Factors Influencing the Adoption of Internet Banking

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Abstract

This thesis reports the findings of a study issues concerning the adoption of internet banking in Iran. This study investigates costumers’ adoption within the context of Iran Internet Banking services and research framework is based on the extension of Technology Acceptance Model with Theory of Planned behavior and Trust.

Theory was developed to identify factors that would influence the adoption of Internet banking. The framework includes Attitude, subjective norm, Perceived behavioral control, Perceived usefulness, Perceived ease of use, Trust and intention constructs. Survey was conducted to gather the data. Partial Least Square was used to examine the entire pattern of inter-correlations among the thirteen proposed constructs and to test related propositions empirically. Results show that Attitude, Perceived behavioral control, Perceived usefulness, Perceived ease of use, Trust significantly influence customers’ intention toward adopting Internet banking. Theoretical contributions and practical implications of the findings are discussed and suggestions for future research are presented.

**Keywords:** Electronic Banking (Ebanking), Internet Banking, Information Technology (IT), Technology Adoption, Trust
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January 2007

Sara Naimi
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Chapter 1

Introduction

1. Introduction

The first chapter represents the research approach, background of the study, motivation of the study, introduces the reader to the objective, problem research question that leads us to our purpose. Subsequently it reports contribution of the study and structure of the thesis.
1.1 Overview

Advances in information and communication technologies in particular, the growing use of the internet for business transaction, have had a profound effect on the banking industry. While this is a global phenomenon, creating a truly global marketplace, penetration of internet banking into less developed countries lags behind that of the developed Western countries. While poor economies, education and infrastructure are obvious factors in the slow adoption of technology in some developing countries, there are probably also other issues like Trust that plays role. This thesis reports finding of research into adoption of internet banking in Iran, a country of Middle East, and propose variety of factors that are likely to be involved in acceptance by users.

1.2 The Research Approach

This research develops and tests a theoretical extension of the Technology Acceptance Model (TAM) (Davis, 1989), Theory of Planned Behavior (TPB) (Ajzen, 1991) and Trust and examines the factors that influence the adoption and acceptance of the information technology and system of Internet; in the banking sector in Iran, especially Internet banking.

The spatial and temporal separation of e-commerce between customers and e-vendors as well as the unpredictability of the Internet infrastructure generate an implicit uncertainty around the initial adoption of on-line service (Pavlou, 2001). Accordingly, the initial adoption of eservice like Internet banking, basically involves the acceptance of both the Internet technology and on-line service providers. As technology acceptance model (TAM) is mainly proposed for technology-based perspective through two system features of perceived usefulness (PU) and perceived ease of use (PEOU) (Davis et al., 1989), it is incomplete in the context of on-line services.

A model, named Trust and TAM, has been previously presented in exploring the acceptance of on-line shopping setting (Gefen et al., 2003a). This model integratively placed use of on-line system into both system features such as ease of use and usefulness
and trust in e-vendors. This result indicated that these variables are good predictors for behavior intention to use on-line shopping. However, a diffusion of innovative technology is highly related to communication channels, individuals, organizational members, and social system except for the technology itself (Rogers, 1995). Theory of planned behavior (TPB) is the model widely used in predicting and explaining human behavior while also considering the roles of individual organizational members and social system in this process (Ajzen, 1991). Accordingly, the three influencers in this theory, i.e. attitude, subjective norm and perceived behavioral control, can be interpreted as attitude for technology role, subjective norm for organizational members and social system roles, and perceived behavioral control for individual role.

As the focus of this study is on the Internet banking setting, which is considered as a type of innovative technology, organizational and social systems such as peer or superior influence and self-efficacy in computer or external resource constraint should play the important role in determining the acceptance of Internet banking (Taylor and Todd, 1995). As a result, an extension of Trust and TAM model with TPB including subjective norm and perceived behavioral control should be in a more comprehensive manner to examine the acceptance of internet banking. In this extension, trust is placed as an important antecedent of attitude, subjective norm, and perceived behavioral control and also intention. Hopefully, this will provide us more information to solve this problem of low usage rate in using Internet banking.

1.3 Background of the Study

Banking has always been a highly information intensive activity that relies heavily on information technology (IT) to acquire, process, and deliver the information to all relevant users. Not only is IT critical in the processing of information, it provides a way for the banks to differentiate their products and services. Banks find that they have to constantly innovate and update to retain their demanding and discerning customers and to provide convenient, reliable, and expedient services. Driven by the challenge to expand and capture a larger share of the banking market, some banks invest in more bricks and mortar to enlarge their geographical and market coverage. Others have considered a more
revolutionary approach to deliver their banking services via a new medium: the Internet. Since the introduction of the Internet in 1969, it has evolved from the sole domain of the computer nerd and the academic to a mainstream channel of communication (Nehmzow, 1997). Recently, it has been rapidly gaining popularity as a potential medium for electronic commerce (Crede, 1995; Ooi, 1999; U.S. Department of Commerce, 1999). The rapid growth of the Internet has presented a new host of opportunities as well as threats to business. Today, the Internet is well on its way to become a full-fledged delivery and distribution channel and among the consumer-oriented applications riding at the forefront of this evolution is electronic financial products and services.

With the rapid diffusion of the Internet, banking in cyberspace is fast becoming an alternative channel to provide banking services and products. In the USA, banks are already providing services on the Internet and Internet banks, such as Security First National Bank, are beginning to appear. The Internet is now being considered as a strategic weapon and will revolutionize the way banks operate, deliver, and compete against one another, especially when competitive advantages of traditional branch networks are eroding rapidly (Nehmzow, 1997; Seitz, 1998). As “Business Week” noted, “Banking is essential to a modern economy, banks are not” (quoted in Financial Times, 1996). This statement is supported by a recent report from Booz Allen & Hamilton (Warner, 1996) that claims the Internet poses a very serious threat both to the customer base of the traditional banking oligopoly and to its profits. Their belief is that the Internet promises a revolution in retail banking of monumental proportions. High street or brick and mortar banks as we know them may largely disappear.

Indeed, the emergence of Internet banking has prompted many banks to rethink their IT strategies in order to stay competitive. Customers today are demanding much more from banking services. They want new levels of convenience and flexibility (Birch and Young, 1997; Lagoutte, 1996) on top of powerful and easy to use financial management tools and products and services that traditional retail banking could not offer. Internet banking has allowed banks and financial institutions to provide these services by exploiting an extensive public network infrastructure (Ternullo, 1997). Despite the many potential benefits, many teething problems will need to be addressed
before Internet banking can become widely adopted. It is believed that, in the future, Internet banking will recede in importance as a strategic application to become a competitive necessity that must be adopted by most if not all banking and financial institutions.

1.4 Motivation of the Study

The motivations for this research are as follows:

1. This is a new innovation in Iran; Internet banking is a worthwhile topic to study so that the quality of services in Iranian banking sector can be enhanced for the future.
2. Internet banking has been widely studied in developed countries. Few studies have been done in developing countries, and it has not been investigated in Iran.

Literature shows that there is problem in using the Internet in the Middle East. There is a lack of experience within individuals and organizations, and most of the potential users are unqualified.

1.5 Objective of the Study

The research aims at enriching the knowledge and understanding of factors affecting adoption of Internet Banking services in Iran (an IT innovation). Specifically, the main objectives of this study are:

1. Investigate the adoption and use of internet for banking transactions by individuals in Iran as an example of a developing country.
2. Quantify constructs concerning the current state of consumer beliefs and attitudes toward internet banking, and develop and validate the relationships between the factors that drive the adoption and acceptance of such services.
3. Propose opportunities for both participants and researchers to uncover unseen problems, thereby improving the use and acceptance of internet banking.
1.6 Problem Discussion

It is well known that individuals in the Middle East are late adopter of the internet and its applications with regards to Internet banking. Iran, as well as many other countries has the same problems. There is no study that identifies and explains factors that affect Internet banking acceptance in Iran.

Iran is now seeking to join WTO so adopting new technologies will modernize the service industries (banks-Commerce, e-Shopping, e-Governments, etc). All these services require a strong banking system, and this cannot now be achieved without adopting new technology. Competition among the national banks in Iran is driving the acceptance of internet banking.

Customers in Iran are late adopters of the internet and its applications with regards to Internet banking. It seems that internet banking is facing difficulties in Iran. This is not unique to Iran many developing countries have the same problem (Guru et al., 2003). Some issues already has mentioned by AL-Sukkar and Hasan (2004a):

- Although many customers perceived Usefulness and Eases of Use as benefits of the internet, they have not transferred this attitude toward the application of the internet to bank operations. May banks customers are reluctant to use online banking. Some customers simply don’t like the technology at all, and others fear their computer will garble their accounts.
- Lack of banking services through the web due to a limited number of banks using the Internet.
- Data and network security, in addition privacy problems.
- Lack and limitation of government policies, regulations and ecommerce laws, as well as legislation to protect workers and to make the Internet secure.
- Lack of infrastructure and weak telecommunications.
- Broken and slow internet connections.
- Lack of internet awareness, because this service is still widely unaccepted. It is believed that customers are still not fully confident with using ATM cards, and telephone banking. Greater awareness could show them the benefits of using new systems and could encourage them to adopt Internet banking transactions.
- Customers are afraid to use Internet banking and purchases through the Internet because they think that any mistake or error could mean a loss of money.
- Connection costs and costs of building and managing site.
As mentioned above many developing countries have the same problems, not only Iran. Also no study has been undertaken on the factors that affect Internet banking adoption and acceptance in Iran.

1.6.1 Problem Definition

Traditional branch-based retail banking remains the most widespread method for conducting banking transactions in Iran as well as any other country.

However, Internet technology is rapidly changing the way personal financial services are being designed and delivered. Now, commercial banks in Iran are trying to introduce Internet-based e-banking systems to improve their operations and to reduce costs. Despite all their efforts aimed at developing better and easier Internet banking systems, these systems remained largely unnoticed by the customers, and certainly were seriously underused in spite of their availability. Therefore, there is a need to understand users’ acceptance of Internet banking, and a need to identify the factors that can affect their intention to use Internet banking. This issue is important because the answer holds the clue that will help the banking industry to formulate their marketing strategies to promote new forms of Internet banking systems in the future.

So in our research we are going to identify the factors influencing the adoption of internet banking by Iranian customer.

1.7 Research Question

This research is remedying the lack of studies on the internet baking in Iran. This research deals with intention toward Internet banking usage. So research questions of this study will be:

- What are the factors influencing adoption of internet banking by Iranian customers?
- What is the role of social influence (Trust) in acceptance of Internet banking? (High lightening direct and indirect effect of Trust)
1.8 Practical and Theoretical Value of this Research

The need to understand what the factors are influencing the adoption of internet banking is important for managers, providers and researchers. In the technologically developed world, IT adoption is faced by barriers, such as the lack of top management support, poor quality IS design and inadequately motivated and capable users (Kwon and Zmud, 1987). In the developing world, the same barriers appear to be often impenetrable (Danowitz et al., 1995; Knight, 1993). In addition, problems found in developing countries are attributed to a lack of national infrastructure (Odedra et al., 1993), capital resources (Goodman and Press, 1995), or government policies set in place to prevent technology transfer (Goodman and Green, 1992). Although there are isolated reports of countries where sufficient resources and government support exist, the technology has failed to be effectively transferred (Atiyyah, 1989; Goodman and Green, 1992). While the uses of IT are varied, the common tie of computer use in the developing counties is one of limited diffusion (Goodman and Green, 1992). Consequently, there will be some beneficial applications of this research to Iranian banks and researchers in Iran. Some of these practical applications are as follows:

1. The acceptance of Internet banking is a new topic in Iran, and so it is worthwhile to conduct this study, whose result could be used to improve the banking sector, and enhance the quality of Internet services in Iran for the future.

2. Undertaking investigation on technology acceptance could enrich the research centers in Iran, providing a standard of research that could receive wider recognition. Iranian research organizations are looking for guidance in creativity and innovation.

3. Helping bank managers to identify factors that influence the adoption of Internet banking in order to increase the use of the service, as well as to encourage the general acceptance of new IT services.

From the practical perspective bank managers and other decision makers in the banking sector want information about how their customers act and react. Consumer acceptance models are valuable to managers as they help the to organize their learning about consumers and their behaviors, banks are able to acquire a better understanding and build a stronger relationship with them. The battle for customers has never been fiercer than it is today. Therefore, banks must understand who their customers are and how they...
behave. It is only through this knowledge of consumer that banks can satisfy the demands of consumers today and achieve a competitive edge over their competitors.

Issues of consumer acceptance of information technology have continuing interest in areas of academic research. To address these issues, we have Extended TAM and TPB with Trust. In fact, theoretical contribution is to enhance existing models through better conceptualization of effect of the Trust.

- TAM and TPB has been integrated
- Trust effect has been considered

We have modeled Trust effect indirect and fully mediated through Attitude, Perceived behavioral control, Subjective norms. There is, however, empirical evidence of the trust direct effect on behavior intention. The research tests the relationships between the entire variable in the model.

1.9 Structure of the Study

This dissertation is organized into 5 chapters as shown in Figure 1-2.

![Figure 1-1 Structure of the Study](image)
Chapter 2

Literature Review

2. Literature Review

Chapter two is structured along several themes. First of all, this chapter explains the basic terminology of electronic banking and Internet Banking. Second, this chapter outlines the definition of adoption. Third, different intention based models introduced. Finally, the chapter concludes by research model and hypothesis.
Internet Banking

2.1.1 Basics of Electronic Banking

Electronic banking is a high-order construct, which consists of several distribution channels. It should be noted that electronic banking is a bigger platform than just banking via the Internet. However, the most general type of electronic banking in our times is banking via the Internet, in other words Internet banking. The term electronic banking can be described in many ways. In a very simple form, it can mean the provision of information or services by a bank to its customers, via a computer, television, telephone, or mobile phone (Daniel, 1999). Burr (1996), for example, describes it as an electronic connection between bank and customer in order to prepare, manage and control financial transactions. Internet banking allows consumers to access their bank and accounts to undertake banking transactions. At an advanced level Internet banking is called transactional online banking, because it involves the provision of facilities such as accessing accounts, transfer of funds, and buying financial products or services online (Sathye, 1999). The terms Internet banking and online banking are often used in the literature to refer the same things. Nowadays the Internet is the main channel for electronic banking.

Furthermore, electronic banking is said to have three different means of delivery: telephone, PC, and the Internet. Daniel (1999), for example, introduces four different channels for electronic banking: PC banking, Internet banking, managed network, and TV-based banking.

It is important to remember that Internet Banking is different from PC Home Banking. The obvious difference is that Internet Banking is browser-based, whereas PC Home Banking requires customers to install a software package assigned by the bank on their PC.

Moreover, PC Home Banking allows customers to do their banking services only on PCs that have been installed the assigned software package, such as include Intuit, Inc.'s Quicken and Microsoft Corp.'s Money.
Karjaluoto et al. (2002a) suggests that the main electronic delivery channel in banking is the Internet, accessed via personal computer.

Telephone banking, TV-based banking, and managed network do not play such a big role in banking today. However, in the future the delivery platform is expected to shift from wired Internet connections to wireless mobile technologies. Thus, as Wah (1999) points out, electronic banking does not necessarily have to be on a computer screen. It can, for example, be on the tiny screen of a mobile phone or any other wireless device. With these wireless applications, customers can, for example, consult their bank account balances and transaction histories, view pie charts of their holdings in a portfolio, initiate payments or orders to buy and sell securities, and also send e-mail to their banks.

Electronic banking is the newest delivery channel in many developed countries and there is a wide agreement that the new channel will have a significant impact on the bank market (Daniel, 1999; Jayawardhena and Foley, 2000). According to Nehmzow (1997) Internet banking offers the traditional players in the financial services sector the opportunity to add a low cost distribution channel to their numerous different services. He continues that Internet banking also creates a threat to traditional banks’ market share, because it neutralizes so many of their competitive advantages in having a traditional branch bank network. In Table 2-1 we have summarized different delivery platform for e-banking.

