Factors Affecting the Adoption of Online Banking

An Integration of Technology Acceptance Model and Theory of Planned Behavior

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Abstract

Online banking has emerged as one of the most profitable e-commerce applications over the last decade. This study investigates which factors affect the adoption of Online banking in Isfahan province of Iran. We developed a theoretical model based on the Technology Acceptance Model (TAM) with theory of planned behavior (TPB) model. We designed a questionnaire and used it to survey a randomly selected sample of customers of national bank of Iran. A total of 500 pieces of questionnaire papers are given out to the community randomly. However those questionnaires that not fill in properly and completely have been taken out. Hence, the actual sample used for the study is 349 respondents. We analyzed the data using Structured Equation Modeling (SEM) to evaluate the strength of the hypothesized relationships; the results provide support of the integrated TAM and TPB models and confirm its robustness in predicting customers' intention of adoption of online banking. The results indicated that the intention to use online banking is positively affected mainly by perceived behavioral control and perceived usefulness.

Keywords: Online banking, Technology Acceptance Model (TAM), Theory of planned behavior (TPB), Structural Equation Modeling (SEM)

1. Introduction

Among the various ICT applications introduced in the last decade, online banking changed the delivery channels used by the financial services industry. Banks can benefit from much lower operating costs by offering online banking services, which require less staff and fewer physical branches. Customers will also benefit from the convenience, speed and round-the-clock availability of online banking services. However, despite the fact that online banking provides many advantages (Kalakota and Whinston, 1997), there are still a large group of customers who refuse to adopt such services (Kuisma et al., 2007; Littler and Melanthiou, 2006). Therefore, understanding the reasons for this resistance would be useful for bank managers in formulating strategies aimed at increasing online banking use. This study aims to investigate the factors influencing the adoption of online banking services.

2. Literature review

User acceptance or adoption of information technology is defined as ‘‘the act of receiving information technology use willingly” (Saga et al. 1994).The findings from user acceptance research suggest that when users are presented with a new software package, a number of factors influence their decision about how and when they will use it. In the past two decades several theories have emerged that offer new insights into acceptance of information technology. Among these theories, the technology acceptance model (TAM) has received more attention. Several theories reveal the factors that may affect consumers’ willingness to use an online financial service. They consist of (1) theory of reasoned action (Fishbein et al. 1975). (2) Theory of planned behavior (Ajzen, 1985; (3) Technology acceptance model (Davis .1986); (4) Decomposed Theory of planned behavior (Taylor et al. 1995).

2.1 Technology acceptance model (TAM)

Among the various efforts to understand and predict the process of user acceptance or adoption of information systems, the TAM introduced by Davis (1986) is one of the most cited theoretical frameworks. This model hypothesizes that system use is directly determined by behavioral intention to use, which is in turn influenced by users' attitudes toward using the system and the perceived usefulness of the system. Attitudes and perceived usefulness are also affected by perceived ease of use. Perceived usefulness (PU) is defined as the extent to which a person believes that using a system will increase his or her job performance. Perceived ease of use (PEOU) refers to the degree to which a person believes that using the system will be free of effort (Davis et al., 1989). Perceived usefulness directly influences intention to use, while perceived ease of use has an indirect effect through perceived usefulness and attitude on the behavioral intention. The TAM has been evaluated to be not only a powerful and parsimonious model for representing the determinants of system usage but also a valuable tool for system planning, since the system designers have some degree of control over easiness and usefulness (Taylor & Todd, 1995).Behavioral intention is a measure of the strength of one's willingness to exert effort while performing certain behaviors. Attitude explains a person's favorable or unfavorable assessment regarding the behavior in question.

