Analysis of Factors Affecting the Adoption of Internet Banking. Case Study: Customers of Mellat Bank in Isfahan City

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Abstract. The growth in the use of the Internet as a distribution channel of products and services offered by various businesses has been phenomenal. One such application is Internet banking services. As more and more financial institutions are finding ways to utilize Internet technologies to launch Internet banking services, an important issue is to understand what factors will impact the decisions of customers in adopting the service. The aim of this study is to analysis the factors affecting the acceptance of Internet banking at Mellat bank branches in Isfahan city. For this purpose we have used the modified model of technology acceptance model (TAM).The findings show that, acceptance of Internet banking mainly affected by trust, perceived ease of use, perceived usefulness, and attitude and tend to use.

Keyword: Internet banking, Trust in Internet banking, Perceived ease of use, Perceived usefulness.

JEL code: L81

1. Introduction

In recent years, developments in information technology and the subsequent evolution of internet banking have fundamentally changed the ways in which banks implement their business and consumers conduct their everyday banking activities (Eriksson et al., 2008; Sayar and Wolfe, 2007). Internet banking allows customers to conduct a wide range of banking transactions electronically via the bank's web site – anytime and anywhere, faster, and with lower fees compared to using traditional, real-world bank branches(Sonja and Rita, 2008).

Online banking and other electronic payment systems are new and the development and diffusion of these technologies by financial institutions is expected to result in a more efficient banking system. This technology offers institutions alternative or non-traditional delivery channels through which banking products and services can be delivered to consumers more conveniently and economically without diminishing the existing service levels. Internet banking (IB) is such a delivery channel that deserves special attention from financial institutions, policy-makers, researchers, and academicians owing to its enormous potential from the viewpoint of banks, businesses, and retail consumers (Akinci et al., 2004).

As Sarel and Marmorstein (2003) point out, despite heavy investment by banks in developing online capabilities, many online consumers are inactive or use online banking sporadically, focusing mainly on verification tasks and avoiding more complex transactions. As moving consumers to the online channel has a clear cost savings goal, succeeding in this objective becomes very important for bank services providers, as meaningful savings are only possible with a significant migration of consumers to online banking. Understanding the key drivers that may be slowing adoption has become a relevant topic for the banking sector (Aldas et al., 2009).

Beside, although online banking is common in many developed countries, for many developing countries online banking is still very much at its infancy. This is especially true for countries, such as Iran, which are still building up their IT infrastructure. One of the Iranian's government economic plans is to shift its focuses from agricultural production to the service industry. As banking is an important part of the service industry, it is important for the banks to operate efficiently through the use of online banking.

Although online banking is still unfamiliar to many Iranian users and is still at an early stage of development, but with an internet population of 24 million users, there is a huge market potential for banks to explore (National Internet development center of Iran, 2010).

However, for any technologies to be successfully introduced and used, the users have to accept and adopt the technology. Although online banking adoption studies have been conducted in many developed countries, studies for a developing and fast growing country such as Iran remain very few. Therefore this study attempts to investigate the factors that can influence users' acceptance of online banking in Iran.

2. Background and hypotheses

Organizations invest in information systems for many reasons, for example cutting costs, producing more without increasing costs, improving the quality of services or products (Lederer et al., 1998). It has been noted that users' attitudes towards and acceptance of a new information system have a critical impact on successful information system adoption (Davis, 1989; Venkatesh and Davis, 1996). If users are not willing to accept the information system, it will not bring full benefits to the organization (Davis, 1993; Davis and Venkatesh, 1996). A system that satisfies user's needs reinforces satisfaction with the system and is a perceptual or subjective measure of system success. Similarly, usage of a system can be an indicator of information system success and computer acceptance in some cases. Whether the system is regarded as good or bad depends on how the user feels about the system. Especially if the users do not rely on the system and its information their behavior toward the system could be negative. Success is not necessarily dependent of the technical quality of the system (Ives et al., 1983).

