers' diffusion of innovation framework with those from the TAM model to propose a hybrid framework, for instance the study by Kolodinsky et al. (2004) on the adoption of electronic banking technologies by US consumers. TAM has been used for research in various technological studies (Venkatesh and Davis, 2000). O'Cass and Fenech (2003) suggested that although TAM has been specifically used in the acceptance of computer-based technologies they find that its robustness and parsimonious structure allows its usage in other technological adoption with required adjustments. Researchers have suggested the addition of external variables to improve the predictive power of the model (Davis, 1989). For instance Wang et al. (2003) had used an extended model of TAM with the addition of credibility and self-efficacy.

The limitations of TAM are that it excludes influence and personal control factors on adoption behaviour. Other aspects such as economic factors and outside influences are also not included (Akkeren and Cavaye, 1999).

3.5.3 Other Behavioural theories and Adoption

Ajzen (1991) proposed the Theory of Planned Behaviour (TPB) which is an extension of his Theory of Reasoned Action (TRA). According to TPB the behaviour depends on behavioural intention and perceived behavioural control. TPB also propounds that the behavioural intention is an outcome of one's attitude, subjective norms (social influences) and perceived behavioural control. As Ajzen has pointed out, the limitations with TPB are that the relationship between the belief structures and the determinants of intention are not well understood resulting in inconsistency in results.

Decomposed Theory of Planned Behaviour was proposed by Taylor and Todd (1995) as an improvement over Theory of Planned Behaviour model. In this model attitudinal, normative and control beliefs were decomposed to clearer and readily understood multidimensional belief constructs. The factors included are perceived characteristics of an innovation such as relative advantage, and compatibility of an innovation to the adopter's existing values, previous experiences and current needs.

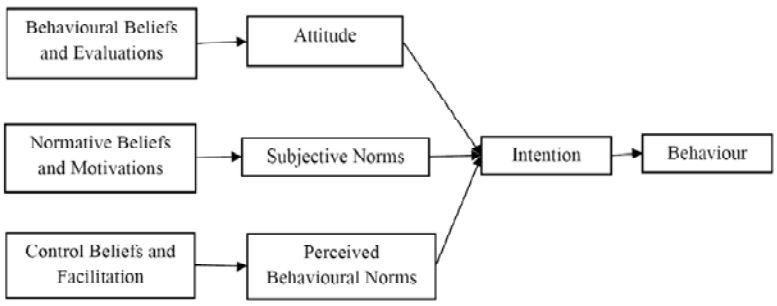

Figure 3.6: Theory of Planned Behaviour

Source: *adapted from Taylor and Todd, 1995*

3.5.5 Triandis model

Both TRA and TPB say that a person's *behaviour* is determined by the *intention to perform* the behaviour.

According to Triandis (1980), *behaviour* is determined not only by *intention* alone which is deliberate and cognitive, but also by the factors such as *habit* and *facilitating conditions*. Behaviour in any situation is, according to Triandis, a function partly of the intention, partly of the habitual responses, and partly of the situational constraints and conditions.

Triandis suggests that habits are situation specific sequences that are or have become automatic, since they occur without any self-instruction (Ramayah et al., 2009). Habits are what people normally do without usually conscious of sequences, like driving a car by an experienced driver. He says that habits are closely related to an individual's past experience and ability in performing a given act. Triandis theory says that habitual nature of behaviour in addition to intention will have a significant impact in an individual's response to a given situation. Thus he suggested that in certain situations habits are more influential in determining behaviours.

In the context of the study where the adoption and usage of different technology-enabled banking channels are considered, the usage of ATMs by consumers might be more habitual than intention-driven, as it is the most widely adopted of all the electronic banking channels and has been available for a longer duration.

3.5.6 Technology Readiness Index

Technology Readiness Index (TRI) developed by Parasuram (2000) contains four factors namely *optimism*, *innovativeness*, *discomfort* and *insecurity*. Of these optimism and innovativeness are drivers of *technology*

readiness, whereas discomfort and insecurity are inhibitors of technology readiness (TR).

These four factors could be defined as (Gerrard et al., 2006):

Optimism: the degree to which people view the technology in a positive way. It pertains to their beliefs regarding to the extent to which technology provided benefits such as increased control, flexibility and efficiency in their lives.

Innovativeness: the degree to which people are pioneers and thought leaders in the usage of technology.

Discomfort: the extent to which people feel a perceived lack of control over technology and feel overwhelmed by it.

Insecurity: the extent to which people distrust technology and are doubtful about its proper working.

Technology readiness indicated people's likelihood of using and adopting new technologies for accomplishing tasks related to their personal life and work life Parasuram (2000). It can be considered as an overall state of mind resulting from the combination of all mental drivers and inhibitors that, together as a whole, determine a person's predisposition towards technology. It is found that TRI is especially useful in studying the propensity of technology products to be adopted especially those that are computer or internet-based.

The research done by Lin and Hsieh (2006) showed that the technology readiness had a positive effect on self-service technology usage and perception. They found that TR is an important driver of SST service quality and behavioural intentions. Customers who had increased TR had higher perceived service quality and behavioural intentions, they were willing to use it repeatedly

and recommend it to others. Hence technology readiness is an important construct in the adoption of self-service technologies in the banking sector.

3.5.7 Adoption constructs used in the study

The constructs used in the present study have been adapted from the theories mentioned earlier such as diffusion of innovation framework by Rogers (1995), technology acceptance model (TAM) by Davis (1989) and technology readiness index (TRI) by Parasuram (2000).

A careful examination of the theories showed that some of the constructs have similar themes according to Gerrard et al. (2006). This they say might be because of different labels being given to similar factors. For instance, 'relative advantage' from diffusion of innovation is similar to 'perceived usefulness' from TAM and 'optimism' from TRI. Similarly the 'perceived ease of use' from TAM is similar in nature with the 'complexity' from diffusion of innovation and 'discomfort' from TRI. If an innovation is perceived to be possessing less complexity and having less discomfort it is having greater perceived ease of use.

From the review of the literature those constructs such as 'observability' and 'trialability' from diffusion of innovation theory which were not found to be relevant in the domain of electronic banking adoption had not been considered for this study.

Other variables considered in the study were innovativeness, perceived risk, need for personal contact, self -efficacy in using technology products, involvement with the computers, internet usage and demographics. Detailed explanations of these constructs have been given in the appropriate sections of this report. The hypotheses (H2 to H7) proposed in the study are based on the

relationship of these constructs as independent variables and the adoption level (extent of adoption) as the dependent variable.

3.6 Adoption level measure

Literature says that relationship duration and interaction frequency have been found to be good predictors of relationship development (Levinthal and Fichman, 1988). Similarly, theories of social practice also hold that more use of a product or a service leads to more automatic and taken-for-granted behaviour (Brown and Duguid, 2001). Turning to a technology context of use, the frequency of use has been found to capture a consumer's extent of usage of a technology (Lang and Colgate, 2003; Ricard et al., 2001). Another valid representation of technology use is the duration of the experience with the technology (Ricard et al., 2001). Frequency and duration of use of the internet banking by the respondents had also been used by Eriksson et al. (2005) to measure the usage of internet banking in their study.

In view of this the respondents' frequency of usage and duration of usage have been asked and a composite score calculated taking their summated scores to develop a measure for adoption level (extent of adoption).

3.7 Service Quality

There is a division amongst academic circles regarding how service quality has to be conceptualized. Two main conceptualizations of service quality exist in the literature, of which one is based on the disconfirmation approach, and the other is based on performance only approach.

Pioneering work (Gronroos, 1984; Parasuraman et. al. 1985 and 1988a) on service quality conceptualized it on the basis of disconfirmation between consumer expectations and perceptions. Gronroos (1984) developed a service

quality model with expected service and perceived service as independent variables. The expected service is formed through the firm's promotional activities, consumer's past experience, word of mouth communication and consumer needs. According to Gronroos the discrepancy between expectations and perceptions decides the customers' service quality assessment. The major contribution of this research was that this was the first attempt to conceptualize service quality from the customers' view point and that it had laid the foundation for future service quality research.

Most comprehensive studies to date in service quality were conducted by Parasuram, Berry and Zeithmal (1985, 1988a, 1988b, 1990, 1991 and 1994a). They developed a conceptual model called the Gaps model of service quality which showed the various gaps that need to be managed by a service firm in order to provide quality service from its customers' view point.

According to Parasuram et al. (1988a) service quality could be defined as the overall evaluation of a service firm that results from comparing that firm's performance as perceived by its customers with their general expectations of how firms in that industry should perform. On the basis of this definition they developed a multi-dimensional service quality assessment instrument called SERVQUAL containing 22 variables divided into five dimensions and the service quality was operationalised as the summated difference or discomfirmation between the customers' perception (P) and expectations (E) along these variables. This particular SERVQUAL scale has been extensively used in a number of studies covering different service settings.

Subsequently, various studies (Teas, 1993, 1994; Spreng and Olshavsky, 1992) found that the disconfirmation as a method of determining service quality has several conceptual, theoretical and measurement problems. They also argued that the model suffers from the problems with respect to measuring

expectations, the confusion stems from the fact that expectations are dynamic (varying from time to time), then again when to measure it, before or after receiving the service. These problems with the disconfirmation model had made researchers to increasingly ignore expectations completely and measuring perceptions as an indicator of service quality (Jayawardhena, 2004). The studies by Andaleeb and Basu (1994) and Mittal and Lassar (1996) propound that this approach results in good predictive power of service quality. Babakus and Boller (1992) and Cronin and Taylor (1992) in their respective works compared the computed difference scores with perceptions and found that perceptions are a superior predictor of service quality than disconfirmation. This had led to the designing of performance-only or perception-only scale by Cronin (1994).

The studies by Dabholkar et al. (2000) also proved that the perception measures have higher predictive and explanatory power and have better indicative power in the cases of customer evaluation and intention. In addition, they observed that perception could also allow an understanding of service quality at factor level and proposed all the dimensions of quality as antecedents, rather than components of service quality. It is found by Page and Spreng (2002) that performance-only measure is more reliable and stronger indicator of service quality than expectations.

A study done by Lee, et al. (2000) showed that perception/performance-based measures of service quality capture more of the variation in service quality than do differences measure. So they advocated that the managers place more emphasis on performance perceived by customers rather than the difference between perceived performance and prior expectation. In addition to this, the performance-based scale reduces the number of items to be measured by half as compared to the disconfirmation scale, thereby increasing the parsimony of the survey instrument.

Moreover in case of e-commerce, as found out by Santos (2003), expectations seem to be of lesser of a comparison standard and customers appear to use experience-based standards. According to the study by Yang and Jun (2002) majority of consumers were found not to have a clear idea regarding what expectations they held for online services.

Taking into consideration the problems associated with the disconfirmation model of service quality and the fact that it was measured in an e-commerce environment, this study conceptualized and measured service quality as performance perceived by consumers.

3.7.1 Automated Service Quality (E -service quality)

Service quality involving face-to-face interactions between the service provider and the customer has well-established definitions in the literature, but with the introduction of technology-enabled service delivery, the service quality concepts have to be suitably modified. Presently most of the literature focuses only on the service quality of those services delivered through websites as seen in the research by Parasuram et al. (2005) and Zeithmal (2002). In the current study, a broader view of the e-service quality is considered so that it addresses the service quality of not only internet banking but also of those services delivered through the other technology-enabled banking delivery channels such as telephone banking and ATM banking services. Hence, a broader definition of automated service quality or e-service quality has been considered in this research as proposed by Santos (2003), "as the consumers' overall evaluation and judgment of excellence and quality of e-service offerings in the virtual market place."

3.7.1.1 Two approaches for measuring automated service quality (E-service quality)

Researchers have relied upon mainly two types of approaches for developing the measurement models for automated service quality (Al-Hawari et al., 2005). In the first approach existing service quality theory is used as a basis for developing automated service quality measures (Yang & Jun, 2002; Zeithaml, 2002; Long and McMellon, 2004).

So the dimensions and items generated to measure the automated service quality have their roots in the traditional service quality conceptualization. According to van Riel et al. (2001), these have to be modified suitably so that they fit in the technology-based service delivery context. Additionally, this deals with only services that are delivered through websites. But the internet is not the only electronic delivery channel, other electronic channels such as ATMs, telephones, mobile phones are increasingly used to deliver banking services (Hway-Boon & Yu, 2000; Mols, 1999).

In the second approach, the focus is on technological interfaces and the quality of new categories of self-services technology (Santos, 2003; van Riel et al., 2001). In this approach new categories and measurement models for automated service quality have been formed which diverge from the traditional service quality constructs (Joseph et al., 1999; Joseph & Stone, 2003). These are propounded to be more appropriate to measure the determinants of service quality in which the customer interaction is with technology -enabled self-service delivery channels rather than interpersonal interaction with the service providers. Even though this approach considers other technology-enabled delivery channels in addition to online channels, there is a drawback with this approach as the models provided aggregates all the electronic channels and the

measures are taken together as a unified whole (Meuter et al., 2000; Joseph et al., 1999; Joseph & Stone, 2003).

3.7.1.2 Need for measuring the service quality of each electronic channel separately

Every automated service delivery channel has its own attributes (Dabholkar, 1996) and hence it is required to separate out the individual attributes of every delivery channel or other compounding factors which affect the perception of quality.

However these two approaches have the following common factors such as reliability, ease of use, personalistion, accessibility, accuracy, security and efficiency. So these factors are considered while developing appropriate items for measuring service quality of the services provided through each channel and the individual measurement items are discussed separately in the methodology section.

Technology-enabled self-service delivery channel refers to the methods of delivering banking service products using electronic media such as telephone, ATM, internet and mobile phones (Daniel, 1999; Hway-Boon and Yu, 2003). These delivery channels allow banks to offer financial services without the need for face-to-face employee-consumer interaction.

In the banking sector, as the delivery of the same services takes place through multiple channels, depending on their conveniences the customers tend to use these channels in a complimentary way. Hence the customer relationship and transactions can be managed by any one delivery channel or a combination of them (Patricio et al. 2003, Lang & Colgate 2003). The customers' assessment of the services through a particular technology-enabled delivery channel and their intention to use a particular delivery channel depends on their perceptions about the various attributes of that particular delivery channel

(Dabholkar, 1996). That is, every different channel has its own attributes, which differ from the others, so it is important to measure the quality of each channel separately and not combine their attributes together in a generalized way. This will give a better picture of the service quality pertaining to the technology-enabled services delivered through these self-service automated delivery channels.

3.7.2 Core service perception

Core service perception which is the perception regarding the attributes of a bank's service offerings that could positively influence quality perceptions and satisfaction levels (Sureshchander et al., 2002a; van Riel et al., 2001). Hence the perceptions about the overall services offered by a bank have been considered. The measurement details of the same have been shown in chapter 4.

3.7.3 Price perception

Price is an important determinant in technology-enabled services, as online customers are considered price sensitive (Surjadjaja et al., 2003; Iqbal et al., 2003). Hence price has been incorporated as an additional factor that could influence perception of automated service quality. Perceived price has been used here to describe customers' price perception (Chen et al., 1994), the measurement details of which have been shown in chapter 4.

3.8 Customer Satisfaction

Issue regarding whether service quality and customer satisfaction are the same or different constructs have been explored by several researchers (Dabholkar et al., 2000; Taylor and Baker, 1994). They are in agreement that these two are different but closely related constructs (Sureshchander et al., 2002b; Dabholkar, 1995, Parasuram et al., 1994b).

According to Rust and Oliver, (1994) the definition of customer satisfaction in the services literature is given as "customer satisfaction is a summary of cognitive and affective reaction to a service incident (or sometimes to a long term service relationship). Satisfaction (or dissatisfaction) results from experiencing a service quality encounter and comparing that encounter with what was expected".

Oliver's (1993) model says that consumer satisfaction is a consumer's fulfillment response and that satisfaction judgments are influenced by both positive and negative, affective or emotional responses and cognitive disconfirmation.

3.8.1 Relationship between service quality and customer satisfaction

As far as service quality is concerned there is a general agreement that it is a construct which is different from customer satisfaction and many researchers are endorsing the definition put forth by Bitner and Hubert (1994), which says that 'service quality is consumers' overall impression of the relative inferiority/superiority of the organization and its services'.

Rust and Oliver (1994), have identified some of the key aspects that distinguish service quality from customer satisfaction. They are:

- The expectations for quality are based on ideals or perceptions of excellence, while a large number of non-quality issues go into the formation of satisfaction evaluations such as needs, perceptions of fairness and so on.
- Inorder to have satisfaction judgment one should have experience with the service or provider while to have quality perceptions prior experience is not required.

Researchers are having divergent views regarding the linkage between service quality and customer satisfaction. Some of the findings suggest that customer satisfaction with a given experience would influence an overall evaluation/attitude about service quality over time (Bitner, 1990; Parasuram et al., 1988). However studies by Oliver, (1993) and Spreng and Mackoy, (1996) have shown that service quality would be an antecedent to customer satisfaction whether measured in a transaction-specific or over the time mode. In this particular study customer satisfaction is taken as an antecedent to service quality.

3.8.2 Measurement of customer satisfaction

The customer's overall satisfaction of the organization is based on all the experiences of the customer with that of organization. It can occur at different levels in a firm, like satisfaction with the different channels of service, with different aspects of each service and so on (Sureshchandar et al., 2002b).

In order to measure customer satisfaction, different researchers have used different types of scales, single item and multi-item scales (Al-Hawari et al. 2006). For instance, Cronin and Taylor (1992) had defined and measured customer satisfaction using a one-item scale asking customers overall satisfaction. But other researchers (Sureshchander et al 2002, Danaher and Haddrel, 1996) are of the opinion that customer satisfaction is multi-dimensional in nature, so a single-item scale fails to capture the complexity of customer satisfaction. The present study has mostly used multi-item scales to measure customer satisfaction except in two cases where single-item measures have been used in the interest of maintaining the parsimony of the research instrument.

3.9 Consumer Non-Usage of Electronic Banking

The frameworks such as the Technology Acceptance Model (TAM) of Davis (1989), the Technology Readiness Index (TRI) of Parasuraman, (2000), the diffusion innovation theory by Rogers (1995) can be used to understand why many consumers are not using electronic banking services. The TAM propounds linkages between 'perceived usefulness' and 'perceived ease of use' and the attitudes, behavioural intentions and actual adoption behavior of bank customers. As per this frame work it can be concluded that the consumers who do not use the technology products such as electronic banking services might perceive the services as not being useful and not being easy to use Gerrard et al. (2006).

Through the Technology Readiness Index(TRI), Prasuraman (2000) states that the readiness to adopt technology products depends on four factors such as optimism, innovativeness, discomfort and insecurity, these have been explained in this chapter earlier. According to TRI, if the consumers are not ready to adopt electronic banking services they are likely to feel discomfort and insecurity in using these services and may be less optimistic and innovative about these technology products.

As per Rogers' (1995) Diffusion of Innovation work the non-adopters could perceive the innovation as having more complexity, less relative advantage, less compatibility and less trialability as compared to their existing modes of conducting banking transactions.

Gerrard et al. (2006) had done a study among the non-users of the internet banking services in Singapore. The key findings were that the non-users perceive more *security risks* in using internet banking, they have *no perceived need* for using it, they might have *lack of knowledge* regarding how

to use internet banking such as the procedures involved, and some of them might be *unaware* about the availability of the service. The additional factors they found out for the non-usage of internet banking were *inertia* meaning lack of motivation to find out what the internet banking offered and what needed to be done to become an internet banking user, *inaccessibility* referring to the lack of proper internet connectivity or having no PC connection. A minority of the respondents cited the reason for the non-usage of internet banking as *lack of human touch* and a few of them gave the reason as *pricing concerns* arising out of the need for buying a PC.

According to a study by Sathye (1999) among Australian banking consumers, *security concerns* and *lack of awareness* about internet banking and its *benefits* are the major reasons for the non-adoption of the internet banking services. Other reasons cited for non-usage were *pricing concerns, lack of ease of use, resistance to change* and *lack of access to computers/internet*.

Kaynak and Harcar (2005) found in their study among the U. S. bank customers that the major reasons for non-usage of online banking are *security concerns, satisfaction with branch banking services* and *inability to talk face-to-face.*

According to the study conducted among the Saudi Arabian bank services consumers on the adoption of tele-banking services by Al-Ashban and Burney (2001) the important factors determining adoption are the exposure levels to the service, familiarity with the service, and the demographic factors like age, income and educational level. So the non-usage of tele banking services can be due to the *unfamiliarity with the service* and *demographic factors.*

Thornton and White (2001) conducted a study in Australia and found that non-users of self-service banking delivery channels including telebanking exhibited dislike for computers, technology and lacked confidence in using these electronic channels. The study also concurred with the findings of Moutinho & Meidan (1989), and Marr & Prendergast (1993) pertaining to the fact that one of the reasons for non-adoption of electronic banking channels could be the preference for *personal contact or face-to-face contact* with the human tellers in the bank.

3.10 Conclusion

The way the service delivery changes through technology enablement has been explained along with its implications. How technology-enabled self-services empower consumers and benefit organizations has been brought out. The findings related to similar studies and their implication to the present study is discussed. The major theories explaining the technology adoption such as diffusion of innovation, technology acceptance model and technology readiness index which forms the basis for the research models in this study have been explained. The review of literature regarding other themes of the study such as adoption measure, service quality and customer satisfaction under technology-enabled condition has been looked into. The review regarding the reasons for no-usage of electronic banking channels is also dealt with.

Chapter 4

RESEARCH DESIGN

4.1 Design of the Study

Some of the time-tested definitions of research design are given below so that it forms a backdrop for the various aspects like the research approaches, sampling plan, questionnaire design, data collection methods and data analysis approaches used in this study and that which are going to be discussed in this chapter.

According to Kerlinger (1986: 279), 'a research design is a plan, structure and strategy of investigation so conceived as to obtain answers to research questions or problem. The plan is the complete scheme or program of the research. It includes an outline of what the investigator would do from writing the hypothesis and their operational implications to the final analysis of the data'. Aaker et al. (1998) define it as the detailed blue print which guides a research study toward its objectives.

From these two definitions it is clear that research design entails the type of evidence that is to be collected and analysed to arrive at acceptable answers to the research questions. This is guided by the underlying philosophies of science, the epistemology concepts and the schools of thought in the area of study under consideration. Even though attempt is not made here to look into

these aspects in detail a brief mention is made here as these have a bearing on the methodology of research used in the study.

4.1.1 Research paradigm

The research methodology used depends on the kind of research approaches used in the earlier related studies and the kind of research problem and questions to be addressed.

From the review of literature it is found that there are two main research philosophies or paradigms, the positivist paradigm and phenomenological paradigm. Positivist studies generally use quantitative methods for empirical testing of formulated hypothesis (Buttery and Buttery, 1991). These types of studies usually involve obtaining data through surveys with relatively large samples and analyzing the structured data using statistical methods. The positivistic approach or paradigm explores the facts or the reasons for the social phenomenon without the subjective interpretation from the researcher and the stress is on logical reasoning applied to the research so that precision, objectivity and rigour are the guiding forces rather than hunches, experience and intuition for investigating research problems (Collis and Hussey, 2003). However, the phenomenological paradigm is concerned with the understanding and exploration of the phenomenon from participant's own frame of reference. The research is based on unstructured data obtained through mainly qualitative methods like field work studies and case research methods.

In the case of this particular research a positivistic approach has been used as it relies mainly on quantitative data, using relatively large samples and is concerned with hypotheses testing, structured research design and objective method using cross-sectional study.

4.1.2 Deductive and inductive reasoning

The scientific method used in research involves logical reasoning for drawing inferences from the finding of a study or for arriving at conclusion (Krishnaswami, 1993). The logical reasoning could be either inductive or deductive. Inductive reasoning moves from specific observations to broader generalizations and theories. In this the researcher begins with various observations and measures and continues by finding patterns and regularities, formulating tentative hypothesis that can be observed. Finally the researcher may develop some general conclusions and theories. These conclusions and theories are subject to further confirmation based on subsequent evidence.

On the other hand, deductive reasoning is the process of applying a generally accepted principle to a specific individual case falling under the general principle. Hence in this case the reasoning is from the more general to the more specific. This method is useful for testing or confirming hypothesis but it is not of use for arriving at new truth. The inductive process overcomes this limitation.

Usually in a social research both the logical process of induction and deduction are used together in a complimentary way. Both the deductive and the inductive reasoning process are applied in scientific investigations (Sekaran, 2003). This is true of this particular research too.

4.1.3 Research approach

Two basic approaches used in social sciences are quantitative and qualitative research approaches. Quantitative research (Muijs, 2004) is 'explaining phenomena by collecting numerical data that are analysed using mathematically based methods, especially statistical methods'. Quantitative method is objective in nature and is focused on measuring phenomena.

Qualitative research approach is concerned with qualitative phenomena and involves non-numerical observations and examination for finding out the underlying relationships and meanings. Through these researches which mainly use methods such as depth interviews, focus groups and projective techniques the various factors which motivate people to behave in a particular way or which make them like or dislike a particular thing are being analysed (Kothari, 2004).

Though this study's main stay is quantitative research approach, qualitative method is also being used here especially during the exploration phase of the study for problem formulation and the research instrument development.

4.2 Type of Research Designs used

Examination of the literature shows that most of the authors have commonly categorised the types of research designs into exploratory research, descriptive research and causal research based on the type of information required (Tull and Hawkins, 1998; Malhotra, 2004; Zikmund, 2003).

Exploratory research deals with the process of finding out of the general nature of the problem and the related variables. Descriptive research is concerned with the accurate description of the variables in the problem formulated and causal research specifies the functional relationship between the variables in the problem formulated. Each of these methods has different characteristics and methods of conducting research.

4.2.1 Exploratory Phase

This is a preliminary study or search about which the researcher has little or no knowledge, the objectives of which could include formulation of the

problem, to increase familiarity with the problem, developing hypothesis, isolation of key variables and their relationships for further examination.

Thus the exploratory research provides a basis for the subsequent conclusive research.

The usual methods used for the exploratory phase of the research are (Kothari, 2004):

1) Survey of the related literature. This is the simplest means for formulating the exact research problem and developing hypothesis.
2) Experience survey, which means interviewing experts in the relevant area who are having practical experience with the problem to be studied
3) Analysing of 'insight-stimulating cases, intensive study of some selected cases will give insights regarding the phenomenon.

The present study has an exploratory phase in which a thorough examination of the literature is made regarding the studies done in similar areas. These studies cover a range of topics such as the adoption studies of technology-enabled banking delivery self-services, studies on customer satisfaction and service quality perception of the services offered through these channels, theoretical frameworks pertaining to adoption of innovation, service quality and so on. Detailed reviews of these are given in chapter 3.

In addition to this, experience survey was done during the problem development stage by way of interviewing and discussing the issues concerning the area of study with about ten practising banking professionals, who had specific experiences dealing with the electronic banking channels in their day-to-day work. These banking professionals were from different categories of banks such as private sector, nationalized and foreign banks. Banking professionals from different categories of banks were consulted as it was

anticipated that the usage and adoption patterns of these delivery channel varied from one bank group to another. Academicians who had prior experience in doing research in the banking related and services marketing areas were also consulted.

The input so obtained during the exploration phase through the literature survey and experience survey was used in questionnaire/research instrument development. Additional insights were also gained in the exploration phase through interviews with some of the regular users and non-users of these technology-enabled banking services such as ATMs, internet banking, tele banking and mobile banking.

Two focus group discussions, one consisting of a group of academicians numbering nine and the other consisting of a group of ten students were also conducted to deliberate on the aspects of the usage and non-usage aspects of these services. The outcome from these focus group discussions were also used to refine the problem and develop the questionnaire.

4.2.2 Descriptive study

The dominant methodology used in this work is descriptive research. According to Cooper and Schindler (2003) descriptive studies are used to "make descriptions of the phenomena or the characteristics associated with a subject population: who, what, when, where and how of a topic" (p. 161). It also finds out the proportion of the population having certain characteristics and discovers association among variables. This method can also be used for making specific predictions, according to Malhotra (2004: 78). Another characteristic of descriptive study is that it could contain hypothesis that are formulated during the exploration phase which are to be tested.

The methods typically used in a descriptive study could be surveys, panels, observations or secondary data analysed in a quantitative manner (Malhotra, 2004).

The current study, using a survey method, employing a structured questionnaire which was administered through personal contact method, tries to identify the characteristics of the users and non-users of technology-enabled banking self-services such as ATM services, internet banking, tele banking and mobile banking. Further, an attempt is made to estimate their usage patterns pertaining to technology-enabled banking self-services and their relationships with demographic, attitudinal and perceptual factors of bank customers.

Hence this research uses a *two-stage design* as proposed by Cooper and Schindler (2003: 160), with exploration as the first stage which aims at clearly defining the research question and developing the research design followed by description and diagnosis as the second stage.

Finding out relationship among variables in the descriptive research process is labeled as *correlation study* which, according to Cooper and Schindler (2003), is a subset of descriptive study. Since in this study relationship among variables especially for the adoption of technology-enabled banking self-services is examined, this study is also a correlation type of investigation.

4.2.2.1 Cross-sectional design

The present study has a cross sectional time horizon which involves the collection of the information from the sample of population elements only once. The other option would have been to use a longitudinal design in which a fixed sample of population is measured repeatedly on the same variables over a period of time. Although a longitudinal study would have provided a greater

wealth of information, the lack of time and funds and the possibility of unanticipated changes in the unit of analysis or sampling elements and the research environment precluded the use of this design.

According to Bryman and Bell (2003: 52) because of time and cost involvement longitudinal designs are relatively little used in business and management research.

The primary data was collected using a structured questionnaire from the sampled respondents between the period from July 2007 to November 2007 with the response collected only once thus making the study a cross sectional or a one-shot study.

4.2.3 Data sources

The present study utilizes both primary and secondary data sources. The secondary data sources primarily consisted of the following:

- Published studies in various international and national journals and conference proceedings, those studies which deal with topics such as the adoption studies on electronic banking services, studies on customer satisfaction and service quality perception of these channels, theoretical frameworks pertaining to adoption of innovation, service quality and so on.
- Articles published in periodicals relating to the above subjects.
- Information contained in websites such as RBI website, websites of various banks in India, website of Banknet India and so on.
- Unpublished studies pertaining to the above topics.

The primary data was collected through a sample survey using structured pre-tested questionnaire from bank customers residing in the following cities of

Karnataka namely Bangalore (metro banked centre) and Mangalore and Udupi (urban banked centres).

4.2.3.1 Survey research

The descriptive part of the study was carried out using a survey research method which involves a structured questionnaire given to respondents for eliciting information regarding their behaviour, intentions, attitudes, awareness and motivations pertaining to the electronic banking self-services and along with their demographic and life style characteristics.

Survey methods could be classified depending on the mode of administration; whether it is through telephone interviews, personal interviews, mail interviews, or electronic interviews (Malhotra, 2004). The questions could be asked verbally, in writing or via computer depending on the above modes. Usually the questions are structured in the sense that they are arranged in a standardized sequence to enable easier coding, analysis and interpretation of data.

The present study uses a self-completion questionnaire delivered personally to the respondents to be filled up at a later stage and returned to the researcher or his representative either collected by hand or mailed back as the case may be. A personal contact method was used so that the respondents could be selected for the survey depending on their usage of the services through the electronic banking delivery channels and to brief them regarding the filling up of questionnaire, in addition to give them the assurance of anonymity and confidentiality. A brief introductory note was also included along with the questionnaire stating the purpose of the study and giving assurance of confidentiality and anonymity as recommended in the literature (Bryman and Bell, 2003).

4.3 Sampling Design

A multi-phase sampling design has been done for the study in which the geographical locations was first fixed, followed by the banks from which the respondents were sampled and finally the sampling of the population of interest in the study.

4.3.1 Geographical extent of the study

The study required the inputs from users of these electronic banking along with those from non-users, the various parameters explored in this study like customer satisfaction, usage patterns, adoption levels (extent of usage) and so on could be had only from the users of these services. Hence when selecting the geographical locations care was taken so that the locations selected had an adequate representation of the users of internet banking, tele banking and mobile banking. Such locations had to be selected so that it had the probability of having a fairly good segment of users of these services. Therefore the study was limited to metros and urban banked centres.

Karnataka state which was selected for conducting the study has been the breeding ground for many a bank that has attained excellent reputation in the Indian banking sector. Seven of the country's leading banks- Canara bank, Syndicate bank, Corporation bank, Vijaya bank, Karnataka bank, Vysya bank and the State Bank of Mysore had their origins from this state. Of these banks the first five were from the coastal districts of Dakshina Kannada and Udupi, this area is called by some as the 'cradle of banking' in the country (Shanker, 2005).

The state of Karnataka is located in the southern part of India towards the western side. It has a population of about 52.7 million as per the 2001 census of India. It is one of the relatively heavily banked states having a total

of 4767 bank branches with average population per bank branch being 11,000 as per the data given in RBI's Branch Banking Statistics, vol. 3, which shows the branch status as on 31st March 2002 available at the RBI website. The population per bank branch in Karnataka was found to be more than the national average of India which according to the same statistics was about 16,000. As per the same report about 81 banks are operating in this state which includes 27 public sector banks, 29 private sector banks, 11 foreign banks and 13 regional rural banks. The report also shows that Karnataka has 2353 'banked centres' which consists of one metropolitan centre, 15 urban centres, 278 semi-urban centres and 2059 rural centres.

The RBI classifies the banking centres into metro, urban, semi-urban and rural centres based on the population in the respective banking areas. Those centres with a population of 10 lakh and above are classified as 'metropolitan centres', those with a population of 1 lakh and above but less than 10 lakh classified as 'urban centre', the ones with less than 1 lakh and above 10,000 population as 'semi-urban centres' and finally centres with less than 10,000 population as 'rural centres'. (Ref Appendix-3, sec 3.1)

4.3.1.1 Geographical scope of the study

Since the study planned to cover the adoption, usage and perceptions regarding electronic banking channel services and such services are mostly offered in the metropolitan centres and urban centres by the banks, only metropolitan and urban areas are considered for the study. It is also found that users of these services are more in the metro and urban centres since the customers tend to be better educated and more aware of these services.

Bangalore (Bengaluru) city is an obvious choice as it is the only metropolitan centre in Karnataka state. Out of the 15 urban banked centres in

Karnataka Mangalore city and Udupi town were selected on a random basis for the study purpose.

Udupi and Dakshina Kannada districts of which Mangalore is the headquarters were unified prior to 1997, and this region as metioned earlier is known as the 'cradle of banking industry' with as many as five leading banks in the country originating from here. Hence traditionally this region has been a heavily banked area with well-developed economic activity and highly educated population.

Some of the relevant details of the areas selected are given below:

Bangalore city was having a population of 6.8 million (http://www.bmponline.org, Bengaluru city corporation website). It had (http://yellowpages.webindia123.com) 808 bank branches approximately, excluding co operative banks. About 62 scheduled commercial banks excluding the regional rural banks had their branches here. Bangalore or Bangaluru as it is currently called, is known as the *silicon valley of India* with a host of IT and ITes companies, third most populous city in the country and fifth largest urban conglomerate.

Mangalore city had a population of 4.19 lakhs (www. mangalorecity. gov.in, official website of Mangalore city corporation). About 170 bank branches were present in the Mangalore city and its suburbs (http://yellowpages.webindia123.). Approximately 54 scheduled commercial banks excluding the regional rural banks were operating in this city.

Udupi town had a population of 1.19 lakhs (www.udupicity.gov.in the official website of the Udupi city municipal council), it had about 31 bank branches from about 14 scheduled commercial banks operating here (http://yellowpages.webindia123.com).

4.3.2 Universe/Population of the study

C.R Kothari (2004) defines the term *universe* 'as the total of the items or units in any field of enquiry', while the term *population* refers 'to the total of items about which the information is desired'.

In this research the investigation is about the adoption, consumer behaviour, perceptions and satisfaction about the services offered through technology-enabled banking self-services such as the ATMs, internet banking, tele banking and mobile banking services and the study is confined to the state of Karnataka in India. A metro banked centre (Bangalore city-the only metro city in Karnataka) and two randomly selected, urban banked centres (Mangalore and Udupi cities) were the geographical limits of the study.

Accordingly *universe* in this research could be taken as the set of all bank consumers in the selected geographical locations, while the *population* for the study can be defined as all the banking customers in the selected cities who had an annual income of more than rupees one lakh and above, who were using at least one of the electronic banking channels and aged above eighteen years. The income condition was not kept applicable for the student category as they could be non-income earners but at the same time represent a potential group of electronic banking users. The income condition was kept because for utilizing banking services extensively a reasonable earning capacity is a prerequisite. The condition that the respondents should be using at least one of the self-service banking delivery channel is because the domain of the study was primarily on adoption, satisfaction levels and usage patterns of the respondents with respect to the services offered through these electronic banking channels. Now-a-days ATMs are widely adopted by the average bank customer as evident from the Banknet India's ATM User Survey Report 2006 which states that 95

percentage of the respondents preferred banking via ATMs over the conventional branch banking.

Even though this study examined the usage and perceptions pertaining to all the four banking channels mentioned, the main focus of this study was on the services offered through ATMs and internet banking.

The reasons for this study focusing mainly on the services offered through ATMs and Internet banking were:

1) To make the study more manageable.
2) Telebanking services were not that widely adopted and this service was offered by the scheduled commercial banks only in a few select branches located in the metros and major urban centres. Only some banks were offering this service.
3) Though mobile banking has tremendous potential, the service provisioning was only in the initial phases by most of the banks and hence it was yet to gain wide spread awareness and acceptance.

4.3.3 Sampling procedure

The *units of analysis* or *sampling elements were* the bank customers of the nine selected banks in the chosen geographical locations, who were satisfying the income criteria and using at least one of the electronic banking channel services.

Of the nine banks whose customers were sampled four were from the public sector (State Bank of India, Canara Bank, Syndicate Bank and Corporation Bank), three were from the private sector (ICICI Bank, HDFC Bank and AXIS Bank) and two were from the foreign bank group (Citi Bank and ABN Ambro Bank). Among the public sector banks, SBI was selected for the study as it was the largest bank in this sector; Canara Bank was selected as

it was the 'lead bank' in Bangalore area and was also headquartered here; Syndicate Bank was the 'lead bank' in Mangalore as well as Udupi area, headquartered in Udupi; Corporation Bank was selected since it was headquartered in Mangalore. ICICI bank, HDFC bank and AXIS bank were number one, number two and number three banks respectively, in terms of business in the private sector. Citi Bank was the largest foreign bank operating in the country, while ABN Ambro bank was the only foreign bank which had branches both in the selected metro and urban 'banked centres'. It was presumed that through the selection of the largest bank in the respective sectors and the banks which were the 'lead banks' and those having headquarters in the geographical locations selected for the study, maximum coverage of the population of interest can be had. Major branches of these banks located in the prominent centres in the selected cities were approached for sampling the population of interest.

From the discussions with the bank officials and pilot study results it was found that adoption of ATMs among the bank customers were not a problem and that almost everyone had opted for it. The intention of the sampling was to get a representative sample of users and non-users of those technology-enabled banking self-services, such as internet banking, tele banking and mobile banking for which the adoption among bank customers were a problem. The percentage of bank customers using these self service technology delivery channels was limited. From the discussions with the banking executives it was learned that only about 12-15 percentage of the average bank customers used services such as internet banking in a city like Bangalore and in the other cities like Mangalore and Udupi the percentage of such users out of average bank customers were only 6 to 8 percentage. From the Internet & Mobile Association of India's (IAMMAI) Report on Online Banking

2006 only about 12% of the internet users avail internet banking facility, which shows that the internet banking has not really picked up in India. In a more recent report of a survey jointly conducted by IMRB and IMMAI 'I-Cube, 2008' the percentage of internet users using internet banking has gone up to only 20%.

In order to get representative samples of users and non-users the cooperation and assistance from the bank officials of the nine participating banks were obtained. With their help partial customer lists from the banks were obtained. The samples of users of internet banking were obtained randomly from the partial list of bank customers who had applied for internet banking, which were provided by the participating bank officials. Many respondents were found to be using multiple electronic banking modes. The probability of users of tele banking and mobile banking using the internet banking were found to be high. From the partial list of customers who had abstained from applying for internet banking the sample of non-users of internet banking were obtained. From these two groups of sampled respondents tele banking and mobile banking users and non users emerged.

A personal contact method was adopted to approach these respondents so that their usage status could be verified and they could be briefed regarding the need for the survey and assured about the confidentiality of the responses given by them. Those who agreed to participate in the survey were given the questionnaires which were either collected back on the spot after filling in a few cases and the rest of the cases were given the questionnaire so that it could be collected back after being filled at a later point of time either in person or by post. Those respondents who agreed to sent back the questionnaires by post were given postage paid envelops with address.

4.3.4 Sample size

The sample size was determined based on aspects such as:

- the budgetary constraints,
- the time limitation,
- sample size taken in similar studies,
- the adequacy for statistical tests and
- adequacy of numbers obtained from all sub-samples in the population under consideration.

An examination of the sample sizes and methods of sample selection in similar empirical studies pertaining to technology-enabled banking self-services are looked into and results shown in table 4.1.

From the table it can be found that:

- The sample sizes ranged from 128 to 801.
- Both non-probability and probability sampling methods have been used. The sampling methods used were convenience sampling, random sampling, branch intercept method, cluster sampling, mall intercept methods, purposive sampling and so on.
- The contact methods used were mail survey, online survey, telephonic survey and branch/mall intercept methods.

Table 4.1: Research methods and sample size from similar studies

Authors (Journal)	Services & Distribution Channels studied	Data Gathering instrument/method	No of Responses & Country	Additional Information
Rugimbana R (1995) *(International Journal of Bank Marketing)*	ATMs	Branch-floor intercept questionnaire	430, Australia	Convenience Sampling, Likert scale, 14 statements, Response rate 71.7%
Lockett and Littler (1997) (*Journal of Marketing Management)*	ATM and Phone banking	Mailed Questionnaires	593, U K	Mail Survey
Sathye (1999) (*International Journal of Bank Marketing)*	Internet banking	Separate Mailed questionnaires for individuals & Business firms	265 individuals & 324 business firms, Australia	Random sampling using white & yellow pages of telephone books, Response rate 61%
Tan and Teo, (2000) (*Journal of the Association for Information Systems)*	Internet banking	Online Questionnaire Survey	454, Singapore	Personalized e-mails sent, Incentives for eliciting responses, pilot study
Al-Ashban and Burney (2001) (*International Journal of Bank Marketing)*	Telebanking	Self administered questionnaire & telephonic interviews	128, Saudi Arabia	Branch intercept method of callers and visitors, Response rate 49%
Thornton and White (2001) (*Journal of Services Marketing)*	Human Teller, ATMs, EFTPOS, Telephone banking, Cheques & Credit cards	Mailed Questionnaires	801, Australia	Focus groups, Cluster Sampling, Response rate 31%
Howcraft et al. (2002) (*International Journal of Bank Marketing)*	Telephone & Internet banking (Home based banking)	Mailed Questionnaires	286, U K	Focus groups, Pilot study, Mail survey, Response rate of 7.5%
Kolodinsky et. al. (2004) (*International Journal of Bank Marketing)*	Automatic Bill Payments, Phone banking, PC banking	Telephonic survey using structured questionnaire	1000 in 1997 & 1002 in 2003, USA	Multistage cross sectional study
Wan, et al. (2004) (*International Journal of Bank Marketing)*	Branch banking, ATM, Telephone banking & Internet banking	A combination of Mall-intercept method and Telephonic interviews using questionnaires	314, Hong Kong	Convenience sampling for mall-intercept method and random sampling for telephonic interviews
Pikkarainen et al. (2004) (*Internet Research)*	Internet banking	Survey using questionnaire	268 Finland	Questionnaires collected using mall-intercept method & from university class rooms. Response rate 63%
Laforet and Li (2005) (*International Journal of Bank Marketing)*	Internet Banking & Mobile Banking	Street intercept method using a structured questionnaire .	128 , China	questions asked verbally & recorded by interviewers, Response rate 43%
Thamaraiselvan and Raja (2006) (*The Journal of Contemparay Management Research)*	ATMs	Standardised questionnaire	263, India	Purposive sampling method, seven point likert scale, mainly SBI & ICICI Bank customers of Tiruchirappalli, T N State

The suggestion which Sudman, (1976) gave about the sample size cited by Thronton and White (2001) was used as a guideline for determining sample size. This suggestion states that the sample size should be large enough so that each major category of break downs should have 100 units or more and minor categories of break downs should have 20 to 50 units. The major categories of breakdowns for this study were:

1. The number of respondents from two types of banked centres considered.
2. The number of respondents who are the users of each of the electronic banking services (except ATMs) such as internet banking, tele banking and mobile banking.
3. The number of respondents who were non-users of internet banking, tele banking and mobile banking services.
4. The number of respondents from the various bank categories such as public sector banks, private sector banks and foreign banks.

The minor categories of breakdowns in this study are the demographic categories. Another guideline followed in selecting the sample size for this particular study is that given by Alreck and Settle (2004) which states that for a survey research if the population is 10,000 or more usually a sample size of between 200 to 1000 respondents are considered adequate by most experienced researchers to give reasonable results.

The final usable sample size obtained in the study was 553 of which 300 were from the metro banked centre and 253 were from the urban banked centres. The responses from the public sector, private sector and foreign banks were 254, 228 and 71 respectively. These were deemed to be, as per the before mentioned guidelines, adequate for the study.

Incidentally this sample size is also higher than when calculated using the formula by C. R. Kothari (2004) for the estimation of sample size for infinite population.

$n = (z^2 \times \sigma^2) / e^2$, where n = size of the sample, z = standard variate at a given confidence level, σ = estimate of standard deviation of the population given the range, e = acceptable error

Given that the most of the measures are using 5-point scales in the research instrument the range = 5-1 = 4, so $\sigma = 4/6 = 0.67$, z = 1.96 (as per the table area under normal curve when the confidence level is at 95%), e = 0.1 (assuming estimate to be within 10% of the true value) the sample size obtained n = 172

4.4 Research Instrument

The survey instrument/questionnaire was designed and developed after an extensive literature review, close consultation with experts in the banking area (both practitioners and researchers) and inputs from two focus group discussions.

The literature survey covered mostly the following areas:

- Adoption studies pertaining to electronic banking channel services
- Service quality and customer satisfaction studies pertaining to them
- Theoretical frame works pertaining to the adoption of innovations especially technology enabled self services
- Research on service quality.

The detailed reviews of the literature pertaining to the above areas are given in chapter three.

4.4.1 Pre-testing / pilot study

The questionnaire so developed was subjected to *pretesting,* during the pretesting the questions were analysed to check the readability and

comprehensibility of the questionnaire. The pretesting was done using five students who were bank customers, three academicians, three banking professionals and another sample of ten respondents. Necessary corrections were made to the questionnaire from the feed back so obtained. The corrections mainly pertained to some of the wordings and instructions provided.

The questionnaire contained seven parts, each part of the questionnaire is described below.

4.4.2 General questions

Part one is containing questions regarding the 'most frequented bank', the term *most frequented bank* is used because the respondents might be having accounts in multiple banks, the usage pattern and perceptions are asked in the questionnaire with respect to the services of a single bank. The customers are asked about the services offered by their primary bank's services as they would have maximum transactions and frequency of transactions with their primary bank. Hence the term most frequented bank. Moreover sector wise comparisons of banks are done in the study. The reasons for selecting their most frequented bank are asked and their overall satisfaction level with services offered by their respective most frequented bank is asked using a multi-item scale. A five item scale as shown below is used for satisfaction measurement as multi-item scales are better to capture the richness of the construct of customer satisfaction (Suresh Chander et al., 2002a; Danaher and Haddrel, 1996).

1. Bank Products
2. Staff Interactions
3. Physical Surroundings
4. Bank Fees
5. Automated Services (ATMs, Internet, Telephone, Mobile Banking etc.)

Overall customer satisfaction level with the bank was measured using a five point Likert scale with 5 equals highly satisfied to 1 equals highly dissatisfied across the following aspects of banking service, which covers almost all aspects of a banking service.

The frequency of branch visits is asked as it is assumed that customers using electronic banking services visit bank branches less frequently.

Core service construct, a multi-item scale used to measure the crucial contents or attributes of the banking service has been also included in part one. This has been adopted from Al Hawari et al (2005) and Sureshchandar et al (2002a). The perceptions of the core service have been included as it has a key role to shape the overall quality perception and customer satisfaction. It also differentiates one service provider from another. The measure was done using the following statements:

1. My bank provides wide range of services (retirement's account, loans for vehicles, foreign exchange, fund transfers, home loans etc.)
2. My bank provides diverse service features (different interest rates, service options etc.)
3. My bank follows the most advanced technology.