2.2 Theory of planned behavior (TPB)

The theory of planned behavior (TPB) suggests that a central factor in human behavior is behavioral intention, which is affected by attitude toward behavior, subjective norm, and perceived behavioral control (Ajzen, 1985, 1991, 2002). Subjective norm (SN) expresses the perceived organizational or social pressure of a person who intends to perform the behavior in question. In other words, the subjective norm is relative to normative beliefs about the expectations of other people. Perceived behavioral control (PBC) reflects a person's perception of the ease or difficulty of implementing the behavior in question. It concerns beliefs about the presence of control factors that may facilitate or hinder their performing the behavior. Numerous studies demonstrated the applicability of TPB to various content domains (Ajzen, 2001). Also the ability of TPB in providing a very useful theoretical framework for understanding and predicting the acceptance of new information technology is demonstrated. Abundant empirical evidence suggests that TPB effectively explains individual intentions and behavior in adopting new information technologies. Such evidence includes the acceptance of telemedicine technology by physicians (Chau et al., 2002).the widespread adoption of virtual banking (Liao et al., 1999). Computer resource center adoption and usage (Taylor & Todd, 1995). IT adoption in work settings (Venkatesh et al., 2000). Acceptance of electronic brokerage services (Bhattacherjee, 2000) and others.

3. Research model and hypothesis

3.1 Research model

In this study we integrate TAM and TPB for our research framework, that will prepare a comprehensive model in order to examine the consumers' intentions towards, and adoption of, online banking. There are 6 constructs in our model, which includes perceived ease of use, subjective norm, and perceived behavioral control as independent variables, perceived usefulness, and attitude as intervening variables, and intention to use as the dependent variable. We will test the strength of the hypothesized relationships embedded in the theoretical model and the robustness of the model in predicting customers' intention to adopt online banking in Isfahan province of Iran. The theoretical model is graphically presented in Fig. 1.

3.2 The development of hypotheses

Based on the theoretical model developed, this study proposes the following hypotheses with regard to the adopt of online banking.

3.2.1 Perceived ease of use

A considerable of prior studies supported the significant effect of perceived ease of use on behavioral intention, either directly or indirectly through perceived usefulness and attitude (e.g., Davis et al., 1989; Jackson et al., 1997; Venkatesh, 1999). This study seeks to revalidate such relationships in the context of online banking.

Hypothesis 1. Perceived ease of use will have a positive effect on attitudes towards the use of online banking.

Hypothesis 2. Perceived ease of use will have a positive effect on perceived usefulness of online banking.

3.2.2 Perceived usefulness

There is also extensive empirical evidence that supports the significant effect of perceived usefulness on behavioral intention (e.g., Davis et al., 1989; Jackson et al., 1997; Venkatesh, 1999). Based on prior research, this study hypothesized the following.

Hypothesis 3. Perceived usefulness will have a positive effect on behavioral intention to use online banking.

Hypothesis 4. Perceived usefulness will have a positive effect on attitudes towards the use of online banking.

3.2.3 Attitude

Hypothesis 5. Attitude will have a positive effect on behavioral intention to use online banking.

3.2.4 Subjective norm (SN)

Hypothesis 6. Subjective norm will have a positive effect on behavioral intention to use online banking.

3.2.5 Perceived behavioral control (PBC)

Hypothesis 7. Perceived behavior control will have a positive effect on behavioral intention to use online banking

Hypotheses and their supporting studies are summarized in Table 1.

4. Research method

4.1 Data collection

In order to collect online banking users' information, we first required the permission of national bank of Iran in Isfahan to express our need for the information research purposes. Research questionnaire has been distributed between customers of national bank of Iran in Isfahan province. A total of 500 pieces of questionnaire papers are given out to the community randomly. However those questionnaires that not fill in properly and completely have been taken out. Hence, the actual sample used for the study is 349 respondents.