There has also been some discussion about the disappearance of traditional banks. The future of Internet banking looks very promising. As Internet banking becomes more popular, it will be interesting to see what happens to traditional banks with branches. Wah (1999), for example, argues that traditional banks will not disappear in the future. Instead, the new technology will put them on a new level in banking services. She concludes that even traditional banks will benefit from this new technology, and the will be able to care for their customers in a more efficient, more productive and even more fun way. She also argues that Internet banking is playful for customers. However, there is relatively little evidence about the playfulness of Internet banking.
Table 2-1 Delivery platforms for electronic banking. Source: Adapted from Daniel, 1999 and Karjaluoto, 2003

<table>
<thead>
<tr>
<th>Type of service</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC banking (private dial up)</td>
<td>Proprietary software, distributed by the bank, is installed by the customer on their PC. Access to bank via a modem linked directly to the bank</td>
</tr>
<tr>
<td>Internet banking</td>
<td>Access their bank via Internet</td>
</tr>
<tr>
<td>Managed network</td>
<td>The bank makes use of an online service provided by another party</td>
</tr>
<tr>
<td>TV based</td>
<td>The use of satellite or cable to deliver account information to the TV screens of customers (Also Internet based)</td>
</tr>
<tr>
<td>Telephone banking</td>
<td>Customers access their bank via telephone (Own personal ID and password required)</td>
</tr>
<tr>
<td>Mobile phone banking (SMS, WAP, 3rd generation)</td>
<td>Access with text message (SMS), Internet connection (WAP), or high speed 3rd generation mobile connection (also Internet based)</td>
</tr>
</tbody>
</table>

2.1.2 Conception of Internet Banking

Internet Banking means that banking services such as services introduction, loan application, account balance inquiry, fund transfer and so forth are provided by a bank through the Internet. Internet banking has evolved into a “one step service and information unit” that promises great benefits to both banks and consumers.

According to Michael Karlin, the President and Chief Operation Officer of the world's first virtual bank, Security First Network Bank, the idea of Internet Banking is as follows:

1. You do not have to purchase any software, store any data on your computer, back up any information, since all transactions occur on the bank server over the infrastructure of the Internet.
2. You will be able to conduct your banking services anywhere you like but you need to have a computer and a modem, no matter where you are (e.g. at home, at office, or in a place outside the country).
3. You can use the banking services 24 hours a day, 7 days a week, and 365 days a year. You no longer have to reconcile a bank statement or manually track your ATM and paper checks.

2.1.3 Internet Banking in Iran

The appearance of electronic banking in Iran goes back to late 70s when two banks installed the first automatic Teller Machine (ATM) in Tehran. But because of vast changes in the nation’s banking and economic system plus the US embargo in Iran from the 80s, the use of these machines actually was discontinued. Later in early 90s the Iranian banks by slowly upgrading their automation standards once again started installing ATM devices. Gradually with nationwide growth in Internet connectivity, online networks and protocols, Fundamental platforms of online data transmission formed. Thus by defining electronic banking projects across the nations, these banks could take the first steps in developing and expanding the use of electronic payment devices such as Automatic Teller Machine (ATM), electronic cards and Point of Sales (POS). In recent years, most of Iranian banks have undertaken initiatives towards electronic banking services and official predict that electronic banking system will become fully operational by 2007 in Iran (quoted in Iran Daily, 2005).

Table 2-2 Electronic banking service provided by Iranian banks. Source: electronic banking special issues, June 2005

<table>
<thead>
<tr>
<th>Bank</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keshavarzi</td>
<td>ATM, Telephone bank, SMS banking, Credit Card, Debit Card, POS</td>
</tr>
<tr>
<td>Maskan</td>
<td>ATM, Telephone banking, SMS banking, POS</td>
</tr>
<tr>
<td>Mellat</td>
<td>ATM, Telephone banking, SMS banking, Internet banking, Debit Card, POS</td>
</tr>
<tr>
<td>Melli</td>
<td>ATM, Telephone banking, SMS banking, Internet banking, Debit Card, POS</td>
</tr>
<tr>
<td>Saderat</td>
<td>ATM, Credit Card, Debit Card, Telephone banking, SMS banking, POS</td>
</tr>
<tr>
<td>Sepah</td>
<td>ATM, Telephone banking, SMS banking, Debit Card</td>
</tr>
</tbody>
</table>
Table 2-2 Electronic banking service provided by Iranian banks. Source: electronic banking special issues, June 2005 (Continued)

<table>
<thead>
<tr>
<th>Bank</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tejarat</td>
<td>ATM, Telephone banking, SMS banking, Debit Card, Repaired Card</td>
</tr>
<tr>
<td>Tose Saderat</td>
<td>ATM, Internet banking, Mobile banking</td>
</tr>
<tr>
<td>Karafarin</td>
<td>ATM, Telephone banking, Debit card</td>
</tr>
<tr>
<td>Parsian</td>
<td>Telephone banking, SMS banking, Credit Card, Debit card, POS, internet banking</td>
</tr>
<tr>
<td>Saman</td>
<td>ATM, Telephone banking, Mobile banking, Internet banking Credit Card, Debit Card, POS</td>
</tr>
</tbody>
</table>

2.1.4 Benefits of Internet Banking

2.1.4.1 Benefits for Banks

Internet banking offers many benefits to banks and their customers. The main benefits to banks are cost savings, reaching new segments of the population, efficiency, enhancement of the bank’s reputation and better customer service and satisfaction (Brogdon, 1999; Jayawardhena and Foley, 2000).

According to a global survey conducted by Booz-Allen and Hamilton (1997), the establishment of specialized Internet Banking requires only US$1-2 million, which is lower than branch-based banking setup. The traditional bank's running costs account for 50% to 60% of its revenues, while the running costs of Internet Banking is estimated at 15% to 20% of its revenues.

According to Robinson (2000) the cost of an electronic transaction is dramatically less when done online compared to at a branch. According to Robinson (2000) the cost of an electronic transaction is dramatically less when done online compared to at a branch.

Sheshunoff (2000) says further that the single most important driving force behind the implementation of full service Internet banking by banks is the need to create
powerful barriers to customer exiting. He argues that once a customer moves to full-service Internet banking, the likelihood of that customer moving to another financial institution is significantly diminished. The main reasons for this behavior can be found in the consumer behavior theory: switching always requires much time and effort from the individual consumer. He concluded that the competitive advantage of Internet banking for banks is very significant.

Mols (1998) conducted a survey in Denmark argued that Internet Banking might be useful for strengthening cross-selling and price differentiation. Internet banking makes it possible for banks to offer consumers a variety of services 24/7. Internet banking is attractive because the consumer are more satisfied with their banks, are less price sensitive have the highest intention to repurchase, and provide more positive word of mouth information than other bank customers.

2.1.4.2 Benefits for Banks

Internet banking offers also new value to customers. The emergence of the Internet has had a significant impact on the diffusion of electronic banking. With the help of the Internet, banking is no longer bound to time or geography. Consumers all over the world have relatively easy access to their accounts 24 hours per day; seven days a week. It makes available to customers a full range of services including some services not offered at branches. The greatest benefit of Internet banking is that it is cheap or even free to customers. However, price seemed to be one factor militating against Internet banking (e.g. Sathye, 1999). Two important factors in the price debate are on the one hand geographical differences and on the other hand disparities between the costs of e.g. Internet connections and telephone call pricing. It has also been argued that electronic banks are more likely to change in response to customers’ demands (Brogdon, 1999). Internet banking has the advantage that the customer avoids traveling to and from a bank branch. In this way, Internet banking saves time and money, provides convenience and accessibility, and has a positive impact on customer satisfaction (Karjauloto, 2003). Customers can manage their banking affairs when they want, and they can enjoy more
privacy while interacting with their bank. It has been claimed that Internet banking offers the customer more benefits at lower costs (Mols, 1998).

Turban et al. (2000) indicated that Internet banking is extremely beneficial to customers because of the savings in costs, time and space it offers, its quick response to complaints, and its delivery of improved services, all of which benefits make for easier banking.

To summarize, electronic banking in general and Internet banking in particular offer many benefits to both service providers and their customers.

2.1.5 International Studies of Consumer Adoption of Internet Banking

The emergence of new banking technology has created highly competitive market conditions, which have had a critical impact upon consumer behavior. Internet banking providers must, therefore, attempt to better understand their customers and their attitudes toward technology in general. If they succeed, banks will be able to influence and even determine consumer behavior, which will become a major issue in creating competitive advantage in the future. The interaction between the adoption and marketing of electronic delivery channels by the banks and the changing customer segments is creating new environments for distribution channels (Mols et al., 1998). There has been wide discussion in the literature about adoption process of Internet banking services. Literature about adoption of internet banking is listed in the following table (Table 2-3).

<table>
<thead>
<tr>
<th>Studies</th>
<th>Research Title</th>
<th>Model</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ndubisi Sinti, 2006</td>
<td>Consumer attitudes. system’s characteristics an internet banking adoption in Malaysia</td>
<td>Decomposed TPB</td>
<td>• Importance to banking needs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• compatibility</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• complexity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• trainability</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Utilitarian orientation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Hedonic orientation</td>
</tr>
</tbody>
</table>

Table 2-3 Summary of international studies about internet banking
The results of the study reveal that the attitudinal factors play a significant role in internet banking adoption. Moreover, utilitarian orientation of the website rather than hedonic orientation has significant influence on adoption.

<table>
<thead>
<tr>
<th>Studies</th>
<th>Research Title</th>
<th>Model</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fink, 2005</td>
<td>Internet banking adoption strategies for a developing country: the case of Thailand</td>
<td>Decomposed TPB</td>
<td>• features of the web</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• perceived usefulness</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Risk and privacy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• personal preference</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• External environment</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>• culture</td>
</tr>
</tbody>
</table>

The attitudinal factors that appear to encourage the adoption of internet banking in Thailand most are “Features of the web site” and “Perceived usefulness”, while the most significant impediment to adoption is a perceived behavioral control, namely “External environment”. The significant moderating factors are gender, educational level, income, internet experience and internet banking experience, but not age.

<table>
<thead>
<tr>
<th>Studies</th>
<th>Research Title</th>
<th>Model</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eriksson Kerem Nilsson, 2004</td>
<td>Customer acceptance of internet banking in Estonia</td>
<td>Technology acceptance model</td>
<td>• Trust</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Perceived usefulness</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Ease of use</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Use</td>
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</tbody>
</table>

The findings suggest that internet bank use increases insofar as customers perceive it as useful. The perceived usefulness is central because it determines whether the perceived ease of internet bank use will lead to increased use of the internet bank. Put differently, a well-designed and easy to use internet bank may not be used if it is not perceived as useful. They thus conclude that the perceived usefulness of internet banking is, for banks, a key construct for promoting customer use. They also suggest that models of technology acceptance should be reformulated to focus more on the key role of the perceived usefulness of the service embedded in the technology.

<table>
<thead>
<tr>
<th>Studies</th>
<th>Research Title</th>
<th>Model</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pikkarainen Karjaluoito Pahnila, 2004</td>
<td>Consumer acceptance of online banking: an extension of technology acceptance model</td>
<td>Technology acceptance model And focus group</td>
<td>• Perceived usefulness</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Perceived ease of use</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Perceived enjoyment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Information on online banking</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Security and privacy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Quality of internet connection</td>
</tr>
</tbody>
</table>
The findings of the study indicate that perceived usefulness and information on online banking on the Web site were the main factors influencing online-banking acceptance.

<table>
<thead>
<tr>
<th>Studies</th>
<th>Research Title</th>
<th>Model</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wang Lin Tang, 2003</td>
<td>Determinants of users acceptance of Internet banking</td>
<td>Technology Acceptance Model</td>
<td>• Trust/Perceived credibility</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Perceived usefulness</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Ease of use</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• computer self efficacy</td>
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<td></td>
<td></td>
<td></td>
<td>• intention</td>
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</tbody>
</table>

Results:
Results provide evidence of the significant effects of the individual difference variable (i.e. computer self-efficacy) on behavioral intention through perceived ease of use, perceived usefulness, and perceived credibility. Consistent with the hypothesis, users who have a higher computer self-efficacy are likely to have more positive usefulness and ease of use beliefs, but have more negative credibility belief about the Internet banking. These findings also support prior research that has found a significant direct Internet banking relationship between computer self-efficacy and perceived ease of use and extend its generalizability to Internet banking. While computer self-efficacy had a negative effect on perceived credibility, its total effect on behavioral intention is positive.

<table>
<thead>
<tr>
<th>Studies</th>
<th>Research Title</th>
<th>Model</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shih Fang, 2003</td>
<td>The use of decomposed theory of planned behavior to study internet banking in Taiwan</td>
<td>Using both TPB and Decomposed Theory of Planned Behavior</td>
<td>• Behavior intention</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Actual usage</td>
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<td></td>
<td></td>
<td></td>
<td>• Attitude</td>
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<td></td>
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<td></td>
<td>• subjective norms</td>
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<td></td>
<td></td>
<td></td>
<td>• Perceived advantage</td>
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<td></td>
<td></td>
<td></td>
<td>• Relative advantage</td>
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<td></td>
<td></td>
<td></td>
<td>• Compatibility</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Complexity</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Normative influences</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Efficacy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Facilitating</td>
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</tbody>
</table>

Results:
In the decomposed TPB model, only relative advantage and complexity are related to attitude, while compatibility is not. With regard to subjective norm, the path from subjective norm to Intention failed to achieve significance in model. However, only self-efficacy was a significant determinant of PBC. Facilitating conditions did not influence perceived behavioral control.
### Table 2-3 Summary of international studies about internet banking (Continued)

<table>
<thead>
<tr>
<th>Studies</th>
<th>Research Title</th>
<th>Model</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suh Han, 2002</td>
<td>Effect of trust on customer acceptance of internet banking</td>
<td>Technology Acceptance Model</td>
<td>• Trust</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Perceived usefulness</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Ease of use</td>
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<td></td>
<td></td>
<td></td>
<td>• attitude</td>
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<td></td>
<td>• intention to use</td>
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</tbody>
</table>

**Results:**
In this study, They found that trust is one of the most significant beliefs in explaining a customer’s attitude towards using Internet banking. As suggested by the TAM, customer perception of the usefulness and ease of use also affect attitude significantly. At the same time, behavioral intention use Internet banking is highly related to attitude, perceived usefulness, and trust. These results imply that customers rely on trust in online environments that are processing sensitive information.

<table>
<thead>
<tr>
<th>Studies</th>
<th>Research Title</th>
<th>Model</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karjuoto Mattila Pento, 2002</td>
<td>Factors underlying attitude formation towards online banking in Finland</td>
<td>-------------------------------</td>
<td>• Prior computer experience</td>
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<td></td>
<td></td>
<td></td>
<td>• Prior technological</td>
</tr>
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<td></td>
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<td>• Experience</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Prior banking</td>
</tr>
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<td></td>
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<td></td>
<td>• experience</td>
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<td></td>
<td></td>
<td></td>
<td>• Reference group influences</td>
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</tbody>
</table>

**Results:**
Prior computer experience, prior technology experience, personal banking experience, reference group, and computer attitudes strongly affect attitude and behavior towards online banking, specifically, the relationship between personal banking experience and attitude was found to be critical.

<table>
<thead>
<tr>
<th>Studies</th>
<th>Research Title</th>
<th>Model</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wungwanit-Chakorn, 2002</td>
<td>Adoption Intention of Bank’s customers in Internet Banking Service</td>
<td>Decomposed TPB</td>
<td>• Relative advantage</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Complexity</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Compatibility</td>
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<td>• Trialability</td>
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<td></td>
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<td></td>
<td>• Perceived Risk</td>
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<td></td>
<td>• Cost</td>
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<td></td>
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<td></td>
<td>• Social Value</td>
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<td></td>
<td></td>
<td></td>
<td>• Age</td>
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<td></td>
<td></td>
<td></td>
<td>• Income</td>
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<td></td>
<td></td>
<td></td>
<td>• Personality Trait</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Option leader</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Product category usage</td>
</tr>
</tbody>
</table>
**Results:**
This research yielded useful conclusion related to adoption of internet banking services

<table>
<thead>
<tr>
<th>Studies</th>
<th>Research Title</th>
<th>Model</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Lockett Winklohofer Ennew, 2001</td>
<td>The adoption of internet financial service: a Qualitative study</td>
<td>Decomposed TPB</td>
<td>• Relative advantage</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Compatibility</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Trainability</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Observability</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Complexity</td>
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</tbody>
</table>

**Results:**
This paper focused on the innovation of delivering financial services through the Internet and re-evaluated the applicability of Rogers’ (1983) model. The focus group members used for data gathering were selected based on their usage of the Internet. Those who use the Internet to purchase financial services (S3) differ from those who use the Internet to purchase goods/services, but not financial services (S2) on the basis of higher income, and more use of information technology. S2 compared to S1 participants (users of the Internet but have not yet purchased anything over the Net) differ in terms of higher income and a larger product related involvement. Contrasting these three groups revealed that based on the factors of Rogers' model, S1 and S2 have very similar attitudes in terms of the advantages perceived by using the Internet compared to using bank branches or telephone, and share a similar attitude towards the risk involved. Their attitude was far less positive than their S3 counterparts. As one of the strongest influencing factors which emerged for adoption of the Internet to conduct financial transactions was compatibility with a person's values and previous experience with the product category, i.e. computers. Trialability was regarded as important for future adoption; however, its availability needs to be better communicated. Although the Rogers framework for evaluating the perceived attributes of an innovation is a useful starting point, other issues emerged which need to be considered, namely societal issues and the sense of fatalism. While the former could have a negative effect on adoption, the latter seems to have a positive effect.

