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A Multi-dimensional Model of Acceptance of Mobile Banking

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Abstract

Factors affecting rejection or acceptance of emerging technologies such as mobile banking have caused a high interest in researchers and consumers. Yet, understanding the risks of this technology has remained unknown in this infrastructure. This study aims to investigate multi-dimensional effects of trust and risk factors on initial acceptance of mobile banking. Thus, after representing a theoretical background using applied research method and questionnaire, a multi-dimensional investigation of effects of trust and risk factors on initial acceptance of mobile banking has been represented. The statistical population consists of the customers who referred to branches of bank Saderat across Qazvin city, that sample size (385) was obtained using Cochran formula. To measure validity of questionnaire with referral to scholars, validity of questionnaire was confirmed through Lawshe's formula, and its reliability was obtained through Cronbach's alpha formula. The results of this study indicate that trust and risk factors from six different aspects affect initial acceptance of mobile banking. To investigate effects of research variables, methods of inferential statistics including SPSS and LISREL software have been used. The results of research indicated that ninth hypothesis among 10 hypotheses was not confirmed.

Keywords: Mobile banking, Trust, Perceived Risk, Self-Efficacy, Performance Expectancy

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Introduction

In recent years, rapid growth of information technology and development of communication networks have opened up a new horizon to markets and financial sectors. Emergence of modern techniques and approaches of processing and transfer of information as well as development of large information databases have caused improving efficiency and productivity, proliferation at making communication, reducing operating costs in financial institutions, and also as an agent for superiority at arena of financial markets have caused a big development in vision of financial sector. A quick look into banking communication system, it can be informed of functions and effects of modern communication and information technologies on banking. Modern technologies have been resulted in new products and personal financial management notification services that have paved the way for increasing development and growth of banks. Mobile banking is one of the newest electronic distribution channels for the banks in which technology has been increasingly appeared as a vital agent which increases value added and convenience for both customer and bank. With regard to certain advantages of this technology, currently this system has benefited huge popularity in Asian and European countries. A study on factors affecting use of *mobile banking services in Iran requires an in-depth investigation. Today, banking industry has kept increasing.* With development of international economy and competitiveness of markets, the banks have been influenced, in which technology is the major force which causes breaking the legal, geographical and industrial barriers, and developing new products and services(Dandapani, 2008; Suoranta&Mattila, 2007). Special advantages of mobile banking including lack of local restrictions, use of minimum facilities and high penetration rate of mobile phone, have caused the developed countries search for exploitation from this technology with a great desire and enthusiasm (Schwanhausser, 2009).

In this sense, the questions as follows are asked:

- Why the customers prefer standing in long banks queues, however they can fulfil their financial transactions at any time and place?
- How is the customers' impression, that they prefer spending their time for use of banking services?

With regard to importance of mobile banking and novelty of this technology across the country, this study aims to help for improving mobile banking system via a comprehensive model.

Hence, the research question will be as follow:

How are the effects of trust and risk factors on initial acceptance of *mobile banking?*

Literature review

It is about half a century that information and communication technology has been used in business and management processes (Lesjak et al.). In this section, development of mobile banking technology regarding related works to use of mobile banking services is entered into discussion.

Today, advancement of information and communication technology has increased speed and quality of mobile banking services. From the second half of the twentieth century with a huge development in banking system, the banks were transformed to information processing centers, resulting in emergence of electronic money and transfer

of resources (Ashfaei, Sheikhani, 1998, p.83). Mobile banking is one of the major fields of mobile commerce (Kahzadi, 2005). Mobile commerce is called to process of electronic transfer or exchange of information by means of a mobile means on an infrastructure of wireless network, through which actual value or prepaid money in exchange for goods, services or information is transferred (Nambiar and Chang, 2009). On the other hand, trust is an integral part of the digital economy (Tapscott and et al). Trust is facilitator of human interaction, which allows the individuals to fulfill their commercial transactions and helps for rapider movement of economy. On the other hand, lack of trust is a useful subjective state which causes refraining from unreliable systems, individuals and organizations (Bashiri, 2007).Banks are of organizations which provide services; in point of view of Kotler, service implies any action or function that a supplier provides for customers, which is regarded with intangibility. According to this definition, importance of trust is revealed in banks, because service is not tangible before purchase, thus the purchasers assume service with an inherent risk, and they will not move towards it in case of lack of trust in supplier of services (Coulter, and Coulter, 2002).In the past, the interactions between people who had never seen each other rarely occur, but today the people who had never seen each other in real world can take step for exchange using modern technologies. These interactions include various levels of risk. Trust is the only agent that provides the possibility for such interactions (Mansell, 2005). On the other hand, development of processing from centralized systems to distributed systems has caused increasing complexity in trust (Benantar, 2006). This complexity has caused any academic area regarding its professional view proposes a special definition for trust. At the same time, a huge attempt is made to represent an interdisciplinary definition for trust so as to depict conditions governing mobile banking. The present problem has been stated in*bank Saderat that has provided necessary infrastructures for mobile banking services through mobile banking, for which a particular attention has been paid to providing faster services and trust which is the most important item for attracting customers at this area.*