Beside, many organizations today have responded to the competitive business environment by implementing e-business as part of their business strategies. With the growth of the internet, it is inevitable for banks to move towards providing online banking for their customers. Although the current branch based retail banking remains the most common method for conducting banking transactions, internet technologies has changed the way personal financial services are designed and delivered to customers (Wang et al., 2003). Shih and Fang (2004) describe internet banking as a new type of information system that uses the innovative resources of the internet and WWW (World Wide Web) to enable customers to effect financial activities in virtual space. For example, it allows customers to perform a wide range of banking transactions electronically via the bank's web site (Tan and Teo, 2000).

There is a growing body of academic research being focused on examining the determinants of computer technology acceptance and the utilization among users (Davis, 1989; Davis et al., 1989). Beside, several studies, whether with/without casual model is done in context of Internet banking in all of the world.

Among the different models that have been proposed, the technology acceptance model (TAM) (Davis, 1989; Davis et al., 1989) adapted from the theory of reasoned action (TRA) (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975), appears to be the most widely accepted among information systems researchers. The reason for its popularity is perhaps because of its parsimony and the wealth of recent empirical support for it (Agarwal and Prasad, 1999). According to the TAM, system use (actual behavior) is determined by perceived usefulness (PU) and perceived ease of use (PEOU) relating to the attitude toward use that relates to intention and finally to behavior. According to the TAM these two beliefs are of primary significance for computer acceptance. PU refers to the prospective user's subjective likelihood that the use of a certain application will increase his or her performance. PEOU is defined as the degree to which the prospective user expects the potential system to be free of effort (Davis et al., 1989). Although information systems researchers have investigated and replicated the TAM, and agreed that it is valid in predicting the individual's acceptance of various corporate IT (Adams et al., 1992), the TAM's fundamental constructs do not fully reflect the specific influences of technological and usage-context factors that may alter the users' acceptance (Moon and Kim, 2001). As Davis (1989) noted, future technology acceptance research needs to address how other variables affect usefulness, ease of use, and user acceptance. However, factors affecting the acceptance of a new IT are likely to vary with the technology, target users, and context (Moon and Kim, 2001). Recent research has indicated that "trust" has a striking influence on user willingness to engage in online exchanges of money and personal sensitive information (Friedman et al., 2000). Therefore, perceived ease of use and perceived usefulness may not fully reflect the users' intention to adopt Internet banking, necessitating a search for additional factors that better predict the acceptance of Internet banking. Therefore, in our study, we use modified model of TAM, we add trust to TAM, and research model is shown in figure 1. The primary objective of this research is to extend the TAM in the context of Internet banking.

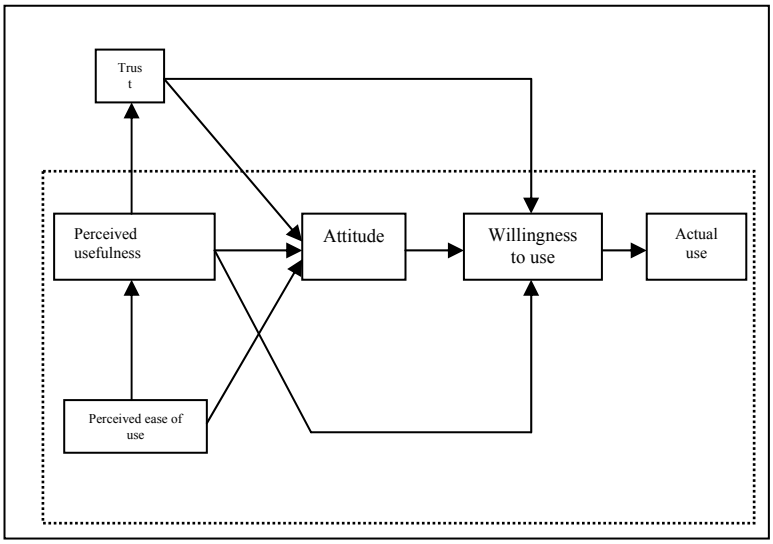

Figure1-Modified model of TAM (Davis, 1986)

Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance"(Davis, 1989). Perceived ease of use, refers to "the degree to which a person believes that using a particular system would be free of effort "(Davis, 1989). Trust: the perceived credibility and benevolence of a target of trust (Doney and Cannon, 1997). The first dimension of trust, perceived credibility, is the extent to which one partner believes that the other partner has the required expertise to perform the job effectively and reliably (Ganesan, 1994). The second dimension of trust, benevolence, is the extent to which one partner is genuinely interested in the other partner's welfare, and has intentions and motives beneficial to the other party when new conditions arise, conditions for which a commitment was not made(Wang et al., 2003). Attitude: is defined as positive or negative sense about the desired behavior. While some theorists argue that beliefs influence behavior only via their indirect influence on attitudes (e.g., Fishbein and Ajzen, 1975), others view beliefs and attitudes as co-determinants of behavioral intentions (e.g., Triandis, 1977), and still others view attitudes as antecedents of beliefs (e.g., Weiner, 1986). Counter to Fishbein and Ajzen's (1975) position, both Davis (1986) and Davis, et al. (1989) found that attitudes do not fully mediate the effect of perceived usefulness and perceived ease of use on behavior.

Based on the above mentioned model the following hypotheses are developed:

H1. Customers' perceived usefulness has an effect on their trust to using Internet banking.
H2. Customers' trust has an effect on their attitude to using Internet banking.
H3. Customers' trust has an effect on their willingness to using Internet banking.
H4. Customers' perceived ease of use has an effect on their using of Internet banking.
H5. Customers' perceived usefulness has an effect on their attitude to using Internet banking.
H6. Customers' perceived ease of use has an effect on their attitude to using Internet banking.
H7. Customers' perceived usefulness has an effect on their willingness to using Internet banking.
H8. Customers' attitude has an effect on their willingness to using Internet banking.
H9. Customers' willingness to use has an effect on their actual use of using Internet banking.

3. Research Methodology

This research can be categorized as descriptive survey research. The statistical population of this research was the customers of Mellat bank in Isfahan city that use Internet banking. The sample size estimated to be 247 based on Cochran formula.

The data gathering instrument was a self-administered questionnaire which consists of two sections. The first part designed to test the hypotheses which had been formed basis on modified model of technology acceptance model (TAM), and the second part records the respondents' demographic data. The first part contains 25 items in total that questions from 1 to 4 are related to customers' trust according to the research model. Questions 5 to 9 measure the Customers' perceived usefulness according to the research model. Questions 10 to 14 are related to Customers' perceived ease of use variable .Questions from 15 to 18 measures the fourth variable, Customers' attitude. Questions from 19 to 22 measure the Customers' willingness to use according to the research model. And eventually questions from 23 to 25

measure the actual use of using Internet banking according to the research model. All the items were measured using five-point Likert scale items with anchor points 1 = strongly disagree and 5 = strongly agree. Seven common model-fit measures were used to assess the model's overall goodness of fit: the ratio of x2 to degrees-of-freedom (df), Chi-Square (CMIN), goodness-of-fit index (GFI), Error of Approximation (RMSEA), adjusted goodness-of-fit index (AGFI. Finally, to determine the extent of the effects of variables, regression analysis has been used.

To test the reliability of data gathering instrument, a preliminary study has been conducted with a sample of 30. The results of the primary sample show that Cronbach alpha (α) index is 0.89, which indicate a good reliability.

4. Data Analysis and Findings

In this research we used Structural Equation Model (SEM) for testing hypothesis. For analyzing data we used the two steps Structural Equation model that proposed by Anderson & Gerbing (1988). For analyzing relation between constructs, in step one, we used Confirmatory factor analysis (CFA), and in other step Path Analysis have used. For determine that to what extent, indexes are acceptable for measuring patterns, first we must analyzing all of the measuring patterns separately. For this base, first, seven measuring patterns related to variables are tested separately. General indexes of measuring patterns (CFA) have shown in table 1.