<table>
<thead>
<tr>
<th>Studies</th>
<th>Research Title</th>
<th>Model</th>
<th>Factors</th>
</tr>
</thead>
</table>
| Tan Teo, 2000 | Factors Influencing The Adoption of Internet Banking | Theory of planned behavior and Diffusion of innovation | • Relative advantages
|            |                                                     |                                            | • Compatibility with values    |
|            |                                                     |                                            | • Internet experiences        |
|            |                                                     |                                            | • Banking needs               |
|            |                                                     |                                            | • Complexity                  |
|            |                                                     |                                            | • Trialability                |
|            |                                                     |                                            | • Risk                        |
|            |                                                     |                                            | • Self efficacy               |
|            |                                                     |                                            | • Government support          |
|            |                                                     |                                            | • Technology Support          |
|            |                                                     |                                            | • Social norms                |
Results:
The results revealed that attitudinal and perceived behavioral control factors, rather than social influence, play a significant role in influencing the intention to adopt Internet banking. In particular, perceptions of relative advantage, Compatibility, trialability, and risk toward using the Internet were found to influence intentions to adopt Internet banking services. In addition, confidences in using such services as well as perception of government support for electronic commerce were also found to influence intentions.

<table>
<thead>
<tr>
<th>Studies</th>
<th>Research Title</th>
<th>Model</th>
<th>Factors</th>
</tr>
</thead>
</table>
| Liao, Shao, Wang, Chen, 1999 | The adoption of virtual banking: a empirical study | Theory of planned behavior and Diffusion of innovation | • Attitude  
• Relative Advantage  
• Ease of Use  
• Compatibility  
• Results demonstrability  
• Perceived risks  
• Subjective norms  
• Belief of image  
• Belief of visibility  
• Critical mass  
• Perceived behavioral control  
• Voluntariness  
• Trialability  
• support  
• learning |

Results:
TPB was only partially applicable in predicting the adoption intention of virtual banking in the research setting. However, four major relationships of TPB were presented as the four hypotheses and three of them were tested. The first hypothesis stated that attitude towards virtual banking was dependent on relative advantage, compatibility, ease of use, result demonstrability and perceived risk. Reliable measures on perceived risk could not be obtained and only the first four constructs were tested. The hypothesis was supported but the two factors found were not clear cut. One of them was a combination of ease of use, compatibility and result demonstrability whereas the other was a mixture of relative advantage, compatibility and result demonstrability. The explanation power of this relationship is 0.56. The second hypothesis claimed that subjective norms about virtual banking were dependent on image, visibility and critical mass. Visibility was not used as no reliable measure was available. The hypothesis was also supported. However, the $R^2$ square value was only 0.29, which meant that image and critical mass alone could not provide a powerful explanation of subjective norms.
Results:
The third hypothesis was that perceived behavioral control about virtual banking was dependent on voluntariness, trialability, support and organizational learning. However, this hypothesis could not be tested in this study due to an unavailable reliable measure. The last hypothesis stated that intention to use virtual banking was determined by attitude, subjective norms and perceived behavioral control. Dependency on subjective norms could not be tested due to the absence of reliable measure. Dependency on the other two factors was found statistically significant. Nevertheless, the low $R^2$ square value of 0.056 indicated very low explanation power.

<table>
<thead>
<tr>
<th>Studies</th>
<th>Research Title</th>
<th>Model</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sathe, 1999</td>
<td>Adoption of internet banking by Australian consumers</td>
<td>..........</td>
<td>• Security concerns</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Ease of use</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• awareness of service and its benefits</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Reasonable price</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Resistance to change</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• availability of infrastructure</td>
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</tbody>
</table>

Results:
Shows that security concerns and lack of awareness about Internet banking and its benefits stand out as being the obstacles to the adoption of Internet banking in Australia.

2.2 Adoption

Adoption is the acceptance and continued use of a product, service or idea. According to Rogers and Shoemaker (1971), consumers go through “a process of knowledge, persuasion, decision and confirmation” before they are ready to adopt a product or service.

So the stages through which a technological innovation passes are:

1. Knowledge
2. Persuasion
3. Decision
4. Implementation
5. Confirmation
A potential adopter passes through certain stages before decision is made on whether to adopt or reject an innovation. Rogers has been one of the number of researchers who has focused upon the adoption process, which he defines as the “the process through which an individual or other decision-maker unit passes from first knowledge of an innovation, to forming an attitude toward the innovation to a decision or rejection to implementation of the new idea, and to confirmation of this decision” (Frambach, 1993).

The innovation adoption process defined by Rogers is the process through which an individual or other decision making unit passes from knowledge of an innovation, to forming an attitude towards the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision (Figure 2-1).

As the Figure 2-1 shows there are five stages in innovation decision process. These are:

1. Knowledge: Socio-economic characteristics, Personality variables and communication behavior all relate to innovativeness. Innovativeness is the degree to which an individual or other adoption unit is relatively early in adopting new ideas compared to other members of a system (Rogers, 1995). According to Rogers early adopters have more formal education than later adopters and are more likely to be (socio-economic characteristics).

2. Persuasion: The potential adopter’s attitude towards the innovation is formed in this stage. By anticipating and predicting future use satisfaction and risk of adoption, the potential adopter develop positive or negative attitudes to the innovation, which play important role of modifying the final decision. Perceived attitudes of an innovation as its relative advantage, compatibility and complexity are especially important here (Rogers, 1995).

3. Decision: The decision stage occurs when an individual engages in activities that lead to adoption or rejection of the innovation. In this stage the adopter starts to actively seek out information about the innovation that assists the decision making.

4. Implementation stage: In this stage, mental information processing and decision making come to an end, but the behavioral change begins.

5. Confirmation stage: After the adoption of innovations, the adopter keeps evaluating the results of his / her decision. If the level of satisfaction is significant enough, the use of innovation will continue; however, it is also possible that the rejection occurs after adoption. In the latter case, the reverse of previous decision is called “discontinuance”.

33
Figure 2-1 A model of stages in the innovation-Decision Process. Source: Rogers, 1995

The time frames for adopting an innovation can be compressed or fairly lengthy. For example, awareness of an innovation may precede the decision to adopt by months or years. Rogers (1995) has data showing awareness preceding the adoption of hybrid seed corn by about 1.7 years for early adopters and by as much as 3.1 years for later adopters. Further, the decision to adopt and the implementation of the decision may be separate acts and may be separated in time (Reed et al., 1996).

So we can briefly define adoption: Adoption is the acceptance and continued use of a product, service or idea. According to Rogers and Shoemaker (1971), consumers go through “a process of knowledge, persuasion, decision and confirmation” before they are ready to adopt a product or service.
2.3 Theoretical Framework

2.3.1 Social Psychology

The raw power of computer technology continues to improve, making sophisticated applications economically feasible. As technical barriers disappear, a pivotal factor in harnessing this expanding power becomes the ability to create applications that people are willing to use. Therefore, practitioners and researchers require a better understanding of why people resist using information technologies in order to devise practical methods for evaluating technologies, predicting how users will respond to them, and improving user acceptance by altering the nature of technologies and the processes by which they are implemented. Information Systems investigators have suggested intention models from social psychology as a potential theoretical foundation for research on the determinants of user behavior (Swanson, 1982).

Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA) is an especially widely validated intention model that has proven successful in predicting and explaining behavior across a wide variety of domains. However, due to its limitation on volitional control, Ajzen (1985) extended the Theory of Reasoned Action by including another construct called perceived behavioral control, which predicts behavioral intentions and behavior. The extended model is called the Theory of Planned Behavior (TPB). Empirical results (Mathieson, 1991; Taylor and Todd, 1995; Venkatesh et al., 2000) show the appropriateness of using these two theories for studying the determinants of IT usage behavior.

2.3.1.1 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 (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975). It is composed of attitudinal, social influence, and intention variables to predict behavior. Figure 2-2 is a schematic representation of the relationships among constructs in TRA. It is hypothesized by TRA
that the individual's behavioral Intention (BI) to perform a 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. The importance of ATB and SN to predict BI will vary by behavioral domain. For behaviors in which attitudinal or personal-based influence stronger (e.g., purchasing something for personal consumption only), ATB will be the dominant predictor of BI, and SN will be of little or no predictive efficacy. While for behaviors in which normative implications are strong (e.g., purchasing something that others will use), SN should be the dominant predictor of BI, and ATB will be of lesser importance (Ajzen and Fishbein, 1980).

The Theory of Reasoned Action also hypothesizes that BI is the only direct antecedent of actual behavior (AB). BI is expected to predict AB accurately if the three boundary conditions specified by Fishbein and Ajzen (1975) can be hold: (a) the degree to which the measure of intention and the behavioral criterion correspond with respect to their levels of specificity of action, target, context, and time frame; (b) the stability of intentions between time of measurement and performance of the behavior; and (c) the degree to which carrying out the intention is under the volitional control of the individual (i.e., the individual can decide at will to perform or not to perform the behavior).

Moreover, TRA is a general model that does not specify the beliefs that are operative for a particular behavior. Researchers using TRA must first identify the beliefs that are salient for subjects regarding the behavior under investigation.

Fishbein and Ajzen (1975) and Ajzen and Fishbein (1980), suggest eliciting five to nine salient beliefs using free response interviews with representative members of the subject population. They recommend using “modal” salient beliefs for the population, obtained by taking the beliefs most frequently elicited from a representative sample of the population.

The TRA has been successfully applied to a large number of situations to predict the performance of behavior and intentions. For example, TRA predicted turnover
(Prestholdt et al., 1987); education (Fredricks and Dossett, 1983); and breast cancer examination (Timko, 1987). In a meta-analysis of research on the Theory of Reasoned Action, Sheppard et al. (1988) concluded that the predictive utility of the TRA was strong across conditions.

Figure 2-2 Theory of Reasoned Action. Source: Fishbein and Ajzen, 1975

2.3.1.2 Theory of Planned Behavior (TPB)

Despite the predictability of the TRA is strong across studies, it becomes problematic if the behavior under study is not under full volitional control.

Sheppard et al. (1988) pointed out two problems of the theory. First, one must differentiate the difference between behaviors from intention. This could be problematic because a variety of factors in addition to one’s intentions determine how the behavior is performed. Second, there is no provision in the model for considering whether the probability of failing to perform is due to one’s behavior or due to one’s intentions. To deal with these problems, Ajzen (1985) extended the Theory of Reasoned Action by including another construct called perceived behavioral control, which predicts behavioral intentions and behavior. The extended model is called the Theory of Planned Behavior (TPB).

As Figure 2-3 shows, TRA and TPB have many similarities. In both models, BI is a key factor in the prediction of actual behavior. Both theories assume that human beings are basically rational and make systematic use of information available to them when making decisions. By considering control-related factors, TRA assumes that the behavior
being studied is under total volitional control of the performer (Madden et al., 1992). However, TPB expands the boundary conditions of TRA to more goal-directed actions.

Attitude toward Behavior (ATB) is defined as “a person’s general feeling of favorableness or unfavorableness for that behavior” (Ajzen and Fishbein, 1980).

Subjective Norm (SN) is defined as a person’s “perception that most people who are important to him/her think he/she should or should not perform the behavior in question” (Ajzen and Fishbein, 1980). Attitude toward behavior is a function of the product of one’s salient beliefs that performing the behavior will lead to certain outcomes, and an evaluation of the outcomes, i.e., rating of the desirability of the outcome.

The main difference between these two theories is that the TPB has added Perceived Behavioral Control (PBC) as the determinant of Behavioral Intention, as well as control beliefs that affect the perceived behavioral control. Though it may be difficult to assess actual control before behavior, TPB asserts that it is possible to measure PBC - “people’s perception of the ease or difficulty in performing the behavior of interest” (Ajzen, 1991). PBC is a function of control beliefs and perceived facilitation. Control belief is the perception of the presence or absence of requisite resources and opportunities needed to carry out the behavior. Perceived facilitation is one’s assessment of the importance of those resources to the achievement of the outcomes (Ajzen and Madden, 1986).

PBC is included as an exogenous variable that has both a direct effect on actual behavior and an indirect effect on actual behavior through intentions. The indirect effect is based on the assumption that PBC has motivational implications for behavioral intentions. When people believe that they have little control over performing the behavior because of a lack of requisite resources and opportunities, then their intentions to perform the behavior may be low even if they have favorable attitudes and/or subjective norms concerning performance of the behavior. Bandura (1977) has provided empirical evidence that people's behavior is strongly influenced by the confidence they have in
their ability to perform the behavior. The structural link from PBC to BI reflects the motivational influence of control on actual behavior through intentions.

The direct path from PBC to AB is assumed to reflect the actual control an individual has over performing the behavior. Ajzen (1985) offers the following rationale for this direct path. First, if intention is held constant, the effort needed to perform the behavior is likely to increase with PBC. For example, if two people have equally strong intentions to learn to ride a bike, and if both try to do so, the person who is confident that he or she can master this activity is more likely to ride the bike than a person who doubts his or her ability. Second, PBC often serves as a substitute for actual control, and insofar as perceived control is a realistic estimate of actual control, PBC should help to predict AB.

As with TRA, the relative importance of BI predictors varies with the behavioral domain. In some applications, it may be found that only ATB has a significant impact on BI; in others, ATB and PBC will be significant; in still others, ATB, SN, and PBC will contribute to the prediction of BI (Ajzen, 1985). Similarly, the ability of PBC and BI to predict AB also will vary across behaviors and situations. Both BI and PBC can make significant contributions to the prediction of goal-directed actions. In any given application, however, one predictor may be more important than the other, and only one of the two may be significant.

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

Taylor and Todd (1995) indicated that a better understanding of the relationships between the belief structures and antecedents of intention requires the decomposition of attitudinal beliefs. Shimp and Kavas (1984) argued that the cognitive components of belief could not be organized into a single conceptual or cognitive unit. Taylor and Todd (1995) also specified that, based on the diffusion of innovation theory, the attitudinal belief has three salient characteristics of an innovation that influence adoption, are relative advantage, complexity and compatibility (Rogers, 1983). Taylor and Todd (1995) showed that the decomposed model of the TPB has better explanatory power than the pure TPB and TRA models. So, the argument of our empirical study is that Internet banking is a technological innovation and thus the decomposed TPB model gives a more satisfactory explanation of adoption intention.

Related advantage refers to the degree to which an innovation provides benefits which supersede those of its precursor and may incorporate factors such as economic benefits, image, enhancement, convenience and satisfaction (Rogers, 1983).

Relative advantages should be positively related to an innovation’s rate of adoption (Rogers, 1983; Tan and Teo, 2000).
Complexity represents the degree to which an innovation is perceived to be difficult to understand, learn or operate (Rogers, 1983). It is also defined as “the degree to which an innovation is perceived as relatively difficult to understand and use”. Innovative technologies that are perceived to be easier to use and less complex have a higher possibility of acceptance and use by potential users. Thus, complexity would be expected to have negative relationship to attitude. Complexity (and its corollary, ease of use) has been found to be an important factor in the technology adoption decision (Davis et al., 1989).

Compatibility is the degree to which the innovation fits with the potential adopter’s existing values, previous experience and current needs (Rogers, 1983). Tornatzkey and Klein (1982) find that an innovation is more likely to be adopted when it is compatible with the job responsibilities and value system of the individual. Therefore, it may be expected that compatibility relates positively to adoption.

As for the structure of normative belief, while some studies have found support for the decomposition of normative belief structures (e.g. Burnkrant and Page, 1988), studies such as those by Shimp and Kavas (1984) and Oliver and Bearden (1985) have failed to identify a multidimensional structure for nbjmcj. Therefore, as Taylor and Todd (1995), we also should not provide additional insight into the decomposition of the subjective norm.