Hence, it requires identifying mechanisms associated to emergence of affiliated behaviors in acceptance of mobile banking.

So the aims of research are as follows:

- Identifying mechanisms associated to emergence of affiliated behaviors in acceptance of mobile banking
- Creating view together with trust towards bank in acceptance of mobile banking
- Reducing the extent of risk for use of mobile banking among bank’s customers

Mobile Banking

Mobile banking has been developed as a wireless communication channel for creating value by customers in banking transactions. Today, supply of financial and banking services using mobile phones has been considered as one of modern approaches in supply of banking services.

However, long time has not passed from use of mobile phones in banking and financial operations, but great advancements have been witnessed at this area, which report huge expansion of this modern approach of mobile banking in future (Yulia et al., 2009, p. 517). Mobile banking which is sometimes recalled *telephone banking implies*

use of terminals such as mobile phones and PDA to access banking networks through Wireless application protocol (WAP) (Tao, 2010, p. 762).

Trust

Trust has been introduced as an accelerator in most of buyer-seller transactions through which it can expect a high satisfaction for customers in transactions (Shumaila). Trust is a very complicated and multidimensional structure (Kit, 2006). Trust model is a process to detect threats and risks based on data flow analysis at any information system which consequently recognize the mechanisms for response to a special threat (Droudchi et al., 2012, p. 49). In this study, three dimensions of trust based on typology and trust proposed by McKnight et al. (2003) which includes disposition to trust, structural trust and believing in trust, are examined.

Disposition to trust: this is a state in which the person has a fixed orientation in disposition to attachment to others among a wide spectrum of conditions and individuals.Disposition to trust does not imply that the person believes that he can rely on others, but this can be a reason for the person's disposition to others. The individuals might increase disposition to trust in their life, or develop it later (McKnight et al.2003, p. 301).

Structural Assurance: it refers to security of networks in terms of legal sources, warranties and a discipline which governs at a particular area. When the users receive structural assurance from mobile banking, trust increases (Lee Kun Chang, Chung Namho, 2009, p. 11607).

*Belief in trust: belief in*trust is a mutual perception between customer and seller, consisting of particular beliefs about honesty, compassion, and competence (Leo et al., 2010, p. 225).

Perceived Risk

Perceived risk is defined based on security risk in comparison with use of banking services. Perceived risk has an inverse relationship with the rate of using innovation (Lockett & Little, 1997, p. 795).

Self-efficacy

Self-efficacy has been derived from Bandura's social cognition theory (1997), which refers to the person's beliefs or judgments to his abilities in doings responsibilities. Social cognition theory is based on Tri-Modal Causation Model of behavior, environment and person. This model emphasizes on mutual relationship between behavior, environmental effects and personal factors (cognitive, affective and biological factors) which refers to the person's perception for defining psychological functions. Hence, actions in the context of mobile banking implies self-efficacy referring to users' judgment on their abilities in acceptance of mobile banking(Leo et al., 2010, p. 225).

Performance Expectancy

This is an extent believed by the person in this way that use of it will help for access to his job aims (Okonkwo et al., 2012). In other words, performance expectancy is an extent which is perceived by use of an innovation as a better pioneer.

Intention to use: intention to use is a subjective probability called to a behavior which might be seen in the person's behaviors (Naeyang, 2009). Intention to use might be different from the person's behavior. To understand the difference between customer's intention and behavior, the researchers generally use theory of reasoned action. According to this theory, the person's actual behavior relates to intention to use.

The conceptual model has been formulated based on model of Xin Luo et al, and represented in figure 1.

