

Influence of Demographic Profile on Perceived Security and level of adoption of Internet Banking in a developing country: An Empirical Study

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Abstract

Internet Banking is becoming an important channel for banks to deliver banking services to their customers. The proponents of Internet banking believe that it offers convenience to customers and enhanced efficiency to bankers. While the Internet technology holds the potential to fundamentally change banks and the banking industry, it is still haunted by low rate of adoption by bank customers due to perceived risks in transacting in the virtual environment of Internet. The study examines the influence of demographic variables age, gender, educational level, occupation and monthly income on the level of adoption of Internet banking. The paper builds on existing literature on the importance of security as perceived by the users towards adoption of internet banking.

Keywords: Internet banking, customers, perceived security, integrity, reliability, privacy, confidentiality, adoption, demographic variables.

1. Introduction

In a typical online banking transaction, most of the steps are carried out electronically. There is an intrinsic anonymity that creates doubts about the different aspects of transactions. There are serious concerns regarding the reliability and security of e-commerce infrastructure. The vulnerability of this infrastructure to threats from hackers and system failures is well known. There are concerns regarding the confidentiality of transaction information. These concerns add to the plethora of issues relating to trust in Internet banking leading to low participation by customers/users. In order to be able to achieve the potential benefits of Internet banking and realize reasonable 'rate of return' on investment in its infrastructure, it is necessary to enhance the levels of such participation. Since, technology is the facilitator of Internet banking; it is felt that technology can be instrumental in addressing some of the above mentioned, concerns and thereby enhance the levels of trust in Internet banking. It is perceived that Internet banking environment is both insecure and unreliable. The issue of security in Internet banking is primarily concerned with ensuring integrity of electronic environment and also securing the transaction information. The news of online frauds, eavesdropping, hacker attacks, malicious intrusion into information and pilferage of data shakes the confidence in the Internet banking infrastructure. Hence, there is a need to effectively address the security issue in

order to reduce the occurrence of such events associated with the bank. There is a need to build a secure environment in which the customers have complete confidence and they are able to use it without fear of falling victim to security risks. The aim of this paper is to study the customers' perceptions regarding security as a trust indicator in adoption of Internet banking.

2. Literature Overview

Since, 1998 when the first important study on Internet banking was conducted by Eglund et al. (1998) estimating the number of US banks offering Internet banking and analyzing the structure and performance characteristics of these banks, many research scholars and surveys all over the world have tried to explore various issues pertaining to adoption of Internet banking. To name a few, Hasan et al. (2002) studied the adoption of Internet by banks in Italy; DeYoung (2001a, 2001b, 2001c and 2005) studied the performance of pure-play Internet banks in U.S; Delgado et al. (2004 and 2006) found similar results for Internet-only banks in the EU; Hernando and Nieto (2005) examined the performance of multi-channel banks in Spain; etc. These studies were primarily focused that adoption of Internet banking is often related to economical and statistical improvement in bank profitability. Mirza et al, (2009) investigated empirically the internet banking adoption by Iranian Customers. Lack of technological knowledge, security concern and awareness were the main barriers reported in the study. Burcu et al, (2009) found that the demographic variables are the most influencing way to identify the target consumers. They further classified the usage of consumer perception attributes and found that internet banking appeared to be a valuable alternative channel for Turkey.

While many factors have been identified to influence e-banking adoption, security is found to be the common factor in most of these studies (Kim and Prabhakar, 2000; Grabner- Krauter and Faullant, 2008). This is in congruence with the fact that internet banking is delivered online, which basically is vulnerable to all the risk associated with online activities (Md, Nor and Pearson, 2007). As technology uses Internet as its delivery platform, it is expected that potential users may perceive it to be exposed to faceless online negative activities. The activities of hackers and the widespread phishing

websites, for instance, have highlighted the perceived unsafe nature of the Internet and these have been frequently projected in the media and also on the banks websites. These indirectly have affected consumers' perceptions regarding security of the online technology and services, including e-banking.

Studies have often stated that security and privacy have a direct and significant effect on consumer trust in the online banking context (Casalo et al., 2007). When people have the confidence and assurance about the absolute privacy and security related with the Internet banking then certainly it induces them for future transaction using the same system. The issue of security is among the most critical obstruction for the acceptance of online banking (Laforet and Li, 2005). Manzano et al. (2008) stated that perceived risk consists of security, privacy, performance and social factors, and have strong bearing on Internet banking adoption.

