INTERNET BANKING AND CUSTOMER ACCEPTANCE: THE INDIAN SCENARIO

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DOCTOR OF PHILOSOPHY

Under the Faculty of Social Sciences

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CERTIFICATE

Certified that the thesis **"Internet Banking and Customer Acceptance: The Indian Scenario"** is the record of bonafide research work carried out by Mr. Sudeep S under my supervision. The thesis is worth submitting for the degree of Doctor of Philosophy in Management under the Faculty of Social Sciences.

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DECLARATION

I declare that the thesis titled **"Internet Banking and Customer Acceptance: The Indian Scenario"**, is the record of bonafide research work carried out by me under the supervision of Prof. (Dr.) K. C. Sankaranarayanan , Former Head, Dept. of Applied Economic & Former Dean, Faculty of Social Science, Cochin University of Science and Technology, Kochi-22, submitted for the partial fulfillment of the requirement for the degree of Doctor of Philosophy. I further declare that this thesis has not previously formed the basis for the award of any Degree, Diploma, Associateship, Fellowship or other similar title of recognition.

17-07-2008   Sudeep S
Kochi

ACKNOWLEDGMENTS

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CHAPTER 1

INTRODUCTION

1.1 Background

August 15th 1995 marked a new dawn in India's communications history, when Videsh Sanchar Nigham Ltd (VSNL) then a state owned Telecom Company introduced commercial Internet services. Till then Internet connectivity was available to only select few researchers and government officials through the ERNET or NICNET networks. VSNL launched its "Gateway Internet Access Services" (GIAS) to Indian public in the form of shell and TCP/IP dial-up connections with a modest estimate of 20,000 connections in the first year of operations(Ghosh, 1995).

By mid nineties Indian government allowed private companies to enter the protected Telecom industry and issued licenses for offering a broad spectrum of telecom services which included Basic telephony services, Wire-less telephony (GSM/CDMA) services and Internet services. Seeing the immense potential that existed in the industry space many new players entered into the foray of offering telecom services. The main players were still the state owned

Bharat Sanchar Nigam Ltd (BSNL) and Mahanager Nigam Ltd (MTNL), followed by Private Indian owned companies (Reliance Infocomm, Tata Teleservices) and Foreign invested companies (Hutchison-Essar, Bharti Tele-Ventures, Escotel, Idea Cellular, BPL Mobile, Spice Communications). Together with the availability of affordable quality services and a huge pool of technically qualified techno-savvy urban population, Internet users soared from few thousands in mid nineties to 37 million users in 2006 (IMRB & IMAI,2006). Figure 1.1 illustrates the growth of Internet users in India from 2000 – 2006. In Figure 1.2 Urban Internet users in India is depicted in a "funnel" like graphic.
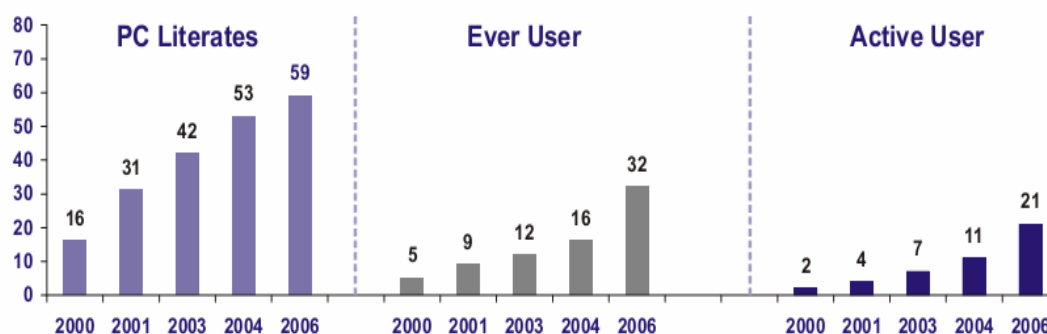
Figure 1.1: Internet users in India
(Source: I-cuber 2006 survey ((IMRB & IMAI,2006).
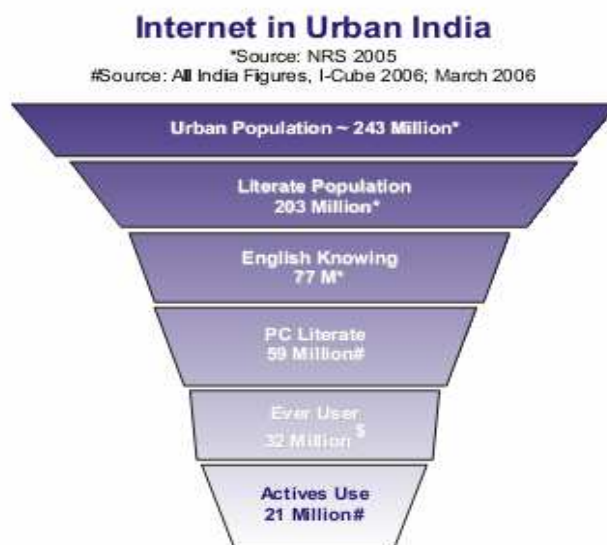
Figure 1.2: Internet in Urban India (Source: I-cuber 2006 survey ((IMRB & IMAI,2006).

Internet which is a "network of networks" evolved out of a research network developed by US military establishment in last sixties. ARPANET established in 1969 could be designated as the beginning point of the now mammoth network of computers spanning all throughout the globe. Earlier, Internet was mainly used for transmitting electronic mails or e-mail and transfer of files across servers located in different locations. But with the introduction of Hyper Text Transfer Protocol or HTTP and HTTP Server (commonly referred as WWW server) in 1990's changed the way Internet was used or could be used. The World Wide Web as the name denoted allowed creation of modern world wide network

of computers as we know today. From simple applications like e-mail and file transfer, Internet got transformed itself into a source of huge information provider which offered wide variety of content for its users. The usability of Internet also increased many fold and the user needed a software tool named 'Web browser' to access any content anywhere in the world. Internet slowly changed its role as a tool for researchers to a medium for common people to gather knowledge and even to do commercial transactions. As seen from Figure 1.3, the number of computers connected to Internet increased enormously from mid-nineties which is a result of the introduction of new user friendly technological innovation in that sphere. Commercial activities carried out using Internet included showcasing of products or services, allowing buying or selling of products/services using electronic mechanisms. As of 2007, approximately 1.1 billion people are online around the world, North America and Western Europe account for nearly half of the world Internet users (Figure 1.4). Even though Asia has half the world's population, its share in Internet users is 399m or 36% of total Internet users. The penetration of Internet is low for countries in Africa, the Middle East and Latin America mainly due to lack of access to new technologies (Figure 1.5). Table 1.1 contains global

Internet usage and population statistics for the year 2007.From Table 1.1; it could be observed that Internet users nearly doubled between 2000 and 2007, with regions like Africa, Asia, Middle East and Latin America achieving a growth rate of 638.4 %, 248.8 %, 491.4 % and 433.4 % respectively.
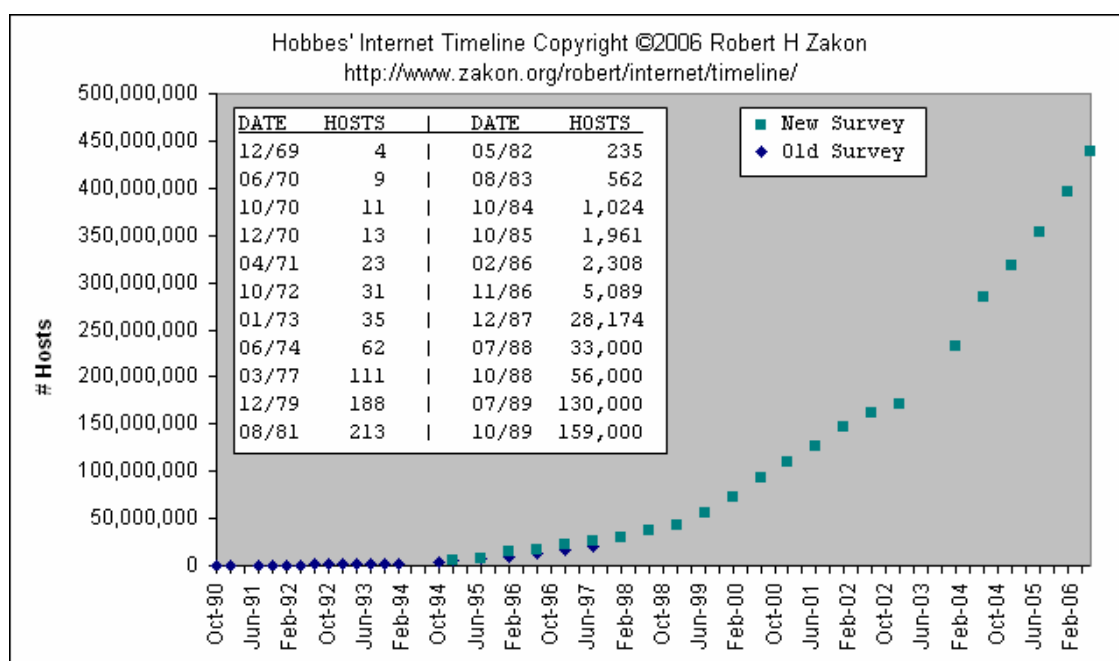
Figure 1.3: Internet Timeline 1990-006 (Scoure: Hobbe's Internet Timeline)

WORLD INTERNET USAGE AND POPULATION STATISTICS						
World Regions	**Population (2007 Est.)**	**Population % of World**	**Internet Usage, Latest Data**	**% Population (Penet-ration)**	**Usage % of World**	**Usage Growth 2000-2007**
Africa	933,448,292	14.2 %	**33,334,800**	3.6 %	3.0 %	638.4 %
Asia	3,712,527,624	56.5 %	**398,709,065**	10.7 %	35.8 %	248.8 %
Europe	809,624,686	12.3 %	**314,792,225**	38.9 %	28.3%	199.5 %
Middle East	193,452,727	2.9 %	**19,424,700**	10.0 %	1.7 %	491.4 %
North America	334,538,018	5.1 %	**233,188,086**	69.7 %	20.9%	115.7 %

Latin America/Caribbean	556,606,627	8.5 %	**96,386,009**	17.3 %	8.7 %	433.4 %
Oceania / Australia	34,468,443	0.5 %	**18,439,541**	53.5 %	1.7 %	142.0 %
WORLD TOTAL	6,574,666,417	100.0 %	**1,114,274,426**	16.9 %	100.0 %	208.7 %

NOTES: (1) Internet Usage and World Population Statistics were updated on Mar. 10, 2007. (2) CLICK on each world region for detailed regional information. (3) Demographic (Population) numbers are based on data contained in the world-gazetteer website. (4) Internet usage information comes from data published by Nielsen//NetRatings, by the International Telecommunications Union, by local NICs, and other other reliable sources. (5) For definitions, disclaimer, and navigation help, see the Site Surfing Guide. (6) Information from this site may be cited, giving due credit and establishing an active link back to www.internetworldstats.com. Copyright © 2007, Miniwatts Marketing Group. All rights reserved worldwide.

Table 1.1: World internet usage and population statistics (Source: www.internetworldstats.com)
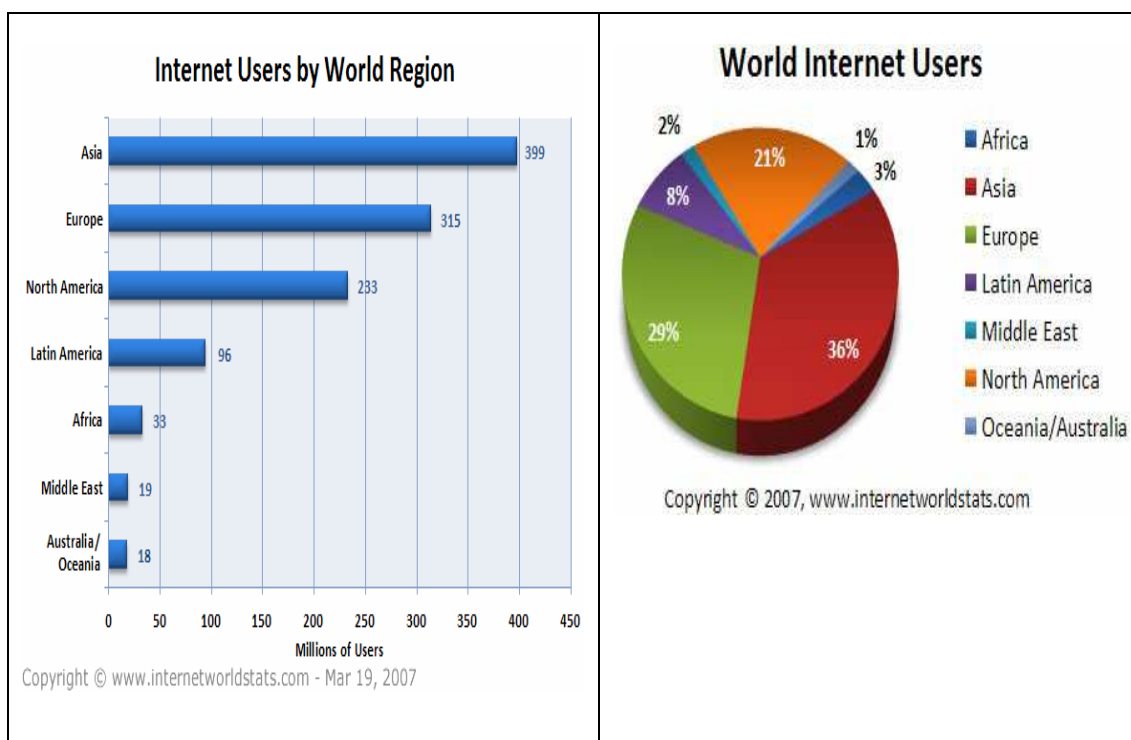
Figure 1.4: Worldwide Internet Users as of September 2007 (in m) (Source: www.internetworldstats.com)
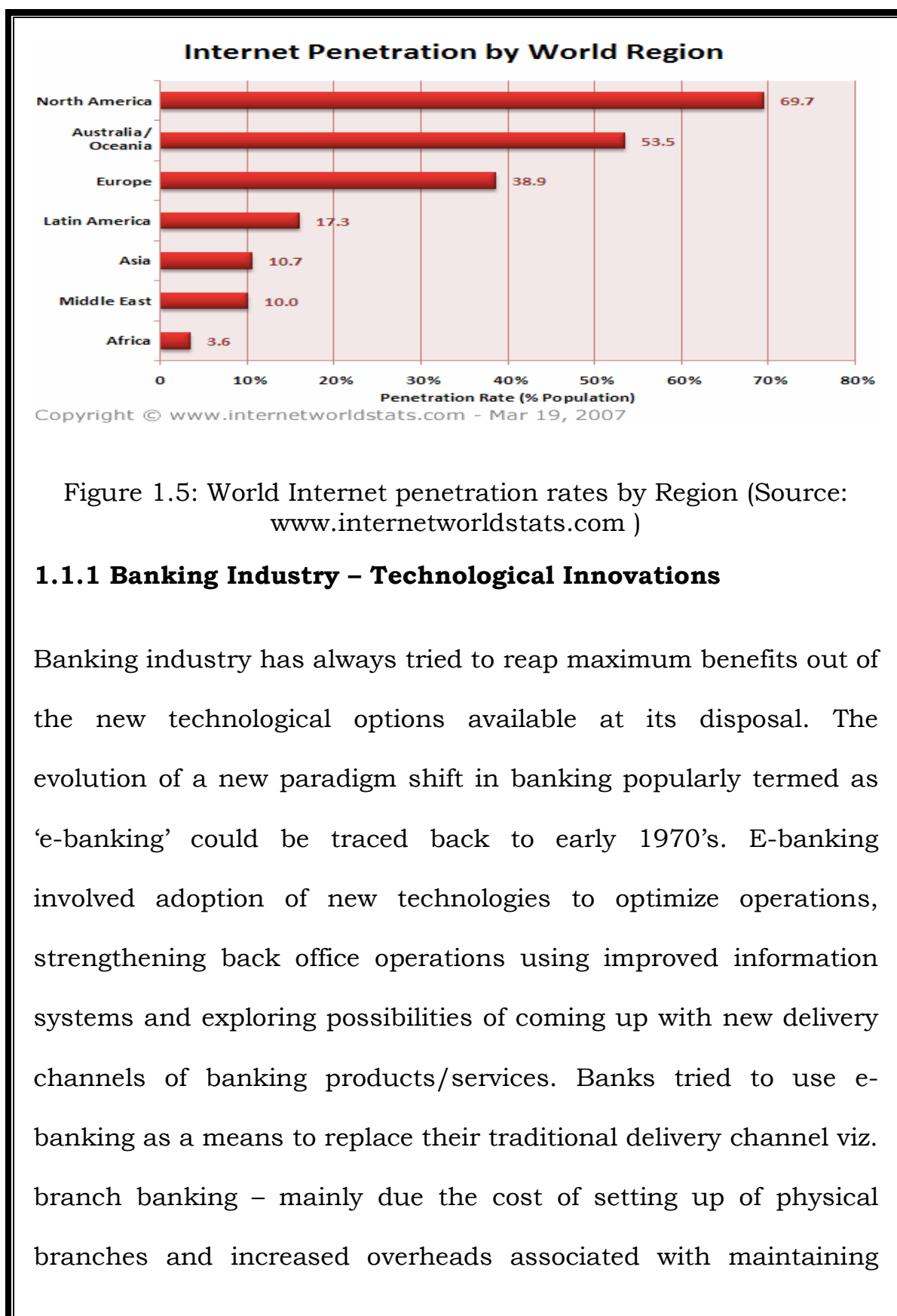
Figure 1.5: World Internet penetration rates by Region (Source: www.internetworldstats.com)

1.1.1 Banking Industry – Technological Innovations

Banking industry has always tried to reap maximum benefits out of the new technological options available at its disposal. The evolution of a new paradigm shift in banking popularly termed as 'e-banking' could be traced back to early 1970's. E-banking involved adoption of new technologies to optimize operations, strengthening back office operations using improved information systems and exploring possibilities of coming up with new delivery channels of banking products/services. Banks tried to use e-banking as a means to replace their traditional delivery channel viz. branch banking – mainly due the cost of setting up of physical branches and increased overheads associated with maintaining

them. As part of their e-banking initiatives banks offered the following new delivery channels to customers' – Automated Teller Machines (ATM)/ Cash Dispensers (CD), Phone banking, Internet Banking and Mobile banking. Banks used e-banking as mechanism to fight fierce competition that existed in the market and also to retain the customer base they had. Customers' response to e-banking was enthusiastic and followed predicted path of Technology Adoption Life Cycle models (Shreyan et al., 2002).

New delivery channels available through e-banking allowed banks to provide a wide variety of specialty services to their customers. Services available from each of new e-banking channel are briefly discussed below:

ATM: Main function of a banking institution is the safe custody of their customer's money. They allowed their customer to deposit excess cash into their account and withdrawal of the same through their branches. Bank maintained counters known as 'Teller counter' for accepting and dispensing customer cash. A main lacuna of this system is the restriction it placed on the transactions timings – banking could be done only during specific time when the bank is open. To add to this problem increasing labour costs

during the 1960's forced banks to look for alternatives which included automating their labour intensive functions. Automated Teller Machines or ATMs as they are popularly known; allowed banks to dispense cash throughout 24 hours a day. Barclays Bank was the first to envisage the potential of ATMs, and introduced the first ever ATM in 1967(Automated teller machine. (2007, May 10)). Initially, ATMs were not very sophisticated, and served only as cash dispensers and were normally attached to the branch itself. But as technology improved, banks started setting ATMs in remote places which were connected to the central hub of the bank through various communication links. To operate an ATM the customer should possess a valid ATM or Debit card issued by the bank and need to know a secret 4 digit code called PIN (Personal Identification Number) code. The latest generation ATMs allowed customers do many branch banking functionalities like cash withdrawal, cash/cheque deposit, mini statement of transactions, application of cheque books etc.

Phone Banking: Phone banking is a relatively new delivery channel in which most of the banking functions (except cash withdrawals or deposits) could be carried out by a customer using a telephone. In Phone banking the customer has to dial a phone

banking number provided by the bank, after that customer could do banking through an Interactive Voice Response System (IVRS) provided by the bank. To guarantee security, the customer has to punch in a secret code called Tele-banking PIN (TPIN). A customer could conduct the following transactions via Phone banking: account balance information and list of latest transactions, electronic bill payments, funds transfers between a customer's accounts, etc. It has been seen that customer acceptance of phone banking channel has been the lowest among the new delivery channels. The main reason of this could be difficulty in using an IVRS system and lack of options for withdrawing cash.

Mobile Banking: Mobile banking also popularly known as M-Banking or mBanking is a delivery channel which opened up after the tremendous success of mobile telephony. Banks started offering M-Banking during the late nineties and with the introduction of 3G mobile telephony that allowed accessing Internet using a mobile phone in the early 2000, acceptance of M-Banking showed good growth rates. M-baking customers could conduct banking transactions using Short Messaging Service (SMS) or mobile Internet. Instruction for a banking operation is send as a SMS to a predefined number given by the bank. M-Banking provide the

following banking services to a customer: account balance information and list of latest transactions, electronic bill payments, micro payments, mobile recharge, cheque book request, cheque status, stop payment instruction for cheque payments, funds transfers between customer's accounts, etc. The provision of real-time updates of critical banking transactions is the main benefit of M-Banking– for example soon after a transaction like ATM cash withdrawal customer gets a mobile alert about it through M-Banking. In spite of having good potential to become a medium for electronic payments and mobile cash, M-Banking has not been well accepted by customers world wide (Figure 1.6). M-Banking penetration and usage is notably high in Korea and Japan. Korea has around 23.4 m M-Banking customers as of 2001. The social structure of Korea which allows collective adoption of new developments is attributed to the very rapid adoption and penetration of new technologies like M-Banking or Internet Banking in that county(Chang, 2005). In Japan 'i-mode' which is NTT DocoMo's proprietary mobile Internet platform have around 47 million customers in Japan as of October 2006. i-mode allows users to conduct a wide variety of commercial activities like mobile reservations, e-mail, online shopping, Mobile Banking, ticket

reservations, and restaurant reviews. Success of i-mode is mainly due its wide availability, ease of use, affordability and security (NTT DoCoMo. (2007, May 6)). Although the penetration of mobile telephony is very high in Europe, adoption of M-Banking among European mobile phone customers is very low. As seen in Figure 1.7 only 3% of the mobile phone customers were using mobile banking. Customers in Europe prefer other channels for banking operations compared to M-Banking as of 2007.
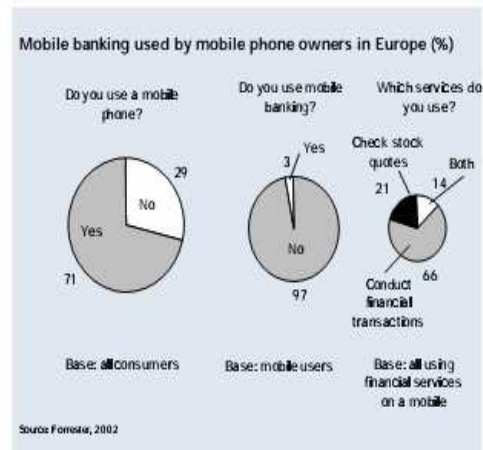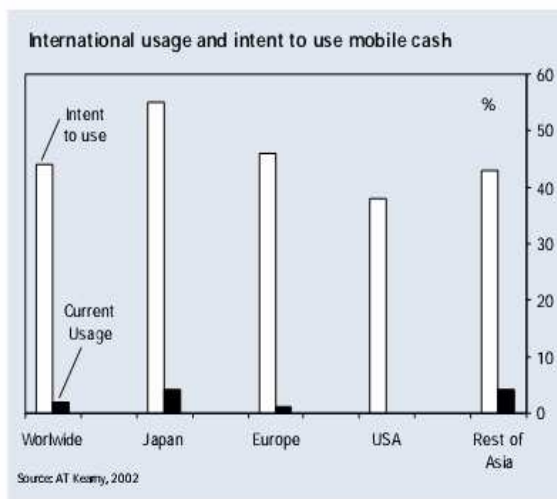
Figure 1.6: World wide Mobile banking adoption (Source: DBR (Schaaf, September 2002))

Figure 1.7: Mobile banking adoption in Europe (Source: DBR (Schaaf, September 2002)

Internet Banking: Tremendous growth of Internet during the mid-nineties prompted banks to utilize Internet as a medium for offering banking services. In Internet Banking banks allow their customers to perform banking transactions through their web site in a secure way. For accessing Internet banking, a customer has to browse to the net banking site of the Bank and login with the 'username' and 'password' provided to him/her by the Bank. Banks normally provide wide variety of banking service through their Internet banking facility which includes: account summary, details of historical banking transactions, funds transfer, new service announcements, loan applications, bill payment, cheque book request, cheque status enquiry, stop cheque request, credit card payments/statement, facilities to contact account manager etc. Table 1.2 provides a possible classification of services offered through Internet Banking.

Type of service	Services provided
Basic bank products/Account Control	Account opening/ closing/management
	Account summary
	Details of historical banking transactions
	Funds transfer
	E-cheques
	Cheque book request
	Cheque status enquiry
	Stop cheque request
	Standing orders, Direct debit
	Debit card application
Credit products	Loan application
	Loan limit
	Loan Approval
	Loan delivery
	Credit card application
	Credit card payments
Investment products	Deposit account opening & management
	Domestic / foreign equity investment
	Mutual funds / bonds investment
	Insurance investment
3rd Party services	E-commerce payment (shopping)
	Tax payment on-line
	Utilities bill payments
	e-Billing
Other	Contact A/c manager
	Online financial advice
	Other financial products

Table 1.2: Classification of Internet banking services

1.1.2 Internet Banking – Prospects & Issues

Rapid growth of Internet ensures that Internet banking acceptance will also grow in the coming years. A report from Internet Data Corporation (IDC) estimates around 122.3 million Internet banking users worldwide as of 2004 (Perumal, 2004). According to IDC estimates nearly 58 million Internet banking users in Western European countries which is roughly equivalent to users from USA, Japan & Asia-Pacific countries and Japan's users are almost equal to that of USA. (shown in Figure 1.8).

	2000	2001	2002	2003	2004
■ Rest of the world	1.0	1.7	3.1	5.1	6.1
▩ Asia- Pacific (exc Japan)	2.4	4.4	6.8	9.8	13.8
▢ Japan	2.5	6.5	11.9	19.6	21.8
▨ United States	9.9	14.7	17.1	20.4	22.8
▢ Werstern Europe	18.6	28.0	37.8	47.7	57.9
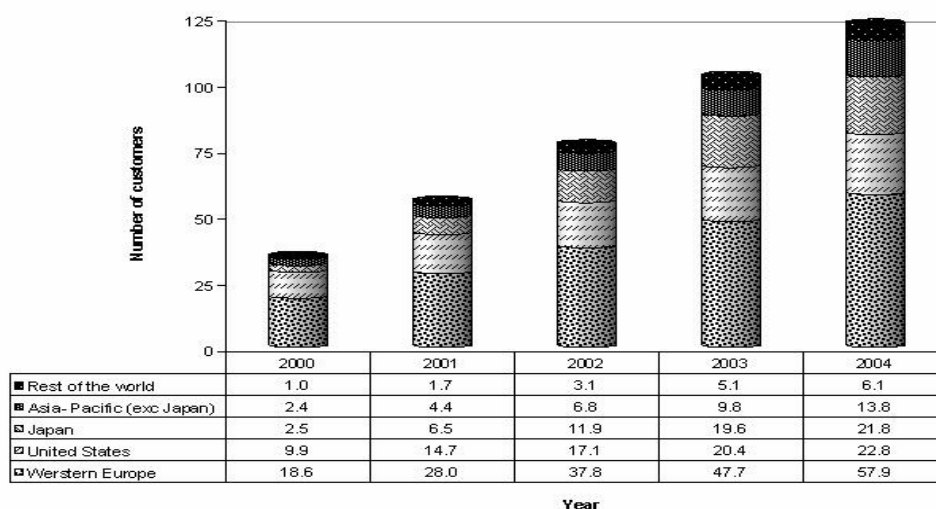
Figure 1.8: Growth in Internet Banking (Millions)
(Source: Perumal, 2004)

Table 1.3 which provides selected E-banking indicators from few countries. It is interesting to note that globally European countries are far ahead in Internet banking usage (Centeno, 2003; Claessens et al., 2001; Nitsure, 2003; Sato & Hawkins, 2001).