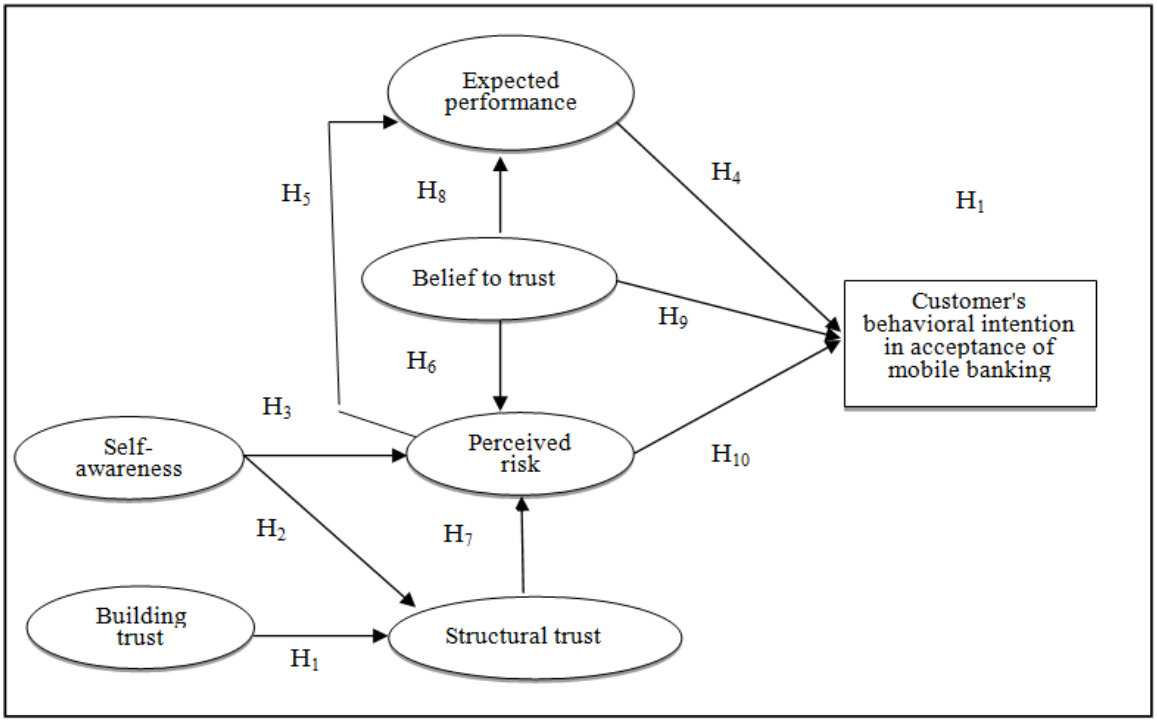

Figure 1. Conceptual model of the research

Source: X. Luo et al., 2010, p.224

A wide range of studies in the context of acceptance of a variety of mobile technologies have been represented. The studies in 1998-2005 have largely used qualitative and heuristic methods to determine the causes for lack of acceptance of mobile banking by some of customers. Yet, in 2005-2010, most these studies have used *confirmatory methods* to determine factors affecting acceptance of mobile banking. In following, an overview on domestic and foreign studies has been represented.

Table 1.Summary of previous studies

Authors	Year	Results of research
Lin	2010	Perceived advantage, ease of use, compatibility, ability and accuracy significantly affect attitude, and as the result behavioral intention of acceptance of mobile banking will be benefited.
Lewis et al.	2010	The results were in this way that these factors have a negative effect on acceptance of mobile banking that are examined in this study.
Leo et al	2010	Performance expectations positively and perceived risk negatively affect customer's behavioral intention to use mobile banking. Further, structural trust which is influenced of personal ability and tendency to trust, negatively affects extent of perceived risk by customer.
Cruz et al.	2010	Most of users have rarely use Mobile banking services, and risk, cost, complexity and lack of understanding advantage of these services are of major factors in *people's reluctance* to use any mobile banking services.
Kim et al	2010	Ease of use and utility are two important factors for acceptance of mobile banking; all the participants have not known compatibility as the main reason, and people's sense to ease of use tie with their knowledge to pay via mobile. Further, personal innovation affects ease of use.
Bong Hyun Joong	2013	Perceived utility, ease of use, creditability, perceived self-efficacy expect for perceived financial costs affect behavioral intention to use mobile banking.
MojdeHashemian et al	2012	Factors including quality of services, trust to bank, expected performance, adaptation of technology and responsibility, expected effort, facilitating conditions, awareness from services, self-efficacy and personal innovation affect acceptance of mobile banking. Factor of sense of risk to personal innovation and self-efficacy and awareness relatively affect acceptance of mobile banking.
SamaneSarvarnejad	2010	The extent of acceptance of mobile banking users largely rely on percent of risk-taking by people. In other words, it can say that the people with high extent of risk-taking highly tend to innovation.
Mohammad TaghiTaghvafare et al	2010	Features of mobile banking technology in turn priority, compatibility variables, cost of use, capability of testing and utility affect acceptance of mobile banking. Yet, complexity and perceived risk rarely affect acceptance of mobile banking.