4.2 Instrument development and pre-test

We used a paper-based questionnaire as the instrument for the survey, and it was in Persian. The questionnaire consisted of two sections. The first section had questions intended to collect respondent's demographic profile. The second section solicited responses about the variables of interest in this study: perceived usefulness, perceived ease of use, attitude, subjective norm, perceived behavioral control and intention to use. Regarding instrument construction, the items used to operationalize the constructs of each investigated variables, were mostly adopted from relevant previous studies, with necessary validation and wording changes (see Table 2). All items were measured using a five-point Likert-type scale with anchors ranging from strongly disagree to strongly agree. The items used to measure each variable are listed in the Appendix A. Moreover, the final questionnaire was validated by two professional translators to ensure that no syntax or semantic biases occurred during the translation from English to Persian. Furthermore, to ensure validity and reliability, this study first pre-tested the questionnaire by having three professors and users review it. Once the final survey was administered analysis of the responses of thirty random respondents. Regarding reliability, the survey had strong internal consistency with all multiple-item constructs achieving Cronbach's alpha of 0.80 or higher.

5. Results

5.1 Descriptive statistics

Participants in the study were composed of 79.1% male and 20.9% female. Majority of the respondents were between 27 and 35 years old, which was 41.8% of the total respondents. Majority of the respondents were college or university graduates (51%). Addition, when the survey was conducted, 65.6% of participants had medium computer usage skill.77.3% of the respondents had medium or easy access to internet and 52.4% of the respondent had medium Internet usage skill while 77.7% had used the Internet for more than 3 hour in each week.

5.2 Structural model results

This study used the structural equation modeling (SEM) for hypotheses testing. The first step in model estimation involved examining the model fit results of the hypothesized model. Some common fit indices reported in structural equation modeling are designed to identify model goodness-of-fit. Common criteria for SEM have been previously suggested and the results are presented in Table 3. (Joreskog et al. 1993).

In these results, the structural model presented here indicates adequate fit with the observed data, compared with the suggested fit criteria.

5.3 Tests of hypotheses

Fig. 2 presents results from the path analysis of the combined hypotheses. The first two hypotheses proposed that perceived ease of use would predict attitude toward the use of online banking system (Hypothesis 1), and

perceived usefulness of online banking. (Hypothesis 2), both with positive signs. The path for Hypothesis 1 was significant (β= 0.18, t = 6.15), either the path for Hypothesis 2 was significant (β= 0.37, t = 4.43). Thus, Hypothesis 1 and Hypothesis 2 were supported.

The third and fourth Hypotheses proposed that perceived usefulness would be a positive predictor of intention (Hypothesis 3) and attitude toward the use of online banking (Hypothesis 4). The path for Hypothesis 3, (β= 0.32, t = 2.86) and the path for Hypothesis 4, (β= 0.43, t = 2.73) were significant. Thus, Hypothesis 3 and Hypothesis 4 were supported. The fifth Hypotheses proposed that attitude toward the use of online banking system would be a positive predictor of intention to use online banking .The path for this Hypotheses was significant, (β= 0.20, t = 2.56). Therefore Hypothesis 5 was supported. The sixth Hypotheses proposed that subjective norms would be a positive predictor of intention to use online banking (Hypothesis 6). The seventh Hypotheses proposed that perceived behavior control would be a positive predictor of intention (Hypothesis 7). The path for Hypothesis 6, (β= 0.23, t = 7.61) and the path for Hypothesis 7, (β= 0.33, t = 10.81) were significant. Thus, Hypothesis 6 and Hypothesis 7 were supported. Summarized results for the hypothesis tests are shown in Table 4.

In addition to the tests of hypotheses, direct and indirect effects of each variable are presented in Table 5.

6. Discussions

The results of this study provide support for the research model presented in Fig. 1 and for the hypotheses regarding the directional linkage among the model's variables. Results show that the intention to use online banking is primarily and positively affected by perceived behavioral control (β = 0.33) and less so by Perceived usefulness (β = 0.32), subjective norms (β = 0.23) and attitude (β = 0.20).This implies that the perceived behavioral control is the most important predictor of the intention to use online banking. Perceived usefulness also has a significant impact (β = 0.32) and appears to be the second determinant of a consumer's intention to adopt online banking. Moreover, Perceived usefulness is predicted jointly by perceived ease of use (β = 0.37).also perceived usefulness has an indirect influence, via attitude, on behavioral intention to use online banking. This result is similar to the finding reported in Taylor and Todd (1995), which indicated that perceived usefulness has both direct and indirect influences on behavioral intentions toward system use.