Price perception is important for determining service quality in technology-enabled services (Al-Hawari et al., 2005). Price saving motivates the customers to use these services and also forms a basis for comparison among different modes of service delivery (Surjadjaja et al., 2003). So a three item scale for measuring price value perception modified and validated by Al-Hawari et al. (2005) adopted from studies by Bahia and Natali (2000) and Colgate and Hedge (2001) has been included in this part. The measure was done using a five point Likert scale in which 5 was equal to strongly agree and 1 strongly disagree.

1. My bank adequately explains the service charges associated with each transaction.
2. The banking services of my bank are having acceptable fees.
3. My bank's service charges are competitive.

One single item scale five point Likert scale is also included to know the respondent's perception regarding whether 'the electronic banking services provided have improved the quality of their bank's overall services'.

Part two of the questionnaire contains questions pertaining to the respondents'' accessibility to computers and internet, plus the hours that they spent using the computer and browsing the internet. These questions are included as working knowledge of computers and internet access are prerequisites for using services provided through internet banking. The need for computer proficiency and prior experience with computers and technology being major drivers for internet banking usage and adoption are found out in the studies done by Gerrard and Cunningham (2003), Minna Mattila (2001), Karjaluoto et al. (2002), Laforet and Li (2005) and many other studies.

4.4.3 Variables pertaining to Determinants of Technology-Enabled Banking Self-Services Adoption Levels.

The independent variables which are the determinant constructs of the adoption levels of technology-enabled banking self-services are *perceived self-efficacy/capacity*, *relative advantage/perceived benefits, perceived innovativeness*, *perception of risk* and *need for personal contact.* The dependent variable is the *Total Electronic Banking Channel Adoption Level* which is a composite measure of the total adoption by the respondents of all the electronic banking self-services such as ATMs, internet banking, tele banking and mobile banking.

The second part of the questionnaire additionally contains 16-item multi-dimensional scale which is designed to measure the respondents' *perceived self-efficacy/capacity*, *relative advantage/perceived benefits, perceived*

innovativeness, *perception of risk* and *need for personal contact* as far as the aforementioned banking self-services are concerned.

The item pools of the scale are explained in chapter 7, table 7.13 along with the findings and results of this part.

This part also contained questions to gauge the awareness, frequency of usage and the duration of usage if using of the ATM services, internet banking services, tele banking services and mobile banking services offered by their respective "most frequented banks".

The adoption levels of each technology-enabled self-service such as ATM services, internet banking services, tele banking services and mobile banking services are measured using a composite variable which is a summated score of the frequency of usage and duration of usage of the respective services as mentioned in the section 3.8 of chapter 3. The *Total Electronic Banking Channel Adoption Level* is computed by adding up the individual adoption levels of all the four services.

All the banks may not be providing all the four services mentioned however ATM services and *internet* banking services are provided by most of the scheduled commercial banks. The tele banking and mobile banking services are provided by only select banks that too only in certain branches.

4.4.4 Questions related to ATM services

Part three of the questionnaire is exclusively pertaining to ATM services. It is having questions regarding the services commonly used through ATMs by the respondents. The respondents have to tick those services which they are using out of the following services.

Cash withdrawal, balance enquiry, cheque/cash deposit, transferring funds, ordering cheque books, bill payments and recharging of prepaid cards are the options provided.

These services provided through ATMs by banks are selected after studying the most commonly provided services through ATMs provided by various banks in India obtained from their respective websites.

In order to measure the customer satisfaction of the ATM services a three-item scale is given in this section. The items include overall satisfaction with the ATM of the respondent's bank, the respondent's satisfaction with the reliability of the ATM to provide transactions and the satisfaction with the accessibility of the ATMs.

4.4.4.1 ATM quality perception

As mentioned in chapter 3 service quality is measured on a performance only basis, which means the overall evaluation of excellence in service performance on the key parameters of the ATM services as perceived by the respondents. So the ATM service quality is measured on a performance based seven item scale which consists of the customer perception regarding easiness of usage, usefulness of the functions provided, easiness to use and operate, security of operation, convenience of location, safety of location, and its complaint resolution. The performance of the items are rated using a five-point Likert type scale with 1 equals strongly disagree and 5 equals strongly agree. These items given below have been modified and adapted from studies by Al-Hawari et al. (2005):

1. Learning to use ATM was easy for me
2. Functions provided by the ATM of my bank are very useful for doing my banking
3. ATM machine is easy to use and operate

4. I feel secure in conducting my banking business through ATMs
5. ATM is conveniently located
6. ATM is located in safe locations
7. The complaint resolution of my bank's ATM is fast and satisfactory.

4.4.4.2. Measurement of Beliefs, Attitude and Intention to Use ATMs

In order to measure customer perceptions and beliefs towards ATM service offered by the respondent's most frequented bank a 11-item scale has been used the items are as shown in the chapter 9, table 9.1 in order to measure the independent variables *ease of use, usefulness and security of usage.*

A 3-item scale is used to measure the attitude towards ATM adapted from Currren & Meuter (2005) & Barki & Hatwick (1994) on a five point likert scale with end points 5 (strongly agree) and 1 (strongly disagree) . The statements are as shown below.

1. I feel good about ATM Service of my bank
2. I feel pleasant about the ATM Service of my bank
3. I like the ATM service of my bank

The intention to use the ATM is measured using a single item five point scale adapted from Curren & Meuter (2005) which asks the respondent the likelihood of using ATM for a routine transaction.

4.4.5 Questions related to internet banking services

Part four of the questionnaire consists of questions pertaining to the internet banking services of the respondent's "most frequented bank". The respondents are asked to tick from among the following services those which are used by them. The services option provided are:

statement enquiry, bills payment, funds transfer, cheque book request, loan applications, DD requests, online shopping, mutual fund transactions and

investments advice. The services mentioned here are by no means an exhaustive list of services offered by banks through internet banking channels, but are representative of the major services offered and are selected after studying the websites of the selected banks.

A three-item scale is included to measure the satisfaction of the users of internet banking regarding the internet services offered by their most frequented bank. The items are as shown below measured on a five point scale with 5 being highly satisfied and 1 being highly dissatisfied.

1. Overall satisfaction with internet banking of your bank
2. Satisfaction with the website contents
3. Satisfaction with the accuracy of services.

4.4.5.1 Internet banking quality perception

The customer perception regarding the service quality of the internet banking services offered by the respondents' "most frequented bank" has been measured using the following items modified and adapted from the studies by Jun and Cai (2001), Al-Hawari et al (2005) and Jayawardhena (2004)

1. The bank's website contains all the required information to conduct my banking.
2. The bank's internet transactions are secure.
3. The Internet banking is reliable as it provides error free transactions.
4. The bank's website is attractive with clear instructions
5. The bank's internet banking facility enables me to carry out a wide range of transactions.
6. The complaint resolution of my bank's internet banking is fast and satisfactory.
7. The bank is very accurate in their responses to my queries/requests.
8. Navigating the Bank's website is easy and it can be downloaded fast

A five point scale is used with 1 being strongly disagree and 5 being strongly agree is used to measure the perceptions of the respondents. The

responses to the questions from the above part of this section were to be answered by only the users of internet banking.

4.4.5.2 Measurement of Beliefs, Attitude and Intention to Use Internet Banking

The next part of this section was to be answered by both users and non users of internet banking to measure their perceptions, beliefs, attitude and intention to use internet banking services. Four antecedent beliefs are proposed as predictors of attitude towards internet banking services. These beliefs are proposed after an extensive review of the literature (Curran and Meuter, 2005; Davis et al., 1989; Igabria, 1996, Walker and Johnson, 2006; Dabholkar, 1994 and Tan & Teo, 2000). These independent variables are *ease of use, perception of usefulness, compatibility* and *security concerns.* The constructs are measured using a 14-item five point scale as shown in chapter 9, table 9.8.

The explanations of the constructs '*ease of use*' and '*perception of usefulness*' is the same as in the model used for analyzing the attitude and behavioural intentions of ATM services used in this study. However, two new constructs have been introduced in this model in view of the nature of internet banking services which is quite different from the operational aspects of ATM services. These constructs are *compatibility* and *security concerns*.

Compatibility is a construct adopted from the original work of Rogers (1962) Diffusion of Innovation. It is defined as the degree to which an innovation is perceived as being consistent with the existing values, past experiences and the needs of potential adopters. From the literature it is found that those customers who were having prior experience with computers (Mattila et al., 2001; Karjaluoto et al., 2002), high P C proficiency (Jayawardhena and

Foley, 2000), comfortable with internet usage (Black et. al., 2001) would take to internet banking faster.

Several researches (Allen et al, 1992; Dabholkar, 1994a; Taylor and Todd, 1995; Curran and Meuter, 2005) have shown attitudes towards self service technologies such as internet banking as antecedent to behavioural intention and certain beliefs as antecedents to these attitudes.

As mentioned in the case of ATM services the attitude towards internet banking services is also measured using a 3-item Likert type scale shown in chapter 9, table 9.10.

The *Intention to Use* internet banking services is measured using a single item five point scale adapted from Curran and Meuter (2005) in which 5 is *extremely likely to use* and 1 is *extremely unlikely to use*.

The *usage of internet banking services* is measured as the percentage of the banking transactions done by the respondent using internet banking out of their total banking transactions.

4.4.5.3 Reasons of Non-Usage of Internet banking

The common reasons for non-usage of internet banking are identified from the literature as well as from the discussions with the experts and the bank customers. The perceptions of the non-users of the internet banking were obtained on a five point scale with 1 being 'strongly agree' and 5 being 'strongly disagree'. The reasons for non-usage of internet banking included in the questionnaire are as shown below.

1. Happy with other mediums of services such as branch banking & ATMs
2. Concern about security
3. No training provided by the banks in using the internet banking services
4. Don't know the procedure for using internet banking

5. Concern about the pricing of transactions using internet banking
6. Don't trust the internet banking services provided by the bank
7. Benefits of using internet banking not clear
8. Lack of confirmation of transactions through paper receipts
9. Not aware about the services available through internet banking
10. Not happy with the speed of internet connection

4.4.6 Questions pertaining to Tele banking services

Part five of the questionnaire consists of questions pertaining to the tele banking services of the respondent's "most frequented bank". The respondents are asked to tick from among the following services those which are used by them. The services option provided are:

balance enquiry, account statement request, cheque status enquiry, cheque book request, funds transfer and utility bill payments.

The services mentioned here are by no means an exhaustive list of services offered by banks through tele-banking channels, but are representative of the major services offered and are selected after studying the websites of the various banks.

Tele-Banking satisfaction was measured using a single-item five point scale with 1 being 'highly satisfied' and 5 being 'highly dissatisfied'.

4.4.6.1 Tele banking quality perception

Tele banking service quality perception was measured using a 6-item scale to capture the tele-banking services provided in an automated interactive response system mode as this type of tele-banking is the one which come under the self-service categorization.

These items were adapted from the studies of Al-Hawari et al., (2005) and Joseph and Stone (2003).

1. The bank's tele banking service has pleasant musical background.
2. The bank's tele banking service has reasonable number of voice prompts.
3. The bank's tele banking service has short waiting time.
4. The bank's tele banking service provides clear instructions.
5. The bank's tele banking service is reliable.
6. The bank's tele banking service provides ample options.

4.4.6.2 Reasons of Non-Usage of Tele banking

The reasons for the *non-usage* of telebanking services were also given in this section and responses of non-users of telebanking services obtained using a five point scale with 1 being 'strongly disagree' and 5 being 'strongly agree'. The reasons included in the questionnaire to elicit responses regarding the non-usage of tele banking services are as shown below.

1. Comfortable with other modes of accessing banking services
2. Unfamiliarity with the service
3. Not clear about the benefits of using telebanking services
4. Don't know the procedure for using tele banking
5. Bank does not offer training to use tele banking services
6. Don't trust the tele banking services provided by the bank.
7. Pricing concerns because of high telephone charges

4.4.7 Questions pertaining to Mobile Banking Services

Part six of the questionnaire consists of questions pertaining to the mobile banking services of the respondent's "most frequented bank". The respondents are asked to tick from among the following services those which are being used by them which include both *alert* and *request* services. The services option provided are:

- balance enquiry,
- account statement request,

- cheque status enquiry,
- cheque book request,
- funds transfer
- utility bill payments.

Drivers and Inhibitors of Mobile banking services

The respondents were asked to indicate their perception regarding the factors that enable or aid the adoption of mobile banking services. Five factors were identified through literature review (Souranta et al., (2005), which aided the adoption of mobile banking services. The respondents were asked to give their degree of agreement/disagreement on a five point Likert scale with 5 as 'strongly agree' and 1 as 'strongly disagree'.

1. Mobile is always with you
2. Mobile is a familiar device
3. Sufficient guidance from bank given
4. Conducting banking is fast and efficient
5. Quality of service does not change as it is standardized

Some of the common inhibitors of mobile banking services were identified from the literature (Souranta et al, 2005) and the respondents were asked to give their degree of agreement/disagreement on a five point Likert scale with 5 as 'strongly agree' and 1 as 'strongly disagree'.

1. Possibility of errors
2. Lack of familiarity with the service
3. Use is complicated
4. Slow data transmission
5. Feel more comfortable with other means of transaction

4.4.8 Perception regarding banking transactions conducted through various channels

Finally this section has a question requesting the respondents to indicate the approximate percentage of banking transactions done by them through various modes of banking such as branch banking, ATMs, internet banking, tele banking and mobile banking.

The seventh and the final part of the questionnaire contained demographic details.

4.5 Reliability and Validity of the scales

Reliability and validity are two main criteria for measuring the goodness of measures used in a research instrument. Validity tests how well an instrument that is developed measure the particular concept it is supposed to measure and reliability tests how consistently a measuring instrument measures whatever concept it is measuring. Reliability is a necessary but not a sufficient condition for the validity of an instrument.

Different multi-item scales are used in the questionnaire of the study; the multi-item scales have been adapted with suitable modifications from related literature. These scales have shown reliability and validity in the respective studies from which they have been adapted.

However to verify the suitability of the measurements used with the data in the study the multi-item scales have been subjected to reliability and validity tests in the study. Cronbach alpha which is a measure of reliability based on internal consistency of the constructs used have been calculated for all the multi-item variables as recommended by (Hair et al., 1998). Only those items having Cronbach alpha coefficient of 0.7 or more have been used for measurement in this study.

Content validity has been ensured by adapting the measures of the constructs from prior studies based on well accepted theoretical backing and the consultation with experts during the pre-testing stage. The construct validities are established through factorial validity test involving factor analysis.

The reliability and validity tests are shown in the relevant chapters along with the findings and results from respective multi-item scales used.

4.6 Statistical Techniques

The primary data collected from the respondents were tabulated and analysed using the Statistical Package for Social Sciences (SPSS. 10). Descriptive statistics were used to know about the characteristics of the respondents.

The statistical tools such as the weighted means, independent sample t-test and one way ANOVA test were used to test the differences in adoption levels of the electronic banking channels among various demographic categories, respondents belonging to different bank groups and cities. The same tools were used to find the differences in the satisfaction levels and perception levels pertaining to the electronic banking channels among these groups.

Correlation tests were used to find out the pairwise relationships between adoption and use percentage of transaction through these channels, the pairwise relationships between adoption levels, customer satisfaction, service quality and so on.

Reliability and validity of the various scales used in the study are tested by computing the Cronbach's alpha and by conducting exploratory factor analysis using principal component analysis with varimax rotation respectively. In some cases confirmatory factor analysis (CFA) using AMOS.16 statistical package has also been done.

Logistic regression was done to identify the predictors of adoption/usage of internet banking services. Multiple regression analysis using enter method was used with total electronic banking channel adoption as the dependent variable for to understand the effect of various independent variables like perceived relative advantage, self efficacy, need for personal contact, innovativeness and perceptions regarding risks.

Structural Equation Modeling (SEM) using AMOS.16 package was employed to find the relationship among antecedent beliefs, attitudes, intention to use and usage in case of ATMs and internet banking.

The reasons for non-usage of internet banking and tele banking were analysed using weighted means.

4.7 Conclusion

The chapter outlined the principles underlying the design of the study and the research methodology used. The details regarding the research approaches used, data sources, sampling method used, research instrument, and the statistical tools that are made use of are also brought out in this here. The chapter shows that the study endeavors to adhere to the scientific principles of research.

Part Two: Data Analysis, Findings and Conclusions

Chapter 5

DEMOGRAPHIC PROFILE AND GENERAL PERCEPTIONS

5.1 Introduction

This chapter presents the demographic profile of the respondents, their electronic banking channel usage and their perceptions pertaining to overall characteristics of the bank. A total of 940 questionnaires were distributed out of which 520 were distributed in the 'metro banked centre' and 420 were distributed in the 'urban banked centres'.

Out of the 940 questionnaires distributed 567 were received back, yielding a response rate of 60.32% which is better than the rate of similar studies, the high rate of response being due to the fact that the data collection was done using direct contact method. Of the 567 responses only 557 were valid for further analysis. On further examination of these 557 respondents 4 of them were found to be using only branch banking, and as this category was negligible it was decided to remove them from further analysis. So for all practical purposes the sample size used for analysis is 553.

5.2 Demographic Profile of the Respondents

The sample population comprised of 56.2% males and 33.8% females indicating that men might use the electronic banking services more than women. This might also be because of the fact that more males in the society

have bank accounts than the females. Further, similar studies done abroad also point out the fact that more males than females use technology-enabled banking self-services. For instance studies pertaining to electronic banking by Laforet and Li (2005) in China and by Akinci et al. (2004) in Turkey, showed that the users of these services were predominantly males.

Table 5.1 Demographic details of the respondents

Demographic factors	Valid Items	Frequency	Percentage
Gender	Males	366	66.2
	Females	187	33.8
Age	18-25	166	30
	26-35	157	28.4
	36-45	117	21.2
	46- 60	79	14.3
	Above 60	34	6.1
Educational Qualification	Pre Degree/12th	16	2.9
	Graduate	290	52.4
	Post Graduate	157	28.4
	Professional Qualification	90	16.3
Occupation	Salaried	311	56.2
	Business/Self Emoployed	161	29.1
	Student	69	12.5
	House wife	10	1.8
	Others	2	0.4
Marital Status	Married	317	57.3
	Unmarried	236	42.7
Total number of respondents		553	100

Age-wise distribution of the sampled respondents showed that majority of the respondents (58.4%) are below 36 years which points out the fact that the adoption level of electronic channel is more among the younger population. Similar studies done in other countries also show that it is mostly the youngsters who take to these electronic channel self-services. Filotto et al. (1997) in their study in Italy found that younger consumers more than older consumers like to use ATMs, which at that time was in its introductory phase in that country. Al-Ashban and Burney (2001) in their study in Saudi Arabia found that adoption of tele banking is negatively associated with age. Likewise Karjaluoto et al. (2002) found that online banking usage is more among relatively younger people.

Of the respondents 55.2% were married. More than 98% of the respondents have graduation or higher qualifications, which again shows that it is the educated category of the population who has widely adopted electronic banking channels. This is in tune with similar studies done earlier. The studies by Sathye (1999), Mattila et al. (2001) and Karjaluoto et al. (2001) also have shown that it is the educated category of the bank consumers who are likely to use more of technology-enabled banking self-services.

Among the occupational categories, the salaried classification has the highest number among the respondents with 56.7%, followed by the business/self employed category with 29.1%.

The largest percentage of the respondents (21.9%) fall in Rs 3-4 lakh per annum income category. The median income is also in this range. Considering the fact that the annual per capita income of Karnataka is only Rs 34, 250 for 2006-07 (Special correspondent, The Hindu, 2008), this range consists of bank customers with above average income as compared to the general population of Karnataka.

The second largest category i.e., 17.2 per cent of respondents belong to Rs 2-3 lakhs income category followed by the Rs 4-5 lakhs income category with 14.3 per cent of respondents.

Table 5.2: Income distribution of the respondents

Demographic factors	Valid Items	Frequency	Percentage
Income Distribution (annual income in Rupees)	No income or Rs 1lakh or less *	55	9.9
	Between Rs 1-2 lakhs	74	13.4
	Between Rs 2-3 lakhs	95	17.2
	Between Rs 3-4 lakhs	121	21.9
	Between Rs 4-5 lakhs	79	14.3
	Between Rs 5-7 lakhs	57	10.3
	BetweenRs 7-10 lakhs	38	6.9
	Above Rs 10 lakhs	34	6.1
	Total	553	100

* student category

5.3 Most Frequented Banks

Public sector bank is the largest 'most frequented bank' (45.9%) of the respondents, closely followed by a private sector bank (41.2%). Foreign banks have a share of 12.8% in this regard.

The respondents were required to base their responses from the experience with their most frequented bank as it is assumed that bank consumers are likely to use the electronic banking services of their 'most frequented bank' the maximum, since the majority of banking transactions an individual performs will be with his/her most frequented bank.

Table 5.3: Most frequented bank group/category

Respondents' most Frequented Bank Group/Category	Frequency	Percentage
Public Sector Bank	254	45.9
Private Sector Bank	228	41.2
Foreign Bank	71	12.8
Total	553	100

The reason for low share of the respondents from foreign banks could be assigned to the fact that most of the branches of banks belonging to foreign bank group are only in the metro 'banked centre' of Bangalore barring one bank which has a branch in the sampled urban 'banked centres'.

5.4 Geographical locations of the respondents

Geographically 300 responses were from the 'metro banked centre' Bangalore city and 253 responses were from the 'urban banked centres' consisting of Mangalore and Udupi cities.

Table 5.4: Geographical Locations

Banked Area	Frequency (percentage)
Metro banked centre	300 (54.2)
Urban banked centres	253 (45.8)
Total	553 (100)

As there were no significant differences in the respondent usage patterns and adoption levels of the sampled urban banked centres it was decided to club together the responses from these two locations so that comparisons could be made between two categories of banked centres viz. metro and urban banked centres.

5.5 Reasons for selecting the banks

When asked about the reason for selecting their most frequented bank the largest percentage of respondents (49.4%) had ticked the reason '*convenience of the location of the bank branch*'. The second largest reason given was '*better service and friendly staff*' (34.9%).

These were followed by reasons such as '*greater spread of ATM network*' (33.8%) and '*availability of electronic banking facilities*' (30%).

Table 5.5: Most important reason for selecting the bank

Reasons for selecting the bank	Frequency (Percentage)
Convenience of the location of the bank branch	273 (49.4)
Better service and friendly staff	193 (34.9)
Greater spread of ATM network	187 (33.8)
Availability of electronic banking facilities	166 (30)
Bank's image	159 (28.8)
Employer's insistence on having salary account with the bank.	141 (25.5)
Recommendations of friends and relatives	86 (15.6)

Despite the increasing provisioning of services through the self-service electronic channels the bank customers in India still feel that the bank branch location and the customer services provided by the bank employees are very important factors in the choice of their bank (table 5.5).

5.6 Types of electronic banking channels used by respondents

From table 5.6 it is found that 32.9% of the sample was using ATM and internet banking services out of the technology-enabled banking channels. Following this the next largest group 26.6% was using ATM only out of the four electronic channels. The group that was using all the four technology-enabled services namely ATM, internet banking, tele banking and mobile banking is 18.4% of the respondents.

The segment using the combination of ATM and tele banking out of the electronic banking self-services was only 3.3%. Those using a combination of ATM, tele banking and mobile banking were only 1.1%. Those using ATM and mobile banking combination were only 0.9%.

Table 5.6: Electronic banking channels used

Electronic Banking Delivery Channels used	Frequency (Percentage)
Using ATM only	147 (26.6)
Using ATM, Internet Banking	182 (32.9)
Using ATM, Internet Banking , Tele banking	56 (10.1)
Using ATM, Tele banking	18 (3.3)
Using ATM, Internet banking, Mobile banking	37 (6.7)
Using ATM, Tele banking, Mobile Banking	6 (1.1)
Using ATM, Internet banking, Tele banking, Mobile banking	102 (18.4)
Using ATM, Mobile banking	5 (0.9)
Total	553 (100)

The results show that 86.8% of the tele banking users is also using internet banking. So it can be seen that the vast majority of those customers who use tele banking services are also users of internet banking.

The results also points out the fact that 92.67% of mobile banking users is also using internet banking. Thus a vast majority of mobile banking users also use internet banking.

The above two observations show that once a person starts using internet banking, the chances of him/her using tele banking and mobile banking are high. Of the internet banking users 51.72% was using either tele banking or mobile banking or a combination of both.

The electronic banking adopters can be categorized into two major groups those using only ATMs and those using electronic banking self-services other than ATMs, such as internet banking, tele banking and mobile banking along with ATMs.

The proportion of ATM, internet banking, tele banking and mobile banking users and non-users can be found in table 5.7.

Table 5.7: Electronic banking delivery channel users and non-users

Electronic Banking delivery channel	Frequency (percentage)	
	Users	Non-users
ATM	553 (100)	------
Internet Banking	377 (68.2)	176 (31.8)
Tele banking	182 (32.9)	371 (67.1)
Mobile Banking	150 (27.1)	403 (72.9)

Almost all of the respondents have adopted ATM. This is hardly surprising as the penetration of ATMs in the past few years has been phenomenal and even among the common bank users ATM usage is widespread. ATM card is a standard issue nowadays when a bank account is

opened in all the scheduled commercial banks barring the regional rural banks and cooperative banks.

The internet banking user percentage, tele banking user percentage and mobile banking user percentage are on the higher side than what is found amongst average bank consumers due to the working population of the sample.

5.7 Overall bank satisfaction

Overall bank satisfaction here is denoting the satisfaction of the respondents with their respective 'most frequented' banks. It was measured using a five-item scale adapted from Al-Hawari et al. (2006), which measures satisfaction directly with 5 being 'highly satisfied' and 1 being 'highly dissatisfied'. The five items included in the scale cover the consumers' satisfaction with bank products, staff services, physical surroundings of the bank, bank fees and automated services. The composite mean score is taken as the satisfaction with the bank as a whole. However, individual satisfaction across these five parameters is also looked into for the sake of comparing the satisfaction levels among the three bank groups considered.

Table 5.8a: Overall bank satisfaction levels bank group wise

Mean Satisfaction with	Public sector bank N= 254	Private sector bank N = 228	Foreign bank N = 71
Bank Products	3.87 (0.75)	3.76 (0.72)	3.75 (0.67)
Bank Staff	3.82 (0.82)	3.68 (0.79)	3.68 (0.86)
Bank physical surroundings	3.73 (0.86)	3.75 (0.78)	3.68 (0.82)
Bank fee	3.79 (0.73)	3.30 (0.92)	3.28 (1.03)
Automated services	4.06 (0.88)	4.17 (0.80)	4.37 (0.83)
Overall bank satisfaction	3.85 (0.58)	3.73 (0.53)	3.75 (0.58)

The values are calculated on a five point scale with 5 = highly satisfied and 1= highly dissatisfied

The values shown are mean values

The values shown in the parenthesis are standard deviations

The bold values are the highest in the category

The public sector banks' customers are having the highest overall satisfaction level with 3.85 followed by foreign banks' customers with 3.75 and private bank customers' with 3.73 (table 5.8a). From ANOVA table 5.8b it is found that the variation in overall satisfaction levels of the respondents is significant among the three bank groups at 95% confidence level since the p value is less than 0.05. This variation is significant between public sector banks and private sector banks as well as that between public sector and foreign banks. The variation is not significant between the values of private sector banks and foreign banks in this regard.

Table 5.8b: ANOVA test for determining significant variations in consumer satisfaction levels

		Sum of Squares	df	Mean Square	F	Sig.
Satisfaction with Bank Products	Between Groups	1.704	2	.852	1.619	.199
	Within Groups	289.360	550	.526		
	Total	291.063	552			
Satisfaction with Bank Staff	Between Groups	2.691	2	1.346	2.040	.131
	Within Groups	362.846	550	.660		
	Total	365.537	552			
Satisfaction with Bank Physical Surroundings	Between Groups	.296	2	.148	.219	.804
	Within Groups	372.095	550	.677		
	Total	372.391	552			
Satisfaction with Bank Fee	Between Groups	33.941	2	16.971	23.102	**.000**
	Within Groups	404.026	550	.735		
	Total	437.967	552			
Satisfaction with Automated Services	Between Groups	5.624	2	2.812	3.972	**.010**
	Within Groups	389.374	550	.708		
	Total	394.998	552			
Overall Bank Satisfaction	Between Groups	1.921	2	.961	3.062	**.048**
	Within Groups	172.582	550	.314		
	Total	174.503	552			

Sig. values darkened are less than 0.05, indicating significance at 95% confidence level

With regard to the bank product satisfaction level, the public sector bank customers are found to have the highest satisfaction level (3.87). The bank products' satisfaction level of customers is almost the same for private bank customers (3.78) and foreign bank customers (3.75). But there is no

significant variation between the satisfaction levels for bank product among all the three bank groups at 95% confidence level since the p value is more than 0.05.

Again for the bank staff satisfaction level the public sector banks' customers are found to have highest satisfaction level (3.82). It is found to be the same for private sector and foreign bank customers (3.68 each). This might be due to the fact that public sector banks are able to provide more personalized attention to its customers as the public sector banks have more of branch transactions than the private sector and foreign banks. However, the difference in satisfaction levels is not significant at 95% confidence level since the p value is more than 0.05.

The physical surroundings satisfaction is almost the same for public sector and private sector banks at 3.76 and 3.77. This shows that the efforts from the public sector banks to upgrade their physical surrounding and ambience of the branches have paid rich dividends. But the variation in the values of satisfaction levels on account of the banks' physical surroundings is not significant at 95% confidence level since the p value is more than 0.05.

The satisfaction level with bank fees is the highest for the public sector banks' customers (3.79), while it is almost the same for both private and foreign bank customers having values of 3.3 and 3.28 respectively. The variation in the values of the respondents' satisfaction with the bank fees of the public sector banks is statistically significant with those of both private sector banks and foreign banks since the p value in this regard is less than 0.05.

The satisfaction with the automated services is the highest for the foreign bank customers (4.37) followed by the private sector bank customers (4.17) and by the public sector bank customers with a satisfaction level of 4.06. These findings are not surprising as it is the foreign banks and private sector banks that have pioneered the introduction of electronic banking delivery channels in the country long before the public sector banks. In foreign banks such as Citi Bank the customers are compelled to use electronic delivery channels as they impose a penalty if the customers other than the high net worth customers do branch banking. From ANOVA table 5.8b it is found that differences among the satisfaction level regarding the automated services are significantly different among the bank groups at 95% confidence level since the significance level is less than 0.05.

In conclusion, the levels of overall banking satisfaction, with the bank fee and satisfaction with automated banking services are significantly different among the respondents from the three bank groups. The overall satisfaction and bank fee satisfaction are the highest among the customers from public sector banks and the satisfaction with the automated banking services are the highest among the customers from the foreign banks.

5.7.1 Comparison of overall bank satisfaction level between users and non-users

A comparison is made between the overall bank satisfaction levels of users and non-users of internet banking, tele banking and mobile banking services. This comparison is done in order to find out whether the users have a higher satisfaction level as compared to non-users. So the mean overall bank satisfaction levels are compared and independent sample t-tests performed to determine whether the differences are significant.

Table 5.9: Comparison of overall bank satisfaction level between users and non-users

Electronic Banking Channel	Overall bank satisfaction level* (mean values)		t-value	Sig. (2-tailed)
	Users	Non-users		
Internet banking	3.82	3.73	1.73	0.085
Tele banking	3.8	3.79	0.26	0.79
Mobile banking	3.84	3.77	1.28	0.55

* the maximum satisfaction level 5 = highly satisfied

When the overall bank satisfaction levels between the users and non-users are compared it is found from table 5.9 that though the satisfaction levels are marginally higher for the users, it is not significantly high as found from the results of the t-test. Since the significance level from the t-test is found to be more than 0.05 the difference in the values is not statistically significant at 95% confidence level. However it is found that at 90% confidence level the overall bank satisfaction level is significantly higher for internet banking users as compared to non-users.

Thus it can be concluded that the overall bank satisfaction levels are not higher for the users of technology-enabled banking self-services.

5.8 Branch visit frequency

From the literature it is found that when the consumers start adopting technology-enabled self-services such as ATMs, internet banking, tele banking and mobile banking the branch banking transactions of the bank consumers reduce (Mols et al., 1999). This has several implications for the banks such as reduction of work for bank branch staff, freeing them to concentrate on more value-added work than the routine transaction work (Marr and Prendergast, 1994). So in this study need was felt to empirically test the effect of adoption of

electronic banking on the branch banking transactions. The frequency of branch visit by the respondents was taken here as the extent of branch transactions undertaken by them. Hence comparisons were made of the branch visit frequency among respondents from different bank categories, locations and between the branch visit frequency of users and non-users.

The frequency with which the bank customers visit the bank branch is measured on a six-point scale with the following measures- once or twice a week, fortnightly, monthly, quarterly, once in six months and rarely.

As per the responses (table 5.10) the branch visit frequency is the highest among the respondents from the public sector banks (3.33), followed by private sector banks (2.65) and foreign banks (1.10). The maximum branch transactions are done by the public sector bank customers and the least by foreign bank customers.

Table 5.10: Branch visit frequency- bank group wise

5 = weekly, 4= fortnightly, 3= monthly, 2= quarterly, 1= once in six months and 0= rarely

Bank type/ Group	Mean branch visit frequency of customers
Public Sector banks	3.33
Private Sector banks	2.65
Foreign banks	1.10

The foreign banks and private sector banks were the first ones to introduce technology-enabled banking services, so it is not surprising that the branch transactions are lower in these bank types as compared to public sector banks.

Table 5.11: Branch visit frequency at different locations

5 = weekly, 4= fortnightly, 3= monthly, 2= quarterly, 1= once in six months and 0= rarely

Banked centre	Average branch visit frequency of customers
Metro	2.51
Urban	3.07

When the branch visit frequency of the respondents was compared between the two geographical locations which were sampled it was found that the respondents from the metro banked centre visited bank branch less frequently (2.51) as compared to those from urban banked centres (3.07). The educational and financial advancement of the bank customers of the metro banked centres enhance the usage of the technology-enabled self-services in comparison with the customers from tier-2 cities of the urban banked centres.

5.8.1 Branch visit frequency comparisons of users and non-users of Internet banking, Tele banking and Mobile banking

The branch visit frequency of internet banking users is significantly lesser than the internet banking non-users. The same trend is also found when users and non-users of tele banking and mobile banking are compared. The independent sample t-test shows that the difference between branch visit frequencies between users and non-users was statistically significant at 95% confidence level since the p-value in all the cases is lesser than 0.05 (table 5.12).

Table 5.12: Independent sample t-tests between users and non-users regarding branch visit frequency

	Mean Branch visit frequency factor*		t-test for equality of means		
	Users	Non-users	t-test value	df	Sig. (2-tailed)
Internet banking	2.41	3.51	-7.165	551	0.000
Tele banking	2.31	2.98	-4.294	551	0.000
Mobile banking	2.48	2.87	-2.364	551	0.018

* maximum value = 5

The electronic banking users have lesser need to visit bank branches as they do the banking transactions mainly through the electronic banking delivery channels such as ATMs, internet, telephones and mobile phones.

5.9 Perceptions regarding Core service and Price

Core service construct is defined as the features of the service product offered by the bank (Sureshchandar et al., 2002a). A multi-item scale used to measure the crucial contents or attributes of the banking service also has been included in the questionnaire. This has been adopted from Al-Hawari et al. (2005) and Sureshchandar et al. (2002a). The perceptions of the core service have been included as it has a key role to shape the overall quality perception and consumer satisfaction. It also differentiates one service provider from another. Again the measure was done using a five point Likert scale used in which 5 was equal to strongly agree and 1 strongly disagree.

Table 5.13: Core service perception items

Coding	Core service perception Items	Adapted from
CrSr1	My bank provides wide range of services (retirement's account, loans for vehicles, foreign exchange, fund transfers, home loans etc.)	Al-Hawari et al. (2005), Suresh Chander et al. (2002a)
CrSr2	My bank provides diverse service features (different interest rates, service options etc.)	
CrSr3	My bank follows the most advanced technology.	

Price perception is important for determining customer satisfaction and service quality in technology-enabled services (Al-Hawari et al., 2005). Price savings motivate customers to use these services and also form a basis for comparison among different modes of service delivery (Surjadjaja et al., 2003). So a three-item scale for measuring price-value perception adapted from Al-Hawari et al. (2005) had been included in this part. The measure was done using a five point Likert scale used in which 5 equal to strongly agree and 1equal to strongly disagree.

Table 5.14: Price perception items

Coding	Price Perception items	Adapted from
PrPer1	My bank adequately explains the service charges associated with each transaction.	Al-Hawari et al. (2005), Bahia and Natali (2000)
PrPer2	The banking services of my bank are having acceptable fees.	
PrPer3	My bank's service charges are competitive.	

5.9.1 Factor Analysis of Core service and Price perceptions

Factor analysis is done to show that the core service perception and price perceptions are two separate constructs and that the multi-item scales used to measure them are correctly measuring them.

Kaiser–Meyer-Olkin measure of sampling adequacy is 0.802 and Barlet's test of sphericity is significant at 672.697 with degrees of freedom 15. This shows that factor analysis can be done.

Principal component analysis is done with Varimax rotation and the items are loaded on to two factors as shown in table 5.15. None of the variables fell into unacceptable range, as all are above 0.5 factor loadings. Hence it can be concluded that the items are measuring the constructs correctly.

Table 5.15: Factor analysis of Core service and Price perceptions

	Variables	Factor 1 Core Service	Factor 2 Price Perception	Cronbach Alpha (Relaibility Co efficient)
CrSr1	My bank provides wide range of services	**.761**	.273	0.719
CrSr2	My bank provides diverse services	**.790**	.249	
CrSr3	My bank use the most advanced technology	**.763**	.120	
PrPer1	My bank explains the service charges	.289	**.717**	0.7138
PrPer2	My bank has acceptable fees	.220	**.765**	
PrPer3	My bank has competitive fees	.129	**.820**	
	Initial Eigen values	2.907	0.951	
	Percentage of variance explained	48.45	15.86	

***** the total variance extracted by the two factors are 64.31%

the overall cronbach alpha is 0.785

None of the variables fell into unacceptable range, as all are above 0.5 factor loadings. Hence it can be concluded that the items are measuring the constructs correctly. So the two multi-item scales shown can be used to measure the constructs of core service and price perceptions.

5.9.2 Core Service Perception and Price perception bank group wise

The customers' core service perception is the highest for foreign banks with 3.95 on a five point scale (table 5.16a), while the core service perception is almost the same for public sector and private sector banks. The reason for the same might be due to the fact that the customers perceive very little differentiation between the various services provided by the public sector and

private sector banks in India. Of late the public sector banks, due to increasing competition, are taking care to improve their services and hence have improved their range of services by including diverse services and they have increased their investments in the latest technology as well.

Table 5.16a: Core Service Perception and Price perception bank group wise

Bank Group	Mean core service perception*	Mean price perception*
Public Sector Banks	3.78 (0.7)	3.56 (0.7)
Private Sector Banks	3.80 (0.60)	3.42 (0.66)
Foreign Banks	3.95 (0.65)	3.47 (0.78)

* with maximum value being 5

Values given in the parenthesis are standard deviations

Refer Appendix-2, table A 2.2, for descriptive statistics of overall core service and price perception

Table 5.16b: ANOVA table comparing the core service perception and price perception- bank group wise

		Sum of Squares	df	Mean Square	F	Sig.
CORE SERVICE PERCEPTION	Between Groups	1.640	2	.820	1.906	.150
	Within Groups	236.629	550	.430		
	Total	238.269	552			
PRICE PERCEPTION	Between Groups	2.323	2	1.162	2.402	.091
	Within Groups	265.909	550	.483		
	Total	268.232	552			

However, the perception of the core services about foreign banks is a notch above the other two categories because their customers being relatively high networth individuals might be receiving more value-added services by virtue of the fact that the cost of services and minimum balances kept by them are higher. But there is no statistically significant difference at 95% confidence for core service value for all three groups of bank as the p-value is more than 0.05 (Table 5.16b).

Price perception is the best in case of the public sector banks. Perhaps this is due to the perception among customers that the service charges and interest rates are lower in case of public sector banks as compared to the foreign and private sector banks. The price perception of private sector banks and foreign banks is more or less the same. The difference in price perceptions among the bank groups is not statistically significant at 95% confidence level since the p value is more than 0.05. However, perception pertaining to price is an important aspect which creates an impact on quality of service.

5.9.3 Relationship between overall bank satisfaction and core service perception

From the literature (Suresh Chander et al, 2002b) it is found that core service perception is having a positive relationship with the overall bank satisfaction. When these two constructs were correlated it was found that there is significant positive correlation between them (correlation coefficient r = 0.498) at 99% confidence level since the p value is less than 0.01.

Table 5.17: Correlation between overall bank satisfaction and core service perception

		Overall bank satisfaction	Core Service Perception
Overall bank satisfaction	Pearson Correlation	1.000	.498**
	Sig. (2-tailed)	.	.000
	N	553	553
Core Service Perception	Pearson Correlation	.498**	1.000
	Sig. (2-tailed)	.000	.
	N	553	553

**. Correlation is significant at the 0.01 level (2-tailed).

This shows that the more the core service perception of a bank customer the more will be his/her overall satisfaction level with the bank. So the banks should see to it, that to improve the core service perception and thereby satisfaction of its customers they have to provide diverse and wide range of services and adopt the advanced technology.

5.9.4 Relationship between overall bank satisfaction and price perception

The price perception has a positive relationship with the consumer satisfaction as per the study by Al-Hawari et al. (2006). When the constructs of price perception and satisfaction were correlated, the correlation coefficient (r = 0.501) was found to be significant at 99% confidence level since the p value is less than 0.01.

Table 5.18: Correlation between overall bank satisfaction and price perception

		Overall bank satisfaction	Price perception
Overall bank satisfaction	Pearson Correlation	1.000	.501**
	Sig. (2-tailed)	.	.000
	N	553	553
Price perception	Pearson Correlation	.501**	1.000
	Sig. (2-tailed)	.000	.
	N	553	553

**. Correlation is significant at the 0.01 level (2-tailed).

This means that the better the price perception by the respondents the higher will be their overall satisfaction with the bank. Hence the banks need to have acceptable and competitive fees which have to be clearly explained to their customers in order to create a better price perception thereby improving the customer satisfaction.

5.9.5 Comparison of core service and price perception between users and non-users

The core service perception is compared between users and non-users of internet banking, tele banking and mobile banking. The users of these services had better perception than non-users and the differences are significant as found out from the results of the independent sample t-test at 95% confidence level since the p-values are lesser than 0.05 (table 5.19a). Hence it can be concluded that users of technology-enabled self-services are found to have better perception pertaining to the core services offered by their banks. The implication is that the better the perception a bank customer has the more likely that he/she uses the services through these electronic banking channels.

Table 5.19a: Comparison of core service perception between users and non-users

	Core service perception*		t-test for equality of means	
	Users	Non-users	t-value	Sig. (2-tailed)
Internet banking	3.88	3.68	3.34	0.001
Tele banking	3.90	3.77	2.074	0.039
Mobile banking	3.97	3.76	3.435	0.001

* maximum value is 5

Table 5.19b: Comparison of price perception between users and non-users

	Price perception*		t-test for equality of means	
	Users	Non-users	t-value	Sig. (2-tailed)
Internet banking	3.54	3.39	2.445	0.015
Tele banking	3.53	3.47	1.102	0.271
Mobile banking	3.62	3.44	2.654	0.008

* maximum value is 5

The price perception is also found to be higher among the users of these services. From the independent sample t-test shown in table 5.19b it is found that the price perceptions between users and non-users is significantly higher among the users as compared to non-users at 95% confidence level (p-values less than 0.05) except in the case of tele banking services.

So it can be concluded that the users in general have more positive perception regarding the pricing of the banking services. One factor indirectly leading to positive price perception might be the savings in cost of conducting transactions, since these services donot require customers to visit bank branch, the bank customers save on the cost of visiting bank branches. Another reason could be that at present the banks in India are offering services such as internet banking and tele banking free of any service charges.

5.10 Perception regarding electronic services and improvement of quality of services.

The respondents were asked whether the electronic banking services have improved the quality of banking services of their respective banks. The responses were measured on a five-point Likert scale with 5 being strongly agree and 1 being strongly disagree. The intention of asking the question was to see whether they felt that the electronic banking services were a contributor to the banking services quality.

Table 5.20: Electronic banking improving the quality perception

	Perception regarding electronic banking improving the banking quality*		t-test for equality of means	
	Users	Non-users	t-value	Sig. (2-tailed)
Internet banking	4.16	3.74	5.713	0.000
Tele banking	4.13	3.97	2.062	0.040
Mobile banking	4.13	3.98	1.917	0.056

* maximum value is 5

According to the results (table 5.20) users felt that electronic banking had improved the quality of banks more than the non-users. This difference in perceptions between users and non-users is statistically significant at 95% confidence level (p-value lesser than 0.05) except in the case of mobile banking. But the p-value corresponding to the mobile banking in the t-test is found to be very close to 0.05 at 0.056, which shows that for all practical purposes it can be assumed that there is significant difference between the perception of mobile banking users and non-users.

Comparison of the perception regarding the improvement in quality of services because of electronic banking by the respondents is compared among the bank groups. It was found that this perception regarding the improvement in quality was maximum among foreign bank respondents (4.44), followed by those from private bank (4.07) and the least was from among the public sector bank respondents (3.88).

Table 5.21: Comparison of perception regarding improvement in banking quality due to electronic banking

Bank Group	Perception regarding electronic banking improving the banking quality*
Public Sector Banks	3.88
Private Sector Banks	4.07
Foreign Banks	4.44

***** maximum value is 5 = strongly agree

As it is the foreign banks which have adopted the technology to the largest extent followed by the private banks and then by public sector banks, the inference from the above result is that the more a bank adopts technology products and its customers use them, the better will be the perception that electronic banking has improved the quality of services of the bank.

5.11 Conclusion

In this chapter the demographic details of the respondents of the survey are explained, along with the number of users and non-users of the technology-enabled banking self-services. The demographic distribution shows that the users of these services are mostly well-educated youth who have relatively higher income. The bank choice criteria are examined which showed that location of the branch is still the most important criterion.

There is no significant difference between the satisfaction levels of users and non-users of the technology-enabled services. The branch visit frequencies of users were found to be significantly lower showing that when customers start using the electronic banking channels bank branch transactions come down. A comparison of the core service perceptions and price-value perceptions between the users and non-users showed that the users had significantly higher perceptions as compared to non-users. The users were having a higher perception pertaining to the improvement in the quality of banking services because of electronic banking.

Chapter 6

USAGE PATTERNS OF TECHNOLOGY–ENABLED BANKING SELF-SERVICES

6.1 Introduction

This chapter shows the findings related to various usage patterns of technology-enabled banking self-services such as ATM services, internet banking services, tele banking services and mobile banking services. In particular the usage of computers and internet by the respondents, awareness levels among the respondents regarding the electronic banking self-services, the frequency and duration of usage of these services have been examined. The extent of usage of various functions or menu options offered through these technology-enabled delivery channels is also brought out.

6.2 Usage of computers and internet

In order to use internet banking, access to and knowledge of computers are essential pre- requisites. Accordingly, one should have internet access and should know how to use the internet to use internet banking. There is also evidence from the literature (Mattila, 2001) that experience with computer is a major driver for internet banking adoption. Therefore questions pertaining to computer access of the respondents, and computer and internet usage by them were included in the questionnaire. These questions were included to check the

relationship of these aspects with the respondents' adoption behaviour and usage patterns of technology-enabled banking self-services.

6.2.1 Access to computers and internet

Of the respondents 94% have claimed that they had access to computers and 89.7% have responded that they had access to internet. Having access to computers and internet is the primary requirement for using technology-oriented services such as internet banking. Thus a relatively high percentage of the respondents having access to computers and internet is not surprising considering the fact that the respondents were from metro and urban locations, highly educated, have relatively higher income and majority are in their youth or middle adulthood.

If all-India figures are taken into account for comparison sake, there are about 87.1 million computer literates among the population and there are about 55.5 million claimed internet users as per the 'I-Cube 2008' survey on internet usage in India, jointly conducted by IMRB International and Internet & Mobile Association of India (IAMAI) during September, 2008. According to this report the internet penetration in India is less than 0.6 % of the total population and only less than 9% of the internet users are from rural locations.

6.2.2 Duration of computer usage per day

Largest percentage (30.2%) of respondents are using computer for more than 6 hours per day. 21.5% of respondents use computers for 3 to 6 hours and 23.5% of the respondents use the computer for 1 to 3 hours per day. Those who are using computers less than one hour per day are a minority at 16.6% of the respondents and 8.1% of the sample hardly use the computer. Majority of the respondents are fairly experienced with the usage of computers with 75% of them using computers more than an hour a day.

Table 6.1a: Hours of computer usage per day

Hours of Computer usage/day	Percentage of respondents
More than 6 Hrs.	30.2
Between 3-6 Hrs.	21.5
Between 1-3 Hrs.	23.5
One hour or less	16.6
Hardly any	8.1

6.2.3 Frequency and hours of internet browsing

From the table 6.1b it is found that majority of the respondents browse internet on a daily basis (57.2%). Those who are using 2-3 times a week are 25.6%. From this result we find that 82 % of the respondents browse the net minimum 2-3 times a week showing that majority of the respondents are regular users of the internet.