Though a number of studies have been conducted regarding adoption of Internet banking, most of these studies have been focused only on factors affection the adoption of Internet banking. Only a few studies could be traced that comprehensively focus on trust inducing security issues of Internet banking. Further, there seems to be a dearth of literature specific to adoption of Internet banking in developing countries like India. Most developing countries suffer from low penetration of banking and Internet banking is being viewed as an instrument of achieving financial inclusion. These countries also suffer from weak IT infrastructure and low levels of IT skills. This coupled with weak regulatory framework makes the Internet banking user more vulnerable that creates impediments in the adoption of Internet banking. This paper makes a modest attempt to find a relationship between various demographic profiles of the users of Internet banking and their respective level of adoption particularly in the context of developing countries.

3. Sample Selection

For the purpose of study, a survey of Internet banking users of leading banks of India was conducted. Convenient sampling was used to select the respondents belonging to different age groups and of different educational background. A structured questionnaire was given to these respondents in advance either personally or through e-mail so that they have understood the questions before they were approached for responses. The questionnaire and items were modified based on the feedback from a pilot study group. The questionnaire consisted of closed questions. The answers for the question set were represented by the Likert scale, allowing the respondents to select the level of impact the objectives referred to had on their adoption to internet banking. This enabled scoring the replies and quantification of the research findings. The respondents belonging to different cities like Delhi, Gurgaon, Noida, Mumbai, Pune, Chennai, Hyderabad, Bangalore, Chandigarh, Dehra Dun, etc. constituted the sample. In total 107 completed responses were received. The main aim behind the survey was to get

the perceptions of the user regarding the service quality offered by the bank and various components of security like integrity, confidentiality, privacy, authorization and structural assurances. However, the scope of the present paper is limited to only to two constructs namely integrity and reliability and privacy and confidentiality. The aim of the paper is to explore their relationship with the demographic profile. This would give us a glimpse on the general perception of the users of internet banking and their expectations from the services provided by the banks. The descriptive statistics of the respondents' demographic characteristics were analyzed and presented in Table 1. As can be observed, the sample was fairly diversified in respect of the attributes identified. The number of the male respondents (56%) and female respondents (44%) are comparable which can account to an impartial feedback from both perspectives. The age group of the respondents ranged from 20 years to more than 40 years. As is clear from the table, there is comparable distribution of sample in all the age groups. People falling under the age group of 25-35 years are most technology savvy and hence almost half of the respondents fell in this category. About one third of the sample constituted of people between 35-40 years. These constituted the working class and hence Internet banking users either by choice or by force.

Table 1: Descriptive Statistics

Demographic profile		Frequency	Percentage
Sex	Female	46	44
	Male	61	56
Age	< 25yrs	10	10
	25- 30yrs	25	24
	30 -35yrs	26	25
	35- 40yrs	11	10
	>40yrs	35	31
Occupation	Pvt Sector	37	34.6
	Govt. Sector	43	40.2
	Bank Employee	6	5.6
	Professional/Self Employed	18	16.8
	Non-Earning	3	2.8
Educational Qualification	Graduate or less	22	20.5
	Post Graduate	38	35.5
	Professional Degree	47	44
Monthly Income	< Rs. 50,000	52	48.6
	Rs.50,000 -	44	41.1
	Rs.1,00,000		
	> Rs.1,00,000	11	10.3

In regard to the occupation, care was taken to involve respondents from all walks of profession like private sector employees, government sector employees, bank employees, business professionals, etc. Another group as 'non-earning group' was also included that mainly comprised of students and home makers who were Internet banking users. About 40% of the respondents

were government employees, 35% were private sector employees and 17% were self employed professionals. This amounted to an almost unbiased sampling.

4. Operationalization of the Constructs

4.1 Adoption of Internet banking

Adoption is the acceptance and continued use of a product, service or idea (Rogers 1983). TAM (Davis et al., 1989) model suggests that adoption behavior of customer is determined by the intention to use a particular system. Adoption of internet banking not only helps in reducing costs and improving competitiveness but also helps bank's ability to retain the existing customer base and also to increase it by attracting new customers (Guriting and Ndubisi, 2006; Gerrard and Cunningham, 2003; Rotchanakitmnuai and Speece, 2003; Akinci et al., 2004). Since all of the respondents in the survey were users of Internet banking, however, it was found that the level of its adoption varied. though Internet banking offer various services like: balance enquiry, cheque/statement/draft requisition, utility payments, online shopping, electronic fund transfer or EFT trading etc., yet users limit their usage to basic rudimentary level. Such low level of adoption cannot be actually specified as true adoption of technology. The aim of the present study is to analyze the factors that are mainly responsible for such varying level of adoption of Internet banking. For this, the respondents were asked to specify their extent of usage of Internet banking and based on the varying response rates received; the respondents were then classified under 3 levels of adoption namely high, medium and low.