In addition, according to Ajzen (1985, 1991), PBC reflects belief regarding access to the resources and opportunities needed to effect a behavior. PBC appears to encompass two components. The first is “facilitating conditions” (Triandis, 1979), which reflect the availability of resources needed to perform a particular behavior. This might include access to the time, money and other specialized resources. In fact, as supporting technological infrastructures become easily and readily available, Internet commerce applications such as banking services will also become more feasible. Accordingly, the government can play an intervention and leadership role in the diffusion of innovation. The second component is self-efficacy (Ajzen, 1991), that is, being confident of the ability to behave successfully in the situation (Bandura, 1977, 1982). An individual with
the self-assured skill to use a computer and the Internet is more inclined to adopt Internet banking. This component then refers to comfort with using the innovation.

Figure 2-4 Decomposed model of theory of planned behavior. Source: Shih and Fang, 2004

2.3.1.4 Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM), introduced by Davis (1989), is an adaptation of the Theory of Reasoned Action (TRA) specifically tailored for modeling user acceptance of information systems. The goal of TAM is to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified. Ideally one would like a model that is helpful not only for prediction but also for explanation, so that researchers and practitioners can identify why a particular system may be unacceptable, and pursue appropriate corrective steps. A key purpose of TAM, therefore, is to provide a basis for tracing the impact of external factors on internal beliefs, attitudes, and intentions. TAM was formulated in an attempt to achieve these goals by identifying a small number of fundamental variables suggested by previous research dealing with the
cognitive and affective determinants of computer acceptance, and using TRA as a theoretical backdrop for modeling the theoretical relationships among these variables.

As Figure 2-5 shows, TAM posits that two particular beliefs, perceived usefulness (PU) and perceived ease of use (PEOU), are the primary relevance for computer acceptance behavior. PU is defined as the degree to which a prospective user believes that using a particular system would enhance his or her job performance. This follows from the definition of the word “useful”: “capable of being used advantageously”. Within an organizational context, people are generally reinforced for good performance by raises, promotions, bonuses, and other rewards (Pfeffer, 1982; Vroom, 1964). A system high in perceived usefulness, in turn, is one for which a user believes in the existence of a positive use-performance relationship.

PEOU refers to the degree to which a prospective user believes that using a particular system would be free of effort. This follows from the definition of “ease”: “freedom from difficulty or great effort”. Effort is a finite resource that a person may allocate to the various activities for which he or she is responsible. All else being equal, an application perceived to be easier to use than another is more likely to be accepted by users. In January 2000, the Institute for Scientific Information’s Social Science Citation Index® listed 424 journal citations of the two journal articles that introduced TAM (i.e., Davis 1989, Davis et al. 1989). In the past decade, TAM has become well established as a robust, powerful, and parsimonious model for predicting user acceptance.

Figure 2-5 Technology Acceptance Model. Source: Davis, 1989
2.3.1.4.1 Extension of Technology Acceptance Model (ETAM)

A study of the adoption of telemedicine technology by physicians using TAM has found relatively low explanation power of TAM of attitude and intention (Hu et al., 1999). The researchers suggested that integration of TAM with other IT acceptance models or incorporating additional factors could help to improve the specificity and explanatory utility in a specific area.

IS researchers have begun to use TAM to examine the possible antecedents of Perceived Usefulness and Perceived Ease of Use toward microcomputer usage (Igbaria, Guimaraes, and Davis, 1995; Igbaria, Iivari, and Maragahh, 1995). However, one criticism of the current TAM studies is that there are very few investigations target at the study of the factors (i.e., the external variables) that affect the PU and PEOU (Gefen and Keil, 1998). In order to address this issue, Venkatesh and Davis (1996) used three experiments to investigate the determinants of Perceived Ease of Use. The results showed that general Computer Self-Efficacy significantly affects Perceived Ease of Use at all time, while Objective Usability of the system affects users' perception after they have direct experience with the system.

Furthermore, Venkatesh and Davis (2000) developed and tested a TAM2 model by including a number of determinants to Perceived Usefulness into the new model (see Figure 2-6). It is a theoretical extension of the Technology Acceptance Model that explains Perceived Usefulness and Usage Intentions in terms of social influence processes (Subjective Norm, Voluntariness, and Image) and cognitive instrumental processes (Job Relevance, Output Quality, Result Demonstrability and Perceived Ease of Use). Longitudinal data were collected from four different organizations that spanned a range of industries, organizational contexts, functional areas (ranging from small accounting service firm, medium-sized manufacturing firm, to the personal financial services department of a large financial services firm), and types of system being introduced. The results showed that all the above-mentioned social influences and cognitive instrumental processes have significantly influenced user acceptance of the systems.
2.3.1.5 Triandis Model

Similar to TRA, TPB and TAM, Triandis model assumes an attitude-intention-behavior relationship. Triandis model, however, include a number of relevant variables. The model, as presented in Figure 2-7, takes into account the important constructs such as habit, social factors and facilitating conditions. It postulates that the probability of performing an act is a function of (a) habits; (b) intention to perform the act; and (c) facilitating conditions. The intention of performing a particular behavior is a function of the (a) perceived consequences; (b) social factors (including norms, roles and the self-concept); (c) Affect (Chang and Cheung, 2001). Facilitating conditions refer to the necessary resources and supports to perform a behavior, for example, time, money, expertise, hardware, software, network connection, etc. The inclusion of this construct has made up the deficiency of TAM, which assumes that usage is volitional and that no barriers would prevent an individual from using an IS (Mathieson et al., 2001). Triandis model has been widely adopted in the studies of social and health behavior, and
consumer behavior. In recent studies, the Triandis model has been applied to technology adoption researches including the adoption of personal computer, internet/WWW and Executive Information System (EIS) (Chang and Cheung, 2001; Cheng et al., 2002; Cheung et al., 2000). For example, Triandis model and its extensions were used to understand the determinants of users’ intention for using the internet/WWW in working environments and for shopping (Chang and Cheung, 2001; Cheung et al., 2000).

The findings in Chang and Cheung’s study (2001) show that theoretical constructs in the Triandis model are useful in explaining the intention to use the Internet/WWW. Whereas, the modified model, which includes the constructs of perceived complexity, near-term and long-term consequences, provides a better fit. The new model shows that affect, social factors, facilitating conditions, and perceived near-term consequences all have positive impacts on the intention to use the Internet/WWW. Firstly, the modified model assumes that perceived complexity (in contrast to perceived ease of use in TAM) is a person’s perception, which is an ‘internal’ factor, and should therefore be put under the construct of perceived consequences. Secondly, while the Triandis model posits that facilitating conditions only affect the actual behavior, the modified model postulates that facilitating conditions can have significant impacts on intention. It is similar to TPB that perceived behavioral control affects both the behavioral intention and actual usage. Thirdly, on the basis of the past studies on TAM, the modified model postulates that perceived complexity has positive impact on affect. That is, the users will feel happier if they perceive the computer technology is easy to use. Fourthly, consistent with the TRA that intention is a function of the subjective norm, the modified model assumes that social factors (including social norms and perceptions of the “significant others”) have positive impact on affect (Chang and Cheung, 2001).
2.3.1.6 Diffusion of Innovation

Innovation Diffusion Theory (IDT) is a model that explains the process by which innovations in technology are adopted by users. Rogers defines an innovation as “an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (Rogers, 1995). Diffusion is defined as “the process by which an innovation is communicated through certain channels over time among the members of a social system.” So, it follows that Innovation Diffusion theory focuses on explaining how new ideas and concepts gain widespread adoption.

Innovation Diffusion Theory considers a set of attributes associated with technological innovations that affect their rate of widespread adoption. Rogers defines these attributes as:

Relative advantage – “The degree to which an innovation is perceived to be better than the idea it supersedes.”

Compatibility – “The degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters.”
Complexity – “The degree to which an innovation is perceived as relatively difficult to understand and use.”

Trialability – “The degree to which an innovation may be experimented with on a limited basis.”

Observability – “The degree to which the results of an innovation are visible to others.”

Among these attributes, only relative advantage, compatibility and complexity are consistently related to innovation adoption (Chen et al., 2000).

Rogers reviewed nearly 1500 studies where variants of IDT are used to investigate the adoption of technological innovations in an array of settings including agriculture, healthcare, city planning, and economic development. A smaller set of studies focus on, how these attributes influence behavioral intention and use. Rogers developed his IDT constructs by identifying the product attributes that most greatly influenced adoption.

2.4 Comparison of Theories

Although the TAM, TRA, TPB and Triandis and IDT focus on different determinants to explain the consumer behavior in technology adoption, these theories share some similarities. Firstly, TRA, TPB, TAM and Triandis model assume an attitude-intention-behavior relationship, that is, cognitive and normative or affective beliefs form attitude, which, in turn, has influence on behavioral intention and actual usage of behavior. Secondly, the perceived usefulness (PU) in TAM is similar to relative advantage in IDT and, to a certain extent, the perceived consequences in Triandis model. These constructs are cognitive component of individual’s attitude. The constructs of PU, relative advantage and perceived consequences in various models further justify the rationale in TRA that the beliefs about the consequences of the behavior are keys to the formulation of attitude towards the behavior. Thirdly, the construct of perceived ease of use (PEOU) in TAM is obviously close to the complexity construct in IDT. Fourthly,
perceived behavioral control in TPB refers to one’s perception of whether a behavior is under his control and whether he has access to resources and opportunities required to facilitate a behavior (Ajzen, 1991). In this connection, facilitating conditions in Triandis model is related to the perceived behavioral controls in TPB. However, Triandis model posits that facilitating conditions only affect the actual behavior while the perceived behavioral controls in TPB affect both the behavioral intention and actual usage.

2.5 Trust, Important Factor Influencing Consumer Adoption

2.5.1 Definition of Trust

Various definitions of trust exist in multiple disciplines, reflecting the complex nature of the trust construct, and these definitions are summarized in Table 2-4. The comprehensive literature review of trust across disciplines by Rousseau et al. (1998) reveals that, regardless of the underlying discipline of authors, confident expectations and willingness to be vulnerable are critical components of all definitions of trust. The most frequently cited definition in the literature is the one proposed by Mayer et al.’s (1995), which we adopted in this research: “The willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party,” (p. 712).

This definition hinges upon the trustor making him/her self vulnerable, which implies that something of importance could potentially be lost as a result of engaging in the trusting relationship (Mayer et al., 1995). This is true in the Internet banking context.

Making a banking transaction on the Internet is a form of trusting behavior, since a consumer makes him/herself vulnerable to the actions of the Internet. The consumer is willing to be dependent upon the Internet, based on the expectation that the Internet will perform what the consumer expects it to do.
Table 2-4 Trust Definitions

<table>
<thead>
<tr>
<th>Authors</th>
<th>Definition of Trust</th>
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<tbody>
<tr>
<td>Currall and Judge (1995)</td>
<td>An individual reliance on another party under conditions of dependence and risk.</td>
</tr>
<tr>
<td>Mayer, Davis, and Schoorman (1995)</td>
<td>The willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party.</td>
</tr>
<tr>
<td>Michalos (1990)</td>
<td>A relatively informed attitude or propensity to allow oneself and perhaps others to be vulnerable to harm in the interests of some perceived greater good.</td>
</tr>
<tr>
<td>Hosmer (1995)</td>
<td>In the context of economic transactions, of the behavior of a stakeholders of the firm under conditions of organizational vulnerability and dependence.</td>
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2.5.2 Multidimensional Nature of Trust

Trust can take different forms in different relationships. Rousseau et al. (1998) identify the three different forms of trust: calculus-based trust, relational trust, and institutional trust. Calculus-based trust is based on rational choice – characteristic of interactions in economic exchange. Trust emerges from a calculated weighing of perceived gains and losses in the intended relationship. Relational trust derives from repeated interactions over time between trustor and trustee. Information available to the trustor from within the relationship forms the basis of relational trust. Institutional trust derives from the institutional factors which can act as broad supports for the critical mass of trust that sustains further risk taking and trusting behavior (e.g. Sitkin, 1995). Institution-based trust can ease the way to formulating both calculus-based trust and relational trust.

Further, the fact that trust changes over time is manifest from comparative research upon trust in organizations (Miles and Creed, 1995). According to Rousseau et al. (1998), there are three phases of trust development: (a) building (where trust is form
or reformed), (b) stability (where trust already exists), and (c) dissolution (where trust declines).

During the building stage of trust development, calculative trust and institutional trust would be more relevant, while relational trust would be formulated develop during the later stage of trust development (Rousseau et. al., 1998). Since this study focuses on the early stages of trust development, i.e. adoption of Internet banking, calculative trust and institutional trust would be more relevant to this research context.

In another vein, trust can be broadly categorized into two different types: Competence trust and Intentional Trust (Nooteboom et al., 1997). Competence trust concerns a partner’s ability to perform according to the intentions and expectations of a relationship while intentional trust concerns a partner’s intentions not to defect (Nooteboom, et al., 1997). In the case of trust in the electronic channel, intentional trust does not manifest itself since the entity to be trusted does not have intentions by itself and thus competence trust becomes paramount. In this context, a trustable electronic channel does what people expect it to do -and not something else – despite the possibility of environmental disruption, human user and operator errors, and attacks by hostile parties (Schneider, 1998).

On the other hand, in the case of trust in the bank providing the Internet banking service, the type of trust will be intentional trust as the trustor becomes vulnerable to the potential consequences of engaging in the trusting behavior with the bank offering the Internet banking service.

Rousseau et al. (1998) argued that it is necessary to integrate the differing views of trust across disciplines and put forth that trust may be a “meso” concept which integrates both the individual and institutional level views of trust. In this research, our focus is on the transactions conducted by individuals using an electronic medium (the Internet) to interact with a service (Internet banking) provided by an institution (the bank).
2.5.3 Importance of Trust

Carrying on commerce with suppliers involves customers in a highly uncertain situation, which can inhibit customers’ intentions to carry on commerce (Gefen, 2000).

The uncertainty is due to the fact that suppliers are inevitably independent and not fully predictable, while there is an inborn need among customers to understand suppliers’ actions. Without reducing the uncertainty, customers cannot carry on commerce with suppliers. Trust is one of the most effective uncertainty reduction methods (Gefen, 2000; Hart, 1997). Uncertainty and risk are inherent and where contracts and warranties are often absent (Crosboy et al., 1990; Grazioli and Jarvenpaa, 2000). In the Internet environment, remote users in all corners of the world are allowed to access critical files on computers and information transferred via the Internet. Internet banking is, therefore, inherently risky from the viewpoint of security. Moreover, Internet banking is highly uncertain, because the parties involved in a transaction are not in the same place (Clarke, 1997). Customers cannot, therefore, observe a teller’s behavior directly, so cannot depend on things like physical proximity, handshakes, and body signals of the teller. Because of the importance of trust in Internet, customer trust is a major factor influencing the growth of Internet banking. Internet banking is a new kind of IS, but marketing perspective, it is also a new kind of channel where a bank makes contact with its customers. Researchers in the marketing area have considered trust as one of the key constructs of relationship marketing (Crosboy et al., 1990; Doney and Cannon, 1997; Gefen, 2000; Macintosh and Lockshin, 1997; Morgan, 1994; Newell et al., 1998). They have empirically verified that customer trust has an impact on store loyalty, which can be defined as a customer’s enduring desire to maintain a valued relationship with a store (Macintosh and Lockshin, 1997). The most commonly used constructs for store loyalty are the proportion of purchase, purchase intention, and attitude. By extending TPB with Trust, we can examine whether trust also has an impact on the adoption of internet banking.
2.5.4 Trust and TAM

The connections between trust and TAM have been widely discussed in literature in that the relationships between PU, PEOU, and trust are hypothesized in many online based business settings (Gefen et al., 2003a, b; Pavlou, 2003; Saeed et al., 2003; Gefen, 2004). In particular, a model of Trust and TAM was well defined in on-line shopping setting (Gefen et al., 2003a). This model explicitly indicated their relationship as trust is an antecedent of PU, PEOU is an antecedent of trust, and trust has a direct influence on behavioral intention to use. Trust is one of the determinants of PU, especially in an online environment, because part of the guarantee that consumers will sense the expected usefulness from the web site is based on the sellers behind the web site. Moreover, trust is recognized to have positive effect on PU since trust allows consumers to become vulnerable to e-vendor to ensure that they gain the expected useful interaction and service (Pavlou, 2003). While consumers initially trust their e-vendors and have an idea that adopting online service is beneficial to their job performance, they will believe the online service is useful (Gefen et al., 2003a).