Country	Real GNP per capita (US = 100)	Internet users as % of inhabitants	Mobile phones per 100 Inhabitants	Bank customers using online banking (%)	Electronic brokerage transactions: % of total
Australia	75	32	34	4	22
Finland	71	41	65		
Germany	74	18	29	12	32
Japan	79	21	45		32
Sweden	69	41	58	31	55
United Kingdom	70	21	46	6	26
United States	100	27	31	6	56
Hong Kong	71	36	64	2	1
Korea	49	23	50		65
Singapore	70	24	42	5	10
Argentina	37	2	12		
Brazil	21	2	9	4	6
China	11	1	3		3
Czech Republic	40	7	19	3	
India	7	0	0	2	
Malaysia	24	7	14	<1	
Mexico	25	2	8	4	41
Nigeria	2	0	0		
Poland	26	5	10	<1	
South Africa	27	4	12		
Thailand	19	1	4		

Table 1.3: World E-Banking Indicators (Source: BIS)

Figure 1.9 illustrates Internet banking users and online users in European nations. From the figure it is clear that Nordic countries particularly Sweden, Finland , Norway, Austria, Czech Republic lead in Internet banking adoption, while countries like Greece and Portugal lag behind. Key factor affecting adoption of Internet banking is the penetration of Internet in a country, there exists a clear correlation between Internet penetration and Internet banking acceptance among customers – the higher the Internet penetration rate, the higher the number of Internet banking customers as a percentage of the online population (Schaaf, March 2003).
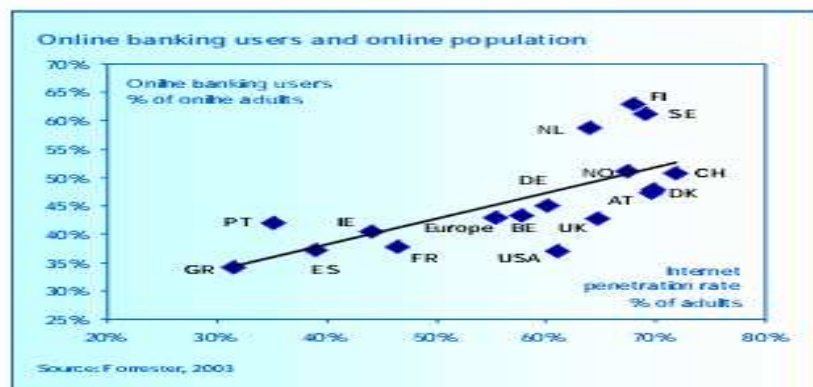
Figure 1.9: Online banking users and online population (Source: DBR)

Analyses of demographic characteristics of European Internet banking users over a period of five years from 2002-2007 show that more than fifty percent of the users belonged to the age group of

25-45 years (Figure 1.10). It is interesting to note that the band of "25-45 years old" users is narrowing over the years, mainly due to the increase in Internet banking adoption among the older age group of customers.
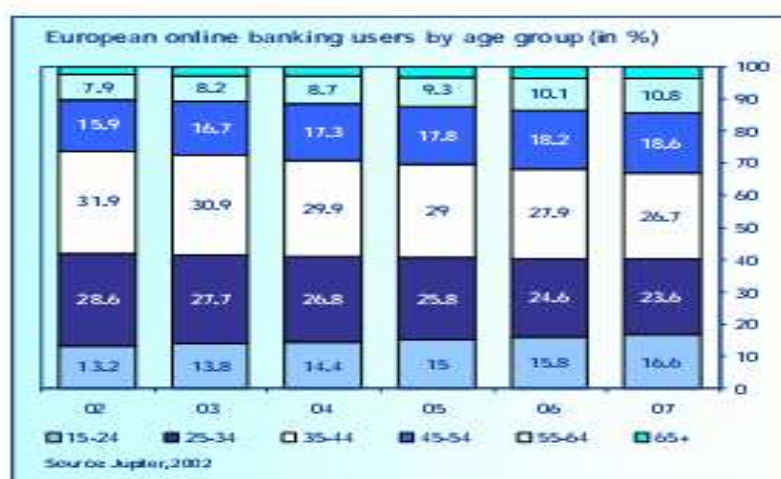
Figure 1.10: European online banking users by age group (%)
(Source: DBR)

DB Research in their research report (Schaaf, June 2002) have mentioned about the demographic characteristics of a typical German Internet banking user, who is middle aged, higher income male (Figure 1.11). A European Commission study (Centeno, 2003) on Internet banking adoption in EU region has identified the following factors as deterrent to Internet banking in EU region:

    i.   Limited PC/Internet penetration at home

ii.   Consumer security and privacy concerns

iii.   Low trust in banking institutions

iv.   Lower development of e-banking culture

v.   Lower development and use of financial services

The typical online banker is middle-aged, higher-income and male	Online banker	Internet user	All
Male	59%	55%	48%
Average age (years)	38	38	45
High education	42%	35%	23%
High income	42%	36%	27%
Household assets (EUR)	92,000	85,000	74,000
Online experience (years)	2.6	2.1	N/A
Technology optimist	72%	66%	50%
Career-motivated	31%	28%	21%

Source: Forrester, 2002

Figure 1.11: German Internet banking user profile (Source: DBR)

It is heartening to note that Banks are allocating substantial amount of their investments in building credible Internet banking platform for their customers. This could justify the argument that Internet banking is going to be an integral banking channel in the coming years. It is seen from Figure 1.12 that German banks invested around 10% of their budget in strengthening their Internet banking service.
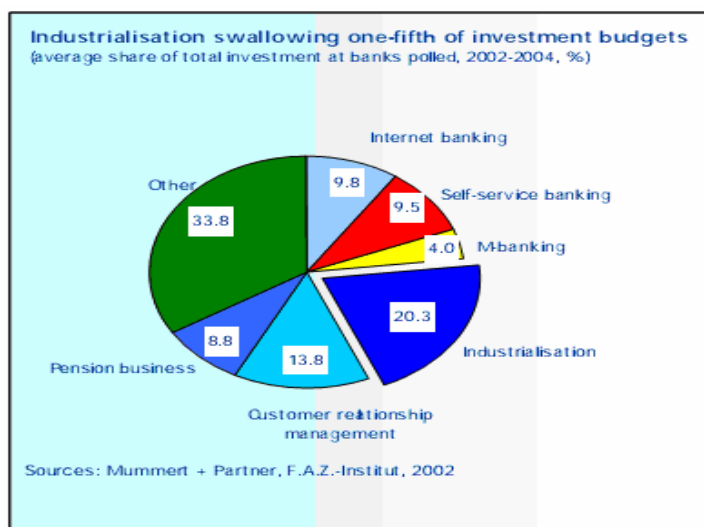
Figure 1.12: Investment pattern of German Banks (Source: DBR)

In spite of having high Internet penetration rate (nearly 70%), the adoption of Internet banking among North American customers has been low (less than 45% in 2005). From figure 1.13 it is seen that Internet banking has been rising steadily during the last five years. Pew report (Fox & Beier, 2006), identified consumers fear of security of Internet or the "trust gap" as the main negative factor affecting Internet banking adoption. Customer confidence in Internet banking is low among US customers owing to the constant stream of news of threats like identity theft, phishing, worms etc. A 2005 report by Consumer Web Watch (Consumer Reports WebWatch, 2005) found that customers who are comfortable with

using e-commerce or financial services are more open to adopting

Internet banking compared with non e-commerce users.
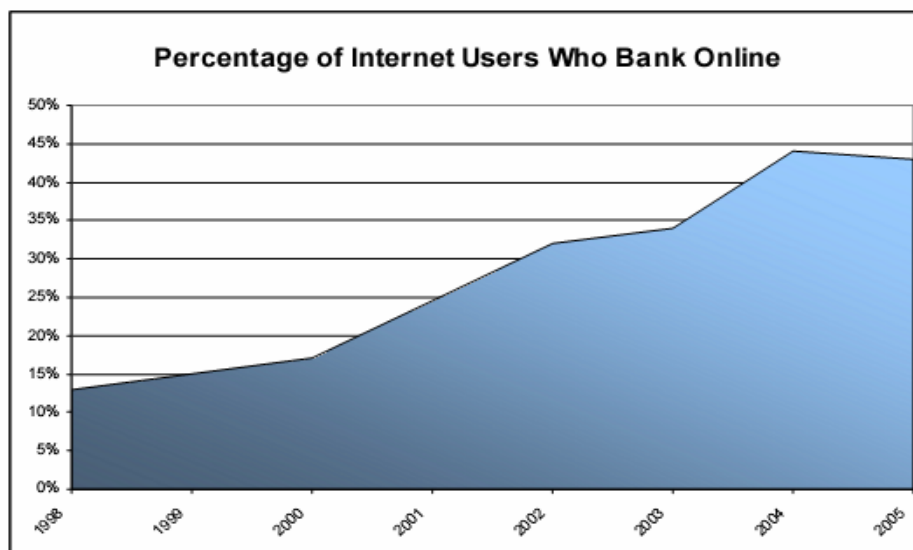
Figure 1.13: Percent of Internet banking users among Internet
users in USA. (Source: Pew Report)

From an earlier Pew Report (Fox,2005) it is clear that demographic

characteristics of an American Internet banking user matches that

of a European user - a typical American customer has broadband

and online experience , belong to the GenX (age group 28-39), is a

male and has high socio-economic status (Table 1.4).

Growth in online banking 2002-2004		
The percentage of those in each group with internet connections who have tried online banking. In other words, 31% of online men had done online banking in October 2002 and 29% of online women had done it.		
	October 2002 N=1027 internet users	November 2004 N=537 internet users
All internet users	30%	44%
Sex		
Men	31%	49%
Women	29%	39%
Age		
Generation Y (ages 18-27)	29%	38%
Generation X (ages 28-39)	34%	60%
Younger Baby Boomers (ages 40-49)	33%	42%
Older Baby Boomers (ages 50-58)	26%	49%
Household income		
Live in households earning less than $30,000	21%	32%
$30,000-$49,999	31%	44%
$50,000-$74,999	33%	51%
$75,000 or more	35%	55%
Educational attainment		
High school graduate	27%	42%
Some college	27%	41%
College and graduate school degree	37%	52%
Internet connection at home		
Dial-up	24%	35%
Broadband	35%	63%
Source: Pew Internet & American Life Project Surveys: Oct 7-27, 2002 (margin of error is±3%); Nov. 23-30, 2004 (margin of error is ±5%).		

Table 1.4: Typical US Internet banking User profile

Few Internet only banks which started operations in US, had limited success in establishing themselves as credible alternatives to traditional banks. Some of the Internet only banks wound up their business or merged itself with some other financial institution (Carlson et al., 2001). DeYoung (DeYoung, 2001) in his paper argues that Internet banking could be seen as a new delivery channel only, which will not have any independent impact on the bank's profitability. Since most of the customers have access to Internet, there could be sudden change in customer Internet banking usage patterns. From a Bank's point of view, more transactions through Internet banking channel would improve its operational efficiency as relative cost of Internet banking transactions is the cheapest among the delivery channels. Few studies concluded that cost of Internet banking transactions is only fraction of that of a branch banking (Table 1.5).

Channel	United States [1]	India
Physical branch	100	100
Postal	-	40
Telephone	50	18
ATM	27	18
PC-Dialup	8	Na
Internet	1	12
[1] Simple average of three studies (i) US Department of Commerce ;(ii) Booz,Allen & Hamilton; and (iii) Goldman Sachs and Boston Consulting Group. Sources Sato et al (2001); ICICI Bank.		

Table 1.5: Relative costs of banking transactions (Source: BIS)

Internet banking usage in the rest of the world (except Japan) is comparatively low as of 2007. But there are few notable exceptions like South Korea which had around 25 million users in mid 2002 which corresponds to more that 53% of the population. Higher adoption level of Internet banking is mainly to the proactive steps taken by the Government in developing the Internet in the country and marketing efforts from the part of banks. Another country which has higher Internet banking rate is Estonia which has an adoption rate between 18-25% in 2001 (Centeno, 2003).

DB Research has come up with the following five trends in the Internet banking space in 2005 (Schaaf, March 2005)

i)   Security: Concerns with security is the main issue in front of Internet banking user. Banks need to create awareness among customers regarding the various threats that exists and also see that customer doesn't stop using Internet banking owning to the fear of security.

ii) Customer retention: For a bank acquiring a new customer is more costlier than keeping an existing customer. The profitability of the bank increases when the customer uses more services from the bank. Customer loyalty therefore, acquires importance and customer relation management should be carefully carried out.

iii) Technological progress: Progress in technology is expected to be a great force which would increase Internet banking acceptance. More spread of technology which is cheaper and quicker would result in increased penetration of Internet as well as Internet banking.

iv) Mobile banking: Mobile banking may come up after the introduction of 3G mobile technology like GPRS or EDGE. Mobile devices could be used to connect to an Internet

banking channel which offers more convenience and ease of use.

v) Online research grows: Growing number of customers is using Internet to search for information on various matters. This is true even for matters related to financial services. They shop around for financial products, and make their own investment decisions. Internet banking acceptance should increase as a result of researching via Internet.

1.1.3 E-Threats – A primer

A serious impediment to faster diffusion of E-Banking and particularly Internet banking is the various electronic security threats it faces. Just as technology could be used for the betterment of mankind, it could also be abused for conducting many type of heinous activities by entities inside or outside of an organization. E-banking infrastructure of a banking institution is at risk of modification/destruction/fabrication/ disclosure /intrusion or theft of its information from criminal software developers normally referred to as hackers or crackers. The U.S. National Information Systems Security Glossary defines

Information systems Security as "the protection of information systems against unauthorized access to or modification of information, whether in, processing or transit, and against the denial of service to authorized users or the provision of service to unauthorized users, including those measures necessary to detect, document, and counter such threats" (NSTISSC, 2000). NIST (NIST, 1997) in their special publication named SP800-12 lists the following threats commonly faced by a computer network:

Errors and Omissions: Data and system integrity of an information system is threatened due to errors and omissions occurred during capture of data. It could be either intentional or unintentional from the part of the user, but detecting it could be difficult for a program. Computers lack the intelligence to detect and correct error or omissions that is a part of the user inputs.

Fraud or theft: Computer software could be misused to conduct frauds, which is normally committed by insiders who could be employees or persons having access to computer networks internally like contractor personnel or consultants. Insider frauds are more serious in nature, because of their nature and difficulty in detection. In the report of Global Security Survey conducted by

Deloitte (Deloitte, 2006), it is mentioned that 28% Internal breaches identified by its respondents were due to internal fraud. Findings of 2006 CSI/FBI survey (Gordon et al., 2006) also give similar findings, 39% of that survey respondents attributes a percentage of their organization's losses greater than 20 percent to insiders (Figure 1.14). Frauds like 'Salami Attack' which is skimming of small amounts of money from a large number of financial accounts, assuming that small discrepancies may not be investigated is very common in financial institutions.
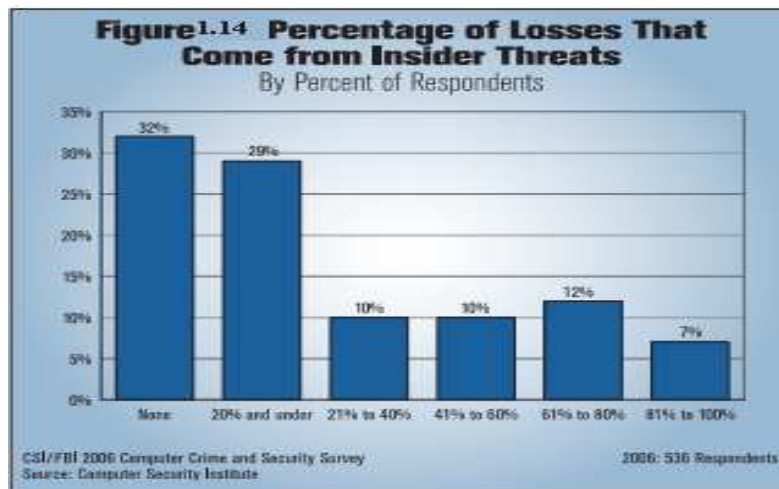
Figure 1.14: Percentage of Losses That Come from Insider Threats (Source: CSI/FBI)

Employee Sabotage: Disgruntled employees unhappy with their management may resort to damaging of information system resources available at their disposal as a display of revenge.

Although this type of threat is less compared to other threats, it still is a threat a company has to watch out particularly when there is a strike call by workers or when an employee is fired as a part of downsizing exercise. Common examples of computer-related employee sabotage include:

- destroying hardware or facilities,
- planting logic bombs that destroy
- programs or data,
- entering data incorrectly,
- "crashing" systems,
- deleting data,
- holding data hostage, and
- changing data.

Loss of Physical and Infrastructure Support: Physical loss infrastructure could be due man made disasters like terrorist attack, war etc or natural disasters like acts of God viz earthquakes, fires, floods, storms and accidents like water spills , fires due to electrical short circuiting etc.

Malicious Hackers: Hackers or crackers, refer to those who break into computers without proper authorization or permission. They can include both insiders and outsiders. Hacking as an activity has

become more prevalent after the advancement in connectivity among computers – this allowed hackers to remotely access computers. Hackers could break into computer systems or supporting equipments like switches or routers and could severely damage the network reliability & speed. As Figure 1.15 shows, there is increased number of unauthorized access incidents during the year 2006. Attacks from malicious hackers have caused lots of panic among organizations and customers which has adversely affected the adoption of e-banking services like Internet banking. Finding of many surveys points out that concern of security with activities like hacking is the main reason for non usage of Internet banking.
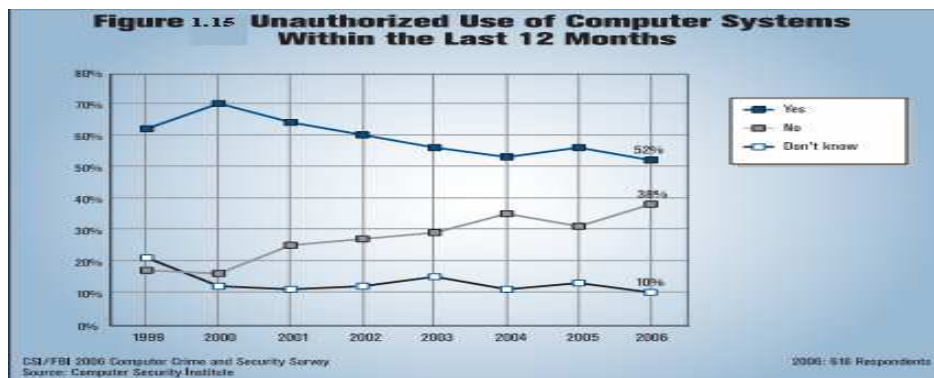
Figure 1.15 Unauthorized Use of Computer Systems   (Source: CSI/FBI)

Industrial Espionage: Industrial espionage is the gathering of proprietary information by organizations about their rivals for some

specific purpose. It is also a type of information theft, but carried with more resources and has an institutional support.

Malicious code: Malicious code refers to viruses, worms, Trojan horses, logic bombs, and other "uninvited" software. As the name indicates malicious code are programs written for damaging the host computer or network they invade and spread itself through network. From customer's perspective these type of threat is the most dreaded because most of these threats are targeted against personal computers. Programs like virus or worm cause great damage to the user and forces lots of computer downtime. They also capture personal information of a user and send them to the hacker, who could then misuse it.

Threats to Personal Privacy: With massive quantity of personal information being kept by various agencies government & private, protection of personal privacy is a big responsibility. Threats like 'identity theft' where hackers misuse personal details like social security numbers, driving license etc to conduct fraudulent transactions force governments to pass legislation like Identity Theft and Assumption Deterrence Act. Personal information should

be stored and protected from the prying eyes of hackers for the benefit of customers Identity theft. (2007, May 18).

1.1.4 E-threats and Internet Banking

Acceptance of Internet banking is directly influenced by the confidence of customers with regards to the security of the computer, network and most importantly the infrastructure of the bank they wish to access. A survey among UK customers clearly highlights this concern about the security of online banking (Schaaf, December 2004). Findings of the survey show that customers are wary of the common e-threats like viruses, identity theft, snooping of information when they access an Internet banking web site (Figure 1.16). As mentioned earlier, malicious hacking has increased after the prominence of Internet from mid-nineties. More enterprises are using Internet as a medium for connecting their computers across the globe; this has prompted hackers to try gain unauthorized access to computer networks. Computer programs are becoming more complex day by day and vendors are not able to plug all the security vulnerabilities in operating systems or application programs before they are released for public use. Hackers are quick to exploit these vulnerabilities to

gain illegal access to computer and perform malicious activities. As the Figure 1.17 shows, the graph computer vulnerabilities reported and incidents reported are going high over the last few years. This high rise of incidents has worried the customers and made them stay away from Internet banking usage.
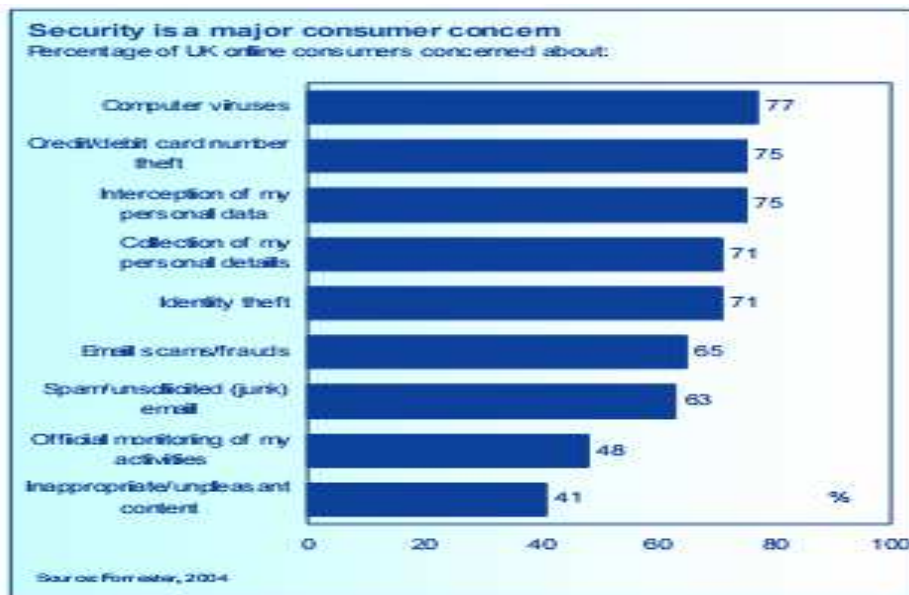
Figure 1.16: Internet banking concerns among UK Customers (Source: DB Research)
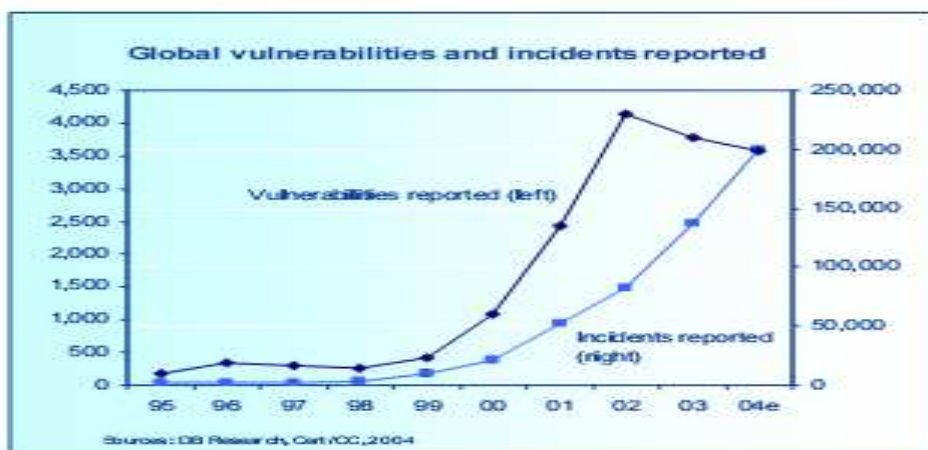
Figure 1.17: Global Vulnerabilities Reported (Source: DB Research)

1.1.4 Banking Industry in India

The Indian Banking industry, which is governed by the Banking Regulation Act of India, 1949 can be broadly classified into two major categories, non-scheduled banks and scheduled banks. Scheduled banks comprise commercial banks and the co-operative banks. In terms of ownership, commercial banks can be further grouped into nationalized banks, the State Bank of India and its group of banks, regional rural banks and private sector banks (the old/ new domestic and foreign). These banks have over 54,000 branches spread across the country. The Indian banking sector functions under the regulatory and supervisory guidelines issued

by the central bank, the Reserve Bank of India (RBI). Table 1.6 gives details of the commercial banks operating in India.

Banks	Nos.	Branches					ATMs		
		Rural	Semi-urban	Urban	Metro-politan	Total	On-site	Off-site	Total
State Bank Group	8	5,229	4,043	2,449	2,110	13,831	1,775	3,668	5,443
Nationalised Bank	19	12,990	7,103	6,990	6,929	34,012	4,812	2,353	7,165
Other Public Sector Bank	1	2	17	66	88	173	135	241	376
Old Private Sector Banks	19	936	1,447	1,236	947	4,566	1,054	493	1,547
New Private Sector Banks	8	97	322	674	857	1,950	2,255	3,857	6,112
Foreign Banks	29	–	1	37	221	259	232	648	880

Table 1.6: Indian Banking at a glance (As at end-March 2006) (Source:RBI) (73885.pdf)

E-banking initiatives in India took off from the early 1980's both in the industry level and in an organizational level. Industry wide electronic banking offerings were coordinated and implemented by the Reserve Bank of India, which is the central bank and market regulator (Rishi & Saxena, 2004). During the 1980's, the RBI commenced banking modernization exercises. Several committees were setup by the RBI to work out the kind of automation required for increasing efficiency of banking operations like clearing of

cheques, electronic transfer of funds between and within banks, computerization of front office and back office operations of a bank etc. Computerization which concentrated mainly at head office and regional office level slowly started to percolate down the line. Computerization of branches started by late eighties with the introduction of ledger posting machines (LPMs) and later substituted by advanced ledger posting machines (ALPMs). Soon, stand alone mini-computers were deployed at branch level to automate more tasks. But after the introduction of new channels of banking services like ATM and Internet banking – banks had to network their branches in order to provide the new services. During late nineties banks tried many models for networking their branches spread across the country with their head quarters. With the introduction of new technology in telecommunication like VSAT and VPNs through Internet which were cost effective, reliable and fast, most of the banks started to install Core Banking Solutions (CBS) for running their operations. CBS allowed banks to automate their operations more efficiently and also allowed them to automate more branches simultaneously. Presently, all new private sector banks and public sector banks have gone for CBS. Table 1.7 gives details of computerization of public sector banks. From Table 1.7, it

is seen that about 50 % of branches of public sector banks are fully computerized as on march 2006 (RBI, 2006). Out of these nearly 30% PSB branches are running under core banking solutions. In spite of being the group with the largest number of branches spread all over this vast country, State Bank Group has already fully computerized 99.9 percent of its branches. Fifty percent of the State Bank group branches are presently running on CBS and few of its associates like State Bank of Bikaner and Jaipur, State Bank of Hyderabad, State Bank of Patiala, State Bank of Saurashtra and State Bank of Travancore have all their branches under CBS.

Sr. No.	Name of the Bank	Branches already Fully Computerised #	Branches Under Core Banking Solution	Fully Computerised Branches (3+4)	Branches Partially Computerised
1	2	3	4	5	6
	Public Sector Banks (I+II)	**48.5**	**28.9**	**77.5**	**18.2**
I)	**Nationalised Bank**	**48.0**	**20.5**	**68.5**	**25.4**
1.	Allahabad Bank	79.5	–	79.5	20.5
2.	Andhra Bank	26.7	73.3	100.0	–
3.	Bank of Baroda	95.3	4.7	100.0	–
4.	Bank of India	75.5	21.2	96.6	3.4
5.	Bank of Maharashtra	57.0	–	57.0	–
6.	Canara Bank	63.4	0.1	63.4	36.6
7.	Central Bank of India	51.1	0.5	51.6	2.0
8.	Corporation Bank	39.9	60.1	100.0	–
9.	Dena Bank	99.4	–	99.4	0.6
10.	Indian Bank	36.8	36.1	72.9	27.1
11.	Indian Overseas Bank	42.8	12.2	55.1	44.9
12.	Oriental Bank of Commerce	6.0	57.3	63.3	38.4
13.	Punjab National Bank	45.8	51.8	97.6	2.4
14.	Punjab and Sind Bank	9.6	–	9.6	90.4
15.	Syndicate Bank	8.7	26.4	35.0	65.5
16.	UCO Bank	27.5	–	27.5	66.2
17.	Union Bank of India	–	33.3	33.3	66.7
18.	United Bank of India	26.6	–	26.6	73.4
19.	Vijaya Bank	69.6	30.3	99.9	0.1
II)	**State Bank Group**	**49.8**	**50.1**	**99.9**	**–**
20.	State Bank of India	70.2	29.8	100.0	–
21.	State Bank of Bikaner and Jaipur	–	100.0	100.0	–
22.	State Bank of Hyderabad	–	100.0	100.0	–
23.	State Bank of Indore	–	98.4	98.4	–
24.	State Bank of Mysore	76.1	23.9	100.0	–
25.	State Bank of Patiala	–	100.0	100.0	–
26.	State Bank of Saurashtra	–	100.0	100.0	–
27.	State Bank of Travancore	–	100.0	100.0	–

– :Nil/Negligible. # :Other than branches under Core Banking Solution.

Table 1.7: Computerization in Public Sector banks (Source: Trend and Progress in Banking 2005-06, RBI)

1.1.5 E-banking initiatives in India and the role of RBI

Reserve Bank initiated several electronic banking mechanisms in the early 2000(Kamesam, 2003; Kamesam, 2001; Mohan, 2004; RBI, 2005; Reddy, 2006). Some of the important e-banking mechanisms that came into existence are discussed below:

1. Magnetic Ink Character Recognition (MICR) Cheque processing: MICR was introduced during the years 1986-88. MICR resulted in quicker realization of cheques.