Table 6.1b: Frequency of internet browsing

Frequency of internet browsing	Percentage of respondents
2/3 times daily	19.2
daily	38
2/3 times weekly	25.6
monthly	6.5
Never	10.7

Table 6.1c: Hours of internet browsing per week

Hrs. of internet browsing per week	Percentage of respondents
More than 15 Hrs.	17.3
Between 10-15 Hrs.	10.2
Between 5-10 Hrs.	21.3
Between 1-5 Hrs	40.4
Hardly any	10.9

Majority of the respondents (89.1%) spend at least 1-5 hours per week browsing the internet (Table 6.1c).

6.2.4 Comparison between users and non-users regarding hours of computer usage per day, frequency of internet browsing and internet browse hours

A comparison was made between the users and non-users of internet banking, tele banking and mobile banking across the parameters taken for measuring the extent of usage of computers and internet such as hours of computer usage per week, internet browse frequency and hours of internet browsing per week. From the literature it is seen that the adopters of technology-enabled banking self-services such as internet banking are found to posses prior experience with computers and are more PC proficient (Mattila, 2001; Karjaluoto et al., 2002). They are also found to be technology-oriented and comfortable with the usage of technology products such as computers and internet (Gerrard and Cunningham, 2003; Akinci et al., 2004; Laforet and Li, 2005). So in this study it was decided to examine whether bank customers who use computers and internet to a significant level are more likely to be adopters of technology-enabled banking self-services.

Table 6.2a: Comparison between users and non-users regarding hours of computer usage per day

Technology-enabled banking self-service	Hours of computer usage per day* (mean)		t-test for equality of means	
	Users	Non-users	t-value	Sig. (2-tailed)
Internet banking	3.87	2.67	10.58	0.000
Tele banking	3.79	3.34	3.88	0.000
Mobile banking	3.89	3.34	4.91	0.000

*****5 = More than 6 hours per day, 4 = Between 3-6 hours per day, 3 = Between 1-3 hours per day, 2 = One hour or less per day and 1 = Hardly any

From the table 6.2a it is found that the hours of computer usage by users of technology-enabled banking self-services are significantly more than the non-users at 99% confidence level as the p-value is less than 0.01. This shows that the users are more experienced with computers than the non-users as they spend more hours using the computers. This result also shows that the users are more technology-oriented as it can be assumed that they are more comfortable with technology products such as computer by virtue of using the computers more.

Table 6.2b: Comparison between users and non-users regarding their frequency of internet browsing

Technology-enabled banking self-service	Frequency of internet browsing* (mean)		t-test for equality of means	
	Users	Non-users	t-value	Sig. (2-tailed)
Internet banking	3.95	2.85	10.8	0.000
Tele banking	3.93	3.44	5.35	0.000
Mobile banking	4.02	3.45	6.6	0.000

*****5 =2/3 times daily, 4 = daily, 3 =2/3 times weekly , 2 = monthly, 1 = never used

The frequency of internet browsing is significantly high among the users of electronic banking as compared to the non-users at 99% confidence level since the p-value is less than 0.01 (table 6.2b).

Table 6.2c: Comparison between users and non-users regarding their hours of internet browsing per week

Technology-enabled banking self-service	Hours of internet browsing per week*		t-test for equality of means	
	Users	Non-users	t-value	Sig. (2-tailed)
Internet banking	3.19	2.05	11.68	0.000
Tele banking	3.05	2.72	2.93	0.004
Mobile banking	3.07	2.73	2.78	0.006

*5 = More than 15 hours per week , 4 = Between 10-15 hours per week , 3 = Between 5-10 hours per week , 2 = Between 1-5 hours per week , 1 = Hardly any

From the table 6.2c it is also found that the hours of internet browsing are significantly higher for the users of electronic banking when compared with non-users. The p-values of the independent sample t-test are found to be less than 0.05 signifying the differences at 95% confidence level. From these two aspects it can be concluded that those who adopt technology-enabled banking self-services tend to browse internet more often and have greater familiarity in the usage of internet.

6.3 Awareness about technology-enabled banking self-services

As in the case of any innovation the awareness of the technology-enabled banking self-services is an important pre-condition for the usage of the service. This awareness is pertaining to not only being aware of the internet banking per se, but also customers' awareness that their banks are providing this particular service and awareness regarding the usage and the resultant use benefits. In fact in a study conducted among Australian bank customers,

Sathye (1999) found that one of the major reasons for non-usage of the internet banking services was the lack of awareness of the provision of such services.

Table 6.3a: Awareness regarding the TEBSS

TEBSS type		Total (%)	Metro banked centre (%)	Urban banked centres (%)
ATM	Aware	100	100	100
Internet Banking	Aware	77.9	83.6	71.2
	Not Aware	22.1	16.4	28.8
Tele banking	Aware	46.3	64.4	24.9
	Not Aware	53.7	35.6	75.1
Mobile Banking	Aware	39.1	54.5	21
	Not Aware	60.9	45.5	79.

From the survey conducted it is evident that ATM services are widely adopted and the awareness level pertaining to it is 100% indicating that this particular electronic banking self-service has become as common as, and if not more popular than, the branch banking services.

The awareness level of internet banking services is also fairly high with 78% of the respondents being aware of the services. This might be due to the fact that the internet banking is offered by almost all the major scheduled commercial banks in metro and urban banked centres. The wide advertisement and publicity given to this service by some of the banks also might have helped in creating relatively higher awareness levels. But from the table 6.3a it is found that the awareness levels in tier-2 cities and towns of urban banked centres are marginally lower for this service (71.2%) when compared with the metro banked centre (83.6%).

In the cases of tele banking services and mobile banking services more than half of the respondents are not aware of these services. The awareness

level for tele banking services was 46.3%, while that in the case of mobile banking services it is still lower with only 39.1% of the respondents being aware of this service. The awareness level of these services is much lower in tier-2 cities which constituted the urban banked centres. The awareness levels are about 26% in case of tele banking services and about 21 % in case of mobile banking services. Lack of awareness about these services might be due to the fact that not all banks are providing these services in tier-2 cities and towns. It is mainly the new private banks, foreign banks (if present) and a few progressive public sector banks which are providing telebanking and mobile banking services in tier-2 cities. Some of the public sector banks have only recently started providing these services. Another reason could be the lack of advertisements and publicity regarding these services.

Table 6.3b: Awareness among non-users as to whether their respective bank is providing the following TEBSS

	Aware percentage	Non-aware percentage
Awareness about internet banking among internet banking non-users	31	69
Awareness about tele-banking among tele-banking non-users	19.8	80.2
Awareness about mobile banking among mobile banking non-users	16	84

From table 6.3b it is found that the awareness levels among the non-users of these banking self-services are very less, for instance only 31 per cent of non-users of internet banking had proper awareness about this service. In case of tele-banking services non-users and mobile banking non-users the awareness levels are even lesser with awareness levels of the services at 20 per cent and 16 per cent respectively. Thus, it can be inferred that non-awareness

about electronic banking might be a very important factor for non-adoption of these services.

6.4 Usage frequency of TEBSS by users

From table 6.4 it can be seen that it is the ATM service which is being most frequently used. Most of the users of ATM (74.3) use it at least once or twice a week. This show the popularity and widespread adoption levels which the ATM services have achieved. The key reasons for the same could be convenience it offers (Leblanc, 1990; Marr and Prendergast, 1991), the widespread availability of ATM locations, and 24 X 7 transactions facilitated.

Table 6.4: Frequency of use of TEBSS

	Daily (%)	Weekly once or twice (%)	Fortnightly once or twice (%)	Monthly once or twice (%)	Number of Users
ATM	13.2	61.1	20.1	5.6	553
Internet Banking	9.8	34.2	30	26	377
Tele banking	6	20.9	29.1	44	182
Mobile Banking	8.7	16.0	37.3	33.3	150

Internet banking was the next widely adopted electronic banking service since about 44% (9.8 + 34.2) of its users were using the internet banking services at least once or twice a week. However, from the studies done in India it was found that even though most of the scheduled commercial banks except for the regional rural banks and cooperative banks were offering the internet banking services, there remained a considerable number of customers who were not using the internet banking services.

Tele banking services are not very popular since only 27% (6 + 20.9) of its users were using it at least once or twice a week. Most of the respondents who claimed to have used tele banking services were using it marginally with 44% of them reporting that they are using this service only once a month.

Mobile banking services also had marginal patronage as only about 24.7% (8.7 + 16) of its users were using it on a regular basis at least once or twice a week. Mobile phone banking services was the latest introduction to the technology-enabled banking self-services. Late introduction and limited number of banks offering mobile services currently might be the reasons for low usage rate of this service. Nevertheless, in future it is expected to have tremendous scope as a facilitator for banking transactions considering the high penetration of mobile telephones among Indian population with a subscriber base of 375.74 million as on March 2009 and growing at more than 13 million per month according to Wireless Federation (a wireless industry research conglomerate).

6.5 Duration/Length of usage of the electronic banking services

In order to analyse the adoption level of electronic banking services another parameter used is the length or duration of usage by the respondents.

From table 6.5a it is obvious that ATM services were well-adopted as about 59.7% of the respondents had been using ATM services for more than 3 years. In contrast to this the corresponding figures of internet banking services are 13.26%, that of tele banking services is 17.58% and the mobile banking services 4.67%.

Table 6.5a Length/Duration of usage by users of TEBSS

	(0-1) Yr (%)	(1-2)Yrs (%)	(2-3)Yrs (%)	More than 3yrs (%)	Number of users
ATM	1.8	14.1	24.4	59.7	553
Internet Banking	23.6	44.56	18.57	13.26	377
Telebanking	25.82	37.36	19.23	17.58	182
Mobile Banking	44	36.67	14.67	4.67	150

The lower period of usage of internet banking, tele banking and mobile banking services may be assigned to the fact that three years before the survey only a limited number of banks were offering these services. These services were being offered by foreign banks and a few private banks at that time, that too mainly in the metros and bigger cities. Very few public sector banks were offering these services and it is only in the past two to three years there has been increased provisioning of these services by the public sector banks. The very low figure of mobile banking services may be assigned to the fact that prior to 3 years only a few foreign banks like ABN Ambro bank and CITI bank, and a few new private banks like ICICI bank and HDFC bank were offering the mobile banking services. The mobile banking services were the latest electronic banking self-service to be offered by the banks, even while this study was going on it was only in its introductory phase.

With reference to the internet banking the largest percentage (44.56%) of the users had been using the services for a period between 1-2 years. In case of telebanking services the largest group of users (37.36%) had been using it for a period between 1-2 years. In the case of mobile banking services the largest group of users (44%) had been using the services for less than a year.

The non-user categories of respondents were asked about their likelihood of using technology-enabled banking self-services. The options

given were 'will use within 12 months', 'unlikely to use within 12 months' and 'will never use'. Those who had ticked the option 'will use within 12 months' are considered as the category of users who are likely to adopt electronic banking self-services in the short-term. The category 'unlikely to use within next 12 months' are the ones who had not totally ruled out the option of using technology-enabled banking self-services but were unsure whether they will start using this in the short-term. 'Will never use' category are the ones who have totally ruled out the usage of the respective electronic self-service option.

Table 6.5b: Non-users' likeliness of using the following TEBSS

	Will use within 12 months (%)	Unlikely to use within 12 months (%)	Will never use (%)	Total number
Internet banking	28.57	33.77	37.66	176
Tele banking	23.07	38.46	38.46	371
Mobile banking	27.42	39.06	33.52	403

From table 6.5b it was found that there were considerable numbers of non-users who were likely to adopt the electronic banking services in the short–term. The percentage of non-users of internet banking who were likely to go for it within next 12 months was 28.57%, the corresponding percentage among tele banking non-users was 23.07% and those among the mobile banking non-users was 27.42%. These segments of bank customers who have the propensity to adopt the respective technology-enabled banking self-services in the short-term are important for banks. They could be targeted to promote the usage of electronic banking services.

Next promising set of bank customers who can be targeted by banks as the potential adopters are those who are unlikely to use technology-enabled self-services within the next 12 months. Banks could persuade

these to take up electronic banking services as they have not totally ruled out the usage internet banking, tele banking and mobile banking respectively. As can be seen from table 6.5b such category of non-users represents a considerable number with about 34% of internet banking non-users, 38% of tele banking non-users and 39% of mobile banking non-users.

6.6 Perception regarding percentage of use of different banking channels

The respondents were asked regarding the average percentage of transactions usually conducted by them through different banking channels namely branch banking, ATMs, internet banking, tele banking and mobile banking.

Of the total percentage of banking transactions by the respondents their perception was that on an average they did 24.1% through branch banking, 54.65% through ATMs, 15.02% through internet banking, 3.51 % through tele banking, 2.21 % through mobile banking and 0.51% through other means.

The respondents perceive that their usage of ATMs for banking transactions is the maximum (54.65%), followed by branch banking transactions (24.1%) and internet banking is the second widely used technology-based banking self-service (15.02%). The usage of telebanking and mobile banking is marginal at 3.51% and 2.21% respectively. Out of all the technology-enabled banking self-services it is the ATMs which are most widely adopted, followed by internet banking while tele banking and mobile banking services are the least adopted. Branch banking is still important in Indian conditions as it is found to be second most used channel after ATMs (table 6.6a).

Table 6.6a: Perceived percentage of use of banking channels

Banking Channel	Average percentage of transactions		
	Total	Metro	Urban
Branch banking use percentage	24.1	19.62	29.17
ATMs use percentage	54.65	53.71	55.71
Internet banking use percentage	15.02	17.37	12.50
Tele banking use percentage	3.51	5.48	1.38
Mobile banking use percentage	2.21	3.24	1.15
Other means*	0.51	0.58	0.1

*Other means is include to accommodate those transactions perceived to be conducted through other means like door to door banking, banking transactions using third parties etc.

When these percentages are compared between metro and urban banked centres it is found that the urban banked centre respondents used more of branch banking and ATMs, while they used less of other electronic channels such as internet banking, tele banking and mobile banking. The use percentage of tele banking and mobile banking was marginal at 1.38% and 1.15% respectively, which shows that these services are still to catch up in the urban banked centres consisting of tier-2 cities. As mentioned earlier another reason for this could be that only a limited number of bank branches in the urban banked centres might be offering tele banking and mobile banking services.

6.6.1 Banking channel usage by users and non-users of TEBSS

The use percentages of banking channels by users and non-users of technology-enabled banking self-services are compared and the results are shown along with the average percentage of the respondents taken together.

From table 6.6b the percentage of use of various categories of users and non-users is examined.

Table 6.6b: Comparative percentage of use of banking channels by users and non-users

Banking Channel	Average percentage of transactions	Internet banking (%)		Tele banking (%)		Mobile banking (%)	
		Users	Non-users	Users	Non-users	Users	Non-users
Branch banking use percentage	24.1	19.04	34.91	16.8	27.62	17.9	26.43
ATMs use percentage	54.65	51.41	61.57	48.92	57.4	46.47	57.72
Internet banking use percentage	15.02	22.03	0	18.85	13.18	19.17	13.46
Tele banking use percentage	3.51	3.99	2.49	10.66	0	8.11	1.79
Mobile banking use percentage	2.21	2.98	0.57	4.13	1.29	8	0
Other means (percentage)	0.51	0.55	0.46	0.64	0.51	0.35	0.6

Internet banking users

The users of internet banking on an average did 22% of their total banking transactions through internet banking. However they relied mostly on ATMs to conduct majority of their transactions (51.41%), which is understandable as most important transactions like cash withdrawal and cash/cheque deposit cannot be conducted over internet banking. But their reliance on branch banking transactions is found to be less than that of average respondents (19.04%). Their usage of

telebanking and mobile banking was marginal at 3.99% and 2.98% respectively, which was slightly above that of average respondent.

Internet banking non-users

Internet banking non-users use ATMs (61.57%) the most followed by branch banking (34.91%). Their usage of telebanking and mobile banking was below average in comparison with that of the total respondents with values of 2.49% and 0.57%.

Tele banking users

The tele banking users on an average did about 10.66% of their transactions over the tele banking. Their usage of branch banking and ATMs was less than that of an average respondent with figures of 16.8% and 48.92% respectively. Their usage of internet banking was higher than that of an average respondent at 18.85%. Interestingly their usage of mobile banking at 4.13% was not only higher than that of an average respondent, it was even more than that of an average internet banking user.

Tele banking non-users

Tele banking non-users relied more on branch banking and ATMs than an average respondent at 27.62% and 57.4%. However their usage of internet banking at 13.18% and mobile banking at 1.29% was below that of an average respondent.

Mobile banking users

Mobile banking users, on an average, did 8% of their transactions in the mobile banking mode. They used lesser of branch and ATM transactions which were 17.9% and 46.47 respectively which is well below the same in case of an average respondent. Average mobile banking users did more than average internet banking and tele banking which were19.17% and 8.11% respectively.

Mobile banking non-users

The mobile banking non-users used branch banking and ATMs marginally more than the average respondent at 26.43% and 57.72% respectively. They used internet banking and tele banking lesser than average respondents at 13.46% and 1.79% respectively.

To conclude, it was observed that users, in general, used less of branch banking and ATMs as compared to the non-users. They used more of the electronic banking channels such as internet banking, tele banking and mobile banking.

6.7 ATM services usage pattern

The respondents were asked to tick which all services were being accessed through ATMs. Table 6.7 shows the percentage of respondents using the various services. The services shown in the table are not an exhaustive list of services provided but is only an indicative list selected after studying the common services provided in the menu by various banks whose customers were taken as respondents. Before finalizing this list of options consultations were also done with banking professionals in the related area.

Table 6.7: Usage of ATM services

ATM Services	Percentage of users using the services (No of ATM users = 553)
Cash Withdrawal	99.8
Balance Enquiry	72.9
Cheque/Cash Deposit	30.7
Funds Transfer	20.8
Order Cheque Book	11.0
Bills Payment	12.7
Recharging of Mobile Pre-paid card	4.3

It is evident that ATM machines were being utilized as convenient cash dispensers as mostly the basic services of ATMs like Cash Withdrawal (99.8%) and balance enquiry (72.9%) were the ones that were popularly being used by the respondents (table 6.7). But Cheque/Cash deposit facility is only used by a minority of the respondents (30.7%) indicating apprehension by users in availing this facility. The higher order value-added services like funds transfer, bill payments and recharging of mobile phone SIM cards and such were being used only by minority of the respondents. This proves that though the adoption of ATMs was widespread by the respondents and despite a multitude of services being provided now-a-days through the ATMs only a few people were utilizing these additional value-added services and even basic facilities like cheque/cash deposit are not used.

Thus despite many value-added services being provided through the modern ATMs and its widespread adoption, it was still being used by the majority of the people as convenient cash dispensers.

6.8 Internet banking services usage pattern

The respondents were asked to tick the commonly availed services through internet banking channel. The list of services or menu options shown was not an exhaustive list but represents a list of services commonly provided by banks through internet banking. These services have been further classified by Dinz E (1998) as those providing information as basic queries like *statement enquiry*, those conducting transactions like *bill payments* and those for maintaining customer relationship like *investment advice*.

Looking at the services another classification could be made like the services providing basic transactions of the bank or those higher order transactions providing more value-added services like shopping online and

investment advice. As the users move from basic transactions to more value-added services the adoption level increases and their confidence in the usage of internet banking transactions increases.

Table 6.8: Usage of internet banking services

Internet Banking Services	Percentage of Users (No of internet banking users = 377)
Statement Enquiry	86.2
Bills Payment	56
Funds Transfer	59.7
Cheque Book Request	40.3
Loan Applications	10.9
DD Requests	18.8
Shop Online	30.2
Mutual Fund Transactions	8.8
Investment Advice	7.4

Commonly used transactions within internet banking menu options (table 6.8) were statement enquiry(86.2%), funds transfer (59.7%) , bill payments (56%) and cheque book request (40.3%). The value added services like Mutual fund transactions (8.8%) and investment advice (7.4%) were being sparingly used. One of the reasons for this trend could be that only a few banks' websites were providing these value-added transaction services. Even in case of some of the common services of banks like loan applications (10.8%) and DD requests (18.8%) the usage rate was relatively low, while the value- added service shopping online (30.2%) had a wider patronage.

From the usage pattern of internet banking services it can be seen that the users are increasingly conducting fund-based transactions such as

fund transfers (59.7%) and bill payments (56%), which is quite encouraging since this shows that the users have gained some degree of confidence in using internet banking.

This shows that the internet banking was popular among its users for certain services while the usages of certain other services were still to gain popularity among their users.

6.9 Tele banking services usage pattern

Table 6.9 shows the common services through the telephone banking channel in a self-service mode using an interactive voice response system (IVRS). It is to be noted that employee-manned phone banking service (call centre) had not been considered in this study as it does not come under the purview of self-service banking as mentioned earlier. The respondents were asked to tick the services which they availed. From this emerged the usage pattern of the various services provided through the telephone banking services.

Most widely used services with regard to tele banking were balance enquiry (84.1%), followed by cheque status enquiry (46.2%) and then account statement request (39%). But bill payment services (17%) and fund transfer services (23.6%) which require transfer of funds were minimally used. So it was found that the users of tele banking services were mainly using information-based transaction services more than the fund- based transactions. This shows the lack of popularity as well as the lack of trust in the services through this channel.

Table 6.9: Usage of Tele Banking services

Tele Banking Services	Percentage of users using the services (No of tele banking users = 182)
Balance Enquiry	84.1
Account statement request	39
Cheque Status enquiry	46.2
Cheque book request	28
Funds transfer	23.6
Utility Bill Payments	17

6.10 Mobile banking services usage pattern

Table 6.10 shows some of commonly provided services through the Mobile banking channel. Two types of mobile banking services dependent on the technology used it could be SMS (Short Messaging Service)-enabled or it could be WAP (Wireless Application Protocol)-enabled depending on the technology used. Presently in India majority of mobile banking services provided are SMS-enabled services. These services could be of two categories. First category could be *alert or push services* in which a text message is sent to the customer's mobile phone as soon as a predetermined transaction occurs such as debiting or crediting of the bank account above a certain limit such as Rs 5000/-. The second category is called *request or pull services* in which case the customer has to send a SMS text request upon which the transaction is effected.

In this study only the SMS-enabled mobile banking services were considered as WAP-enabled services were only at its nascent stage and was not introduced when the survey was conducted. Moreover, mobile banking was offered only by a limited number of banks especially the foreign banks and the private banks.

The respondents were asked to tick the services which they availed from the list of selected services provided through the mobile banking services. The list of services shown was not an exhaustive one; it provides only some of the commonly availed services offered by those banks which offer mobile banking services. From this emerged the usage percentage of the various services provided through the mobile banking services.

Table 6.10: Usage of mobile banking services

Mobile Banking Services	Percentage of users using the services
Account transaction alerts	72%
Balance Enquiry	77.3%
Last few transactions	28%
Cheque status enquiry	27.3%
Cheque book request	14.7%
Bill Payments	24%

Mobile banking *alert or push* services have been utilized mostly by the majority of the respondents (72%) along with balance enquiry (77.3%). The other transactions were being utilized sparingly including fund-based transactions like bill payments (24%). An examination of the usage pattern of various services provided through mobile banking showed that, the mobile banking transactions which were still being in the initial introductory phase are being taken up at first only at an information transaction stage and fund-based transactions are still to pick up in a major way.

6.11 Conclusion

The majority of the respondents in this study have computer and internet access and they are also mostly proficient in using them. The users of internet

banking, tele banking and mobile banking are in general found to be spending more hours using computers and internet than non-users of these services. Lack of awareness among the non-users regarding these services could be one major reason for their non-usage. So awareness creation has to be the prime agenda of the banks planning to popularize these services.

Frequency and duration of usage of the respective electronic self-services among ATM users shows that this mode of banking has, in fact, become the most popular one, surpassing the traditional branch banking. However, frequency and duration of the usage of internet banking is a distant second showing that there is much scope for improvement pertaining to its usage, while the same regarding tele banking and mobile banking is only marginal. Similar pattern is seen in the perceived use percentage with maximum usage perceived through ATMs, followed by branch banking and internet banking, with only minimal use through tele banking and mobile banking. An examination of the various functions used through these electronic channels reveals that mainly it is the informational and basic functions which are being used through them, with value-added and fund-based transactions used by a lesser percentage of respondents. The banks have to promote the usage of fund-based and value-added services in future among the adopters of technology-enabled self-services. Only if the users start using all kinds of services within the ambit of the electronic banking would the adoption of these services would be complete and the users would then derive maximum benefit from these electronic banking channels.

Chapter 7

FACTORS AFFECTING ADOPTION AND ADOPTION LEVELS OF TECHNOLOGY-ENABLES BANKING SELF-SERVICES

7.1 Introduction

In this chapter the various demographic and perceptual factors which influence adoption and adoption levels of technology-enabled banking self services are looked into. A research model which shows the relationship between perceptual factors of the users and their total adoption levels of electronic banking self-services is analysed. The predictors of internet banking which is one of the key technology-enabled banking self-service adoption indicators are examined.

'Adoption' and 'adoption level' as used in the study are two separate constructs. Adoption as defined by Loudon and Bitta (2002) is 'the acceptance and continued use of a product/service', and in this context the service is the technology-enabled banking self-services. Adoption level means the extent or the intensity of usage of a service by a consumer. So as per this definition only users of the service will have adoption level, while the adoption level of a non-user is zero.

7.2 Adoption measure of banking delivery channels

As explained in detail in chapter 3, the relationship duration and interaction frequency are found to be good predictors of relationship development (Levinthal

and Fichman, 1988). The frequency of use of a technology product and the duration of experience with it are found to represent the extent or intensity of usage of it (Ricard, 2001). Therefore the respondents' frequency of usage and duration of usage of the electronic banking self-services under the study namely, ATM, internet banking, tele banking and mobile banking, were asked and a composite score calculated taking their mean to develop a measure for adoption level.

The frequency of usage were measured using a five point scale with weightages of 4 for every day use, 3 for once or twice a week, 2 for fortnightly use, 1 for monthly use and 0 for never used.

The duration of usage also were measured using a seven point scale consisting of usage duration of 3 years or more, between 2 to 3 years, between one to 2 years , up to one year , will use within 12 months, unlikely to use within 12 months and will never use. The weightages given for analysis were 4 for *usage duration of three or more years*,

3 for usage duration *between two to three years*, 2 for usage duration *between one to two years*, 1 for usage duration *up to one year* and 0 for all the other options by non-users such as *will use within 12 months*, *unlikely to use within 12 months* and *will never use*.

Table 7.1: Coding of adoption levels

Adoption	Coding
ATM adoption level	ATMAD
Internet banking adoption level	IBAD
Tele banking adoption level	TBAD
Mobile Banking Adoption level	MBAD
Total Electronic banking Channel Adoption level OR Total adoption level of technology-enabled banking self-services	CHAD

Table 7.1 shows the coding used for denoting the adoption levels of ATM services, internet banking services, tele banking services, mobile banking services and total electronic banking channel adoption.

For calculating the adoption levels of ATM (ATMAD), internet banking (IBAD), tele banking (TBAD) and mobile banking (MBAD) composite variables are formed by adding up the frequency of usage and duration of usage. Hence a variable having highest value of 8 and lowest value of 0 is obtained indicating the adoption levels. Suppose a respondent states that he/she has been using a banking service (ATM, internet banking, tele banking or mobile banking) with a frequency of 'daily basis' and for a duration of 'three years or more' he/she gets the highest adoption level score of 8 and if a person has not used a technology-enabled banking self-service the adoption score is the lowest which is 0.

ATM services adoption level = ATMAD = Frequency of ATM services usage + Length/duration of using ATM services.

Internet Banking services adoption level = IBAD = Frequency of Internet banking services usage + Length/duration of using internet banking services.

Tele banking services adoption level = TBAD = Frequency of tele banking services usage usage + Length/duration of using tele banking services.

Mobile banking services adoption level = MBAD = Frequency of Mobile banking services usage + Length/duration of using of Mobile banking services.

Total adoption level of all the four channels were also computed for each respondent by adding up the adoption values for ATM adoption (ATMAD), Internet banking adoption (I BAD), tele banking adoption (TBAD) and mobile banking adoption (MBAD).

The total adoption level of technology-enabled banking self-services CHAD can be mathematically represented as:

CHAD = ATMAD + IBAD + TBAD + MBAD

So the variable CHAD can possibly have a maximum value of 32 if the respondent has been using all the four electronic banking delivery channel services namely ATM service, internet banking services, tele banking services and mobile banking services for over 3 years that too on a daily basis.

Likewise CHAD can possibly have a minimum value of 0 if the respondent has not used any of the four electronic banking channels.

7.3 Comparison of adoption levels bank group wise and testing of hypothesis H1

In this section the adoption levels of respondents belonging to different bank groups (public, private and foreign) are compared. Thereby the hypothesis H1 which states that 'the total adoption levels of technology-enabled banking self-services by bank consumers vary with the type of bank group (foreign, private or public sectors) bank consumers bank with' is tested.

Table 7.2a: Comparison of adoption levels bank group wise

Bank Group/Type	Total adoption level of TEBSS (CHAD)**	ATM Adoption (ATMAD)*	Internet Banking Adoption (IBAD)*	TeleBanking Adoption (TBAD)*	Mobile Banking Adoption (MBAD)*
Public Sector Banks	10.1	6.07	2.57	1.00	0.64
Private Sector Banks	12.47	6.44	3.41	1.56	1.26
Foreign Banks	14.85	6.21	4.78	2.98	2.28

** maximum score 32, * maximum score 8

Refer Appendix-2, table A 2.3, for descriptive statistics of Total adoption level of TEBSS (CHAD)

Table 7.2b: Analysis of variance among different bank group customers' adoption levels

		Sum of Squares	df	Mean Square	F	Sig.
CHAD	Between Groups	1493.381	2	746.691	30.193	.000
	Within Groups	13601.870	550	24.731		
	Total	15095.251	552			
ATMAD	Between Groups	16.716	2	8.358	6.578	.002
	Within Groups	698.814	550	1.271		
	Total	715.530	552			
IBAD	Between Groups	261.165	2	130.583	24.760	.000
	Within Groups	2784.624	528	5.274		
	Total	3045.789	530			
TBAD	Between Groups	194.741	2	97.370	22.186	.000
	Within Groups	2260.201	515	4.389		
	Total	2454.942	517			
MBAD	Between Groups	135.818	2	67.909	22.510	.000
	Within Groups	1535.571	509	3.017		
	Total	1671.389	511			

*For the purpose of testing of hypothesis **H1** the ANOVA test corresponding to CHAD is only considered.*

Table 7.2a shows the bank groupwise adoption levels of all electronic banking delivery channels such as ATMs, internet banking, tele banking and mobile banking. The highest total adoption level (CHAD) is for the foreign bank customers (14.85), followed by private sector bank customers (12.47) and then by public sector bank customers (10.1). The results imply that the customers of foreign banks have taken to the usage of technology-enabled banking self-services as they are the highest adopters of technology-enabled banking self-services, followed by those from the private sector banks and then those from the public sector banks. The results corroborate the fact that foreign banks and private sector banks were the pioneers of technology-enabled banking. Hence it is found that the total adoption levels of TEBSS are more among these bank groups as compared to public sector banks.

When individual adoption levels are compared across the bank groups similar trends are found with the adoption levels, highest in case of foreign banks, followed by those from private sector banks and the least levels by those from public sector banks except in the case of ATM adoption levels ATMAD.

In case of ATM adoption levels the private sector bank customers are leading in adoption level (6.44), followed by foreign banks (6.21) and least adoption by public sector bank customers (6.07). The foreign bank customers seem to be favouring more of internet banking or tele banking so this might be the reason for lower level of ATM adoption as compared to the private sector bank counterparts.

Analysis of variance is carried out to see whether the differences between the adoption levels of the different bank group customers are statistically significant. From table 7.2b it is evident that the differences between the adoption levels of different bank category respondents are statistically significant at 95% confidence level as the p-value is less than 0.01 in all cases.

The Tukey's Post Hoc test also corroborates the above fact, referring table 7.2c, it is found that except in the case of ATM adoption levels, difference between public sector bank and foreign bank respondents' adoption levels, those between foreign and public sector bank respondents' adoption levels and those between foreign and private sector bank respondents' adoption levels are statistically significant at 95% confidence level since the p-value is than 0.05.

Table 7.2c: Tukey test for highly significant difference (HSD) between the adoption levels bank groupwise

Multiple Comparisons

Tukey HSD

Dependent Variable	(I) Bank Type	(J) Bank Type	Mean Difference (I-J)	Sig.
CHAD	Public Sector	Private Sector	-2.3792*	.000
		Foriegn	-4.7506*	.000
	Private Sector	Public Sector	2.3792*	.000
		Foriegn	-2.3714*	.001
	Foriegn	Public Sector	4.7506*	.000
		Private Sector	2.3714*	.001
ATMAD	Public Sector	Private Sector	-.3721*	.001
		Foriegn	-.1404	.623
	Private Sector	Public Sector	.3721*	.001
		Foriegn	.2317	.285
	Foriegn	Public Sector	.1404	.623
		Private Sector	-.2317	.285
IBAD	Public Sector	Private Sector	-.8328*	.000
		Foriegn	-2.1999*	.000
	Private Sector	Public Sector	.8328*	.000
		Foriegn	-1.3671*	.000
	Foriegn	Public Sector	2.1999*	.000
		Private Sector	1.3671*	.000
TBAD	Public Sector	Private Sector	-.5602*	.012
		Foriegn	-1.9836*	.000
	Private Sector	Public Sector	.5602*	.012
		Foriegn	-1.4234*	.000
	Foriegn	Public Sector	1.9836*	.000
		Private Sector	1.4234*	.000
MBAD	Public Sector	Private Sector	-.6156*	.000
		Foriegn	-1.6357*	.000
	Private Sector	Public Sector	.6156*	.000
		Foriegn	-1.0200*	.000
	Foriegn	Public Sector	1.6357*	.000
		Private Sector	1.0200*	.000

*. The mean difference is significant at the .05 level.

7.3.1 Hypothesis testing of H1

The hypothesis **$H1_a$** states that *'the adoption levels of technology-enabled banking self-services (CHAD) by bank customers vary significantly with the type of bank group (foreign, private or public sectors) the bank consumers bank with'.*

The corresponding null hypothesis **$H1_0$** states that *'the adoption levels of technology-enabled banking self-services (CHAD) by bank customers do not vary significantly with the type of bank group (foreign, private or public sectors) the bank consumers bank with'.*

From the table 7.2b it is seen that variation in the total banking channel adoption levels (CHAD) of technology-enabled banking self-services with the type of bank group is statistically significant at 95% confidence level since the p-value is less than 0.05. Hence the null hypothesis is rejected and the alternate hypothesis is supported.

So the interpretation is that the adoption levels are significantly different among the respondents of the different bank groups.

The highest adoption levels of internet banking, tele banking and mobile banking are by the respondents belonging to the foreign bank group. The highest adoption level for ATMs is by the respondents belonging to the private bank group. The lowest adoption levels are by respondents belonging to the public sector banks. These findings are not surprising as it has been the foreign banks and private banks which have pioneered the introduction of electronic banking in India. The customers of these bank groups especially those of foreign banks are in the highly educated and relatively well-off categories. Moreover the foreign banks insist that their customers avoid branch banking and avail services through electronic channels, through charging higher fees for branch transactions.

7.4 Demographic factors and adoption levels of TEBSS and testing of hypothesis H2

In this section the relationship of demographic variables such as gender, age , income and occupation with that of adoption levels of electronic banking self-services are examined. Thereby the hypothesis H2 which states that 'the adoption level of the technology-enabled banking self-services (CHAD) by bank customers vary significantly with the variation in the demographic factors such as gender (H2a), age (H2b), income (H2c) and occupation (H2d)' is tested.

7.4.1 Gender wise comparison of adoption levels

Some of the studies done abroad (Laforet and Li, 2005; Akinci et al., 2004) had shown that the adopters of electronic banking self-services were predominantly males. So the variation in the adoption levels between males and females was examined. The hypothesis H2a which states that 'the total adoption levels of the technology-enabled banking self-services (CHAD) by bank customers vary significantly with the variation in the gender' is tested.

From table 7.3 it is found that the adoption levels of all the electronic banking channels are more among males than the females in the case of all the banking delivery channel services.

But from the results of the independent sample t-test it is found that the differences in adoption levels is statistically significant at 95% confidence level for ATM adoption levels only since the p-value is less than 0.05. Hence it can be inferred that in case of ATMs the males tend to use it more than females due to the fact that the males are likely to spend more time outside the house than females and to access ATMs you need to go to an ATM kiosk.

The differences in adoption levels of males and females for overall cumulative adoption CHAD is statistically significant only at 90% confidence level since the p value is less than 0.1 but more than 0.05.

Table 7.3: Gender wise comparison of adoption levels

	Adoption levels of		t-test for equality of means	
	Males	Females	t	Sig. (2-tailed)
Total Electronic banking channel Adoption CHAD**	11.99	11.09	1.93	0.054
ATM Adoption ATMAD*	6.36	6.02	3.37	0.001
Internet Banking Adoption IBAD*	3.31	2.96	1.52	0.116
Tele Banking Adoption TBAD*	1.56	1.29	1.34	0.182
Mobile Banking Adoption MBAD*	1.1	1.06	.254	0.8

** maximum value is 32

* maximum value is 8

*For the purpose of testing of hypothesis **H2a** the t- test corresponding to CHAD is only considered.*

In case of internet banking the adoption levels differences are not statistically significant at 95% confidence level, hence it can be concluded that in the case of internet banking the adoption levels between the male and female respondents are more or less the same. While in the case of tele banking services and mobile banking services the overall adoption level itself is low and it can be seen that the adoption level differences are not statistically significant when adoption levels are compared between males and females.

7.4.1.1 Testing of sub-hypothesis H2a

The hypothesis H2a states that, '*the adoption levels of the technology-enabled banking self-services (CHAD) by bank customers vary significantly with the variation in the gender'*.

The corresponding null hypothesis $H2a_0$ states that, '*the adoption levels of the technology-enabled banking self-services by bank customers do not vary significantly with the variation in the gender'*.

The result from table 7.3 shows that the difference is not significant at 95% confidence level as the significance level corresponding to CHAD is more than 0.05. Thus the null hypothesis $H2a_0$ is accepted and the alternate hypothesis H2a is not supported. Thus the results do not support the sub-hypothesis H2a. There is no significant variation in total adoption level CHAD between male and female respondents.

7.4.2 Age group wise comparison of adoption levels

According to some studies (Sathye, 1999; Mattila et al., 2001; Karjaluoto et al., 2001) it is the younger and more educated who are more likely to adopt electronic banking. Other studies like those by Akinci et al. (2004) have found that mid aged customers are more likely than younger or older customers to use services such as internet banking. Hence a comparison is made among the adoption levels of different age groups to find out whether there are significant differences in adoption levels. The hypothesis H2b which states that 'the adoption levels of the technology-enabled banking self-services by bank consumers vary significantly with the variation in the 'age' is also tested in this section.

Table 7.4a: Age group wise comparison of adoption levels

Age Category (in years)	Total Electronic Banking Channel Adoption (CHAD)**	ATM Adoption (ATMAD)*	Internet Banking Adoption (IBAD)*	TeleBanking Adoption (TBAD)*	Mobile Banking Adoption (MBAD)*
18-25	11.31	6.04	3.19	1.36	1.05
26-35	13.03	6.35	4.00	1.80	1.35
36-45	11.92	6.20	3.20	1.58	1.09
46-60	10.63	6.51	2.19	1.29	0.96
Above 60	8.94	6.29	1.65	0.59	0.41

** maximum value is 32

* maximum value is 8

mean valves shown

Table 7.4b: Analysis of Variance for testing the significant age group wise difference in adoption levels

		Sum of Squares	df	Mean Square	F	Sig.
CHAD	Between Groups	657.318	4	164.329	6.237	.000
	Within Groups	14437.934	548	26.347		
	Total	15095.251	552			
ATMAD	Between Groups	14.730	4	3.682	2.880	.022
	Within Groups	700.800	548	1.279		
	Total	715.530	552			
IBAD	Between Groups	254.398	4	63.600	11.984	.000
	Within Groups	2791.391	526	5.307		
	Total	3045.789	530			
TBAD	Between Groups	46.836	4	11.709	2.494	.042
	Within Groups	2408.106	513	4.694		
	Total	2454.942	517			
MBAD	Between Groups	26.154	4	6.539	2.015	.091
	Within Groups	1645.234	507	3.245		
	Total	1671.389	511			

*For the purpose of testing of hypothesis **H2b** the ANOVA- test corresponding to CHAD is only considered.*

From table 7.4a it is found that the total adoption level of the technology-enabled banking self-services CHAD is the highest (13.03) among

the age group of 26-35 years. This might be due to the fact that in this age group people are conducting more frequent bank transaction by virtue of more earnings, at the same time they are technology savvy to have adopted electronic banking channels. More over, it is in agreement with the studies (Sathye, 1999; Mattila et al., 2001; Karjaluoto et al., 2001) done in other countries that it is the youth who takes to these channels the most.

The next highest adoption level is found among the 36-45 yrs. age group (11.92) followed by the 18-25 yrs. age group (11.31). The least total adoption level (CHAD) is among the above 60 yrs age group, showing that this age group is having the lowest adoption rate. If the adoptions levels of the electronic banking channels are taken individually, similar trend is found in all the cases namely internet banking (IBAD), tele banking (TBAD) and mobile banking (MBAD). The only deviation in this trend is found to be in the ATM adoption level (ATMAD). Surprisingly in this study it is the 46-60 yrs. age group who has adopted the ATM the most. This might be because of the fact that since they lack the technology savvy nature to take up internet banking, tele banking or mobile banking they might be forced to use ATM more. Another reason could be that the 46-60 age group is consisting of people who are having above average income, hence might have large number of financial transactions with their banks, which they conduct mostly through the ATMs.

From table 7.4b it is found that there are significant differences in the adoption levels at 95% confidence level (p-values less than 0.05) among the various age groups, in case of the total adoption levels of technology-enabled banking self-services (CHAD), ATM adoption levels (ATMAD), internet banking adoption levels (IBAD) and telebanking adoption levels (TBAD).

But differences in adoption levels are not statistically significant in case of mobile banking adoption level (MBAD) among the different age groups.

This might be because of the fact that the overall usage rate and adoption of mobile banking services are much less as compared to the adoption levels of banking self-services through the other electronic banking channels.

7.4.2.1 Testing of sub-hypothesis H2b

The hypothesis **H2b** proposes that *'the adoption levels of the technology-enabled banking self-services (CHAD) by bank consumers vary significantly with the variation in their age.'*

The corresponding null hypothesis **$H2b_0$** states that *'the adoption levels of the technology-enabled banking self-services (CHAD) by bank consumers do not vary significantly with the variation in their age.'*

The null hypothesis **$H2b_0$** is rejected as the p-value corresponding to the total adoption levels CHAD from ANOVA table 7.4b is found to be less than 0.05. Thus the hypothesis **H2b** is supported since the variation in CHAD among different age groups is found to be significant at 95% confidence level. Thus the variation in the adoption level of technology-enabled banking self-services (CHAD) is dependent on the age of the bank customers thus proving hypothesis H2b.

7.4.3 Income category wise comparison of adoption levels

It is found from similar studies that as the income level increases the likelihood of adopting technology-enabled banking channels increases (Jayawardhena and Foley, 2000; Karjaluoto et al., 2001; Al-Ashban and Burney, 2001). The relationship of income levels with the adoption levels of technology-enabled banking self-services is examined. This is done with the total electronic banking channel adoption level (CHAD) and individual adoption levels of ATMs (ATMAD), internet banking (IBAD), tele phone banking (TBAD) and mobile banking (MBAD).

The hypothesis H2c which proposes that 'the total adoption levels of the technology-enabled banking self-services (CHAD) by bank consumers vary significantly with the variation in the income levels' is tested using analysis of variance test in this section.

For computing the adoption levels income category wise the student segment which has shown earnings of one lakh or less is removed from the sample to get a truer relationship between the income and the adoption levels. Most of the student groups are non-income earners dependent on their guardians.

Table 7.5a: Income category wise adoption

Income Category (Annual Income in Indian Rupees)	Total Banking Channel Adoption level (CHAD)**	ATM Adoption level (ATMAD)*	Internet Banking Adoption level (IBAD)*	TeleBanking Adoption level (TBAD)*	Mobile Banking Adoption level (MBAD)*
Between 1-2 lakhs	8.57	5.86	1.6	.64	.54
Between 2-3 lakhs	11.54	6.17	3.11	1.51	.84
Between 3-4 lakhs	11.60	6.36	3.14	1.47	1.20
Between 4-5 lakhs	12.43	6.42	3.51	1.51	1.20
Between 5-7 lakhs	13.46	6.37	4.07	1.67	1.33
Between 7-10 lakhs	13.61	6.40	4.32	1.58	1.37
Above 10 lakhs	16.12	6.55	4.70	2.97	2.00

** maximum value is 32

* maximum value is 8

From table 7.5a the general trend is that, as the income level increases the adoption level also increases for all the electronic banking delivery channels. The highest level of adoption is by respondents having annual income

of Rs 10 lakhs and above, indicating that as the income level increases there is need for more number of transactions and the need for transactions through multiple delivery channels. Moreover, the higher earning population is likely to be more technology savvy and better educated.

7.4.3.1 Testing of sub-hypothesis H2c

In order to ascertain whether variations in the adoption levels of the respondents belong to different income levels and to test the hypothesis **H2c** which proposed that '*the adoption levels of the technology-enabled banking self-services (CHAD) by bank customers vary significantly with the variation in their income levels*', analysis of variation test is performed and the results are shown in table 7.5b.

Table 7.5b: Analysis of variance for testing the significant income level wise differences in adoption levels

		Sum of Squares	df	Mean Square	F	Sig.
CHAD	Between Groups	1720.255	6	286.709	11.895	.000
	Within Groups	11835.056	491	24.104		
	Total	13555.311	497			
ATMAD	Between Groups	19.699	6	3.283	2.662	.015
	Within Groups	605.613	491	1.233		
	Total	625.311	497			
IBAD	Between Groups	358.398	6	59.733	11.536	.000
	Within Groups	2459.453	475	5.178		
	Total	2817.851	481			
TBAD	Between Groups	126.747	6	21.125	4.507	.000
	Within Groups	2221.498	474	4.687		
	Total	2348.245	480			
MBAD	Between Groups	60.991	6	10.165	3.135	.005
	Within Groups	1491.531	460	3.242		
	Total	1552.522	466			

*For the purpose of testing of hypothesis **H2c** the ANOVA- test corresponding to CHAD is only considered.*

The corresponding null hypothesis $\mathbf{H2c_0}$ which states that '*the adoption levels of the technology-enabled banking self-services (CHAD) by bank*

customers do not vary significantly with the variation in their income levels', is rejected as seen from table 7.5b significance level of the f-statistic of CHAD which is less than 0.05. Thus the hypothesis **H2c** is supported.

Thus there are significant differences among the adoption levels of the total electronic banking channel adoption (CHAD), as the p-value is less than 0.05, showing that the results are significant at 95% confidence level. The results are similar in the cases of the individual adoption levels of ATM adoption (ATMAD), internet banking adoption (IBAD), tele banking adoption (TBAD) and mobile banking adoption (MBAD) since the p-values in all cases are less than 0.05.

The income levels of respondents are hence linked with the adoption levels of banking self services, the more the income the more will be the adoption levels, which is the general trend. Also, more the income more will be the banking transactions and the propensity to use multiple channels. Likewise, the respondents who are earning more are likely to be better educated and thereby more technology-savvy.

7.4.4 Occupation wise adoption levels of technology-enabled banking self-services

The occupation wise comparison of adoption levels were done in order to find whether the adoption levels of the electronic banking self-services varies with different types of occupations the respondents were engaged in. Since the housewife category and the others category consisted of only 10 and 2 respondents respectively for this particular analysis these categories of respondents were removed as the representations were negligible. The other categories were salaried who were employed in government or private firms, business persons/self employed and the students (table 7.6a).

Table 7.6a: Comparison of adoption levels occupation wise

Occupation	Total Banking Channel Adoption (CHAD)**	ATM Adoption (ATMAD)*	Internet Banking Adoption (IBAD)*	TeleBanking Adoption (TBAD)*	Mobile Banking Adoption (MBAD)*
Salaried Category	12.45	6.29	3.42	1.78	1.37
Business person/ Self Employed	11.37	6.29	3.21	1.17	0.74
Student	9.46	6.00	2.41	0.70	0.75

** maximum value = 32, * maximum value = 8

The salaried category of respondents is having the highest levels of adoption across all the electronic delivery channels. Next highest level of electronic banking channel adoption is exhibited by the business/self employed category, with the student category showing the lowest levels of adoption. The salaried category is found to be using the electronic banking self services most widely as the banking transactions are mostly done by themselves so they might be pressed for time and hence the usage of these services offers them a convenient and time saving way to conduct their banking transactions.