Perceived ease of use does not have a direct impact on intention to use, although it affects the attitude and perceived usefulness, which in turn leads to greater acceptance of online banking. Similar findings were obtained by Pikkarainen (2004) and Chan and Lu (2004), who investigated the acceptance of Internet banking in Finland and Hong Kong, respectively. Both studies reached the same conclusion that perceived usefulness is more influential than perceived ease of use in explaining the acceptance of online banking. As we knew from previous research, perceived usefulness was always an important determinant of attitude in TAM, and it may mediate the influence of perceived ease of use on attitude. Indeed, perceived ease of use has long been recognized as a basic requirement for system design (Chau, 1996; Davis et al., 1989). Another interpretation is that difficulty in using online systems is becoming less of a concern as they are increasingly user-friendly. In addition, since online systems are more common and standardized nowadays, the public has become increasingly competent in using them. Accordingly, in the planning and development of online banking, software developers should pay attention to practical functions and extend key features that are frequently required (Chen et al., 2007).

Subjective norms also has a significant impact (β = 0.23) intention to use online banking. Attitude also has a significant impact (β = 0.20) intention to use online banking. Moreover, attitude is predicted jointly by perceived usefulness (β = 0.43), perceived ease of use (β = 0.18).

7. Conclusion

This study was conducted to identify determinants of user adoption of online banking services among citizens of Isfahan province (Iran). The causal relationships among the variables that determine internet banking services adoption were examined. The results show that the proposed model has good explanatory power and confirms its robustness in predicting customers' intentions to use such services and demonstrated that online banking services adoption can be explained in terms of perceived behavioral control, perceived usefulness, perceived ease of use, subjective norm and attitude. The underlying framework used in this study is the integrated model of Technology Acceptance Model and Theory of Planned Behavior. The findings generally supported the hypotheses derived from the model as well as earlier empirical studies.

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Table 1. Summary of research hypotheses

Hypothesis	Supporting studies
Hypothesis 1 Perceived ease of use ⟶ Attitude	Davis (1989); Taylor and Todd (1995); Cheng et al.(2006)
Hypothesis 2 Perceived ease of use ⟶ Perceived use-fulness	Davis (1989); Taylor and Todd (1995); Cheng et al.(2006)
Hypothesis 3. Perceived use-fulness ⟶ Intention	Davis (1989); Taylor and Todd (1995); Cheng et al.(2006)
Hypothesis 4 Perceived use-fulness ⟶ Attitude	Davis (1989); Taylor and Todd (1995); Cheng et al.(2006)
Hypothesis 5 Attitude ⟶ Intention	Davis (1989); Taylor and Todd (1995); Cheng et al.(2006)
Hypothesis 6 Subjective norm ⟶ Intention	Ajzen (1991); Ajzen (2001); Liao et al. (1999); Chau and Hu (2002);Taylor and Todd (1995); Bhattacherjee (2000);Mathieson (1991)
Hypothesis 7 Perceived behavioral control ⟶ Intention	Ajzen (1991); Ajzen (2001); Liao et al. (1999); Chau and Hu (2002);Taylor and Todd (1995); Bhattacherjee (2000);Mathieson (1991)

Table 2. Research variables and measurements

Construct	Source
Subjective norms	Taylor and Todd (1995); Wu and Chen(2005)
Perceived behavioral control	Taylor and Todd (1995); Wu and Chen(2005)
Intention	Taylor and Todd (1995); Cheng et al.(2006)
Perceived usefulness	Davis (1989); Cheng et al.(2006)
Perceived ease of use	Davis (1989); Cheng et al.(2006)
Attitude	Taylor and Todd (1995);Davis (1989); Cheng et al.(2006)