2. Indian Financial Net (INFINET) : INFINET, a wide area satellite based network (WAN) using VSAT (Very Small Aperture Terminals) technology, was jointly set up by the Reserve Bank and Institute for Development and Research in Banking Technology (IDRBT) in June 1999. The Indian Financial Network (INFINET) which initially comprised only the public sector banks was opened up for participation by other categories of members.Various inter-bank and intra-bank applications ranging from simple messaging, MIS, EFT (Retail), Electronic Clearing Service (ECS) for both Credits and Debits, online dealing and trading in Government securities, Centralized Funds Management System(CFMS) for Banks and

FIs, Anywhere/Anytime Banking, Inter-Branch Reconciliation, Structured Financial Messaging System (SFMS) and Real Time Gross Settlement (RTGS) System are being implemented using the INFINET as the backbone

3. Real Time Gross Settlement (RTGS) System: RTGS is an online system for inter-bank fund transfer on a transaction-by-transaction basis. RTGS resulted in risk free credit mode of funds settlement. The facility for inter-bank funds settlement through RTGS is available across more than 23,700 branches of banks spanning more than 500 centres in the country.

4. Electronic Funds Transfer (EFT)/National Electronic Funds Transfer (NEFT) System: EFT is a safe, secure and quick electronic fund transfer system for both corporate and retail segments. Reserve Bank implemented the Electronic Funds Transfer (EFT) System in the mid nineties, which was later upgraded as the Special Electronic Funds Transfer (SEFT) System in 2003 and has now been further enhanced as the National Electronic Funds Transfer (NEFT) System since

November 2005. As of 2006 the NEFT facility covers more than 5000 branches of 32 banks spread across 200 centres.

5. Cheque Truncation System (CTS):CTS would improve the efficiency of cheque clearing system substantially, it also would result in faster clearing of out station cheque. A pilot project for implementing CTS underway in the National Capital Region.

6. The setting up of the Institute for Development and Research in Banking Technology (IDRBT), Hyderabad in the mid nineties, as a research and technology centre for the Banking sector; has resulted tremendous pace in the introduction of new technology in this domain. IDRBT contributed extensively in the setting up of INFINET and also is a Certifying Authority for the issuance of digital signature and certificates in India

1.1.6 E-Banking services for Indian customers

E-banking initiatives by the Reserve Bank and the deployment of Core Banking Solutions has allowed Indian banks to offer a new banking 'experience' for their customers. Indian customers suddenly became at par with their counter parts in developed

countries in terms of services obtained from their banks. Gone are the days of branch only banking – computerization allowed banks to offer many new channels of delivery. Indian banks, particularly the new generation banks which started their operations after 1993, were the first to offer new channels of delivery like ATMs, Phone Banking, Internet Banking and Mobile Banking. The new generation banks did not have the branch network that public sector banks possessed and they also had to introduce some differentiator to the customers. New generation banks like ICICI Bank, HDFC Bank, UTI Bank and foreign banks like ABN Amro Bank and Citibank kicked the ATM revolution in India. ICICI Bank employed a very aggressive strategy of ATM deployment to counter its lack of branch presence across the country. ICICI's ATM count surged from 125 ATMs in January 2000 to 1200 ATMs by the end of 2002 (Srikanth & Padmanabhan, 2-Dec-2002). The bank also saw the impact of that deployment in the form exceptional growth in customers in the same period, customer base swelled to 5 million from 2 million. ATMs not only worked as an attraction for customers but also allowed banks to lower its transaction cost. ATMs as a delivery channels became a huge success, which prompted public sector banks also to invest in them. Customer

acceptance of ATMs were very high, customers in semi-urban also welcomed this innovation with both hands. Efforts are being done to develop ATMs that could be deployed in rural markets, the multi-lingual ATM developed by IIT Chennai promises new market for this channel.

Another major innovation that was introduced in India during the last decade is Internet banking which offered many new services to the customer(Rajneesh & Padmanabhan, 16-Sep-2002). ICICI Bank was the first bank in India which offered this delivery channel, by kicking off its online banking services in 1996. Other private sector banks like Citibank, IndusInd Bank and HDFC Bank and Times bank (now part of HDFC Bank) started offering internet banking services in 1999. SBI launched its internet banking services in July 2001. Other public sector banks like State Bank of Travancore, Bank of Baroda, Allahabad Bank, Syndicate Bank and Bank of India, also rolled their services during the same time. Although, the acceptance of internet banking is lower compared to that of ATMs, banks are expecting usage levels to go up as internet penetration in the country improves. Details of internet banking services offered by some major banks is given in Table 1.8.

Bank Name	Technology Vendor	Service offering
ABN AMRO Bank	Infosys (BankAway)	NetBanking
Abu Dhabi Commercial Bank	Infosys (BankAway)	ADCB NetLink
Bank of India	I-flex	BOIonline
Centurion Bank	Logica	MyCBOL
Citibank	Orbitech (now Polaris)	Citibank Online
Corporation Bank	I-flex	CorpNet
Deutsche Bank	-	db direct
Federal Bank	Infosys	FedNet
Global Trust Bank	Infosys (BankAway)	ibank@gtb
HDFC Bank	i-flex/ Satyam	NetBanking
HSBC	-	Online@hsbc
ICICI Bank	Infosys, ICICI Infotech	Infinity
IDBI Bank	Infosys (BankAway)	i-net banking
IndusInd Bank	CR2	IndusNet
Punjab National Bank	Infosys (BankAway)	
Saraswat Bank		
Standard Chartered Bank	In-House	Me Standard Chartered Online
State Bank of India	Satyam/Broadvision	onlinesbi.com
UTI Bank	Infosys (BankAway)	iConnect

Table 1.8: Net Banking services in India (Source : Express Computers)

Reserve Bank constituted a Working Group under the Chairmanship of S.R. Mittal. The working group came up with the "Report on Internet Banking" in 2001(RBI, 2001). This report gave guidelines for offering internet banking services in India. It discussed the technical, legal, regulatory and supervisory aspects of internet banking. The Information Technology Act of 2000 took care of the legal aspects of electronic commerce in India that allowed banks to offer full suite of internet banking. Banks in India

currently offer 'Fully Transactional Websites' to their customers. The customers could conduct variety of transactions through internet banking facility which includes: account summary, details of historical banking transactions, funds transfer, new service announcements, loan applications, bill payment, cheque book request, cheque status enquiry, stop cheque request, credit card payments/statement, facilities to contact account manager etc. Internet banking is the least cost delivery channel available for a bank; the working report suggests the following comparative costs for different channels – teller cost at Rs. 1 per transaction, ATM transaction cost at 45 paise, phone banking at 35 paise, debit cards at 20 paise and Internet banking at 10 paise per transaction. The main deterrent for acceptance of internet banking among customers is lack of confidence in the security. The committee recommended implementing latest security technology to safe guard internet banking infrastructure in a bank. The report estimates that round 1% of the 9 lakh internet users in India used Internet banking in 1998. A survey conducted by IAMAI and IMRB (IMRB & IMAI, 2006) in September 2006, estimated around 37 million Internet users in India and the number of 'active' users is pegged around 25 million. The survey also estimates around 2.4

million E-Commerce users, which included internet banking users. As of 2007, around 4.6 million Indians are availing Internet banking services (Kothari, 2007). In contrast to internet banking, usage of Telephone Banking and Mobile banking is limited. Mobile banking is expected to pick-up once the mobile companies offer 3G services.

1.2 Need for the study

Introduction of new technologies allowed banking institutions to offer new channels of service outlets like ATM facility, Internet Banking, Telephone Banking and Mobile Banking. Indian consumers too have access to many new channels to interact with their bank. Banks race against each other in bringing the latest technology for the benefit of their customers and themselves. But not many studies have been conduced to evaluate if "Internet Banking" channel is utilized properly by the customers in India. Reasons for customer apathy towards Internet banking channel, if that exist, have also not been analyzed in an Indian context earlier.

1.3 Objective of the Study

This study plans to "plug" the gap in research in acceptance of Internet banking among Indian customers. The primary objectives of this study are to:

- Identify factors influencing the adoption and usage of Internet banking in India

- Examine whether Theory of Planned Behaviour (TPB) or Technology Acceptance Model can be applied in Internet banking adoption and usage.

- Develop a model to explain behavioral intention to use internet banking.

1.4 Significance of the Study

This study has a number of theoretical contributions. It is one of the first study to empirically examine the behavioral intentions to adopt or use Internet banking services in India using a modified version TAM construct. In this study TAM constructs along with influences of *security awareness* and *security concerns* among consumers is analyzed. Even though TAM has been considered as one of the most important models for analyzing user acceptance of

computer & IT in a wide range of end-user computing technologies, not many studies were conducted among Indian IT users. This study tries to verify if the results of TAM constructs reflect the results of other studies conducted in other countries. From a business point, commerce through Internet is showing tremendous increase over the past few years. But there are few factors which affect the decisions of customers when adopting Internet commerce, positively or negatively. This study tries to analyze the customer feeling about Internet Banking. Findings of this survey could help banks operating in India to fine tune their Internet Banking products.

1.5 Organization of the Thesis

This thesis is organized into five chapters. Chapter 1 provides an introduction to the growth of Internet and technological innovations that happened in the banking industry over the last few decades. The need for the study, research objectives and significance of the study is also discussed. Chapter 2 contains review of literature and the discussion of the theoretical models used in this study. In Chapter 3, the methodology used for conducting the study is discussed along with the research model

and hypotheses framed for the study. The results of the survey conducted as part of the research study is presented and analyzed in Chapter 4. Finally, Chapter 5 contains the discussion of the findings, contributions of the study, limitations of the study, conclusions of the study, and suggestions for further research.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The aim of this research study is to analyze the factors that determine acceptance/adoption of Internet banking among Indian customers. The main activity in the adoption of Internet banking is the "decision-making process" that happens in the minds of the customers and the subsequent issues related to the technological aspect of Internet banking. During the review of literature in this area, it was found that researchers relied on theories from social psychology for their theoretical background. Researchers used two theories namely – Theory of Reason Action and Theory of Planned Behavior to frame their research designs in studies related to consumer behavior, consumer attitudes, consumer beliefs etc. In the case of studies on consumer behavior related to adoption of technology, researchers used a modified version of the above theories called Technology Acceptance Model to base their study. Technology Acceptance Model or TAM is extensively used for

studies involving customer acceptance of technology. Applicability of TAM is tested in a wide variety of technology adoption context and in a number of cultural environments. In this chapter we discuss about the theoretical base that is used in this study and also highlight the significant studies conducted in the area of customer adoption of electronic commerce and internet banking. The research design for this study utilizes the important findings from the literature review.

2.2 Review of literature on Social Psychology

Since the introduction of computers, nobody has questioned the capability of information technology as a medium for simplifying complex tasks that has to be performed for carrying out commercial or non-commercial activities. It is noted that usability and facility of software has improved tremendously over the years, so is the speed of computing hardware. But, it is also to be noted that not all software or technology are accepted by customers. The main challenge of software developers is to come up with applications which have least user resistance. There are many examples of users rejecting extremely power packed applications while accepting less functional applications. Therefore,

practitioners and researchers have spend considerable time analyzing why people resist using information technology and what makes them accept or reject a technology and how users will respond to a change in the information technology and its environment. Researchers in Management of Information Systems (MIS) area has come up with three main pillars in a IS environment viz. People, Process and Technology. Robert Kling (Kling & Lamb, 1999) calls for a "social-technical" approach for managing IT in digital economy. With couple of cases he illustrates why IT is a social-technical system and identifies key socio-technical perspectives which makes it different from the mainstream conceptualizations of IT in organizations. Markus (Markus, 1983) analyzed failure of IT implementation in an organization and concluded that main cause of failure is not a technical problem with the new software but the real culprit is the "politics" that existed in the organization. Even though the above mentioned studies analyzed acceptance of technology in an organizational perspective, it highlights the point that when it comes to understanding of usage of IT by people theories from multiple disciplines should be considered. Complex nature of the study of information systems which involves people, process and technology

necessitated adoption of theories from areas like management, psychology and economics. In the context of studies on consumer behavior of adoption of a product/service theories in social psychology is widely used for theoretical background.

Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA) is a widely validated model that has proven successful in predicting and explaining the determinants of intended behavior of individuals across a wide variety of areas. However, due to its limitation on volitional control, Ajzen (1985) extended the Theory of Reasoned Action by including another construct called perceived behavioral control and named it Theory of Planned Behaviour (TPB). Both these theories are discussed in detail below.

2.2.1 Theory of Reasoned Action (TRA)

The Theory of Reasoned Action is a widely studied model from social psychology, which is concerned with the determinants of consciously intended behaviors. The Theory of Reasoned Action suggests that a person's behavior is determined by his/her *intention to perform the behavior* and that this intention is, in turn, a function of his/her *attitude toward the behavior* and his/her *subjective norm* (Ajzen and Fishbein, 1980). According to this

model, a person's behavior is determined by his/her behavioral intention to perform it. This intention itself is determined by the person's attitudes and his subjective norms towards the behavior. Fishbein and Ajzen define the subjective norms as "the person's perception that most people who are important to him think he should or should not perform the behavior in question" (Fishbein and Ajzen 1975, p.302). Figure 2.1 is a schematic representation of the relationships among constructs in TRA. TRA hypothesis that the individual's Behavioral Intention (BI) to perform an actual behavior is jointly determined by the individual's Attitude toward performing the Behavior (ATB) and Subjective Norm (SN), which is the overall perception of what relevant others think the individual should or should not do.
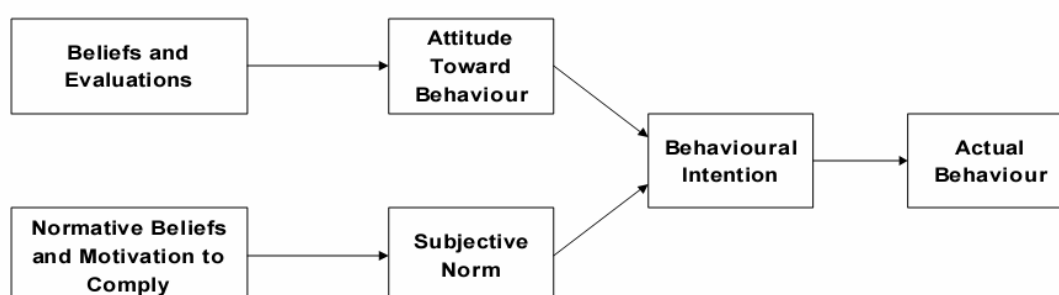
Figure 2.1: Theory of Reasoned Action from Davis, Bagozzi and Warshaw (1989)

This theory can be summarized by the following equation:

Behavioral Intention = Attitude + Subjective norms

According to TRA, the attitude of a person towards a behavior is determined by his beliefs on the consequences of this behavior, multiplied by his evaluation of these consequences. Beliefs are defined by the person's subjective probability that performing a particular behavior will produce specific results. This model therefore suggests that external stimuli influence attitudes by modifying the structure of the person's beliefs. Moreover, behavioral intention is also determined by the subjective norms that are themselves determined by the normative beliefs of an individual and by his motivation to comply to the norms.

TRA also claims that all other factors which influence the behavior only do so in an indirect way by influencing the attitude or subjective norms. Fishbein & Ajzen (1975) refer to these factors as being external variables. These variables can be for example, the characteristics of the tasks, of the interface or of the user, the type of development implementation, the political influences, the organizational structure, etc.(Davis, Bagozzi, & Warshaw, 1989).

TRA has been tested in numerous studies across many areas including advertising (James & Hensel, 1991), coupon usage (Bagozzi, Baumgartner, & Yi, 1992), AIDS Messages (Greene, Hale, & Rubin, 1997), childbirth (Lowe & Frey, 1983), and voting behaviour (Fishbein & Ajzen, 1981). A meta-analysis on the application of the theory of reasoned action showed that the model can produce good predictions of choices made by an individual when facing several alternatives (Sheppard, Hartwick, & Warshaw, 1988).

2.2.2 Theory of Planned Behavior (TPB)

Even though results of studies based on TRA showed high predictability of behavior intention, the applicability of TRA diminishes considerably in situations were the subjects under study had limited self-control over facilities. If behaviors are not fully under *volitional control*, even though a person may be highly motivated by his/her own attitudes and subjective norm, he/she may not actually perform the behavior due to intervening environmental conditions. To accommodate for the factor of volitional control, Ajzen (1985) extended the TRA by adding a new construct named *perceived behavioral control* to predict behaviors

in which individuals have incomplete volitional control. The extended model is called the Theory of Planned Behavior (TPB). The major difference between TRA and TPB is the addition of a third determinant of behavioral intention, perceived behavioral control. Perceived Behavioral control is determined by two factors; Control Beliefs and Perceived Power. Perceived behavioral control indicates that a person's motivation is influenced by how difficult the behaviors are perceived to be, as well as the perception of how successfully the individual can, or can not, perform the activity. If a person holds strong control beliefs about the existence of factors that will facilitate a behavior, then the individual will have high perceived control over a behavior. Conversely, the person will have a low perception of control if he/she holds strong control beliefs that impede the behavior. Figure 2.2 gives a diagrammatic representation of TPB model.
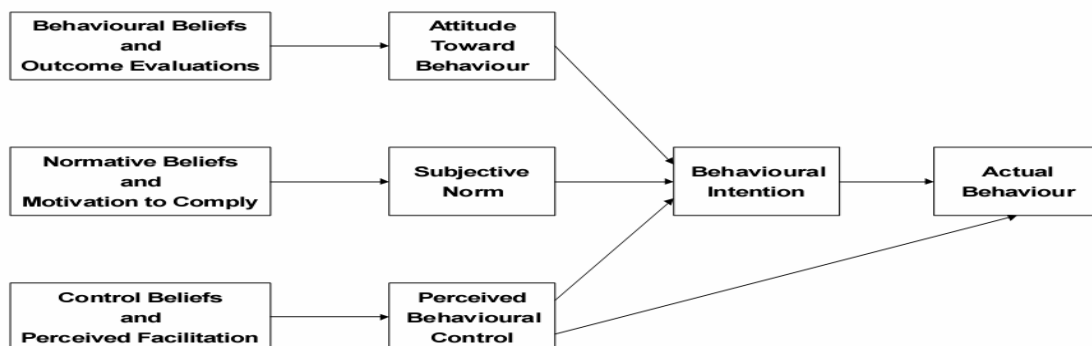
Figure 2.2: The Theory of Planned Behaviour (Ajzen, 1991)

TPB supersedes TRA and both theories state that Behavioral Intentions as being the immediate antecedents to behavior. It is believed that the stronger a person's intention to perform a particular behavior, the more successful they are expected to be. Intentions are a function of salient beliefs and/or information about the likelihood that performing a particular behavior will lead to a specific outcome. Intentions can also change over time. The longer the time period between intention and behavior, the greater the likelihood that unforeseen events will produce changes in intentions. Both theories assume that human beings are rational and make systematic use of information available to them. Another assumption of this theory is people consider the implications of their actions before they decide to engage or not engage in certain behaviors.

The addition of Perceived behavioral control construct gave TPB better prediction behavior of an individual and could be used as an alternative of TRA (Cheung, Chan, & Wong,1999;Madden, Ellen, & Ajzen,1992). Perceived behavioral control refers to readily available resources, skills, and opportunities as well as the person's own perception towards the importance of achieving the results. The concept of Perceived Behavioral Control is close to the concept of

self-efficacy of Bandura (1982).The latter explains that beliefs of an individual concerning his self-efficacy can have an influence on his choice of activities, his preparation for the activity and finally on the effort that he will exert during the activity in question. Therefore, if for example two individuals have the strong intention to learn a new language, the one who thinks that he will succeed in mastering it, is the one who will tend to persevere more than the other who doubts in his capacities (Ajzen,1991).

TPB has been successfully applied to various situations in predicting the performance of behavior and intentions such as choice of travel mode (Bamberg, Ajzen, & Schmidt, 2003), health care (Walker, Grimshaw, & Armstrong, 2001), wild game hunting (Daigle, Hrubes, & Ajzen, 2002), and to perform breast self-examination (Young, Lierman, Powell-Cope, Kasprzyk, & Benoliel, 1991). TPB or model based on TPB is also widely used in the study of technology acceptance in general or specific instances like electronic commerce or internet banking adoption.

2.2.3 Technology Acceptance Model

The technology acceptance model (TAM) developed by Davis (1989) was adapted from TRA (Fishbein & Ajzen 1975). The objective of

TAM is to provide an explanation of user's acceptance and usage behaviour across a variety of end-user computing technologies (Davis 1989; Davis et al., 1989). Among other technology acceptance and diffusion models TAM is arguably the approach most widely accepted and used by information system researchers. The main reason for the TAM's popularity is perhaps due to its parsimony, information system-specific nature and empirical support from several studies (Mathieson, 1991; Gefen, & Straub,1997).

TAM postulated that user acceptance of a new technology is determined by their behavioral intention to use the systems which can be explained jointly by user's perception about the technology's usefulness and attitude towards the technology use (figure 2.3). Attitude is jointly influenced by two behavioral beliefs, perceived usefulness and perceived ease of use. Perceived usefulness is defined as the degree to which a person believes that using a particular system will enhance his or her performances while the perceived ease of use is defined as the extent to which a person believes that using a particular system is free of effort. External variables, such as tasks, user characteristics, political influences, organizational factors are expected to influence technology

acceptance behavior indirectly by affecting perceived usefulness and perceived ease of use (Szajna,1996). Further, perceived usefulness is influenced by perceived ease of use. Venkatesh and Davis (2000) proposed a second version of the TAM, which incorporates additional constructs regarding subjective norm and cognitive instrument process.
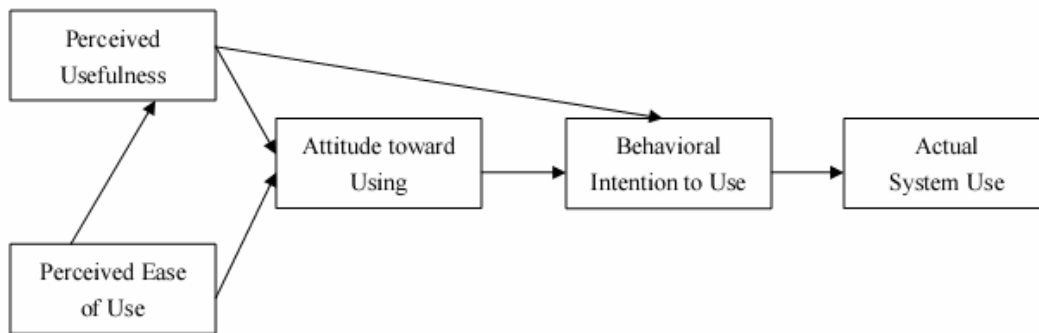
Source: Davis et al. (1989)

Figure 2.3: Technology Acceptance Model

2.3 Review of previous studies in Internet banking area

1. Sathye (1999) in his study tried to identify the factors affecting the adoption of Internet banking by Australian customers. The findings of the study revealed that lack of awareness and security concerns were the main obstacles for the adoption of Internet banking among the customers.

2. Tan & Teo (2000) studied the factors that influenced adoption of internet banking among customers in Singapore. They used a framework based on the theory of planned behaviour Ajzen (1985) and the diffusion of theory (Rogers 1983). An online survey was conducted for collecting the responses. Their main findings revealed that attitudinal and perceived behavioral control factors played significant role in influencing the intention to adopt internet banking.

3. Hoppe, Newman, & Mugera (2001) tried to replicate the Tan & Teo (2000) study in South Africa. They obtained results which were largely in agreement to the Singapore study, indicating the cross-cultural validity of the Tan & Teo (2000) framework.

4. Suganthi, Balachandher, & Balachandran (2001) conducted an empirical study on internet banking patronage in Malaysia. They identified the following factors which influenced internet banking adoption: *Accessibility, Reluctance, Costs, Trust in One's Bank, Security Concerns, Convenience* and *Ease of Use.* They studied the internet

banking adoption among internet banking users and non-internet banking users. They observed that more promotional activities should be carried out by banks in creating greater awareness among customers regarding the benefits of internet banking to ensure better adoption.

5. Polatoglu & Ekin (2001) conducted an exploratory study to analyze the customer acceptance of Internet banking services in a Turkish bank. Their findings suggest that customer confidence in Internet banking services tends to increase when they use the service for a long time.

6. Mattila, Karjaluoto, & Pento (2002) examined responses of 3000 survey respondents and 30 in-depth interview participants to study the customer channel preference in Finland. They tried to analyze the implication of new channel delivery channels in banking and its effect on customers and banks.

7. Karjaluoto, Mattila, & Pento (2002) tried to explore the factors affecting attitude formation towards internet banking in Finland. Factor analysis was performed on the

data of large sample size (n=1167) to identify the factors of internet banking adoption.

8. Karjaluoto, Mattila, & Pento (2002) tried to analyze the consumer beliefs and reactions to electronic banking channels in Finland. The paper discusses the state of internet banking in Finland and tries to investigate the customer perceptions towards it. They observe bank employees (in particular bank managers) could improve the chances of customer adoption internet banking by more effective customer communication.

9. Sciglimpaglia & Ely (2002) tried to study the impact of internet banking from "customer centric" perspective. They conclude that customers who don't mind doing business through Internet might leave their current bank if they find a rival offering the service. They observe that electronic channels of delivery cannot be sidelined by banks and they should strive to offer all the latest technology to their customers.

10. Singh, Chhatwal, & Heng (2002) in their paper tried to develop a framework for technology evolution in e-banking.

Their framework is based on the Revised Technology Adoption Life Cycle model. Life cycle for new channels of banking like ATM and Internet banking is discussed.

11. Kamal & Hassan (2003) tried to access the effects of introduction of electronic banking in Egypt. They try to analyze the acceptance of new channels using a model which is based Technology Acceptance Model. They added an additional construct in the form of *Trust.* They studied customer acceptance of these new channels: ATM, Credit Cards, Phone banking and Internet banking. They concluded that TAM could be considered as a useful tool in studies related to acceptance of new channels in banking.

12. Karjaluoto, Koivumäki, & Salo (2003) tried to study the banking habits of customers in Finland. They found that customer acceptance of new delivery channels is high and for digital customer relationship management is critical for banks. They also observed that non-internet banking user would be more loyal to the bank in comparison to internet banking user.

13. Mattila, Karjaluoto, & Pento (2003) tried to study adoption of internet banking among "mature" customers in Finland. They found that *perceived difficulty* and *lack of personal service* were the main barriers for mature customers to accept internet banking. Mature customers had more *concerns on security* of internet banking than other general customers.

14. Wang, Wang, & Lin (2003) in their study tried to identify the determinants of user acceptance of Internet banking among Taiwanese customers. The model developed by them for the study extended the TAM model with the inclusion of the construct *perceived credibility.* Significant effects of *perceived usefulness, perceived ease of use* and *perceived credibility* on behavioral intention for using Internet baking were observed among the participants.

15. Hui & Wan (2004) in their paper tried to examine "why current users of the Internet might want to shop on the Web". They investigate the relationship between consumer innovativeness and determination of internet banking. They conclude that "individuals with higher levels of

Internet usage and those who score high on open-*processing innovativeness* and *domain-specific innovativeness* are more likely to adopt the Internet for shopping".

16. Pikkarainen, Pikkarainen, Karjaluoto, & Pahnila (2004) in their study investigated online banking acceptance among finish customers. In the study they used an extended model of TAM. They studied influence of the following variables on the usage of internet banking: *Perceived Usefulness, Perceived Ease of Use, Perceived Enjoyment, Information on online banking, Security and privacy* and *Quality of Internet connection.* After performing multiple regression analysis on the collected data (n=268) they found that variables *Perceived Usefulness* and *Information on online banking* were the main factors influencing internet banking acceptance.

17. Kim & Prabhakar (2004) analyzed the reason for delayed acceptance of Internet as a channel for conducting commercial transactions. They develop a model which "posits that initial trust in the electronic channel as

banking medium and trust in bank are the major determinants of adoption behavior". They found existence of significant relationship between the initial trust in the electronic channel and the adoption of internet banking.

18. Sivanand & Geeta (2004) tried to examine the barriers in the adoption of mobile internet banking services in Malayasia.

19. Awamleh & Fernandes (2005) in their study analyzed the factors influencing customers satisfaction of the internet banking services offered by banks in United Arab Emirates (UAE). They factors they considered were *convenience, independence,* and *security* of internet banking transactions. Their findings revealed that *convenience* and *security* of internet banking transactions have a significant impact on satisfaction.

20. Guerrero, Egea, & González (2005) tried to carry out an empirical investigation on the adoption of internet banking among citizens in European countries. They try to explain the use of e-banking services on the basis of socio-demographic and internet specific behavioral indicators.

Data is analyzed using latent class regression. The influence of country, age, profession, and several Internet behaviors on the use of e-banking was found after data analysis.

21. Kim, Widdows, & Yilmazer (2005) tried to investigate the determinants of consumers' adoption of Internet banking using data from 2001 Survey of Consumer Finances. The secondary data is analyzed using Multinomial Logit Regression technique. They found that "consumers' ability, attitude and opportunity cost of time play a significant role on the decision of adopting Internet banking".