In the case of business/self employed category even though the banking transactions might be happening at a higher frequency they might be assisted by their employees or assistants as the case may be to conduct the banking transactions which includes branch transactions as well.

The relatively lower level of adoption and usage of electronic banking self services by students may be assigned to the limited funds at their disposal and their limited number of transaction requirements. But they represent a latent category of high level adopters of future.

7.4.4.1 Testing of sub-hypothesis H2d

In order to check whether the variations in the adoption levels are significant between these occupation categories a one-way ANOVA test is performed. This test is also used to test the hypothesis H2d.

The hypothesis **H2d** states that 'the *adoption levels of the technology-enabled banking self-services (CHAD) by bank customers vary significantly with the variation in their type of occupation*'.

The corresponding null hypothesis **$H2d_0$** states that '*the adoption levels of the technology-enabled banking self-services (CHAD) by bank customers do not vary significantly with the variation in their type of occupation*'.

The significance value or p-value of the f-statistic corresponding to CHAD is found to be less than 0.05 signifying that the null hypothesis **$H2d_0$** is rejected. Thus the hypothesis **H2d** is supported with 95% confidence level.

From table 7.6b it is found that there is significant variation among the adoption levels in all cases at more than 95% confidence level (sig. less than 0.05) except for the adoption levels of ATMs. That means in the case of all electronic banking self services except ATMs, the adoption levels (CHAD, IBAD, TBAD and MBAD) vary significantly with the type of occupation.

Reason for no significant difference in the case of the ATM services adoption level occupation wise might be due the fact that the ATM services have been widely adopted by all the occupational categories. It is also found that it is the salaried occupational category that relies more on technology-enabled banking self-services. The reason as stated could be

their preference for convenience since they are doing their own banking transactions.

Table 7.6b: Analysis of variance of channel adoption levels occupation wise

		Sum of Squares	df	Mean Square	F	Sig.
CHAD	Between Groups	536.791	2	268.396	10.275	.000
	Within Groups	14053.516	538	26.122		
	Total	14590.307	540			
ATMAD	Between Groups	5.146	2	2.573	2.019	.134
	Within Groups	685.652	538	1.274		
	Total	690.799	540			
IBAD	Between Groups	52.979	2	26.489	4.710	.009
	Within Groups	2901.811	516	5.624		
	Total	2954.790	518			
TBAD	Between Groups	78.194	2	39.097	8.482	.000
	Within Groups	2332.383	506	4.609		
	Total	2410.578	508			
MBAD	Between Groups	48.804	2	24.402	7.669	.001
	Within Groups	1587.795	499	3.182		
	Total	1636.600	501			

*For the purpose of testing of hypothesis **H2d** the ANOVA- test corresponding to CHAD is only considered.*

The table 7.6c shows the results of the post hoc test using Tukey's HSD multiple comparisons. Except in the case of ATM adoption level ATMAD, there are significant differences in the adoption levels of other channels and the total adoption level CHAD. So while targeting customers for the electronic banking the banks should look at the kind of occupation the bank customers are in.

Table 7.6c: Multiple comparisons of occupation wise adoption levels

Multiple Comparisons

Tukey HSD

Dependent Variable	(I) Occupation	(J) Occupation	Mean Difference (I-J)	Sig.
CHAD	Salaried	Businessman/Self Employed	1.0837	.074
		Student	2.9864*	.000
	Businessman/Self Employed	Salaried	-1.0837	.074
		Student	1.9027*	.026
	Student	Salaried	-2.9864*	.000
		Businessman/Self Employed	-1.9027*	.026
ATMAD	Salaried	Businessman/Self Employed	6.790E-04	1.000
		Student	.2926	.125
	Businessman/Self Employed	Salaried	-6.790E-04	1.000
		Student	.2919	.171
	Student	Salaried	-.2926	.125
		Businessman/Self Employed	-.2919	.171
IBAD	Salaried	Businessman/Self Employed	.2133	.631
		Student	1.0082*	.006
	Businessman/Self Employed	Salaried	-.2133	.631
		Student	.7948	.063
	Student	Salaried	-1.0082*	.006
		Businessman/Self Employed	-.7948	.063
TBAD	Salaried	Businessman/Self Employed	.6108*	.011
		Student	1.0847*	.001
	Businessman/Self Employed	Salaried	-.6108*	.011
		Student	.4739	.311
	Student	Salaried	-1.0847*	.001
		Businessman/Self Employed	-.4739	.311
MBAD	Salaried	Businessman/Self Employed	.6326*	.001
		Student	.6160*	.039
	Businessman/Self Employed	Salaried	-.6326*	.001
		Student	-1.660E-02	.998
	Student	Salaried	-.6160*	.039
		Businessman/Self Employed	1.660E-02	.998

*. The mean difference is significant at the .05 level.

7.5 Comparison of adoption levels between metro and urban banked centres

It is likely that the respondents from the two 'banked centres' taken for the study could be having different adoption level. This arises due to the fact that in a metro centre like Bangalore the usage of electronic banking services could be higher when compared to non-metro urban banked centre cities like Mangalore and Udupi. There are several demographic, situational and behavioural reasons for this.

As far as demographic reasons are concerned the residents of a metro centre could be having higher educational levels, better income levels and more awareness levels regarding technology products. From a situational point of view it is in the metro banked areas these electronic banking services were introduced first by the banks, the provisioning of these services are more intense and some of the services like telephone banking and mobile banking are available mainly in the metro branches of the banks. Hence as per the model by Triandis (1980), on consumer choice behaviour, social factors and facilitating conditions to use the electronic banking self-services are more in the context of metro city. As far as the behavioural reasons are concerned people are busier, they don't want to travel much distance due to heavy traffic and many of them will be using computers and internet in their daily course of work

Table 7.7: Comparison of adoption levels between metro and urban banked centres

	Metro Banked centre	Urban banked centre	t-test for equality of means	
			t-value	Sig. (2-tailed)
Total Electronic Banking Channel Adoption (CHAD)**	13.30	9.77	8.582	0.000
ATM Adoption (ATMAD)*	6.24	6.24	-0.127	0.899
Internet Banking Adoption (IBAD)*	3.74	2.58	5.747	0.000
Tele Banking Adoption (TBAD)*	2.37	0.52	10.771	0.000
Mobile Banking Adoption (MBAD)*	1.73	0.42	8.81	0.000

****** Maximum value = 32, * Maximium value = 8

From table 7.7 it is found that the respondents from the metro banked centres are having higher adoption levels in case of all the electronic banking delivery channels except in the case of ATM services. This finding is not surprising as Bangalore being a metropolitan city, home to many IT and ITes employees with hefty pay packets and pressured for time, the respondents from this city are likely to adopt the electronic banking channels the most. It is also found from the independent sample t-test that the adoption levels of the respondents from the metro region are significantly higher than those from the urban banked centre at 95% confidence level since the significance value is less than 0.05 in the cases of total electronic banking channel adoption (CHAD), internet banking adoption level (IBAD), tele banking adoption level (TBAD) and mobile banking adoption level (MBAD). This trend is violated only in the

case of ATM adoption levels for which the adoption levels are equal for both the centres.

So from these results it can be inferred that the adoption levels of all the technology-enabled banking self-services are higher for metro banked centre as compared to the urban banked centre except in the case of ATMs. As mentioned earlier this could be due to the differences in demographic, situational and behavioural factors of respondents from these two centres. As indicated earlier the respondents from the metro centres could be better educated, having higher income levels and more techno-savvy. Along with these factors the situational factors or facilitating factors like the better avenues to perform electronic banking, wide spread availability of it, lack of time, higher traffic levels, all are contributing factors which encourage respondents to use more of these banking self-services.

7.6 Correlation between adoption levels and perceived use percentage of different electronic channel banking services

The respondents were asked regarding their perception of the percentage of their total banking transactions they do through various banking services delivery channels viz. branch banking, ATMs, internet banking, telebanking and mobile banking. This percentage of their respective banking delivery channel usage is correlated with their adoption levels to verify whether their actual usage increases with increasing adoption levels.

The branch visit frequency also was correlated with the percentage of banking transactions done through branch banking to see whether there is a positive correlation between the frequency of branch visits and the perceived use percentage of branch banking.

Table 7.8 Correlation between ATM adoption level and perceived ATM use percentage

		ATMADOPTION	ATM Percantage
ATM Adoption ATMAD	Pearson Correlation	1.000	.039
	Sig. (2-tailed)	.	.372
	N	553	539
ATM Use Percantage	Pearson Correlation	.039	1.000
	Sig. (2-tailed)	.372	.
	N	539	539

Table 7.9: Correlation between Internet banking adoption levels and perceived internet banking use percentage

		IBAD	Internet Banking Percentage
Internet Banking Adoption IBAD	Pearson Correlation	1.000	.703**
	Sig. (2-tailed)	.	.000
	N	531	531
Internet Banking Use Percentage	Pearson Correlation	.703**	1.000
	Sig. (2-tailed)	.000	.
	N	531	553

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7.10: Correlation between Tele banking adoption levels and perceived Tele banking use percentage

		TBAD	Tele Banking Percentage
Tele Banking Adoption TBAD	Pearson Correlation	1.000	.669**
	Sig. (2-tailed)	.	.000
	N	518	518
Tele Banking Use Percentage	Pearson Correlation	.669**	1.000
	Sig. (2-tailed)	.000	.
	N	518	553

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7.11: Correlation between mobile banking adoption levels and perceived mobile banking use percentage

		MBAD	Mobile Banking Percentage
Mobile Banking Adoption MBAD	Pearson Correlation	1.000	.674**
	Sig. (2-tailed)	.	.000
	N	512	512
Mobile Banking Use Percentage	Pearson Correlation	.674**	1.000
	Sig. (2-tailed)	.000	.
	N	512	553

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7.12: Correlation between the branch visit frequency and perceived branch banking use percentage

		Bank Branch Frequency	Branch Banking Percantage
Bank Branch Frequency	Pearson Correlation	1.000	.672**
	Sig. (2-tailed)	.	.000
	N	553	539
Branch Banking Percantage	Pearson Correlation	.672**	1.000
	Sig. (2-tailed)	.000	.
	N	539	539

**. Correlation is significant at the 0.01 level (2-tailed).

From the above findings it is seen that there are significant positive correlations between the adoption levels of technology-enabled banking self-services and the use percentage of transactions through them except in the case of ATMs.

For instance there is a significant positive correlation (correlation coefficient r = 0.703) between Internet banking adoption IBAD and the internet banking actual usage perception by the respondents at 95% confidence level since significance value is less than 0.05 from table 7.9 with relatively higher strength of correlation .

Similar patterns are observed in cases of tele banking and mobile banking. There is significant positive correlations (correlation co efficient r = 0.669) between tele banking adoption level (TBAD) and its use percentage (table 7.10). There is also significant positive correlation (correlation co efficient r = 0.674) between mobile banking adoption (MBAD) and its use percentage (table 7.11).

Thus in all the above cases, as the adoption levels of these technology-enabled banking self-services increases, the percentage of transactions through them also increases.

From correlation table 7.8 it is found that the ATM Adoption ATMAD and the customers' perception of ATM usage percentage are not correlated as the p value or the significance level is above 0.05. This might be because of the wide spread adoption of the ATM delivery channel services and due to the fact that most of the respondents have adopted ATM for more than 3 years (59.7%) and it is the channel having the highest frequency of usage (74% use it at least once a week) of all the electronic banking delivery channels. Considering the higher frequency of usage and longer duration of usage of ATM services by the respondents it can be concluded that using ATM services might have become habitual or automatic for the respondents without the conscious cognitive processing (Triandis, 1980). So the ATM usage might have been under estimated by the users and added to this is the fact that as the usage of other electronic banking channels increases the ATM usage to some extent is reduced. This might explain the lack of correlation of adoption levels of ATMs with perceived use percentage of ATM transactions.

The implication for the banks are that they have to encourage more frequent usage of these electronic banking channels such as internet banking, tele banking and mobile banking whose adoption by customers are only at the introductory or growth stages. Once the usage starts by the customers the banks should take care to see that they continue using these channels through providing incentives like lesser service

charges and promotional offers. This will increase the percentage of banking transactions done through the electronic banking channels. As the adoption levels of customers with respect to electronic banking channels increases, the frequency of their branch visits will naturally come down and thereby the bank transactions are considerably reduced resulting in huge saving for banks by way of reduced transaction costs at the branch level.

In case of ATM channels the adoption levels have attained maturity levels as evident from the increased frequency and duration of usage by customers. As far as the banks are concerned there need not be any specific thrust from their part to improve ATM adoption per se but they can think of promoting the usage of more value added services through ATMs by customers, as the use percentage of value added services through ATMs are found to be low.

7.7 Determinants of Technology-Enabled Banking Self-Services Adoption Levels

In the earlier part of this chapter the effect of demographic variables such as gender, age, income levels and occupation on the adoption level of the technology-enabled banking self-services were examined. From the literature it has been found that there are other factors such as perceived beliefs about the electronic banking self-services such as the relative advantage and perceived risks in using them, and consumer attitudinal traits such as innovativeness and need for interaction, and belief pertaining to the capacity or self efficacy which determines the levels of adoption by the consumers. These together are termed in this study as the 'determinants' of adoption levels.

The determinants of adoption levels of electronic banking channel services were measured using a hypothesized research model developed specifically for this study. A 16-item scale with five independent variables namely relative advantage/perceived benefits, capacity/self efficacy, innovativeness, need for

personal contact and perception of risk was developed after review of literature. The extent to which the respondents adopt the electronic banking self-services will be determined by their beliefs and attitudes pertaining to these dimensions. The model was found more applicable to explain the total/cumulative adoption levels of all technology-enabled banking self-services taken together and the adoption levels of internet banking services. It had limited applicability in explaining the individual adoption levels of other electronic banking services - ATMs, tele banking and mobile banking.

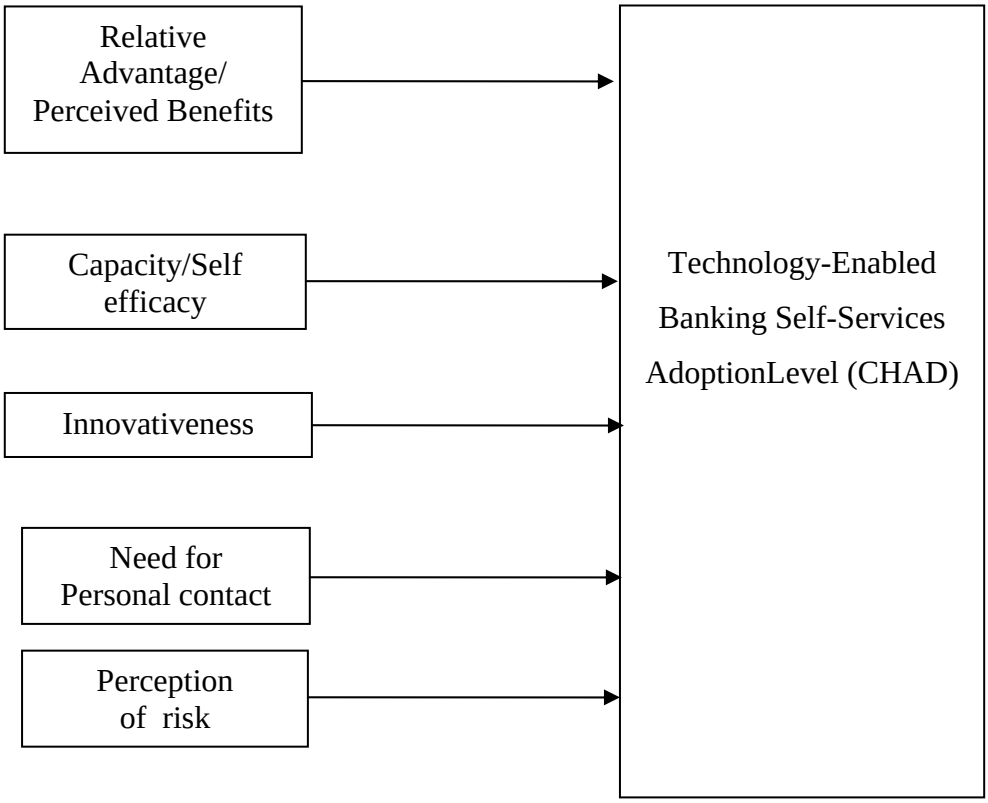

Figure 7.1: Determinants of Technology-Enabled Banking Self-Services Adoption Levels.

Explanation regarding the model and its constructs are given below and the proposed model is shown in figure 7.1.

7.7.1 Explanations of the constructs

1) Relative advantage/perceived benefits,

Relative advantage or perceived benefit is that greater benefit the bank customer perceives through using the electronic banking self-services, the extent to which these services are perceived or believed to offer relative benefits over the traditional face-to-face branch banking services offered by human tellers/bank personnel. These benefits could be greater convenience offered, saving of time, being less costly , greater perceived control and so on as perceived by the user (Dabholkar and Bagizzi, 2002; Walker et al, 2000; Mick and Fournier, 1998). The perceived relative advantage of an innovation is positively related to its rate of adoption (Rogers, 1983). The customers can access the banking services 24 hours a day and 7 days a week through the usage of electronic channel. Bank consumers using the electronic banking channel services such as internet banking, tele banking and mobile banking can access their bank accounts and avail the banking services from any location, at any time of the day thus experiencing tremendous advantage and convenience.

2) Capacity/Self efficacy

Capacity or self efficacy dimension shows to what extent the customer believe that he/she has the perceived ability to use the electronic banking channel services and how much he/she is confident of using it. Dabholkar and Bagozzi (2002) describe this construct in the context of technology-enabled services usage as self-efficacy. The similar construct have been mentioned in the studies by Walker et al. (2002), Karjaluoto et

al. (2002), Dabholkar, (1996) and Walker and Johnson, (2006). The items used to measure this construct are the respondent's perceived technological ability, comfort in the usage of technology products like computers and the confidence in using electronic banking.

3) Innovativeness

Innovativeness construct shows to what extent he/she is having the innovativeness characteristics in him/her, which means to what extent he/she is willing to try out new products/ services especially electronic banking services, in the context of this study. Parasuram (2000) describes innovativeness as "*the tendency to be a technology pioneer and thought leader*". Innovativeness can be measured through the extent to which the respondents are having the domain specific characteristics such as opinion leadership and the tendency to acquire new information and ideas about a specific product/services or a set of related products. They may also be the pioneers in the usage and adoption of such products or services. The items used for measuring innovativeness are adapted from studies by Parasuram (2000), Locket and Littler (1997) and Lassar et al. (2005). Items are shown in table 7.13.

4) Need for personal contact

Need for personal contact means in the delivery of banking services to what extent the customer want the personal contact or face-to face interaction with the bank employees. The adopters of the technology enabled services such as electronic banking sometimes adopt them to eliminate the need for personal contact and interaction with the service personnel and other customers (Walker and Johnson, 2005; Polatoglu and Ekin, 2001; Dabholkar and Bagozzi, 2002; Sathye, 1999). At the same time

there are some segments of bank customers who prefer face-to-face interaction with people rather than impersonal interaction with the machines, which are unable to provide personalized attention (Dabholkar and Bagozzi, 2002; Walker et al., 2002; Prendergast and Marr, 1994). Moreover earlier studies suggest that some people prefer service encounters that afford social interaction. The items used to measure this constructs are shown in table 7.13.

5) Perception of risk

This factor measures the extent to which the bank customers perceive the electronic banking self services to be safe, trustworthy and secure to use (Walker et al, 2002;, Polatoglu and Ekin, 2001 ;, Jayawardhena and Foley, 2000). Perceived risk is associated with the concerns about the personal privacy, security of the transactions, and the trust and confidence in the electronic banking channel services. The lower the perception of risk in using the services the greater would be the adoption level of the respondent adopting the electronic banking channel services.

The model has been operationalised using a multi-item scale with items validated and adapted from similar studies as shown in table 7.13.

Table 7.13: Multiple-item scale for determinants of Technology-Enabled Banking Self-Services adoption levels

Dimensions		Statements	Items adapted from	Cronbach Alpha
Capacity/Self efficacy	Selef1	1. I have a well developed technological ability	Walker & Johnson (2006), Meuter et al (2003)	0.908
	Selef2	2. I am comfortable with the usage of technology products like computers		
	Selfef3	3. I feel confident of using electronic banking methods for conducting transactions.		
Relative Advantage/Perceived Benefits	Relad1	1. Electronic banking channels are much more convenient to use	Parasuram (2000), Walker& Johnson (2006), Polatoglu &Ekin (2001)	0.843
	Relad2	2. Electronic banking channels saves time		
	Relad3	3. Electronic Banking is less costly or have no cost		
	Relad4	4. Electronic banking channels gives more control over banking transactions		
Perception of risk	Risk1	1. I do not consider it safe to do any kind of financial transaction online	Parasuram (2000), Tan & Teo (2001)	0.773
	Risk2	2. I trust the traditional banking methods more.		
	Risk3	3. I am worried that the information send over internet will be seen by others		
Innovativeness	Innov1	1. Other people come to me for advice on electronic banking	Parasuram (2000), Lockett& Littler (1997), Lassar et al (2005)	0.788
	Innov2	2. I am one of the first among my friends and relatives to use electronic banking		
	Innov3	3. I do not like changes from the usual way I do things		
Need for personal contact	Persocon1	1. I am more comfortable with face-to-face transactions with human tellers	Dabholkar (1996), Curren& Meuter (2005), Walker& Johnson (2006)	0.712
	Persocon2	2. I enjoy seeing people who work at my bank		
	Persocon3	3. The people at my bank do things for me that no machine would do		

Refer Appendix-2; table A 2.4, for descriptive statistics of Self efficacy, Relative advantage, Perception of risk, Innovativeness and Need for personal contact.

7.7.2 Reliability and validity of the scale

The multi-item scale was assessed for its reliability, which is defined as the ability of the scale to consistently measure the phenomenon it is designed to measure, which is an essential precondition for the instrument validity (Robert Ho, 2006). Cronbach's alpha, which measures the internal consistency of the items in a construct, was computed for each variable to test reliability. Table 7.13 shows the Cronbach alpha values ranges from 0.712 to 0.908, which falls in the acceptable range according to Nunnally (1967).

As the Cronbach's alphas are in the acceptable range the constructs are deemed to have adequate reliability for the next stage of validity analysis. The validity of the constructs used in this scale had been proved in the related studies from which they had been adapted from. However the content validity is again tested in the study through consultation with experts and reference of the related literature. The construct validity is tested using a factorial validity method using exploratory factor analysis as explained in the next section.

7.7.2.1 Factor Analysis of Determinants of TEBSS Adoption Levels

Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (MSA) was first computed to determine the suitability of using factor analysis. The MSA was found to be 0.893 which is greater than 0.5, so the factor analysis is appropriate in this case (Malhotra 2005). Bartlett's test of sphericity was significant at 4820.46 at degrees of freedom df of 120, and hence the data can be subjected to factor analysis.

According to Malhotra (2005) principal component analysis is recommended when the primary concern is to determine the minimum number of factors that will account for maximum variance in the data for the subsequent multivariate analysis.

To determine the minimum loading required to include an item in its respective constructs Hair et al. (1998) suggested that variables with loadings greater than 0.3 were considered significant; loadings greater than 0.4, more important; and loadings 0.5 or greater very significant. In this study the criteria used was to accept items with loadings greater than 0.5.

Table 7.14: Factor Analysis of determinants of Technology-Enabled Banking Self-Services Adoption Levels

Variables	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Selef1	**.744**	.302	-.114	.285	-.118
Selef2	**.880**	.270	-.182	.197	-.0442
Selef3	**.861**	.239	-.187	.173	-.0133
Relatad1	.361	**.733**	-.0946	.177	-.151
Relatad2	.383	**.750**	-.155	.0652	-.128
Relatad3	.0729	**.798**	-.166	.228	.0465
Relatad4	.358	**.606**	-.198	.327	-.118
Risk1	-.178	-.210	**.769**	-.233	.137
Risk2	-.158	-.195	**.708**	-.100	.352
Risk3	-.113	-.0425	**.800**	-.079	.0231
Innov1	.257	.243	-.128	**.792**	-.0462
Innov2	.170	.170	-.134	**.836**	-.0744
Innov3	.260	.223	-.391	**.546**	-.239
Persoco1	-.0558	-.210	.479	-.156	**.532**
Persoco2	-.0115	-.110	.132	.042	**.844**
Persoco3	-.0881	.0333	.109	-.174	**.823**
Initial Eigen values	6.747	1.978	1.084	1.002	.927
% of Variance	42.171	12.364	6.774	6.266	5.793
Cumulative %	42.17	54.54	61.31	67.58	73.37

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotation converged in 6 iterations.

Refer Appendix-2; section A2.2, for additional results of factor analysis, of determinants of TEBSS adoption levels.

Principal component analysis is done using varimax rotation performed and five factors considered of which 4 factors had eigen values greater than 1.0 and the fifth factor is also considered after studying the scree plot as its eigen value is 0.927 which is very close to 1.0. The total variance explained by these five factors was 73.367%.

7.7.3 Correlations Analysis between the Total /Cumulative Electronic Banking Self- Services Adoption level CHAD and the five determinants of adoption levels

Correlation and regression analysis are performed with the model variables. Correlation analysis is done to measure the degree of association between two sets of quantitative data.

Here the degree of association of total electronic channel adoption CHAD is correlated with the dimensions such as self efficacy (Selef), relative advantage (Relatad), perception of risk (Risk), innovativeness (Innov) and personal contact (Persoco).

Table 7.15: Correlations Analysis between the Total /Cumulative Electronic Channel Services Adoption level CHAD and the five determinants of adoption levels

	Total Electronic Banking Channel Adoption (CHAD)	Self Efficacy	Relative Advantage	Perception of Risk	Innovativeness	Personal Contact
Total Electronic Banking Channel Adoption (CHAD)	1.000 .	.392** .000	.477** .000	-.386** .000	.515** .000	-.312** .000
Self Efficacy	.392** .000	1.000 .	.663** .000	-.426** .000	.572** .000	-.246** .000
Relative Advantage	.477** .000	.663** .000	1.000 .	-.459** .000	.586** .000	-.307** .000
Perception of Risk	-.386** .000	-.426** .000	-.459** .000	1.000 .	-.499** .000	.505** .000
Innovativeness	.515** .000	.572** .000	.586** .000	-.499** .000	1.000 .	-.353** .000
Personal Contact	-.312** .000	-.246** .000	-.307** .000	.505** .000	-.353** .000	1.000 .

**. Correlation is significant at the 0.01 level (2-tailed).

From the correlation table 7.15 it is found that total electronic banking channel services adoption CHAD shows significant positive correlation at 99% confidence level with capacity/self efficacy (correlation co efficient r = 0.347), relative advantage /perceived benefit (r = 0.434) and innovativeness (r = 0.451). The correlation power is medium. CHAD is negatively correlated with perception of risk (r = 0.314) and need for personal contact (r = 0.256).

It means that the more the positively correlated dimensions a respondent is having such as self efficacy in using electronic banking self services, perceives more relative advantage in using the electronic banking channel services and more a respondent is having innovativeness with respect to using electronic banking self services the more will be the total electronic banking self services adoption levels of that respondent. While for the negatively correlated dimensions, the more a respondent's perception of risk in using electronic banking self services the lesser will be the total adoption level for electronic banking self services. Likewise, the more a respondent's need for personal contact the lesser will be the adoption level of total electronic banking self services as he/she will prefer services like branch banking which will give opportunity for face-to-face contact with the service personnel.

We can proceed to do regression analysis as the variables are having significant correlations.

7.7.4 Regression Analysis with Total Electronic Banking Self-Services adoption level (CHAD) as the dependent variable and the testing of Hypotheses H3, H4, H5, H6 and H7

For conducting the regression analysis the dependent variable is the total electronic banking channel self-services adoption level (CHAD). The output of the regression analysis is also used to test the hypothesis H3, H4, H5, H6 and H7.

Y = the total electronic banking channel services adoption (CHAD)

The five independent variables are self efficacy (Selef), relative advantage (Relatad), perception of risk (Risk), innovativeness (Innov) and need for personal contact (Persoco)

X_1 : self efficacy (Selef)

X_2 : relative advantage (Relatad)

X_3 : perception of risk (Risk)

X_4 : innovativeness (Innov)

X_5 : Need for personal contact (Persocon)

The pair wise correlations show that all the independent variables are having significant medium correlation with the dependent variable. The correlation table also shows that the independent variables are also correlated with each other, so some of them will have to be eliminated. Regression helps in eliminating some of the independent variables as some of them being correlated with the other do not add any value to the regression model (Nargundkar, 2003).

The regression model have been formed using the enter method taking all the five independent variables together and examining their combined effect on the dependent variable. The regression model represented by the equation

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5$$

The R^2 value from table 7.16 is found to be 0.325; it indicates the percentage of variation in the dependent variable explained by the independent variables (Robert Ho, 2006). Thus about 33 percent of variation in the dependent variable is explained by the independent variables.

Table 7.16: Results of the Multiple Regression analysis with Total Adoption level (CHAD) as dependent variable

Dependent variable	Independent variables	Unstandardised coefficient		Standardised coefficient	t	Sig	Collinearity statistic VIF
		B	Std. Error	Beta			
Total Electronic Banking Channel Adoption (CHAD)	(Constant)	3.901	1.827		2.136	0.033	
	Self efficacy	0.117	0.316	0.019	0.368	0.713	1.94
	Relative advantage	1.454	0.376	0.206	3.866**	0.000	2.11
	Perception of risk	-0.498	0.276	-0.085	-1.800	0.072	1.67
	Innovativeness	1.795	0.294	0.306	6.110**	0.000	1.86
	Need for personal contact	-0.613	0.285	-0.093	-2.153*	0.032	1.37
General							
F	48.217**, p-value = 0.000						
R	0.570						
R^2	0.325						

** P value < 0.01, * P value < 0.05

Refer Appendix-2; section A2.3, for detailed results of regression analysis shown in the table.

The F value serves to test how well the regression model fits the data (Robert Ho, 2006). Looking at the F-statistic in table 7.16 we find that the model is statistically significant at a confidence level of more than 99%, since the p-value is less 0.01.

An examination of the t-tests for significance of independent variables shows that the Relative Advantage (Relatad) with beta value of 0.206 and Innovativeness (Innov) with beta value of 0.306 are significant at 95% confidence level since the significance value is less than 0.05. The effects of these two variables are positive on the total electronic banking self-services adoption. The *need for personal contact* with beta value of

-0.093 is significant at 95% confidence level (significance value less than 0.05) indicating the *need for personal contact* is inversely affecting the

total electronic banking self-services adoption level (CHAD). The *perception of risk* with the beta value -0.085 is not having a significant effect on CHAD as the significance level is more than 0.05. Finally the independent variable *capacity/self efficacy* is not statistically significant since the p-values are greater than 0.1.

Since the standardized beta coefficient is having the highest value in case of *innovativeness* the positive impact of this variable is the highest on the dependent variable total electronic banking self-services adoption level (CHAD), the second highest positive impact is by *relative advantage* perception as it is having the second highest standardized beta value. The third highest impact is by the *need for personal contact*, which is having a negative influence. The construct perception of risk might have some influence on the CHAD, but the influence is significant only at 90% confidence level as the p-value is greater than 0.05 but less than 0.1.

The multi-collinearity is not a problem as seen from table 7.16 as the collinearity statistic for all the independent variables are less than 10, which is in the acceptable range (Robert Ho, 2006).

7.7.4.1 Testing of hypotheses H3, H4, H5, H6 and H7

Hypothesis H3 proposed that 'the adoption levels of technology-enabled banking self-services by bank consumers are related to their *self efficacy/perceived capacity* in using them'.

The corresponding null hypothesis $\mathbf{H3_0}$ states that 'the adoption level of technology-enabled banking self-services by bank consumers are not related to their *self efficacy/perceived capacity* in using them'.

The result from the regression analysis shows that the null hypothesis $\mathbf{H3_0}$ is accepted as the signifance level or the p-value of the t-test from the

regression output is more than 0.05. The implication is that the hypothesis **H3** is not supported. That means the construct *self efficacy/capacity* does not have a significant influence on the total adoption levels (CHAD) of the technology-enabled banking self-services. As majority of the respondents are comfortable with using computers and internet, self efficacy or capacity of the respondents to use the electronic banking services did not show an impact on the adoption levels.

Hypothesis H4 proposed that 'the adoption levels of technology-enabled banking self- services by bank consumers are related to their perceived *relative advantage* in using them'.

The corresponding null hypothesis $\mathbf{H4_0}$ states that 'the adoption levels of technology-enabled banking self-services by bank consumers are not related to their *relative advantage* in using them'.

The result from the regression analysis shows that the null hypothesis $\mathbf{H4_0}$ is rejected as the significance level or the p-value of the t-test from the regression output is less than 0.05. Thus the hypothesis **H4** is supported. That means the construct *relative advantage* is having a significant positive effect on the total adoption levels CHAD. From the standardized beta co efficient values it is having the second highest value showing that of all the five independent variables considered it is the variable which is having the second highest influence on the dependent variable, CHAD.

Hypothesis H5 proposed that 'the adoption levels of technology-enabled banking self- services by bank consumers are related to their *perception of risk* in using them'.

The corresponding null hypothesis **$H5_0$** states that 'the adoption levels of technology-enabled banking self-services by bank consumers are not related to their *perception of risk* in using them'.

This null hypothesis **$H5_0$** is accepted from the results of the regression analysis as the significance level or the p-value of the t-test from the regression output is more than 0.05. However the null hypothesis is not accepted if the confidence level is reduced to 90% as the p value is 0.072 which is less than 0.1. Thus hypothesis **H5** is partially supported from the results. The implication is that the *perception of risk* is only having a minor influence in deciding the extent of adoption or usage. The reason could be that once the users start using these services they may not find that much risk in using them.

Hypothesis H6 proposed that 'the adoption levels of technology-enabled banking self –services by bank consumers are related to their *innovativeness*.

The corresponding null hypothesis **$H6_0$** states that 'the adoption levels of technology-enabled banking self-services by bank consumers are not related to their *innovativeness* in using them'.

Thus the null hypothesis **$H6_0$** is rejected as can be seen from the result of the t-test in the regression output since the p-value is less than 0.05. Therefore hypothesis **H6** is supported. So the independent variable *innovativeness* is found to be having influence on the dependent variable total adoption level. As standardized beta co efficient from table 7.16c is having the highest value corresponding to this variable that this is having the highest influence on the adoption level. The more a bank consumer is having innovativeness the more would be his/her adoption level of electronic banking self-services.

Hypothesis H7 proposed that 'the adoption levels of technology-enabled banking self-services by bank consumers are related to their *need for personal contact*'.

The corresponding null hypothesis **$H7_0$** states that 'the adoption levels of technology-enabled banking self-services by bank consumers are not related to their *need for personal contact* '.

The result of the t-test corresponding to *need for personal contact* of the regression output shows that the null hypothesis **$H7_0$** is rejected as the p-value is less than 0.05. So the hypothesis **H7** is supported. This shows that the variable *need for personal contact* is having an effect on the extent of adoption or the adoption level and the direction of influence is negative as the corresponding beta coefficient is negative. So as bank consumers *need for personal contact* increases, they tend to adopt electronic banking services to a lesser extent.

To sum up, the *innovativeness* exhibited by the bank customers, the *relative advantage* in using the electronic banking as perceived by the bank customers, and their desire for interacting with the bank personnel are found to be the relevant factors which determine the extent of adoption or the adoption levels of bank consumers. The perception of risk in using them is only having a very minimal effect in determining the adoption level. Finally, the self efficacy or bank consumers' perceived capacity to use the technology products such as electronic banking is seen not to have any significant effect on the adoption levels by the bank consumers who are adept at using computers and the internet.

The implication of these findings for the banks is that when targeting these electronic banking services such as internet banking, tele banking and mobile banking the banks have to identify those customers who are more innovative, who perceive a greater benefit accruing in using these services and who prefer interaction with the machines rather than the bank employees. These customer segments want more convenience and perceive more control in

doing the banking transactions by themselves. As far as innovativeness and need for interaction are concerned, being personality traits these are not within the control of the banks. However, the perceived benefit or relative advantage the bank consumers get from using these services can be influenced by the banks through communicating and demonstrating the benefits they get by using these services. The perception of risk by bank customers in using these services can be reduced by banks through installation of the latest electronic security measures and publicizing this to the consumers.

7.8 Relationship, between electronic banking adoption level determinants and Internet banking adoption levels

Internet banking is found to be the second most adopted electronic banking mode after ATMs. In this section an examination is made regarding to what extent the internet banking adoption levels by its users are explained by the five dimensions namely *self-efficacy*, *relative advantage*, *perception of risk*, *innovativeness* and *need for personal contact*. The adoption levels for internet banking IBAD used here in this study means the rate of usage or the intensity of usage of the internet banking by the users of it. The higher the IBAD, the more will be the usage, so the non-users will have nil IBAD.

For this purpose correlation analysis and regression analysis are performed. Correlation analysis is performed using Pearson correlation method to know the pairwise relationships between the dependent variable which in this case is the internet banking adoption level (IBAD) and the five independent variables.

From the correlation table 7.17 it is found that the dependent variable internet banking services adoption levels IBAD is correlated positively at 99% confidence level with *self efficacy* (Correlation co efficient r = 0.445), *relative advantage* (r = 0.536), and *innovativeness* (r = 0.617). IBAD is negatively

correlated at 99% confidence level with *perception of risk* (r = -0.384) and *personal contact* (r = -0.354). This is to be expected as more a person has self efficacy or confidence in using electronic banking self services the more will be the adoption level. Similarly more a person perceives relative advantage or benefit in using internet banking over the other options of using the banking services the more will be that person's adoption level of internet banking. Like wise the same is true in the case of innovativeness dimension, more a person has innovativeness or opinion leadership specific to internet banking services the more will be the adoption level IBAD.

Table 7.17: Correlation Analysis with the Electronic banking adoption model dimensions and Internet banking adoption level

	Internet Banking Adoption IBAD	Self Efficacy	Relative Advantage	Perception of Risk	Innovativeness	Personal Contact
Internet Banking Adoption IBAD	1.000 .	.487** .000	.583** .000	-.452** .000	.668** .000	-.394** .000
Self Efficacy	.487** .000	1.000 .	.663** .000	-.426** .000	.572** .000	-.246** .000
Relative Advantage	.583** .000	.663** .000	1.000 .	-.459** .000	.586** .000	-.307** .000
Perception of Risk	-.452** .000	-.426** .000	-.459** .000	1.000 .	-.499** .000	.505** .000
Innovativeness	.668** .000	.572** .000	.586** .000	-.499** .000	1.000 .	-.353** .000
Personal Contact	-.394** .000	-.246** .000	-.307** .000	.505** .000	-.353** .000	1.000 .

**. Correlation is significant at the 0.01 level (2-tailed).

While in the case of negatively correlated dimension perception of risk, greater the *perception of risk* lesser will be the adoption of internet banking services IBAD. Same is the case with '*need for personal contact*' higher the need for personal contact for a person lesser will be the adoption of internet banking by that person.

7.8.1 Regression Analysis of Internet Banking Adoption level (IBAD) as dependent variable using the electronic banking adoption dimensions

In this case the dependent variable is the internet banking adoption level IBAD. The independent variables are *self efficacy* (Selef), *relative advantage* (Relatad), *perception of risk* (Risk), *innovativeness* (Innov) and *need for personal contact* (Persoco).

From the correlation table 7.17 it is found that the dependent variable is having medium to fairly good level of correlation with the independent variables (ranging from 0.354 to 0.617). However correlations are also observed between the independent variables which mean that they are not independent of each other, regression analysis shows the independent variables that are having significant influence on IBAD (Nargundkar, 2003).

The R Square value obtained from the regression model is 0.523 from table 7.18 which means the independent variables together explain about 52% of the variation in the dependent variable IBAD (Robert Ho, 2006).

The F value serves to test how well the regression model fits the data (Robert Ho, 2006). Looking at the F-statistic in table 7.18 we find that the model is statistically significant at a confidence level of more than 99%, since the p-value is less than 0.01, which proves that the regression model obtained is valid.

An examination of the individual variable t-tests from table 7.18 it is found the coefficients of the independent variables *relative advantage* (Relatad) with beta co efficient of 0.24, *innovativeness* (Innov) with beta coefficient of 0.44 and *need for personal contact* (Persoco) with beta coefficient of -0.141 are

statistically significant at 99% confidence level as the significance values or p-values are 0.000.

Table 7.18: Results of Multiple Regression with internet banking adotion level IBAD as dependent variable

Dependent variable	Independent variables	Unstandardised coefficient		Standardised coefficient	t	Sig	Colline-arity statistics VIF
		B	Std. Error	Beta			
Internet Banking Adoption level (IBAD)	(Constant)	-1.826	0.677		-2.698	0.007	
	Self efficacy	0.056	0.119	0.020	0.468	0.640	1.96
	Relative advantage	0.761	0.139	0.238	5.480**	0.000	2.09
	Perception of risk	-0.130	0.103	-0.049	-1.257	0.209	1.66
	Innovativeness	1.198	0.110	0.444	10.86**	0.000	1.84
	Need for personal contact	-0.428	0.107	-0.141	-4.01**	0.000	1.36
General							
F	115.154**, p-value = 0.000						
R	0.723						
R^2	0.523						

* p-value < 0.05, ** p-value < 0.01

Refer Appendix-2; section A2.4, for detailed results of regression analysis shown in the table.

The standardized beta coefficient of 'need for personal contact' is negative because as the need for personal contact increases the internet banking adoption level of the respondent decreases.

Regarding the independent variables Self efficacy and Perception of Risk as the p-values are found to be 0.64 and 0.209 respectively, both the dimensions are statistically not significant hence they don't affect significantly the dependent variable internet banking adoption levels IBAD of the respondents.

Self efficacy or perceived capacity to use the internet banking is not affecting the internet banking adoption level since majority of the respondents are having high technological usage ability as evident from their computer and internet usage patterns.

The perception of risk also is not found to be a good predictor of the level of adoption as the respondents does not perceive high risk in the usage of internet banking services.

7.9 Predictors of internet banking use

In this section an examination is made of the different factors which will predict whether a bank customer would go for using internet banking or not. This has to be distinguished from the earlier section which deals with the internet banking adoption levels which denote the intensity or extent of internet banking usage.

Here the dependent variable representing adoption is a dichotomous one with using = 1 and not using = 0. Hence multivariate statistical technique called binomial logistic regression is used for analysis.

The independent variables taken for predicting use are the demographic factors such as gender, age category, occupation, income level and behavioural factors such as hours of computer usage by consumer, his/her frequency of internet browsing, the hours of internet browsing, and the factors considered earlier for determining the adoption levels such as relative advantage, innovativeness, perception of risk, need for interaction and self efficacy.

The demographic factors were included drawing insights from literature as they were found to influence adoption and use. The factors related to the computer and internet usage are included as in the literature it has been mentioned, the more the expertise in usage of technology products like

computers and internet the more will be the likelihood of the bank customers adopting electronic banking. The other factors are already explained in the earlier section.

The logistic regression is conducted to determine which of these factors are able to significantly predict whether a bank consumer will use internet banking or not. Logistic regression can be used to predict a dichotomous dependent variable on the basis of continuous and/or categorical independents and to determine the percent of variance in the dependent variable explained by the independents and to rank the relative importance of independent variables in predicting the dependent variable (Hair et al., 1998).

Table 7.19a: Classification table for internet banking use and goodness of fit statistics

		Predicted		Correct Classification Percentage
		Not Using	Using	
Observed	Not Using	130	44	74.71%
	Using	26	350	93.09%
Overall correct classification : 87.27%				
Goodness of fit measures				
Cox & Snell - R^2 0 . 487				
Nagelkerke - R^2 0 . 682				
Hosmer and Lemeshow Goodness-of-Fit Test				
Chi-Square df Sig.				
8.6315 8 .3743				

Refer Appendix-2, section A2.5 for additional details

Logistics regression output shows that the model is able to predict internet banking usage correctly in 87.27% cases. The fit statistics of the model shown such as Cox & Snell R^2 and Nagelkerke R^2 are found to have values of

0.487 and 0.682 respectively according to Hair et al. (1998). Another significant goodness of fit is the Hosmer and Lemeshow chi- square which is found to be non-significant since its sig value is more than 0.05, indicating no differences in the distribution of the actual and predicted dependent values (Hair et al., 1998) .

Table 7.19b: Predictors of internet banking use

Variable	B	S.E	Wald	df	Sig
SEX	-.5154	.3181	2.6253	1	.1052
AGE	.1250	.1375	.8255	1	.3636
OCC	.0296	.1900	.0242	1	.8763
ANINCOM	**-.2954**	**.0923**	**10.2424**	**1**	**.0014**
COMPHRS	-.0838	.1525	.3020	1	.5826
NETBROF	-.1619	.1831	.7818	1	.3766
NETBRHR	-.2769	.1682	2.7107	1	.0997
SELFEF	-.2021	.2554	.6264	1	.4287
RELATAD	**-1.0368**	**.2833**	**13.3885**	**1**	**.0003**
PERSOCO	.3478	.2304	2.2776	1	.1313
INNOV	**-1.5911**	**.2665**	**35.6424**	**1**	**.0000**
RISK	**.5577**	**.2166**	**6.6283**	**1**	**.0100**

(SEX- gender, Age- age category, Occ- occupation, Anincom- annual income category, Comphrs- hours of computer usage per day, Netbrof-net browse frequency, Netbrhr-net browse hours, selef- self efficacy, related- relative advantage, persoco- need for interaction, Innov- innovativeness, Risk- perception of risk)

From table 7.19b p-values relating to income category (ANINCOM) to which the respondent belonged, perception of relative advantage (RELATAD), innovativeness (INNOV) and perception of risk (RISK) are found to be less than 0.05, indicating that these variables are the significant predictors of the dependent variable internet banking usage/adoption at 95% confidence level.

It can further be observed that *innovativeness* is having the highest predictive power as the Wald's statistic is the highest in this case (35.64), followed by relative advantage perception (13.39), income level (10.24), and the perception of risk (6.63).

However, the variables such as net browse hours (NETBRHR), gender (SEX) and need for personal contact (PERSOCO) all might have marginal influence on the dependent variable at 90% confidence level since their p-values are around 0.1, from (table 7.19b).

The income levels, perception regarding the relative advantage by bank consumers, their innovativeness and perception regarding the risk associated with using the services are the significant predictors for usage or adoption of internet banking. It means that higher the innovativeness, more the perceived relative advantage in using internet banking, higher the income and lesser the perception of risk by a bank customer, the more the probability of internet banking usage/adoption by him/her. Further, it can be seen that these are the factors which significantly discriminates users and non-users of internet banking.

7.10 Conclusion

The chapter explained the measures of adoption levels of the total electronic banking self services as well as that of individual adoption levels of each of the four technology-enabled banking self-services considered for the

study namely ATM, internet banking, tele banking and mobile banking. It also dwelt upon the relationship between the demographic factors such as gender, age group, income levels and occupation of the repondents with their total electronic banking self services adoption levels as well the individual channels adoption levels. The related hypotheses proposed were examined and it was found that while gender did not have much influence on adoption levels other demographic factors like age, income levels and occupation do have influence on the adoption levels and the extent of usage of technology-enabled banking self services.

The proposed research model showing the effect of determinants of the total adoption levels of electronic banking such as self efficacy, relative advantage, innovativeness, need for personal contact and perception of risk was examined and found to explain significant level of variation in the adoption levels. The determinants such as innovativeness, relative advantage perception and need for personal contacts were found to impact the extent of adoption or the adoption levels. The related hypotheses were tested. The above model when tested for internet banking adoption levels showed even more explanatory power for variation in the adoption levels.

Finally, various demographic, computer and internet usage parameters, and belief and attitudinal parameters of predicting the internet banking usage were tested using logistic regression. The parameters of innovativeness, relative advantage perception, income levels and perception of risk were found to be significant predictors for discriminating users and non-users of internet banking.

Chapter 8

CUSTOMER SATISFACTION AND PERCEPTION OF INDIVIDUAL TECHNOLOGY-ENABLED BANKING SELF-SERVICES

8.1Introduction

In this chapter the findings regarding the customer satisfaction and perceptions of quality of services provided through the technology-enabled banking self-services are shown for ATM, internet banking, tele banking and mobile banking. Their relationship with the adoption and usage of these services are examined.

The comparisons of satisfaction and service quality levels across the bank groups and those between the two geographical locations are conducted. The reasons which inhibit the usage of these services are also looked into.