Methodology

This study has been conducted in branches of *BANK SADERAT IRAN*across city of Qazvin. This study has been started since 2013 and ended in 2014. The statistical population of this study consists of customers of *BANK SADERAT IRAN* who are well-informed of mobile banking services.

With regard to variables of research, sample size based on Kokran formula is 385. Cluster sampling method has been used in this study. Data collection to test hypotheses has been conducted by standardized questionnaire by Koenig Lewis et al (2010) and Wessells (2010). Finally the questionnaire was used after necessary adjustments.

According to the revisions and results of multidimensional investigation into effects of trust and risk factors on acceptance of mobile banking, these factors consisting of 28 measurement indices were represented in a list as follows:

Table 2: questionnaire and its items

Variable	Reference	Number of items
Customer's behavioral intention in acceptance of mobile banking	Wessells (2010)	3
Variable of expected performance	Wessells (2010)	3
Perceived risks	Wessells (2010)	4
Self-awareness	Wessells (2010)	4
Building trust	Koenig Lewis et al(2010)	8
People's view on mobile banking	Wessells (2010)	6

Pilot test

By 30 respondents, test and re-test method has been used to estimate reliability, and Cronbach's Alpha method and*Guttman split-half* method has been used for reliability of sampling. Cronbach's Alpha coefficient has been observed for about 0.91 that is significant at alpha level (0.05). Further, *Guttman split-half* coefficient was obtained equal to 0.87, which is greater than 0.7 and final results have been obtained using SPSS and LISREL software.

Table3- Results of Pilot Test

	Number of items	Number of respondents	Cronbach alpha	test-retest	Guttman Split-Half
Results	55	38 (person)	0.740	0.750	0.758
Results	55	38 (person)	0.740	0.750	0.758

Result

First hypothesis: building trust has a positive, direct and significant effect on structural trust, which is equal to 0.90. Further, t-value between these two variables equals to 12.9 which is greater than critical limit(1.96). Hence, the relationship between two variables is significant.

Second hypothesis: self-awareness has a negative, direct and significant effect on structural trust, which is equal to -0.25. Further, t-value between these two variables equals to -3.56 which is smaller than critical limit(-1.96). Hence, the relationship between two variables is significant.

Third hypothesis: self-awareness has a positive, direct and significant effect on reducing perceived risk, which is equal to 0.79. Further, t-value between these two variables equals to 13.06 which is greater than critical limit(1.96). Hence, the relationship between two variables is significant.

Table 4- SEM results

Hypothesis	t- value	Factor loading	Sig	R^2	Result
H_1	12.9	0.9	0.000	0.80	Confirmed
H_2	-3.56	-0.25	0.000	0.06	Confirmed
H_3	13.06	0.79	0.000	0.62	Confirmed
H_4	6.80	0.54	0.000	0.30	Confirmed
H_5	9.09	0.50	0.000	0.25	Confirmed
H_6	5.57	0.43	0.000	0.19	Confirmed
H_7	-3.96	-0.35	0.000	0.12	Confirmed
H_8	6.44	0.33	0.000	0.10	Confirmed
H_9	-1.51	-0.08	0.072	0.006	Rejected
H_{10}	7.86	0.53	0.000	0.49	Confirmed

Fourth hypothesis: expected performance in acceptance of mobile banking has a positive, direct and significant effect on behavioral tendency, which is equal to 0.54. Further, t-value between these two variables equals to 6.80 which is greater than critical limit (1.96). Hence, the relationship between two variables is significant.