On the other hand, PEOU is hypothesized to have positive influence on trust because PEOU can help promote customers’ favorable impression on e-vendors in the initial adoption of on-line service and further, cause customers to be willing to made investment and commitment in buyer-seller relationship (Ganesan, 1994; Gefen et al., 2003a). In general, while following the definition of social cognitive theory, PEOU can be argued to positively influence a person’s favorable outcome expectation toward the acceptance of an innovative technology (Bandura, 1986). This is because cognition-based trust, as discussed previously, is mainly built on the first impression of a person toward certain behavior and extensively, PEOU in terms of on-line service can be considered the first feeling or expectation established for further continued on-line transaction. In sum, while internet banking is considered a special type of e-service, the Trust and TAM model is partly fitted to this on-line banking setting while there are additional variables, as discussed below, to be included in the particular context.
2.5.5 Trust and TPB

The relationship between trust and TPB can be examined in a variety of aspects, in which trust is hypothesized as the common antecedent of attitude, perceive behavioral control, and subjective norm. For attitude construct, trust in e-vendor is viewed as a salient behavioral belief that directly affects customer’s attitude toward the purchase behavior. While an e-vendor is trustworthy, it is more possible that the consumer will gain benefits and avoid possible risks from adopting on-line service (McKnight and Chervany, 2002; Pavlou, 2003). As cost-benefit paradigm greatly influences people’s attitudinal beliefs and outcome judgments, trust can be a direct influencer that determines people’s attitude toward behavior (Bandura, 1986; Davis et al., 1989). Besides, research has shown that trust definitely increases the confidentiality of business relationship and determines the quality of transaction between buyers and sellers as well as people’s outcome expectation on many commerce activities (Luhmann, 1979; Lewis and Weigert, 1985; Hosmer, 1995). According to social cognitive theory, outcome expectation refers to people’s estimation of a given behavior yielding a particular outcome, which is closely related to people’s attitude toward behavior (Bandura, 1986). Therefore, trust is apparently an important antecedent of attitude toward the on-line transaction behavior.

For perceived behavioral control construct, trust can increase perceived behavioral control over on-line transactions since the virtual interactions between customers and e-vendors become more expectable (Pavlou, 2002). Explicitly, trust influences perceived behavioral control through control factors of self-efficacy and facilitating favorable conditions. According to the psychological reports, self-efficacy in personal relationships is constructed from self-confidence and mutual trust in friendships (Matsushima and Shiomi, 2003). Hence, mutual trust in the relationship between customers and e-vendors should increase customer self-efficacy and in turn, increase perceived behavioral control. On the other hand, trust can be a perceptual resource that facilitates customers to gain control over on-line transactions. While customers trust an e-vendor that behaves in accordance with their expectation, the trust beliefs are likely to increase customer’s perceived behavioral control over online transactions (Pavlou, 2002).
For subjective norm construct, researchers have found that mutual trust and mutual influence between users and IS units are highly correlated to each other based on a study concerning the performance of information system group (Nelson and Cooprider, 1996). Furthermore, Decomposed TPB revealed that there are peer and superior influences on users for determining subjective norm toward IS usage (Taylor and Todd, 1995). Derivatively, it can be predicted that trust in peers and superiors about their beliefs of IS usage should play a role in determining subjective norm. Similarly, trust in e-vendors about their reputation, brand name, and service may positively influence subjective norm over the behavior of on-line transactions. Besides, they may indicate certain relationship between trust in peers and superiors and trust in vendors. As the opinions from the referents of peers and superiors are positive for certain e-vendors in the market, trust in peers and superiors in this situation can enhance user beliefs in trusting these e-vendors and in turn, subjective norm toward the behavior of on-line transactions. Therefore, whatever types of trust are with direct and indirect influences on subjective norm, they are all the important antecedents of subjective norm in on-line service.

2.6 Research Model

While Internet banking is considered as a special type of e-service, the initial adoption in

Internet banking, in essence, concerns both the roles of the Internet technology and e-vendor in providing service. The Trust and TAM model in Gefen et al. (2003a) has been well studied in on-line shopping setting and showed that understanding both the Internet technology and trust issue is critical in determining behavioral intention to use on-line shopping, as discussed before, the diffusion of Internet banking could also be influenced by the potential antecedents such as individuals, organizational members, and social system while the issue for innovative technology is well discussed in Rogers (1995). An extension of Trust and TAM model with TPB would be in more comprehensive manner to understand the acceptance behavior toward Internet banking and hopefully, this extension would provide us with higher explanatory power to examine
this problem and effectively improve the low usage rate. This extension model in Internet banking is indicated in Figure 2-8.

Hypotheses 1, 13, 12, 11, and 9 are proposed based on TAM as discussed before, while Hypotheses 2 and 3 are initiated underlying TPB as described in Section 2.3.1.2. More importantly, Hypotheses 4, 5, 6 are the unique features from Trust and TAM model, respectively. Hypotheses 11 and 12 are mainly developed based on Trust and TAM model, i.e. PEOU indicated as a direct prediction to trust and trust to PU. Hypothesis 13 is contribution of this study, which is added based on previous empirical studies and literature review. Furthermore, these hypotheses were further verified for their validity by empirical data.

**Hypothesis 1**: Attitude has positive impact on intention to use Internet banking.

**Hypothesis 2**: Perceived behavior control positively influences intention to use Internet banking.
Hypothesis 3: Subjective norm has positive effect on intention to use Internet banking.

Hypothesis 4: Trust has positive effect on attitude to use Internet banking.

Hypothesis 5: Trust has positive impact on perceived behavior control to use Internet banking.

Hypothesis 6: Trust positively influences subjective norm to Internet banking.

Hypothesis 7: Trust has positive effect on intention to use Internet banking.

Hypothesis 8: Trust has positive effect on PU to use Internet banking.

Hypothesis 9: PEOU has positive impact on PU to use Internet banking.

Hypothesis 10: PEOU positively influences trust in using Internet banking.

Hypothesis 11: PEOU positively influences attitude to use Internet banking.

Hypothesis 12: PU has positive impact on attitude to use Internet banking.

Hypothesis 13: PU has positive effect on intention to use Internet banking.
Chapter 3
Methodology

3. Methodology

This chapter discusses the research methodology of the dissertation. It starts with research purpose and research approach. It also outlines research strategy and sampling methods. Finally it presents validity and reliability of measurements, used in this research.
3.1 Research Purpose

Research can be categorized into different types depending on the nature of the purpose or research problem. The purpose of the academic research can be exploratory (ambiguous problem), descriptive (aware of problem), or explanatory (clearly defined problem) (Yin, 1994; Zikmund, 2000). Saunders et al. (2000) argue that more than one purpose can be employed in a study Yin (1994) highlights that the boundaries between the categories are not always clear.

- Exploratory Research

According to Zikmund 2000, exploratory research is conducted to clarify and research a better understanding of the nature of the problem. Consequently, exploratory research is appropriate to use when there is little prior knowledge of the problem researched. Exploratory study is a valuable means of finding out “what is happening; to seek new insight; to ask questions and to assess phenomena in a new light”. The purpose of the exploratory research is to provide insight and understanding, not conclusive evidence. Saunders and Thornhill (2003) argue that exploratory research is advantageous because it is flexible and adaptable to change. An explorative investigation is appropriate when research problem is instructed and difficult to delimit. (Erikson and Wiedersheim-Paul, 1999).

- Descriptive Research

The objective of the descriptive is to “portray an accurate profile of a person, event or situation” (Robson, 1993), and may be an extension of, or forerunner to, a piece of exploratory research. Zikmund (2000) elucidates descriptive research as, when research problem is known but the researcher is not fully aware of situation. When a particular phenomenon of the nature is under study, it is understandable that research is needed to describe it, to explain its properties and inner relationship (Huczynski and Buchanan, 1991). According to Zikmund (2000), descriptive research will answer who, what, where and how questions and not give any explanation for the cause of the findings.
• Explanatory Research

The emphasis of explanatory researches is on studying a problem or a phenomena in order to establish causal relationship among variables (Saunders et al., 2000). Explanatory research is sometimes referred to as causal research (Zikmund, 2000). Normally, Exploratory and descriptive research is conducted first and then explanatory research tries to establish and explain patterns related to phenomenon of interest (Saunders et al., 2000).

The starting point of our research purpose is the research problem, what are the factors influencing adoptions of internet banking, depending on research problem literature review has been conducted in order to specify research questions and construct framework. The research purpose and research question reveal that this study is primarily descriptive.

3.2 Research Approach

3.2.1 Quantitative versus Qualitative Research Approach

Qualitative and quantitative methods are two broad approaches to research, and are two research approaches often used in social science research studies. While quantitative research involves numerical representation and manipulation observation for the purpose of describing and explaining the phenomena that those observation reflect, qualitative research on the other hand involves non-numerical examination and interpretation of observation for the purpose of discovering the underlying meaning and pattern of relationships. Qualitative research emphasis the process and meaning that are not rigorously examined or measured, in term of quantity, amount of intensity or frequency. In contrast, quantitative study emphasis measurement and analysis of causal relationships between variables, not processes (Casebeer and Verhoef, 1997; Zikmund, 2000; McDaniel and Gates, 1996; Miles, 1994; Easteby-Smith, 1991).

In quantitative research variables and relationships are the central idea (Neuman, 2003).
Quantitative research is useful in providing detailed planning prior to data collection and analysis, because it provided tools for measuring concepts, planning design stages and for dealing with population and sampling issues. In addition, a quantitative research approach utilizes a deductive model in testing the relationship between variables and to provide evidence for or against pre-specific hypothesis (Neuman, 2003).

Table 3-1 Quantitative vs. Qualitative research. Source: Chisnal, 1997

<table>
<thead>
<tr>
<th></th>
<th>Qualitative Research</th>
<th>Quantitative Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective</td>
<td>To gain qualitative understanding of underlying reasons and motivations</td>
<td>To quantify the data and generalized results from sample to the population of interest</td>
</tr>
<tr>
<td>Sample</td>
<td>Small number of non-representative cases</td>
<td>Large number of representative cases</td>
</tr>
<tr>
<td>Data Collection</td>
<td>Unstructured</td>
<td>Structured</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>Non-statistical</td>
<td>Statistical</td>
</tr>
<tr>
<td>Outcome</td>
<td>Develop an initial understanding</td>
<td>Recommend a final course of action</td>
</tr>
</tbody>
</table>

The main object of this study is to find factor influencing the adoption of internet banking. For achieving this, we have chosen a structured framework and developed our research hypothesis. We are going to analyze the data collected from sample customers and generalize the data to population. So this theory will be tested by using quantitative research method.

3.2.2 Inductive versus Deductive Research Approach

The two theoretical research approaches propose two different ways of drawing conclusions when conducting research. The inductive research approach can be defined as “The logical process of establishing the general proposition on the basis of observation of particular facts” (Zikmund, 2000). The inductive data involves collecting data and developing theory as a result of data analysis (Saunders et al., 2000). The deductive
A research approach can be defined as “the logic process of deriving a conclusion from unknown premise or something known to be true” (Zikmund, 2000).

When deciding what research approach to adopt, Saunders et al. (2000) suggest number criteria. The first and perhaps the most important criterion is the nature of the research topic.

If there is a lot of literature about the topic from which a theoretical framework can be defined.

It is often suitable to use the deductive approach. In opposition, when researching a topic that is new and little existing literature can be found, it may be more appropriate to use an inductive approach. The time available for the study is another factor that needs to be considered. Inductive research is often more time consuming because it is based on a longer period of data collection and analysis, and the ideas emerge gradually. The risk involved can also be an issue. The inductive research approach involves the risk that no useful data pattern and theories will emerge. The deductive research approach is usually a lower risk strategy. Even though there are some risks, such as non-return of questionnaires.

This study is deductive, because theories exist within the area and conclusion were drawn from theories. The deductive research approach is also appropriate because of the limited time available for this study and the lower risk involved.

![Deductive and inductive reasoning](source: Trochim, 2000)
3.3 Research Strategy

According to Yin (1994), the most important condition for differentiating among various research strategies is to identify the research question being asked. There are five main research strategies to use when collecting and analyzing empirical evidences: experiment, Survey, Archival analysis, History and case study.

Each strategy has its advantages and disadvantages depending on: a) The type of research question b) Investigator’s control over actual behavior events c) the focus on contemporary versus historical phenomena. The boundaries between he methods are not always sharp and clear, and they often overlap each other.

Table 3-2 Relevant situation for different research strategies. Source Yin, 1994, P.6

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Form of Research Question</th>
<th>Requires control over behavioral events</th>
<th>Focus on contemporary event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>How, Why</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Survey</td>
<td>Who, What, Where, How many, How much</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Archival Analysis</td>
<td>Who, What, Where, How many, How much</td>
<td>No</td>
<td>Yes/No</td>
</tr>
<tr>
<td>History</td>
<td>How, Why</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Case Study</td>
<td>How, Why</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The research strategy depends on characteristics of the stated research question. The main goal of this study is to find the factors influencing adoption of internet banking from customer point of view, the study focuses on contemporary event, does not require control over behavioral events and the research question of this study is in form of what, so the most appropriate strategy is survey.

3.4 Sampling

The population of interest was defined as a group of Saman Bank’s customers who were internet users. Since we were interested in concept of intention the respondents
are inexperienced users (non-users) of internet banking or just one-time users (not continual users).

We limited our sampling frame so data collection was conducted in four branches of Saman bank in Tehran, from the middle of July to the middle of August 2006.

Table 3-3 Summary

<table>
<thead>
<tr>
<th>Elements</th>
<th>non-users or one-time users of internet banking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling Unit</td>
<td>Saman bank in Tehran</td>
</tr>
<tr>
<td>Extent</td>
<td>4 branches of Saman bank in Tehran</td>
</tr>
<tr>
<td>Duration</td>
<td>14 July 2006 to 16 August 2006</td>
</tr>
</tbody>
</table>

3.4.1 Selecting the Sampling Technique

Traditional sampling method can be divided into two categories: (Saunders et al., 2000).

- Probability
- Non-probability

Probability sampling is the most commonly associated with survey –based research where researcher needs to make inferences from the sample about a population to answer the research questions or to meet research objectives (Saunders et al., 2000). In probability sampling, sampling units are selected randomly. If done properly, probability sampling ensures that the sample is representative (Hair et al., 2003).

Non-probability sampling provides a range of alternative technique based on researcher subjective judgment (Saunders et al., 2000). In non-probability sampling the selection of elements for the sample is not necessarily made with the aim of being statistically representative of the population. Rather the researcher uses the subjective methods such as personal experience, convenience, expert judgment and so on to select the elements in the sample. As a result the probability of any elements of the population being chosen is not known (Samuel et al., 2003).
According to Samuel et al., 2003 most non-probability sampling methods are: Convenience Sampling: Convenience sampling involves select sample members who can provide required information and who are more available to participate in the study. Convenience sample enables the researcher to complete a large number of interviews cost effectively and quickly but they suffer from selection bias because of difference of target population (Hair et al., 2003).

Judgment Sampling: Researcher’s judgment is used to select sample elements and it involves for a specific purpose. Group pf people who have knowledge about particular problem they can be selected as sample element. Sometimes it referred as a purposive sample because it involves a specific purpose. Judgments sampling is more convince and low cost involvement (Hair et al., 2003).

Quota Sampling: Objective of quota sampling is to have proportional representation of the strata of the target population for the total sample and the certain characteristics describe the dimension of the population (Cooper and Schindler, 2003). In quota sampling the researcher defines the strata of the target population determines the total size and set a quota for the sample elements from each stratum. The finding from the sampling cannot be generalized because of the choice of elements is not done using a probability sampling methods (Samuel et al., 2003).

Objective of this research is to find factors influencing the adoption of internet banking. Since in this study we want to generalize result to whole non-user of internet banking population, so the probability sampling method was chosen.