4.2 Integrity and Reliability

During and after exchange of information, the content should remain unchanged and should be tamper free. This covers both accidental and intentional damage to information data (Grandison & Sloman, 2000). Ally & Toleman (2005), state integrity ensures that messages that are not created, modified, interception or deleted by unauthorised people. The information required by users should be accessible when required by them. This ensures that the system is reliable (Maijala, 2004) and authorized personnel can access the services of an application within a desired time frame (Knorr & Röhrig, 2000). The constructs taken by the study regarding integrity and reliability are extracted from the literature review and the table 2 illustrates the same. This table also indicates the contribution of the author.

Table 2: Constructs for Integrity and Reliability

You believe that the transaction is secure	Schneider 1998;
You believe that transaction information will not be altered during the transmission	New Item
You believe that transaction information will not be lost during an online session	Yousafzai, 2009
You believe that your Internet banking transaction information will reach the target bank account only	Chellappa (2003)

4.3 Privacy and Confidentiality

Confidentiality is the assurance that the communication between the user/customer and the service provider would not accessible to any other third party (Suh & Han, 2003). It also means to prevent any unauthorized access of information (Knorr & Röhrig, 2000). Hence, confidentiality not only includes confidentiality of information that is passed over the network during communication but the confidentiality of information that is stored at different locations (Maijala, 2004).

Privacy, though considered by some researchers a separate issue from that of security (Mukherjee & Nath, 2003), has been included by many as part of the security objectives (Nilsson et al., 2005; Patton, 2004). From a customer's perspective, security and privacy may not be discrete concepts, and in most circumstances, security would imply privacy (Suh & Han, 2003). Privacy is defined as the need to guarantee that the customer information is not accessible to unauthorized users and is not misused

Table 3: Constructs for Privacy and Confidentiality

You believe that your Internet banking transaction information will be used only for the purpose of the purpose of requisite transaction only.	Chellappa (2003)
You believe that your Internet banking transaction information will be shared with others only with your consent other than regulatory authorities (ITax)	Chellappa (2003)
While being a user of Internet banking, you believe that you control the use of your information available to the bank	Chellappa (2003)
You believe that your Internet banking transaction information will be used only for the purpose of the purpose of requisite transaction only.	Chellappa (2003)

5. Data Analysis

Perception of security is described as a subjective belief of a user that their communication with the systems is protected from all potential threats (Ally & Toleman, 2005). Perceived security can either give the customers confidence to continue interactions with their bank accounts and transact online or can inhibit them from doing so (Ally & Toleman, 2005; Suh & Han, 2003). In Liao & Cheung (2002)'s study, perceived security was rated to be of high importance by users of online banking systems. Perceived security is hypothesized by the author to be influenced by various components that have the potential to affect the user's perception regarding adoption of Internet banking. These components are a) Integrity and Reliability; b) Privacy and Confidentiality; c) Authentication and Authorization; d) Structural Assurances; and e) Security practices. Although, the author had conducted a survey had asked the respondents their perceptions regarding the importance of these components and presence of them in their banking sites, yet the scope of present paper is limited to the first two constructs only. The paper makes a modest attempt to find

the relation of these two components of security with the level of adoption and the demographic profile of the respondents. These perceptions were taken in the form of Likert scales ranging from strongly agree to the importance and presence in the site to could not find the presence or indifferent of its importance to strongly disagree with the importance or absolute non existence of its presence in the banking site.

5.1 Integrity and Reliability

Integrity has been included by the study as one of the components of perceived security as it ensures that the online transactions made by the user can not be created, modified, interception or deleted by any unauthorised people. It also ensures that the information required by users should be accessible when required by them. When this component is related with the level of adoption of Internet banking, it is found that the respondents with high level of adoption strongly agree that banking site ensure integrity and reliability of information. None of the respondents with high level of usage disagreed to this fact. Further, the only 5% of the respondents with medium level of adoption disagreed to the presence of this component of security.

Table 5: Integrity and Reliability & Level of Adoption

Level of adoption	Agree & Present	Indifferent	Not present
Low	47.6%	47.6%	4.8%
Medium	63.0%	31.5%	5.6%
High	96.9%	3.1%	Nil
Total	70.1%	26.2%	3.7%

Note: level of adoption : $\chi^2 = 23.118$ (df = 6); Phi = 0.465; Cramer's V = 0.329;

The statistical tests also support the above analysis. This would imply that there definitely exist a relationship between integrity and reliability of the site with the level of adoption of Internet banking. Further, this study made an attempt to find the relationship of this component with the demographic profile of the respondent.