Table 3. Results of the model goodness-of-fit

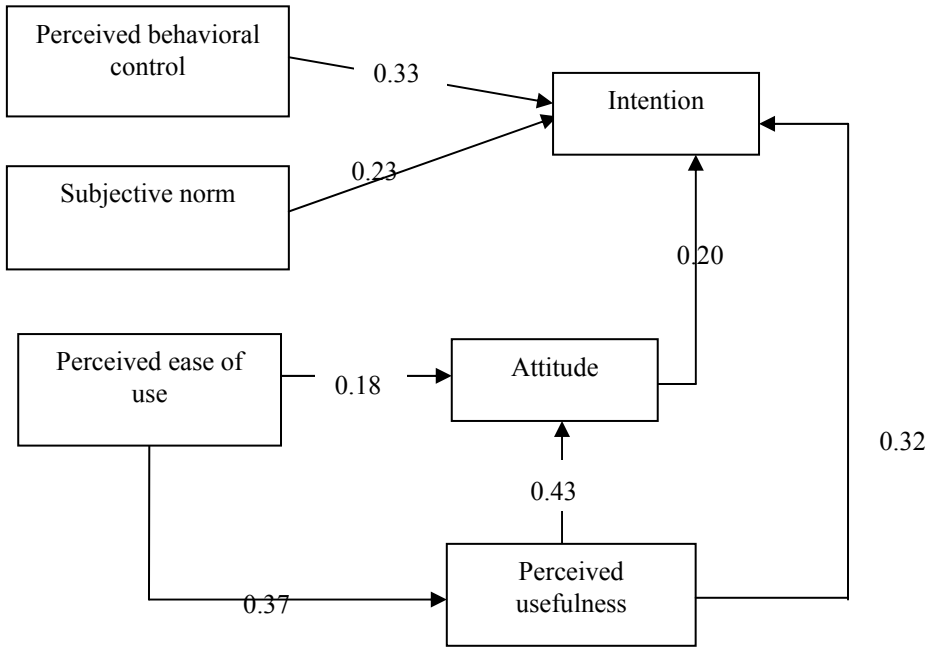
Fit index	Recommended criteria	Results in this study
Chi-square/Degree of freedom	< 3	1.87
P value	> 0.05	0.099
GFI (goodness-of-fit index)	> 0.90	0.93
AGFI (adjusted goodness-of-fit index)	> 0.90	0.91
CFI (comparative fit index)	> 0.90	0.92
RMR (root mean squared residual)	< 0.05	0.041
RMSEA (root mean squared error of approximation)	< 0.05	0.048
NFI(Normative Fit Index)	>0.90	0.92

Table 4. Summary of hypothesis tests

Hypothesis			Support
Hypothesis 1. Perceived ease of use	→	Attitude	Yes
Hypothesis 2. Perceived ease of use	→	Perceived use-fulness	Yes
Hypothesis 3. Perceived use-fulness	→	Intention	Yes
Hypothesis 4. Perceived use-fulness	→	Attitude	Yes
Hypothesis 5. Attitude	→	Intention	Yes
Hypothesis 6. Subjective norm	→	Intention	Yes
Hypothesis 7. Perceived behavioral control	→	Intention	Yes

Table 5. Direct , indirect and total effects

Variable	Effect on								
	Perceived usefulness			Attitude			Intention		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
Perceived ease of use	0.37	_	0.37	0.18	0.16	0.34	_	0.19	0.19
Perceived usefulness	_	_	_	0.43	_	0.43	0.32	0.086	0.41
Attitude	_	_	_	_	_	_	0.20	_	0.20
subjective norm	_	_	_	_	_	_	0.23	_	0.23
perceived behavioral control	_	_	_		_	_	0.33	_	0.33



χ^2/df =1.87 GFI=0.93 AGFI=0.91, CFI=0.92
NFI=0.92, RMSEA=0.048

Fig. 2. Results of structural modeling analysis