3.5 Measurement of Constructs

The main goal of this study is to find out the factors influencing the adoption of internet banking from customer point of view. As we mentioned before survey is the strategy of this research. Based on extended literature review we have developed an appropriate research construct which had been validated in prior studies. Following table presents constructs and their corresponding measurements sources used for questionnaire.
Table 3-4 Definition of constructs

<table>
<thead>
<tr>
<th>Construct</th>
<th>Definition</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>The person positive or negative fleeing about internet banking adoption</td>
<td>Davis et al., 1989; Taylor and Todd, 1995</td>
</tr>
<tr>
<td>Subjective Norms</td>
<td>Represent the degree to which a person perceives that important others believe he or she should use internet banking</td>
<td>Taylor and Todd, 1995</td>
</tr>
<tr>
<td>Facilitating Condition</td>
<td>The degree to which a person believes that the required resources exists to support use of internet banking</td>
<td>Thompson et al., 1991; Triandis, 1979</td>
</tr>
<tr>
<td>Self Efficacy</td>
<td>The degree to which a person’s self-confidence in her/his ability to use internet banking.</td>
<td>Bendura, 1977</td>
</tr>
<tr>
<td>Perceived Usefulness</td>
<td>The degree to which a person believes that using internet banking would enhance her/his job performance</td>
<td>Davis et al., 1989</td>
</tr>
<tr>
<td>Perceived Ease of Use</td>
<td>The degree to which a person believes that using internet banking would be free of effort</td>
<td>Davis et al., 1989</td>
</tr>
<tr>
<td>Trust</td>
<td>Trust refers to the belief that the promise of another can be relied upon and that, in unforeseen circumstances, the other will act in a spirit of goodwill and in a benign fashion toward the trustor. Trust has three characteristics: ability, benevolence, and integrity.</td>
<td>Mayer et al., 1995</td>
</tr>
<tr>
<td>Intention</td>
<td>A person readiness to adopt internet banking</td>
<td>Davis et al., 1989</td>
</tr>
</tbody>
</table>

It should be mentioned that both Subjective norms and behavioral control were measured with formative items resulting from review of the relevant literature.

According to Ajzen the construct of perceived behavioral control reflects beliefs regarding the availability of resources and opportunities for performing the behavior as well as the existence of internal/external factors that may impede the behavior. Hence, we agree with Taylor and Todd's decomposition of perceived behavioral control into "facilitating conditions" and the internal notion of individual “self-efficacy”.

66
According to Rogers (1985) we have considered subjective norms as interpersonal and external influence, point of view. Rogers (1985) stated that channels can be classified mass-media and interpersonal, and that in general, interpersonal communication channel are more efficacious for the development of perception about the innovation.

Bhattacherjee’s definition is that: “External influence refers to mass media report, expert opinion, and other non-personal information considered by adopter in making a “rational” acceptance decision, while interpersonal influence refers to word-of-moth influence by friend colleague, superior and other prior adopters known to potential adopter” (Bhattacherjee, 2000).

Bhattacherjee (2000) stated that both inter-personal and external influence have influence on subjective norms.


**3.6 Questionnaire**

After extended literature review questionnaire was developed. The questionnaire was translated to Farsi language. After translating, pilot study was conducted in order to identify and eliminate potential problem.15 bank customer answered the questions. They were asked to critique the questions and to mention any vague point in the questions. Based on feedback the questionnaire was refined for clarity.

The final questionnaire consists of two sections. The first section gathers general information about respondent like age, occupation, gender, age…The second section is about perception of respondent about internet banking. The five point likert scale is used for statements of the second section ranging from “1” for strongly agree, “2” agree, ”3” for no pinion, “4” disagree, “5” for strongly disagree.
3.7 Data Collection

In this study survey is used as a data collection method. As we mentioned before the main goal of this study is to found factors influencing the adoption of internet banking from customer point of view. Sample was taken randomly from customer with internet experiment and at the same time non-user of internet banking or one-time users (not continual). Data collection was conducted in four branches of Saman bank in Tehran, from the middle of July to the middle of August 2006. Toatal number of distributed questionnaire was equal to 320, from which 80 were incomplete so the sample size of this study was 240.

3.8 Quality Standard: Validity and Reliability

In order to reduce the possibility to getting wrong answer, attention need to be paid to: Reliability and validity (Saunders and Thornhill, 2003).

3.8.1 Reliability

Reliability can be defined as the degree to which measurements are free from error and, therefore, yield consistent results. Operationally, reliability is defined as the internal consistency of a scale, which assesses the degree to which the items are homogeneous.

Reliability can be assessed y the following questions (Easteby-Smith et al., 1991)

1. Will the measures yield the same results on other occasions?
2. Will similar observation be reached by other observers?
3. Is there transparency in how sense was made from row data?

For reflective measures, all items are viewed as parallel measures capturing the same construct of interests. Thus, the standard approach for evaluation, where all path loadings from construct to measures are expected to be strong (i.e., 0.70 or higher), is used. In the case of formative measures, all item measures can be independent of one another since they are viewed as items that create the “emergent factor.” Thus, high
loadings are not necessarily true and reliability assessments such as Cronbach's alpha are not applicable. Under this situation, Chin (1998) suggests that the weights of each item be used to assess how much it contributes to the overall factor. For the reflective measures, rather than using Cronbach's alpha, which represents a lower bound estimate of internal consistency due to its assumption of equal weightings of items, a better estimate can be gained using the composite reliability formula (Chin, 1998).

So Measure reliability was assessed using internal consistency scores, calculated by the composite reliability scores (Werts et al., 1974)

Internal consistencies of all variables are considered acceptable since they exceed .70, signifying tolerable reliability.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Composite reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intention</td>
<td>0.971175</td>
</tr>
<tr>
<td>Attitude</td>
<td>0.948346</td>
</tr>
<tr>
<td>Perceived Behavioral Control</td>
<td>0.846025</td>
</tr>
<tr>
<td>Subjective Norms</td>
<td>0.829422</td>
</tr>
<tr>
<td>Perceived Usefulness</td>
<td>0.919873</td>
</tr>
<tr>
<td>Perceived Ease of Use</td>
<td>0.946994</td>
</tr>
<tr>
<td>Trust</td>
<td>0.871538</td>
</tr>
</tbody>
</table>

**Composite Reliability (Construct Reliability):**

The formula for calculating the **Composite Reliability** is as follows:

\[
\rho_c = \frac{(\Sigma \lambda^2)}{[\left(\Sigma \lambda^2\right) + \Sigma(\theta)]}
\]

Where \( \rho_c = \text{composite reliability} \)

\( \lambda = \text{indicator loadings} \)
\[ \theta = \text{indicator error variances (i.e. variances of the } \delta \text{'s or } \epsilon \text{'s)} \]

\[ s = \text{summation over the indicators of the latent variable} \]

### 3.8.2 Validity

Validity is concerned with whether the findings are really about what they appear to be about. Validity is defined as the extent to which data collection methods or methods accurately measure what they were intended to measure (Saunders and Thornhill, 2003).

The two elements convergent validity and discriminant validity are components of a larger scientific measurement concept known as construct validity (Straub et al., 2004). These two validities capture some of the aspects of the goodness of fit model, i.e., how well the measurement items relate to constructs. When factorial validity is acceptable, it means each measurement item correlates strongly with the one construct it is related to, while correlating weakly or not significantly with all other constructs.

Convergent validity is shown when each measurement item correlates strongly with its assumed theoretical construct.

The ideal level of standardized loadings for reflective indicators 0.7 but 0.6 considered to be an acceptable level (Barclay et al., 1995). For all the constructs with multiple reflective measures, all items have high loadings, with majority above 0.8 therefore demonstrating convergent validity.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Indicator</th>
<th>Loading</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intention</td>
<td>INT1</td>
<td>0.930400</td>
<td></td>
</tr>
<tr>
<td></td>
<td>INT2</td>
<td>0.956600</td>
<td></td>
</tr>
<tr>
<td></td>
<td>INT3</td>
<td>0.930200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>INT4</td>
<td>0.964200</td>
<td></td>
</tr>
<tr>
<td>Attitude</td>
<td>ATT1</td>
<td>0.917500</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ATT2</td>
<td>0.873200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ATT3</td>
<td>0.908700</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ATT4</td>
<td>0.924500</td>
<td></td>
</tr>
<tr>
<td>Perceived Behavioral Control</td>
<td>PBC1</td>
<td></td>
<td>0.762100</td>
</tr>
<tr>
<td></td>
<td>PBC2</td>
<td></td>
<td>0.366300</td>
</tr>
</tbody>
</table>
Table 3-6 Weight and loading (Continued)

<table>
<thead>
<tr>
<th>Construct</th>
<th>Indicator</th>
<th>Loading</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjective Norms</td>
<td>SN1</td>
<td></td>
<td>0.479500</td>
</tr>
<tr>
<td></td>
<td>SN2</td>
<td></td>
<td>0.647500</td>
</tr>
<tr>
<td></td>
<td>SN3</td>
<td></td>
<td>0.076400</td>
</tr>
<tr>
<td>Perceived Usefulness</td>
<td>PU1</td>
<td>0.824100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PU2</td>
<td>0.880000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PU3</td>
<td>0.864300</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PU4</td>
<td>0.719600</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PU5</td>
<td>0.877600</td>
<td></td>
</tr>
<tr>
<td>Perceived Ease of Use</td>
<td>PEU1</td>
<td>0.857300</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PEU2</td>
<td>0.873100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PEU3</td>
<td>0.857300</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PEU4</td>
<td>0.873100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PEU5</td>
<td>0.857300</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PEU6</td>
<td>0.873100</td>
<td></td>
</tr>
<tr>
<td>Trust</td>
<td>T1</td>
<td>0.842200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>0.811400</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>0.677900</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T4</td>
<td>0.614500</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T5</td>
<td>0.831700</td>
<td></td>
</tr>
</tbody>
</table>

Discriminant validity is shown when each measurement item correlates weakly with all other constructs except for the one to which it is theoretically associated.

Discriminant validity is shown when two things happen:

1. The correlation of the latent variable score with measurement item need to show an appropriate pattern of loading, one in which the measurement item load highly on their theoretically assigned factor and not highly on other factors.

Table 3-7 Factor structure matrix of loadings and cross-loadings

<table>
<thead>
<tr>
<th>Scale Item</th>
<th>Intention</th>
<th>Attitude</th>
<th>Perceived behavioral control</th>
<th>Subjective Norms</th>
<th>Trust</th>
<th>Perceived Usefulness</th>
<th>Perceived Ease of Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT1</td>
<td>0.9304</td>
<td>0.6228</td>
<td>0.3274</td>
<td>0.2259</td>
<td>0.4233</td>
<td>0.5680</td>
<td>0.3738</td>
</tr>
<tr>
<td>INT2</td>
<td>0.9566</td>
<td>0.6625</td>
<td>0.3611</td>
<td>0.2986</td>
<td>0.4403</td>
<td>0.6559</td>
<td>0.4305</td>
</tr>
<tr>
<td>INT3</td>
<td>0.9302</td>
<td>0.6631</td>
<td>0.3769</td>
<td>0.2222</td>
<td>0.4120</td>
<td>0.5914</td>
<td>0.4032</td>
</tr>
<tr>
<td>INT4</td>
<td>0.9642</td>
<td>0.6486</td>
<td>0.3918</td>
<td>0.2476</td>
<td>0.4466</td>
<td>0.6632</td>
<td>0.4423</td>
</tr>
<tr>
<td>ATT1</td>
<td>0.5997</td>
<td>0.9175</td>
<td>0.4678</td>
<td>0.1799</td>
<td>0.4282</td>
<td>0.6391</td>
<td>0.4886</td>
</tr>
<tr>
<td>ATT2</td>
<td>0.4876</td>
<td>0.8732</td>
<td>0.4562</td>
<td>0.1335</td>
<td>0.3511</td>
<td>0.5642</td>
<td>0.4928</td>
</tr>
<tr>
<td>ATT3</td>
<td>0.7341</td>
<td>0.9087</td>
<td>0.4786</td>
<td>0.2097</td>
<td>0.4353</td>
<td>0.6300</td>
<td>0.5072</td>
</tr>
<tr>
<td>ATT4</td>
<td>0.6401</td>
<td>0.9245</td>
<td>0.4002</td>
<td>0.1664</td>
<td>0.3964</td>
<td>0.7210</td>
<td>0.5547</td>
</tr>
</tbody>
</table>
Table 3-7 Factor structure matrix of loadings and cross-loadings (Continued)

<table>
<thead>
<tr>
<th>Scale Item</th>
<th>Intention</th>
<th>Attitude</th>
<th>Perceived behavioral control</th>
<th>Subjective Norms</th>
<th>Trust</th>
<th>Perceived Usefulness</th>
<th>Perceived Ease of Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBC1</td>
<td>0.3701</td>
<td>0.4654</td>
<td><strong>0.9491</strong></td>
<td>0.1133</td>
<td>0.3507</td>
<td>0.4437</td>
<td>0.5838</td>
</tr>
<tr>
<td>PBC2</td>
<td>0.2832</td>
<td>0.3857</td>
<td><strong>0.7553</strong></td>
<td>0.0307</td>
<td>0.2907</td>
<td>0.3701</td>
<td>0.4269</td>
</tr>
<tr>
<td>SN1</td>
<td>0.1863</td>
<td>0.0885</td>
<td>0.0361</td>
<td><strong>0.7872</strong></td>
<td>0.1790</td>
<td>0.0477</td>
<td>0.0409</td>
</tr>
<tr>
<td>SN2</td>
<td>0.2457</td>
<td>0.2149</td>
<td>0.1206</td>
<td><strong>0.8807</strong></td>
<td>0.1484</td>
<td>0.1743</td>
<td>0.0848</td>
</tr>
<tr>
<td>SN3</td>
<td>0.2021</td>
<td>0.1410</td>
<td>0.0288</td>
<td><strong>0.6836</strong></td>
<td>0.0994</td>
<td>0.1286</td>
<td>0.1405</td>
</tr>
<tr>
<td>T1</td>
<td>0.3598</td>
<td>0.3561</td>
<td>0.2948</td>
<td>0.1044</td>
<td><strong>0.8422</strong></td>
<td>0.3338</td>
<td>0.2980</td>
</tr>
<tr>
<td>T2</td>
<td>0.3329</td>
<td>0.3669</td>
<td>0.2939</td>
<td>0.1270</td>
<td><strong>0.8113</strong></td>
<td>0.2979</td>
<td>0.2895</td>
</tr>
<tr>
<td>T3</td>
<td>0.2714</td>
<td>0.2798</td>
<td>0.2482</td>
<td>0.0901</td>
<td><strong>0.6779</strong></td>
<td>0.2866</td>
<td>0.2316</td>
</tr>
<tr>
<td>T4</td>
<td>0.2729</td>
<td>0.3070</td>
<td>0.2520</td>
<td>0.1891</td>
<td><strong>0.6145</strong></td>
<td>0.3159</td>
<td>0.3368</td>
</tr>
<tr>
<td>T5</td>
<td>0.4629</td>
<td>0.3747</td>
<td>0.3217</td>
<td>0.1968</td>
<td><strong>0.8317</strong></td>
<td>0.3724</td>
<td>0.3073</td>
</tr>
<tr>
<td>PU1</td>
<td>0.5012</td>
<td>0.5904</td>
<td>0.4442</td>
<td>0.0930</td>
<td>0.3349</td>
<td><strong>0.8241</strong></td>
<td>0.4782</td>
</tr>
<tr>
<td>PU2</td>
<td>0.5611</td>
<td>0.6265</td>
<td>0.4265</td>
<td>0.1226</td>
<td>0.4000</td>
<td><strong>0.8800</strong></td>
<td>0.6816</td>
</tr>
<tr>
<td>PU3</td>
<td>0.5358</td>
<td>0.5735</td>
<td>0.3678</td>
<td>0.1125</td>
<td>0.2664</td>
<td><strong>0.8643</strong></td>
<td>0.5273</td>
</tr>
<tr>
<td>PU4</td>
<td>0.5101</td>
<td>0.4808</td>
<td>0.3189</td>
<td>0.1182</td>
<td>0.4240</td>
<td><strong>0.7196</strong></td>
<td>0.4709</td>
</tr>
<tr>
<td>PU5</td>
<td>0.6254</td>
<td>0.6698</td>
<td>0.4141</td>
<td>0.1572</td>
<td>0.3539</td>
<td><strong>0.8775</strong></td>
<td>0.5345</td>
</tr>
<tr>
<td>PEU1</td>
<td>0.3846</td>
<td>0.4759</td>
<td>0.4640</td>
<td>0.0973</td>
<td>0.3349</td>
<td>0.5396</td>
<td><strong>0.8573</strong></td>
</tr>
<tr>
<td>PEU2</td>
<td>0.3723</td>
<td>0.5004</td>
<td>0.5738</td>
<td>0.0515</td>
<td>0.3342</td>
<td>0.5834</td>
<td><strong>0.8731</strong></td>
</tr>
<tr>
<td>PEU3</td>
<td>0.3846</td>
<td>0.4759</td>
<td>0.4640</td>
<td>0.0973</td>
<td>0.3349</td>
<td>0.5396</td>
<td><strong>0.8573</strong></td>
</tr>
<tr>
<td>PEU4</td>
<td>0.3723</td>
<td>0.5004</td>
<td>0.5738</td>
<td>0.0515</td>
<td>0.3342</td>
<td>0.5834</td>
<td><strong>0.8731</strong></td>
</tr>
<tr>
<td>PEU5</td>
<td>0.3846</td>
<td>0.4759</td>
<td>0.4640</td>
<td>0.0973</td>
<td>0.3349</td>
<td>0.5396</td>
<td><strong>0.8573</strong></td>
</tr>
<tr>
<td>PEU6</td>
<td>0.3723</td>
<td>0.5004</td>
<td>0.5738</td>
<td>0.0515</td>
<td>0.3342</td>
<td>0.5834</td>
<td><strong>0.8731</strong></td>
</tr>
</tbody>
</table>

2. Establishing discriminant validity requires an appropriate AVE (Average variance extracted) analysis, we test to see if the square root of every AVE (there is one for every latent construct) is much larger than any correlation among any pair of latent construct. As a rule of thumb, the square root of each construct should be much larger than the correlation of the specific construct with any of the other constructs in the model (Chin, 1998) and should be at least 0.5 (Fornell and Larcher, 1981).