Index	Willingness to use	Attitude	Perceived ease of use	Perceived usefulness	Trust	Actual use
CMIN	0/000	0/152	2/138	8/84	1/719	5/517
P	0/997	0/196	0/343	0/116	0/190	0/504
GFI	1	1	0/997	0/987	0/997	0/978
RMR	0/000	0/004	0/016	0/022	0/009	0/036
CFI	1	1	1	0/969	0/998	0/914
RMSEA	0/000	0/000	0/017	0/042	0/048	0/046
AGFI	1	0/997	0/974	0/96	0/965	0/905

Table 1. General indexes of measuring patterns (CFA)

Giving that for all of measuring patterns p> 0.05, could result that the ratio of (chi-square) is fit for measuring patterns.

Goodness-of-fit index (GFI) for all measuring patterns is above 0.97(GFI> 0.97), showed that data are fit to patterns.

RMR for all measuring patterns is below 0.05 (RMR<0.05), showed that minimum error in patterns and acceptable fitness of them.

Comparative fit index (CFI) for all measuring patterns except actual use is above 0.96 can be concluded that data clearly support measuring patterns.

RMSEA index for measuring patterns is below 0.05 (RMSEA< 0.05), showed that data are fit to patterns.

And eventually, given the above contents can be concluded that measuring patterns have a good fitness and in the other words, general indexes confirmed that data clearly support measuring patterns.

After review and confirm the patterns measured in Step one, we used Path analysis for testing hypothesis. Table 2 show general indexes that presented in path analysis.

Index	Value
CMIN	9/648
P	0/086
GFI	0/988
RMR	0/019
CFI	0/989
RMSEA	0/043
AGFI	0/948

Table 2: General Indexes

Giving that for mentioned pattern p> 0.05, could result that the ratio of χ^2 (chi-square) is fit for that pattern.

Goodness-of-fit (GFI) for pattern is 0.98(GFI=0.98), showed that there is not little difference between reproduced and observed variance and co-variance, and it represented the good fitness of pattern.

RMR for mentioned pattern is 0.019(RMR=0.019), that is little and showed little error in pattern and good fitness of it.

Comparative fit index (CFI) for mentioned pattern is 0.98(CFI=0.98) and showed that the fitness of pattern is good.

RMSEA for pattern is 0.043(RMSEA=0.043), this index too, showed that the fitness of pattern is good.

Given the above contents can concluded that general indexes showed a good fitness in pattern by data, or on the other words, could say gathering data, are supported the pattern truly.

After review and confirmation pattern, for meaningful test of hypothesis we have used Critical Value (CV) index and P. Critical value is the ratio that resulted of dividing the "Regression Weight Estimation" on "Standard Error". According to meaningful level of 0.05, critical value must above 1.96. Below this value, the related parameter in pattern is not considered important (chau, 1997). And values below 0.05 for P value have showed meaningful difference in accounted value for regression weights with value of 0 in meaningful level of 0.95. Hypothesis with regression coefficient and partial index values related to each of hypothesis have showed in table 3.

Hypothesis	Regression Coefficient	Critical value	P	Result
H1	0.27	47.78	0.000	Accept
H2	0.21	92.86	0.000	Accept
H3	0.12	54.36	0.000	Accept
H4	0.41	99.753	0.000	Accept
H5	0.22	71.011	0.000	Accept
H6	0.25	108.289	0.000	Accept
H7	0.42	107.530	0.000	Accept
H8	0.17	65.695	0.000	Accept
H9	0.43	34.038	0.000	Accept

Table 3: Hypothesis with regression coefficient

5. Hypothesis analysis

H1. Customers' perceived usefulness has an effect on their trust to using Internet banking.

Standard regression coefficient for this hypothesis is 0.27, that given the p<0.05 for this hypothesis can concluded that this hypothesis is accepted with degree of confidence 0.95, and on the other words with degree of confidence=0.95 can say Customers' perceived usefulness has an effect on their trust to using Internet banking.

H2. Customers' trust has an effect on their attitude to using Internet banking.