22. Alsajjan & Dennis (2006) introduced a new conceptual framework studying internet banking acceptance. In their model they try to integrate construct *Trust* into the Technology Acceptance Model (TAM) (Davis, 1989). In the conclusion they observed that "Integrating Trust as a set of beliefs into TAM should result in a model that offers better prediction of Online Banking acceptance".

23. Awamleh & Fernades (2006) analyses the internet banking channels and service preferences on customers in UAE.

They examines the factors influencing the intention to adopt or continued usage of internet banking among user and non-users of internet banking using model based on Technology Acceptance Model. Their findings revealed that factors *relative usefulness, perceived risk, computer efficacy* and *image* had a significant impact on continued usage of internet banking for internet banking users.

24. Mansumitrchai, Sanchez, Arreola, & Minor M.S. (2006) conducted a study on internet banking adoption among adopters and non-adopters in Mexica. Factor analysis conducted by them suggested these factors: *difficulty, trust, compatibility, third party concerned, human contact, social influence, security* and *computer proficiency* determined adoption of internet banking. Analysis of variance (ANOVA) showed that adopters and non-adopters differed on their attitudes towards these four attributes of the adoption: d*ifficulty, trust, compatibility and human contact.*

25. Ravi, Carr, & Sagar (2006) tried to identify profiles of Internet banking users in India. They used multiple

techniques like Classification and Regression Trees (CART), Support Vector Machines (SVM), Neural Network and Logistic Regression to analyzed data in their study. They derived 17 rules to profile Internet banking users and non-users.

26. Arunachalam & Sivasubramanian (2007) discussed the future of internet banking in India. They discuss the latest trends in Indian banking industry and new initiatives planned by Reserve Bank of India.

27. Khalil & Pearson (2007) tried to analyze influence of trust together with some attributes of Innovation Diffusion Theory on internet banking acceptance. They study was conducted among business students in Malaysia. The findings showed that variables such as *trust, relative advantage*, and *trialability* had significant effect on attitude towards using Internet banking.

2.4 Review of previous studies in E-Commerce area using TAM

1. Compeau & Higgins (1995) tried to examine the computer self-efficacy beliefs of users. The researchers tried to develop and validate a measure of computer self-efficacy

among IT users. They found that computer self-efficacy (i.e. abilities to use computers competently) exerts significant influence on individual's expectations and outcomes of using computers.

2. Gefen & Straub (1997) tried to examine the gender difference in perception and use of technology. They develop a model which extended from TAM and the model is tested in the context of e-mail usage. The study finding indicates the presence of difference in perception among men and women but not in use of e-mail.

3. Malhotra & Galletta (1999) tried to extend TAM taking into account the factor social influence. They developed a theoretical model and conducted a survey to test it. They found that social influence played an important role in technology adoption.

4. Jarvenpaa, Tractinsky, & Saarinen (1999) tried to examine the role played by consumer trust in adoption of Internet store in a cross-cultural setting. They studied the online shopping perception among Israeli and Australian customers using a model named Internet Customer Trust

Model. They found that results of the cross-cultural study gave similar results indicating the generalizability of the model.

5. Tan & Teo (1999) tried to investigate the factors affecting the diffusion of the Internet in Singapore. They developed a push-pull framework that incorporated political, technological, economic, and social factors for the study. Results revealed that both push-pull factors prevailed in the early stages of Internet diffusion. But pull forces predominated over push forces over passage of time.

6. Bhatnagar, Misra, & Rao (2000) in their study investigated online shopping behaviour of customers in US. They found that two factors *convenience* and *risk* played major role in forming customer behavioral intention to conduct shopping through Internet. They found that only two product categories "Other Web Services" and "Music and CDs" had positive customer preference for the Internet as a channel. This finding shows that customers perceive purchase of items or service which they cannot "feel, touch or know exactly" as a risky proposition over Internet.

7. Jarvenpaa, Tractinsky, & Vitale (2000) tried to examine the influence of consumer trust in an Internet store. They try to analyze if Internet provide a "level playing field" for large and small retailers. Their finding revealed that for the consumer the size and reputation of the e-retailer does play a major role in establishing a feeling of trust in them.

8. Venkatesh & Davis (2000) tried to extend the Technology Acceptance Model by adding constructs relating to social influence and cognitive instrumental processes. The constructs added to existing TAM model are *subjective norm, image, job relevance, output quality, result demostrability, experience* and *voluntariness.* The new model developed was named TAM2. They also conducted four longitudinal studies to test the TAM2 model.

9. Bobbitt & Dabholkar (2001) investigated the different attitudinal theories in predicting use of technology based self-service. They considered use of Internet as the technology based self-service. They analyzed the problem using Theory of Reasoned Action, Theory of Planned Behavior, Theory of Trying and other constructs.

10. Lowengart & Tractinsky (2001) in their study analyzed the consumer buying behavior at e-commerce sites. They examined the purchase decision of consumer for two product categories – books and computers. They found that consumers' attitudes differed while taking online purchase decisions. Consumers are more vary of risks involved in purchasing high value products like computer than low value items like books.

11. Mathieson, Peacock, & Chin (2001) tried to extend the TAM model by adding variable *perceived user resources.*

12. Gefen (2002) examined the customer loyalty in e-commerce environment. The study was based on five dimensions of service quality (SERVQUAL). The results showed that customer loyalty in e-commerce vendor increased with perceived better service quality and increased trust in the vendor.

13. Koufaris (2002) presented a model for examining online consumer using theories from three domains viz. information systems (Technology Acceptance Model),

marketing (Consumer Behavior), and psychology (Flow and Environmental Psychology).

14. Lee, Lee, & D. Schumann (2002) examined the influence of communication source and mode on consumer adoption of technological innovations. The researchers discuss different types of communication and its modalities in their paper. The results demonstrated that communication source influenced the adoption of technology among customers.

15. Van Slyke, Comunale, & Belanger (2002) tried examining the factors influencing the adoption of online shopping with special emphasis to the impact of trust. The results revealed that there is a positive impact of trust on the consumer's intention to conduct an online shopping activity.

16. Gefen, Karahanna, & Straub (2003) tried to develop a model for online shopping adoption among e-shoppers by integrating the Technology Acceptance Model antecedents *Perceived Usefulness* and *Perceived Ease of Use* with *Consumer Trust* on the e-commerce site. Their findings

showed that *Trust* plays a significant factor in customer adoption of online shopping.

17. Lee, Kozar, & Larsen (2003) in their paper traced TAM's history, investigated its findings and also tried to predict its future trajectory. They also conduct a qualitative survey among IS researchers to critically TAM and its utility.

18. Legris, Ingham, & Collerette (2003) conducted a critical review of Technology Acceptance Model. The paper discusses the origin of TAM and studies conducted based on it. They conducted a meta-analysis of previous studies to evaluate the effectiveness of the TAM model.

19. Chen, Gillenson, & Sherrell (2004) studied the influence of *perceived privacy* and *perceived security* in determining the online shopping behavior of customers. The researchers tried to develop a construct to measure the factors under study and validate it using a customer survey. The results revealed that *perceived privacy* and *perceived security* are indeed major determinant for online shopping adoption and "the effect of perceived privacy on trust in EC transactions is strongly mediated by perceive security".

20. Chen, Gillenson, & Sherrell (2004) tried to examine the factors responsible for the customer acceptance of virtual (online) stores. They develop a theoretical model based on TAM and tried to identify critical success factors for online stores.

21. Klopping & McKinney (2004) conducted a study by extending Technology Acceptance Model (TAM) with Task-Technology Fit (TTF) model to predict online shopping activity. When compared TAM/TTF model fared better than TAM.

22. McCoy & Fowler (2004) discussed about the information security awareness program undertaken at university of Missouri. The authors documented their efforts in creating and implementing a security awareness program along with the stumbling blocks they encountered during the process.

23. Burton-Jones & Hubona (2005) analyzed usage of technology had any impact on "individual differences" of the user. For the purpose of the study the researchers considered the following individual parameters: *staff*

seniority, level of education and age. The research model had these variables added to the Technology Acceptance Model. They found that differences had significant effect on frequency and volume of usage.

24. Cao & Mokhtarian (2005) provided an excellent review of literature on the area of online purchasing intention and adoption. They discussed theoretical frameworks that were used currently by various studies and systematically summarize previous studies in e-shopping research. Methodological approaches followed by previous research and data analysis used are also discussed in detail.

25. Kracher, Corritore, & Susan Wiedenbeck (2005) discussed about aspect of trust in success of e-commerce. They perform a detailed review of literature on trust in various fields including philosophy, psychology, sociology, management, and marketing. They explain the concept of online trust and discuss issues that could be taken up in future studies.

26. Bandyopadhyay & Fraccastoro (2007) examined the influence of culture on information technology adoption.

They tries to analyze cross cultural difference in IT adoption using UTAUT (Unified Theory of Acceptance and Use of Technology) model which includes social influence as factor that explains some of the variance in users' acceptance of technology. Their results show that social influences does play significant role in user's IT adoption practices.

27. Zhou, Dai, & Zhang (2007) proposed a new model for study of online shopping. They named proposed model as Online Shopping Acceptance Model (OSAM) OSAM which is an extension of TAM model, is specifically developed to explain consumer acceptance of online shopping. They also provided research questions and hypotheses for conducting studies based on the proposed model.

2.5 Summary

In this chapter theoretical models which predict behavioral intentions of an individual is presented. Two popular models for predicting consumer behaviour or attitude are Theory of Reason Action (TRA) and Theory of Planned Behavior (TPB). Researchers in information systems discipline use a theoretical model named

Technology Acceptance Model (TAM) for analyzing adoption/acceptance of technology among users. Review of literature came out with a substantial number of studies using models based on TAM, TRA or TPB for analyzing Internet banking acceptance among customers. In most of the Internet banking studies, researchers tried to develop models which are an extension of the TAM. In most of the studies constructs were added to the TAM model to make it suitable for studying Internet banking. Trust is the most important construct that was added to the TAM model to conduct studies predicting customer acceptance of Internet Banking. The information obtained from the review of literature was used to develop the research model for this study.

CHAPTER 3

METHODOLOGY

In the previous chapter a detailed review of existing literature was carried out to find a suitable theoretical framework for the research study. Theoretical explanation linking the adoption of Internet banking by customer could be found in social psychology. In this chapter the methodology and research design used for conducting the research work is discussed.

3.1 Research Strategy

Research study is a systematic investigation to establish facts or principles. Researchers have to select a research paradigm based on the field and topic of study. Research in information systems realm could be divided into two paradigms : positivistic (quantitative) and interpretive (qualitative) (Galliers, 1994). Positivism is based upon reductionist thinking, having its origins in the natural sciences and study of laws of nature. Positivism uses quantitative measurement and replicable testing in its aim for generalisibility and prediction. Positivist studies generally attempt

to test theory, in an attempt to increase the predictive understanding of phenomena. Interpretive studies generally attempt to understand phenomena through the meanings that people assign to them. Interpretive research does not predefine dependent and independent variables, but focuses on the full complexity of human sense making as the situation emerges. It uses qualitative methods to seek out explanations and gain an understanding of human and social systems.

Both quantitative and qualitative methods have been used in the current study. Qualitative approach using an open-ended questionnaire was used in the initial phase to understand the outlook of customers to online banking. The research model developed for this study was tested using quantitative method by conducting a survey. Table 3.1 gives an overview of the research design.

Research Level	Detailed Description
Type of research questions	Analyzing factors affecting customer acceptance of internet banking
Strategy	Survey
Paradigm	Positivistic

Data collection method	Web based / Paper
Major References	Davis (1989) , Tan & Leo (2000),Pikkarainnes et al (2004), Kim & Prabhakar (2004), Gefen et al (2003), Gefen (2002).
Participants	Banking customers
Type of results	Descriptive and Quantitative

Table 3.1: Overview of research design (Adopted from Dhillon

(1995))

3.2 Research Design

Review of literature gave knowledge of theoretical framework of work done by researchers in the area of study. Most of the previous studies utilized theoretical framework provided by Technology Acceptance Model (TAM) as the base. TAM provided a sound theoretical base for analyzing customer acceptance of information technology. When studying technology acceptance, researchers extended TAM model to include constructs relevant to the research problem area. For example, the construct relevant in the case of internet banking acceptance could be trust, privacy, security etc. In the present study the research model was developed by taking constructs from TAM and constructs from similar studies in the past. Since there were not many studies in internet banking

acceptance with respect to Indian context, the researcher decided to first conduct a qualitative study with a group of banking customers. The qualitative study was conducted using an open ended questionnaire. The open ended questionnaire was prepared to elicit the customer perception about internet banking in India. The questionnaire for the elicitation study is provided in Appendix I. The questions in the qualitative study were framed in accordance with the recommendations given for conducting the study using Theory of Planned Behavior (TPB) model (Francis et al., 2004). The questions could be used to develop the indirect (belief-based) measures for all the predictor constructs in the TPB model (attitude; subjective norm; and perceived behavioral control). The elicitation questionnaire was administered to 30 banking customers comprising of 20 male respondents and 10 female respondents. The results of the qualitative study are given below:
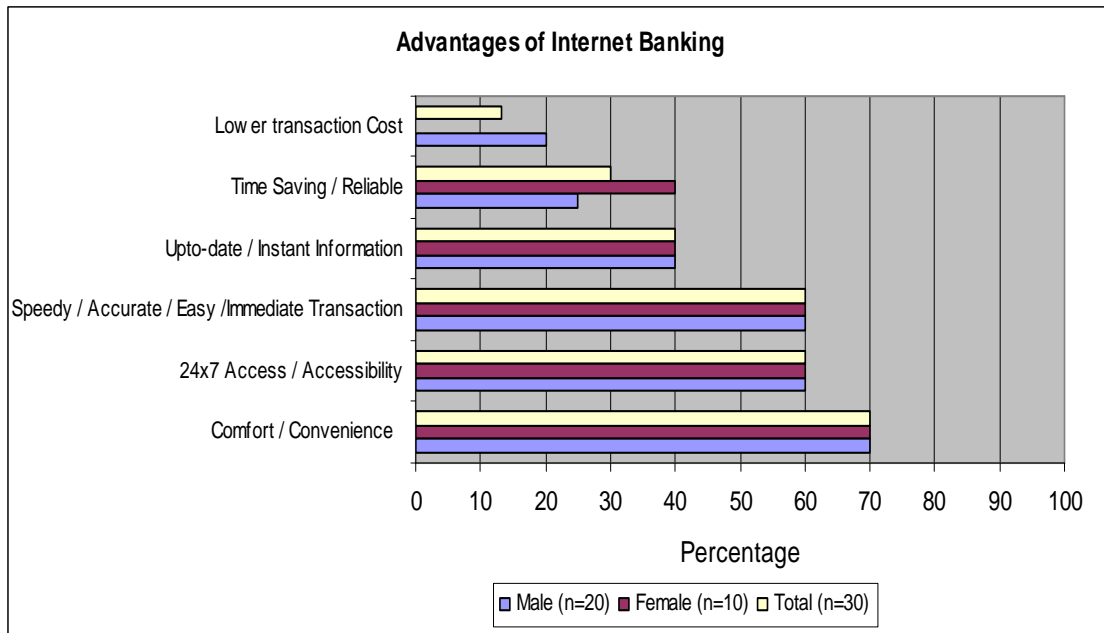
Figure 3.1: Advantages of Internet Banking
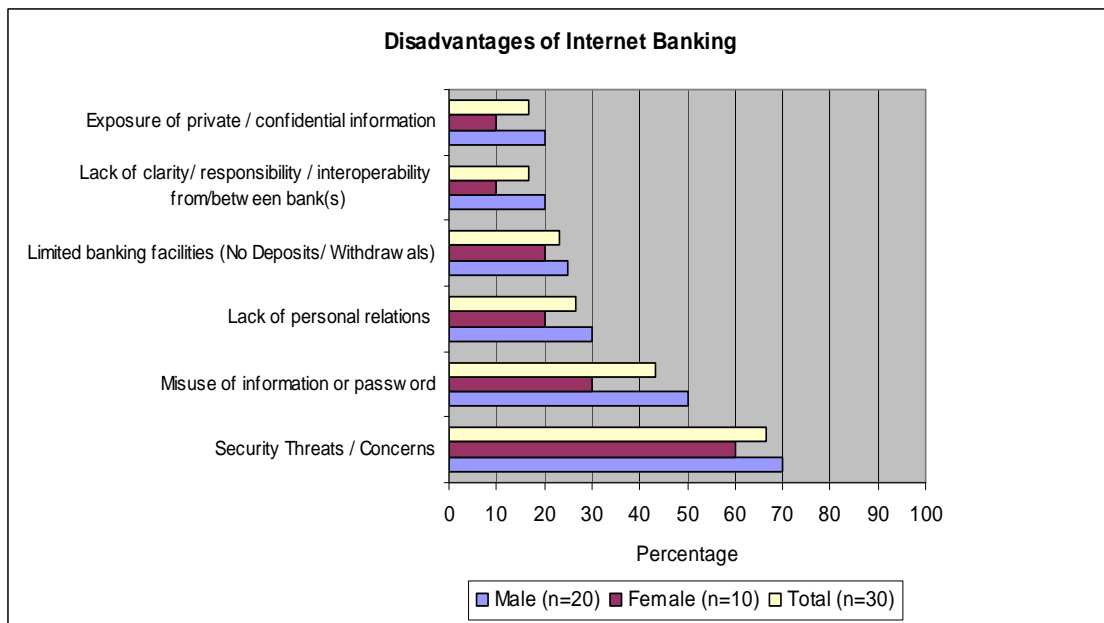
Figure 3.2: Disadvantages of Internet Banking

Other views about Internet Banking
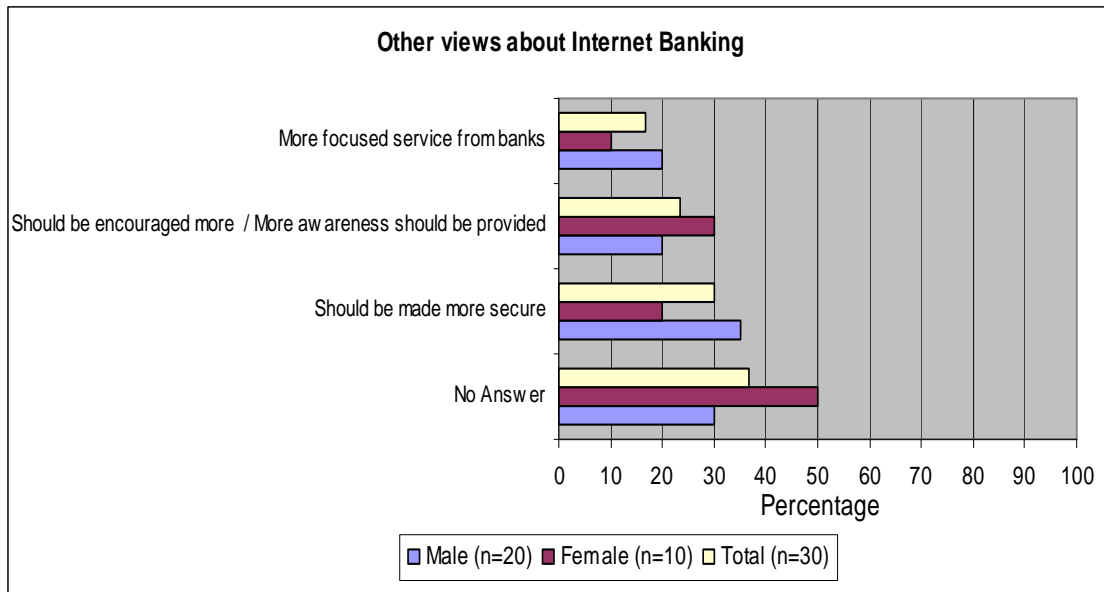
Figure 3.3: Other views about Internet Banking (Attitude)

Individual/Groups recommending Internet Banking
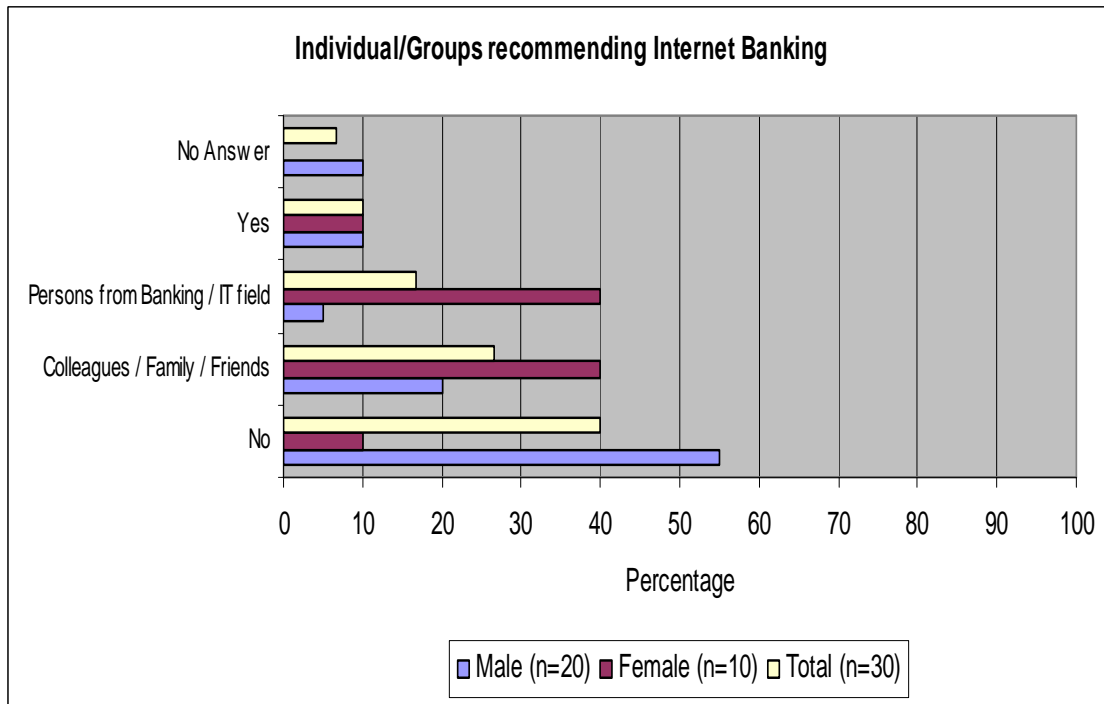
Figure 3.4: Individual/Groups recommending Internet Banking
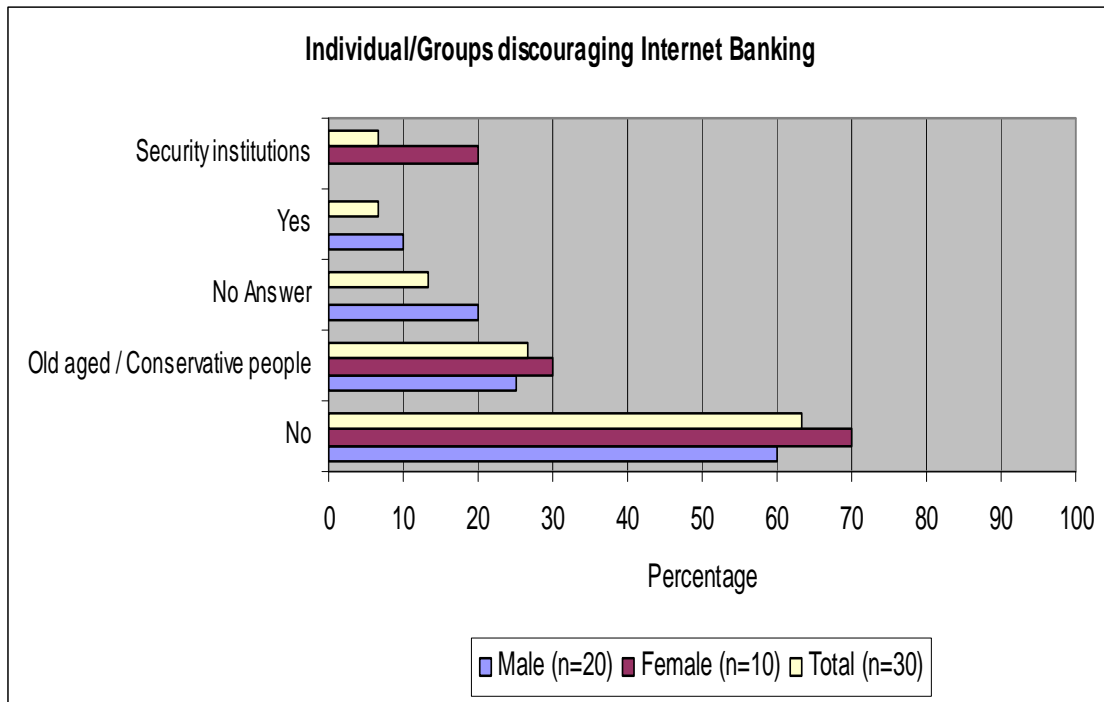
Figure 3.5: Individual/Groups discouraging Internet Banking
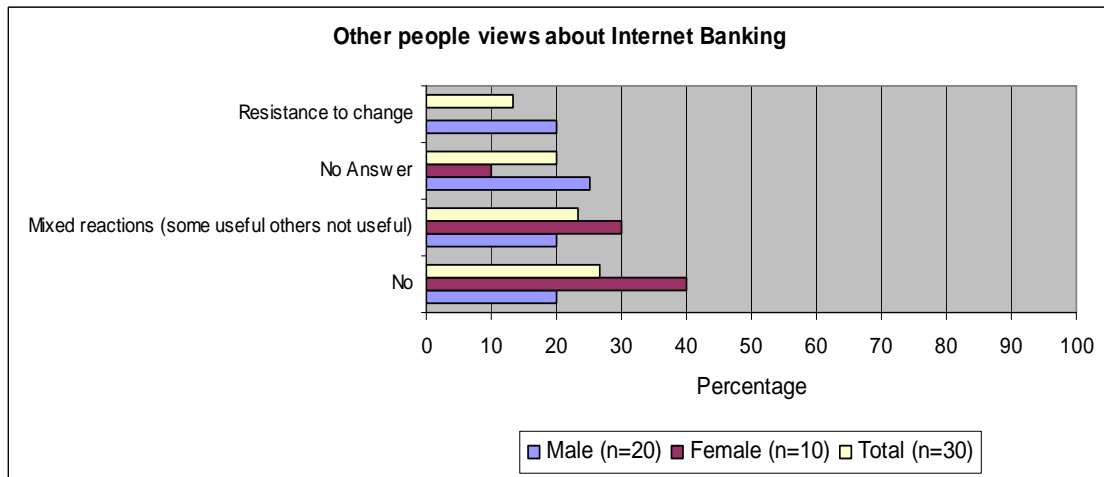
Figure 3.6: Other views about Internet Banking (Subjective Norms)
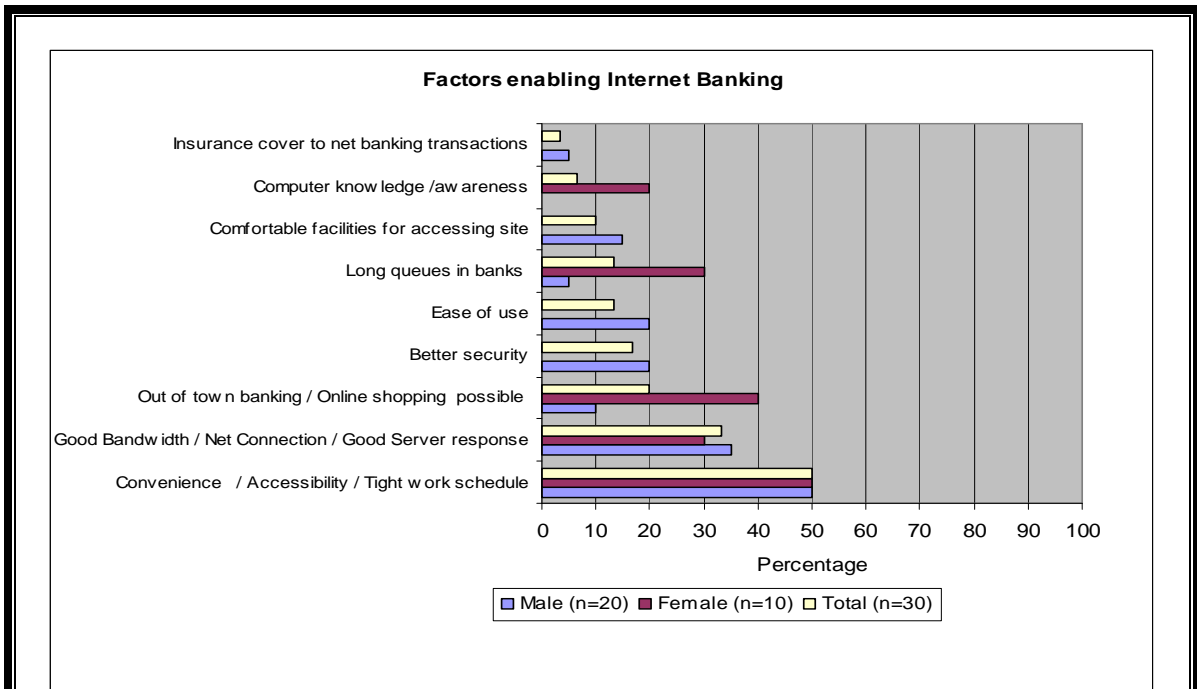
Figure 3.7: Factors enabling Internet Banking
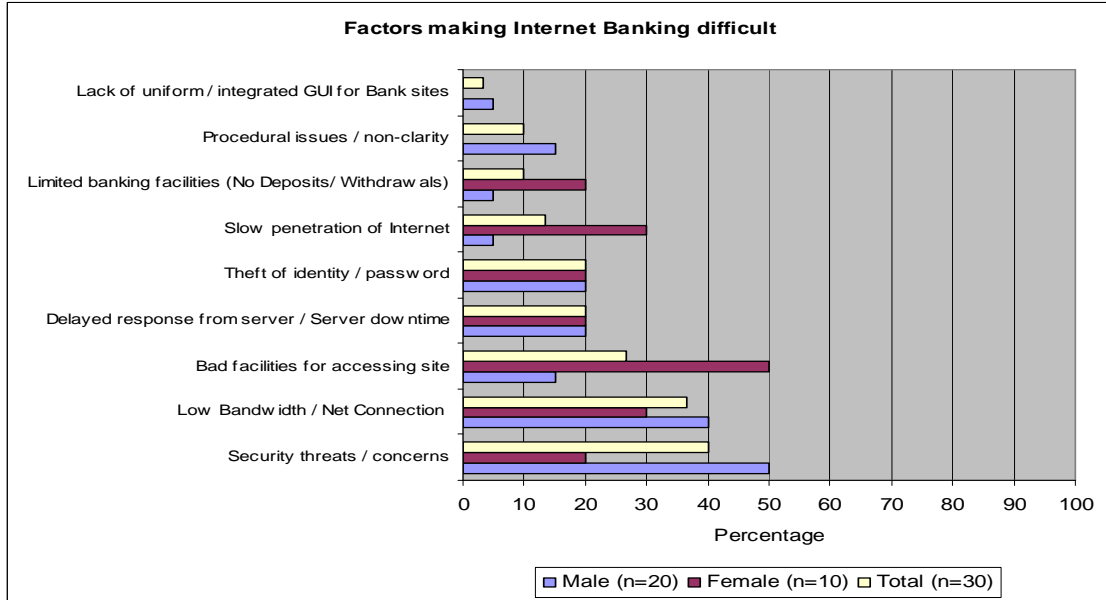
Figure 3.8: Factors making Internet Banking difficult
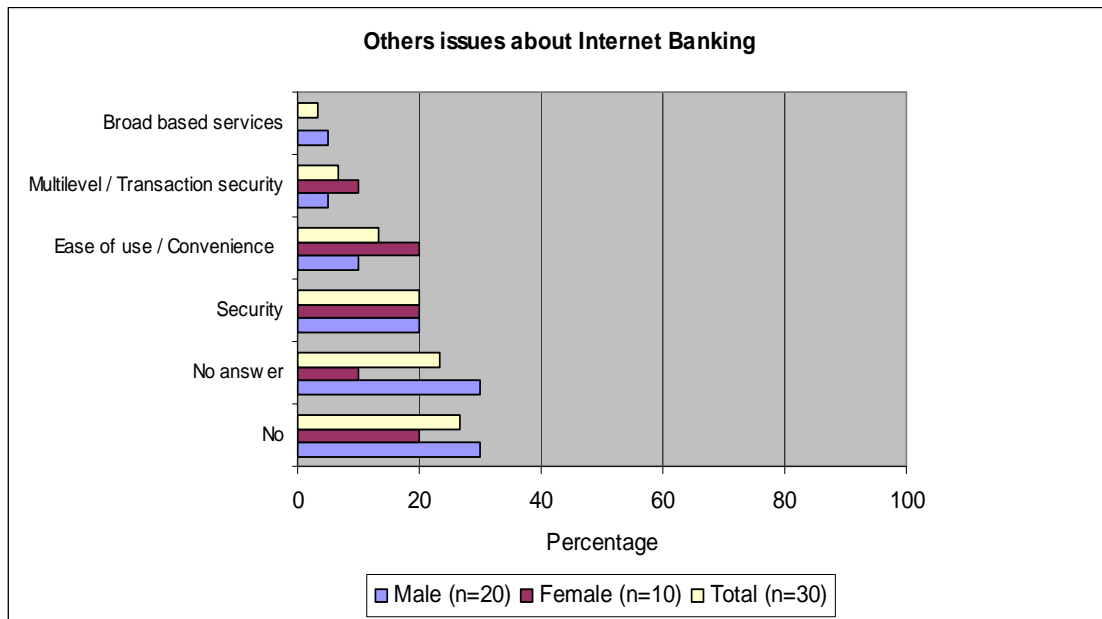
Figure 3.9: Other issues about Internet Banking (Perceived Behavioral Control)