8.2 ATM satisfaction and service quality

Satisfaction and service quality of ATM services were measured using the scales developed for this. These values were compared across the various bank groups and between the two geographical locations selected for the study. The relationship between satisfaction level and service quality were computed along with their relationship with the adoption levels and the perceived use percentage of ATMs. The results are presented in the subsequent sections.

8.2.1 ATM Satisfaction and service quality measures

ATM satisfaction level is measured using a 3-item scale as shown in table 8.1. Multiple item scale was being used to measure the satisfaction level

of ATM in order to get more reliable results. It can be seen from table 8.1 that the reliability coefficient is above the acceptable limit of 0.7 as recommended by Nunally and Bernstein (1994).

Table 8.1: Multi-item scale for measuring ATM satisfaction

Items	Cronbach Alpha
Overall Satisfaction with ATM of your bank	0.834
Satisfaction with the Reliability of ATM to do transactions	
Satisfaction with the accessibility of ATM	

As mentioned in chapter 3 the service quality was measured on a performance only basis, which means the overall evaluation of excellence and service performance on the key parameters of the ATM services measured as perceived by the respondents. So the ATM service quality was measured on a performance based 7-item scale which consists of the customer perception regarding performance in the case of functions provided, easiness to use and operate, availability of cash, ATM's environmental factors, convenience of location, security of location and its complaint resolution.

Table 8.2: Multi-item scale for measuring ATM service quality

ATM Items	Adapted from	Cronbach Alpha
Learning to use ATM was easy for me	Al-Hawari et al., 2005	0.77
Functions provided by the ATM of my bank are very useful for doing my banking		
ATM machine is easy to use and operate		
I feel secure in conducting my banking business through ATMs		
ATM is conveniently located		
ATM is located in safe locations		
The complaint resolution of my bank's ATM is fast and satisfactory.		

8.2.2 Comparison of ATM satisfaction level and service quality- bank group wise

The results of customer satisfaction and service quality are measured and bank group wise comparisons are made. The mean values of satisfaction levels and service quality is found to be the highest for the respondents from the foreign banks, followed by private banks and public sector banks. But the results of the analysis of variance test proved that there is no significant differences between the satisfaction levels and service quality perception values from the three bank groups as the p-values are found to be greater than 0.05. Thus the variations in these values are not significant at 95% confidence levels.

Table 8.3a: Comparison of ATM satisfaction level and service quality bank group wise

	ATM Satisfaction			ATM Service quality		
	N	Mean	Std deviation	N	Mean	Std deviation
Public sector bank s	254	3.996	0.801	254	3.840	0.577
Private sector banks	228	4.054	0.731	228	3.857	0.501
Foreign banks	71	4.117	0.683	71	3.994	0.506
Total	553	4.036	0.758	553	3.867	0.539

maximum value = 5 & minimum value = 1

Refer Appendix-2; section A2.6

Table 8.3b: Analysis of variance of satisfaction level and service quality bank group wise

		Sum of square	df	Mean square	F	sig
ATM Satisfaction	Between groups	.950	2	.475	.825	.436
	With in groups	316.462	550	.575		
	Total	317.412	552			
ATM service Quality	Between groups	1.351	2	.675	2.334	.098
	With in groups	159.190	550	.289		
	Total	160.541	552			

From the above results it can be concluded that satisfaction levels and service quality perceptions are not significantly different for various bank groups.

8.2.3 Comparison of ATM satisfaction level and service quality- geographical location wise

The satisfaction levels and service quality perceptions of ATMs are compared between the two geographical locations under the study namely metro banked centre and urban banked centre. There is no significant difference between these values of the two geographical locations as evident from table 8.4 (the p-values are more than 0.05). So the conclusion is that these values do not vary with the geographical locations. Further the two urban banked centres sampled also did not show significant differences in this regard and hence clubbed together for the purpose of analysis.

Table 8.4: Comparison of ATM satisfaction level and service quality geographical- locationwise

Geographical location		t-test for equality of means	
Metro Banked centre	Urban banked centre	t-value	Sig. (2-tailed)
Satisfaction levels*			
3.99	4.08	-1.39	0.165
Service quality*			
3.86	3.87	-0.295	0.768

* maximum value = 5, minimum value = 1

8.2.4 Pair wise relationships among service quality perceptions, satisfaction levels, adoption levels and use percentage of ATMs

From the correlation table 8.5 it is found that there exists significant correlation between ATM service quality and ATM satisfaction level at 99% confidence level since the p-value is less than 0.01, but however the strength of the correlation is only medium level (correlation co efficient r = 0.462). From the literature as explained in chapter 3, service quality is considered as an

antecedent of customer satisfaction (Oliver, 1993 and Spreng and Mackoy, 1996). So here also it is seen that as the service quality increases customer satisfaction also increases in case of ATMs.

Table 8.5: Correlation between ATM satisfaction levels with ATM service quality, ATM adoption levels and ATM use percentage

		ATM Total Satisfaction	ATM Service quality	ATM Adoption level ATMAD	ATM Use Percantage
ATM Total Satisfaction	Pearson Correlation	1.000	.462**	.055	-.039
	Sig. (2-tailed)	.	.000	.196	.371
	N	553	553	553	532
ATM Service quality	Pearson Correlation	.462**	1.000	.112**	.100*
	Sig. (2-tailed)	.000	.	.008	.021
	N	553	553	553	532
ATM Adoption level ATMAD	Pearson Correlation	.055	.112**	1.000	-.002
	Sig. (2-tailed)	.196	.008	.	.963
	N	553	553	553	532
ATM Use Percantage	Pearson Correlation	-.039	.100*	-.002	1.000
	Sig. (2-tailed)	.371	.021	.963	.
	N	532	532	532	532

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

ATM service quality has weak significant relationships with ATM adoption level ATMAD and ATM use percentage, but as the correlation strengths are 0.112 and 0.1 respectively the strength of correlation is found to be negligible. ATM satisfaction levels are found to have no significant correlation with ATM Adoption level and ATM use percentage. This means both the service quality and satisfaction levels are not having any effect on adoption level and usage in the case of ATMs. The ATMs are widely adopted, and the usages of ATMs have become habitual, the consumers tend to use this service irrespective of their satisfaction levels and quality perceptions. When

usage of something becomes habitual the consumers tend to use it automatically with little cognitive or mental processing (Triandis, 1980).

8.3 Internet banking satisfaction and service quality

Internet banking customer satisfaction is important construct which measures how satisfied the users are with the internet banking services. It determines the adoption levels and continued usage of the internet banking services. The perceptions regarding the quality of services through internet banking is expected to be an antecedent of customer satisfaction with it and it might in turn have an influence on the adoption level and use percentage of internet banking.

8.3.1 Measurement of internet banking satisfaction and service quality

A three item scale was used to measure the satisfaction level of the users of the internet banking services. A multi item scale was selected as it exhibits more reliability. A five point scale was used with extreme points 5 taken as highly satisfied and 1 taken as highly dissatisfied

The items used in the three item scale to measure the satisfaction levels by the internet banking users are shown in table 8.6 below.

Table 8.6: Three-item scale for measuring internet banking satisfaction

Items	Cronbach's alpha
Overall Satisfaction with internet banking of your bank	0.854
Satisfaction with the Website contents	
Satisfaction with the accuracy of services	

An examination of the literature reveals that primarily two broad categories of scales have been used to measure customer satisfaction single-

item and multi-item scales; of which multi-item scales are found to be superior as it captures the multi-faceted nature of customer satisfaction (Al-Hawari and Ward, 2006 , Sureshchander et al., 2002). Hence in this study a multi-item scale had been employed.

The service quality of internet banking was measured by means of customer perception along an eight-item scale whose items were adapted from the literature pertaining to customer perception of internet banking service quality (Jun and Cai, 2001; Long and McMellon 2004; Yang & Jun 2002) used by Al-Hawari et al (2005) in their study. This scale covered pertinent aspects of internet banking services such as availability of the needed information, security of internet banking transactions, reliability of services, attractiveness of the website, ability to carry out a wide range of transactions, fast complaint resolution, accurate responses to queries and requests, easiness of website navigation and fast download.

Table 8.7: Multiple-item scale for measuring service quality perceptions towards internet banking services

Items	Adapted from	Cronbach's Alpha
1) The bank's website contains all the required information to conduct my banking.	Al-Hawari et al., (2005).	0.854
2) The bank's internet transactions are secure.		
3) The Internet banking is reliable as it provides error free transactions.		
4) The bank's website is attractive with clear instructions		
5) The bank's internet banking facility enables me to carry out a wide range of transactions.		
6) The complaint resolution of my bank's internet banking is fast and satisfactory.		
7) The bank is very accurate in their responses to my queries/requests.		
8) Navigating the Bank's website is easy and it can be downloaded fast		

The Cronbach's Alpha coefficient is found to be above 0.7 which is the acceptable level according to Nunnally and Bernstein, 1994. These items have been validated in the study done by Al-Hawari et al. (2005).

8.3.2 Comparison of customer satisfaction and service quality of internet banking bank group wise

It can be seen from table: 8.8a that the customer satisfaction and service quality perceptions are marginally higher for the respondents from the foreign bank group as compared to the private sector and public sector banks. The values for all the groups of banks are nearly 4 for customer satisfaction and 3.7 for the service quality showing reasonably high levels of these values But analysis of variance test result (table 8.8b) shows that there is no significant difference between these values across the bank groups as the p-values are more than 0.05. Therefore the implication is that the customers from all the three bank groups were having comparable levels of customer satisfaction and service quality perceptions.

Table 8.8a: Comparison of customer satisfaction and service quality of internet banking, bank group wise

	Internet banking Satisfaction			Internet banking Service quality		
	N	Mean	Std deviation	N	Mean	Std deviation
Public sector bank s	150	3.862	0.650	150	3.724	0.537
Private sector banks	168	3.911	0.683	168	3.725	0.540
Foreign banks	59	4.079	0.656	59	3.871	0.578
Total	377	3.918	0.668	377	3.747	0.546

maximum value = 5 & minimum value = 1

Table 8.8b: Analysis of variance of customer satisfaction and service quality bank group wise

		Sum of square	df	Mean square	F	sig
Internet banking Satisfaction	Between groups	2.006	2	1.003	2.262	0.106
	With in groups	165.783	374	0.443		
	Total	1.67.88	376			
Internet banking Service Quality	Between groups	1.065	2	0.533	1.793	0.168
	With in groups	111.119	374	0.297		
	Total	112.185	376			

Refer Appendix-2; section A2.6

Thus it can be seen that inorder to differentiate the services while providing services through internet, banks have to look for new ways of differentiating their services from one another. They have to work on aspects such as improving the navigability of the website; ensure all the required details are there on the website, high level of reliability, ensuring security and so on.

8.3.3 Comparison of customer satisfaction and service quality of internet banking geographical location wise

The variation in customer satisfaction and service quality was examined by comparing the mean customer satisfaction level of the two geographical locations namely metro and urban banked centres considered for the study.

Table 8.9: Comparison of customer satisfaction and service quality of internet banking geographical location wise

Geographical location		t-test for equality of means	
Metro Banked centre	Urban banked centre	t-value	Sig. (2-tailed)
Satisfaction levels*			
3.95	3.86	1.008	0.165
Service quality*			
3.74	3.76	-0.246	0.806

***** maximum value = 5 & minimum value = 1

The satisfaction level and the service quality perceptions of the internet banking services users were more or less the same irrespective of the geographical location as seen from table 8.9. The geographical location from where the respondents hail from did not have much impact on the values of these two constructs. The significance levels for the variations in customer satisfaction and service quality perceptions from the independent sample t-tests conducted are found to be more than 0.05 indicating there are no significant differences.

Internet banking services are free from the constraints of the geographical locations as the bank accounts of the customers could be accessed from anywhere provided that the customer has access to a personal computer with internet connectivity. The lack of differences could also be due to the fact that the internet banking services provided by a bank is uniform and standardized (thanks to technology-enabled service delivery) irrespective of the geographical location.

8.3.4 Pair wise relationships among service quality perceptions, satisfaction levels, adoption levels and use percentage of internet banking and their implications

There is significant correlation between the internet banking service quality and customer satisfaction at 99% confidence level (since sig. level is less than 0.01) and the strength of correlation denoted by correlation co efficient r = 0.643 is on the higher side. So it can be interpreted that as the service quality perception increases

the customer satisfaction also increases. The literature says that service quality is an antecedent of customer satisfaction (Oliver, 1993; Spreng and Mackoy, 1996). From table 8.10 it is also found that the customer satisfaction is significantly correlated with internet banking adoption (correlation coefficient r = 0.338) and internet use percentage (correlation coefficient r = 0.245) at 99% confidence level. Hence it can be inferred that the customer satisfaction affects both adoption levels and use percentage although to a milder extent, since the strengths of correlation coefficients are mild. Thus it can be concluded that the internet banking service quality impacts customer satisfaction which in turn positively affects the adoption levels and usage of internet banking. When a customer is having good service quality perceptions his/her satisfaction levels tend to be higher. The more the customer satisfaction the more will be the adoption level as there will be more repeat usage by the customers that too for prolonged durations. This translates into higher percentage of use of internet banking services.

Table 8.10: Correlations among service quality perceptions, satisfaction levels, adoption levels and use percentage of internet banking

		Internet banking Satisfaction	Internet Banking Service Quality	Internet banking adoption level IBAD	Internet Banking Use Percentage
Internet banking Satisfaction	Pearson Correlation	1.000	.643**	.338**	.245**
	Sig. (2-tailed)	.	.000	.000	.000
	N	377	377	377	377
Internet Banking Service Quality	Pearson Correlation	.643**	1.000	.216**	.113*
	Sig. (2-tailed)	.000	.	.000	.029
	N	377	377	377	377
Internet banking adoption level IBAD	Pearson Correlation	.338**	.216**	1.000	.704**
	Sig. (2-tailed)	.000	.000	.	.000
	N	377	377	531	531
Internet Banking Use Percentage	Pearson Correlation	.245**	.113*	.704**	1.000
	Sig. (2-tailed)	.000	.029	.000	.
	N	377	377	531	553

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The implication is that the banks should strive to improve the service quality levels of their internet banking along with the factors mentioned like having a website with required information, reliable and secure transactions, clear instructions, enabling wide number of transactions, good complaint resolution, smooth navigation through the website and so on. With the improvement in quality banks can achieve better satisfaction among its customers thereby increasing their adoption levels.

8.4 Tele banking services customer satisfaction and service quality

Customer satisfaction and service quality perceptions of the customers are important as they are likely to influence the adoption levels and in turn the extent of usage of it. More over these two variables are also interrelated since from the literature (Oliver, 1993 and Spreng and Mackoy, 1996) the service quality is an important antecedent of the formation of satisfaction.

8.4.1 Measurement of customer satisfaction and service quality of tele banking services

As mentioned in chapter 4 customer satisfaction of the users of tele banking services was measured using a single-item scale similar to the one used by Cronin and Taylor (1992). A multi-item scale would have given a much more reliable estimate of customer satisfaction construct but single item scale has been used in the interest of the parsimony of the research instrument.

The perception regarding the service quality of tele banking services have been measured using perception of performance on a six-item five point Likert scale with the end points 5 taken as ‘Strongly Agree’ and 1 taken as ‘Strongly Disagree’. The items of telephone banking were originally developed by Joseph and Stone (2003) and subsequently used by Al-Hawari et al (2005). It

has been adapted from the study by Al-hawari et al. (2005) in which its reliability and validity had been proven.

The 6-item scale used for measuring the service quality perception is as shown in table 8.11

Table 8.11: Multi-item scale for measuring tele banking service quality

Items	Adapted from	Cronbach 's Alpha
1) The bank's tele banking service has pleasant musical background.	Al-Hawari et al. (2005), Joseph & Stone (2003)	0.783
2) The bank's tele banking service has reasonable number of voice prompts.		
3) The bank's tele banking service has short waiting time.		
4) The bank's tele banking service provides clear instructions.		
5) The bank's tele banking service is reliable.		
6) The bank's tele banking service provides ample options.		

From table 8.11 the Cronbach alpha co efficient which is the reliability measure is 0.768 which is above the recommended value of 0.7 (Nunnally, 1994).

8.4.2 Comparison of tele banking customer satisfaction and service quality across bank groups

The tele banking customer satisfaction and service quality were compared across the various bank groups such as private sector banks, public sector banks and foreign banks.

From the table it is found that the maximum customer satisfaction and service quality perception are found among the customers of foreign banks. In order to know whether the differences in these two values are statistically significant an analysis of variance test was performed.

Table 8.12a: Comparison of tele banking customer satisfaction and service quality across bank groups

	Tele banking Satisfaction			Tele banking Service quality		
	N	Mean	Std deviation	N	Mean	Std deviation
Public sector bank s	60	3.80	0.78	60	3.586	0.66
Private sector banks	79	3.58	0.91	79	3.481	0.78
Foreign banks	43	3.88	0.88	43	3.651	0.72
Total	182	3.723	0.86	182	3.539	0.72

maximum value = 5 & minimum value = 1

Table 8.12b: Analysis of variance of tele banking customer satisfaction and service quality across bank groups

		Sum of square	df	Mean square	F	sig
Tele banking Satisfaction	Between groups	3.030	2	1.515	2.035	0.134
	With in groups	133.234	179	0.744		
	Total	136.264	181			
Tele banking Service Quality	Between groups	0.809	2	0.404	0.763	0.468
	With in groups	94.782	179	0.530		
	Total	95.591	181			

Refer Appendix-2; section A2.6

The differences between the groups are not statistically significant as the p values are found to be more than 0.05. It implies that irrespective of the bank group to which they belong the customers had similar customer satisfaction levels and service quality perceptions.

8.4.3 Comparison of Service Quality and Customer Satisfaction between metro and urban banked centres- for tele banking

Tele banking customer satisfaction and tele banking service quality of the respondents from the metro and urban banked centres were compared. Table 8.13 shows that both the mean values are higher for the respondents from the metro banked centres than those for the respondents from the urban banked centres.

Table 8.13: Comparison of tele banking customer satisfaction and service quality between the two geographical locations

	Geographical location		t-test for equality of means	
	Metro Banked centre	Urban banked centre	t-value	Sig. (2-tailed)
Satisfaction levels*				
	3.78	3.49	1.83	0.069
Service quality*				
	3.59	3.34	1.79	0.075

***** maximum value = 5 & minimum value = 1

Customer satisfaction and service quality perception are the highest among the respondents from the metro banked centre as compared to urban banked centres. The reason could be that the provisioning of tele banking services are more wide spread by banks in the metro banked centres and the metro bank customers are willing to use this services thanks to their better educational status, awareness levels and pressure for time. When the statistical significance of this difference is tested using independent sample t-test it is found that these differences are not significant at 95% confidence levels since the p-values are more than 0.05. However when the confidence levels are reduced to 90% these differences are significant since the p value is less than 0.1.

So it can be inferred that the variables tele banking customer satisfaction and service quality perceptions are independent of the geographical locations the users hail from as the values are not found to be much different from the two geographical locations considered for the study.

8.4.4 Pair wise relationships among service quality perceptions, satisfaction levels, adoption levels and use percentage of tele banking and their implications

A Pearson correlation test is done to find out the pairwise relationships among the service quality perceptions, customer satisfaction, adoption levels and use percentage of the tele banking services. It is found that there is significant positive correlation between service quality perception and customer satisfaction in tele banking services at 99% confidence level since it is significant at 0.01. The strength of correlation is also high at correlation coefficient r = 0.803 showing that as the service quality perception increases the customer satisfaction level also increases. This implies that for users to have high satisfaction level high level of service quality is a pre requisite, as mentioned earlier the service quality is an important antecedent of customer satisfaction. There is significant positive correlations at 99% confidence levels between customer satisfaction and adoption, with relatively high strength of correlation r = 0.707, which implies that for the adoption levels to be high the customer satisfaction levels should also be high. Customer satisfaction is also having a significant correlation with the use percentage with r = 0.33.

The service quality is also having significant correlation with adoption and use percentage as can be seen from table 8.14.

Table 8.14: Correlations between satisfaction, service quality, adoption and usage of tele banking services

		TB Satisfaction	TB Service Quality	Tele Banking Adoption level TBAD	Tele Banking Percentage
TB Satisfaction	Pearson Correlation	1.000	.803**	.707**	.333**
	Sig. (2-tailed)	.	.000	.000	.000
	N	182	182	182	173
TB Service Quality	Pearson Correlation	.803**	1.000	.689**	.227**
	Sig. (2-tailed)	.000	.	.000	.003
	N	182	182	182	173
Tele Banking Adoption level TBAD	Pearson Correlation	.707**	.689**	1.000	.771**
	Sig. (2-tailed)	.000	.000	.	.000
	N	182	182	518	501
Tele Banking Percentage	Pearson Correlation	.333**	.227**	.771**	1.000
	Sig. (2-tailed)	.000	.003	.000	.
	N	173	173	501	532

**. Correlation is significant at the 0.01 level (2-tailed).

Implication of these findings are that a high level of customer satisfaction and a high level of tele banking service quality are required to achieve a high level of tele banking adoption and usage. So also the service quality perception is having a positive relationship with the customer satisfaction with tele banking services. Therefore the banks have to maintain high level of service quality through maintenance of good performance along the tele banking factors which impacts the quality such as reliable service, ample options, clear instructions, short waiting time and so on.

8.5 Customer perceptions regarding Mobile banking services

Mobile banking services being the latest addition to the technology-enabled banking self-services was in the introductory phase when the survey was conducted for this study. Hence it was decided that it would be premature to ask the customer satisfaction levels and service quality perceptions. However an examination of the drivers and inhibitors of mobile banking is presented in this section.

8.5.1 Drivers of Mobile banking services

The respondents were asked to indicate their perception regarding the factors that enable or aid the adoption of mobile banking services. Five factors were identified through literature review (Souranta et al (2005), which aided the adoption of mobile banking services. The respondents were asked to give their degree of agreement/disagreement on a five point Likert scale with 5 as strongly agree and 1 as strongly disagree.

All the five identified factors had positive influence in aiding the usage of mobile banking services as all the factors obtained a mean score over three which is the neutral point (table 8.15).

Table 8.15: Factors aiding the adoption of mobile banking

	Mean	Std Deviation
Mobile always with you	4.21	.93
Mobile is a Familiar device	4.16	.93
Bank gives sufficient guidance in using	3.25	1.15
Mobile banking is fast and efficient	3.51	.94
Quality of service is standardized	3.51	.98

The factors which are having the highest influence in aiding the usage of mobile banking services are '*mobile is always with you'* and '*mobile is a familiar device'*. This showed that the respondents recognized the potential of banking through mobile hand sets and this could be a medium which holds the maximum potential as a self-service banking delivery channel considering the above two advantages.

8.5.2 Inhibitors of Mobile banking services

Some of the common inhibitors of mobile banking services were identified from the literature (Souranta et al, 2005) and the respondents of the mobile phone services felt that all of the factors were not that much of an inhibitor as the mean values of the perceptions are less than three, except for one factor which is '*feel more comfortable with the other means of services*' which is having a mean perception value greater than three.

Table 8.16: Inhibitors of mobile banking services

	Mean	Std. Deviation
Possibility of errors	2.97	.98
Lack of familiarity with the services	2.88	1.09
Use is complicated	2.59	.98
Slow data transmission	2.82	1.01
Feel more comfortable with other means of transaction	3.13	1.25

Hence the reason for the non-adoption of mobile banking could be that the bank customers were more comfortable with the usage of banking services available through the other modes of banking such as ATMs, branch banking and so on.

8.5.3 Comparison of perceptions of users and non-users of mobile banking services

The differences in the perceptions of the factors aiding and hindering adoption of mobile banking services between the users and non-users of mobile banking services are compared.

Both users and non-users agree that the factor which has the highest impact in aiding the adoption or usage of mobile banking services were that the

'*mobile is always with you'* and '*mobile is familiar device'* (table 8.17). The perceptual measures on these two factors were the same for both users and non-users of mobile banking as statistically the values are not significantly different. They also equally agree to the fact that if the banks give *sufficient guidance* the bank customers would start using mobile banking services.

Table 8.17: Comparison of perceptions of users and non-users of mobile banking services

	Users		Non-Users		t-value
	Mean	Std deviation	Mean	Std deviation	
Factors aiding mobile banking use					
Mobile is always with you	4.3	.85	4.09	1.03	1.485
Mobile is a familiar device	4.25	.85	4.06	1.02	1.354
Sufficient guidance from bank given	3.33	1.16	3.19	1.11	.806
Conducting banking is fast and efficient	3.65	.87	3.31	1.01	2.413*
Quality of service does not change as it is standardised	3.65	.91	3.3	1.06	2.405*
Factors hindering mobile banking usage					
Possibility of errors.	2.92	.96	3.07	1.00	-1.041
Lack of familiarity with the service	2.76	1.08	3.12	1.08	-2.360*
Use is complicated.	2.4	.89	2.92	1.06	-3.816**
Slow data transmission	2.81	1.03	2.84	.97	-.202
Feel more comfortable with other means of transaction.	2.81	1.21	3.7	1.09	-5.367**

* Significant at 95% confidence level, ** Significant at 99% confidence level

While factors such as *'Conducting banking is fast and efficient'* and *'Quality of service does not change as it is standardised'* which aid the adoption of the mobile

banking services both users as well as the non-users were having positive perceptions but the perceptions of the users are significantly more positive than the non-users.

Regarding the factors which hinder the usage of mobile banking services the perceptions pertaining to the factors such as *'Lack of familiarity with the service','Use is complicated',* and *'Feel more comfortable with other means of transaction'* of non-users were significantly different from those of users.

The reasons why the non-users might not be using the mobile banking services if it were provided by their banks could be that they were more comfortable with accessing the banking services through the other modes of banking , they might perceive the services to be complicated thereby avoiding its usage. Finally they might be unfamiliar with the mobile banking services hence not using it.

8.6 Reasons for Non-Usage of Internet banking services

As mentioned in chapter 3 there could be several reasons for the non usage of the internet banking services by those bank customers who have not started using the internet banking services. The reasons explored in the study are obtained from literature review, discussions with banking experts and the respondents. One of the obvious reasons could be the lack of internet connectivity; the customer might not be having access to a personal computer with internet access either at home or work place. Perhaps they may not even have a computer either at home or the workplace. This might be true of lot of the average Indian bank consumers as the internet penetration among the general population is only 5.2% or about 60 million users as per International Telecommunication Union as on September 2007 (available at www.internet worldstats.com/asia.htm).

But since in this study the target respondents are those segments of bank customers having above average income and having above average education

most of the respondents were found to have the knowledge to use computers and were internet users.

Table 8.18: Computer and internet access percentage

Percentage of respondents having computer access	94
Percentage of respondents having internet access either at office or home	89.7

Percentage of internet banking non-users who claimed that they were not aware of the internet banking services was 69%. Hence lack of awareness can be cited as a major reason for the non-usage of internet banking services. In the study done by Sathye (1999) among Australian bank consumers it was found that 74 per cent of the respondents were unaware of the availability of the internet banking services.

Additional reasons for not adopting internet banking services by non-users were measured on a five-point scale with 1= Strongly Disagree and 5 = Strongly Disagree. The results are as shown in table 8.19.

Table 8.19: Reasons of non-usage of internet banking

Reasons	Mean*, N= 176	Standard Deviation
Happy with other mediums of services such as branch banking & ATMs	4.00	0.85
Concern about Security	3.96	0.85
No training provided by the banks in using the internet banking services	3.68	1.00
Don't know the procedure for using internet Banking	3.33	1.07
Concern about the pricing of transactions using Internet banking	3.30	0.89
Don't trust the internet banking services provided by the bank.	3.28	0.97
Benefits of using internet banking not clear	3.24	1.04
Lack of confirmation of transactions through paper receipts.	3.16	0.84
Not aware about the services available through internet banking	2.93	1.16
Not happy with the speed of internet connection.	2.70	1.07

*Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2, Strongly disagree = 1

From the results it is seen that:

- The most important reason for not using internet banking is being happy or satisfied with other modes of banking such as branch banking and ATMs,
- The second most prominent reason for not using internet banking is concern about security of transactions.
- Other key reasons are lack of training by the bank to use internet banking, lack of knowledge about the procedure of using it, lack of trust, benefits of using internet banking not very clear and no confirmation using paper receipts.

8.7 Reasons for Non-Usage of Tele banking services

The literature survey, discussions with the banking experts and the bank customers have brought out many relevant reasons for the non-usage of tele banking services. In order that the bank customers use the tele banking services their banks have to provide these services in the first place and they have to be aware of the availability of this service. It is found from the study that while telebanking services are provided in metro cities like Bangalore by many banks, in the tier 2 and other smaller cities which constituted the urban banked centres only a few banks are offering this service.

Of the total respondents 50.7% of the respondents were unaware of the tele banking services. The lack of awareness regarding tele banking services was about 33% among the respondents from metro banked centre whereas about 73% of the respondents from urban banked centres were unaware regarding this service. Another reason for more unawareness among urban respondents may be due to the fact that only a few banks were offering this service in these tier 2 cities.

Of the non-users about 77% were unaware of the tele banking services. Hence lack of awareness as well as the lack of availability could be the major reasons for non-usage of the tele banking services.

The other reasons for not adopting tele banking services by non-users, measured on a five-point scale are shown in table 8.20. The main reason for not using tele banking services was that bank consumers were more *comfortable with other modes of accessing banking services.* The other reasons given were unfamiliarity with the service, not being clear about the benefits that can be had in using telephone banking, not knowing the procedure of using telephone banking and the banks not providing training to use tele banking services.

Table 8.20: Reasons for non-usage of tele-banking services

Reasons	Mean*, N= 371	Standard Deviation
Comfortable with other modes of accessing banking services	4.31	0.75
Unfamiliarity with the service	3.86	0.97
Not clear about the benefits of using tele banking services	3.77	0.92
Don't know the procedure for using tele banking	3.72	1.01
Bank does not offer training to use tele banking services	3.58	1.05
Don't trust the tele banking services provided by the bank.	3.22	1.1
Pricing concerns because of high telephone charges	2.98	1.14

* Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2, Strongly disagree = 1

8.8 Conclusion

This chapter dealt with the findings pertaining to service quality perceptions and customer satisfaction levels for the technology-enabled banking self-services such as ATMs, internet banking and tele banking. When these were compared across the three bank groups considered for study it was found that there are no significant differences in values for these two constructs.

Geographical location wise comparison with regard to these two values showed no significant differences.

Service quality perceptions are positively correlated with satisfaction levels for the technology-enabled banking services. The service quality is a major factor in deciding customer satisfaction and the banks are advised to improve the same. The customer satisfaction levels were found to influence the adoption levels and the extent of usage of the electronic banking services. In order to improve the adoption levels and usage of these electronic banking self-services the banks have to put in efforts to improve both service quality and satisfaction levels.

Mobile phone being a familiar device which is always with a person is a major driver for mobile banking, while the customers being more comfortable with other modes of banking and lack of familiarity with the use of the device for banking are major inhibitors for the same. Lack of awareness, being comfortable with other modes of banking, security concerns and unfamiliarity are found to be the main reasons for the non-usage for internet banking and tele banking services.

Chapter 9

BELIEFS, ATTITUDES AND INTENTIONS TO USE TECHNOLOGY-ENABLED BANKING SELF-SERVICES

9.1Introduction

This chapter explores the relationships among bank customers' antecedent beliefs, their attitudes toward electronic banking self-services, intentions to use and their usage of them. Two electronic banking self-services are used to explore these relationships one being ATM which is widely adopted and the other being internet banking, which is yet to be extensively adopted. The constructs from SST attitude/intention model by Curren and Meuter (2005) and Technology Acceptance Model (TAM) by Davis (1989) are utilized to develop the research models proposed in this chapter.

9.2Beliefs, Attitudes and Intention to use Technology-Enabled Banking Self-Services (TEBSS)

The different constructs used in the study are explained in this section. These constructs are related to the beliefs, attitudes and intention to use TEBSS.

9.2.1Antecedent Beliefs proposed as predictors of Attitudes towards TEBSS

Antecedent beliefs used as predictors of attitude towards TEBSS were proposed after an extensive literature review of the literature (Curran and Meuter, 2005; Davis et al.,1989; Igabria, 1996; Walker and Johnson, 2006; and Dabholkar, 1994). The '*ease of use*' and '*usefulness*' which have been

extensively explored in the Technology Acceptance model (TAM) of Davis et al (1989) are used as antecedent beliefs both in the case of models for ATMs and internet banking.

Ease of use as explained earlier in the literature review is the extent to which a user finds the usage of a technology-enabled service free of effort as propounded by Davis et al. (1989). This construct which is the key construct of Technology Acceptance Model (Davis et al 1989) has been used in several subsequent studies such as those done by Adams et al. (1992), Dabohlkar, (1994), Igabria et al. (1995) and Taylor and Todd (1995).

Usefulness as explained in detail in chapter 3 is the perception with regard to what extent the usage of a technology enabled service would help improve a user's performance of a given task. Usefulness is the second key construct of Technology Acceptance Model of Davis et al. (1989). This construct has also been used in the earlier mentioned studies done by Adams et al. (1992), Dabohlkar (1994), Igabria et al. (1995) and Taylor and Todd (1995).

Separate belief constructs have been considered depending on the individual characteristics of ATMs and internet banking for explanation of the models.

9.2.1.1 Additional ATM belief constructs

'*Security of usage'* involved has been adopted from the study by Curran and Meuter (2005), even though the name given in Curran and Meuter's (2005) was *risk*. A separate construct 'security of usage' which actually is related to the risk perception had been developed because unlike in the case of internet banking wherein the risk is the unauthorized access to the bank customers' bank accounts, the security or risk perception in case of usage of ATMs lies more in

relation to the aspects such as physical security, safety and convenience of location. *Security of usage* had not been that widely studied. This new construct was expected to open new avenues in the research based on technology acceptance model (TAM), thus improve our understanding of the self service usage and adoption of services like those provided through ATMs.

9.2.1.2 Additional belief constructs for Internet banking

Compatibility is a construct adopted from the original work of Rogers (1995) Diffusion of Innovation. It is defined as the degree to which an innovation is perceived as being consistent with the existing values, past experiences and the needs of potential adopters. From the literature it is found that those customers who were having prior experience with computers (Mattila et al., 2001; Karjaluoto H et al., 2002), high P C proficiency (Jayawardhena and Foley, 2000) and who were comfortable with internet usage (Black et. al., 2001) would take to internet banking faster.

The construct *security concerns* is a variable by Suganthi et al. (2001) which denotes the risk associated with the usage of internet banking services along with the trust in the services and the privacy aspects associated with its usage. The security concerns also cover the risk of unauthorized access to the customer's bank accounts, which is popularly referred to as phising. Tan and Teo (2000) have described a similar construct which they had termed as *risk*.

9.2.2 Relationship between attitudes towards TEBSS and behavioural intentions

Consumers can have identifiable attitudes towards self-service technologies as found out by Curran et al (2003). It is further proposed in this study that the antecedent beliefs are instrumental in predicting the attitude towards TEBSS. The idea that the attitudes influence behavioural intentions

had been proposed by Ajzen and Fishbein (1980). The behavioural intention towards a TEBSS in turn influences the actual usage of it.

9.3 Relationship between antecedent Beliefs and Attitude towards ATM and Intention to Use ATMs

The model showing the relationship between the three antecedent beliefs to the attitude formation towards ATM is shown in figure 9.1 along with the relation of attitude towards ATM and intention to use ATM services. The figure also shows the relationship between the *behavioural intention* to use ATM and the *actual usage* of ATM expressed as percentage of transaction done through it.

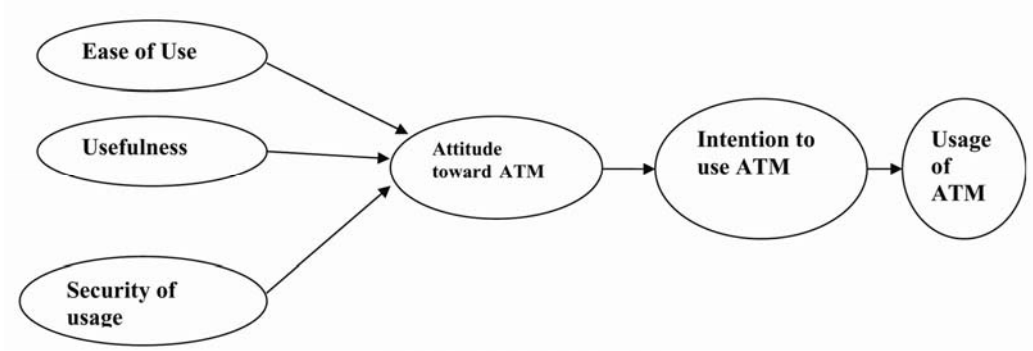

Figure 9.1: Model showing the relationship between antecedent Beliefs and Attitude towards ATM and Intention to Use ATMs

The multi-item scale with which the three antecedent beliefs were measured is given with the items adapted from the studies shown and modified suitably to fit the present study context. From table 9.1 it is found that the reliability coefficients are all above 0.7 which is the acceptable range according to Nunally & Bernstein (1994).

Five point Likert scale with 1 being strongly disagree and 5 being strongly agree has been used to measure the above items.

Attitude has been defined as "*a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour*" (Eagly and Chaiken, 1993). Curran et al. (2003) have shown that consumers have distinguishable attitudes towards self-service technologies such as ATMs and these attitudes determine their intention to use that particular self-service technology. In this study attitude towards ATMs had been measured using a 3-item five point Likert type scale as shown below with 1 being totally disagree and 5 being totally agree.

Table 9.1: Multi-item scale for measuring the antecedent Beliefs Ease of Use, Usefulness and Safety of Usage

Dimension		Statements	Modified &Adapted from	Cronbach's Alpha
Ease of use	Easuse1	1. Learning to use ATM was easy for me	Curran & Meuter (2005), Dabholkar (1994), Davis et al (1989)	0.816
	Easuse2	2. It was easy for me to become skillful at using ATM		
	Easuse3	3. I Find ATM difficult to use[R]		
Usefulness	Useful1	1.Using ATM improves the way in which I do my banking	Curran & Meuter (2005), Igabria et al (1996), Davis et al (1989), Walker& Johnson[58] (2006)	0.818
	Useful2	2.Functions provided by the ATM of my bank are very useful for doing my banking		
	Useful3	3. ATM machine is easy to use and operate		
	Useful4	4. ATM provides a convenient way of doing banking		
	Useful5	5. I know that ATM will handle my business correctly		
Security of usage	Secure1	1.I feel secure in conducting my banking business through ATMs	Curran & Meuter (2005), Dabholkar (1996)	0.708
	Secure2	2. ATM is located in safe locations		
	Secure3	3. There is no danger of my card getting stuck in the machine		

R- indicates an item reverse coded for analysis

Refer Appendix-2; section A2.7, table A 2.15

Table 9.2: Three-item scale used for measuring Attitudes towards ATMs

ATM Attitude	Items	Modified &Adapted from	Cronbach's Alpha
$Atmatt_1$	1) I feel good about ATM Service of my bank	Curran & Meuter 2005	0.89
$Atmatt_2$	2) I feel pleasant about the ATM Service of my bank		
$Atmatt_3$	3) I like the ATM service of my bank		

Refer Appendix-2; section A2.7, table A 2.15

Several researches (Allen et al, 1992; Dabholkar, 1994; Taylor and Todd, 1995; Curran and Meuter, 2005) have shown attitudes toward self-service technologies such as ATMs as antecedent to behavioural intention to use ATMs and certain beliefs as antecedents to these attitudes. The *intention to use ATM* is expected to influence *usage of ATMs*.

Intention to use ATMs

Inorder to measure the *intention to use ATMs* a single item five-point Likert scale had been used with end points of 1 (extremely unlikely) and 5(extremely likely).

Usage of ATMs

The *usage of ATM* services was measured on the basis of the perception by the respondent of the banking transactions done by him/her using ATM as a percentage of total banking transactions.

9.3.1 Factor Analysis Using Principle Component Method of ATM Belief items.

A factor analysis is performed to show that the three antecedent beliefs are three separate constructs and to examine the structural relationships among them and to prove their factorial validity which is a form of construct validity.

Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (MSA) was first computed to determine the suitability of using factor analysis. The MSA was found to be 0.893 which is greater than 0.5 indicating factor analysis to be appropriate in this case (Malhotra 2005). Bartlett's test of sphericity was significant at 2782.4 at degrees of freedom df of 55, hence the data can be subjected to factor analysis.

Table 9.3: Factor analysis of Beliefs towards ATM

Variables	Factor 1	Factor 2	Factor 3
Easuse1	.276	.847	.155
Easuse2	.257	.769	.218
Easuse3	.195	.809	.0356
Useful1	.748	.298	.0983
Useful2	.740	.251	.224
Useful3	.704	.425	.135
Useful4	.823	.274	.143
Useful5	.615	-.0433	.402
Secure1	.375	.295	.605
Secure2	.294	.131	.737
Secure3	.102	.148	.853
Initial Eigen values	5.184	1.30	1.00
Percentage of Variance Explained	47.13	11.81	9.105
Percentage of Cumulative Variance Explaine	47.13	58.94	68.04

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotation converged in 6 iterations

Refer Appendix-2; section A2.8 additional results

According to Malhotra (2005) principal component analysis is recommended when the primary concern is to determine the minimum number of factors that will account for maximum variance in the data for the subsequent multivariate analysis.

To determine the minimum loading required to include an item in its respective constructs Hair et al. (1998) suggested that variables with loadings greater than 0.3 were considered significant; loadings greater than 0.4, more important; and loadings 0.5 or greater very significant. In this study the criteria used was to accept items with loadings greater than 0.5.

After the factor analysis using principal component method with varimax rotation, it is found that items are loading on to three factors as described earlier factor1 being *usefulness*, factor 2 being *ease of use* and factor 3 being *security/safety of usage* The total variance explained by these three factors were found to be 68.04%..

The reliability of the constructs is proved using Cronbach's Alpha co efficients in tables 9.1 and 9.2 which are above 0.7 and so are within the acceptable level as per Nunally & Bernstein (1994).

9.3.2 Relationships among antecedent Beliefs and Attitude towards ATM and Intentions to use ATM using Structural Equation Modeling (SEM)

The proposed ATM attitude and intentions model is analysed using Structural Equation Modeling (SEM), which can be described as a combination of both factor analysis and path analysis.

9.3.2.1 Structural Equation Modeling

Byrne (2001) defines "structural equation modeling (SEM) as a statistical technique that takes a confirmatory approach to the analysis of a structural theory bearing on some phenomenon". SEM conveys two important aspects of the procedures: a) causal process under study is represented by a series of structural (regression) equations, and b) these structural relationships can be modeled to facilitate a clearer conceptualization of the theory under study. The hypothesized

model is statistically tested simultaneously to examine its consistency with the data through goodness of fit measures.

It allows the examination of a series of dependence relationships between *exogenous (independent)* and *endogenous (dependent)* variables simultaneously (Robert Ho, 2006). An *exogenous* variable is one whose variability is assumed to be determined by causes outside causal model and an *endogenous* variable, is the one whose variation is explained by exogenous and other endogenous variables in the causal model.

SEM techniques are distinguished by two characteristics (Hair et al., 1998):

1. estimation of multiple and interrelated dependence relationships
2. the ability to represent unobserved concepts in these relationships and account for estimation error in the estimation process

Another classification of variables is *latent variables* and *manifest variables (observed)*. Latent is a hypothesized and unobserved concept that can only be approximated by observable or measurable variables which are called manifest variables.

SEM consists of two parts: *measurement model* and the *structural equation model.*

Measurement model specifies how the latent variables are represented through observed variables and its measurement properties. The *structural equation model* is a comprehensive model that depicts the pattern of relationships among independent and dependent variables. It incorporates the strengths of multiple regression analysis, factor analysis and multivariate ANOVA.

The structural equation modeling is done using the two-stage analysis in which the measurement model is first estimated and then the measurement model is kept fixed in the next step in which the structural model is estimated. The rationale for this approach is that accurate representation of the reliability of the indicators is

best accomplished in two steps to avoid interaction of structural and measurement models (Bryne, 2001)

9.3.2.2 Evaluation of the measurement model for ATM Attitude and Intentions model using Confirmatory Factor Analysis (CFA)

The confirmatory factor analysis (CFA) is performed to check whether the 14 observed variables taken for measuring the 4 unobserved constructs do so in a reliable manner. The overall fit of the measurement model is determined by confirmatory factor analysis.

Table 9.4: Measurement model with Confirmatory Factor Analysis (CFA) results

Sl No.	Factors/ Latent Variables	Indicators	Standardised Regression Weights (factor loadings)	C. R (Critical Ratio)	P ((sig. level)	Average Variance Extracted (AVE)	Composite Reliability coefficient	Cronbach Alpha coefficient
1	Ease of Use	Easuse1	0.909	----*	***	0.62	0.82	0.816
		Easuse2	0.707	18.26	***			
		Easuse3	0.698	16.30	***			
2	Usefulness	Useful1	0.756	12.18	***	0.56	0.86	0.818
		Useful2	0.761	12.30	***			
		Useful3	0.816	12.60	***			
		Useful4	0.837	12.94	***			
		Useful5	0.536	-----*	***			
3	Security of Usage	Secure1	0.724	11.73	***	0.45	0.706	0.708
		Secure2	0.640	11.48	***			
		Secure3	0.638	------*	***			
4	Attitude towards ATMs	Atmatt1	0.819	24.2	***	0.74	0.89	0.89
		Atmatt2	0.862	25.85	***			
		Atmatt3	0.893	------*	***			

***Unstandardised regression Weights assumed as 1**
***** Significant at P < 0.01 level**

Fit Indexes

Chi-Square = 242.42, p < 0.001, Degrees of Freedom = 71, Sample Size = 553
Root mean square error of approximation (RMSEA) = 0.066,
Normed fit index (NFI) = 0.941,
Incremental index of fit (IFI) = 0.957,
Comparitive fit index (CFI) = 0.957,
Tucker-Lewis index (TLI) = 0.945
Root mean square residual (RMR) = 0.029

Refer Appendix-2; section A2.10 for additional results and table A 2.24
Composite reliability coefficient = (Sum of standardized loadings)^2 ÷ {(Sum of standardized loadings)^2 + Sum of indicator measurement error}, (Hair et al., 1998)
Average Variance Extracted = Sum of squared standard loadings ÷ (Sum of squared standard loadings + Sum of indicator measurement error), (Hair et al., 1998)

From the chi-square goodness-of-fit test (χ^2 = 242.42, degrees of freedom = 71, $p < 0.001$) since p-value is less than 0.05 it is found that the model did not fit the data well, but according to Byrne (2001), in structural equation modeling as the χ^2 values are sensitive to sample sizes other model fit measures are to be relied upon.

For instance a root mean square error of approximation (RMSEA) value equal to 0.08 is an indicator of reasonably good fit between the sample data and the proposed model (Byrne, 2001) and from the table the same is found to be 0.066, indicating appropriate fit. Other fit indexes such as NFI, CFI, IFI and TLI which are together called baseline fit indexes are all having values greater than 0.9 which again shows goodness of fit of the model with the sample data.

From table 9.4 it is found that the constructs (latent) are having unidimensionality with the measurements variables loading significantly on the underlying latent constructs. The factors loading (standardized regression weights) are close to or above 0.7 except for one (useful5) item, indicating that the items are good enough to measure the intended factors (Byrne, 2001). But all of them are found to be above the threshold of 0.50 as used by Thamaraiselvan and Raja (2007) in their study. The unstandardised regression weights (table 9.4) are significant from the critical ratio test ($C.R > \pm 1.96$, $p < 0.01$).

The convergent validity of the measurement model was examined by calculating the composite reliability and average variance extracted (AVE) as recommended by Fornell and Larcker (1981). All the reliabilities are greater than the recommended 0.7 (Nunnally and Bernstein, 1994). The Cronbach alpha values for the constructs are also above 0.7, further proving the reliability of the constructs. The AVE represents the amount of variance captured by the construct measures relative to measurement error and correlations by the latent

variables. AVEs of all the constructs are above 0.50 which shows that the indicators are truly representative of the latent constructs.

The discriminant validity of the constructs were proved as seen in table 9.3 in which each of the indicator variables loading higher on the construct of interest than any other variable (Chen et al., 1998).

There are two single-item latent constructs used in the model which are *intention to use ATMs* and *usage of ATMs.* As far as single-item scales are concerned it is not possible to empirically estimate reliability, so the researcher has to make some estimate of the reliability, one way is to fix the reliability at 1.0, assuming there is no measurement error (Byrne, 2001). Since the measurement of the *intention to use ATMs* has been adopted from study by Curran and Meuter (2005) where they have used it to measure the same construct and had used it in their SEM model, it was deemed fit for this study. The usage of ATMs was measured as the perceived use percentage of ATMs as a percentage of the total transactions done by bank customers. Experts agreed to the adequacy of such measure for representing the usage of ATM.