Fifth hypothesis: reducing perceived risk has a positive, direct and significant effect on performance expectations, which is equal to 0.50. Further, t-value between these two variables equals to 9.09 which is greater than critical limit (1.96). Hence, the relationship between two variables is significant.

Sixth hypothesis: belief together with trust to a bank has a positive, direct and significant effect on reducing perceived risk in mobile banking, which is equal to 0.43. Further, t-value between these two variables equals to 5.57 which is greater than critical limit (1.96). Hence, the relationship between two variables is significant.

Seventh hypothesis: structural trust has a negative, direct and significant effect on reducing perceived risk, which is equal to -0.35. Further, t-value between these two variables equals to -3.96 which is smaller than critical limit (-1.96). Hence, the relationship between two variables is significant.

Eighth hypothesis: belief together with trust to a bank has a positive, direct and significant effect on performance expectations, which is equal to 0.33. Further, t-value

between these two variables equals to 6.44 which is greater than critical limit (1.96). Hence, the relationship between two variables is significant.

Ninth hypothesis: belief together with trust to a bank has a negative, direct and significant effect on reducing perceived risk, which is equal to -0.08. Further, t-value between these two variables equals to -1.51 which is smaller than critical limit (-1.96). Hence, the relationship between two variables is not significant.

Tenth hypothesis: reducing perceived risk to mobile banking has a positive, direct and significant effect on customer's behavioral intention in acceptance of mobile banking, which is equal to 0.53. Further, t-value between these two variables equals to 7.86 which is greater than critical limit (1.96). Hence, the relationship between two variables is significant.

Discussion

First hypothesis: building trust affects structural trust.

Result of hypothesis: according to previous results, as t-value equals to 12.90, thus it can conclude that building trust affects structural trust. Hence, this hypothesis is confirmed. The results represented in this study are similar to viewpoint of Leo et al. (2010), as he believed that building trust affects structural trust, because a significant relationship was observed between these two variables in this study.

Second hypothesis: self-awareness affects structural trust.

Result of hypothesis: according to previous results, as t-value equals to -3.56, thus it can conclude that self-awareness affects structural trust. Hence, this hypothesis is confirmed. Hence, self-awareness at area of mobile banking refers to users' judgment on their abilities in acceptance of mobile banking, and further self-awareness is required in understanding personal responses to information technology at area of information systems. The results represented in this study are similar to viewpoint of Leo et al.(2010), as he believed that self-awareness affects structural trust, because a significant relationship was observed between these two variables in this study.

Third hypothesis: self-awareness affects reducing perceived risk.

Result of hypothesis: according to previous results, it can perceive that a significant relationship exists between self-awareness and reducing perceived risk, because *factor loading* and t-value have been obtained equal to 0.79 and 13.06, respectively. Hence, this hypothesis is confirmed. This implies that self-awareness affects reducing perceived risk. According to definition of self-awareness, as users' judgment on their abilities is effective in acceptance of mobile banking, thus managers must pay a particular attention to this factor. On the other hand, the results represented in this study are not similar to viewpoint of Leo et al. (2010), as he believed that self-awareness affects structural trust, because a significant relationship was observed between these two variables in this study, but such a relationship was not observed in study by Leo et al. (2010).

Fourth hypothesis: expected performance in acceptance of mobile banking affects behavioral tendency.

Result of hypothesis: according to previous results, it can perceive that a significant relationship exists between expected performance in acceptance of mobile banking and behavioral tendency, because *factor loading* and t-value have been obtained equal to 0.54 and 6.80, respectively. Hence, this hypothesis is confirmed. On the other hand, the results represented in this study are not similar to viewpoint of Leo et al. (2010), as he believed that expected performance in acceptance of mobile banking affects behavioral tendency, because a significant relationship was observed between these two variables in this study.

Fifth hypothesis: reducing perceived risk affects performance expectations.

According to previous results, it can perceive that a significant relationship exists between reducing perceived risk and performance expectations, because *factor loading* and t-value have been obtained equal to 0.50 and 9.09, respectively. Hence, this hypothesis is confirmed, i.e. reducing perceived risk affects performance expectations. Hence, it can say that reducing perceived risk between users and bank is very important, because the more sense of risk to mobile banking services decreases, the extent of using such services will increase. The results represented in this study are not similar to viewpoint of Leo et al. (2010), as he believed that reducing perceived risk affects performance expectations, because a significant relationship was observed between these two variables in this study.