Qualitative study helped in gaining customer's opinion on internet banking and findings of the study was useful in framing the research model for this study. Table 3.2 summarizes the main findings of the elicitation study. The table also contains the TPB model construct viz. attitude, subjective norms and perceived behavioral control with respect to internet banking acceptance among the respondents of the study.

TPB Model Construct	Questions	Major answers
Attitude	Advantages	Comfort / Convenience 24x7 Access / Accessibility Speedy / Accurate / Easy /Immediate Transaction
	Disadvantages	Security Threats / Concerns Misuse of information or password Lack of personal relations Limited banking facilities (No Deposits/ Withdrawals)
Subjective Norm	Approving group	Colleagues / Family / Friends Persons from Banking / IT field
	Disapproving group	Old aged / Conservative people
Perceived Behavioral Control	Enabling factors	Convenience / Accessibility / Tight work schedule Good Bandwidth / Net Connection / Good Server response Out of town banking / Online shopping possible Better security Ease of use
	Disabling factors	Security threats / concerns Low Bandwidth / Net Connection Bad facilities for accessing site Delayed response from server / Server downtime Theft of identity / password

Table 3.2: Summary of findings of Elicitation Study

From the findings of elicitation study it is clear that customer attitude towards internet banking is formed after considering the advantages like comfort & accessibility and disadvantages like security issues & privacy concerns. Customer's subjective norms were formed after taking into opinion of approving group like colleagues & friends and skeptics like old people or people with

conservative views. Customer's perceived behavioral control beliefs were formed taking into consideration enabling factors like convenience, good connectivity with bank site etc and disabling factors like security concerns, lack of facilities, identity theft concerns etc. The study findings did not show too much of gender difference in most of the customer beliefs. However, it could be seen that female respondent's answers to subjective norm questions showed greater influence from others.

3.3 Research Model

Based on the literature review and findings of the qualitative study conducted on a focus group, the researcher developed a research model indicating the acceptance of internet banking among customers. The model contained seven factors that the researcher posits to have an effect on internet banking acceptance (Figure 3.10). The research model developed is primarily based on the Theory of Planned Behaviour (TPB) (Ajzen, 1985) and the Technology Acceptance Model (TAM) (Davis et al., 1989). The constructs for *consumer security concerns, customer security awareness* and *trust and privacy* was added to the model to make it

more relevant for internet banking acceptance. Research constructs and hypotheses posited are given below.

3.3.1 Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)

PU and PEOU are constructs used in the Technology Acceptance Model (Davis et al., 1989). Davis defines PU as "the degree to which a person believes that using a particular system would enhance his or her job performance" Davis (1989). In the TAM model the construct PEOU is introduced as a major factor that determines acceptance of technology among users. Davis defines PEOU as "the degree to which a person believes that using a particular system would be free of effort" Davis (1989). PU and PEOU could be considered as important factors that forms user attitude towards use of technology. Therefore, the constructs PU and PEOU used in TAM could be said to be based on the Theory Reasoned Action (Fishbein and Ajzen, 1975). An application which is perceived to be easier to use would be accepted more by users and in the same way users would only accept those applications they think would be more useful for them. Applying these construct in the internet

banking context the researcher has come up with three hypotheses, viz;

H1: *Perceived Usefulness (PU) has a positive effect on the customer acceptance of online banking*

H2a: *Perceived Ease of Use (PEOU) has a positive effect on the customer acceptance of online banking*

H2b: *Perceived Ease of Use (PEOU) has a positive effect on the perceived usefulness of online banking*

3.3.2 Consumer Awareness (CA)

Awareness on issues related to internet banking particularly security precautions could be a major factor affecting acceptance of internet banking. Not many studies have considered this factor while conducting research on this area. Consumer awareness could be determinant for other constructs such as security concerns and trust. Taking into consideration these factors the following hypothesis is formed.

H3: *Perceived consumer awareness (CA) has a positive effect on the customer acceptance of online banking.*

3.3.3 Consumer Security Concerns (SC)

Security concerns among customers is a major factor affecting acceptance of internet banking. Cao and Mokhtarian (2005) list perceived risk and confidence as important factors determining e-shopping behavior of customers. Pikkarainnes et al (2004) used security and privacy as constructs in their study on internet banking acceptance. They concluded that security and privacy had significant impact on internet banking acceptance. Security concerns figured as major deterrent to internet banking in the elicitation study conducted by the researcher also. Tan and Teo (2000) included risk as a construct that formed attitude towards internet banking acceptance, which is similar to security risk. Taking into consideration customer security concerns the following hypothesis is developed:

H4: *Perceived consumer security concerns (SC) has a negative effect on the customer acceptance of online banking.*

3.3.4 Quality of Facilities (QF)

 Respondents of the elicitation study mentioned presence of good net connection and bandwidth as factors that enabled adoption of internet banking. The construct quality of facilities was added

seeing the importance that was attached with that factor. Pikkarainnes et al (2004) had included quality of internet connection as factor in their study. Quality of facilities assumes more importance in Indian context due to the comparatively poor infrastructure facilities available. The following hypothesis is developed for this factor:

H5: *Perceived quality of facilities for accessing bank site has a positive effect on the customer acceptance of online banking.*

3.3.5 Subjective Norms (SN)

Subjective norms refer to "the person's perception that most people who are important to him think he should or should not perform the behavior in question" (Fishbein and Ajzen 1975, p. 302). It was included as construct in the model to check if a user's attitude had any influence based on his/her peer group recommendation. Tan and Teo (2000) included this construct in their study on internet banking adoption. Cao and Mokhtarian (2005) found many cases of social and psychological characteristics influencing adoption of e-shopping intention and adoption in their qualitative study. To investigate if subjective norms had any influence on internet banking acceptance the following hypothesis is formed:

H6: *The beliefs associated with subjective norms are significantly related to an individual's intention to adopt Internet banking.*

3.3.6 Trust and Privacy (TP)

Trust is an important determinant of banking services; it is also true for internet banking services. Customers should trust the internet banking infrastructure of the banking to adopt it. Trust is a major construct used in any empirical study in the area of e-commerce and internet banking (Cao and Mokhtarian (2005), Tan and Teo (2000), Pikkarainnes et al (2004)). Gefen and Karahanna (2003) in their study added trust into the TAM model and analyzed the impact of trust online shopping acceptance. In the same study the researchers came up with different aspects of trust a customer could have while considering adoption of online shopping. Kim and Prabhakar (2004) concluded that initial trust in electronic channel had significant effect in the adoption of internet banking. Similarly, privacy is also a major concern of internet users. With the increasing incidents of identity theft and misuse of personal information collected, customers are very cautious with their privacy. Pikkarainnes et al (2004) included privacy construct in

their study. The following hypothesis is developed taking into consideration trust and privacy:

H7: *Perceived trust and privacy on the bank has a positive effect on the customer acceptance of online banking.*

Table 3.3 provides all the constructs and hypotheses used in this study.
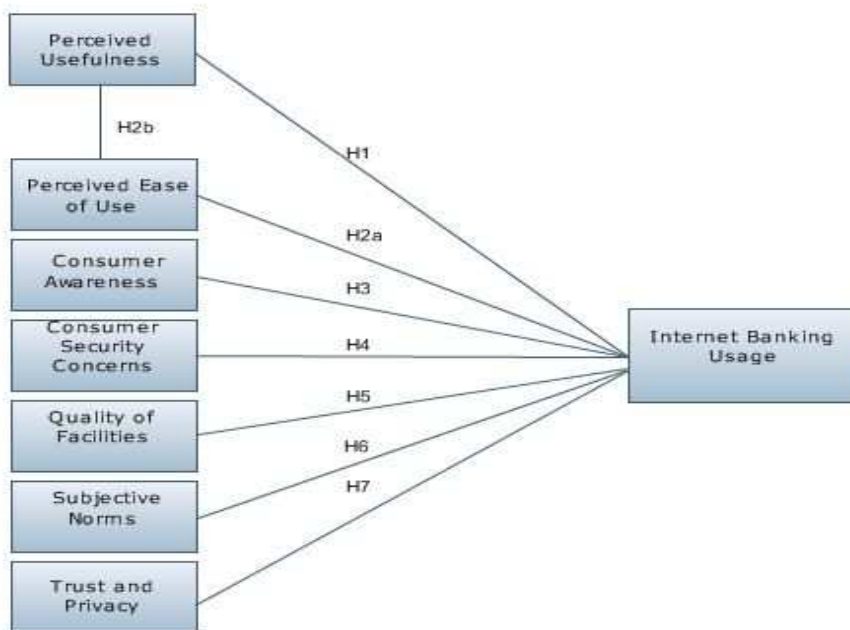
Figure 3.10: Research Model

Research Construct	Hypotheses	Reference
Perceived Usefulness (PU)	H1: *Perceived Usefulness (PU) has a positive effect on the customer acceptance of online banking*	Pikkarainnes et al (2004), Chan (2001), Davis (1989) , Tan & Leo (2000)
Perceived Ease of Use (PEOU)	H2a*: Perceived Ease of Use (PEOU) has a positive effect on the customer acceptance of online banking* H2b: *Perceived Ease of Use (PEOU) has a positive effect on the perceived usefulness of online banking*	Tan & Leo (2000), Pikkarainnes et al (2004), Chan (2001), Davis (1989)
Consumer Awareness (CA)	H3:*Perceived consumer awareness (CA) has a positive effect on the customer acceptance of online banking*	
Consumer Security Concerns (SC)	H4: *Perceived consumer security concerns (SC) has a negative effect on the customer acceptance of online banking*	Pikkarainnes et al (2004), Chan (2001), Tan & Leo (2000)
Quality of Facilities (QF)	H5: *Perceived quality of facilities for accessing bank site has a positive effect on the customer acceptance of online banking.*	Pikkarainnes et al (2004)
Subjective Norms (SN)	H6: *The beliefs associated with subjective norms are significantly related to an individual's intention to adopt Internet banking.*	Pikkarainnes et al (2004), Tan & Leo (2000)
Trust and Privacy (TP)	H7: *Perceived trust and privacy on the bank has a positive effect on the customer acceptance of online banking*	Pikkarainnes et al (2004), Tan & Leo (2000), Kim & Prabhakar (2004), Gefen et al (2003), Gefen (2002).

Table 3.3: Research Constructs and Hypotheses

3.4 Survey Questionnaire design

Questionnaire for the survey was designed to gather the respondent's personal information and views about the factors included in the research model. The survey questionnaire contained four sections. Section I contained questions for capturing respondent's demographic details. Section II, questions to collect respondent's computer and internet usage, Section III, questions to collect users banking patronage and usage of e-banking channels and finally Section IV, questions to measure the respondent's views on the research model. While designing the questionnaire questions from previous surveys were also considered and relevant important questions were included in the survey. Table 3.4 contains questions in the first three sections.

Variable	Options	Reference
Section 1: General Demographics		
Gender	Male / Female	[1]
Age	Below 15 years , 16-20, 21-25 , 26-30,31-35,36-40,41-45,46-50, 51- 55,56-60, 61 or above	[9]
Marital status	Rather not say / Divorced / Married/ Separated / Single / Widowed	[9]
Highest education	Primary School/ Secondary School/ Bachelor's Degree (B.Sc, B.A, B.Com, B.Tech , BBA)/ Master's Degree (M.Sc, M.A, M.Com , M.Tech , MBA/ Doctorate Degree (PhD) / Professional Degree	[2] [9]

	(ACA,ICWA,ACS,CISA) /Others	
Current Profession	Student / Professional / Academic / Self-employed / Executive - Junior / Executive – Senior / Manager/ Housewife / Retiree / Others	[2]
Industry	Banking/finance/insurance / Business services /Communications/utility/transport Computer related /Consulting Education / Engineering/R&D Government / Health care/medical / Manufacturing Outsourcing/Services / Retail/wholesale Other	[10]
Organization type	Public sector (e.g. government) / Private sector (e.g. most businesses and individuals) / Not-for-profit sector / Don't know /Other	[9]
Income (Gross monthly)	Under 5000 / 5000-10000 / 10000-15000 / 15000-20000 / 20000-25000 / 25000 and above / Rather not say	[9]
Section II: Computer and Internet Usage/ Competence		
How long have you been using the Internet (including using email, gopher, ftp, etc.)?	Less than 6 months / 6 to 12 months/ 1 to 3 years / 4 to 6 years / 7 years or more	[9]
Places of Net access	Home / Work / School / Cybercafe / Mobile / Others	
Frequency of net usage	Daily / Weekly / Monthly / Less than once a month	[9]
Average weekly net usage	0-5 hrs/ 5-15 hrs / 15-25 hrs / 25-35 hrs / 35 – 45 hrs / 45 hrs and above	[6]
Type of Internet access	28.8 Kbps / 33.6 Kbps / 56 Kbps / 128 Kbps / Broadband / Not aware of the speed	[11]
Operating System used	Windows – XP, 2000, 98, 95 etc / Macintosh / Linux / No idea /	[11]

	Others	
Browser	Internet Explorer / Netscape Navigator / FireFox / Opera / Others	
Type of services used	WWW, E-mail / FTP / IRC / Instant Messenger /Voice Chat / Video Conferencing / Telnet / P2P Network	
Activities carried using Net	ordered a product/service from a business, government or educational entity by filling out a form on the web made a purchase online for more than Rs 1000 created a web page customized a web page for yourself (e.g. MyYahoo, CNN Custom News) changed your browser's "startup" or "home" page changed your "cookie" preferences participated in an online chat or discussion (not including email) listened to a radio broadcast online made a telephone call online used a nationwide online directory to find an address or telephone number taken a seminar or class about the Web or Internet bought a book to learn more about the Web or Internet	[9]
Products/services bought online	Books Electronic Gadgets Railway Tickets Apparel Accessories Apparel Gifts Computers & Peripherals Airline Tickets Music Movies Hotel Booking Magazines	[12]

	Home Tools & Products Home Appliances Toys Jewelry Movie Tickets Beauty Products Sporting Goods Others	
Comfort level of Computer use	Very comfortable / Somewhat comfortable / Neither comfortable nor uncomfortable / Somewhat uncomfortable / Very uncomfortable	[9]
Comfort level of Net use	Very comfortable / Somewhat comfortable / Neither comfortable nor uncomfortable / Somewhat uncomfortable / Very uncomfortable	[9]
Satisfaction of current skills	Very satisfied - I can do everything that I want to do / Somewhat satisfied - I can do most things I want to do / Neither satisfied nor unsatisfied /Somewhat unsatisfied - I can't do many things I would like to do / Very unsatisfied - I can't do most things I would like to do	
Section III : General Banking Patronage		
No of bank accounts	1 / 2 / 3 / 4/ 5/6 /7 /-------	[6]
Primary Bank	SBI/ SBT / Federal Bank / ICICI / HDFC/ ING Vysa / IDBI / Vijaya / CSB / SIB / PNB / Centurion / OBC/ Citibank / Others	[2]
Rank of frequently used Banking services	Branch Counter / ATM / Internet Banking /Phone (Tele) Banking / Mobile Banking	[6]

Table 3.4: Survey questionnaire for collecting personal details.

Refrences : [1] Pikkarainnes et al (2004), [2] Tan & Leo (2000),

[3] Kim & Prabhakar (2004), [4] Gefen et al (2003), [5] Gefen (2002), [6] Chan (2001)

[7] Bits Consumer Confidence Toolkit (2005) [8] ICICI Bank [9] GVU 10th Survey [10] AC Nielson [11] ICICI Web Survey [12] IOAI (2005)

3.4.1 Survey Items Design

While developing the items for measuring constructs of the research model, items in the previous studies were examined. Wherever possible, items used in the study were adopted from items used previously to ensure content validity and readability which would minimize chances of misleading and inaccurate recording of responses. Usage of items which has been tested thoroughly in the past studies would result in good measure of respondent's views on the variables. Findings of the elicitation study helped in framing the most appropriate questions. Table 3.5 contains the items used in this study along with mention of previous studies from which the questions were adapted. There were no previous items found for the measurement of construct consumer security awareness. Therefore the items for that construct were developed afresh. Each question used for measuring respondent view about a construct was developed as a statement like *"Online banking makes it easier for me to conduct my banking transactions"*. Response to an item is captured using a seven-point Likert scale containing response level from "Strongly Disagree to

Strongly Agree". In total, fifty four items were added in the survey questionnaire for measuring the seven constructs used in the research model (Table 3.5). Pre-testing of the survey questionnaire was carried out among 30 students from Cochin University in order to identify if there were any ambiguous questions, problems in understanding the questions, check if the questions were properly worded and to get feedback on questionnaire in general. Respondents in the pre-test mentioned that questions were straight forward and they did not face any problems in responding. Most of the respondents complained that the length of the questionnaire was little long and there were similar sounding questions in section four. Since this was one of the first study in India in this area, the researcher decided to leave the sections on collecting personal information unchanged so as to gather maximum information about a respondent. Regarding the questions in section four the researcher decided to keep the similar sounding questions so that survey results become more reliable. Statistical analysis of pre-test survey data showed some items getting much varying responses from the respondents. Removing such items would have improved the construct validity, but the researcher decided to keep those

types of questions also in the final survey. Questionnaire used in this survey is provided in Appendix II.

Construct	Item	Description	Reference
Perceived Usefulness (PU)	PU1	Online banking makes it easier for me to conduct my banking transactions	[2]: RELADV1
	PU2	Online Banking gives me greater control over my finances.	[2]: RELADV2
	PU3	Online banking allows me to manage my finances more efficiently.	[2]: RELADV3
	PU4	Online banking is a convenient way to manage my finances	[2]: RELADV4
	PU5	Online Banking is more user-friendly than other existing channels, including Bank Branches, ATMs, and Phone Banking.	[6]
	PU6	Online Banking gives me access to banking services at any time (24x7)	[6]
	PU7	Online banking is reliable	
	PU8	Using online banking facilities allows me to save time	
	PU9	Online banking gives me upto-date information of my account	
	PU10	Using an online banking allows me to conduct banking transactions quickly	[1]
Perceived Ease of Use (PEOU)	PEOU1	Online banking is easy-to-use.	[6]
	PEOU2	Online banking is an easy way to conduct banking transactions.	[6]

	PEOU3	Learning to operate online banking would be easy for me.	[6]
	PEOU4	It is easy for me to remember how to perform tasks with online banking.	[6]
	PEOU5	I believe it would be easy to get online banking to do what I want it to do.	[6]
	PEOU6	Using online banking does not require a lot of mental effort.	[6]
	PEOU7	Lack of clarity in procedures related to online banking worries me	
	PEOU8	Lack of personal relations while using online banking worries me	
Consumer Awareness (CA)	CA1	Monitoring my accounts and statements frequently and thoroughly, ensures that all activity is accurate.	[7]
	CA2	I should always thoroughly tear or shred documents with personal information.	[7]
	CA3	I should protect my account information like personal identification number (PIN, Username , Password etc	[7]
	CA4	I should ensure that my computer(s) are equipped with a security toolkit (software) to help keep trespassers out..	[7]
	CA5	I should change my passwords periodically, using strong passwords that could not be easily guessed.	[7]
	CA6	I should always log off from my bank site after an online banking session.	[7]
	CA7	I should shut off/disconnect my computer from the Internet when not in use.	[7]

	CA8	I should be suspicious of requests for personal information from unknown sources.	[7]
	CA9	During phishing attack, a fraudster sends an e-mail to consumers, falsely claiming to be from a legitimate company, in hopes of luring consumers to a "spoofed" website.	[7]
	CA10	Any software that covertly gathers user information through the user's Internet connection without his or her knowledge is called as a Spyware.	[7]
Consumer Security Concerns (SC)	SC1	I am not confident over the security aspects of online banking in India.	[2] [6]
	SC2	Others will know information concerning my online banking transactions.	[6] [2]
	SC3	Others can tamper with information concerning my online banking transactions.	[6] [2]
	SC4	Advances in internet security technology provide for safer Internet Banking.	[6]
	SC5	It is very easy for my money to be stolen if using online banking.	[6]
	SC6	If I sign up for online banking, a hacker will be more likely to access my account.	[7]
	SC7	Most identity theft is caused by fraudsters who steal information from an online bank account.	[7]
	SC8	When it comes to money, you're always safer using traditional paper statements and mail.	[7]
	SC9	If a thief wants to access my accounts (online bank) there is not much I can do about it.	[7]
	SC10	If fraudsters get access to my online bank	[7]

		accounts, I could lose all my money.	
Quality of Facilities (QF)	QF1	I am happy with the quality of facilities available for accessing online banking services.	
	QF2	I am satisfied with the speed of internet connection available for accessing online banking facilities	
	QF3	I feel slow penetration of internet in India is hampering online banking usage.	
	QF4	I am happy with the server response from my online bank while accessing it.	
Subjective Norms (SN)	SN1	There are individual/groups recommending online banking adoption	
	SN2	My bank encourages me to use online banking	
	SN3	Officials working in my bank encourage me to use online banking.	
	SN4	My friends or colleagues encourage me to use online banking.	
	SN5	There are individual/groups discouraging online banking adoption.	
Trust and Privacy (TP)	TP1	I trust online bank as a bank	[1]
	TP2	I trust in the technology used by my bank / I trust in the technology an online bank is using	[1]
	TP3	I have confidence in the security of the computer used for accessing online bank	
	TP4	I trust my internet service provider	
	TP5	I trust in the ability of my bank to protect my	[1]

		privacy	
	TP6	I believe bank may use confidential information about me to its advantage	[3]
	TP7	I believe bank may take advantage of my weakness/problems	[3]

Table 3.5: List items used in the Survey

Refrences : [1] Pikkarainnes et al (2004), [2] Tan & Leo (2000), [3] Kim & Prabhakar (2004), [4] Gefen et al (2003), [5] Gefen (2002), [6] Chan (2001),[7] Bits Consumer Confidence Toolkit (2005)

3.5 Sampling Method

Conducting a survey by choosing the respondents using a random sampling technique is the best way to get a good representative sample of the population. However, such technique could not be applied in this study due the following reasons:

- non-availability of population size or data

- difficulty in getting customer details from banking offering internet banking services

- demographic profile of a respondent of this survey is highly specific – ideal profile of a respondent would be computer literate user who has access to internet and is a customer of

internet banking facility, finding such type of respondent is difficult.

Therefore, the researcher resorted to a choice-based or convenient sampling approach for selecting the respondents for this survey. Respondents to this survey were chosen from the alumni list of Cochin University, membership list of professional associations like ICAI, IEI, ISACA etc and employees of service industry companies.

3.6 Data collection

In this study two different data collection method were employed viz. web based (online) survey and paper based survey. Web based survey was chosen as Internet is the most suitable medium for communicating the target group of the survey i.e. internet banking customers. Web based survey is one of the cheapest mechanism for conducting a study like this. Moreover, it would allow respondents in different geographic location to take the survey at their own convenience (Gunn, 2002). Web survey would also allow better quality responses as the survey responses could be checked for any error or omission during the time of taking the survey itself and it could be rectified at that instance itself. The researcher could put

strict control over information to be gathered and respondent would be required to meet those criteria.

Web based survey for the research study was setup using an open source software named PHP Surveyor (now Lime Survey www.limesurvey.org). The researcher setup the survey in a web server and invitation to participate in the survey were send to the respondents. To eliminate duplication of responses, an invitation with a valid key was send to each respondent. Respondent with a valid key could only respond to the survey and the survey could be taken only once by a respondent. Users could also register themselves by providing an e-mail address to participate in the survey. Invitations to newly registered users were sent automatically by the survey software. For the research study 500 invitation e-mails were sent and 169 responses were received. To increase response rate three reminders were sent to the respondents. The survey was made online during May 2006 and data were collected for a period of 3 months. The response rate of 33.8% falls in the typical response rate of web surveys.

Paper based survey was conducted to gather data for the study. Survey questionnaire were printed and distributed among participants of "General Management and Communication Skills (GMCS)" course conducted by Institute of Chartered Accounts of India, Kochi Chapter, students of Cochin University and members of Kochi chapter of Information Systems Audit and Control Association (ISACA). Participants of 10 batches of GMCS course during 2006-2007 were chosen for the survey. 300 survey questionnaires were distributed among the participants, 250 questionnaires were filled and returned, and 97 fully filled questionnaires were taken for the final analysis. Thus the effective response rate of paper based survey is 32.3%.