Table 3-8 AVE

<table>
<thead>
<tr>
<th>Construct</th>
<th>Average Variance Extracted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intention</td>
<td>0.893902</td>
</tr>
<tr>
<td>Attitude</td>
<td>0.821176</td>
</tr>
<tr>
<td>Perceived Behavioral Control</td>
<td>0.735646</td>
</tr>
<tr>
<td>Subjective Norms</td>
<td>0.620908</td>
</tr>
<tr>
<td>Perceived Usefulness</td>
<td>0.697704</td>
</tr>
<tr>
<td>Perceived Ease of Use</td>
<td>0.748608</td>
</tr>
<tr>
<td>Trust</td>
<td>0.579305</td>
</tr>
</tbody>
</table>
Table 3-9 Correlation of latent variables

<table>
<thead>
<tr>
<th></th>
<th>Intention</th>
<th>Attitude</th>
<th>Trust</th>
<th>Perceived Usefulness</th>
<th>Perceived Ease of Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intention</td>
<td>0.9454</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude</td>
<td>0.687</td>
<td>0.9061</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trust</td>
<td>0.456</td>
<td>0.447</td>
<td>0.7611</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Usefulness</td>
<td>0.657</td>
<td>0.708</td>
<td>0.425</td>
<td>0.8352</td>
<td></td>
</tr>
<tr>
<td>Perceived Ease of Use</td>
<td>0.437</td>
<td>0.564</td>
<td>0.387</td>
<td>0.650</td>
<td>0.8652</td>
</tr>
</tbody>
</table>
Chapter 4
Data Analysis

4. Data Analysis

In this chapter we will analyze the data collected based on basis of frame of reference of this thesis. Partial least square method will be applied for analyzing the collected data.
4.1 Data Analysis Method

In this study, we have used Partial Least Square (PLS) for data analysis. Structural Equation Modeling (SEM) technique such as LISREL and Partial Least Square (PLS) are second generation data analysis techniques (Bagozzi and Fornell, 1982) that can be used to test the extent to which IS research meets recognized standard for high quality statistical analysis. Indeed, even a casual glance at the IT literature suggests that SEM has become de rigueur in validating instruments and testing linkage between constructs.

Contrary to first generation statistical tools such as regression, SEM enables researchers to answer a set of interrelated research questions in a

1. Single,
2. Systematic, and
3. Comprehensive analysis

By modeling the relationship among multiple independent and dependent constructs simultaneously (Gerbing and Anderson, 1988). This capability for simultaneous analysis differs greatly from most generation regression models such as linear regression, LOGIT, ANOVA and MANOVA, which can analyze only one layer of linkage between independent and dependent variables at a time.

The PLS procedure, as one of the SEM techniques, has been gaining interest and use among researchers in recent years because of its ability to model latent constructs under conditions of non-normality and small to medium sample sizes. It allows the researchers to both specify the relationships among the conceptual factors of interest and the measures underlying each construct. The result of such a procedure is a simultaneous analysis of a) how well the measures relate to each construct and b) whether the hypothesized relationships at the theoretical level are empirically confirmed. This ability to include multiple measures for each construct also provides more accurate estimates of the paths among constructs which is typically biased downward by measurement error when using techniques such as multiple regression. Furthermore, due to the formative
nature of some of the measures used and non-normality of the data, LISREL analysis was not appropriate. Thus, Visual PLS version 1.04 was used to perform the analysis.

Table 4-1 Comparative analysis between techniques. Source: Gefen, 2000

<table>
<thead>
<tr>
<th>ISSUE</th>
<th>LISREL</th>
<th>PLS</th>
<th>Linear Regression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective of Overall Analysis</td>
<td>Show that the null hypothesis of the entire proposed model is plausible, while rejecting path-specific null hypotheses of no effect.</td>
<td>Reject a set of path specific null hypotheses of no effect.</td>
<td>Reject a set of path specific null hypotheses of no effect.</td>
</tr>
<tr>
<td>Objective of Variance Analysis</td>
<td>Overall model fit, such as insignificant $\chi^2$ or high AGFI.</td>
<td>Variance explanation (high R-square)</td>
<td>Variance explanation (high R-square)</td>
</tr>
<tr>
<td>Assumed Distribution</td>
<td>Multivariate normal, if estimation is through ML. Deviations from multivariate normal are supported with other estimation techniques.</td>
<td>Relatively robust to deviations from a multivariate distribution.</td>
<td>Relatively robust to deviations from a multivariate distribution, with established methods of handling non multivariate distributions.</td>
</tr>
<tr>
<td>Required Minimal Sample Size</td>
<td>At least 100-150 cases.</td>
<td>At least 10 times the number of items in the most complex construct.</td>
<td>Supports smaller sample sizes, although a sample of at least 30 is required.</td>
</tr>
</tbody>
</table>
4.2 Demographic and Descriptive Statistics

All the 240 respondents of the questionnaire were non-user or just one time user (not continual user). The following table represents the demographic characteristics of the respondents.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Classification of Variables</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>198</td>
<td>82.5%</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>42</td>
<td>17.5%</td>
</tr>
<tr>
<td>Age</td>
<td>Less than 20 years old</td>
<td>1</td>
<td>0.41%</td>
</tr>
<tr>
<td></td>
<td>Between 20-30 years old</td>
<td>159</td>
<td>66.25%</td>
</tr>
<tr>
<td></td>
<td>Between 30-40 years old</td>
<td>75</td>
<td>31.25%</td>
</tr>
<tr>
<td></td>
<td>Between 40-50 years old</td>
<td>4</td>
<td>1.66%</td>
</tr>
<tr>
<td></td>
<td>More than 50 years old</td>
<td>2</td>
<td>0.83%</td>
</tr>
<tr>
<td>Marital Status</td>
<td>Single</td>
<td>143</td>
<td>59.58%</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>95</td>
<td>39.58%</td>
</tr>
<tr>
<td>Education</td>
<td>Diploma</td>
<td>17</td>
<td>7.08%</td>
</tr>
<tr>
<td></td>
<td>Junior College</td>
<td>25</td>
<td>10.41%</td>
</tr>
<tr>
<td></td>
<td>Bachelor</td>
<td>114</td>
<td>47.5%</td>
</tr>
<tr>
<td></td>
<td>Master/PhD</td>
<td>86</td>
<td>35.835%</td>
</tr>
<tr>
<td>Income</td>
<td>Less than 200,000 T/M</td>
<td>12</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Between 200,000-400,000 T/M</td>
<td>58</td>
<td>24.16%</td>
</tr>
<tr>
<td></td>
<td>Between 400,000-600,000 T/M</td>
<td>67</td>
<td>27.91%</td>
</tr>
<tr>
<td></td>
<td>Between 600,000-800,000 T/M</td>
<td>52</td>
<td>21.66%</td>
</tr>
<tr>
<td></td>
<td>Between 800,000-1,000,000 T/M</td>
<td>10</td>
<td>4.16%</td>
</tr>
<tr>
<td></td>
<td>More than 1,000,000 T/M</td>
<td>43</td>
<td>17.91%</td>
</tr>
</tbody>
</table>

The result shows that most of the respondents are male (82.5%) and between 20-30 years old (66.25%). 59.58% are single, 47.5% have bachelor and income of 27.97% is between 600,000-800,000 Toman per Month.

4.3 Result and Hypothesis Test

The following table represents the result of testing the structural links of research model using PLS analysis. The estimated path coefficients are given along with the associated t-value. Most of the coefficients are significant at the 99% significance level providing strong support for all the hypothesized relationships. These results represent
yet another confirmation of the appropriateness of the TPB and TAM for explaining voluntary individual behavior. The results also provide strong support for the new links added to the TPB and TAM representing the effects of Trust on Intention.

Table 4-3 Result of hypothesis tests

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Effects</th>
<th>Path Coefficient</th>
<th>T-statistics</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>ATT→INT</td>
<td>0.391</td>
<td>4.9882</td>
<td>Supported</td>
</tr>
<tr>
<td>H2</td>
<td>PBC→INT</td>
<td>-0.018</td>
<td>-0.6273</td>
<td>Not Supported</td>
</tr>
<tr>
<td>H3</td>
<td>SN→INT</td>
<td>0.120</td>
<td>2.0541</td>
<td>Supported</td>
</tr>
<tr>
<td>H4</td>
<td>Trust→ATT</td>
<td>0.157</td>
<td>3.3766</td>
<td>Supported</td>
</tr>
<tr>
<td>H5</td>
<td>Trust→PBC</td>
<td>0.374</td>
<td>7.6995</td>
<td>Supported</td>
</tr>
<tr>
<td>H6</td>
<td>Trust→SN</td>
<td>0.190</td>
<td>2.7048</td>
<td>Supported</td>
</tr>
<tr>
<td>H7</td>
<td>Trust→INT</td>
<td>0.131</td>
<td>2.1762</td>
<td>Supported</td>
</tr>
<tr>
<td>H8</td>
<td>Trust→PU</td>
<td>0.205</td>
<td>4.0314</td>
<td>Supported</td>
</tr>
<tr>
<td>H9</td>
<td>PEU→PU</td>
<td>0.570</td>
<td>12.9207</td>
<td>Supported</td>
</tr>
<tr>
<td>H10</td>
<td>PEU→Trust</td>
<td>0.387</td>
<td>7.4463</td>
<td>Supported</td>
</tr>
<tr>
<td>H11</td>
<td>PEU→ATT</td>
<td>0.1547</td>
<td>2.1763</td>
<td>Supported</td>
</tr>
<tr>
<td>H12</td>
<td>PU→ATT</td>
<td>0.543</td>
<td>7.1568</td>
<td>Supported</td>
</tr>
<tr>
<td>H13</td>
<td>PU→INT</td>
<td>0.315</td>
<td>3.7025</td>
<td>Supported</td>
</tr>
</tbody>
</table>

The results shows that the intention to use internet banking is predicted by **Attitude** ($\beta= 0.391$, p<0.01), **Subjective Norms** ($\beta= 0.120$, p<0.05) **Trust** ($\beta= 0.131$, p<0.05) and **Perceived Usefulness** ($\beta= 0.315$, p<0.01). Attitude is predicted by **Trust** ($\beta= 0.157$, p<0.01), **Perceived Usefulness** ($\beta= 0.543$, p<0.01), **Perceived Ease of Use** ($\beta= 0.154$, p<0.05). Perceived Usefulness is predicted by **Perceived Ease of Use** ($\beta= 0.570$, p<0.01) and **Trust** ($\beta= 0.205$, p<0.01). **Trust** is predicted by **Perceived Ease of Use** ($\beta= 0.387$, p<0.01). **Trust** has positive effect on **attitude** ($\beta= 0.157$, p<0.01), **Subjective Norms** ($\beta= 0.190$, p<0.01), **Perceived behavioral control** (0.374, p<0.01).

### 4.3.1 Explaining Intention toward Internet Banking Adoption

The intention to use internet banking is jointly predicted by Attitude ($\beta= 0.391$), Subjective Norms ($\beta= 0.120$), Trust ($\beta= 0.131$) and Perceived Usefulness ($\beta= 0.315$).
these variables totally explain 56% of the variance on intention to use ($R^2 = 0.560$ Coefficient of determination). This is an indication of the good explanatory power of the model for intentions. While comparing the presented results with previous TPB-based studies in IS acceptance, the explanatory power of the current research model for behavioral intention to use is higher than Bhattacherjee (2000) with $R^2 = 0.52$, and Chau and Hu (2001) with $R^2 = 0.42$.

Attitude ($\beta = 0.391$) has significant effect on intention and there by supporting Hypothesis 1 In fact, Attitude has the strongest effect with a path coefficient of 0.39 emphasizing the important role of an individual’s attitude in driving his/her intentions towards adoption of internet banking. This would appear to support Kalifa et al. (2003) contention that attitude has strong effect on intention. But this is inconsistent with the findings of Todd and Taylor (1995) and Davis et al. (1989), who had found that there is no significant relation between attitude and intention.

The path between Trust and intention was found to be significant ($\beta = 0.131$), there by supporting Hypothesis 7. This finding supports Suh and Han (2002) contention who reported that there is a significant relation between Trust and behavioral intention toward adoption of internet banking in TAM model.

The path between Perceived Usefulness and intention was found to be significant ($\beta = 0.315$), there by supporting Hypothesis 13. This is consistent with finding of Todd and Taylor (1995), who found that there is significant relation between perceived usefulness and intention.

The path between Subjective norms and intention find to be significant ($\beta = 0.120$) there by supporting Hypothesis 3. In the case of formative measures, we have considered inter personal and external influence, family, friend and media. While media and family influences were significant, friends’ influence did not make a difference. The influence of the media had a considerable weight of 0.64 as compared to 0.47 for family influence. These are consistent with findings of Khalifa et al. (2003).
The path between Perceived behavioral control was not found to be significant \(\beta = 0.018\) and there by rejecting **Hypothesis 2**. This finding is inconsistent with findings of Todd and Taylor (1995), reported that there is significant relation between behavioral control and intention.

### 4.3.2 Explaining Attitude

Attitude is predicted by Perceived Usefulness \(\beta = 0.543\), Perceived Ease of Use \(\beta = 0.154\) and Trust \(\beta = 0.157\) jointly 54% of the total variance explained. The path between Perceived usefulness and attitude was found to be significant \(\beta = 0.543\), there by supporting **Hypothesis 12**. This is consistent with finding of Todd and Taylor (1995), reported that there is significant relation between usefulness and attitude. In fact, perceived usefulness has the strongest effect with a path coefficient of 0.543 emphasizing the important role of an individual’s perceived usefulness in driving his/her attitude.

The path between Perceived ease of use and attitude was found to be significant \(\beta = 0.154\), there by supporting **Hypothesis 11**. This is consistent with finding of Todd and Taylor (1995), reported that there is significant relation between Perceived ease of use and attitude.

The path between Trust and attitude was found to be significant \(\beta = 0.157\), there by supporting **Hypothesis 4**. The result supports findings of Wu and Chen (2005), who found that there is significant relation between Trust and Attitude and The result also partially validates the conclusion of Trust and TAM model by Gefen et al. (2003a) since the influential relationship is in terms of trust and behavioral intention to use in the Trust and TAM model.

### 4.3.3 Explaining Perceived Usefulness

Perceived usefulness is predicted by Trust \(\beta = 0.205\) and Perceived ease of use \(\beta = 0.570\) jointly 45% of the total variance explained. The path between Perceived ease of use and Perceived usefulness was found to be significant \(\beta = 0.570\), there by supporting **Hypothesis 9**. This is consistent with finding of Todd and Taylor (1995) and
Trust and TAM model in Gefen et al. (2003a) reported that there is significant relation between Perceived ease of use and usefulness.