To sum up from the results, it is found that the items or indicators corresponding to each constructs are truly representing the respective latent constructs with relabilities and validities proved along with their unidimensionality of the constructs.

9.3.2.3 Structural Equation Model (SEM) showing relationships among antecendent Beliefs, Attitudes and Behavioural Intentions of ATMs

In this section the results of the Structural Equation Modeling (SEM) are shown. First task is to examine the goodness of fit of the model with the data. The chi-square was statistically significant ($\chi^2 = 309.1$, Degrees of Freedom = 98, $p < 0.001$). So other measures of fit were examined, root mean square error of approximation (RMSEA) value is found to be 0.062 which is below limit of

0.08 as recommended by Bryne (2001) showing a reasonably good fit. The comparative fit index (CFI) as seen from the table is 0.951 which is above 0.95 indicating good fit (Byrne, 2001). Other fit indexes such as NFI, CFI, IFI and TLI which are all having values greater than 0.9 which again shows goodness of fit of the model with the sample data (Robert Ho, 2006).

Next an examination of the regression paths are carried out to check the strength and the significance of the relationships between the various constructs. Table 9.5 shows that the exogenous (independent) variables, *usefulness* and *security of usage* are having significant effect on the endogenous (dependent) variable *attitude towards ATMs* since the p values are significant at 99% confidence levels. Another method to check for significance is the critical ratio (C. R.) test, critical ratio which is more extreme than ± 1.96 indicates a significant path ($p < 0.05$). An examination of C. R.s of the above independent variables (from table 9.6) is seen to pass this test as the values are more extreme than ± 1.96. But the exogenous variable ease *of use* is not having a significant impact on the dependent variable *attitude towards ATMs* since the corresponding C.R. value -1.17 is within the ± 1.96 range.

When values of the standardized regression (equivalent to standardized beta coefficient in regression analysis) of the two independent variables *usefulness* and *security of usage* which are having significant influence on the dependent variable are examined, it is found that *usefulness* with a standardised regression value of 0.43 is having a greater impact on *attitude towards ATMs* than security of usage with a standardized regression value of 0.295. Since the corresponding R^2 value is 0.39 it can be inferred that the proportion of variance explained is 39%.

When the path between *attitude toward ATMs* and *intention to use ATMs* is examined it is found that the path is significant since the corresponding p

value is significant at 99% confidence level (C.R. = 16.84, $p < 0.001$). The standardized regression weight corresponding to this path is 0.644 and that the corresponding R^2 value is 0.415, which means that the proportion of variance explained is 41.5%. The implication is that the *attitude towards ATMs* is effecting intention to use ATMs, significantly with the relationship explaining 41.5% of variance in the dependent variable.

Table 9.5: SEM results of the Beliefs, Attitude and Intention model of ATMs

Path	Standardised Regression path	S.E (Standard Error)	C.R (Critical Ratio)	P (sig. level)	Proportion of variance explained (R^2)
Ease of Use → Attitude towards ATMs	-0.071	0.076	-1.17	0.245	0.39
Usefulness → Attitude towards ATMs	0.43	0.144	5.06	***	
Security of → Attitude Usage towards ATMs	0.295	0.086	3.90	***	
Attitude → Intention towards to use ATMs	0.644	0.040	16.84	***	0.415
Intention to use ATMs → ATM Usage	0.157	1.264	3.66	***	0.025
*** P value < 0.01, significant at 99%					
Fit Indexes					
Chi-Square = 309.1, p < 0.001, Degrees of Freedom = 98, Sample Size = 553					
Root mean square error of approximation (RMSEA) = 0.062,					
Normed fit index (NFI) = 0.930,					
Incremental index of fit (IFI) = 0.951,					
Comparitive fit index (CFI) = 0.951,					
Tucker-Lewis index (TLI) = 0.932					

Refer Appendix-2; section A2.11 for additional results

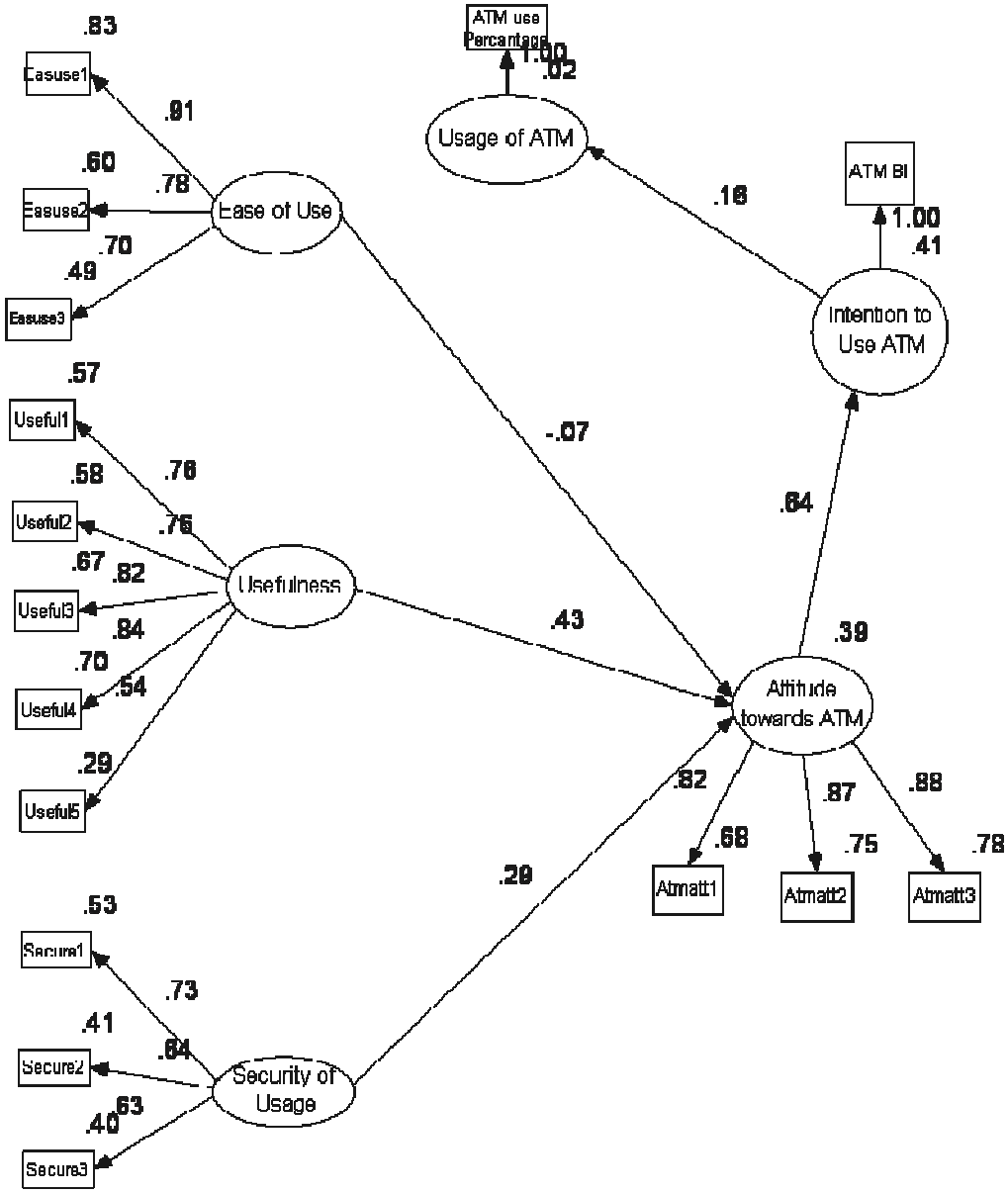

Figure 9.2: SEM results of Beliefs, Attitudes and Intentions of ATMs

The path between *intention to use ATMs* and *ATM usage* (use percentage) is also found to be significant, with the standardized regression weight equaling 0.157, as the corresponding p-value is significant at 99% confidence level (C.R.= 3.6, $p < 0.001$). The percentage of variance explained is only 2.5%, thus even though the path is significant, the strength of relationship between *intention to use* and *ATM usage* is minimal.

The reason for this could be that ATMs are widely adopted and their usage frequency and duration was found to be the highest among all the banking channels. This shows that the usage of ATMs has become habitual and due to the repeated previous experiences and less of cognitive processing is involved while using them. According to Triandis model (1980), when the behaviour becomes habitual, the habit is a more important influencer of the actual usage rather than intentions.

9.4 Beliefs, Attitudes and Intention to use Internet Banking Services

Similar to the model developed for ATMs showing antecedent beliefs, attitudes, intention to use and its usage another model is proposed for these factors of internet banking to depict the relationships among them based on SST attitude/intention model by Curren and Meuter (2005) and TAM by Davis (1989).

It is proposed through this model that the four antecedent beliefs which are explained in the beginning of the chapter as being instrumental in predicting the attitude towards internet banking services and the attitude impacts the behavioural intention which determines the usage of internet banking services.

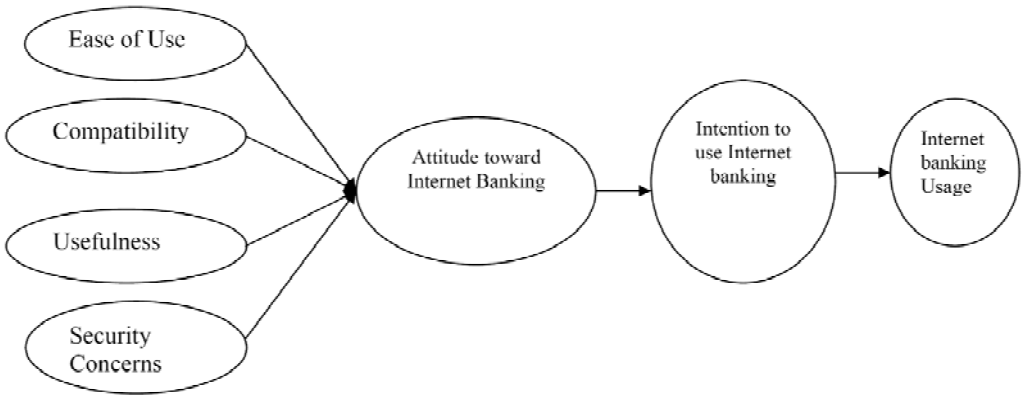

Fig 9.3: Model showing the relationship among antecedent Beliefs and Attitude towards Internet banking services and Intention to use the Internet banking services

The model showing the relationship of the four antecedent beliefs to the attitude formation towards internet banking services is shown in figure 9.2 along with the relation of *attitude towards internet banking* and *intention to use internet banking services*. It also shows how the *intention to use internet banking services* impacts the *actual usage* of it. The antecedent belief constructs are *ease of use*, *compatibility*, *usefulness* and *security concerns* whose explanations are given in the earlier part of the chapter.

The multi-item scale with which the four antecedent beliefs were measured is shown along with the studies from which they were adapted and modified suitably to fit the present study context.

From table 9.6 it is found that the Cronbach alpha coefficients are all above the accepted limit 0.7 (Nunally & Bernstein, 1994) except for the Cronbach alpha co efficient 0.68 for *security concerns* which is very close to 0.7 and hence considered adequate.

Five point Likert scale with 1 being strongly disagree and 5 being strongly agree had been used to measure the above items. The multi-item scale

was assessed for its reliability and construct validity. Cronbach's alpha was computed for each dimension to test reliability, and the values were ranging from 0.68 to 0.895 (table 9.6) which is in the acceptable range (Nunnally & Bernstein, 1994).

Table 9.6: Multi-item scale for measuring the antecedent Beliefs - *ease of use*, *compatibility*, *usefulness* and *security concerns* in case of internet banking

Dimension	Code	Statements	Modified &Adapted from	Cronbach's Alpha
IB Usefulness	IB Useful1	1.Internet banking makes transactions easier.	Tan and Teo (2000), Moore and Benbasat (1991)	0.895
	IB Useful2	2.Internet banking can help to manage my finances more effectively.		
	IB Useful3	3 Internet banking useful for managing my finances.		
	IB Useful4	4. Internet banking saves time		
	IB Useful5	5. Internet banking is a convenient way to mange my finances.		
IB Compatibility	IB Compat1	1. Internet banking is compatible with my lifestyle.	Tan & Teo (2000), Moore and Benbasat (1991)	0.88
	IB Compat2	2. Using Internet banking fits well with the way I like to manage my finances.		
	IB Compat3	3.Using the Internet to conduct banking transactions fits into my working style.		
IB Ease of use	IB Easuse1	1. It is/ will be easy for me to become skillful in using internet banking.	Curran & Meuter (2005), Dabholkar (1994), Davis et al (1989), Tan & Teo (2000)	0.804
	IB Easuse2	2. Using Internet banking doesn't require a lot of mental effort.		
	IB Easuse3	3. I find Internet banking difficult to use (R)		
IB Security Concerns	IB Secure1	1. Information concerning my Internet banking transactions will be known to others.	Tan & Teo (2000), Curran & Meuter (2005), Dabholkar (1996)	0.68
	IB Secure2	2. I am concerned about the security of internet banking services. (R)		
	IB Secure3	3. I don't trust internet banking services. (R)		

R- indicates an item reverse coded for analysis

Refer Appendix-2; section A2.7, table A 2.16

A factor analysis was performed to show that the four antecedent beliefs are four separate constructs and to examine the structural relationships to prove their factorial validities which is a form of construct validity.

9.4.1 Factor Analysis – Using Principal Component analysis of Internet banking antecedent Belief items

Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (MSA) was first computed to determine the suitability of using factor analysis. The MSA was found to be 0.916 which is greater than 0.5 so the factor analysis is appropriate in this case (Malhotra, 2005) and Bartlett's test of sphericity was significant at 4568.54 at degrees of freedom df of 91, hence the data can be subjected to factor analysis.

To determine the minimum loading required to include an item in its respective constructs Hair et al suggested that variables with loadings greater than 0.3 were considered significant; loadings greater than 0.4, more important; and loadings 0.5 or greater, very significant. In this study the criteria used was to accept items with loadings greater than 0.5.

After factor analysis using principal component method with Varimax rotation it was found that the items loaded on to three factors as shown with total variance explained as 68 per cent.

Table 9.7: Factor Analysis of antecedent Beliefs of Internet banking

Variables	Factor 1	Factor 2	Factor 3
IB Useful1	**.676**	.275	-.0672
IB Useful2	**.760**	.343	-.148
IB Useful3	**.761**	.333	-.199
IB Useful4	**.714**	.295	-.0217
IB Useful5	**.782**	.276	-.148
IB Compat1	**.831**	.130	-.111
IB Compat2	**.813**	.160	-.171
IB Compat3	**.807**	.0726	-.258
IB Easuse1	.466	**.733**	-.102
IB Easuse2	.199	**.861**	-.188
IB Easuse3	.270	**.718**	-.146
IB Secure1	-.0514	-.249	**.714**
IB Secure2	-.0966	-.0457	**.828**
IB Secure3	-.337	-.0910	**.711**
Initial Eigen values	6.901	1.478	1.157
Percentage of Variance explained	49.293	10.558	8.267
Percentage of Cumulative Variance	49.293	59.851	68.119

. Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotation converged in 6 iterations

Refer Appendix-2; section A 2.9 for additional results

The items measuring compatibility with values (IBCompat1 to IBCompat3) were found to load together with those measuring perceived usefulness (IBUseful1 through IBUseful5). A possible explanation for this could be that the respondents who perceive banking on the internet as compatible with their values might tend to perceive the usefulness of internet banking services more favourably and hence both the constructs have loaded on to the same factor which is factor1 (similar to result obtained in study by Tan

and Teo, 2000) that explains 49.3% variance with an eigen value of 6.551. While the next two factors factor2 and factor3 are explaining only 11.4% and 8.58% variance respectively with eigen values of 1.6 and 1.2.

9.4.2 Attitude towards Internet banking services

As mentioned in the case of ATM services the attitude towards internet banking services was also measured using a 3-item Likert type scale as shown below with 1 being totally disagree and 5 being totally agree.

Table 9.8: Three-item scale used for measuring Attitudes towards Internet banking

Internet banking Attitude	Items	Modified &Adapted from	Cronbach's Alpha
IBatt$_1$	**1) I feel good about internet Banking services of my bank**	Curran & Meuter 2005	0.928
IBatt$_2$	**2) I feel pleasant about internet Banking services of my bank**		
IBatt$_3$	**3) I like the internet banking services of my bank**		

Refer Appendix-2; section A2.7, table A 2.16

Inter item consistency Cronbach's Alpha 0.928 (table 9.8) shows a good reliability according to Nunally& Bernstein (1994).

The *intention to use* internet banking services was measured using a single item five point scale adapted from Curran and Meuter (2005) in which 5 denoted extremely likely to use and 1 denoted extremely unlikely to use.

The *usage of internet banking* services was measured on the basis of the perception of the banking transactions done by the respondent using internet banking as a percentage of total banking transactions done by him/her.

9.4.3 Relationships among antecedent Beliefs, Attitude towards Internet banking and Intention to Use Internet Banking- an SEM analysis

As in the case of the Structural Equation Modeling for ATM usage, a two stage analysis is done in the case of internet banking usage also. First the measurement model is analysed to check for unidimensionality, reliability and validity after which in the second stage structural equation model is developed and analysed to show the relationships between the constructs under consideration (Byrne, 2001).

9.4.3.1 Evaluation of the measurement model for ATM attitude and intentions model using Confirmatory factor analysis

A total of 17 observed or manifest variables were used to measure 4 latent constructs, in the measurement model it is checked whether these observed variables are truly representing the latent constructs.

The exploratory factor analysis results shown in table 9.7 prove the factorial validity and shows that the items are loading reasonably well on the intended factors. Confirmatory factor analysis further vindicates the unidimensionality, reliabilities and validities of the items used to operationalise the constructs involved in the model.

Chi-square test for the model gave a value of 399.82, 71 being the degrees of freedom and $p < 0.001$. From the chi-square goodness-of-fit test since p-value is less than 0.001 it is found that the model did not fit the data well, but according to Byrne, (2001), in structural equation modeling as the χ^2 values are sensitive to large sample sizes and hence other model fit measures are to be relied upon.

Therefore, an examination of the results obtained on other fit indexes we find that the root mean square error of approximation (RMSEA) value is 0.07 which is greater than 0.08 which is the limit given for reasonable errors of

approximation in the population (Byrne, 2001). The comparative fit index (CFI) is 0.953 which is above the recommended value of 0.95 indicating a well fitting model (Byrne, 2001). The other baseline comparison fit indices NFI, IFI and TLI are showing values of 0.937, 0.954 and 0.935 respectively, with all the values above the threshold of 0.9 as recommended by Robert Ho (2006).

Table 9.9: Measurement model of ATM Beliefs and Attitudes, with Confirmatory Factor Analysis (CFA) results

Sl No	Factors/ Latent Variables	Indicators	Standardised Regression Weights (factor loadings)	C. R (Critical Ratio)	P (Sig. level	Average Variance Extracted (AVE)	Composite Reliability Coefficient	Cronbach Alpha coefficient
1.	Usefulness	IB Useful1	0.715	15.35	***	0.649	0.901	0.895
		IB Useful2	0.877	18.42	***			
		IB Useful3	0.883	18.52	***			
		IB Useful4	0.682	-----*				
		IB Useful5	0.847	17.87	***			
2.	Compat-ibility	IB Compat1	0.843	24.31	***	0.735	0.893	0.88
		IB Compat2	0.868	25.45	***			
		IB Compat3	0.861	-----*	***			
3.	Ease of Use	IB Easuse1	0.890	15.45	***	0.604	0.818	0.804
		IB Easuse2	0.784	14.65	***			
		IB Easuse3	0.637	-----*	***			
4.	Security concerns	IB Secure1	0.523	9.60	***	0.43	0.68	0.68
		IB Secure2	0.603	10.54	***			
		IB Secure3	0.794	-----*				
5.	Attitude Towards Internet banking	IB att1	0.873	29.04	***	0.81	0.928	0.928
		IB att2	0.934	33.17	***			
		IB att3	0.893	-----*				

***Unstandardised regression Weights assumed as 1**

***** Significant at P < 0.01 level**

Fit Indexes

Chi-Square = 399.82, Degrees of Freedom = 71, $p < 0.001$, , Sample Size = 553
Root mean square error of approximation (RMSEA) = 0.07,
Normed fit index (NFI) = 0.937,
Incremental index of fit (IFI) = 0.957,
Comparitive fit index (CFI) = 0.953,
Tucker-Lewis index (TLI) = 0.935

Refer Appendix-2; section A 2.12 for addition results

Composite reliability coefficient = (Sum of standardized loadings)^2 ÷ {(Sum of standardized loadings)^2 + Sum of indicator measurement error}, (Hair et al., 1998)

Average Variance Extracted = Sum of squared standard loadings ÷ (Sum of squared standard loadings + Sum of indicator measurement error), (Hair et al., 1998)

After having established the fitness of the sample data with measurement model the next step is to look for the unidimensionality of the constructs used and to establish their reliabilities and validities from the results obtained.

The constructs (latent) are having unidimensionality with the measurement variables loading significantly on the underlying latent constructs (table 9.9). The factor loadings (standardized regression weights) are close to or above 0.7 except for two items (corresponding to IB secure1, IB secure2) indicating that the items are good enough to measure the intended factors according to Bryne (2001). But all of them are found to be above the threshold of 0.50 as used by Thamaraiselvan and Raja (2007) in their study and the unstandardised regression weights are significant from the critical ratio test ($C.R > \pm 1.96$, $p < 0.05$).

The convergent validity of the measurement model was examined by calculating the composite reliability and Average Variance Extracted (AVE), (Fornell and Larcker, 1981). All the reliabilities are greater than the recommended 0.7 (Nunnally and Bernstein, 1994) except for the reliability associated with the construct *security concerns*. The security concerns which is showing a composite reliability of 0.68 being very close to the recommended value of 0.7 was accepted. The Cronbach alpha values which also is another measure of reliability is also showing similar trend. The AVE represents the amount of variance captured by the construct measures, relative to measurement error and the correlations among the latent variables. The AVEs of all the constructs were calculated and the values were above the recommended 0.50 (Bagozzi and Yi, 1988) except in case of the construct *security concerns* (AVE = 0.43). The lower level of the variance extracted for the construct security concerns indicates

that more than half the variance for the specified items is not accounted for by the construct, these could be because of the additional loadings of these items on the other constructs (Byrne, 2001). Since 0.43 is somewhat close to 0.50 for this study this construct was deemed valid.

The discriminant validity of the constructs was proved (table 9.7) in which each of the indicator variables loading higher on the construct of interest than any other variable (Chen et al., 1998).

There are two single-item latent constructs used in the model which are *intention to use internet banking* and *usage of internet banking.* The treatment of these constructs were similar to what have been told earlier pertaining to the treatment of *intention to use ATMs* and *usage of ATMs*, as recommended by Byrne (2001) their respective errors equated to zero.

To sum up from the results it is found that the items or indicators corresponding to the constructs are truly representing the respective latent constructs with reliabilities and validities proved along with their unidimensionality.

9.4.3.2 Structural Equation Model (SEM) showing relationships among antecendent Beliefs, Attitudes and Behavioural Intentions of Internet banking

In this section the results of the Structural Equation Modeling (SEM) are shown. First task is to examine the goodness of fit of the model with the data. The chi-square was statistically significant ($\chi^2 = 578.42$, Degrees of Freedom = 142, $p < 0.001$). So other measures of fit were examined and it was found that the root mean square error of approximation (RMSEA) value is found to be 0.075 which is lesser than 0.08 as recommended by Bryne (2001) for a reasonable good fit of the data with the model. The comparative fit index as seen from the table is 0.937

which is close to 0.95 indicating reasonably good fit. Other baseline fit indexes such as NFI, CFI, IFI and TLI are having values greater than 0.9 which again shows goodness of fit of the model with the sample data (Robert Ho, 2006).

Next an examination of the regression paths are carried out to check the strength and the significance of the relationships between the various constructs. From table 9.10 it is found that the exogenous (independent) variables *usefulness, compatibility* and *security concerns* are having significant effect at 95% confidence level on the endogenous (dependent) variable *attitude towards internet banking* by the critical ratio test ($> \pm 1.96$, $p < 0.05$). Their critical ratios (C.R) are more extreme than ± 1.96. But the exogenous variable ease *of use* is having a critical ratio (C.R) of 0.02 which is within the range of ± 1.96 and which proves that it is not having a significant impact on the dependent variable *attitude towards internet banking*.

Absolute values of the standardized regression (equivalent to standardized beta coefficient in regression analysis) of the three independent variables *usefulness, compatibility* and *security concerns* which are having significant effect on the dependent variable are examined.

Table 9.10: SEM results of the beliefs, attitude and intention model of internet banking

Path	Standardised Regression path	S.E (Standard (Error)	C.R (Critical Ratio)	P (Sig. level)	Proportion of variance explained (R^2)
IB Usefulness → Attitude towards internet banking	0.484	0.121	5.554	***	0.620
IBCompatibility→ Attitude towards internet banking	0.167	0.063	2.350	0.019*	
IB Ease of Use → Attitude towards internet banking	0.056	0.062	1.016	0.310	
IBSecurity concerns → Attitude towards internet banking	-0.184	0.047	-3.889	***	
Attitude towards internet banking → Intention to use internet banking	0.683	0.053	18.896	***	0.467
Intention to use internet banking → Internet banking usage	0.581	0.510	16.656	***	0.338

***** P value < 0.01, significant at 99%, * P value < 0.05, significant at 95%**

Fit Indexes

Chi-Square = 578.422, Degrees of Freedom = 142, $p < 0.001$, Sample Size = 553

Root mean square error of approximation (RMSEA) = 0.075,

Normed fit index (NFI) = 0.918,

Incremental index of fit (IFI) = 0.937,

Comparitive fit index (CFI) = 0.937,

Tucker-Lewis index (TLI) = 0.915

Refer Appendix-2; section A 2.13 for addition results

Of all the three independent variables, usefulness is having the maximum impact (0.484) on the dependent variable *attitude towards internet banking* followed by *security concerns* with a standardized regression value of 0.184 and *compatibility* with a standardized regression value of 0.167. The construct *security concerns* are having a negative impact on the dependent variable *attitude towards internet banking* since its standardized regression value is negative while the other two independent variables are having a positive impact. From table 9.10 it is found that the proportion of variance explained (R^2) in case of the dependent variable *attitude towards internet banking* is 0.62 by the corresponding independent variables.

Examination of path between *attitude towards internet banking* and *intention to use internet banking* shows that the path is significant as the corresponding critical ratio value is considerably greater than the C R of 1.96 (at 95% confidence level). The proportion of the variance explained (R^2) is 0.467 (table 9.12).

The path between *intention to use internet banking* and *internet banking usage* (use percentage) is also found to be significant, with the standardized regression weight equaling 0.581, as the corresponding p-value is significant at 99% confidence level. The proportion of variance explained is 0.338, which shows that the *intention to use internet banking* is having a significant influence on the perceived *actual usage of internet banking*.

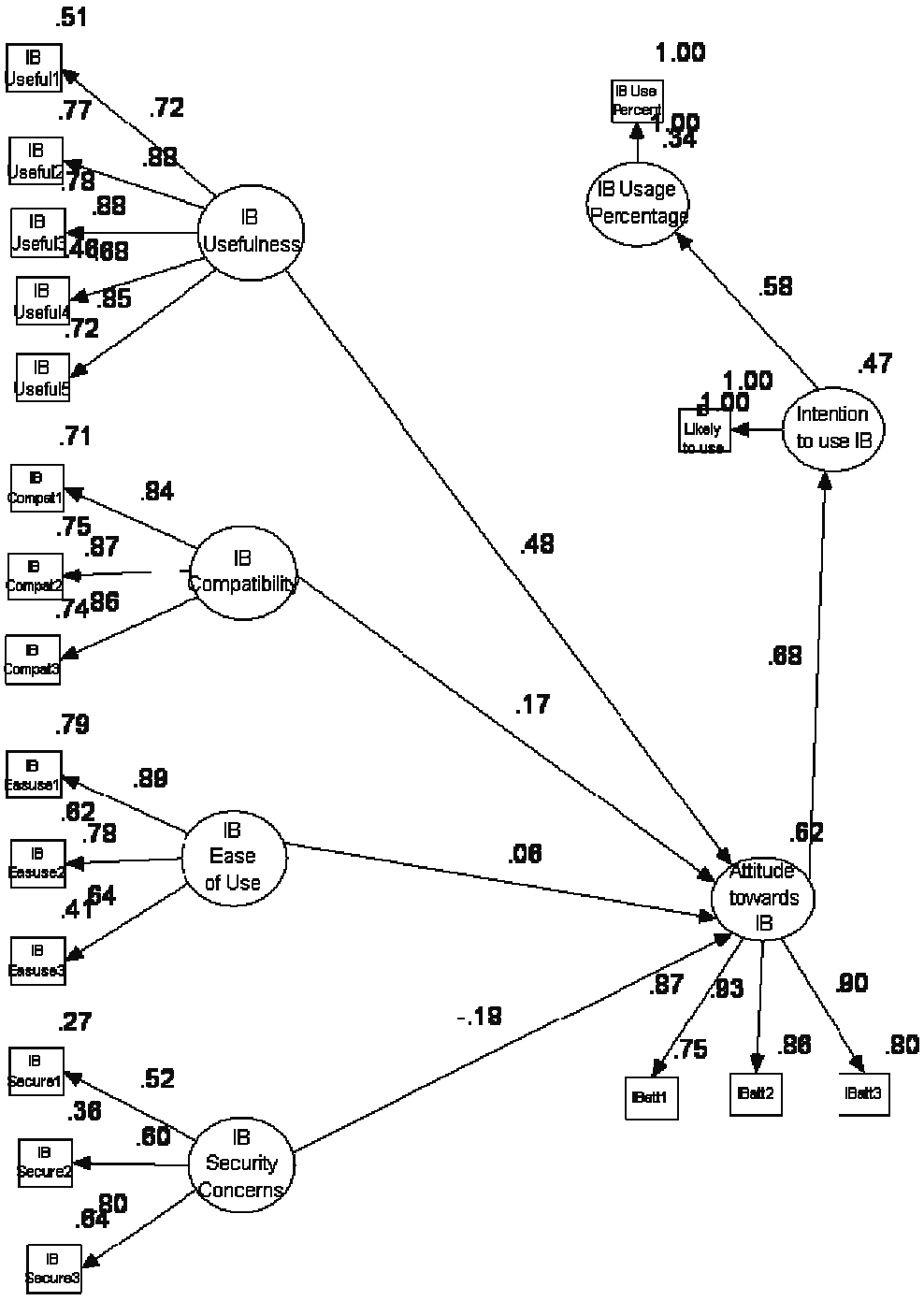

Figure 9.4: SEM results of beliefs, attitudes and intentions of internet banking

9.5 Conclusion

Antecedent beliefs considered are different except for the TAM constructs of *perceived ease of use* and *perceived usefulness.* The security issues in case of ATMs is different from those of internet banking, as mentioned earlier the security issues for ATMs has got more to do with physical security, while it is concerned with aspects like phising (hacking) and the resultant financial loses in the case of internet banking. The additional construct *compatibility* has been included in the case of internet banking because it involves the usage of computers and internet so the user has to have certain proficiency in using them. *Ease of use* is not found to be a statistically significant factor for ATMs as well as internet banking. This might be due to the fact that the sample of respondents selected is found to be proficient in the usage of technology products such as computers and internet; therefore the operation of either ATM or internet banking per se may not be difficult for them. All the other antecedent beliefs are having significant impact on the attitude formation towards ATM as well as internet banking. The linkages between *attitudes* and *intentions to use* are significant in both cases.

The *intention to use* internet banking is having significant influence on the internet banking usage by the respondents, while the impact of intention to use ATM is found to have only relatively weak impact on the ATM usage. This is because the internet banking adoption is only catching up with the adoption cycle being in relatively initial stages, so the usage of internet banking is involving more of cognitive processing. The adoption of ATM is in its maturity stage and thanks to more frequent usage for longer duration the usage of ATM has become habitual, so its usage is more automatic, thus involving lesser of cognitive processing (Limayan et al. 2001; Triandis, 1980). Therefore the linkage between the behaviour intention and usage in case of ATMs is weak.

From the above it can be concluded that efforts are required to promote internet banking usage through proper design, easy navigability and creating awareness about the benefits of its usage. For ATM services efforts are required to promote its value added services as the basic services are well in use.

Chapter 10

SUMMARY OF FINDINGS, IMPLICATIONS AND CONCLUSIONS

10.1 Summary of major findings

The study was conducted primarily to examine influence of demographic, behavioural, perceptual beliefs and attitudinal antecedent factors on the adoption and usage of technology-enabled banking self-services such as ATMs, internet banking, tele banking and mobile banking services. The resulting consequences of adoption of these services such as the adoption levels (extent of adoption), service quality perceptions, customer satisfaction levels and usage pattern were also analysed. Seven hypotheses were proposed during the course of the study and all of them were tested using appropriate statistical tests. The statistical inferences were drawn at 5% level of significance (p= 0.05).

In addition to these hypotheses during analysis significance of relationships between several constructs were tested though, the hypotheses were not formulated earlier with respect to these constructs. These relationships among the various construct variables are stated in the appropriate sections.

Two attitude/intention models were also proposed one for depicting ATM usage and the other pertaining to internet banking usage. In these two cases the proposed models are tested using structural equation modeling and the

resulting relationships among the beliefs, attitudes, intentions of usage and usage are shown as findings.

The summary of findings from the hypotheses testing is shown in table 10.1. The main findings are divided into various sections and explained, followed by the resultant managerial implications and suggestions.

Table 10.1: Summary of test results of the study hypotheses

Sl No	Study Hypotheses	Results
1.	• **H1.**The adoption levels of technology-enabled banking self-services by bank customers vary with the type of bank group (foreign, private or public sectors) they deal with.	Supported
2.	• **H2a.**The adoption levels of the technology-enabled banking self-services by bank customers vary significantly with their gender.	Partially supported
	• **H2b.**The adoption levels of the technology-enabled banking self-services by bank consumers vary significantly with the variation in their age.	Supported
	• **H2c.**The adoption levels of the technology-enabled banking self-services by bank customers vary significantly with the variation in their income levels.	Supported
	• **H2d.**The adoption levels of the technology-enabled banking self-services by bank customers vary significantly with their type of occupation.	Supported
3.	• **H3.**The adoption levels of technology-enabled banking self-services by bank customers are related to their *self efficacy* in using them.	Not supported
4.	• **H4.**The adoption levels of technology-enabled banking self-services by bank customers are related to their perception of *relative advantage* in using them.	Supported
5.	• **H5.**The adoption levels of technology-enabled banking self -services by bank customers are related to their *perception of risk* in using them.	Partially supported
6.	• **H6.**The adoption levels of technology-enabled banking self-services by bank customers are related to their *innovativeness*.	Supported
7.	• **H7.**The adoption levels of technology-enabled banking self-services by bank customers are related to their *need for personal contact*.	Supported

Hypotheses are supported in the Sig. level (p - value) is less than 0.05

They are partially supported in the Sig. level (p - value) is less than 1 but greater than 0.05

Not supported is greater than 0.1

10.1.1 General findings

10.1.1.1 *Bank Choice Criteria*

Locational convenience of the bank branch was the most cited reason for selecting the respondents' bank, followed by better service and friendly staff and spread of the ATM network. Bank branch services play an important role in bank choice criteria despite the services provided through electronic banking channels.

So under Indian conditions bank branches are still relevant and people prefer those banks that have superior service and friendly staff.

10.1.1.2 *Overall Satisfaction with banks*

The highest level of satisfaction with overall banking services was for the public sector banks whereas the satisfaction with automated banking services was the highest for the foreign banks. ANOVA test showed that overall banking satisfaction varies significantly with the bank groups. There was significant difference between the customer satisfaction of public sector banks and that of private sector banks. However the satisfaction levels between private sector banks and foreign banks were similar. Overall satisfaction levels of the users and non-users of the different technology-enabled banking self-services were not significantly different at 95% confidence level.

10.1.1.3 *Branch visit frequency*

Branch visit frequency is the highest among the respondents who banked with public sector banks, followed by private sector banks and foreign banks. This shows that the customers of public sector banks tend to use more of branch transactions.

From various studies it is found that when consumers adopt technology-enabled banking self-services their branch banking transactions get reduced (Mols et al., 1999). This leads to reduction of work for bank branch staff, freeing them to concentrate on more value added work than the routine transaction work (Marr and Prendergast, 1994).

Branch visit frequencies were significantly different between the users and non-users of all the electronic banking channels such as internet banking, tele banking and mobile banking services. This shows that the usage of the electronic banking channels significantly reduces the workload at the bank branches since the number of customers visiting the bank branches is reduced.

10.1.1.4 Perceptions about core service quality and price

Customers' core service quality perception is the highest for the services provided by the foreign banks followed by that of private sector banks and public sector banks. The customers' price-value perception is the highest for the services provided by the public sector banks.

The core service perception is almost the same for public sector and private sector banks. The reason for the same might be due to the fact that the customers perceive very little differentiation between the various services provided by the public sector and private sector banks in India.

The results have shown that more the core service perception of a bank customer the more will be his/her overall satisfaction level with the bank. Therefore the banks need to provide diverse and wide range of services and adopt the advanced technology to improve the overall satisfaction levels among their customers.

From the results it is seen that the better the price-value perception by the respondents the better will be their overall satisfaction with the bank. Hence

the banks need to have acceptable and competitive fees which have to be clearly explained to their customers in order to create a better price-value perception thereby improving the overall customer satisfaction.

The core service quality perception and price perception were significantly more among the users of the technology-enabled banking self-services than the non-users.

The reasons for better price-value perceptions could be lesser cost of transacting through electronic banking mode as the users don't have to visit branches and at present in India the technology-enabled banking self-services are offered free of additional charges.

Overall, the users of these services had significantly better opinion than non-users regarding the improvement in quality of service due to the fact that they deal with banks using technology-enabled.

10.1.2 Usage patterns of technology-enabled banking self-services

10.1.2.1 Usage of computers and internet

Of the respondents 94% have claimed that they had access to computers and 89.7% have responded that they had access to internet.

The majority of respondents (75.2%) were regular users of computer as evident from the computer usage pattern which showed that the largest percentage (30.2%) of respondents were using computer for more than 6 hours a day. 21.5% of respondents use computers for 3 to 6 hours and 23.5% of the respondents use the computer for 1 to 3 hours per day.

The results showed that majority of the respondents (57.2%) browsed internet on a daily basis and on an average most of the respondents (89.1%) browsed the internet at least for one to five hours a week.

The hours of computer usage, the frequency of internet usage and hours of internet browsing were found to be significantly higher among users as compared to non-users of technology-enabled banking self-services.

Hence banks can target those customers whose usage of computers, internet and other technology products are relatively on the higher side.

10.1.2.2 Awareness about technology-enabled banking self-services

Awareness levels about internet banking were found to be 78% among the sampled respondents; it was 46.3% and 39.1% in case of tele banking and mobile banking respectively.

Awareness levels among non-users of these services were still lower at 31%, 20% and 16% respectively for internet banking, tele banking and mobile banking services.

As compared to metro banked centre, the awareness levels were lower in the urban banked centres. Therefore, in order to encourage the usage of these services, banks have to proactively promote these services as it is found that awareness is the first stage in the adoption process (Loudon and Bitta, 2002).

10.1.2.3 Frequency and length of usage of different technology-enabled self-services

It was found that ATM was the most frequently used electronic banking channel with 74.3% of respondents using it at least once a week.

Internet banking is the next widely adopted electronic banking service with about 44% of its users using internet banking services at least once or twice a week.

Tele banking services are not very popular since only 27% of its users were using it at least once or twice a week.

In the case of mobile services only 24.7 per cent of the respondents were using it at least once a week. This may be due to the fact that at the time of the survey mobile banking service was just introduced by a few banks.

Regarding the length of usage in case of ATMs majority of the respondents (59.7%) were using it for more than 3 years, while the majority of internet banking users (68.2%) were using it for less than 2 years. Similar is the case with tele banking services users with majority using (63.2%) it for less than 2 years. Since the mobile banking services were introduced in the recent past only very recently 81.2% of the respondents were found to be using it only for less than 2 years.

10.1.2.4 Perception of actual percentage of use of different banking channels

Of the total percentage of banking transactions conducted by the respondents their perception was that on an average they did 24.1% of their transactions through branch banking, 54.65% through ATMs , 15.02% through internet banking, 3.51 % through tele banking, 2.21 % through mobile banking and 0.51% through other means.

When the perception regarding the usage of various banking channels as compared between users and non-users, it was found that users in general used less of branch banking and ATMs as compared to non-users. They used more of the electronic banking channels such as internet banking, tele banking and mobile banking.

10.1.2.5 The pattern of usage of various functions provided through technology-enabled banking self-services

When the pattern of using the various functions (menu options) used through these electronic channels by the users was examined, it was found that mainly the informational and basic functions which were being used by

majority of their users whereas the value-added and fund-based transactions were being used by a lesser percentage of respondents.

10.1.3 Factors affecting adoption and adoption levels of technology-enabled banking self-services

10.1.3.1 Comparison of adoption levels of electronic banking services by customers belonging to the different bank groups.

Results showed that the total technology-enabled banking self-services adoption level by bank (CHAD) varied significantly with the bank group.

The highest total adoption level (CHAD) is for the foreign bank customers (14.85), followed by private sector bank customers (12.47) and then by public sector bank customers (10.1). The results imply that the customers of foreign banks who have taken to the usage of technology-enabled banking self-services are the highest adopters of technology-enabled banking self-services, followed by those from the private sector banks and then those from the public sector banks.

Thus the public sector banks have to put more efforts in popularizing the usage of these electronic banking services.

10.1.3.2 Demographic factors and adoption levels of technology-enabled banking self-services

a) *Gender wise comparison of adoption levels*

Even though the adoption levels among the male segment of the respondents were more than the female segments, the difference was statistically significant only in case of ATM adoption at 95% confidence level. In the case of internet banking adoption levels the difference was statistically significant only at about 90 per cent confidence level. The total electronic

banking channel adoption levels were significantly different only at 90% confidence level.

Some of the studies done abroad (Laforet and Li, 2005; Akinci et al., 2004) had shown that the adopters of electronic banking self-services were predominantly males. But from the results it was found that women have not hesitated to adopt electronic banking channels, though to a lesser extent as compared to men.

b) *Age group wise comparison of adoption levels*

The total electronic banking channel adoption level (CHAD) was the highest among the age group of 26-35 years. The individual adoption levels of internet banking (IBAD), tele banking (TBAD) and mobile banking (MBAD) exhibited similar trends (only ATM adoption levels (ATMAD) showed a different trend).

This might be due to the fact that in this age group people are in need of more frequent bank transactions by virtue of more earnings and at the same time they have the technology savviness to adopt electronic banking channels. Moreover it is in agreement with the studies done in other countries which showed that it is the youth who take to these channels the most. The next highest adoption level was found among the 36-45 age group followed by the 18-25 age group. From the ANOVA test it was found that these variations in adoption levels were significant among the different age groups. These results are in agreement with the studies (Sathye, 1999; Mattila et al., 2001; Karjaluoto et al., 2001) done in other countries which showed that it is the youth who take to these channels the most.

Surprisingly, in this study it is the 46-60 age group who have adopted the ATM the most, as this group tends to lack the technology savviness to take

up other modes of transactions such as internet banking. So they might be forced to use ATM more.

c) *Income and Adoption levels*

The income levels of the respondents had an influence on the adoption levels with the general trend that higher the income the more will be the adoption of all the electronic banking channels including the total electronic banking channel adoption (CHAD). It is also found from the analysis of variance test that the difference in the adoption levels of electronic banking channel services with respect to the income levels is statistically significant. The highest adoption levels were shown by the highest income group in the study (Rs. 10 lakh and above per annum) and the lowest adoption levels were shown by the lowest income group (Rs 1-2 lakhs per annum).

Therefore it is the 25-36 years age group which has to be targeted for promoting these services as this age group has the maximum potential for adoption of electronic banking.

d) *Occupation and adoption levels*

The salaried category of respondents had the highest levels of adoption across all the electronic banking delivery channels including the total electronic banking channel adoption. The salaried category is found to be using the electronic banking channels most widely as the banking transactions are mostly done by themselves so they might be pressed for time and hence the usage of electronic banking services offers them a convenient and time saving way to conduct their banking transactions. In the case of business/self-employed category, even though the banking transactions might be happening at higher frequency they might be assisted by their employees or assistants, as the case may be, to conduct the banking transactions. Significant difference in adoption

levels is found with the adoption of all electronic channels at 95 per cent confidence level.

For the banks, the salaried category represents a more potential target group for promoting the technology-enabled banking self-services.

10.1.3.3 Comparison of adoption levels between metro and urban banked centres

The metro banked centres had significantly higher adoption levels in case of all the electronic banking delivery channels including the total adoption level (CHAD).

The respondents from the metro centres could be better educated, having higher income levels and more techno-savvy. Along with these factors the situational factors or facilitating factors like better avenues to perform electronic banking, widespread availability of ATMs and PCs, lack of time and higher traffic levels- all these are contributing factors which encourage respondents to use more of these banking self-services.

10.1.3.4 Adoption levels and perception regarding percentage of usage of electronic channels

The adoptions levels of electronic banking channels are significantly correlated with the usage percentage of banking transactions through the respective electronic banking channels except in the case of ATM adoption level (ATMAD). Using ATM services might have become habitual or automatic for the respondents without the conscious cognitive processing (Triandis, 1980). This might explain the lack of correlation of adoption levels of ATMs with perceived use percentage of ATMs for transactions.

10.1.3.5 Determinants of Technology-Enabled Banking Self-Services Adoption Levels

A model for understanding the key attitudinal and perception factors of the respondents which determine their level of adoption of electronic banking channels with total electronic banking channel adoption (CHAD) as the dependent variable and relative advantage, self efficacy, innovativeness, need for personal contact and perception of risk as independent variables was developed. Regression analysis showed that the model is valid and that the independent variables like *relative advantage*, *innovativeness* and *need for personal contact* had significant influence on the dependent variable of *total electronic banking channel adoption level (CHAD).* But the independent variables of *self efficacy* and *perception of risk* did not have significant influence on the dependent variable. The percentage of variance of the dependent variable explained by regression was 32.5%.

The same model which was used to examine the adoption levels of internet banking (IBAD) showed that the dependent variable of internet banking adoption was impacted significantly by the independent variables perception of *relative advantage*, *innovativeness* and *need for personal contact*. The independent variables *self efficacy* and *perception of risk* did not have any significant impact on internet banking adoption, the percentage of variance explained being higher at 52.5%, showing that the model was a better fit for explaining the internet banking adoption.

10.1.3.6 Predictors of Internet banking use

Logistic regression analysis was done to find out the factors which are significant predictors of internet banking usage. The independent variables considered were the demographic factors such as gender, age category, occupation, income level and behavioural factors such as hours of computer

usage by consumer, his/her frequency of internet browsing, hours of internet browsing, and attitudinal factors such as relative advantage, innovativeness, perception of risk, need for interaction and self-efficacy.

The significant predictors were identified as income levels, perception regarding the relative advantage, their innovativeness and perception of risk. These together could classify correctly internet users and non-users in 87.27% of the cases. The goodness of fit measures are within the recommended limits.

10.1.4 Customer satisfaction and perceptions of individual technology-enabled banking self-services

10.1.4.1 Relationship among the service quality perception, customer satisfaction and the adoption levels of electronic banking services

The perceptions pertaining to the service quality and customer satisfaction of the services through the electronic banking channels were found out for ATM services, Internet banking services and tele banking services.

The satisfaction levels and service quality perceptions are not significantly different in case of ATMs, internet banking and tele banking for the different bank groups.

Different geographical locations also did not show significant variations in the customer satisfaction and service quality of these electronic banking services.

It was found that service quality perceptions are significantly and positively correlated with satisfaction levels for the technology-enabled banking services. The customer satisfaction levels were found to influence the adoption levels and the extent of usage of the electronic banking services. In order to improve the adoption levels and usage of these electronic banking self-services,

the banks have to put efforts to improve both service quality and satisfaction levels.

10.1.4.2 Mobile banking perceptions

Most important aspects aiding the use of mobile banking services are that mobile phone is a familiar device and that it remains always with a person. This has been proved from weighted means method. The main factor hindering the adoption of mobile banking is 'feeling more comfortable with other means of conducting banking transactions' followed by the 'possibility of errors'. The mobile banking users of foreign bank category are the most satisfied ones , followed by those of private sector banks and then those from public sector ones.

10.1.4.3 Reasons for non-use of internet banking and tele banking

Non-usage of internet banking services and tele banking services was found to be due to the lack of proper awareness about the service. About 69% of the non-users of internet banking had no awareness regarding the service and 80% of the tele banking non-users had no awareness about this service.

Other major reasons for non-usage of internet banking services are 'happy with other modes of transactions such as branch banking and ATMs' and followed by 'security concerns'.