3.7 Statistical Analysis

Data collected from the survey were analyzed and interpreted using various statistical techniques usually employed in positivistic study. Statistical analysis was carried out using SPSS (Statistical Package for Social Sciences) version 14.0. Descriptive analysis techniques like average, percentage, frequencies etc were performed on the data for getting an overall structure of the sample. Survey figures were converted into charts and tables to analyze the

demographic characteristics of the respondents. Descriptive analyses helped in representing snapshot of a sample at a particular time and in turn gave more clarity to the observed behavior. The reliability and construct validity of the research instrument were assessed before final analysis of the data. The Cronbach alpha coefficient for each research variable was computed to test for reliability. To analyze for convergent and discriminant validity of the constructs, factor analysis was used. Hypotheses were tested using linear regression analysis and multi-linear regression analysis was used to test model's prediction capabilities.

3.8 Summary

In this chapter research method, survey mode, survey instrument, sample selection and survey process were described and discussed. Research model used for this study was presented along with the hypotheses developed. Statistical techniques used for analyzing the data collected were also discussed. In the next chapter, results of the data analyses are reported.

CHAPTER 4

DATA ANALYSIS AND MODEL TESTING

Previous chapter discussed the research model, methodology and hypotheses developed for the study. The results of the survey conducted as part of the research study is presented and analyzed in this chapter. Descriptive statistics of the survey respondents are presented first. Then, reliability and validity of the survey questionnaire is analyzed. Finally, hypotheses and research model are tested using regression techniques.

4.1 Descriptive analysis

As discussed in Chapter 4, a survey was undertaken using web and paper based techniques. After discarding incomplete and vague responses 266 responses were taken for final analysis. Table 5.1 presents the demographics related age, gender, marital status, educational qualification and the profession of respondents. The respondents comprised of 205 males (77.07%) and 61 females (22.93%). The higher percentage of male respondents indicates that access to new technologies like internet or internet banking is

adopted more by males than females. The gender pattern of a previous study conducted on E-commerce was 85% males and 15% females (IOAI, 2005). Around 80% of the total respondents' fall in the age group 21-35 years. This indicates that internet adoption among youngsters is high. More than fifty percent of the respondents are married. Educational level of respondents was high - 28.57 % of the respondents had a graduate degree, 33% post graduate degree and 35% professional qualifications like ACA, ACWA or ACS. Since using internet requires specific skills higher educational level among respondents was expected. Nearly 50% of the respondents responded as "Professional" to the question regarding their profession. Nine percent of the respondents were students, and nearly 30% were employed in various capacities. All these are indicated in Table 5.1. Table 5.2 gives details of the industry in which the respondents worked. Majority of the respondents were working in service industry- 29% of the respondents worked in banking, finance or insurance sectors, 22.5% in computer related business. Around 67% of respondents worked in the "private" sector. Monthly income of 43% of respondents were more than Rs. 25000 and 10%, earned between Rs. 20000 - Rs.25000 in a month. From the demographic details of

the respondents it can be seen that internet adoption is more among youngsters falling in the age group of 21-35 years. They are educated, work in service industry and earn more than Rs. 20000 month.

Variables		All Respondents		Males		Females	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Gender	Male	205	77.07	205	100	-	-
	Female	61	22.93	-	-	61	100
Age	Below 15 years	0	0.00%	0	0.00%	0	0.00%
	16-20	3	1.13%	1	0.49%	2	3.28%
	21-25	59	22.18%	30	14.63%	29	47.54%
	26-30	87	32.71%	71	34.63%	16	26.23%
	31-35	67	25.19%	61	29.76%	6	9.84%
	36-40	20	7.52%	16	7.80%	4	6.56%
	41-45	13	4.89%	12	5.85%	1	1.64%
	46-50	10	3.76%	8	3.90%	2	3.28%
	51-55	3	1.13%	2	0.98%	1	1.64%
	56-60	2	0.75%	2	0.98%	0	0.00%
	61 or above	2	0.75%	2	0.98%	0	0.00%
Marital Status	No answer	2	0.75%	2	0.98%	0	0.00%
	Rather not say	1	0.38%	1	0.49%	0	0.00%
	Married	139	52.26%	108	52.68%	31	50.82%

	Single	122	45.86%	92	44.88%	30	49.18%
	Separated	1	0.38%	1	0.49%	0	0.00%
	Divorced	0	0.00%	0	0.00%	0	0.00%
	Widowed	1	0.38%	1	0.49%	0	0.00%
Educational Qualification	Primary School	0	0.00%	0	0.00%	0	0.00%
	Secondary School	1	0.38%	1	0.49%	0	0.00%
	Bachelor's Degree	76	28.57%	64	31.22%	12	19.67%
	Master's Degree	88	33.08%	66	32.20%	22	36.07%
	Doctorate Degree (PhD)	3	1.13%	3	1.46%	0	0.00%
	ACA,ACWA,ACS	93	34.96%	66	32.20%	27	44.26%
	Other	5	1.88%	5	2.44%	0	0.00%
Profession	Student	23	8.65%	14	6.83%	9	14.75%
	Professional	134	50.38%	105	51.22%	29	47.54%
	Academic	9	3.38%	6	2.93%	3	4.92%
	Self-employed	14	5.26%	13	6.34%	1	1.64%
	Executive - Junior	22	8.27%	16	7.80%	6	9.84%
	Executive – Senior	24	9.02%	20	9.76%	4	6.56%
	Manager	34	12.78%	30	14.63%	4	6.56%
	Housewife	2	0.75%	0	0.00%	2	3.28%
	Retiree	1	0.38%	1	0.49%	0	0.00%
	Other	3	1.13%	0	0.00%	3	4.92%

Table 4.1: Demographic details of survey participants

Variables		All Respondents		Males		Females	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Industry	Banking/Finance/Insurance	77	28.95%	58	28.29%	19	31.15%
	Business services	11	4.14%	10	4.88%	1	1.64%
	Communications	6	2.26%	4	1.95%	2	3.28%
	Utility/Transport	7	2.63%	7	3.41%	0	0.00%
	Computer related	60	22.56%	52	25.37%	8	13.11%
	Consulting	17	6.39%	15	7.32%	2	3.28%
	Education	12	4.51%	7	3.41%	5	8.20%
	Engineering/R&D	12	4.51%	10	4.88%	2	3.28%
	Government	4	1.50%	3	1.46%	1	1.64%
	Health care/medical	1	0.38%	1	0.49%	0	0.00%
	Manufacturing	8	3.01%	6	2.93%	2	3.28%
	Outsourcing/Services	8	3.01%	6	2.93%	2	3.28%
	Retail/wholesale	5	1.88%	5	2.44%	0	0.00%
	Other	38	14.29%	21	10.24%	17	27.87%
Organization Type	No answer	16	6.02%	9	4.39%	7	11.48%
	Public sector	24	9.02%	19	9.27%	5	8.20%
	Private sector	179	67.29%	150	73.17%	29	47.54%
	Not-for-profit sector	3	1.13%	3	1.46%	0	0.00%
	Other	44	16.54%	24	11.71%	20	32.79%
Monthly Income (Rs)	Rather not say	58	21.80%	37	18.05%	21	34.43%
	Under 5000	1	0.38%	1	0.49%	0	0.00%
	5000-10000	16	6.02%	13	6.34%	3	4.92%
	10000-15000	25	9.40%	20	9.76%	5	8.20%
	15000-20000	24	9.02%	20	9.76%	4	6.56%
	20000-25000	27	10.15%	22	10.73%	5	8.20%
	25000 and above	115	43.23%	92	44.88%	23	37.70%

Table 4.2: Sample Details – Industry, Organization Type and

Monthly Income

4.1.1 Internet Usage and Banking Habits

In the survey it was decided to gather the internet usage and

banking habits of the respondents. In this section the results of the

same are discussed. Table 4.3 gives details of the internet usage among the respondents. From the table it is evident that most of the respondents were having good exposure to internet- more 75% of the respondents were using internet for more than 4 years. Nearly 70% the respondents have access to internet from their home or office. Among the respondents, 43% were accessing internet from Cybercafes and 10.5% through their mobile phones. It was seen that respondents also accessed internet frequently- 72.5% of the respondents accessed internet on a daily basis and 19.5%, at least once in a week. It could be noted that respondents spend fairly good time while they accessed net - 47% used net for 0-5 hours in a week, 24%, for 5-15 hours in a week, 10%, for 15-25 hours a week and 10%, were heavy net users with more than 45 hours net usage in a week. More than half of the respondents were accessing net through a high speed broad band connection. In the case of operating systems and browser used for net access Microsoft Corp's OSs like Windows –XP, 2000, 98, 95 etc and Internet Explorer had absolute majority with 98% and 86.5% respectively. Firefox browser was used by 11% of the respondents.

The popular services used by respondents were as follows: E-mail (95%), World Wide Web (88%), Instant Messenger (45%), Voice Chat (29%), FTP (20%) and Video Conferencing (13.5%). With regards to activities done using net: 50% of the respondents had ordered some product or service though net, 65% had participated in an online chat or discussion, 46% had changed the browser "start-up" page, 42% had used net phony service (Refer Table 4.4). Books topped with 31% response among the products or services bought online, followed by Railway Tickets (29.7%) and Airline Tickets (25.5%) (Refer Table 4.5). It is interesting to note that the response rates for white goods like home tool & products and home appliances was quite low viz. 3.76% and 6.39% respectively.

Variables		All Respondents		Males		Females	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Internet Usage	Less than 6 months	8	3.01%	7	3.41%	1	1.64%
	6 to 12 months	7	2.63%	6	2.93%	1	1.64%
	1 to 3 years	40	15.04%	20	9.76%	20	32.79%
	4 to 6 years	98	36.84%	74	36.10%	24	39.34%
	7 years or more	113	42.48%	98	47.80%	15	24.59%
Place of access	Home	186	69.92%	139	67.80%	47	77.05%
	Work	177	66.54%	150	73.17%	27	44.26%
	School	16	6.02%	9	4.39%	7	11.48%
	Cybercafe	115	43.23%	91	44.39%	24	39.34%
	Mobile	28	10.53%	24	11.71%	4	6.56%
	Other	11	4.14%	11	5.37%	0	0.00%
Frequency of web access	Daily	193	72.56%	152	74.15%	41	67.21%
	Weekly	52	19.55%	38	18.54%	14	22.95%
	Monthly	15	5.64%	9	4.39%	6	9.84%
	Less than once a month	6	2.26%	6	2.93%	0	0.00%
Weekly net usage	0-5 hrs	125	46.99%	90	43.90%	35	57.38%
	5-15 hrs	63	23.68%	51	24.88%	12	19.67%
	15-25 hrs	28	10.53%	22	10.73%	6	9.84%
	25-35 hrs	9	3.38%	7	3.41%	2	3.28%
	35-45 hrs	12	4.51%	8	3.90%	4	6.56%
	45 hrs and above	29	10.90%	27	13.17%	2	3.28%
Net access mode	No answer	7	2.63%	3	1.46%	4	6.56%
	28.8 Kbps	7	2.63%	4	1.95%	3	4.92%
	33.6 Kbps	7	2.63%	4	1.95%	3	4.92%
	56 Kbps	32	12.03%	25	12.20%	7	11.48%
	128 Kbps	26	9.77%	21	10.24%	5	8.20%
	Broadband	144	54.14%	118	57.56%	26	42.62%
	Not aware of the speed	43	16.17%	30	14.63%	13	21.31%

Operating System	Windows – XP, 2000, 98, 95 etc	261	98.12%	201	98.05%	60	98.36%
	Macintosh	1	0.38%	1	0.49%	0	0.00%
	Unix/Linux	3	1.13%	3	1.46%	0	0.00%
	Other	1	0.38%	0	0.00%	1	1.64%
Browser used	Internet Explorer	230	86.47%	176	85.85%	54	88.52%
	Netscape Navigator	1	0.38%	1	0.49%	0	0.00%
	FireFox	31	11.65%	26	12.68%	5	8.20%
	Opera	3	1.13%	2	0.98%	1	1.64%
	Other	1	0.38%	0	0.00%	1	1.64%
Services Used	WWW	234	87.97%	183	89.27%	51	83.61%
	E-mail	253	95.11%	195	95.12%	58	95.08%
	FTP	54	20.30%	49	23.90%	5	8.20%
	IRC	6	2.26%	6	2.93%	0	0.00%
	Instant Messenger	120	45.11%	92	44.88%	28	45.90%
	Voice Chat	77	28.95%	55	26.83%	22	36.07%
	Video Conferencing	36	13.53%	30	14.63%	6	9.84%
	Telnet	21	7.89%	19	9.27%	2	3.28%
	P2P Network	24	9.02%	23	11.22%	1	1.64%

Table 4.3: Internet Usage Stats

Which of the following have you done?	All Respondents		Males		Females	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
ordered a product/service from a business, government or educational entity by filling out a form on the web	132	49.62%	110	53.66%	22	36.07%
made a purchase online for more than Rs 1000	95	35.71%	84	40.98%	11	18.03%
created a web page	71	26.69%	57	27.80%	14	22.95%
customized a webpage for yourself (e.g. MyYahoo, CNN Custom News)	67	25.19%	54	26.34%	13	21.31%
changed your browser's "startup" or "home" page	124	46.62%	108	52.68%	16	26.23%
changed your "cookie" preferences	109	40.98%	95	46.34%	14	22.95%
participated in an online chat or discussion (not including email)	174	65.41%	132	64.39%	42	68.85%
listened to a radio broadcast online	85	31.95%	74	36.10%	11	18.03%
made a telephone call online	113	42.48%	94	45.85%	19	31.15%
used a nationwide online directory to find an address or telephone number	99	37.22%	81	39.51%	18	29.51%
taken a seminar or class about the Web or Internet	45	16.92%	39	19.02%	6	9.84%

Table 4.4: Internet browsing activities/capabilities

Products and services bought online	All Respondents		Males		Females	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Books	83	31.20%	66	32.20%	17	27.87%
Apparel Accessories	32	12.03%	25	12.20%	7	11.48%
Computers & Peripherals	42	15.79%	35	17.07%	7	11.48%
Movies	21	7.89%	17	8.29%	4	6.56%
Home Tools & Products	10	3.76%	7	3.41%	3	4.92%
Jewelry	8	3.01%	7	3.41%	1	1.64%
Sporting Goods	13	4.89%	11	5.37%	2	3.28%
Electronic Gadgets	31	11.65%	25	12.20%	6	9.84%
Apparel	15	5.64%	14	6.83%	1	1.64%
Airline Tickets	68	25.56%	58	28.29%	10	16.39%
Hotel Booking	40	15.04%	34	16.59%	6	9.84%
Home Appliances	17	6.39%	13	6.34%	4	6.56%
Movie Tickets	35	13.16%	30	14.63%	5	8.20%
Railway Tickets	79	29.70%	67	32.68%	12	19.67%
Gifts	29	10.90%	26	12.68%	3	4.92%
Music	21	7.89%	18	8.78%	3	4.92%
Magazines	30	11.28%	28	13.66%	2	3.28%
Toys	11	4.14%	10	4.88%	1	1.64%

Table 4.5: Products and Services bought Online

More than 54% of the respondents revealed that they were feeling "Very Comfortable" while using computers in general (Table 4.6). Similarly nearly 49%, of the respondents felt "Very Comfortable" while using Internet (Table 4.7) and half of the respondents were "Somewhat satisfied" with their internet usage skills (Table 4.8).

How comfortable do you feel using computers, in general?	All Respondents		Males		Females	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Very uncomfortable	49	18.42%	40	19.51%	9	14.75%
Somewhat uncomfortable	5	1.88%	5	2.44%	0	0.00%
Neither comfortable nor uncomfortable	10	3.76%	5	2.44%	5	8.20%
Somewhat comfortable	56	21.05%	42	20.49%	14	22.95%
Very comfortable	146	54.89%	113	55.12%	33	54.10%

Table 4.6: Comfort level of using Computers

How comfortable do you feel using the Internet?	All Respondents		Males		Females	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Very uncomfortable	51	19.17%	41	20.00%	10	16.39%
Somewhat uncomfortable	8	3.01%	7	3.41%	1	1.64%
Neither comfortable nor uncomfortable	10	3.76%	4	1.95%	6	9.84%
Somewhat comfortable	68	25.56%	51	24.88%	17	27.87%
Very comfortable	129	48.50%	102	49.76%	27	44.26%

Table 4.7: Comfort level of using Internet

How satisfied are you with your current skills for using the Internet?	All Respondents		Males		Females	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Very unsatisfied - I can't do most things I would like to do	19	7.14%	18	8.78%	1	1.64%
Somewhat unsatisfied - I can't do many things I would like to do	20	7.52%	14	6.83%	6	9.84%
Neither satisfied nor unsatisfied	15	5.64%	11	5.37%	4	6.56%
Somewhat satisfied - I can do most things I want to do	134	50.38%	98	47.80%	36	59.02%
Very satisfied - I can do everything that I want to do	78	29.32%	64	31.22%	14	22.95%

Table 4.8: Satisfaction level of Internet usage Skills

Responses of the respondents with respect to banking section of the survey are discussed below (Table 4.9). More the 69% of the respondents have banking relationships with 2 – 4 banks. State Bank of India (35%) and State Bank of Travancore (25%) had maximum customer patronage among the public sector banks. New generation banks which gave customers more options and facilities also enjoyed good patronage among the respondents as seen from the figures of ICICI Bank (35%) and HDFC Bank (30%). Private sector banks with regional focus also had high customer acceptance level; Federal Bank (30%) and South Indian Bank (10%) came top in this group. Foreign Banks like Citibank and Standard Chartered Bank had less than ten percent of customer patronage.

Variables		All Respondents		Males		Females	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
How many banks are you a client of ?	1	51	19.17%	36	17.56%	15	24.59%
	2	90	33.83%	61	29.76%	29	47.54%
	3	62	23.31%	51	24.88%	11	18.03%
	4	35	13.16%	33	16.10%	2	3.28%
	5	19	7.14%	16	7.80%	3	4.92%
	6	5	1.88%	4	1.95%	1	1.64%
	7	1	0.38%	1	0.49%	0	0.00%
	8+	3	1.13%	3	1.46%	0	0.00%
Which of the following banks do you patronise?	State Bank of India	93	34.96%	75	36.59%	18	29.51%
	State Bank of Travancore	67	25.19%	43	20.98%	24	39.34%
	Federal Bank	80	30.08%	63	30.73%	17	27.87%
	ICICI Bank	94	35.34%	79	38.54%	15	24.59%
	HDFC Bank	78	29.32%	62	30.24%	16	26.23%
	IDBI Bank	4	1.50%	4	1.95%	0	0.00%
	Vijaya Bank	7	2.63%	6	2.93%	1	1.64%
	ING Vysya	9	3.38%	6	2.93%	3	4.92%
	Catholic Sryian Bank	14	5.26%	13	6.34%	1	1.64%
	South Indian Bank	27	10.15%	23	11.22%	4	6.56%
	Punjab National Bank	5	1.88%	4	1.95%	1	1.64%
	Centurion Bank	7	2.63%	5	2.44%	2	3.28%
	Oriental Bank of Commerce	0	0.00%	0	0.00%	0	0.00%
	Citibank	26	9.77%	23	11.22%	3	4.92%
	Standard Chartered Bank	20	7.52%	16	7.80%	4	6.56%
	Other	125	46.99%	101	49.27%	24	39.34%

Table 4.9: Banking Stats

Table 4.10 shows the frequency of usage of various banking services by the respondents in a month. As seen from the table usage of ATM channel is the highest among the respondents, over 80% of the respondents visited ATM more than once in a month. The high acceptance level of ATM might be the reason for lower usage of branch banking among the respondents. Only half of the respondents visited their bank's branch for conducting banking operations in a month. Lower branch banking could be also due the type of respondents in this survey – majority of respondents were employed professionals and there were only few number of business people among the respondents. Majority of the respondents (54%) were not using Internet Banking even once in a month, 19%, "1 to 3 times" and 11%, "3 to 8 times" in a month. Nearly 10% of the respondents used internet banking over 12 times in a month. There exists considerable gender disparity among participants in the case of internet banking usage – 72% of the female respondents were not using internet banking even once in a month. The usage level of other channels Phone (Tele) banking and Mobile Banking were very less among the survey participants. More than eighty percent of the respondents were not using these services even once a month.

Frequency of Use of Banking services in a Month		All Respondents		Males		Females	
		Frequency	Percent	Frequency		Frequency	Percent
Branch Counter	Nil	135	50.75%	106	51.71%	29	47.54%
	1 to 3 times	91	34.21%	66	32.20%	25	40.98%
	3 to 8 times	26	9.77%	22	10.73%	4	6.56%
	8 to 12 times	5	1.88%	5	2.44%	0	0.00%
	Over 12 times	9	3.38%	6	2.93%	3	4.92%
ATM	Nil	46	17.29%	30	14.63%	16	26.23%
	1 to 3 times	64	24.06%	46	22.44%	18	29.51%
	3 to 8 times	73	27.44%	58	28.29%	15	24.59%
	8 to 12 times	37	13.91%	33	16.10%	4	6.56%
	Over 12 times	46	17.29%	38	18.54%	8	13.11%
Internet Banking	Nil	145	54.51%	101	49.27%	44	72.13%
	1 to 3 times	51	19.17%	42	20.49%	9	14.75%
	3 to 8 times	29	10.90%	25	12.20%	4	6.56%
	8 to 12 times	16	6.02%	13	6.34%	3	4.92%
	Over 12 times	25	9.40%	24	11.71%	1	1.64%
Phone (Tele) Banking	Nil	212	79.70%	161	78.54%	51	83.61%
	1 to 3 times	39	14.66%	32	15.61%	7	11.48%
	3 to 8 times	11	4.14%	9	4.39%	2	3.28%
	8 to 12 times	2	0.75%	1	0.49%	1	1.64%
	Over 12 times	2	0.75%	2	0.98%	0	0.00%
Mobile Banking	Nil	235	88.35%	177	86.34%	58	95.08%
	1 to 3 times	14	5.26%	12	5.85%	2	3.28%
	3 to 8 times	9	3.38%	8	3.90%	1	1.64%
	8 to 12 times	4	1.50%	4	1.95%	0	0.00%
	Over 12 times	4	1.50%	4	1.95%	0	0.00%

Table 4.10: Frequency of Banking Channel Usage

4.2 Survey Instrument Validation

Validation of the instrument used for the survey is necessary before applying any statistical test for testing the research model. Different validities and what they test in a survey instrument are given in Table 4.11. Straub (1989) and Straub et al., (2004) provides excellent guidelines for conducting instrument validation in positivistic studies in MIS. In their guidelines for research validities, the authors observes that checking for construct validity, reliability (internal consistency and statistical conclusion validity) should be considered mandatory. Content validity of the survey instrument in this study is ensured by:

- Extensive literature review

- A customer elicitation study using an open questionnaire to understand the customer concerns.

- Using items which were validated in previous studies

Construct validity and reliability of the instrument was checked by using factor analysis and calculation of Cronbach's alpha. Techniques used for testing the validity are discussed in the following paragraphs.

Validity	Questions raised by the validity
Content Validity	Are instrument measures drawn from all possible measures of the properties under investigation?
Construct Validity	Do measures show stability across methodologies? That is, are the data a reflection of true scores or artifacts of the kind of instrument chosen?
Reliability	Do measures show stability across the units of observation? That is, could measurement error be so high as to discredit the findings?
Internal Validity	Are there untested rival hypotheses for the observed effects?
Statistical Validity	Do the variables demonstrate Conclusion relationships not explainable by chance or some other standard of comparison?

Table 4.11: Instrument Validation - Questions Answered by the Validities (Adopted from Straub, 1989)

4.2.1 Reliability Testing

Reliability is the extent to which an experiment, test, or any measuring procedure yields the same result on repeated trials. Internal consistency is the extent to which tests or procedures assess the same characteristic, skill or quality. It is a measure of

the precision between the observers or of the measuring instruments used in a study. An important measure of the reliability of a psychometric instrument is Cronbach's alpha. Cronbach's alpha will generally increase when the correlations between the items increase. Cronbach's alpha of 0.60/0.07 or more and 0.95 is considered as best figures for optimum internal consistency of the instrument (Straub et al., Nunnally 1967). The Cronbach's alpha coefficients of the constructs used in this study are presented in Tables 4.12 to Tables 4.18.

Item	Mean	Std. Deviation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
PU1	5.78	1.484	.912	
PU2	5.01	1.588	.909	
PU3	5.11	1.527	.907	
PU4	5.30	1.474	.907	
PU5	5.17	1.546	.915	.920
PU6	5.92	1.454	.912	
PU7	4.76	1.606	.920	
PU8	5.91	1.314	.910	
PU9	6.00	1.244	.912	
PU10	5.80	1.382	.911	

Sample Size (N) = 266 No. of Items = 10

Table 4.12: Reliability for construct *Perceived Usefulness*

Item	Mean	Std. Deviation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
PEOU1	5.55	1.461	.731	
PEOU2	5.72	1.329	.722	
PEOU3	5.69	1.410	.715	
PEOU4	5.60	1.403	.725	.782
PEOU5	5.27	1.470	.722	
PEOU6	5.27	1.476	.747	
PEOU7	4.18	1.771	.830	
PEOU8	3.92	1.815	.835	

Sample Size (N) = 266 No. of Items = 8

Table 4.13: Reliability for construct *Perceived Ease of Use*

Item	Mean	Std. Deviation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
CA1	5.58	1.439	.905	
CA2	5.32	1.639	.910	
CA3	6.25	1.368	.899	
CA4	5.96	1.408	.900	
CA5	6.01	1.406	.897	.913
CA6	6.18	1.397	.898	
CA7	5.27	1.911	.923	
CA8	5.93	1.569	.900	
CA9	5.46	1.593	.903	
CA10	5.60	1.578	.908	

Sample Size (N) = 266 No. of Items = 10

Table 4.14: Reliability for construct *Consumer Awareness*

Item	Mean	Std. Deviation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
SC1	4.05	1.838	.818	
SC2	3.90	1.731	.805	
SC3	4.14	1.701	.796	
SC4	4.96	1.525	.855	
SC5	3.87	1.586	.799	.831
SC6	4.10	1.531	.804	
SC7	4.34	1.502	.805	
SC8	4.01	1.655	.813	
SC9	3.97	1.687	.826	
SC10	4.64	1.805	.823	

Sample Size (N) = 266 No. of Items = 10

Table 4.15: Reliability for construct *Consumer Security Concerns*

Item	Mean	Std. Deviation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
QF1	4.90	1.451	.663	
QF2	4.79	1.556	.629	.743
QF3	4.65	1.555	.812	
QF4	4.80	1.407	.606	

Sample Size (N) = 266 No. of Items = 4

Table 4.16: Reliability for construct *Quality of Facilities*

Item	Mean	Std. Deviation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
SN1	4.74	1.532	.715	
SN2	4.82	1.672	.663	
SN3	4.69	1.584	.689	.769
SN4	4.62	1.588	.694	
SN5	3.72	1.660	.842	

Sample Size (N) = 266 No. of Items = 5

Table 4.17: Reliability for construct *Subjective Norms*

Item	Mean	Std. Deviation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
TP1	4.88	1.663	.747	
TP2	5.04	1.508	.735	
TP3	4.67	1.631	.755	
TP4	4.63	1.547	.754	.798
TP5	4.86	1.497	.742	
TP6	4.15	1.807	.809	
TP7	3.60	1.778	.842	

Sample Size (N) = 266 No. of Items = 7

Table 4.18: Reliability for construct *Trust & Privacy*

As seen from the tables the Cronbach's alpha coefficient for all the constructs were above .70 which is a satisfactory figure for the current study. Cronbach's alpha for constructs like Perceived Usefulness and Consumer Awareness is quite high. Cronbach'a alpha for constructs *Perceived Usefulness* and *Perceived Ease of Use* in previous studies were higher than .90. But in the current

study, the alpha for construct *Perceived Ease of Use* was only .782 and it could be seen from the Table 4.13 that deleting items PEOU7 and PEOU8 from the construct resulted in better alpha coefficient figure. The item PEOU7 was worded "Lack of clarity in procedures related to online banking worries me" and item PEOU8 "Lack of personal relations while using online banking worries me", on close examination it could be noted that the above items doesn't actually form a part of the construct measuring Ease of Use of internet banking. It was decided to drop these items from further analysis. Similarly other constructs which gave alpha coefficient of less than .80 were analyzed and the items which caused the decrease in alpha coefficient were dropped. Accordingly, the following items were dropped from instrument: "I feel slow penetration of internet in India is hampering online banking usage." (QF3), "There are individual/groups discouraging online banking adoption."(SN5) and "I believe bank may take advantage of my weakness/problems" (TP7). All the dropped items were statements which were controversial in nature. Constructs like *Perceived Usefulness, Perceived Ease of Use, Security Concern* and *Trust and Privacy* were tested for reliability in previous studies, findings of alpha coefficient in the current study matched with those conducted earlier. The

construct *Consumer Awareness* gave an alpha coefficient of .913; this construct was intended to measure consumer's response on precaution to be taken while using internet banking. High Cronbach's alpha figure shows that respondents were giving similar responses; the mean for each of the items in that construct was 5 or higher which corresponds to "Slightly Agree" in the Likert Scale. It is evident that respondents were sufficiently educated on the precaution that should be taken while using internet banking facility. This construct was freshly developed for this study and results of the survey shows that it is having high internal consistency reliability. Table 4.19 gives the Cronbach's alpha coefficients of the constructs used in final statistical analysis.