Table 6: Integrity and Reliability and Demographic Profile

Demographic profile	Agree and Present	Indifferent	Not present
Integrity and Reliability and Gender			
Male	57.4%	37.7%	4.9%
Female	87.0%	10.9%	2.2%
Total	70.1%	26.2%	3.7%
Integrity and Reliability and Age			
< 25yrs	70.0%	30.0%	0.0%
25- 30yrs	52.0%	40.0%	8.0%
30 -35yrs	76.9%	19.2%	3.8%
35- 40yrs	90.9%	9.1%	0.0%
>40yrs	71.4%	25.7%	2.9%
Total	70.1%	26.2%	3.7%
Integrity and Reliability and occupation			
Ext Sector	70.3%	27.0%	2.7%
Govt. Sector	83.7%	14.0%	2.3%
Bank Emp.	0.0%	100.0%	0.0%
Self Emp.	61.1%	27.8%	11.1%
Non-Earning	66.7%	33.3%	0.0%
Total	70.1%	26.2%	3.7%
Integrity and Reliability and Education			
Grad or less	63.6%	36.4%	Nil
Post Graduate	57.9%	36.8%	5.3%
Professional	83.0%	12.8%	4.3%
Total	70.1%	26.2%	3.7%
Integrity and Reliability and Monthly Income			
< Rs. 50,000	69.2%	28.8%	1.9%
Rs.50,000 - Rs.1,00,000	70.5%	22.7%	6.8%
> Rs.1,00,000	72.7%	27.3%	0.0%
Total	70.1%	26.2%	3.7%

Note: Gen.: $\chi^2 = 4.419$ (4); Phi = 0.203; Cramer's V = 0.203; Edu qual: $\chi^2 = 18.763$ (4); Phi = 0.419; Cramer's V = 0.242; Age: $\chi^2 = 9.457$ (4); Phi = 0.297; Cramer's V = 0.288; Occup.: $\chi^2 = 30.014$ (4); Phi = 0.530; Cramer's V = 0.172; Mon. Income: $\chi^2 = 4.521$ (4); Phi = 0.206; Cramer's V = 0.145; As can be seen from the Table 6, when Integrity and reliability component was related with the demographic profile of the respondents, the gender seems to be not much affecting this component. This is in contrast with earlier studies that have found that there is a difference between the males and females in using various types of technology (Burke, 2002). This study found that males and females in almost comparable percentages fell into different levels of adoption implying that both the genders equally perceive the importance and presence of this component of security.

In addition, earlier studies indicated income to potentially exert a strong effect on the adoption and diffusion of technology (Venkatesh and Morris, 2000). When this study related this component of perceived security with monthly income of the respondents, the results indicated that respondents with higher income group are aware of this component and strongly agree to the presence and importance of integrity and reliability component to secure the online bank transactions.

The analysis of the data regarding education of the respondents was in alignment with the earlier findings that education plays a significant role as education affects positively the individual's level of Internet literacy (Burke, 2002). This study also found that most of the respondents with high level of adoption regarding Internet banking had higher level of literacy and were well educated in technology so as to understand the importance of the reliability and integrity of data and the need for banks to ensure this component for their e-service.

5.2 Privacy and Confidentiality

Privacy and confidentiality of the system assures the user that no third party can have access to their personal information without their consent. Also, it assures the user that the bank, that has got certain information about the users which is highly personal, will not use it for any other purpose, than the purpose already stated, without their consent. When this component of security was related with the level of adoption of the respondents, it was found that respondents with high level of usage were found to either strongly agree or agree to the importance and presence of this component of security. Those respondents with high level of adoption of Internet banking had acquired such level only after the assurances indicated by the presence of various security mechanisms that ensures the privacy and confidentiality of the web site. During the informal talk, some of the respondents revealed that they were apprehensive of any leakage of occurring regarding their information and hence restricted their online transactions to bare minimum there by falling under low level of adoption of Internet banking.

Table 7: Privacy and Confidentiality & Level of Adoption

Level of adoption	Agree & Present	Indifferent	Not present
Low	47.6%	47.6%	4.8%
Medium	63.0%	31.5%	5.6%
High	96.9%	3.1%	Nil
Total	70.1%	26.2%	3.7%

Note: level of adoption : $\chi^2 = 29.411$ (df = 6); Phi = 0.534; Cramer's V = 0.371; Kendall's tau-b= 0.375

This would imply that banks need to give adequate assurances to the users regarding the privacy and confidentiality of both the information stored and the online transactions so as to enhance their levels of assurances and there by their level of adoption of Internet banking. The study attempted to find the relation of this perception regarding security with the demographic profile of the respondents.