The path between Trust of use and Perceived usefulness was found to be significant ($\beta = 0.570$), thereby supporting Hypothesis 8. This is consistent with finding of Wu and Chen (2005), reported that there is significant relation between Trust and perceived usefulness.

### 4.3.4 Trust

According to our model Trust is predicted by Perceived Ease of Use ($\beta = 0.387$). Perceived Ease of Use accounted for 15% variance in Trust. Path between Perceived ease of use and Trust was found to be significant ($\beta = 0.387$), thereby supporting Hypothesis 10. This result conforms, Trust and TAM model in Gefen et al. (2003a) and Wu and Chen (2005).

As we mentioned earlier trust has significant effect on Attitude ($\beta = 0.157$). Moreover, trust has positive effect on Perceived behavioral control ($\beta = 0.374$) and is considered as an important antecedent of perceived behavioral control in internet banking. In other words, the trust beliefs will be able to increase customers’ perceived behavioral control in performing the behavior.

On the other hand, trust ($\beta = 0.190$) significantly influences subjective norm while explaining only 7% of the total variance in subjective norm. The reason for this is two-fold. First, this indicates that while users establish the initial trust in internet banking, it will help enhance the users’ normative beliefs about the expectations of referents such as friends, peers, and superiors who concern the initial adoption of the internet banking.

The connection between user’s trust and perceived social pressure to adopt Internet banking seems to be expectable as the underlying definition in this model. Next, the reason for 8% of the total variance explained might be because there are a number of potential influencers to subjective norm remaining to be identified for accounting for the rest of the total variance explained.
In sum, trust, generally, is closely linked to the three antecedents of behavioral intention to use in TPB. This validates the necessity to extend Trust and TAM model with TPB in this study in order to have larger explanatory power in the initial adoption of internet banking ($R^2 = 0.560$ as indicated above).

In addition, this study indicates that trust almost plays an important role on Perceived usefulness ($\beta=0.378$).
Figure 4-1 Result of testing the hypotheses links
Chapter 5
Conclusion

5. Conclusion

Based on the result obtained in the study, a discussion of theoretical and practical implication will be presented on this chapter. Furthermore, we will also have some recommendations for banks. Contribution of this study, its limitations and future research also will be presented in this chapter.
5.1 Discussion

The purpose of this research is to propose an extension of Trust and TAM model with TPB in a more comprehensive manner that jointly predicts user acceptance of internet banking. This study has extended the TAM and TPB by considering the characteristics of the Internet banking environment. This study has verified that an additional belief, trust, is one of the most important determinants of customer acceptance of Internet banking. A large sample survey from non-users of one-time users of internet banking was conducted to empirically examine this research model. There are several new findings regarding the roles of Trust, TAM, and TPB in internet banking as discussed previously.

This study shows that recognizing both technological and trust-based issues are important in increasing customer’s behavioral intention to use internet banking. The TAM beliefs, Perceived Usefulness and Perceived Ease of Use, and trust are shown to be two sets of underlying antecedents in determining behavioral intention to use, each contributing its significant influence on behavioral intention to use through a number of mediators such as attitude, perceived behavioral control, and subjective norm. This means that to effectively attract customers to use internet banking, the design of internet banking site needs to carefully pay attention to both aspects. Besides, as discussed previously, novice users tend to rely more on trust in non-technology features than on Perceived Ease of Use and usefulness in technology-based features to develop their attitude toward the behavior. In other words, trust is important in determining user’s attitude like Perceived Ease of Use and usefulness in internet banking. The major trust-based concerns may include privacy protection, accuracy to declaration, and unauthorized access and so on.

Tan and Teo presented four reasons why people develop trust when using the eCommerce environment: social indicators, understanding, communality, and personal experience. Social indicators mean certification or anything else on the WWW accepted by most people. Hence, Internet banking practitioners can make their sites more publicly trusted by using control systems such as the SET protocol and specifying this fact on their sites. Moreover, they should consider using trust seals such as Trust-e and
WebTrust. A trust seal is a means of assuring that the site possesses some desirable property that has been verified by a trusted third party. To improve customers’ understanding, Internet banking practitioners can introduce their control systems on their sites. Communality is the phenomenon where a person trusts those who are trusted by other members of his community. To reduce the uneasy feeling toward Internet banking held by many members of society, Internet banking practitioners can advertise the safety of their sites and announce publicly the efforts to maintain this safety. There is clearly no need to say that Internet banking practitioners should strengthen the control of their sites to reduce customers’ negative experiences.

Fundamentally, while trust is empirically identified as an antecedent of Perceived Usefulness and in turn, an antecedent of attitude, this has some practical implications in enhancing the attitude toward using internet banking. Internet banking provider should first develop trust building mechanisms for customers in order to attract novice users to accept on-line banking. Examples of the mechanisms include statements of pervious paragraph. After that, Perceived usefulness of internet banking emerges as an important issue in attracting new users and should be carefully designed in terms of users’ requirements to reflect Perceived usefulness of this service. Without an original consideration from trust aspect, a well-designed internet banking site with significant Perceived Usefulness will not well perform in attracting novice users.

This study also revealed that Subjective norms have positive effect on intention. This indicates the relative importance of the social influence on non-users of internet banking. This finding has implication for marketers; it indicates that advertisements in media or press play important roles in forming intention toward internet banking adoption.

For researchers, past research on technology acceptance implicitly assumed that the success of a system adoption and use is mainly dependent on technological aspect and does not consider the notion of uncertainty. However, the advent of the Internet has introduced uncertainty and risk in system acceptance and use because people often need to use the Internet to communicate, collaborate, and transact with individuals and
organizations without physical face-to-face interaction. Thus, uncertainty is increasingly becoming the underlying determinant of the Internet-base system usage.

Traditionally, TAM mainly focuses on the aspect of system features and thus, is insufficient in capturing the roles of individuals, organizational members, and social system in the Internet-based system usage, in particular, internet banking. TPB with the antecedents of attitude, perceived behavioral control, and subjective norm will be in a complementary manner to enhance the prediction capability of TAM.

This study extends Trust and TAM model with TPB in and, empirically demonstrates relatively satisfactory results for providing more insight to this problem. This approach may be as a basis for similar research in the area

5.2 Practical Implication of the Research

The implication of these findings and conclusions are that, banks need to play a leading role in influencing the perception, and there by the attitude and behavior of current and potential internet banking users. The outcome of this study has two practical implication and recommendation for banks.

5.2.1 Push Strategy

Awareness of internet banking services is essential in the early adoption stages. As internet banking services are still new in Iran, effective presentations using all forms of media advertising such as leaflets, brochures, web pages, etc., will be useful to introduce the services to a wider audience and educate potential customers about the benefits of internet banking. To access more potential adopters, information about internet banking should be provided by bank tellers and bank assistants at branches. The information should include references to “time saving”, “convenience” at anywhere any time, “low costs”, and “information availability”. In addition, banks should design their web sites as effective delivery channels and offer information beyond banking services.
It is essential to provide a well-designed and user-friendly web site to attract potential adopters’ attention. The customer should not be required to expend a lot of effort or time, or undergo too great a change in behavior, to adopt internet banking services.

Information and instructions on the web should be provided in both Farsi and English in order to make the adopter comfortable. Wide publicity underscoring the benefits and ease of use by demonstrating internet banking services should be provided. This could be implemented by providing personal computers at bank branches accompanied by good documentation and bank assistance. Regular surveying of customers’ responses and opinions of the services should be conducted to ensure continuous improvement.

Reliability of access when needed is one of the key encouragement factors. Although this “reliability” partly depends on customers’ networks, which were excluded from the study, internet banks can enhance accessibility by co-operating with ISPs to provide good quality internet access. Bank should also separate internal and external uses and give priority to external uses. While reliability is a key element from a customer’s perspective, so is the security system. It must be enhanced continuously to guarantee integrity of online transactions as this will build customer confidence. Security provisions should be posted on banks’ web sites clearly and understandably to create customer confidence and improve the trustworthiness reputation of banks. Security information should be provided in non-technical terms, and be accompanied by standard security statements.

A perception of quality service will increase the bank’s image for good services, accuracy and effectiveness. Failure of execution not only causes dissatisfaction and uncertainty to the customer but also makes the whole internet banking process more complex and less comprehensible.

In summary, recommendations for “supplier push” strategies are as follows:
1. Build customers’ recognition of internet banking: Emphasize the advantages of internet banking services, i.e. time saving, low cost services, and convenience and information availability; and provide various types of information both financial and non-financial.

2. Attract customers to the web site: provide a well-designed and user-friendly web site; Provide information in both Farsi and English languages; Provide demonstrations in public places, e.g. bank branches, department stores, etc; Provide both electronic and documentary demonstrations of online services; and regularly survey customers’ responses to internet banking procedures and further develop the web site.

3. Attract customers by ease of access: regularly monitor customers’ access; implement traffic management systems for internal and external users; co-ordinate services with internet service providers.

4. Build customers’ confidence: present the security used in both technical and non-technical terms; outline the procedure and information on how to cope with problems if they occur; and provide instructions on how to use internet banking services safely.

5. Other strategies: offer incentives such as free internet access dial-up, frequent user benefits, member rewards, etc.

**5.2.2 Pull Strategy**

Banks should develop internet diffusion strategies by adopting “pull” strategies.

Increased diffusion will increase the number of internet banking adopters since they are likely to come from the internet population. Furthermore, support from the government and the industry regulator will positively affect internet banking services by increasing the confidence of the adopters.

Effective co-operation among banks has to be developed. The value of internet banking is increased by linking one activity with other both within banks and with outside suppliers, channels and customers (Porter, 2001). Furthermore, internet banks should collaborate with internet service providers because it will enable banks to better control quality of services as well as enhance adopters’ accessibility. In addition, a high quality internet infrastructure should be provided since it is one of the primary requirements for internet usage.

Support from the government and industry regulator should be effective to increase the growth of internet banking services. The Iranian government should be
encouraged to initiate suitable steps to remove legal and regulatory barriers to e-commerce in general and internet banking in particular. In addition to lobbying the Iranian government, banks should also proactively participate in improving internet services in order to increase online banking. For example, electronic laws should be promoted by the banks in order to reduce customers’ perceptions of risks. Current cooperation has been for commercial purposes, rather than for mutual benefit of the industry.

In summary, recommendations for “market pull” strategies are as follows:

1. Increase service value by collaboration: collaborate with internet service providers; offer free internet access; expand banking service across banks; and increase linkages to suppliers and merchants.
2. Be proactive: support the government to enact electronic commerce laws; work with the industrial regulator; and provide education on the uses of the internet and internet banking.

Customer-targeting strategies Internet banks should focus on people with high purchasing power as the first priority and attempt to shift them online. This requires extensive analyses of customers’ needs and the provision of customized services that are of value to them.

In summary, recommendations for moderating factors are as follows:

1. Target right customers: persuade people in good positions and appropriate income to adopt the services.
2. Provide value to customers: monitor the historical bank usage of customers to know their needs; and provide customized services to customers.

5.3 Academic Contributions of the Study

This study makes significant contribution across all area of IT adoption and usage research and practice. These contributions are:

1. The development of a conceptual model that explains and predicts the factors that influence the adoption and acceptance of information technology/ system of the internet; and it’s application regarding the new technology in the bank sector in Iran, such as internet banking.
2. The empirical support for proposed hypotheses based on the integrative research framework and the literature;
3. It is potential to be generalized to nation-wide general organizational study

The result is an indication of the good explanatory power of the model for intentions and can be used as a research model for further study on IT adoption.

5.4 Limitation and Further Research

This study was conducted to find the factors influencing intentions to adopt Internet banking services. As such, there is still room for further investigation into the adoption of Internet banking services.

This study has focused on users who are inexperienced or one-time users of internet banking. However, prior research has suggested that determinants of behavioral intention change in terms of users’ level of experience (McKnight et al., 1998; Karahanna et al., 1999). First, future studies should be carried out on non-Internet users to investigate their adoption intentions of such service.

Second, as Internet banking services are still relatively new in Iran, this study has been unable to measure the actual usage behavior of such services, which was suggested by the theory of planned behavior (Ajzen, 1985).

Additional research, both longitudinal and cross-sectional, is needed to examine the differences of this framework as users evolving from being aware of the e-service (internet banking), to having experience with the e-service (internet banking), to being continued use of the e-service (internet banking).

More research with the alternative conceptualization of trust would be useful in more understanding the role of trust in the initial adoption of on-line service. Gefen presented some factors said to have an impact on trust such as familiarity and disposition to trust. Grazioli and Jarvenpaa verified empirically that the level of trust in an Internet shopping mall is determined by the presence of trust mechanisms. Further research
considering these factors could enhance the understanding of customer acceptance of Internet banking.

Future studies should incorporate this measure once the number of Internet banking customers has reached a critical mass. In this way, a more comprehensive investigation of Internet banking intentions and usage behavior can be conducted. The study on adoption intentions of Internet banking services in Iran can be extended to corporate customers. Comparison can then be made between individual customers and corporate customers in terms of the factors influencing their adoption decisions, the criteria for selecting an online banking service, and the types of products and services perceived to be useful.
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Appendix A. Acronyms

- ATT: attitude
- PBC: Perceived Behavioral Control
- PEOU: Perceived Ease of Use
- PU: Perceived Usefulness
- S: Supported
- SEM: Structure Equation Model
- SN: Subjective Norms
- NS: Not Supported
- PLS: Partial Least Square
- T: Trust
- TAM: Technology Acceptance Model
- TPB: Theory of Planned Behavior
- TRA: Theory of Reasoned Action
Appendix B. Questionnaire

Part 1 Personal information

1  Gender  □ Female   □ Male

2  Age  □ Less than 20 years old
   □ 20-30 years old
   □ 30-40 years old
   □ 40-50 years old
   □ Older than 50 years old

3  Education  □ High school
   □ College
   □ Bachelor
   □ Master or more

4  Occupation  □ Government employee
   □ Private sector
   □ Other

5  Income  □ Less than 200,000 Toman per month
   □ Between 200,000-400,000 Toman per month
   □ Between 400,000-600,000 Toman per month
   □ Between 600,000-800,000 Toman per month
   □ Between 800,000-1,000,000 Toman per month
   □ More than 1,000,000 Toman per month
Please select the appropriate responses that best describe your perceptions of Internet banking.

<table>
<thead>
<tr>
<th>INT1</th>
<th>I intend to use internet banking within near future</th>
<th>SA</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT2</td>
<td>I plan to use Internet banking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INT3</td>
<td>I expect to use internet banking in near future.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INT4</td>
<td>I am determined to use internet banking soon.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATT1</td>
<td>I feel using internet banking is a wise idea.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATT2</td>
<td>I feel using internet banking is a good idea.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATT3</td>
<td>I like to use Internet banking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATT4</td>
<td>Using Internet banking site is a pleasant idea.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBC1</td>
<td>I would be able to operate Internet banking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBC2</td>
<td>I have the resources to use Internet banking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1</td>
<td>The Internet banking site is trustworthy.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td>I trust in the benefits of the decisions of the Internet banking site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>Internet banking site keeps its promises and commitments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T4</td>
<td>Internet banking site keeps customers’ best interests in mind</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T5</td>
<td>I trust this Internet banking site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PU1</td>
<td>Using the Internet banking site improves my performance of banking activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PU2</td>
<td>Using the Internet banking site makes it easier to do my banking activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PU3</td>
<td>Using the Internet banking site enables me to accomplish banking activities more quickly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PU4</td>
<td>Using IB would increase the quality or output of banking transaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PU5</td>
<td>I find Internet banking site useful for my banking activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEU1</td>
<td>My interaction with the internet banking is clear and understandable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEU2</td>
<td>Interaction with internet banking does not require a lot of mental effort</td>
<td></td>
<td></td>
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<tr>
<td>PEU3</td>
<td>It is easy to use internet banking</td>
<td></td>
<td></td>
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<tr>
<td>PEU4</td>
<td>Learning to use internet banking is easy for me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEU5</td>
<td>I find it easy to do what I want to do with online banking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEU6</td>
<td>I find internet banking flexible to interact with</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

106
My decision to adopt Internet banking is influenced by

| SN1 | FRIENDS | ☐ | ☐ | ☐ | ☐ | ☐ |
| SN2 | Media | ☐ | ☐ | ☐ | ☐ | ☐ |
| SN3 | Family | ☐ | ☐ | ☐ | ☐ | ☐ |