Construct	No. of Items (Initial)	No. of Items (Deleted)	Items Dropped	Cronbach's Alpha (Initial)	Cronbach's Alpha (Deleted)
PU	10	10	-	.920	.920
PEOU	8	6	PEOU7,PEOU8	.782	.922
CA	10	10	-	.913	.913
SC	10	10	-	.831	.831
QF	4	3	QF3	.743	.812
SN	5	4	SN5	.769	.842
TP	7	6	TP7	.798	.842

Table 4.19: Cronbach's Alpha of the Constructs.

4.2.2 Construct Validity

Construct validity seeks agreement between a theoretical concept and a specific measuring device or procedure. Construct validity of the survey instrument was tested using factor analysis. Factors were extracted from the survey responses using Principal Component extraction method with Varimax rotation. Factors with Eigen values above 1 and loading of at least 0.40 is accepted as desired results of PCA (Hair et al., 1992; Straub, 1989). Table 4.21 gives results of the factor analysis of survey responses, for better reading of the results factor loadings below 0.40 are suppressed in the table. The Bartlett's test of sphericity confirmed that the variables within factors are correlated. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is 0.915 which is higher than the commonly accepted threshold limit of 0.60 (Table 4.20). Therefore factor analysis of the data is appropriate.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.915
Bartlett's Test of Sphericity	Approx. Chi-Square	9199.407
	df	1176
	Sig.	.000

Table 4.20: KMO and Bartlett's Test

	Component								
	1	2	3	4	5	6	7	8	9
PU1	0.482					0.513			
PU2						0.702			
PU3	0.422					0.707			
PU4	0.449					0.651			
PU5	0.589								
PU6	0.490								
PU7			0.585						
PU8	0.598								
PU9	0.642								
PU10	0.720								
PEOU1	0.669								
PEOU2	0.733								
PEOU3	0.719								
PEOU4	0.721								
PEOU5	0.780								
PEOU6	0.693								
CA1		0.623							
CA2		0.585							
CA3		0.792							
CA4		0.782							
CA5		0.819							
CA6		0.815							
CA7		0.530							
CA8		0.798							
CA9		0.727							
CA10		0.600							
SC1								0.744	
SC2								0.730	
SC3				0.527				0.647	
SC4			0.552						-0.401
SC5				0.744					
SC6				0.704					
SC7				0.693					
SC8				0.705					
SC9				0.611					
SC10				0.625					
QF1							0.647		
QF2							0.710		
QF4							0.700		
SN1					0.651				
SN2					0.787				
SN3					0.781				
SN4					0.777				
TP1			0.603						
TP2			0.714						
TP3			0.660						

TP4			0.668						
TP5			0.717						
TP6									0.616
Eigen Value	7.039	6.652	4.130	3.668	3.054	2.775	2.307	2.040	1.270
% of Variance	14.365	13.575	8.428	7.486	6.232	5.664	4.707	4.163	2.592
Cumulative %	14.365	27.941	36.368	43.854	50.086	55.750	60.457	64.620	67.212

Rotated Component Matrix(a)

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 9 iterations.

Table 4.21: Component Matrix of Factor Analysis

Factor analysis resulted in extraction of 9 factors with Eigen value of above 1, together these factors explained for 67.21 percent of the variance of the variables. Factor 1 contains factor loadings from items of constructs *Perceived Usefulness* and *Perceived Ease of Use.* All the items in the construct *Perceived Ease of Use* loaded in factor 1 with high factor loading. Factor 1 also contained 8 items of construct *Perceived Usefulness* with factor loading above 0.40, indicating relationship between the construct *Perceived Ease of Use* and *Perceived Usefulness* as hypothesized in the research model. The items of constructs which loaded with *Perceived Ease of Use* indicate that respondents feel that internet banking is *useful* due to its *ease of use.* Factor 1 accounts for 14.365 percent of the total variance explained by the factor analysis.

Factor 2 gets loaded with items in the *Customer Awareness* construct. All the items in the construct gets loaded in factor 2 with high factor loadings. Five items which relate to "trust" in the construct *Trust and Privacy* gets loaded in factor 3. Two items from constructs *Perceived Usefulness* and *Consumer Security Construct* also get loaded in factor 3. The items "Online banking is reliable" (PU7) and "Advances in internet security technology provide for safer Internet Banking" (SC4) is related to the items in construct *Trust & Privacy.* Therefore loading of items PU7 and SC4 in construct *Trust and Privacy* could be accepted. The item TP6 which deals with misuse of confidential information is loaded separately in factor 9 along with negative factor loading of item SC4. Item TP6 states that "I believe that bank may use confidential information about me to its advantage" contradicts to item SC4 and consequently the resultant factor loadings could be explained satisfactorily.

Factor 4 contains seven items from the construct *Consumer Security Concern.* First three items of the construct namely SC1, SC2 and SC3 get loaded separately in factor 8. It was also noted earlier that item SC4 was loaded in factor 3 along with items of construct *Trust & Privacy.* Cross loading of factors indicates that

participants of survey have mixed feeling on the construct *Consumer Security Concern.* The construct's ability to represent as a single entity is questioned and items could be dropped from further analysis due to inadequate validity. But it should be noted that the construct which measures concerns of security among consumers is bound to get such volatile reactions. The items which loaded separately also got high factor loadings indicating that customers see the items as important and related. Considering all these it was decided to keep these items also in the next phase of statistical analysis.

The items in constructs *Subjective Norms* and *Quality of Facilities* got loaded cleanly in factor 5 and 7 respectively. The factors extracted and factor loadings of extracted factors fall in line with the research model proposed in this study. Therefore, it could be concluded that there is construct validity for the instrument used for study and is fit for further statistical analysis based on it.

4.3 Hypotheses Testing

Hypotheses formulated as a part of this research was tested using linear regression analysis. Linear regression analysis is a useful statistical technique for analyzing relationship between dependent

and independent variables. It is widely used in information research and is considered as a reliable "first generation" method (Gefen et al., 2000).

For testing the hypotheses a series of linear analysis was performed on the variables. Independent variables *Perceived Usefulness, Perceived Ease of Use, Consumer Awareness, Consumer Security Concerns, Quality of Facilities, Subjective Norms and Trust and Privacy*were regressed separately with *Internet Banking Use* as dependent variable to test hypotheses H1,H2a,H3,H4,H5,H6,H7. To test hypothesis H2a independent variable *Perceived Ease of Use* was regressed with *Perceived Usefulness* as dependent variable. For carrying out regression analysis construct index was calculated by averaging items in the construct. For example, to develop the construct index for *Perceived Usefulness* response scores of items PU1 to PU10 were added and divided by 10. Items deleted from the instrument were omitted while generating the construct index. Averaging items enhances flexibility of scale without affecting the statistical properties of the scores. The results of the regression analysis are given in Table 4.22. Hypotheses are considered supported when path coefficient (β) are significant with a p-value of less than 0.05 level.

Hypothesis	Dependent Variable	Independent Variable	β	t-value	p-value
H1	Internet Banking Use	Perceived Usefulness	.422	7.560	.000
H2a	Internet Banking Use	Perceived Ease of Use	.371	6.497	.000
H2b	Perceived Usefulness	Perceived Ease of Use	.698	15.821	.000
H3	Internet Banking Use	Consumer Awareness	.246	4.124	.000
H4	Internet Banking Use	Consumer Security Concerns	-.186	-3.083	.002
H5	Internet Banking Use	Quality of Facilities	.286	4.855	.000
H6	Internet Banking Use	Subjective Norms	.231	3.861	.000
H7	Internet Banking Use	Trust & Privacy	.303	5.172	.000

Table 4.22: Results of Hypotheses Testing (Regression Analysis)

4.3.1 Discussion of hypothesis testing

Hypothesis H1, that *Perceived Usefulness (PU) has a positive effect on the customer acceptance of online banking* is accepted (β = .422, t = 7.560 and p <.001). The result is expected and is a confirmation of Technology Acceptance Model postulate (Davis, 1989). Previous studies on internet banking also came with same findings (Pikkarainnes et al., 2004, Chan, 2001, Tan & Leo, 2000). It means

that if a customer perceives internet banking as a useful service then he/she could start using it more.

Hypothesis 2a, that *Perceived Ease of Use (PEOU) has a positive effect on the customer acceptance of online banking* is accepted (β = .371, t = 6.497 and p <.001). Again this result confirms that TAM model could be used to explain internet banking adoption among customers. From a practical viewpoint we could expect adoption of internet banking to increase when more and more customers feel that it is easy to use.

Hypothesis 2b, that *Perceived Ease of Use (PEOU) has a positive effect on the perceived usefulness of online banking* is accepted (β = .698, t = 15.821 and p <.001). This hypothesis was framed to test the postulate of TAM model and expected it was found supporting. Therefore, the perception of ease of use of internet banking service should increase perception of usefulness among customers which in turn should result more usage of the service.

Hypothesis 3, that *Perceived consumer awareness (CA) has a positive effect on the customer acceptance of online banking* is accepted (β = .246, t = 4.124 and p <.001). The awareness level of precautions to be taken while conducting internet banking

transactions was found to be high among the survey respondents. The relationship between the variables are positive indicating that when consumers are aware of the precaution to be taken while doing internet banking transactions they will be inclined to accept hat banking channel.

Hypothesis 4, that Perceived consumer security concerns (SC) has a negative effect on the customer acceptance of online banking is accepted (β = -.186, t = -3.083 and p <.002). The negative relationship between the variables Internet Banking Use and Consumer Security Concerns indicates that concerns about security of internet banking services are hampering acceptance of that channel among customers.

Hypothesis 5, *Perceived quality of facilities for accessing bank site has a positive effect on the customer acceptance of online banking* is accepted (β = .286, t = 4.855 and p <.001). Confirmation of this hypothesis holds great significance in the context of developing countries like India. Acceptance of internet banking among Indian customers is bound to increase when the quality of infrastructure in the country is improved.

Hypothesis 6, that *The beliefs associated with subjective norms are significantly related to an individual's intention to adopt Internet banking* is accepted (β = .231, t = 3.861 and p <.001). This hypothesis is based on the construct of the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975). Hypothesis is found to be supporting indicating that customers are influenced by their peer group while taking decisions on adopting new technology like internet banking. As the number of people using this channel increase they could influence their friends or relatives in adopting internet banking.

Hypothesis 7, that *Perceived trust and privacy on the bank has a positive effect on the customer acceptance of online banking* is accepted (β = .303, t = 5.172 and p <.001). Trust is an important factor affecting any product or service (Gefen et al., 2003, Gefen, 2002). Customers tend to accept internet banking more when they trust their bank and have full confidence in their internet banking infrastructure.

4.4 Research Model Testing

The research model proposed by the study was tested using multiple regression analysis. Multiple regression analysis gives the

amount of variance (R^2) accounted for in the dependent variable from a set of independent variables. To test the research model all the developed constructs were taken as independent variables and was regressed with *Internet Banking Use* as dependent variable. Table 4.23 presents the results of the multiple regression analysis. The Variance Inflation Factor (VIF) of independent variables is in the range of 1.526 to 3.267 indicating non-presence of multicollinearity among the independent variables (Kleinbaum et al., 1988) (Table 4.23). Overall research model is statistically significant (F= 10.264 and p <0.001) and all the independent variables together explain for 21.8% ($R^2 = 0.218$) variance on the dependent variable (*Internet Banking Use*). But out of the independent variables β coefficient of only *Perceived Usefulness* (β = 0.290, t= 2.915, p =0.004) and *Consumer Security Concerns* (β = -0.197, t = -3.290 , p < .001) are found to be statistically significant. The significant levels of other five independent variables are higher than the accepted level of p < .005. The β coefficient of five variables *Perceived Usefulness, Perceived Ease of Use, Consumer Awareness, Quality of Facilities* and *Subjective Norms* are found to be positive showing that they help acceptance of dependent variable *Internet Baking Use.* On the other hand, β coefficient of two

variables *Consumer Security Concerns* and *Trust and Privacy* are found to be negative indicating that these factors hinder acceptance of dependent variable *Internet Banking Use.* It is observed that effect of only *Perceived Usefulness* and *Consumer Security Concerns* variables in acceptance of internet banking could be statistically proved. Out of this effect of factor *Perceived Usefulness* is positive which is expected on the basis of Technology Acceptance Model postulates, customers would consider acceptance of internet banking channel if they find it as a *useful* service. Similarly, effect of factor *Consumer Security Concern* is negative indicating that customers are not using internet banking channel due to concerns regarding security of that channel. Even though the effect of other factors can not be statistically defended, the regression analysis results help in gaining insights into the influence and direction of effect they put on dependent variable internet banking usage. Full model fitting of such complex research model is not practical using first generation technique like multiple regression analysis in real world scenario. Therefore the results of multiple regression analysis could be taken as an indicator of relationship between the factors proposed in the research model

and how they influence the intension to use internet banking service.

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.467(a)	.218	.197	1.390

a Predictors: (Constant), TP, SC, CA, SN, QF, PEOU, PU

ANOVA(b)

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	138.765	7	19.824	10.264	.000(a)
Residual	498.273	258	1.931		
Total	637.038	265			

a Predictors: (Constant), TP, SC, CA, SN, QF, PEOU, PU

b Dependent Variable: IBU

Coefficients (a)

	Unstandardized Coefficients		Standardized Coefficients	T	ig.	Collinearity Statistics	
	B	Std. Error	B			Tolerance	VIF
(Constant)	-1.289	.592		-2.178	.030		
PU	.403	.138	.290	2.915	.004	.306	3.267
PEOU	.113	.126	.088	.893	.373	.314	3.189
CA	.078	.100	.058	.778	.437	.550	1.819
SC	-.292	.089	-.197	-3.290	.001	.846	1.182
QF	.031	.091	.025	.345	.730	.560	1.784
SN	.072	.080	.061	.892	.373	.655	1.526
TP	-.040	.104	-.031	-.382	.703	.463	2.159

a Dependent Variable: IBU

Table 4.23: Research Model Testing (Multiple Regression Analysis)

4.5 Summary

In this chapter the data collected in the survey is presented and analyzed in the beginning. Before undertaking statistical analysis of data, validity of the survey instrument was tested using widely accepted techniques. Reliability of the survey instrument was tested by calculating the Cronbach's alpha for each research construct. Even though the Cronbach's alpha coefficient of every variable was above 0.70 without dropping any item, the researcher decided to drop 5 items for the survey instrument to improve the

alpha coefficient to above 0.80. The construct validity of survey instrument was tested by performing a Factor analysis using Principal Component Analysis method. Factor analysis produced satisfactory results, when 9 factors were extracted out of the factor analysis. After confirming construct validity, hypotheses formulated were tested using linear regression analysis. All the seven hypotheses developed were found to be supportive. Finally, to test the research model multiple regression analysis was conducted. Results of multiple regression analysis confirmed the existence of statistically significant effect of variables *Perceived Usefulness* and *Consumer Security Concerns* on *Internet Banking Use.* The results also showed the effect of other variables in the dependent variable.

CHAPTER 5

FINDINGS AND CONCLUSION

This chapter is derived to present (i) the findings of the research study, (ii) contributions of the study – theoretical as well as practical, (iii) limitations of the study ,(iv) conclusions of the study and (v) suggestions for further research.

5.1 Evaluation of results

The evaluation of the results obtained after the analysis of data is discussed in this section. The results are evaluated vis-a- vis the objectives fixed. Therefore the objectives of the study are recounted once again before the discussion of the results. The researcher had framed three objectives for the study. They are:

Objective 1: Identify factors influencing the adoption and usage of Internet banking in India

Objective 2: Examine whether Theory of Planned Behavior (TPB) or Technology Acceptance Model (TAM) can be applied in Internet banking adoption and usage.

Objective 3: Develop a model to explain behavioral intention to use internet banking.

The main objective of the study was to identify the factors that were influencing internet banking adoption among customers in India. The researcher performed both qualitative and quantitative methodology to find the factors responsible for internet acceptance. The qualitative study was conducted in the form of an "elicitation" study among a small group of customers. The results of the study produced the perception of Indian customers about internet banking. The study conducted according the guidelines provided for Theory of Planned Behavior model, gave real insights into the customers minds in the context of internet banking. The results of the elicitation study are provided in Table 5.1.

TPB Model Construct	Questions	Major answers
Attitude	Advantages	Comfort / Convenience 24x7 Access / Accessibility Speedy / Accurate / Easy /Immediate Transaction
	Disadvantages	Security Threats / Concerns Misuse of information or password Lack of personal relations Limited banking facilities (No Deposits/ Withdrawals)
Subjective Norm	Approving group	Colleagues / Family / Friends Persons from Banking / IT field
	Disapproving group	Old aged / Conservative people
Perceived Behavioral Control	Enabling factors	Convenience / Accessibility / Tight work schedule Good Bandwidth / Net Connection / Good Server response Out of town banking / Online shopping possible Better security Ease of use
	Disabling factors	Security threats / concerns Low Bandwidth / Net Connection Bad facilities for accessing site Delayed response from server / Server downtime Theft of identity / password

Table 5.1: Summary of findings of Elicitation Study

The findings of the elicitation study give us indication of the factors which influence internet banking adoption. The main enabler of internet banking is "convenience" or "24x7 accessibility" and issues related to "security concerns" were the main disabler for internet banking. To get an empirical confirmation of the qualitative findings a quantitative study was conducted. Web based survey method was used for identifying factors influencing internet banking. The survey produced empirical confirmation of seven factors which did influence internet banking acceptance. The factors produced by survey were: *perceived usefulness, perceived ease of use, consumer awareness, consumer security concerns, quality of facilities, subjective norms* and *trust and privacy.* Survey instrument was subjected to test of reliability and construct validity to check if the factors identified are scientifically valid. The survey instrument validity test results were satisfactory. Literature review of previous studies also indicated that these factors played significant role in internet banking adoption in other countries as well. Therefore, it could be concluded that the first objective of the study is successfully achieved.

Second objective of the study was to check if theoretical base of internet banking acceptance could be developed. In particular, two

theories in social psychology area were tested for their applicability in this study. One of the models tested was Technology Acceptance Model (TAM) (Davis, 1989), which is a widely used model for predicting technology adoption. Since its inception, the researchers were using TAM to predict technology in various settings across a number of countries. In this study two constructs in TAM namely *perceived usefulness* and *perceived ease of use* are tested in the context of internet banking acceptance. The results gave empirical evidence that the acceptance of internet banking was significantly influenced by the two constructs of the TAM. Results showed that the factors *perceived usefulness* and *perceived ease of use* had positive influence on internet banking acceptance. The variable *perceived ease of use* also had a positive link with the variable *perceived usefulness* indicating that ease of use meant more usefulness. Previous studies' results also supported these findings (Tan & Teo, 2000, Pikkarainen et al., 2004). The results also supported the use of Theory of Planned Behavior (TPB) (Ajzen, 1991) model in this type of study. The results gave support to the constructs attitude, subjective norms and perceived behavioral control described in Theory of Planned Behavior. Therefore it is

concluded that objective of testing applicability of two popular models in this study is also met.

Third objective of the study was to develop a model that could explain behavioral intention of internet banking adoption. The researcher developed a model for predicting internet banking adoption and framed eight hypotheses vis-a-vis with that model. The model developed for the study was extended from Technology Acceptance Model. The hypotheses framed along with results of their empirical testing are given in Table 5.2.

Research Construct	Hypotheses	Result of test
Perceived Usefulness (PU)	H1: *Perceived Usefulness (PU) has a positive effect on the customer acceptance of online banking*	Accepted
Perceived Ease of Use (PEOU)	H2a: *Perceived Ease of Use (PEOU) has a positive effect on the customer acceptance of online banking* H2b: *Perceived Ease of Use (PEOU) has a positive effect on the perceived usefulness of online banking*	Accepted

Consumer Awareness (CA)	H3: *Perceived consumer awareness (CA) has a positive effect on the customer acceptance of online banking*	Accepted
Consumer Security Concerns (SC)	H4: *Perceived consumer security concerns (SC) has a negative effect on the customer acceptance of online banking*	Accepted
Quality of Facilities (QF)	H5: *Perceived quality of facilities for accessing bank site has a positive effect on the customer acceptance of online banking.*	Accepted
Subjective Norms (SN)	H6: *The beliefs associated with subjective norms are significantly related to an individual's intention to adopt Internet banking.*	Accepted
Trust and Privacy(TP)	H7: *Perceived trust and privacy on the bank has a positive effect on the customer acceptance of online banking*	Accepted

Table 5.2: Results of Hypotheses testing

As seen from Table 5.2 the entire hypotheses framed for the study were found to be empirically accepted. Finally, result of the multiple regression analysis performed on the research model

found the overall model to be statistically significant. Though only statistical significance for only two constructs *perceived usefulness* and *consumer security concerns* were obtained in the multiple regression testing, the research model's ability to predict behavioral intention of Indian banking customers in accepting internet banking could be accepted. Thus it could be concluded that the third objective of the study has also been successfully achieved.

5.2 Theoretical Contribution

The most important theoretical contribution of this study is the development of a model predicting the internet banking adoption among Indian customers. Internet banking is a relatively new delivery channel offered by Indian banks and not many studies have been conducted in this line in the Indian context. The research model developed is an extension of the parsimonious and validated Technology Acceptance Model, making the model more scientifically proven. Another contribution of this study is the testing of Technology Acceptance Model's applicability in the Indian environment. For nearly last two decades, researchers from all over the world have been testing TAM in various contexts. No previous studies were found in testing TAM in the Indian context. In this

study, TAM's constructs were found to be applicable in the Indian context too. From a methodological point also this study has made a significant contribution, by resorting to a web based survey to collect data for the study. Internet is gaining popularity as a medium for conducting customer surveys and in this study the response rate confirmed the choice of Internet as a medium for conducting survey.

5.3 Practical Contribution

Results of this study provide banking decision makers an insight into the perception about internet banking among Indian customers and that is the most important practical contribution of this study. Internet banking is gaining popularity in India and finding of this study allow banks to fine tune their internet banking product. Based on the findings of this study the following suggestions could be arrived at:

1. Banks could increase internet banking adoption by making their customer awareness about the usefulness of the service. It seen that from the study that the variable *perceived usefulness* has a positive influence on internet banking use, therefore internet banking acceptance would increase when

customers find it more usefulness. Banks should plan their marketing campaigns taking into consideration this factor. Proper marketing communications which would increase consumer awareness would result in better acceptance of internet banking.

2. The variable *perceived ease of use* had a positive influence on internet banking use. That means customers would increase internet banking usage when they find it easier to use. Banks should therefore try to develop their internet banking site and interface easier to use. Banks could also consider providing practical training sessions for customers at their branches on usage of internet banking interface.

3. The variable *consumer security concerns* had a negative influence on internet banking use. Banks should try to mitigate concerns of their customers in terms of internet banking technology to increase customer acceptance. Banks should also take measure the trust and privacy of its internet banking infrastructure and procedures.

5.4 Limitations

Any research work would have its on inherent limitations. Although the finding can be statistically significant in most parts, the researcher has identified the following limitations in the present study.

- Internet banking is a relatively new concept in an Indian context. The researcher found lack of relevant information regarding internet banking acceptance or adoption among Indian customers during the collection of literature. The researcher had to rely on studies conducted in various other nations while constructing the research model. Although the impact of the above lacunae was minimized by conducting a qualitative study before framing the research model, the limitation of lack previous empirical studies cannot be neglected.

- The researcher has used a non-probabilistic technique for collecting the sample for the survey. Ideally, probabilistic sampling technique would have improved the validity of the survey findings. The research did try to contact few financial institutions in Kerala for getting list of their internet banking

customers. But the financial institutions cited confidentiality for not providing their customer details, therefore the researcher had to opt for a convenience/judgment sampling technique.

- The same survey instrument was administered to both users and non-users of internet banking service. The opinions/perceptions of users and non-users could differ considerably and this limitation could have affected the survey results.

5.5 Recommendations for future studies

The issues discussed in the limitations section could be taken as a pointer for continuing research in this area. Research on customer acceptance of internet banking in India is still in a nascent stage, there is lot more to be studied and analyzed. Some avenues for continuing study in this exciting field is discussed below:

- The research model developed in this study gave sufficiently acceptable results on empirical testing. Still, there is scope for modifying the model. The factors identified by the researcher could be validated further and more factors could be

considered for better prediction level of the model. Also, it is seen that multiple regression analysis of the model gave only statistically significant results for only two of the seven construct developed in the research model. Therefore, future studies could look into this and come up alternate models which would be more statistically fit.

- The researcher tried to find solution for the research problem by using theoretical base from social psychology. The research model was developed by extending Technology Acceptance Model and also utilizing the framework provided by Theory of Planned Behavior. Although both these models very widely used for studies in technology adoption or prediction of consumer behavior intentions, there are other theories or framework that could be used for studying this research problem. Future studies could look into this angle of research. The researcher proposes considering alternate theories like Innovation Diffusion Theory (Rogers, 1983), Social Cognitive Theory-Self-efficacy (Bandura, 1997), Extension of Technology Acceptance Model (TAM2) (Venkatesh & Davis, 2000) and Extended model of Innovation

Diffusion Theory(Moore & Benbasat,1991) for updating the current research model.

- Internet banking acceptance among Indian customers is very less and due to this the researcher had faced problem in getting suitable respondents. As acceptance of internet banking is expected to improve in the coming years, future studies could be conducted using better sampling technique. Using a probabilistic sampling technique would definitely improve the acceptability of study results. The researcher also proposes conducting surveys in different parts of the country to improve the generalizability of the findings. This is not a constraint if web based survy is conducted as respondents could participant in such a survey from any part of the world. Future studies could also investigate the customer perception between "users" and "non-users" of internet banking by conducting separate surveys among both these categories of users.

5.6 Conclusion

Indian economy is witnessing stellar growth over the last few years. There have been rapid developments in infrastructural and business front during the growth period. Internet adoption among Indians has been increasing over the last one decade. Indian banks have also risen to the occasion by offering new channels of delivery to their customers. Internet banking is one such new channel which has become available to Indian customers. Customer acceptance for internet banking has been good so far. In this study the researcher tried to conduct a qualitative and quantitative investigation of internet banking customer acceptance among Indians. The researcher tried to identify important factors that affect customer's behavioral intention for internet banking. The researcher also proposes a research model which was extended from Technology Acceptance Model for predicting internet banking acceptance. The quantitative analysis of the model confirmed that the factors identified by the researcher viz. *perceived usefulness, perceived ease of use, consumer awareness, consumer security concerns, quality of facilities, subjective norms* and *trust and privacy* did influence customer behavioral intentions towards internet banking. The results showed that five variables *Perceived*

Usefulness, Perceived Ease of Use, Consumer Awareness, Quality of Facilities and *Subjective Norms* had positive influence on internet banking use. Similarly, results showed that two variables *Consumer Security Concerns* and *Trust and Privacy* are negative influence on internet banking use. It was observed that effect of only *Perceived Usefulness* and *Consumer Security Concerns* variables in acceptance of internet banking could be statistically proved. The findings of the study would be useful for Indian banks in planning and upgrading their internet banking service.

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APPENDIX I - Elicitation Study Questionnaire

Survey on Customer Acceptance of Online Banking - Elicitation Study Questionnaire

We are conducting a study on consumers of banking services in Kerala. We are interested in the reasons why consumers do or do not use new technological advancements available in banking services. We would appreciate your responses to some questions about this. There are no right or wrong answers. Please tell us what you really think. Please mail the filled questionnaire to caobsurvey@gmail.com

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Please take a few minutes to list your thoughts about the following questions.

When consumers use Internet (Online) Banking services,

I a) What do you believe are the *advantages* of using Internet Banking services?

I b) What do you believe are the *disadvantages* of using Internet Banking services?

I c) Is there anything else you associate with your own views about using Internet Banking services?

II a) Are there any individual or groups who would *recommend/approve* of your use of Internet Banking services?

II b) Are there any individual or groups who would ***discourage/disapprove*** of your use of Internet Banking services?

II c) Is there anything else you associate with other people's views about use of Internet Banking services?

III a) What factors or circumstances would **enable** you to use Internet Banking services?

III b) What factors or circumstances would make it **difficult or impossible** for you to use Internet Banking services?

III c) Are there any other issues that come to mind when you think about the use Internet of Banking services?

APPENDIX II – Survey Questionnaire

Customer Acceptance of Online Banking Survey (CAOB Survey)

The objective of the CAOB Survey is to identify and analyze the factors influencing customer's adoption/usage of technology in banking services in India. The COAB Survey is conducted by Mr. Sudeep S (Research Scholar, DAE,CUSAT) under the guidance of Prof. Dr. K C Sankaranarayanan (Former Dean, Faculty of Social Sciences, CUSAT). Please be assured that your responses will be strictly confidential. If you have any queries, please do not hesitate to contact me by email at caobsurvey@gmail.com. Please put a [✓] mark to indicate your preference. Thank you very much for your kind assistance.