Table 8: Privacy and Confidentiality and Demographic Profile

Demo profile	Agree and Present	Indifferent	Not present
Privacy and Confidentiality and Gender			
Male	42.6%	47.5%	9.8%
Female	56.5%	34.8%	8.7%
Total	48.6%	42.1%	9.3%
Privacy and Confidentiality and Age			
< 25yrs	30.0%	50.0%	20.0%
25- 30yrs	40.0%	48.0%	12.0%
30 -35yrs	61.5%	26.9%	11.5%
35- 40yrs	81.8%	18.2%	0.0%
>40yrs	40.0%	54.3%	5.7%
Total	48.6%	42.1%	9.3%
Privacy and Confidentiality and Occupation			
Ext Sector	67.6%	24.3%	8.1%
Govt. Sector	46.5%	46.5%	7.0%
Bank Emp	16.7%	66.7%	16.7%
Professional Self Employed	22.2%	61.1%	16.7%
Non-Earning Group	66.7%	33.3%	0.0%
Privacy and Confidentiality and Education			
Total	48.6%	42.1%	9.3%
Grad or less	50.0%	40.9%	9.1%
Post Grad	36.8%	55.3%	7.9%
Professional	78.7%	31.9%	10.6%
Total	48.6%	42.1%	9.3%
Privacy and Confidentiality and Monthly Income			
< Rs. 50,000	57.7%	32.7%	9.6%
Rs.50,000 -			
Rs.1,00,000	40.9%	47.7%	11.4%
> Rs.1,00,000	72.7%	63.6%	0.0%
Total	48.6%	42.1%	9.3%

Note: Gender: $\chi^2 = 2.493$ (df = 4); Phi = 0.153; Cramer's V = 0.153;

Edu qual: $\chi^2 = 14.358$ (df = 4); Phi = 0.366; Cramer's V = 0.211

Age: $\chi^2 = 17.445$ (df = 4); Phi = 0.408; Cramer's V = 0.238;

Occup: $\chi^2 = 17.435$ (df = 4); Phi = 0.404; Cramer's V = 0.233;

Mon Income: $\chi^2 = 7.042$ (4); Phi = 0.257; Cramer's V = 0.181

As can be seen from the Table 8, it was found that the importance of this component is equally felt by both sexes. Almost the same percentage of the male or female respondents agreed or disagreed to the importance of this component of security. However, almost half the male respondents could not find the presence of such indicators in the banking site. Also, the empirical results revealed that the respondents with high literacy level are most likely to perceive the importance of this component of

security for adoption of Internet banking and these results are consistent with the findings of Al-Ashban and Burney (2001) and Stavins (2001). According to Stavins (2001), consumers with more years of education are more likely to use Internet banking.

6. Discussion Implications and Suggestions

Earlier studies have indicated that income has the potential to exert an effect on the adoption and diffusion of technology. Older individuals between 26 and 45 are over- represented in categories of higher income, higher occupational positions, and higher educational qualifications (Venkatesh and Morris, 2000). The results of the present study was in consistent with this result and indicated that respondents with higher income, higher occupational positions, and higher educational qualifications were aware of technology and its impact and hence their perceptions regarding security was based on the importance of PAIN (Privacy, Authentication, Integrity and Non-Repudiation) aspect of online transactions.

This would imply that banks need to make adequate measures to demonstrate privacy and confidentiality of their site to their users in order to enhance their level of perceptions regarding security. The above analysis clearly depicts the significant importance of various components of security in building perceptions regarding security of the site. In addition, this study's results indicate that the youth of India has adapted to this technology and are prospective high level of users of Internet banking. Keeping in view, the banks need to better understand what really influences young adults. By this understanding, they will be able to formulate effective techniques to attract this group into adopting the system. The government as well as other organisations should encourage their staffs and customers to use the system. Since, the education level of the users is found to be above average, so the banks need to realise that the users are aware of the various technological advancements and loop holes of the system, Hence, banks should make efforts to educate the users about their security practices and measures undertaken so as to enhance their perceptions regarding security. Regular and free training imparted by banks would definitely help in encouraging medium to low degree of users to increase their usage. Organisations can also influence the usage of the system by encouraging their customers to make their payments using Internet banking system.

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