Regression coefficient for this hypothesis is 0.21, showed that this hypothesis is acceptable, and for this hypothesis p<0.05, so, with degree of confidence=0.95 can say Customers' trust has an effect on their attitude to using Internet banking.

H3. Customers' trust has an effect on their willingness to using Internet banking.

Regression coefficient for this hypothesis is 0.12, showed that this hypothesis is acceptable, and for this hypothesis p<0.05, so, with degree of confidence=0.95 can say Customers' trust has an effect on their willingness to using Internet banking.

H4. Customers' perceived ease of use has an effect on their using of Internet banking.

Regression coefficient for this hypothesis is 0.41, showed that this hypothesis is acceptable, and for this hypothesis p<0.05, so, with degree of confidence=0.95 can say Customers' perceived ease of use has an effect on their using of Internet banking.

H5. Customers' perceived usefulness has an effect on their attitude to using Internet banking.

Regression coefficient for this hypothesis is 0.22, showed that this hypothesis is acceptable, and for this hypothesis p<0.05, so, with degree of confidence=0.95 can say Customers' perceived usefulness has an effect on their attitude to using Internet banking.

H6. Customers' perceived ease of use has an effect on their attitude to using Internet banking.

Regression coefficient for this hypothesis is 0.25, showed that this hypothesis is acceptable, and for this hypothesis p<0.05, so, with degree of confidence=0.95 can say Customers' perceived ease of use has an effect on their attitude to using Internet banking.

H7. Customers' perceived usefulness has an effect on their willingness to using Internet banking.

Regression coefficient for this hypothesis is 0.42, showed that this hypothesis is acceptable, and for this hypothesis $p<0.05$, so, with degree of confidence=0.95 can say Customers' perceived usefulness has an effect on their willingness to using Internet banking.

H8. Customers' attitude has an effect on their willingness to using Internet banking.

Regression coefficient for this hypothesis is 0.17, showed that this hypothesis is acceptable, and for this hypothesis $p<0.05$, so, with degree of confidence=0.95 can say Customers' attitude has an effect on their willingness to using Internet banking.

H9. Customers' willingness to use has an effect on their actual use of using Internet banking.

Regression coefficient for this hypothesis is 0.43, showed that this hypothesis is acceptable, and for this hypothesis $p<0.05$, so, with degree of confidence=0.95 can say Customers' willingness to use has an effect on their actual use of using Internet banking.

6. Conclusion

The hypotheses are tested in a structural equations model, as shown in Figure 2. The model's key statistics are good since the GFI is 0.98, the CFI is 0.98, the RMSEA is 0.043 and the AGFI is 0.94. We can thus safely conclude that the model is valid and can continue to analyze the outcome of the hypothesized causal effects.

The Trust is positively affected by perceived usefulness, which supports H1.Trust has a positive effect on both Attitude and willingness to use, confirming H2 and H3. As such, other hypothesis also confirmed.

The findings of this study point to the perceived usefulness of internet banking as the primary reason that Mellat bank customers in Isfahan city use the internet for banking.

These findings are supported by Davis's (1989) findings that perceived usefulness has a stronger influence on usage than does ease of use. Davis's study shows that users are driven to adopt a technology primarily because of the functions it provides them, and secondarily because of the easiness of benefiting from those functions. Customers are often willing to overlook some difficulties of usage if the service provides critically needed functions: no amount of ease of use can compensate for a system that does not perform a useful function (Davis, 1989).

From the bank's point of view it is necessary to know the relationship between perceived usefulness and ease of use, because their influence on the actual usage is different. It may seem tempting to concentrate efforts on making the user interface easier and more appealing, but even in the pre-adoption stage the real content is what matters most.

There are also factors, linked to internet bank, that affect usage, like overall trust in the bank.

As the result showed, perceived usefulness effect on both attitude and willingness to use. So Customers' familiarity with advantage and the method of use Internet banking could help to their perception of Internet banking and produce positive attitude to it and so resulted in Customers' willingness to use Internet banking. Therefore, the possibility of this familiarity must be provided for customer by bank.

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