Section 1: General Section

1 What is your gender?   ☐ Male   ☐   Female

2 What is your age ?   ☐ Below 20 years ☐ 21-25 ☐ 26-30 ☐ 31-3

☐ 36-40   ☐ 41 – 45 ☐ 46-50 ☐ 51 or above

3 What is your marital status ?   ☐ Rather not say ☐ Married ☐ Single

☐ Separated   ☐ Divorced ☐ Widowed

4 What is the highest eduatcational qualification you have completed ?

☐ Primary School   ☐ Secondary School

☐ Bachelor's Degree   ☐ Master's Degree

☐ PhD   ☐ ACA,ACWA,ACS

☐ Others _____

5   What is your current profession?

☐ Student   ☐ Professional

☐ Academic   ☐ Self-employed

☐ Executive - Junior ☐ Executive - Senior

☐ Manager   ☐ Housewife

☐ Retiree   ☐ Other

6   Which of the following categories best describes the industry you primarily work in

(regardless of your actual position)?

☐ Banking/Finance/Insurance   ☐ Business services

☐ Communications   ☐ Utility/Transport

☐ Computer related   ☐ Consulting

☐ Education   ☐ Engineering/R&D

☐ Government   ☐ Health care/medical

☐ Manufacturing   ☐ Outsourcing/Services

☐ Retail/wholesale   ☐ Other

7   The organization you work for is in which of the following:

☐ Public sector   ☐ Private sector

☐ Not-for-profit sector ☐ Other

8   Please indicate your current household monthly income (Rs)

☐ Rather not say   ☐ Under 5000

☐ 5000-10000   ☐ 10000-15000

☐ 15000-20000   ☐ 20000-25000

☐ 25000 and above

Section 2 : Computer and Internet Usage

1. How long have you been using the Internet ?

☐ Less than 6 months   ☐ 4 to 6 years   ☐ 6 to 12 months

☐ 7 years or more   ☐ 1 to 3 years

2. I access Internet from the following places (*Check any that apply*)

☐ Home ☐ Work ☐ School ☐ Cybercafe ☐ Mobile ☐ Other

3. How frequently do you access the web ?

☐ Daily ☐ Weekly ☐ Monthly ☐ Less than once a month

4. How many hours do you normally spend on the Internet a week ?

☐ 0-5 hrs ☐ 5-15 hrs ☐ 15-25 hrs ☐ 25-35 hrs ☐ 35-45 hrs

☐ 45 hrs and above

5. What is the modem speed of the PC when you usually access Internet ?

☐28.8 Kbps ☐33.6 Kbps ☐56 Kbps ☐128 Kbps ☐Broadband

☐Not aware of the speed

6. Which operating system do you use usually when you are accessing Internet ?

☐Windows – XP, 2000, 98, 95 etc ☐ Macintosh ☐Unix/Linux Other

7. Which browser do you use usually when you are accessing Internet ?

☐Internet Explorer ☐Netscape Navigator ☐FireFox ☐Opera ☐Other

8. Which all services do you normally use? *(Check any that apply)*

☐WWW ☐ E-mail ☐FTP ☐IRC ☐Instant Messenger ☐Voice Chat

☐Video Conferencing ☐Telnet ☐P2P Network

9. How comfortable do you feel using computers, in general?

☐Very uncomfortable

☐Somewhat uncomfortable

☐Neither comfortable nor uncomfortable

☐Somewhat comfortable

☐Very comfortable

10. How comfortable do you feel using the Internet?

☐ Very uncomfortable

☐ Somewhat uncomfortable

☐ Neither comfortable nor uncomfortable

☐ Somewhat comfortable

☐ Very comfortable

11. How satisfied are you with your current skills for using the Internet?

☐ Very unsatisfied - I can't do most things I would like to do

☐ Somewhat unsatisfied - I can't do many things I would like to do

☐ Neither satisfied nor unsatisfied

☐ Somewhat satisfied - I can do most things I want to do

☐ Very satisfied - I can do everything that I want to do

12. Which of the following have you done? *(Check any that apply)*

☐ ordered a product/service from a business, government or educational entity
   by filling out a form on the web

☐ made a purchase online for more than Rs 1000

☐ created a web page

☐ customized a webpage for yourself (e.g. MyYahoo, CNN Custom News)

☐ changed your browser's "startup" or "home" page

☐ changed your "cookie" preferences

☐ participated in an online chat or discussion (not including email)

☐ listened to a radio broadcast online

☐ made a telephone call online

☐ used a nationwide online directory to find an address or telephone number

☐ taken a seminar or class about the Web or Internet

13. Please select the products and services bought online *(Check any that apply)*

☐Books ☐ Apparel ☐ Accessories ☐Computers & Peripherals ☐ Movies

☐ Home Tools & Products ☐Jewelry ☐Sporting Goods

☐ Electronic Gadgets ☐Apparel ☐Airline Tickets ☐Hotel Booking

☐Home Appliances ☐Movie Tickets ☐Railway Tickets ☐ Gifts ☐ Music

☐Magazines ☐Toys

Section 3: General Banking

1. How many banks are you a client of ?

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8+

2. Which of the following banks do you patronise? *(Check any that apply)*

☐State Bank of India ☐ State Bank of Travancore ☐Federal Bank

☐ICICI Bank ☐ HDFC Bank ☐IDBI Bank ☐Vijaya Bank

☐ING Vysya ☐Catholic Sryian Bank ☐South Indian Bank

☐Punjab National Bank ☐Centurion Bank ☐ Oriental Bank of Commerce

☐Citibank ☐Standard Chartered Bank ☐Other

3. How frequently do you use the following banking services per month ?

	Nil	1 to 3 times	3 to 8 times	8 to 12 times	Over 12 times
Branch Counter	☐	☐	☐	☐	☐
ATM	☐	☐	☐	☐	☐
Internet Banking	☐	☐	☐	☐	☐
Phone (Tele) Banking	☐	☐	☐	☐	☐
Mobile Banking	☐	☐	☐	☐	☐

Section 4: Online Banking

(For the following questions, please put down the number which best describes your choice)

1.Your reactions on usefulness of Online Banking

Disagree ___1___ ___2___ ___3___ ___4___ ___5___ ___6__ ___7___ **Agree**

Strongly Quite Slightly Neutral Slightly Quite Strongly

Online banking makes it easier for me to conduct my banking transactions	
Online Banking gives me greater control over my finances.	
Online banking allows me to manage my finances more efficiently.	
Online banking is a convenient way to manage my finances	
Online Banking is more user-friendly than other existing channels, including	

Bank Branches, ATMs, and Phone Banking.	
Online Banking gives me access to banking services at any time (24x7)	
Online banking is reliable	
Using online banking facilities allows me to save time	
Online banking gives me upto-date information of my account	
Using an online banking allows me to conduct banking transactions quickly	

2 . Your reactions on using Online Banking services

Disagree ___1___ ___2___ ___3___ ___4___ ___5___ ___6__ ___7___ **Agree**

           Strongly Quite   Slightly Neutral Slightly Quite Strongly

Online banking is easy-to-use.	
Online banking is an easy way to conduct banking transactions.	
Learning to operate online banking would be easy for me.	
It is easy for me to remember how to perform tasks with online banking.	
I believe it would be easy to get online banking to do what I want it to do.	
Using online banking does not require a lot of mental effort.	
Lack of clarity in procedures related to online banking worries me	
Lack of personal relations while using online banking worries me	

3. Your reaction on the facilities used for accessing bank site

Disagree ___1___ ___2___ ___3___ ___4___ ___5___ ___6__ ___7___ **Agree**

Strongly   Quite   Slightly   Neutral   Slightly   Quite   Strongly

I am happy with the quality of facilities available for accessing online banking services.	
I am satisfied with the speed of internet connection available for accessing online banking facilities	
I feel slow penetration of internet in India is hampering online banking usage.	
I am happy with the server response from my online bank while accessing it.	

4. What does others say about online banking services ?

Disagree ___1___ ___2___ ___3___ ___4___ ___5___ ___6__ ___7___ **Agree**

Strongly   Quite   Slightly   Neutral   Slightly   Quite   Strongly

There are individual/groups recommending online banking adoption	
My bank encourages me to use online banking	
Officials working in my bank encourage me to use online banking.	
My friends or colleagues encourage me to use online banking.	
There are individual/groups discouraging online banking adoption.	

5. Your reactions on Trust and Privacyof online banking

Disagree ___1___ ___2___ ___3___ ___4___ ___5___ ___6__ ___7___ Agree

Strongly   Quite   Slightly   Neutral   Slightly   Quite   Strongly

I trust online bank as a bank.	
I trust in the technology used by my bank.	
I have confidence in the security of the computer used for accessing online bank.	
I trust my internet service provider.	
I trust in the ability of my bank to protect my privacy.	
I believe bank may use confidential information about me to its advantage.	
I believe bank may take advantage of my weakness/problems.	

6. Your reactions on online banking security issues

Disagree ___1___ ___2___ ___3___ ___4___ ___5___ ___6__ ___7___ Agree

Strongly   Quite   Slightly   Neutral   Slightly   Quite   Strongly

I am not confident over the security aspects of online banking in India.	
Others will know information concerning my online banking transactions.	
Others can tamper with information concerning my online banking transactions.	
Advances in internet security technology provide for safer Internet Banking.	

It is very easy for my money to be stolen if using online banking.	
If I sign up for online banking, a hacker will be more likely to access my account.	
Most identity theft is caused by fraudsters who steal information from an online bank account.	
When it comes to money, you're always safer using traditional paper statements and mail.	
If a thief wants to access my accounts (online bank) there is not much I can do about it.	
If fraudsters get access to my online bank accounts, I could lose all my money.	

7. Your reactions on precautions to be taken while using online banking services

Disagree ___1___ ___2___ ___3___ ___4___ ___5___ ___6__ ___7___ **Agree**

Strongly Quite Slightly Neutral Slightly Quite Strongly

Monitoring my accounts and statements frequently and thoroughly, ensures that all activity is accurate.	
I should always thoroughly tear or shred documents with personal information.	
I should protect my account information like personal identification number (PIN),Username , Password etc.	
I should ensure that my computer(s) are equipped with a security toolkit (software) to help keep trespassers out.	

I should change my passwords periodically, using strong passwords that could not be easily guessed.	
I should always log off from my bank site after an online banking session.	
I should shut off/disconnect my computer from the Internet when not in use.	
I should be suspicious of requests for personal information from unknown sources.	
During phishing attack, a fraudster sends an e-mail to consumers, falsely claiming to be from a legitimate company, in hopes of luring consumers to a "spoofed" website.	
Any software that covertly gathers user information through the user's Internet connection without his or her knowledge is called as a Spy ware	

If you are interested in receiving a copy of the research report, please give your personal details.

Your name : _____

Your e-mail: _____

-END-

⌘ *Thank you very much for your valuable time and information.* ⌘

APPENDIX III - SPSS Results of Factor Analysis

Factor Analysis

Notes

Output Created		26-SEP-2007 11:55:02
Comments		
Input	Data	CAOB-1309.sav
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	266
Missing Value Handling	Definition of Missing	MISSING=EXCLUDE: User-defined missing values are treated as missing.
	Cases Used	LISTWISE: Statistics are based on cases with no missing values for any variable used.
Syntax		FACTOR /VARIABLES PU1 PU2 PU3 PU4 PU5 PU6 PU7 PU8 PU9 PU10 PEOU1 PEOU2 PEOU3 PEOU4 PEOU5 PEOU6 CA1 CA2 CA3 CA4 CA5 CA6 CA7 CA8 CA9 CA10 SC1 SC2 SC3 SC4 SC5 SC6 SC7 SC8 SC9 SC10 QF1 QF2 QF4 SN1 SN2 SN3 SN4 TP1 TP2 TP3 TP4 TP5 TP6 /MISSING LISTWISE /ANALYSIS PU1 PU2 PU3 PU4 PU5 PU6 PU7 PU8 PU9 PU10 PEOU1 PEOU2 PEOU3 PEOU4 PEOU5 PEOU6 CA1 CA2 CA3 CA4 CA5 CA6 CA7 CA8 CA9 CA10 SC1 SC2 SC3 SC4 SC5 SC6 SC7 SC8 SC9 SC10 QF1 QF2 QF4 SN1 SN2 SN3 SN4 TP1 TP2 TP3 TP4 TP5 TP6 /PRINT INITIAL KMO EXTRACTION ROTATION /PLOT EIGEN /CRITERIA MINEIGEN(1) ITERATE(25) /EXTRACTION PC /CRITERIA ITERATE(25) /ROTATION VARIMAX /METHOD=CORRELATION .

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.915
Bartlett's Test of Sphericity	Approx. Chi-Square	9199.407
	df	1176
	Sig.	.000

Communalities

	Initial	Extraction
PU1	1.000	.678
PU2	1.000	.783
PU3	1.000	.821
PU4	1.000	.771
PU5	1.000	.560
PU6	1.000	.616
PU7	1.000	.609
PU8	1.000	.676
PU9	1.000	.708
PU10	1.000	.744
PEOU1	1.000	.720
PEOU2	1.000	.781
PEOU3	1.000	.783
PEOU4	1.000	.729
PEOU5	1.000	.759
PEOU6	1.000	.604
CA1	1.000	.624
CA2	1.000	.483
CA3	1.000	.746
CA4	1.000	.695
CA5	1.000	.763
CA6	1.000	.767
CA7	1.000	.402
CA8	1.000	.694
CA9	1.000	.616
CA10	1.000	.520
SC1	1.000	.674
SC2	1.000	.761
SC3	1.000	.753
SC4	1.000	.594
SC5	1.000	.668
SC6	1.000	.631
SC7	1.000	.631
SC8	1.000	.550
SC9	1.000	.483
SC10	1.000	.563

QF1	1.000	.684
QF2	1.000	.697
QF4	1.000	.746
SN1	1.000	.631
SN2	1.000	.770
SN3	1.000	.725
SN4	1.000	.677
TP1	1.000	.680
TP2	1.000	.774
TP3	1.000	.677
TP4	1.000	.657
TP5	1.000	.760
TP6	1.000	.495

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	16.126	32.910	32.910	16.126	32.910	32.910	7.039	14.365	14.365
2	5.591	11.409	44.320	5.591	11.409	44.320	6.652	13.575	27.941
3	2.557	5.218	49.538	2.557	5.218	49.538	4.130	8.428	36.368
4	2.246	4.584	54.122	2.246	4.584	54.122	3.668	7.486	43.854
5	1.505	3.071	57.193	1.505	3.071	57.193	3.054	6.232	50.086
6	1.366	2.788	59.982	1.366	2.788	59.982	2.775	5.664	55.750
7	1.272	2.595	62.577	1.272	2.595	62.577	2.307	4.707	60.457
8	1.194	2.438	65.015	1.194	2.438	65.015	2.040	4.163	64.620
9	1.077	2.197	67.212	1.077	2.197	67.212	1.270	2.592	67.212
10	.967	1.974	69.186						
11	.919	1.875	71.060						
12	.879	1.794	72.855						
13	.832	1.699	74.553						
14	.775	1.581	76.135						
15	.689	1.406	77.541						
16	.678	1.384	78.924						
17	.662	1.352	80.276						
18	.601	1.226	81.502						
19	.566	1.154	82.656						
20	.555	1.133	83.789						
21	.530	1.082	84.871						

22	.522	1.065	85.937
23	.477	.973	86.910
24	.434	.886	87.796
25	.426	.869	88.665
26	.400	.817	89.482
27	.387	.790	90.272
28	.372	.760	91.032
29	.348	.710	91.742
30	.324	.662	92.404
31	.313	.639	93.043
32	.307	.626	93.669
33	.281	.573	94.241
34	.274	.558	94.800
35	.259	.529	95.329
36	.248	.507	95.835
37	.235	.481	96.316
38	.216	.442	96.758
39	.195	.398	97.156
40	.189	.385	97.541
41	.184	.376	97.917
42	.169	.344	98.261
43	.163	.333	98.594
44	.139	.283	98.877
45	.132	.270	99.147
46	.130	.266	99.412
47	.110	.224	99.637
48	.096	.196	99.833
49	.082	.167	100.000

Extraction Method: Principal Component Analysis.

Component Matrix(a)

Scree Plot

	Component								
	1	2	3	4	5	6	7	8	9
PU1	.698	-.002	-.164	.220	-.083	-.059	.016	.075	-.316
PU2	.708	-.133	-.057	.213	-.238	.204	.192	-.014	-.282
PU3	.735	-.119	-.020	.229	-.283	.162	.184	-.075	-.261
PU4	.728	-.149	-.020	.203	-.322	.139	.099	-.037	-.205
PU5	.643	-.128	-.006	.227	-.104	.130	-.101	-.123	.162
PU6	.699	.057	-.076	.157	-.197	-.045	-.050	.217	-.052
PU7	.615	-.298	.081	.093	.087	.225	.182	.065	.176
PU8	.702	-.023	-.142	.216	-.250	-.026	-.156	.168	.023
PU9	.721	.106	-.154	.188	-.103	-.139	-.161	.204	.141
PU10	.720	-.036	-.152	.255	-.126	-.186	-.201	.171	.127
PEOU1	.774	-.046	.041	.255	.090	-.181	-.049	-.058	-.075
PEOU2	.815	-.031	.005	.282	.083	-.067	-.141	-.062	.003
PEOU3	.798	.020	-.101	.189	.117	-.184	-.079	-.213	9.77E-005
PEOU4	.741	-.025	-.048	.222	.165	-.143	-.098	-.256	.069
PEOU5	.717	-.070	-.071	.303	.138	-.071	-.135	-.266	.174
PEOU6	.639	-.119	-.027	.176	.028	-.147	-.149	-.164	.282
CA1	.672	.272	-.106	-.183	.047	.026	.199	-.065	-.086
CA2	.552	.302	-.118	-.138	.097	.155	.052	-.039	-.129
CA3	.669	.319	-.345	-.238	.080	.050	-.075	.021	.083
CA4	.604	.373	-.284	-.285	.019	.119	.088	-.087	.007
CA5	.648	.405	-.300	-.274	-.010	.103	.047	.011	-.007
CA6	.664	.388	-.281	-.274	.101	.051	-.038	.087	-.022
CA7	.291	.365	-.121	-.230	.122	.167	-.235	-.134	-.023
CA8	.564	.427	-.288	-.306	.118	.009	-.007	.046	-.037
CA9	.540	.395	-.281	-.267	-.086	.027	.062	-.028	.071
CA10	.591	.261	-.154	-.235	-.021	-.108	-.071	.053	.050
SC1	.017	.575	.077	.175	-.166	.108	.359	.042	.371

SC2	-.057	.680	.243	.116	-.164	.061	.247	-.252	.260
SC3	-.041	.739	.214	.253	-.155	.056	.134	-.130	.182
SC4	.401	.061	.021	.020	.146	.229	-.058	.521	.286
SC5	-.089	.709	.349	.126	.079	-.029	-.029	.094	-.059
SC6	-.109	.650	.334	.144	.001	.035	-.121	.218	.023
SC7	.074	.610	.352	.264	-.062	.170	-.020	.106	-.123
SC8	-.125	.603	.151	.201	.181	.005	-.158	.068	-.214
SC9	-.152	.432	.161	.254	.372	-.030	-.164	-.028	-.126
SC10	.238	.518	.203	.039	.182	-.204	.018	.181	-.295
QF1	.613	-.219	.101	.001	.259	-.274	.314	.091	-.038
QF2	.582	-.008	.159	-.082	.112	-.373	.414	.022	-.052
QF4	.591	-.161	.210	-.087	.282	-.347	.318	.057	.123
SN1	.493	.072	.400	-.334	-.235	-.182	.115	-.069	-.063
SN2	.560	.081	.435	-.366	-.308	-.119	-.121	-.055	.015
SN3	.487	-.018	.463	-.352	-.197	-.155	-.283	-.038	.067
SN4	.430	-.086	.438	-.354	-.270	-.099	-.274	-.097	-.034
TP1	.674	-.307	.245	-5.14E-005	.029	.260	.045	-.032	.008
TP2	.686	-.334	.305	-.078	.144	.241	.014	.116	-.008
TP3	.595	-.430	.200	-.059	.025	.256	.074	.127	.083
TP4	.598	-.256	.308	-.040	.286	.235	-.003	.002	.016
TP5	.622	-.320	.349	-.139	.252	.197	-.094	.130	.005
TP6	.238	.142	.172	-.015	.261	.304	-.056	-.467	-.081

Extraction Method: Principal Component Analysis.
a 9 components extracted.

Rotated Component Matrix(a)

	Component								
	1	2	3	4	5	6	7	8	9
PU1	.482	.314	.100	.063	.024	.513	.176	-.181	-.073
PU2	.372	.225	.273	-.097	.064	.702	.107	.001	.032
PU3	.422	.208	.236	-.097	.124	.707	.117	.043	.060
PU4	.449	.195	.235	-.127	.178	.651	.060	.022	-.005
PU5	.589	.156	.303	-.131	.120	.220	-.049	.103	.063
PU6	.490	.321	.183	.058	.153	.366	.080	-.009	-.271
PU7	.346	.118	.585	-.226	.020	.202	.183	.086	.006
PU8	.598	.281	.165	-.033	.143	.340	-.037	-.019	-.271
PU9	.642	.371	.150	.055	.109	.151	.063	.019	-.306
PU10	.720	.257	.139	-.021	.116	.174	.062	-.049	-.298
PEOU1	.669	.209	.209	.082	.132	.248	.294	-.103	.049
PEOU2	.733	.253	.279	.074	.112	.223	.158	-.072	.055
PEOU3	.719	.351	.117	.003	.101	.163	.254	-.063	.156
PEOU4	.721	.267	.166	-.010	.082	.092	.222	-.034	.213
PEOU5	.780	.208	.206	-.060	.030	.065	.122	.027	.201
PEOU6	.693	.165	.184	-.145	.154	-.026	.114	.057	.044
CA1	.208	.623	.150	.045	.126	.241	.277	.093	.095
CA2	.159	.585	.171	.137	.051	.202	.092	.019	.124
CA3	.315	.792	.115	-.008	.055	.026	.041	.011	-.039
CA4	.163	.782	.078	-.009	.075	.134	.082	.120	.082
CA5	.191	.819	.086	.036	.089	.157	.065	.094	-.016
CA6	.226	.815	.129	.101	.081	.076	.092	-.020	-.055
CA7	.085	.530	.042	.170	.101	-.081	-.168	-.030	.193
CA8	.151	.798	.044	.112	.063	.033	.117	-.009	-.021
CA9	.171	.727	-.013	-.010	.119	.099	.059	.170	-.041
CA10	.279	.600	.052	.030	.224	.032	.124	.004	-.105
SC1	-.020	.159	-.029	.263	-.100	.006	.035	.744	-.118
SC2	-.049	.112	-.176	.380	.084	-.036	.000	.730	.175
SC3	.034	.100	-.185	.527	.019	.013	-.071	.647	.076
SC4	.177	.264	.552	.117	-.059	-.075	-.033	.066	-.401
SC5	-.101	.079	-.092	.744	.082	-.078	.012	.278	.007

SC6	-.086	.041	-.027	.704	.090	-.098	-.120	.276	-.133
SC7	.005	.059	.056	.693	.077	.183	-.103	.305	.010
SC8	-.046	.085	-.143	.705	-.092	-.042	-.082	.036	.067
SC9	.035	-.033	-.070	.611	-.181	-.187	-.007	-.027	.185
SC10	.039	.258	-.042	.625	.099	.086	.284	-.048	-.051
QF1	.320	.146	.313	-.091	.073	.130	.647	-.110	-.034
QF2	.231	.218	.134	-.013	.206	.167	.710	.058	-.029
QF4	.305	.143	.318	-.083	.181	-.040	.700	.001	-.028
SN1	.060	.208	.118	.018	.651	.185	.316	.107	.025
SN2	.157	.245	.173	.033	.787	.121	.118	.077	-.010
SN3	.203	.144	.208	.033	.781	-.043	.062	-.049	-.008
SN4	.143	.096	.166	-.027	.777	.061	.003	-.092	.050
TP1	.323	.110	.603	-.154	.246	.284	.119	-.032	.140
TP2	.266	.125	.714	-.098	.265	.206	.178	-.139	.059
TP3	.238	.062	.660	-.266	.203	.223	.122	-.067	-.023
TP4	.264	.109	.668	-.022	.181	.088	.184	-.121	.198
TP5	.238	.113	.717	-.037	.294	.058	.168	-.227	.075
TP6	.106	.174	.211	.144	.056	.021	-.051	.052	.616

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 9 iterations.

Component Transformation Matrix

Component	1	2	3	4	5	6	7	8	9
1	.604	.506	.388	-.037	.267	.308	.247	-.019	.003
2	-.086	.490	-.302	.692	-.012	-.077	-.075	.414	.011
3	-.126	-.482	.382	.414	.591	-.039	.178	.168	.156
4	.562	-.492	-.036	.312	-.478	.277	-.077	.176	-.030
5	.008	.101	.347	.254	-.449	-.502	.353	-.341	.332
6	-.278	.137	.584	-.024	-.232	.262	-.586	.175	.256
7	-.345	.002	.060	-.203	-.283	.331	.645	.479	.021
8	-.188	.022	.327	.229	-.123	.023	.036	-.178	-.870
9	.253	-.020	.198	-.304	-.007	-.625	-.100	.601	-.204

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.

APPENDIX IV - SPSS Results of Linear Regression Analysis

Regression

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	PU(a)	.	Enter

a All requested variables entered.
b Dependent Variable: IBU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
					Change Statistics				
1	.422(a)	.178	.175	1.408	.178	57.152	1	264	.000

a Predictors: (Constant), PU

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	113.367	1	113.367	57.152	.000(a)
	Residual	523.670	264	1.984		
	Total	637.038	265			

a Predictors: (Constant), PU
b Dependent Variable: IBU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.145	.433		-4.958	.000
	PU	.586	.077	.422	7.560	.000

a Dependent Variable: IBU

Regression

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	PEOU(a)	.	Enter

a All requested variables entered.
b Dependent Variable: IBU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
					Change Statistics				
1	.371(a)	.138	.135	1.442	.138	42.209	1	264	.000

a Predictors: (Constant), PEOU

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	87.812	1	87.812	42.209	.000(a)
	Residual	549.226	264	2.080		
	Total	637.038	265			

a Predictors: (Constant), PEOU
b Dependent Variable: IBU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.566	.414		-3.784	.000
	PEOU	.476	.073	.371	6.497	.000

a Dependent Variable: IBU

Regression

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	PEOU(a)	.	Enter

a All requested variables entered.
b Dependent Variable: PU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change	df1	df2	Sig. F Change
1	.698(a)	.487	.485	.8018	.487	250.302	1	264	.000

a Predictors: (Constant), PEOU

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	160.920	1	160.920	250.302	.000(a)
	Residual	169.726	264	.643		
	Total	330.646	265			

a Predictors: (Constant), PEOU
b Dependent Variable: PU

Coefficients(a)

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.291	.269		4.800	.000
	PEOU	.812	.051	.698	15.821	.000

a Dependent Variable: PU

Regression

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	CA(a)	.	Enter

a All requested variables entered.
b Dependent Variable: IBU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.246(a)	.061	.057	1.506	.061	17.004	1	264	.000

a Predictors: (Constant), CA

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	38.549	1	38.549	17.004	.000(a)
	Residual	598.489	264	2.267		
	Total	637.038	265			

a Predictors: (Constant), CA
b Dependent Variable: IBU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.844	.471		-1.792	.074
	CA	.331	.080	.246	4.124	.000

a Dependent Variable: IBU

Regression

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	SC(a)	.	Enter

a All requested variables entered.
b Dependent Variable: IBU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.186(a)	.035	.031	1.526	.035	9.507	1	264	.002

a Predictors: (Constant), SC

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22.144	1	22.144	9.507	.002(a)
	Residual	614.893	264	2.329		
	Total	637.038	265			

a Predictors: (Constant), SC
b Dependent Variable: IBU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.221	.388		5.725	.000
	SC	-.277	.090	-.186	-3.083	.002

a Dependent Variable: IBU

Regression

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	QF(a)	.	Enter

a All requested variables entered.
b Dependent Variable: IBU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
					Change Statistics				
1	.286(a)	.082	.078	1.488	.082	23.571	1	264	.000

a Predictors: (Constant), QF

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	52.215	1	52.215	23.571	.000(a)
	Residual	584.822	264	2.215		
	Total	637.038	265			

a Predictors: (Constant), QF
b Dependent Variable: IBU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.648	.363		-1.782	.076
	QF	.354	.073	.286	4.855	.000

a Dependent Variable: IBU

Regression

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	SN(a)	.	Enter

a All requested variables entered.
b Dependent Variable: IBU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.231(a)	.053	.050	1.511	.053	14.911	1	264	.000

a Predictors: (Constant), SN

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34.057	1	34.057	14.911	.000(a)
	Residual	602.981	264	2.284		
	Total	637.038	265			

a Predictors: (Constant), SN
b Dependent Variable: IBU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.228	.346		-.659	.510
	SN	.273	.071	.231	3.861	.000

a Dependent Variable: IBU

Regression

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	TP(a)	.	Enter

a All requested variables entered.
b Dependent Variable: IBU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.303(a)	.092	.089	1.480	.092	26.751	1	264	.000

a Predictors: (Constant), TP

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.612	1	58.612	26.751	.000(a)
	Residual	578.426	264	2.191		
	Total	637.038	265			

a Predictors: (Constant), TP
b Dependent Variable: IBU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.775	.366		-2.116	.035
	TP	.390	.075	.303	5.172	.000

a Dependent Variable: IBU