Non-users of tele banking services were 'comfortable with other modes of transactions' and 'lack of familiarity' with the service.

10.1.5 Relationship among Beliefs, Attitudes and Intention to use ATMs and Internet banking

Two models, one for ATMs and the other for internet banking were proposed showing the relationships among antecedent beliefs, attitudes,

intention to use and the consequent actual usage. These models were analysed using structural equation modeling.

The model for ATM Attitude/Intention was found valid as the fit indices values prove the reasonably good fitness of data to the proposed model. Out of the antecedent beliefs proposed in case of ATMs such as ease *of use*, *perceived usefulness* and *security of usage*, it was found that *perceived usefulness* and *security of usage* had significant influence on the *attitude towards ATM* and could explain 39% of variance. In turn the *attitude towards ATM* had significant influence on intention *to use it*, and could explain 41.5% variance. The path between intention to use ATM, though significant, could explain only 2.5% of variance showing minimal strength of relationship.

The model for internet banking attitude/intention was also valid as the fit indices values were within the recommended limits. Of the antecedent beliefs proposed such as ease *of use*, *perceived usefulness*, *compatibility* and *security concerns,* except for *ease of use* all the other constructs were found to have significant impact on *attitude towards internet banking* and explains 62% variance. The *attitude towards internet banking* had significant influence on *intention to use it* and could explain 46.7% of variance. Finally the *intention to use internet banking* had significant influence on *actual internet banking usage* and could explain 34% variance.

Ease of use is not found to be a statistically significant factor for ATMs as well as internet banking. This might be due to the fact that the sample of respondents selected is found to be proficient in the usage of technology products such as computers and internet; therefore the operation of either ATM or internet banking per se may not be difficult for them. All the other antecedent beliefs had significant impact on the attitude formation towards ATM as well as internet banking.

The *intention to use* internet banking was found to have impact on the internet usage by the respondents, while the impact of intention to use ATM was found to have relatively weak impact on the ATM usage. This is because the internet banking adoption is only catching up, with the adoption cycle being in relatively initial stages, so the usage of internet banking involves more of cognitive processing. The adoption of ATM is in its maturity stage and thanks to more frequent usage for longer duration, the usage of ATM has become habitual, so its usage is more automatic, thus involving lesser of cognitive processing. Therefore, the linkage between the behaviour intention and usage in case of ATMs is weak.

10.2 Managerial Implications and Suggestions

1) The banks have to locate their bank branches in locations which are convenient to their target customer group and see to it that it is staffed with well-trained employees and maintain superior service standards. This is because, as seen from the results, the bank branches are still relevant in the Indian context and the results showed that important bank choice criteria were locational convenience, superior service standards and friendly staff. So inspite of different modes of electronic banking self-services, the banks cannot choose to ignore their bank branches in India.
2) Despite being pioneers in providing TEBSS, it is found that the overall customer satisfaction levels were significantly lower in case of private sector and foreign banks in comparison with the public sector banks. However, in case of satisfaction levels of automated services, the public sector bank customers had the lowest satisfaction levels of all bank groups, which shows that this is an area for improvement for the public

sector banks. It is also found that there are no significant differences between the overall satisfaction levels of users and non-users of TEBSS. The implication for the banks are that the provisioning of services through technology-enabled channels alone need not necessarily improve the customer satisfaction levels, there could be other aspects such as reasonable bank charges and so on which can exercise an impact on the satisfaction levels. So, in addition to provisioning of TEBSS these aspects also have to be taken care to ensure overall improvement in satisfaction levels.

3) The public sector banks have to ensure that their customers are using the TEBSS provided by them so that the branch visit frequency by their customers which was found to be the highest of all the bank groups could be reduced. All the bank groups have to encourage their tier-2 city customers to use more of TEBSS than depend on branch banking as it is found that the branch visit frequency of the tier-2 city (urban banked centre) customers is more than their metro city counter parts. The banks can probably promote the usage of TEBSS among their customers through demonstrations, creating more awareness and providing incentives for usage by way of reduced banking charges if the transactions are done through TEBSS.

4) Since it is found that quality perceptions regarding core service and price (bank charges) by bank customers have significant positive correlations with overall customer satisfaction felt by them, it is suggested to the banks to improve both these aspects, so that their customers experience better satisfaction levels. Core service can be improved by the banks through the provision of wider range of diverse services and the incorporation of advanced technology in services

provisioning. The price perception can be improved through the process of administering transparent competitive prices.

5) The results showed that the users of TEBSS spent significantly more time before the computers and browsed internet more often than non-users, therefore the banks have to target those customers whose usage of computers, internet and other technology products are on the higher side for promoting TEBSS usage.

6) As found from the study as well as from the literature, the lack of awareness among the non-users could be a major reason for non-usage of TEBSS. The awareness level among tier-2 city bank customers was lower as compared to metro city customers. The banks have to increase awareness levels among these customer segments through promotional measures such as advertising, publicity and so on.

7) The banks have to encourage the existing users of TEBSS such as internet banking, tele banking and mobile banking to use these services more frequently, as the study showed that the majority of the users are not even using these services at least once a week. Some of them reported that they are using these services only once or twice a month thus indicating marginal usage. Perhaps the apprehensions about the usage of these services might be preventing them from using these services more frequently. The banks could encourage customers to use these services more frequently through rewarding customers for conducting transactions through these TEBSS channels with incentives such as reduced service charges. For instance, ICICI bank had launched a pure online banking savings account in July 2008 called 'b2-Branch-free-Banking', the advantages of which includes 'zero minimum balance', 'zero charges for fund transfer', 'online bill

payments', 'mobile top-ups' and 'multi-layered security' (Business Line, 8th July08).

8) As the perception regarding the percentage of transactions done by the sampled respondents through tele banking and mobile banking was marginal at 3.51% and 2.21% respectively, there was a pressing need for the banks that are providing such services to encourage their customers to utilize these services more. Customer awareness has to be created regarding the benefits of transacting through these channels. In order to conduct tele banking the customers need to have access to only a phone, no settings like a computer with internet connection is required. Performing mobile banking transactions is even more versatile as mobile is a device which the customer is likely to carry everywhere. Probably, the banks can convince the customers regarding tele and mobile banking's low start up costs and versatality.

9) Though ATMs are the most widely adopted electronic banking channel and the percentage of transactions through them exceeds even those of the traditional branch banking, they are still being used by majority of the users as convenient cash dispensers. There is a need to promote the usage of its value-added services such as bill payments and even some of the basic services such as cash/cheque deposits.

10) As it is found that fund-based transactions and other value-added services were utilized only by a minority of the sampled respondents, the banks have to encourage the usage of these services in order to ensure that the full potential of TEBSS is realized.

11) As the adoption levels of TEBSS are found to be the lowest in case of public sector banks' customers, they have to put extra efforts in popularizing these services amongst their customers.

12) The banks have to initially target, the 26-35 years age group (highly educated, high income) to promote services such as internet banking, tele banking and mobile banking, so that the probability of adoption is more. Later on they can target other potential segments.

13) Since the study revealed that the adoption levels of customers from urban banked areas (tier-2 cities) were significantly lower in case of internet banking, tele banking and mobile banking services as compared to metro banked centres, steps have to be taken by them to improve the usage level in the tier-2 cities.

14) Of the five determinants of TEBSS adoption level considered, it was found that the *innovativeness* of bank customers had the highest impact on total electronic banking channel adoption level (CHAD), followed by the perception of *relative advantage* and lack of *need for personal contact*. So banks will definitely benefit if they can identify the more innovative segments among their customer base, who don't prefer personal service and then convince this category about the relative merits in using the electronic banking channels. As the *perception of risk* has partial impact on the adoption level, these segments can also be appraised about the latest security features used by banks to allay any possible concerns pertaining to security compromises. They can perhaps carry out a survey to identify bank customers with such characteristics.

15) From the results of logistic regression to find out the distinguishing factors of users and non-users of internet banking, it is found that significant predictors were the innovativeness of the customers, their perception of relative advantage accrued through using it, perception of risk while using it and their annual income. So the banks can identify

the potential users of internet banking based on these parameters and target their efforts to promote internet banking usage to these segments.

16) The service quality has significant positive influence on customer satisfaction levels of TEBSS and in turn customers satisfaction positively influences both the adoption levels and the extent of usage of TEBSS. So banks are suggested to improve the quality of services provided through these electronic banking channels. For instance, in case of internet banking, service quality can be ensured by banks through the development of a website containing all the required information, high level of security providing error free transactions, having attractive website, with ample menu options, effecting fast complaint resolution, accurate query response, and providing website with easy navigation and download capabilities. Likewise, for providing quality services through tele banking, the prerequisites are reliability of service, clear instructions, multiple menu options, pleasant musical background and reasonable number of voice prompts.

17) Another interesting implication to the management of the banks is that the delivery of the services through these channels completely changes the equations, as it obviates human interaction, negates the branch environment experience, the banks virtually become faceless. That is why it is found that there is no significant difference between the quality perceptions between the electronic channels of public sector, private sector and foreign banks. So the banks will have to look for newer methods for differentiating their services, so that they can have better competitive positions in the minds of the customers.

18) The major reasons given for non-usage of internet banking and tele banking services apart from lack of awareness were *happy with other*

modes of transactions such as branch banking and ATMs, *security concerns* and *lack of familiarity*. To overcome these factors, banks have to educate the customers regarding the advantages of transacting through these electronic banking channels, provide training to customers in using them and assure the customers regarding the latest security measures employed by them.

19) Considering the substantial subscriber base of mobile phone users in India, mobile banking has great potential as the electronic banking channel of the future. Therefore banks have to seriously consider its potential for effecting transactions. Those banks which are still to provide this service should seriously consider providing the same and the banks that are already providing this service have to encourage more of its usage by their customers.

20) From the proposed attitude/intention models for ATMs and internet banking, it is found that the antecedent beliefs are influencing the attitude formation about these TEBSS in a significant way. As *perceived usefulness* is the major antecedent belief positively influencing the attitude towards the TEBSS (ATMs/internet banking), banks have to convince the select target segments about the relative benefit that can be gained through the use of the respective TEBSS. As for the concerns regarding the security while using these services which is the second most important antecedent belief influencing the attitude towards TEBSS, the banks have to alleviate these fears through proper customer education and providing appropriate guarantees for proper performance. The ATM users have to be reminded of the less frequently used functions so that they are encouraged to use them. As compatibility is a significant belief which can positively influence the

attitude towards internet banking, the banks have to convince the prospective users regarding the compatibility of this service with their work and life styles.

10.3 Significant Contributions of the study

The study has tried to examine the various antecedent demographic, behavioural and attitudinal factors that influence the adoption and adoption levels of technology-enabled banking self-services such as ATMs, internet banking, tele banking and mobile banking in the Indian context.

It has analysed the various consequences of adoption of TEBSS like usage patterns, customer satisfaction, quality perception, the impact of electronic banking usage on branch banking and so on.

From the results of the study several managerial implications such as identification of the characteristics of the appropriate target segments, the best ways of promoting the technology-enabled banking self-services among them, the areas for improvements in the deployment of such services by banks and the perspectives of the users of such services have emerged. Based on these, several suggestions are put forward to improve the adoption levels and usage of these services by banks. These could be of practical importance for bank managements in India to make informed decisions pertaining to technology-enabled banking self-services regarding their promotion, deployment and provisioning.

The constructs from seminal theoretical frame works developed in different cultural contexts have been adapted for the study and several of such constructs were found valid in the Indian context as well.

10.4 Conclusion

From the study it is found that now-a-days banks are providing multiple modes of delivery of services through provisioning of services through electronic banking channels such as ATMs, internet banking, tele banking and mobile banking services. It is not only the foreign and the private banks that are taking the initiatives in providing these services but also the public sector banks. However it is found that only ATMs are widely adopted by the customers. Adoption of other electronic channels is still to pick up in a big way. The study has endeavored to look at the adoption of technology-enabled banking self services (TEBSS) in totality as it has considered the factors pertaining to all the four prominent TEBSS namely ATMs, internet banking, tele banking and mobile banking that are used by the banks. This approach is used in the study as the customers tend to use the various banking services delivery modes in a complimentary way and each electronic banking channel has its own peculiarities.

The proposed models developed using the relevant constructs from the established frame works from the adoption literature and similar studies done in other countries were able to explain the phenomenon of TEBSS adoption and usage reasonably well in the Indian context also. These models were successful in bringing out several implications relevant to both practioners and academicians in this area. The study shows that with appropriate measures taken by banks in India, technology-enabled banking self services has the potential to revolutionise the way Indians do banking.

10.5 Recommendations for future research

Similar studies could be carried out regarding the adoption of technology-enabled banking self-services in semi-urban and rural locations as these banked centres were not covered under this study.

Now-a-days the banks are looking at technology solutions to implement financial inclusion so that the banking services could be made available to the unbanked and under-banked classes of the society and remote rural population. Therefore research could be carried out to find out the possible provisioning of banking services through technology-enabled channels to facilitate financial inclusion.

Considering the fact that mobile phone penetration has reached all segments of the society and India is one of the fastest growing markets for mobile phone, a research study could be done to look at the adoption factors of mobile banking exclusively.

The adoption of technology-enabled banking services in the corporate sector could be studied.

Studies could be carried out on how best to promote these technology-enabled banking self services among bank consumers.

The models developed in the study could be utilized to capture insights into the adoption of technology solutions in other sectors such as retailing, insurance services, travel and tourism and so on.

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Appendix 1

Questionnaire

Part 1

a) Your "most frequented bank" with which you are having the maximum number of transactions:

.....

b) Please tick the type of dealings you are having with the above bank

☐ Savings A/C ☐ Current A/C ☐ Term Deposit ☐ Recurring Deposit

☐ Demat A/C ☐ Personal Loan ☐ Vehicle Loan

☐ Housing Loan ☐ Consumer Loan ☐ EducationalLoan

☐ Credit Card ☐ Any Other PI Specify.....

c) Reasons For Selecting the "Most Frequented Bank" Please tick

☐ Locational Convenience

☐ Availability of Online Banking, Mobile Banking, TeleBanking etc.

☐ Better Service & Friendly Staff ☐ Greater Spread of ATMs

☐ Bank's image ☐ Recommendations by friends / relatives

☐ Employer's insistence For Salary A/C ☐ Anyother Please Specify .....

e) How satisfied are you in general about the following aspects of Your Most Frequented Bank

1 = Highly dissatisfied. 2 = Dissatisfied. 3 = so-so. 4 = Satisfied. 5 = Highly Satisfied.

	1	2	3	4	5
1) Bank Products					
2) Staff					
3) Physical Surroundings					
4) Bank Fees					
5) Automated Services (ATMs, Internet, Telephone, Mobile Banking etc.)					

f) How often do you visit the bank branch office?

☐ Once a week ☐ Fortnightly ☐ Monthly ☐ Quarterly

☐ Once in six months ☐ Very Rarely

g) Please express your agreement or disagreement to the following statements about your bank

1 = Strongly Disagree. 2 = Disagree. 3 = Neutral. 4 = Agree. 5 = Strongly Agree. (Please Tick.)

	1	2	3	4	5
1) The electronic banking services offered have improved the quality of my					
2) My bank adequately explains the service charges associated with each					
3) The electronic banking services of your bank are having acceptable fees.					
4) My bank's Services Charges are competitive .					
5) My bank provides wide range of services (retirement's account, loans for vehicles, foreign exchange, fund transfers, home loans etc.)					
6) My bank provides diverse service features (different interest rates,					
7) My bank follows the most advanced technology.					

PART 2 (*please tick the appropriate answers)*

a) Do you have access to computers either at home or work place ☐ Yes ☐ No

b) Per working day how many hours you are likely to use the Computer

	Hardly any		1 hour or less		1- 3 hours		3- 6 hours		More than 6 hrs

c) Do you have access to internet ☐ Yes ☐ No

d) How many times you browse the internet

	2/3 times daily		daily		2/3 times weekly		monthly		Never

e) On an average how many hours you browse the internet per week

☐ hardly any ☐ 1- 5hrs ☐ 5-10 hrs ☐ 10- 15 hrs ☐ more than 15hrs

(Scale for determinants of Technology-Enabled Banking Self Services Adoption Level)

f) Please tick your agreement to the following statements

1 =Strongly Disagree. 2 = Disagree. 3 = Neutral. 4 = Agree. 5 = Strongly Agree. (Please Tick.)

	1	2	3	4	5
1) I have a well developed technological ability					
2) I am comfortable with the usage of technology products like computers					
3) Electronic banking channels gives me more control over my banking transactions					
4) Other people come to me for advice on electronic banking					
5) I am one of the first among my friends and relatives to use electronic banking					
6) Electronic banking channels are much more convenient to use					
7) Electronic banking channels saves time					
8) Electronic Banking is less costly or have no cost					
9) I feel confident of using electronic banking methods for conducting transactions.					
10) I am more comfortable with face-to-face transactions with human tellers					
11) I do not consider it safe to do any kind of financial transaction online					
12) I trust the traditional banking methods more.					
13) I am worried that the information send over internet will be seen by others					
14) I enjoy seeing people who work at my bank					
15) The people at my bank do things for me that no machine would do					
16) I do not like changes from the usual way I do things					

Any comments that you would like to add regarding the above responses

.....

.....

d) Please tick which of the below mentioned facilities are offered by your "most frequented bank" of which you are aware of?

☐ ATM ☐ Internet banking ☐ Telephone banking ☐ Mobile Banking

e) How often do you use the mentioned facilities?

Services	Everyday	Once or twice a week	fortnightly	Monthly	Never used
ATM					
Internet Banking					
Tele Banking					
Mobile Banking					

f) For how long you have been using the following services?

Services	0-1 Yr	1-2 yrs.	2–3 yrs.	More than 3 yrs	Will use within 12 months or so	Unlikely to use within 12 months	Will never use
ATM							
Internet Banking							
Tele banking							
Mobile Banking							

Part 3 -ATMs

a) I use ATM for the following purposes (Please tick the appropriate box/boxes)

Cash Withdrawal		Balance Enquiry		Cheque/Cash Deposit	
Transfer Funds		OrderCheque book		Bill Payments	
Recharging of prepaid cards					

b) Please denote your satisfaction level with your bank's ATM Service

1= Highly dissatisfied 5=Highly satisfied

	1	2	3	4	5
Overall Satisfaction with ATM of your bank					
Satisfaction with the Reliability of ATM to do transactions					
Satisfaction with the accessibility of ATM					

c) Please indicate your degree of agreement with the following statements

1 = Strongly Disagree. 2 = Disagree. 3 = Neutral. 4 = Agree. 5 = Strongly Agree.

	1	2	3	4	5
1) Learning to use ATM was easy for me					
2) It was easy for me to become skillful at using ATM					
3) Using ATM improves the way in which I do my banking					
4) Functions provided by the ATM of my bank are very useful for doing my banking					
5) ATM machine is easy to use and operate.					
6) ATM provides a convenient way of doing banking					
7) I feel secure in conducting my banking business through ATMs					
8) There is no danger of my card getting stuck in the machine					
9) ATM is conveniently located.					
10) ATM is located in safe locations.					
11) I Find ATM difficult to use					
12) The complaint resolution of my bank's ATM is fast and satisfactory.					
13) I Know that ATM will handle my business correctly					

If you disagree with above statements kindly mention why you do so and what improvements can be done to make you more satisfied with the Internet banking services provided by your bank.

.....

.....

e) Please tick your degree of agreement with following statements

1 = Totally Disagree. 2 = Disagree. 3 = Neutral. 4 = Agree. 5 = Totally Agree.

	1	2	3	4	5
1) I feel good about Internet Banking Service of my bank					
2) I feel pleasant about the Internet Banking Service of my bank					
3) I like the Internet Banking service of my bank					

g) When you have a routine bank transaction to do, how likely will you use Internet Banking of your bank ?

Extremely Unlikely **Extremely Likely**

1	**2**	**3**	**4**	**5**

Part 4 - Internet Banking

a) Kindly tick the commonly availed services by you using internet banking...

Statement Enquiry		Bills Payment		Funds Transfer	
Cheque book request		Loan applications		DD Requests	
Shop online		**Presently not using**			

b) Please denote your satisfaction level with your banks Internet banking Service (If you are a user)

1 = Highly dissatisfied 5 = Highly satisfied

	1	2	3	4	5
Overall Satisfaction with internet banking of your bank					
Satisfaction with the Website contents					
Satisfaction with the accuracy of services					

c) Please tick your degree of Agreement / Disagreement pertaining to the Internet Banking service of your most frequented bank :

1 = Strongly Disagree. 2 = Disagree. 3 = Neutral. 4 = Agree. 5 = Strongly Agree.

Please tick your degree of Agreement / Disagreement pertaining to the Internet Banking service of your primary bank:

1 = Strongly Disagree. 2 = Disagree. 3 = Neutral. 4 = Agree. 5 = Strongly Agree.

Quality Dimensions	**1**	**2**	**3**	**4**	**5**
1)The bank's website contains all the required information to conduct my banking.					
2)The bank's internet transactions are secure.					
3) The Internet banking is reliable as it provides error free transactions.					
4)The bank's website is attractive with clear instructions					
5)The bank's internet banking facility enables me to carry out a wide range of					
6)The complaint resolution of my bank's internet banking is fast and satisfactory.					
7) The bank is very accurate in their responses to my queries/requests.					
8) Navigating the Bank's website is easy and it can be downloaded fast					

If you disagree with above statements kindly mention why you do so and what improvements can be done to make you more satisfied with the Internet banking services provided by your bank.

.....

.....

d) Please select the appropriate response that best describes your perceptions of internet banking (both users and non users)

1 =Strongly Disagree. 2 = Disagree. 3 = Neutral. 4 = Agree. 5 = Strongly Agree.

Statements	**1**	**2**	**3**	**4**	**5**
1.Internet banking makes transactions easier.					
2.Internet banking can help to manage my finances more effectively					
3 Internet banking useful for managing my finances					
4. Internet banking saves time					
5. Internet banking is a convenient way to mange my finances					
6. Internet banking is compatible with my lifestyle.					
7. Using Internet banking fits well with the way I like to manage my finances					
8.Using the Internet to conduct banking transactions fits into my working style.					
9. It is/ will be easy for me to become skillful in using internet banking					
10. Using Internet banking doesn't require a lot of mental effort					
11. I find Internet banking difficult to use (R)					
12. Information concerning my Internet banking transactions will be known to					
13. I am concerned about the security of internet banking services.					
14. I don't trust internet banking services.					

If you disagree with above statements kindly mention why you do so and what improvements can be done to make you more satisfied with the Internet banking services provided by your bank.

.....

.....

e) Please tick your degree of agreement with following statements

1 =Totally Disagree. 2 = Disagree. 3 = Neutral. 4 = Agree. 5 = Totally Agree.

	1	2	3	4	5
1) I feel good about Internet Banking Service of my bank					
2) I feel pleasant about the Internet Banking Service of my bank					
3) I like the Internet Banking service of my bank					

g) When you have a routine bank transaction to do, how likely will you use Internet Banking of your bank ?

Extremely Unlikely Extremely Likely

1	2	3	4	5

Any comments that you would like to add regarding the above responses

.....

.....

.....

Some of the reasons which inhibits the IB usage are given please share your view (to be answered by non-users of internet banking)

1 = Strongly Disagree. 2 = Disagree. 3 = Neutral. 4 = Agree. 5 = Strongly Agree.

	1	2	3	4	5
1) Happy with other mediums of services such as branch banking & ATMs					
2) Concern about Security					
3) No training provided by the banks in using the internet banking services					
4) Don't know the procedure for using internet banking					
5) Concern about the pricing of transactions using Internet banking					
6) Don't trust the internet banking services provided by the bank.					
7) Benefits of using internet banking not clear					
8) Lack of confirmation of transactions through paper receipts.					
9) Not aware about the services available through internet banking					
10) Not happy with the speed of internet connection.					

PART 5-Telephone Banking

If you use Telephone banking, please answer the following questions:

a) Please indicate which of the following services are commonly used by you in telebanking services (Please tick)

Balance Enquiry		Account statement		Cheque Status	
Cheque book request		Funds transfer		Utility Bill Payments	

b) How satisfied are you with your bank's telebanking services?

Highly Dissatisfied 1 2 3 4 5 Highly Satisfied

c) Please tick your degree of Agreement / Disagreement pertaining to the Telephone Banking service of your primary bank:

1 = Strongly Disagree. 2 = Disagree. 3 = Neutral. 4 = Agree. 5 = Strongly Agree.

Statements	1	2	3	4	5
1) The bank's tele banking service has pleasant musical background.					
2) The bank's tele banking service has reasonable number of voice prompts.					
3) The bank's tele banking service has short waiting time.					
4) The bank's tele banking service provides clear instructions.					
5) The bank's tele banking service is reliable.					
6) The bank's tele banking service provides ample options.					

If you disagree with above statements kindly mention why you do so and what improvements can be done to make you more satisfied with the Internet banking services provided by your bank.

.....

.....

d) If you do not use telephone banking, please give your agreement/disagreement with the following statements.

1 = Strongly Disagree. 2 = Disagree. 3 = Neutral. 4 = Agree. 5 = Strongly Agree.

Reasons	1	2	3	4	5
1.Comfortable with other modes of accessing banking services					
2.Unfamiliarity with the service					
3.Not clear about the benefits of using tele banking services					
4.Don't know the procedure for using tele banking					
5.Bank does not offer training to use tele banking services					
6.Don't trust the tele banking services provided by the bank.					
7.Pricing concerns because of high telephone charges					
8.Comfortable with other modes of accessing banking services					

PART 6-Mobile banking

a) Are you a cell phone user? ☐ Yes ☐ No

b) Do you know how send to SMS messages ☐ Yes ☐ No

c) How many SMS message do you send in a day ☐ Hardly any ☐ upto 5 ☐ 5 to 15 ☐ more than 15

e) The M-Banking facilities which are used by you: (please tick)

Account transaction alerts		Balance Enquiry	
Last 3 transactions		Cheque status enquiry	
Bill payments		Cheque book request	

f) How satisfied are you with your bank's M-Banking facility?

Highly Dissatisfied 1 2 3 4 5 Highly Satisfied

g) What are the factors which aid you in using the mobile banking services?

1 = Strongly Disagree. 2 = Disagree. 3 = Neutral. 4 = Agree. 5 = Strongly Agree.

Factors	1	2	3	4	**5**
Mobile is always with you					
Mobile is a familiar device					
Sufficient guidance from bank given					
Conducting banking is fast and efficient					
Quality of service does not change as it is standardised					

h) What are the factors which inhibit you from using the mobile banking services?

1 = Strongly Disagree. 2 = Disagree. 3 = Neutral. 4 = Agree. 5 = Strongly Agree.

Factors	1	2	3	4	5
Possibility of errors.					
Lack of familiarity with the service					
Use is complicated.					
Slow data transmission					
My Bank does not provide the service					
Feel more comfortable with other means of transaction.					

i) Please mention the approximate percentage of the banking transactions conducted through the following channels

Bank Channel	All Transactions
Branch	
ATMs	
Internet Banking	
Telebanking	
Mobile Banking	
Other Means	
	100

PART 7

Sex : ☐ Male. ☐ Female.

Age : ☐ 18 – 25. ☐ 26 – 35. ☐ 36 – 45. ☐ 46 – 60 ☐ Above 60.

Marital Status : ☐ Married. ☐ Unmarried.

Education Level : ☐ 10th ☐ 12th. ☐ Graduate.

☐ Post Graduate and above.

☐ Professional degree

Occupation:

☐ Salaried ☐ Businessman / Self Employed ☐ Student

☐ House wife ☐ others pl specify.....

Annual income in Rupees:

☐ 1 lakh or less ☐ 1-2 lakhs ☐ 2-3 lakhs

☐ 3-4 lakhs ☐ 4- 5 lakhs ☐ 5- 7 lakhs

☐ 7- 10 lakhs ☐ 10 lakhs & above

Appendix 2

A2.1 Descriptive statistics and results of test for normality of the key variables of the study

Table A 2.1: Descriptive statistics of Overall bank satisfaction

	N	Minimum	Maximum	Mean	Std. Deviation
Overall Bank Satisfaction	553	1.40	5.00	3.7899	.5623
Valid N (listwise)	553				

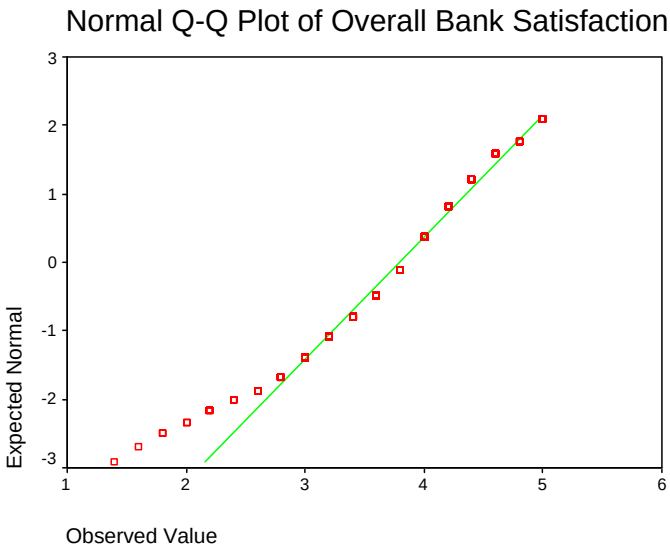


Fig A 2.1: Results of Test for Normality of Overall bank satisfaction

Table A 2.2 : Descriptive statistics of Core Service perception and Price value perception

	N	Minimum	Maximum	Mean	Std. Deviation
Core Service Preception	553	1.67	5.00	3.8131	.6570
Price Value perception	553	1.67	5.00	3.4918	.6971
Valid N (listwise)	553				

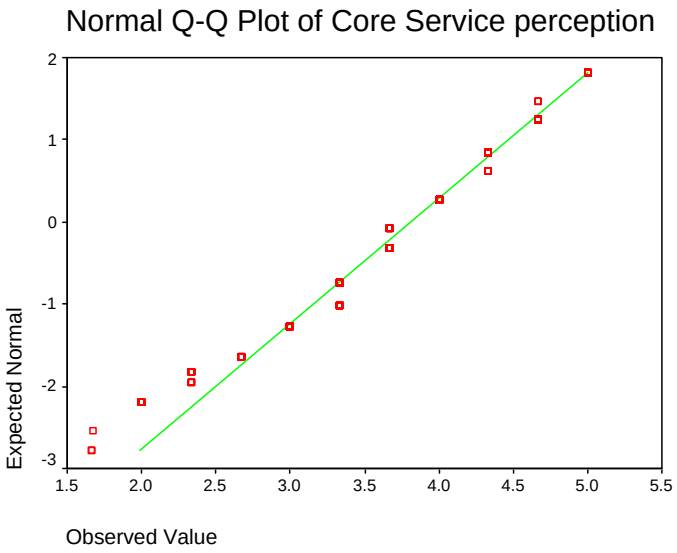


Fig A 2.2: Results of Test for Normality of Core Service perception

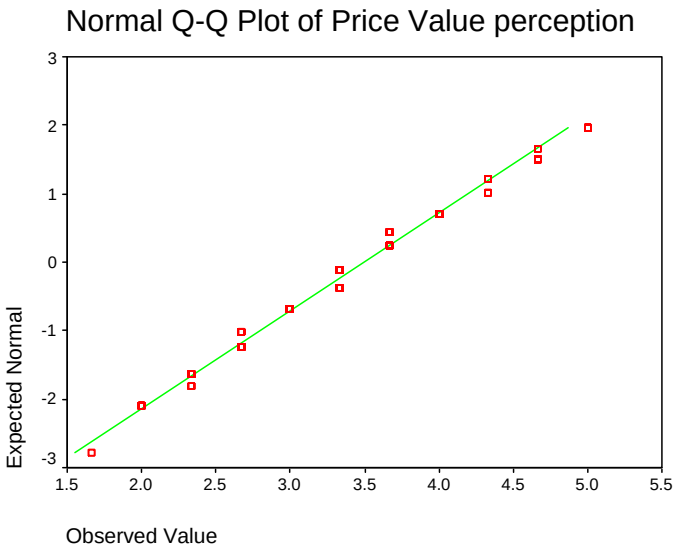


Fig A 2.3: Results of Test for Normality of Price perception

Table A 2.3: Descriptive Statistics of Total adoption levels of technology-enabled banking self-services CHAD (total electronic banking channel adoption)

	N	Minimum	Maximum	Mean	Std. Deviation
Total adoption level of technology-enabled banking self-services CHAD	553	3.00	27.00	11.6854	5.2294
Valid N (listwise)	553				

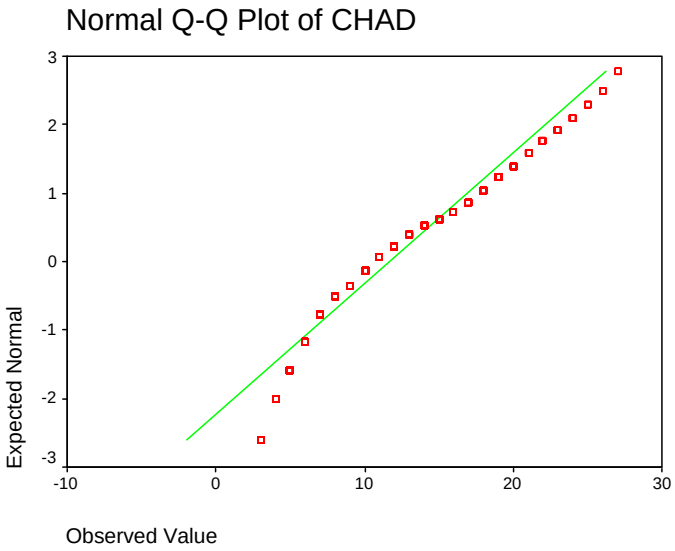


Fig A 2.4: Result of test for normality of CHAD

Table A 2.4: Descriptive Statistics for determinants of technology-enabled banking self-services adoption levels

	N	Minimum	Maximum	Mean	Std. Deviation
Self Efficacy	553	1.00	5.00	3.8572	.8474
Relative Advantage	553	1.00	5.00	3.7608	.7520
Personal Contact	553	1.00	5.00	3.1151	.7953
Innovativeness	553	1.00	5.00	2.9879	.8978
Perception of Risk	553	1.00	5.00	2.7963	.9015
Valid N (listwise)	553				

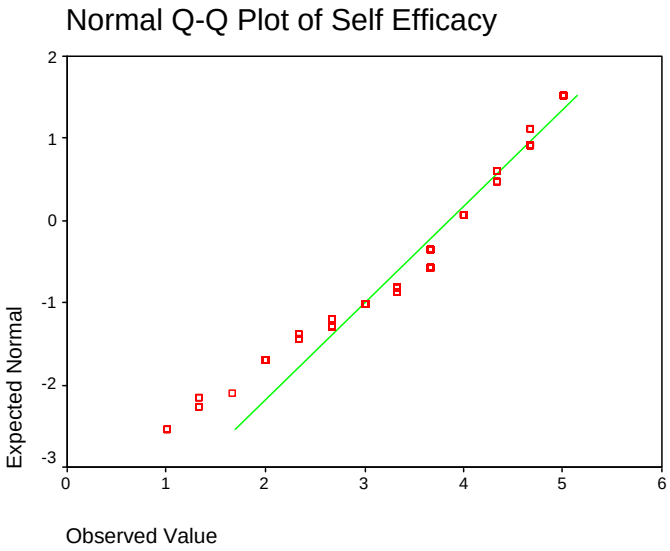


Fig A 2.5: Results of test for normality of Self efficacy

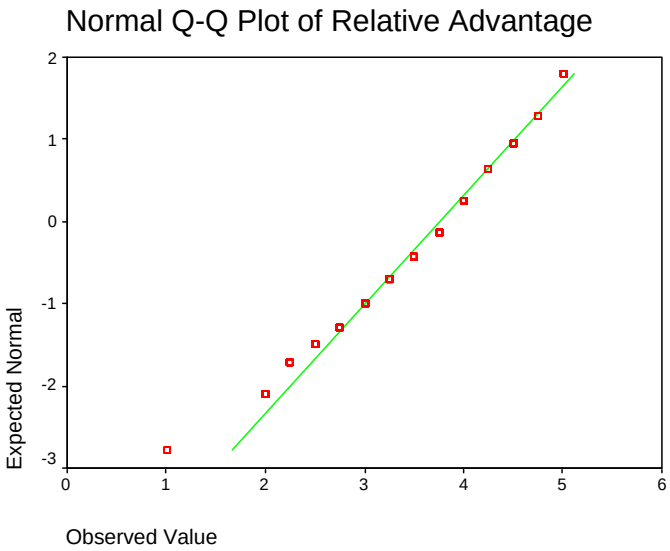


Fig A 2.6: Results of test for normality of Relative Advantage

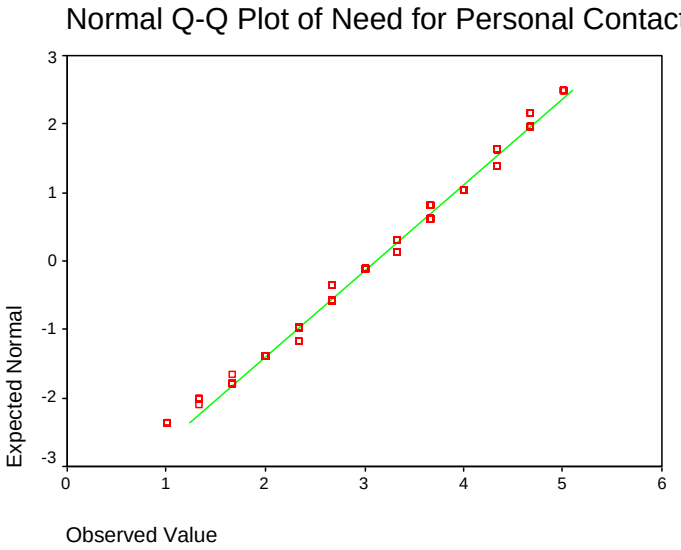


Fig A 2.7: Results of test for normality of Need for Personal Contact

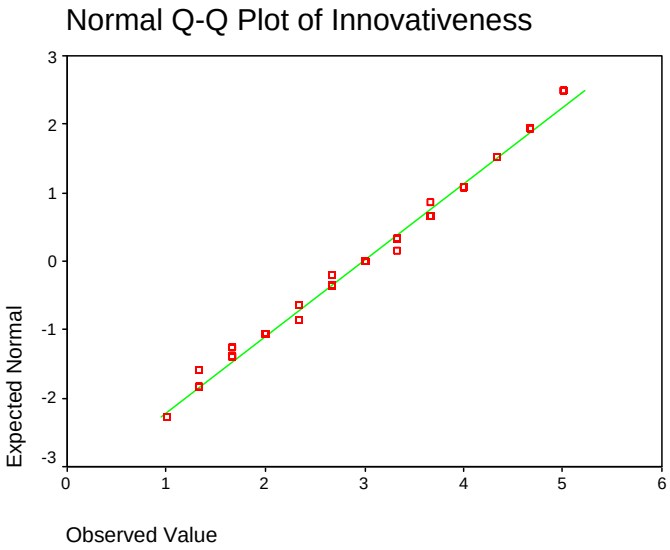


Fig A 2.8: Results of test for normality of Innovativeness

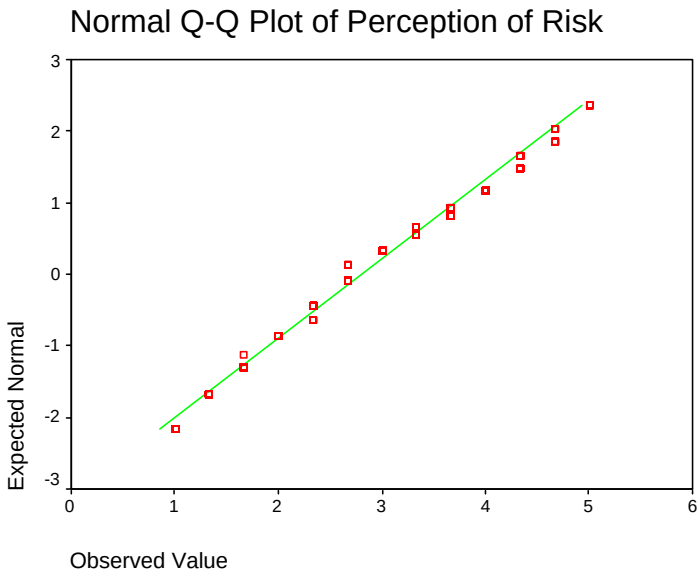


Fig A 2.8: Results of test for normality of Perception of Risk

A2.2: Additional Results of Factor Analysis of Determinants of TEBSS Adoption level variables

Table A2.5: KMO and Bartlett's Test of Determinants of TEBSS Adoption Level variables

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.893
Bartlett's Test of Sphericity	Approx. Chi-Square	4820.456
	df	120
	Sig.	.000

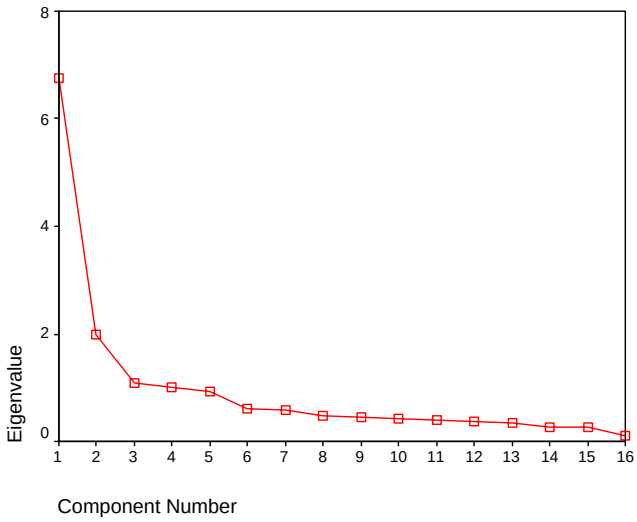


Fig A 2.9: Scree Plot of Determinants of TEBSS Adoption Level variables

Table A2.6: Total variance explained for determinants of TEBSS Adoption level variables

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.747	42.171	42.171	6.747	42.171	42.171
2	1.978	12.364	54.535	1.978	12.364	54.535
3	1.084	6.774	61.309	1.084	6.774	61.309
4	1.002	6.266	67.575	1.002	6.266	67.575
5	.927	5.793	73.367	.927	5.793	73.367
6	.605	3.781	77.149			
7	.580	3.627	80.776			
8	.486	3.036	83.812			
9	.456	2.851	86.663			
10	.415	2.592	89.255			
11	.401	2.505	91.760			
12	.361	2.254	94.014			
13	.333	2.080	96.094			
14	.267	1.666	97.760			
15	.256	1.598	99.358			
16	.103	.642	100.000			

Extraction Method: Principal Component Analysis.

Table A2.7: Communalities for determinants of TEBSS Adoption level variables

	Initial	Extraction
Technological Ability	1.000	.754
Technological Usage	1.000	.922
Control over banking	1.000	.656
Advice on e-Banking	1.000	.772
First among friends and relatives	1.000	.781
Convenience to use	1.000	.731
Saves time	1.000	.755
Less costly	1.000	.723
Confident of e-Banking	1.000	.864
Face-to-Face transactions	1.000	.584
No safe online	1.000	.741
Trust traditional banking	1.000	.698
Seen by others	1.000	.662
Enjoy seeing people	1.000	.744
No machine would do	1.000	.728
NOCHANG	1.000	.625

Extraction Method: Principal Component Analysis.

A2.3: Detailed Results of the Multiple Regression analysis with Total Electronic Banking Channel Adoption level (CHAD) as dependent variable

Table A 2.9: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.570[a]	.325	.319	4.3401

a. Predictors: (Constant), Personal Contact, Self Efficacy, Perception of Risk, Innovativeness, Relative Advantage

Table A2.10: Anova table

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4541.218	5	908.244	48.217	.000[a]
	Residual	9418.228	500	18.836		
	Total	13959.447	505			

a. Predictors: (Constant), Personal Contact, Self Efficacy, Perception of Risk, Innovativeness, Relative Advantage

b. Dependent Variable: Total Electronic Banking Channel Adoption Level (CHAD)

Responses with missing values excluded.

Table A2.11: Model Coefficients

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	3.901	1.827		2.136	.033		
	Self Efficacy	.117	.316	.019	.368	.713	.515	1.942
	Relative Advantage	1.454	.376	.206	3.866	.000	.473	2.113
	Perception of Risk	-.498	.276	-.085	-1.800	.072	.599	1.668
	Innovativeness	1.795	.294	.306	6.110	.000	.537	1.862
	Need for Personal Contact	-.613	.285	-.093	-2.153	.032	.730	1.369

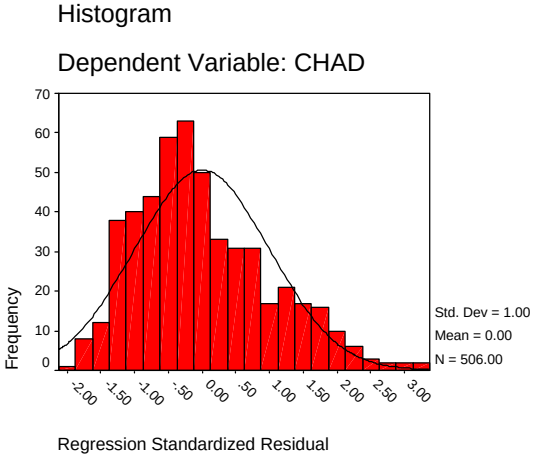


Fig A2.10: Results of Test for normality assumptions

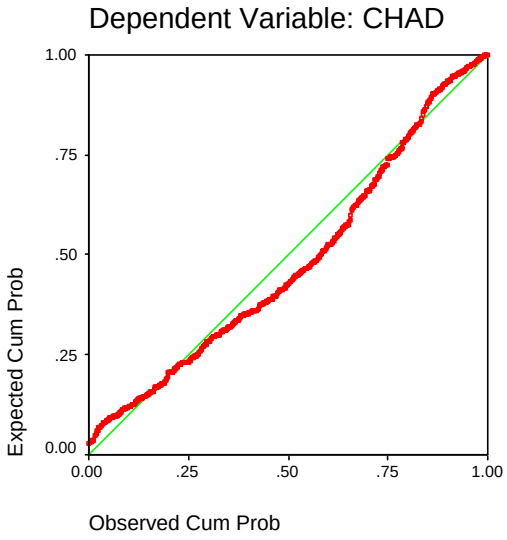


Fig A2.11: Normal P-P Plot of Regression Standardised Residual

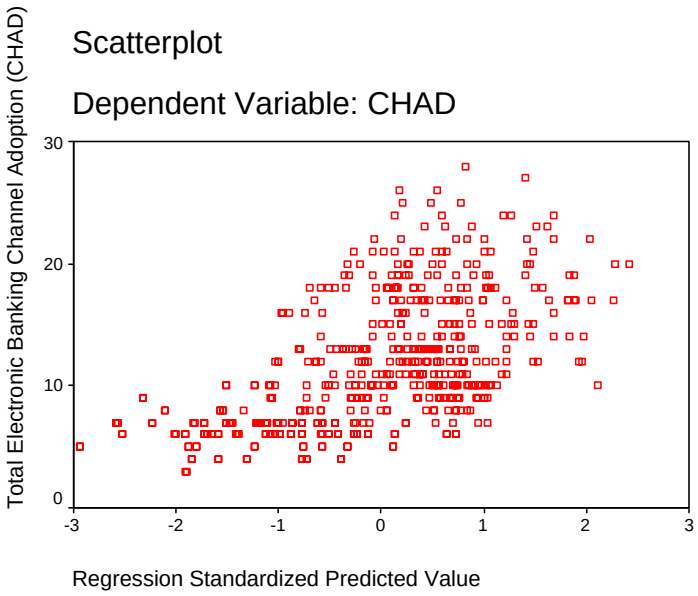


Fig A2.12: Results of test of Linearity and homoscedesticity assumptions

A2.4: Detailed Results of Multiple Regression with internet banking adoption level IBAD as dependent variable

Table A 2.12: Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.723[a]	.523	.519	1.6654

a. Predictors: (Constant), Personal Contact, Self Efficacy, Perception of Risk, Innovativeness, Relative Advantage

b. Dependent Variable: Internet Banking Adoption (IBAD)

Table A2.13: Anova test for the model

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1596.995	5	319.399	115.154	.000[a]
	Residual	1456.173	525	2.774		
	Total	3053.168	530			

a. Predictors: (Constant), Personal Contact, Self Efficacy, Perception of Risk, Innovativeness, Relative Advantage

b. Dependent Variable: Internet Banking Adoption Level (IBAD)

Responses with missing values not considered for IBAD

Table A2.14: Coefficients of the model

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-1.826	.677		-2.698	.007		
	Self Efficacy	586E-02	.119	.020	.468	.640	.510	1.959
	Relative Advanta	.761	.139	.238	5.480	.000	.480	2.085
	Perception of Ris	-.130	.103	-.049	-1.257	.209	.604	1.655
	Innovativeness	1.198	.110	.444	10.862	.000	.543	1.841
	Need for Persona Contact	-.428	.107	-.141	-4.005	.000	.735	1.361

a. Dependent Variable: Internet Banking Adoption Level (IBAD)

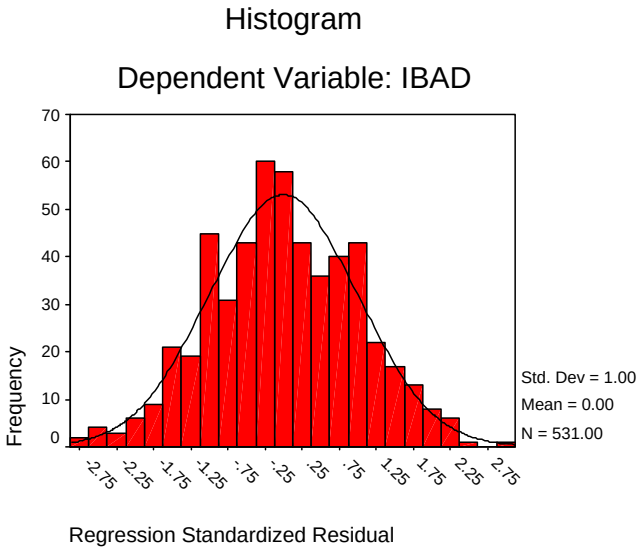


Fig A2.13: Results of Test for normality assumptions

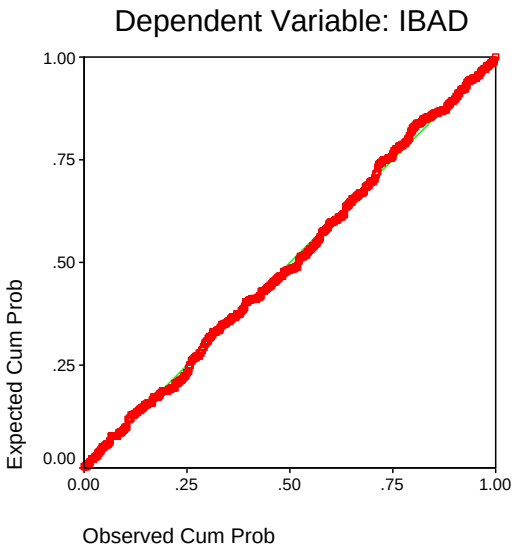


Fig A.2.14: Normal P-P Plot of Regression Standardised Residual

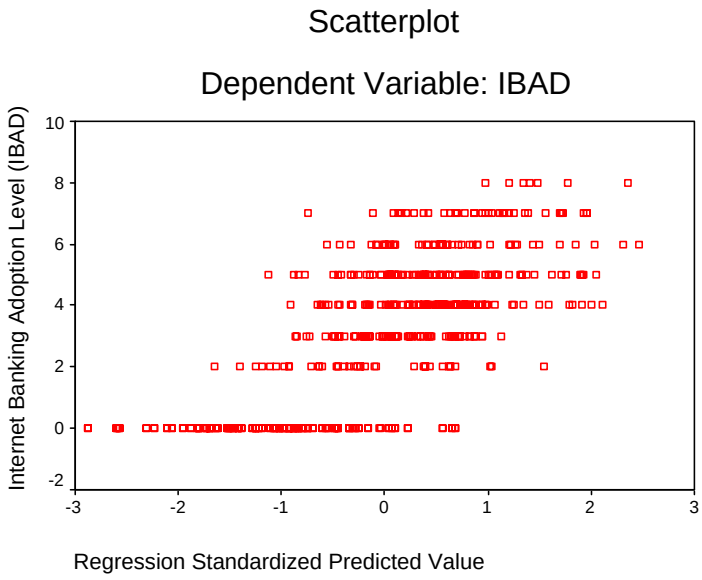


Fig A2.15: Results of test of linearity and homoscedesticity assumptions

A2.5: Additional Results of Logistics Regression for determining Predictors of internet banking use

```
      Total number of cases:      553 (Unweighted)
      Number of selected cases:   553
      Number of unselected cases: 0
      Number of selected cases:                 553
      Number rejected because of missing data:  3
      Number of cases included in the analysis: 550


Dependent Variable Encoding:

Original       Internal
Value          Value
       0       0
       1       1


Dependent Variable..   IBUSER     IBUSE

Beginning Block Number  0.  Initial Log Likelihood Function

-2 Log Likelihood   686.50783

* Constant is included in the model.


Beginning Block Number  1.  Method: Enter

Variable(s) Entered on Step Number
1..        SEX       Sex
           AGE       Age
           OCC       Occupation
           ANINCOM   Annual Income
           COMPHRS   Computer Hours
           NETBROF   Internet Browse frequency
           NETBRHR   Internet Browse hours
           SELFEF
           RELATAD
           PERSOCO
           INNOV
           RISK

Estimation terminated at iteration number 5 because
Log Likelihood decreased by less than .01 percent.

 -2 Log Likelihood      319.866
 Goodness of Fit        435.251
```

Cox & Snell - R^2	.487
Nagelkerke - R^2	.682

	Chi-Square	df	Significance
Model	366.642	12	.0000
Block	366.642	12	.0000
Step	366.642	12	.0000

---------- Hosmer and Lemeshow Goodness-of-Fit Test----------

	Chi-Square	df	Significance
Goodness-of-fit test	8.6315	8	.3743

A2.6: Results of test for normality of satisfaction and service quality perceptions of ATM, internet banking and tele banking

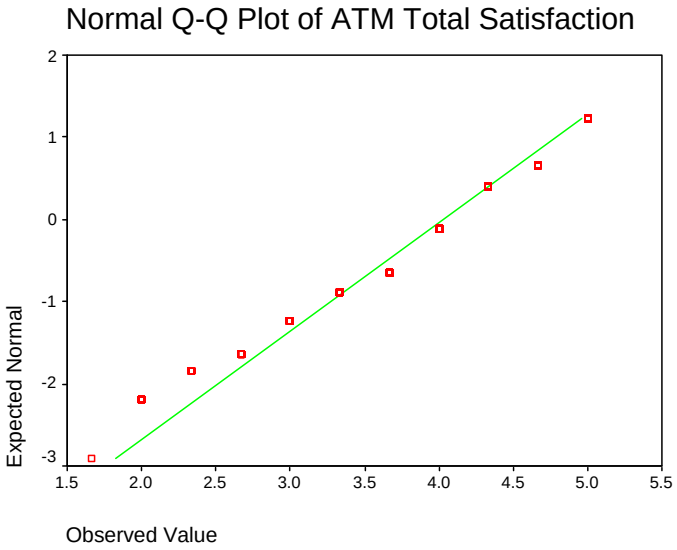


Fig A2.16: Result of Test of Normality for ATM Satisfaction

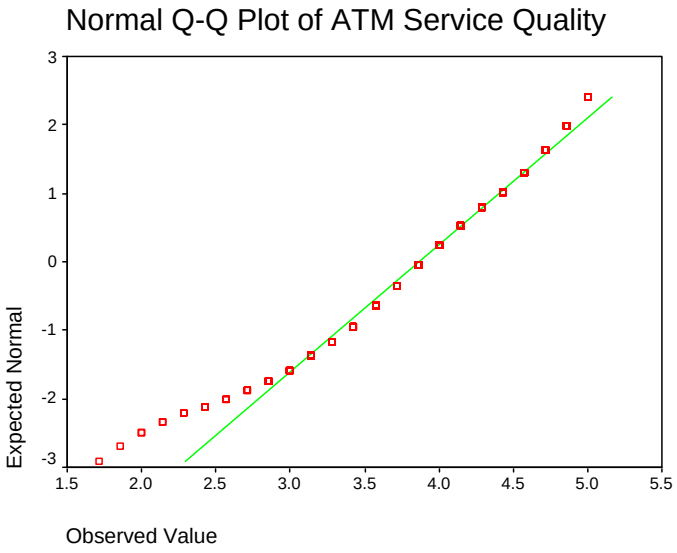


Fig A2.17: Result of Test of Normality for ATM Service Quality

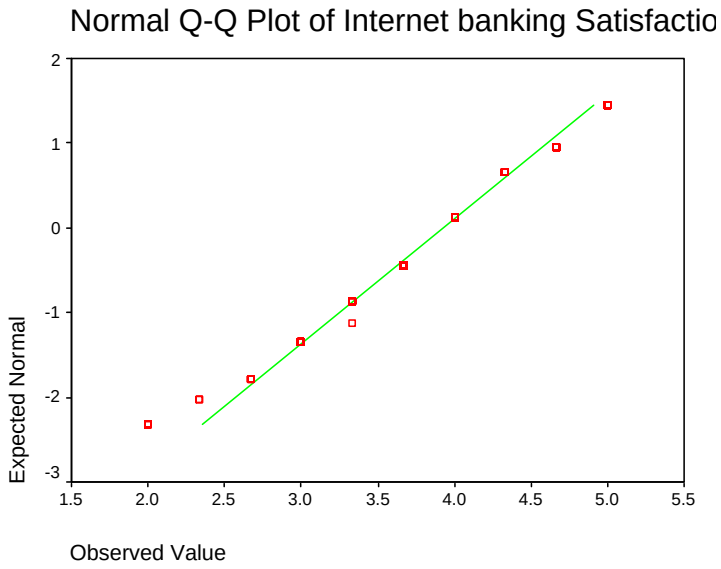


Fig A 2.18: Result of Test of Normality for Internet Banking Satisfaction

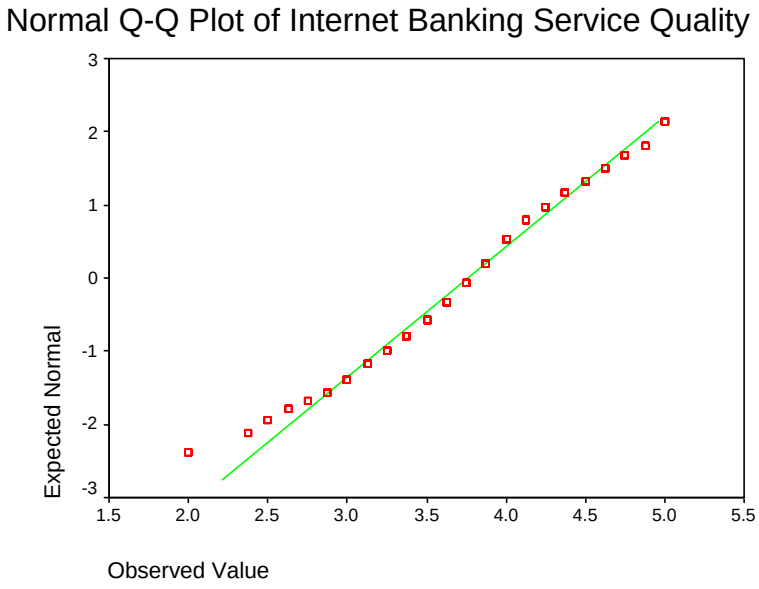


Fig A2.19: Result of Test of Normality for Internet Banking Service Quality

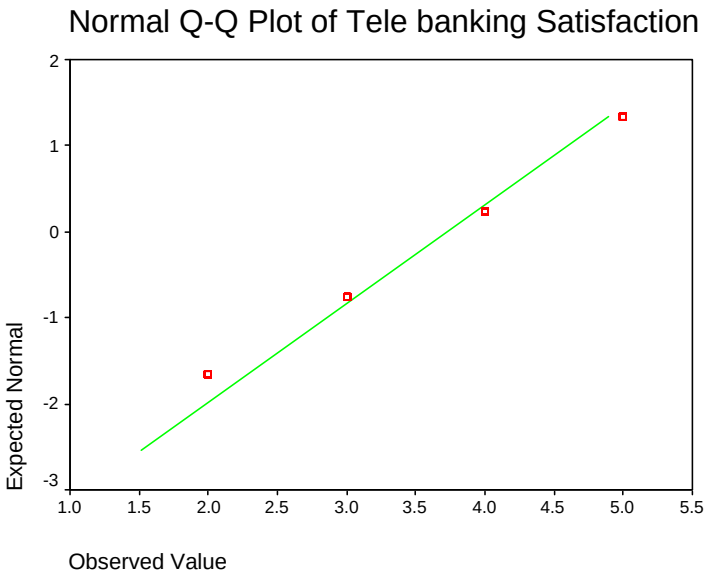


Fig A2.20: Result of Test of Normality for Tele banking Satisfaction

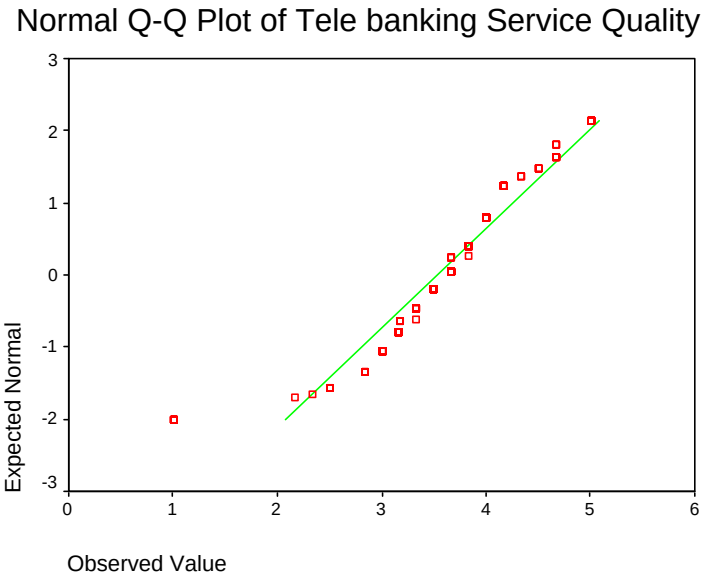
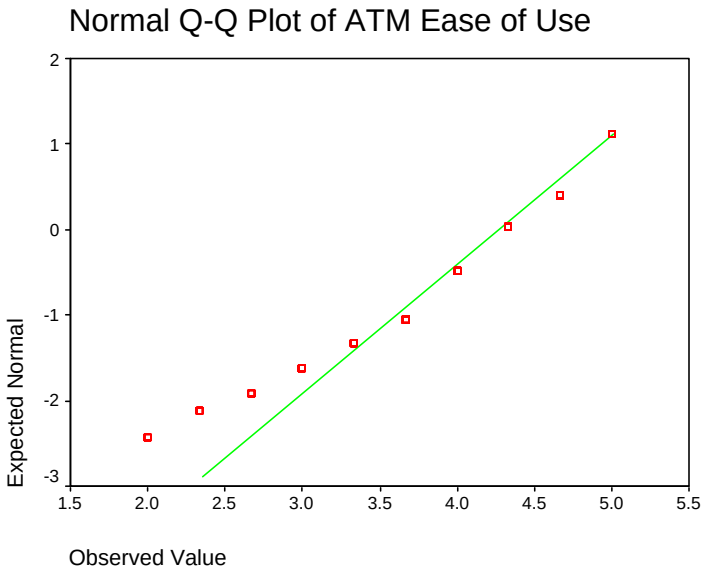


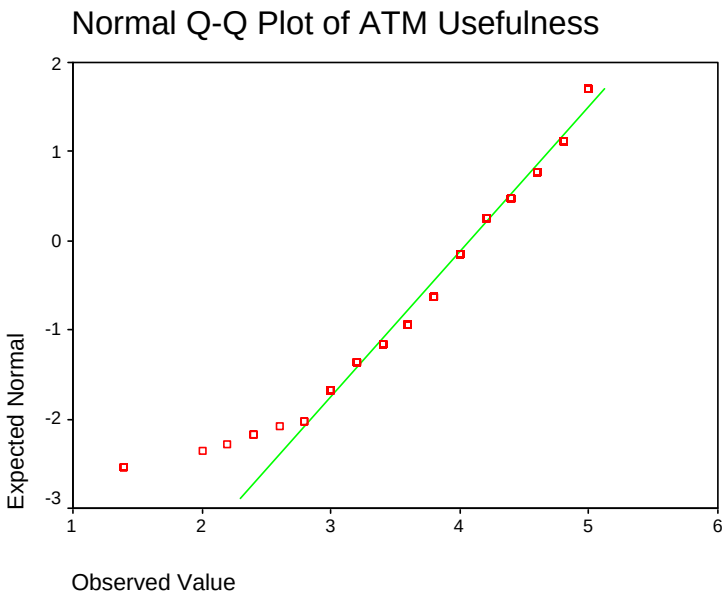
Fig A2.21: Result of Test of Normality for Tele banking Service Quality

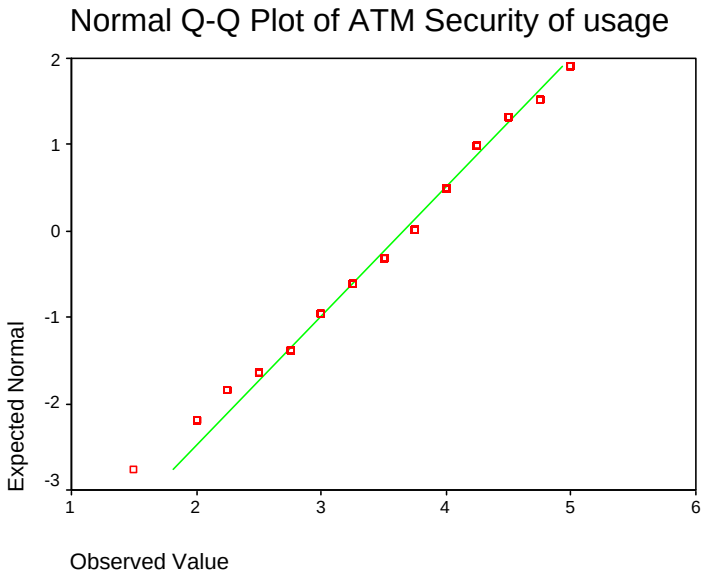
A2.7: Variables of Beliefs, Attitude and Intention models of ATMs and internet banking- descriptive statistics and results of tests for normality

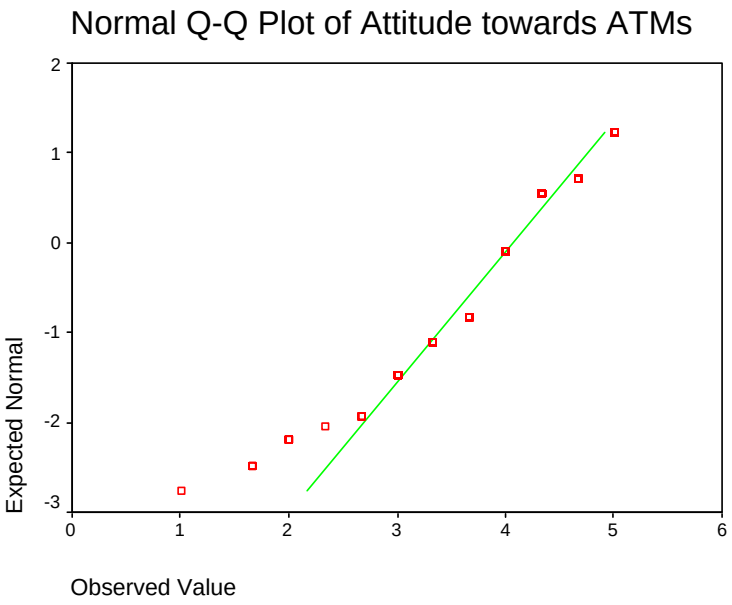
Table A2.15: Descriptive Statistics of antecedent beliefs, attitude towards ATM and intention to use ATMs

	N	Minimum	Maximum	Mean	Std. Deviation
ATM Ease of Use	553	2	5	4.27	.66
ATM Usefulness	553	1	5	4.07	.61
ATM Security of usage	553	2	5	3.66	.67
ATM Attitude	553	1	5	4.06	.68
ATM Intention to Use	553	2	5	4.08	.71
Valid N (listwise)	553				




Normal Q-Q Plot of ATM Usefulness
Expected Normal
Observed Value
2
1
0
-1
-2
-3
1
2
3
4
5
6


Normal Q-Q Plot of ATM Security of usage
Expected Normal
Observed Value
2
1
0
-1
-2
-3
1
2
3
4
5
6



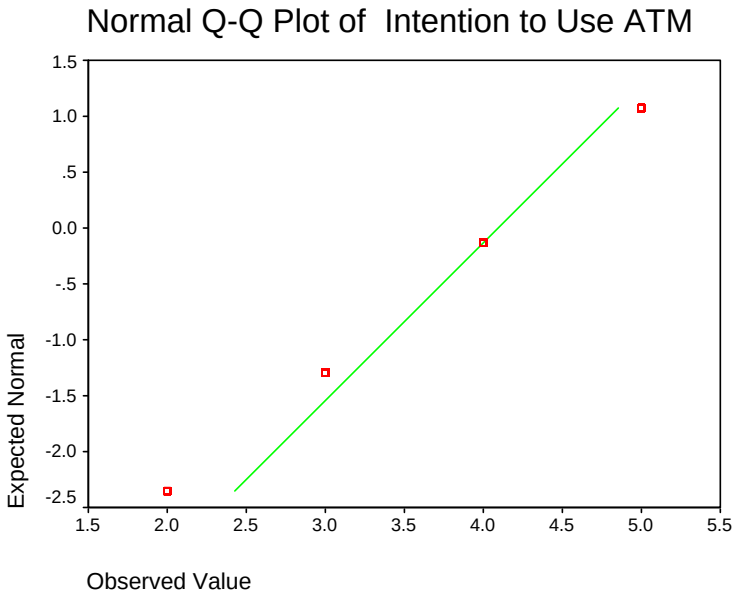
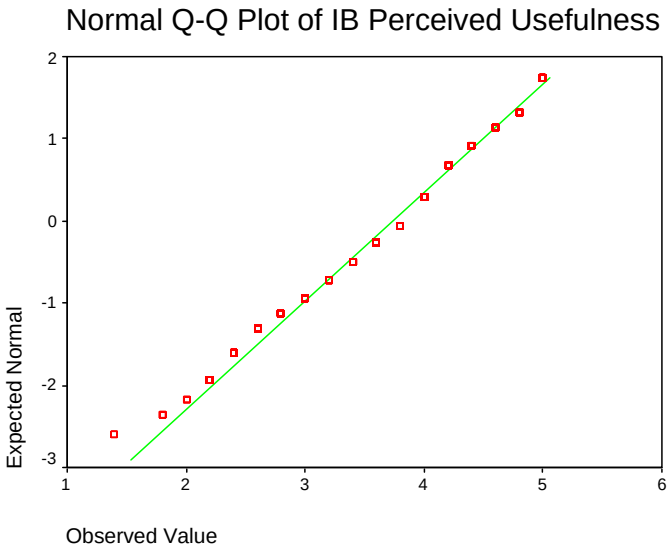


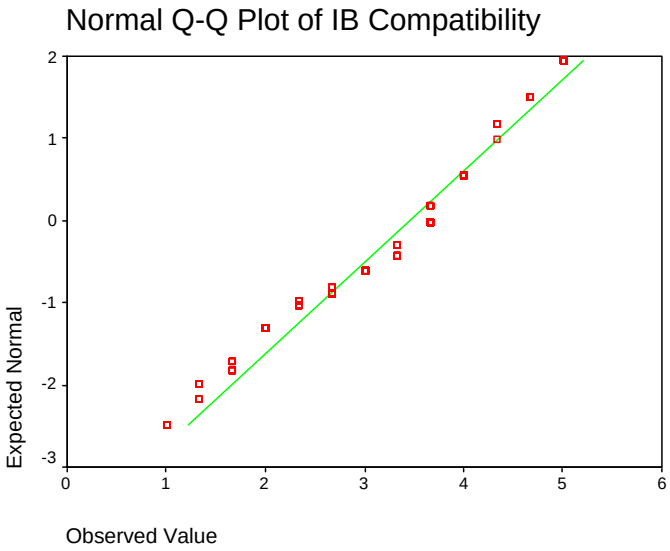
Fig A2.22 to 2.26: Results of test for normality for antecedent beliefs, attitude towards ATMs and intention to use ATMs

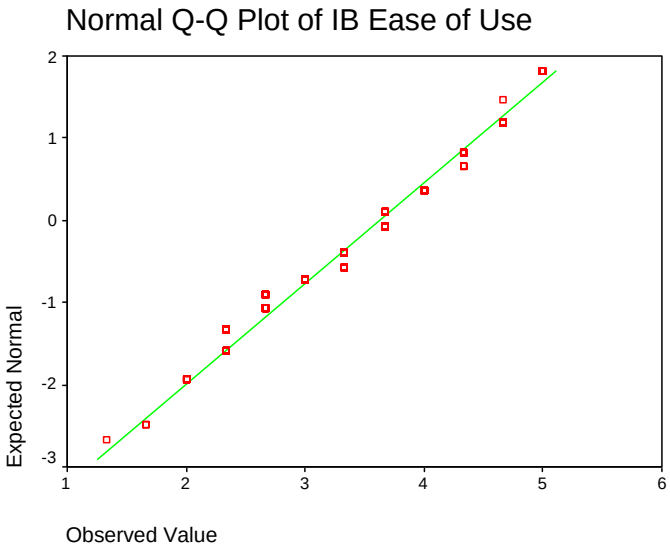
Table A2.16: Descriptive Statistics of antecedent beliefs, attitude towards internet banking and intention to use internet banking

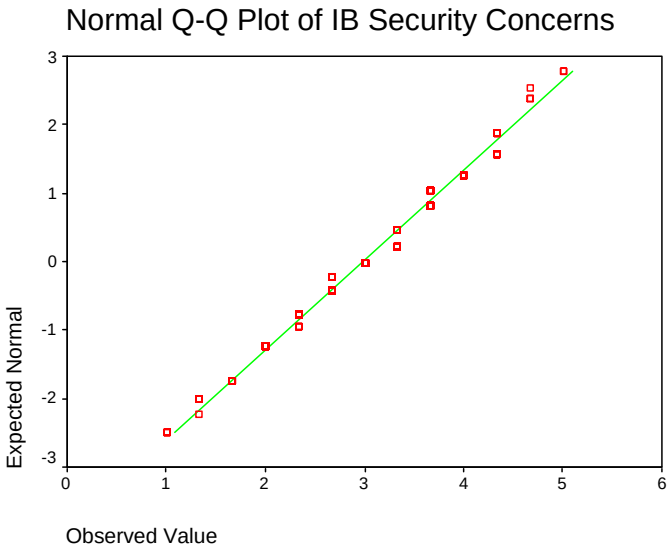
	N	Minimum	Maximum	Mean	Std. Deviation
IB Perceived Usefulness	537	1.20	5.00	3.7311	.7552
IB Compatibility	537	1.00	5.00	3.4525	.8988
IB Ease of Use	537	1.33	5.00	3.6325	.8183
IB Security Concerns	537	1.00	5.00	2.9850	.7649
IB Attitude	537	1.00	5.00	3.6512	.7899
IB Intention to Use	537	1	5	3.19	1.10
Valid N (listwise)	537				

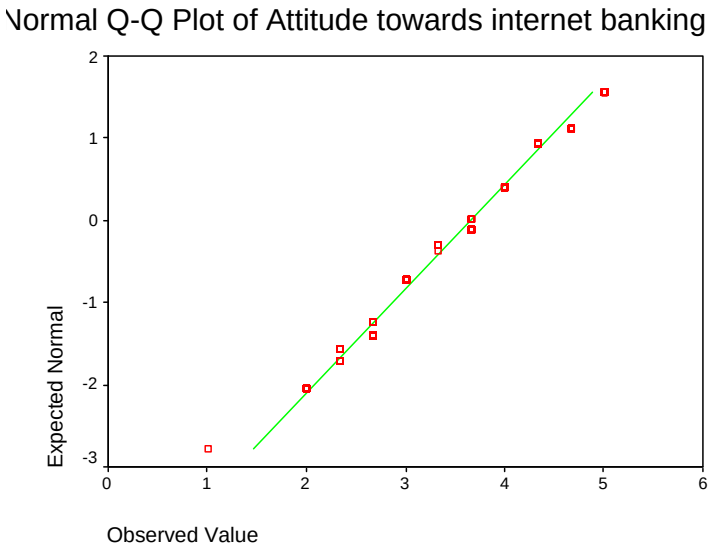
Responses with missing values are excluded.




Normal Q-Q Plot of IB Compatibility
Expected Normal
Observed Value
2
1
0
-1
-2
-3
0
1
2
3
4
5
6


Normal Q-Q Plot of IB Ease of Use
Expected Normal
Observed Value
2
1
0
-1
-2
-3
1
2
3
4
5
6


Normal Q-Q Plot of IB Security Concerns
Expected Normal
Observed Value
3
2
1
0
-1
-2
-3
0
1
2
3
4
5
6


Normal Q-Q Plot of Attitude towards internet banking
Expected Normal
Observed Value
2
1
0
-1
-2
-3
0
1
2
3
4
5
6

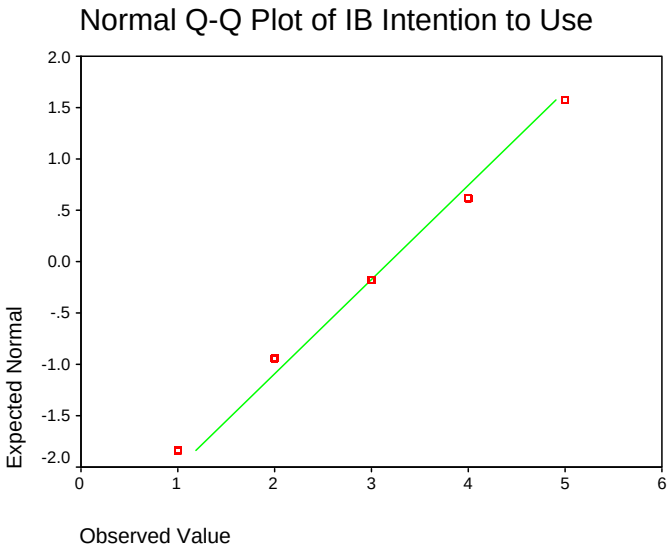


Fig A2.27 to 2.32: Results of test for normality for antecedent beliefs, attitude towards internet banking and intention to use internet banking

A 2.8: Additional Results of Factor Analysis of ATM Beliefs, Attitude and Intention model

Table A2.17: KMO and Bartlett's Test of Sphericity Results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.893
Bartlett's Test of Sphericity	Approx. Chi-Square	2782.404
	df	55
	Sig.	.000

Table A2.18: Total Variance Explained for variable of ATM Beliefs, Attitude and Intentions model

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.184	47.127	47.127	5.184	47.127	47.127
2	1.299	11.810	58.937	1.299	11.810	58.937
3	1.001	9.105	68.041	1.001	9.105	68.041
4	.680	6.185	74.227			
5	.553	5.031	79.258			
6	.528	4.799	84.057			
7	.441	4.014	88.070			
8	.399	3.623	91.694			
9	.394	3.585	95.279			
10	.286	2.601	97.880			
11	.233	2.120	100.000			

Extraction Method: Principal Component Analysis.

Table A2.19: Communalities for ATM Beliefs, Attitude and Intentions model

	Initial	Extraction
ATM Learning	1.000	.817
ATM Skill	1.000	.700
ATM Difficult to Use	1.000	.691
ATM Improves Banking	1.000	.668
ATM Functions	1.000	.661
ATM Easy to Operate	1.000	.708
ATM Convenient	1.000	.782
ATM Business Correctly	1.000	.523
ATM Secure to use	1.000	.569
ATM Safe Location	1.000	.619
ATM Card Stuck	1.000	.747

Extraction Method: Principal Component Analysis.

A 2.9: Additional Results of Factor Analysis of Internet Banking Beliefs, Attitude and Intentions model

Table A2.20: KMO and Bartlett's Test of Sphericity Results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.916
Bartlett's Test of Sphericity	Approx. Chi-Square	4568.540
	df	91
	Sig.	.000

Table A2.21: Total Variance Explained for variable of Internet Banking Beliefs, Attitude and Intentions model

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.901	49.293	49.293	6.901	49.293	49.293
2	1.478	10.558	59.851	1.478	10.558	59.851
3	1.157	8.267	68.119	1.157	8.267	68.119
4	.764	5.455	73.573			
5	.628	4.483	78.056			
6	.545	3.896	81.952			
7	.508	3.627	85.580			
8	.474	3.385	88.965			
9	.391	2.791	91.756			
10	.281	2.008	93.763			
11	.253	1.806	95.570			
12	.238	1.698	97.268			
13	.200	1.429	98.697			
14	.182	1.303	100.000			

Extraction Method: Principal Component Analysis.

Table A2.22: Communalities for Internet banking Beliefs, Attitude and Intentions model of Internet banking

	Initial	Extraction
IB Transactions Easier	1.000	.537
IB Manage Finances Effectively	1.000	.717
IB Useful for Managing Finance	1.000	.729
IB Saves Time	1.000	.597
IB Convenient to Manage Finances	1.000	.710
IB Compatible with Lifestyle	1.000	.719
IB Fits to Manage Finances	1.000	.715
IB Fits with Work style	1.000	.723
IB Easy to Skillful	1.000	.766
IB Mental Effort	1.000	.816
IB Difficult to Use	1.000	.610
IB Known to Others	1.000	.575
IB Concerned about Security	1.000	.697
IB Don't Trust	1.000	.627

Extraction Method: Principal Component Analysis.

A 2.10: Additional Results of the measurement model for ATM beliefs, attitude and intentions model using confirmatory factor analysis (CFA)

Computation of degrees of freedom (Default model)

Number of distinct sample moments:	105
Number of distinct parameters to be estimated:	34
Degrees of freedom (105 - 34):	71

Result (Default model)

Minimum was achieved

Chi-square = 242.420

Degrees of freedom = 71

Probability level = .000

Table A2.23: Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
Easuse3	<---	Ease of Use	1.000				
Easuse2	<---	Ease of Use	.994	.061	16.298	***	par_1
Easuse1	<---	Ease of Use	1.273	.070	18.258	***	par_2
Useful5	<---	Usefulness	1.000				
Useful4	<---	Usefulness	1.610	.124	12.941	***	par_3
Useful3	<---	Usefulness	1.497	.119	12.588	***	par_4
Useful2	<---	Usefulness	1.396	.114	12.293	***	par_5
Useful1	<---	Usefulness	1.401	.115	12.182	***	par_6
Secure3	<---	Security of_ Usage	1.000				
Secure2	<---	Security of_ Usage	.892	.078	11.478	***	par_7
Secure1	<---	Security of_ Usage	.989	.084	11.729	***	par_8
Atmatt3	<---	Attitude towards ATM	1.000				
Atmatt2	<---	Attitude towards ATM	.948	.037	25.847	***	par_9
Atmatt1	<---	Attitude towards ATM	.866	.036	24.197	***	par_10

Table A2.24: Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
Easuse3	<---	Ease of Use	.698
Easuse2	<---	Ease of Use	.776
Easuse1	<---	Ease of Use	.909
Useful5	<---	Usefulness	.535
Useful4	<---	Usefulness	.837
Useful3	<---	Usefulness	.817
Useful2	<---	Usefulness	.760
Useful1	<---	Usefulness	.756
Secure3	<---	Security of_ Usage	.632
Secure2	<---	Security of_ Usage	.641
Secure1	<---	Security of_ Usage	.725
Atmatt3	<---	Attitude towards ATM	.893
Atmatt2	<---	Attitude towards ATM	.862
Atmatt1	<---	Attitude towards ATM	.819

A 2.11: Additional Results of SEM results of the beliefs, attitude and intention model of ATMs

Computation of degrees of freedom (Default model)

Number of distinct sample moments:	152
Number of distinct parameters to be estimated:	54
Degrees of freedom (152 - 54):	98

Result (Default model)

Minimum was achieved
Chi-square = 309.101
Degrees of freedom = 98
Probability level = .000

Table A2.25: Regression Weights: (Group number 1 - Default model)

			Estimate	**S.E.**	**C.R.**	**P**	**Label**
Attitude_towards ATM	<---	Usefulness	.727	.144	5.060	***	par_12
Attitude_towards ATM	<---	Security of_ Usage	.337	.086	3.902	***	par_13
Attitude towards ATM	<---	Ease of Use	-.088	.076	-1.168	.243	par_18
Intention to_ Use ATM	<---	Attitude_towards ATM	.669	.040	16.845	***	par_17
Usage of ATM	<---	Intention to_ Use ATM	4.630	1.264	3.662	***	par_16
Easuse3	<---	Ease of Use	1.000				
Easuse2	<---	Ease of Use	.994	.060	16.532	***	par_1
Easuse1	<---	Ease of Use	1.274	.071	17.819	***	par_2
Useful5	<---	Usefulness	1.000				
Useful4	<---	Usefulness	1.609	.125	12.900	***	par_3
Useful3	<---	Usefulness	1.495	.117	12.755	***	par_4
Useful2	<---	Usefulness	1.396	.113	12.318	***	par_5
Useful1	<---	Usefulness	1.401	.114	12.282	***	par_6
Secure3	<---	Security of_ Usage	1.007	.084	12.035	***	par_7
Secure2	<---	Security of_ Usage	.898	.074	12.166	***	par_8
Secure1	<---	Security of_ sage	1.000				
Atmatt3	<---	Attitude_towards ATM	1.000				
Atmatt2	<---	Attitude_towards ATM	.962	.037	26.232	***	par_9
Atmatt1	<---	Attitude_towards ATM	.881	.036	24.341	***	par_10
likely to use ATMs	<---	Inention to_ Use ATM	1.000				
ATM use percentage	<---	Usage of ATM	1.000				

Table A2.26: Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
Attitude_towards ATM	<---	Usefulness	.430
Attitude_towards ATM	<---	Security of_ Usage	.295
Attitude_towards ATM	<---	Ease of Use	-.071
Intention to_ Use ATM	<---	Attitude_towards ATM	.644
Usage of ATM	<---	Intention to_ Use ATM	.157
Easuse3	<---	Ease of Use	.698
Easuse2	<---	Ease of Use	.776
Easuse1	<---	Ease of Use	.909
Useful5	<---	Usefulness	.536
Useful4	<---	Usefulness	.837
Useful3	<---	Usefulness	.816
Useful2	<---	Usefulness	.761
Useful1	<---	Usefulness	.756
Secure3	<---	Security of_ Usage	.631
Secure2	<---	Security of_ Usage	.640
Secure1	<---	Security of_ Usage	.727
Atmatt3	<---	Attitude_towards ATM	.883
Atmatt2	<---	Attitude_towards ATM	.865
Atmatt1	<---	Attitude_towards ATM	.824
likely to use ATMs	<---	Intention to_ Use ATM	1.000
ATM use percentage	<---	Usage of ATM	1.000

A 2.12: Additional Results of the measurement model for Internet banking beliefs, attitude and intentions model using confirmatory factor analysis (CFA)

Computation of degrees of freedom (Default model)

Number of distinct sample moments:	170
Number of distinct parameters to be estimated:	61
Degrees of freedom (170 - 61):	109

Result (Default model)

Minimum was achieved

Chi-square = 399.823

Degrees of freedom = 109

Probability level = .000

Table A2.27: Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P
IB Useful4	<---	IB_ Usefulness	1.000			
IB Useful3	<---	IB_ Usefulness	1.551	.084	18.524	***
IB Useful2	<---	IB_ Usefulness	1.533	.083	18.416	***
IB Useful1	<---	IB_ Usefulness	1.123	.073	15.353	***
IB Compat3	<---	IB_Compatibility	1.000			
IB Compat2	<---	IB_Compatibility	1.027	.040	25.451	***
IB Compat1	<---	IB_Compatibility	.990	.041	24.308	***
IB Easuse3	<---	IB_Ease_of Use	1.000			
IB Easuse2	<---	IB_Ease_of Use	1.180	.081	14.651	***
IB Easuse1	<---	IB_Ease_of Use	1.167	.076	15.452	***
IB Secure3	<---	IB_Security_Concerns	1.000			
IB Secure2	<---	IB_Security_Concerns	.835	.079	10.541	***
IB Secure1	<---	IB_Security_Concerns	.652	.068	9.595	***
IBatti3	<---	Attitude_ towards_ IB	1.000			
IBatti2	<---	Attitude_ towards_ IB	1.095	.033	33.167	***
IBatti1	<---	Attitude_ towards_ IB	.974	.034	29.044	***
IB Useful5	<---	IB_ Usefulness	1.508	.084	17.873	***

Table A2.28: Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
IB Useful4	<---	IB_ Usefulness	.682
IB Useful3	<---	IB_ Usefulness	.883
IB Useful2	<---	IB_ Usefulness	.877
IB Useful1	<---	IB_ Usefulness	.715
IB Compat3	<---	IB_Compatibility	.861
IB Compat2	<---	IB_Compatibility	.868
IB Compat1	<---	IB_Compatibility	.843
IB Easuse3	<---	IB_Ease_of Use	.637
IB Easuse2	<---	IB_Ease_of Use	.784
IB Easuse1	<---	IB_Ease_of Use	.890
IB Secure3	<---	IB_Security_Concerns	.794
IB Secure2	<---	IB_Security_Concerns	.603
IB Secure1	<---	IB_Security_Concerns	.523
IBatti3	<---	Attitude_ towards_ IB	.893
IBatti2	<---	Attitude_ towards_ IB	.934
IBatti1	<---	Attitude_ towards_ IB	.873
IB Useful5	<---	IB_ Usefulness	.847

A 2.13: Additional Results of SEM results of the beliefs, attitude and intention model of Internet banking

Computation of degrees of freedom (Default model)

Number of distinct sample moments:	209
Number of distinct parameters to be estimated:	67
Degrees of freedom (209 - 67):	142

Result (Default model)

Minimum was achieved
Chi-square = 578.422
Degrees of freedom = 142
Probability level = .000

Table A2.29: Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P
Attitude_ towards_ IB	<---	IB_ Usefulness	.674	.122	5.531	***
Attitude_ towards_ IB	<---	IB_Compatibility	.148	.063	2.335	.020
Attitude_ towards_ IB	<---	IB_Ease_of Use	.063	.063	1.012	.311
Attitude_ towards_ IB	<---	IB_Security_Concerns	-.181	.045	-4.018	***
Intention_ to use IB	<---	Attitude_ towards_ IB	1.005	.053	18.879	***
IB Usage_ Percentage	<---	Intention_ to use IB	8.499	.510	16.658	***
IB Useful4	<---	IB_ Usefulness	1.000			
IB Useful3	<---	IB_ Usefulness	1.552	.085	18.218	***
IB Useful2	<---	IB_ Usefulness	1.535	.085	18.149	***
IB Useful1	<---	IB_ Usefulness	1.123	.073	15.353	***
IB Compat3	<---	IB_Compatibility	1.000			
IB Compat1	<---	IB_Compatibility	.989	.041	24.310	***
IB Easuse3	<---	IB_Ease_of Use	1.000			
IB Easuse2	<---	IB_Ease_of Use	1.179	.080	14.799	***
IB Easuse2	<---	IB_Ease_of Use	1.165	.081	14.407	***
IB Secure3	<---	IB_Security_Concerns	1.000			
IB Secure2	<---	IB_Security_Concerns	.826	.083	9.961	***
IB Secure1	<---	IB_Security_Concerns	.643	.075	8.633	***
IBatt2	<---	Attitude_ towards_ IB	1.086	.033	33.370	***
IB Useful5	<---	IB_ Usefulness	1.509	.085	17.838	***
Likely to use IB	<---	Intention_ to use IB	1.000			
IB Compat2	<---	IB_Compatibility	1.026	.041	25.286	***
IBatt1	<---	Attitude_ towards_ IB	.967	.033	28.948	***
IBatt3	<---	Attitude_ towards_ IB	1.000			
IB use percent	<---	IB Usage_ Percentage	1.000			

Table A2.30: Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
Attitude_ towards_ IB	<---	IB_ Usefulness	.484
Attitude_ towards_ IB	<---	IB_Compatibility	.167
Attitude_ towards_ IB	<---	IB_Ease_of Use	.056
Attitude_ towards_ IB	<---	IB_Security_Concerns	-.184
Intention_ to use IB	<---	Attitude_ towards_ IB	.683
IB Usage_ Percentage	<---	Intention_ to use IB	.581
IB Useful4	<---	IB_ Usefulness	.681
IB Useful3	<---	IB_ Usefulness	.883
IB Useful2	<---	IB_ Usefulness	.877
IB Useful1	<---	IB_ Usefulness	.715
IB Compat3	<---	IB_Compatibility	.861
IB Compat1	<---	IB_Compatibility	.842
IB Easuse3	<---	IB_Ease_of Use	.638
IB Easuse2	<---	IB_Ease_of Use	.784
IB Easuse2	<---	IB_Ease_of Use	.889
IB Secure3	<---	IB_Security_Concerns	.799
IB Secure2	<---	IB_Security_Concerns	.599
IB Secure1	<---	IB_Security_Concerns	.519
IBatt2	<---	Attitude_ towards_ IB	.929
IB Useful5	<---	IB_ Usefulness	.847
Likely to use IB	<---	Intention_ to use IB	1.000
IB Compat2	<---	IB_Compatibility	.868
IBatt1	<---	Attitude_ towards_ IB	.869
IBatt3	<---	Attitude_ towards_ IB	.895
IB use percent	<---	IB Usage_ Percentage	1.000

Appendix 3

RBI Definitions

A3. 1 Banked Centre classifications by RBI

Population Group Classification of centres is based on 1991 population census data obtained from the Office of the Registrar General and Census Commissioner, Government of India. Population groups of the banked centres are based on the 1991 census.

Banked Centre is a centre in which atleast one office of any commercial/ co-operative bank is functioning.

Unbanked Centre is a centre in which no office of any commercial/co-operative bank is functioning.

The population groups are defined as under:

a. **'Rural'** group includes all centres with population of less than 10,000.
b. **'Semi-urban'** group includes centres with population of 10,000 and above but less than 1 lakh.
c. **'Urban'** group includes centres with population of 1 lakh and above but less than 10 lakh.
d. **'Metropolitan'** group includes centres with population of 10 lakh and more.

A3. 2 Classifications of Banks by RBI

Commercial Banks refer to both scheduled and non-scheduled commercial banks which are regulated by Banking Regulation Act, 1949.

a. Scheduled Commercial Banks are grouped under following categories:

1. State Bank of India and its Associates
2. Nationalised Banks
3. Foreign Banks
4. Regional Rural Banks
5. Other Scheduled Commercial Banks.

b. Non-Scheduled Commercial Banks (including local area banks)

Note: Banks in the groups (1) & (2) above are known as **public sector banks**, whereas, other scheduled commercial banks mentioned at group (5) above are known as private sector banks.

Lead Bank: Under Lead Bank Scheme formulated in 1969, every public sector bank and Jammu & Kashmir Bank Ltd., is allotted a district in which it functions as a lead bank of the district. In that role, the bank assists in the overall development of that particular area by collecting certain data and formulating district credit plan, etc.

Source: *Branch Banking Statistics, Volume 3 March 2002, Released by Reserve Bank of India on March 2003, Available at www.rbi.org.in*

Appendix 4

PUBLICATIONS ARISING FROM THE THESIS

Referenced Journal Articles and Edited Book Contributions

1. Joshua A J and Moli P Koshy (2009), "Attitudes and Behavioural Intentions Towards a Technology Based Self-Service Banking Delivery Channel: The Case of ATMs", Erudition, *The Albertian Journal of Management*, Vol. 3, Issue 1, pp 81-94
2. Joshua A J and Moli P Koshy (2008), "Technology based service delivery : the case of banking sector services", in I C Gupta and AnuKool M Hyde (Eds), *Navigating Glocalisation through Quality Initiatives*, Excel Books , New Delhi, pp 69-82
3. Joshua A J and Moli P Koshy (2005) "Expectations and Perceptions of Service Quality in Old and New Generation Banks : a Study of Select Banks in the South Canara region" *The Indian Journal of Marketing*, Vol.35, No. 9, pp 6-11

Referenced Conference publications

1. Joshua A J and Moli P Koshy (2009), "Technology-Enabled Differentiation in Banking Services Delivery: Strategic Initiatives and Best Practices", Proceedings, National Seminar on Strategic Marketing for the Emerging Environment, February 20-21, Organised by School of Management Studies, Cochin University of Science and Technology, pp 152-165
2. Joshua A J and Moli P Koshy (2009), "Provisioning of Services Using Technology: The Customer Acceptance of Technology Based Service Delivery in the Banking Sector", Simon George (Ed.), Research Compendium on Services Management, PROCESS and TECHNOLOGY: Key Drivers of Customer focused Services Management, (conference proccedings of International Conference on Services Management organised by TAPMI, Manipal February 15-16, 2008), pp 90-105