Sixth hypothesis: belief together with trust to a bank affects reducing perceived risk in mobile banking.

According to previous results, it can perceive that a significant relationship exists between belief together with trust to a bank and reducing perceived risk in mobile banking, because *factor loading* and t-value have been obtained equal to 0.43 and 5.57, respectively. Hence, this hypothesis is confirmed, i.e. belief together with trust to a bank affects reducing perceived risk in mobile banking. The results represented in this study are not similar to viewpoint of Leo et al. (2010), as he believed that belief together with trust to a bank does not affect reducing perceived risk in mobile banking, because a significant relationship was observed between these two variables in this study.

Seventh hypothesis: structural trust affects reducing perceived risk.

According to previous results, it can perceive that a significant relationship exists between structural trust and reducing perceived risk in mobile banking, because *factor loading* and t-value have been obtained equal to -0.35 and -3.96, respectively. Hence, this hypothesis is confirmed, i.e. structural trust affects reducing perceived risk. On the other hand, to security of networks in terms of legal sources, warranties and a discipline this governs at a particular area. The results represented in this study are not similar to viewpoint of Leo et al. (2010), as he believed that structural trust affects reducing perceived risk.Because a significant relationship was observed between these two variables in this study.

Eighth hypothesis: belief together with trust affects performance expectations.

According to previous results, it can perceive that a significant relationship exists between belief together with trust and performance expectations, because *factor loading* and t-value have been obtained equal to 0.33 and 6.44, respectively. Hence, this hypothesis is confirmed. Hence, belief together with trust affects performance expectations. The results represented in this study are not similar to viewpoint of Leo et al. (2010), as he believed that belief together with trust does not affect performance expectations in mobile banking, because a significant relationship was observed between these two variables in this study, but such a relationship was not observed in study by Leo et al.

Ninth hypothesis: belief together with trust to a bank affects customer's behavioral intention in acceptance of mobile banking.

According to previous results, it can perceive that a significant relationship does not exist between belief together with trust to a bank and customer's behavioral intention, because *factor loading* and t-value have been obtained equal to -0.08 and -1.51, respectively. Hence, this hypothesis is confirmed. Hence, that a significant relationship does not exist between belief together with trust to a bank and customer's behavioral intention. The results represented in this study are not similar to viewpoint of Leo et al.(2010), as he believed that belief together with trust to a bank does not affect customer's behavioral intention in acceptance of mobile banking, because a significant relationship was not observed between these two variables in this study.

Tenth hypothesis: reducing perceived risk to mobile banking affects customer's behavioral intention in acceptance of mobile banking.

According to previous results, it can perceive that a significant relationship exists between reducing perceived risk to mobile banking and customer's behavioral intention in acceptance of mobile banking, because *factor loading* and t-value have been obtained equal to 0.53 and 5.43, respectively. Hence, this hypothesis is confirmed. Hence, reducing perceived risk to mobile banking affects customer's behavioral intention in acceptance of mobile banking. The results represented in this study are similar to viewpoint of Leo et al.(2010), as he believed that reducing perceived risk to mobile banking affects customer's behavioral intention in acceptance of mobile banking, because a significant relationship was observed between these two variables in this study.

Practical and Management Implications

The results of this study indicate that perceived risk is an important factor which affects tendency to use mobile banking. Indeed, the more perceived risk increases, tendency to use will be in a lower level. Further, a positive significant relationship was found between “trust and expected performance” and tendency to use mobile banking. This implies that the more customer trusts to bank Saderat and he finds mobile banking more effectives, tendency to use this channel will increase. Based on the data analysis relating to trust, it can conclude that trust develops the most important agent in

acceptance of mobile banking. According to various studies across the world and comparing them with Iran, it can perceive that a reason for lack of development in banking in mobile banking lies of mistrust to efficiency of services that can be provided via mobile banking in modern banking system.

Hence, to set security in banking system and increase public trust to this system, the actions as follows can be fulfilled:

- Use of mass*media to notify customers from services and security implications of mobile banking*

- *Providing necessary cultural infrastructure to expand use of modern services of mobile banking and building trust in such banking services through appropriate advertisements*

- The more customers learn how to use mobile banking the rate of acceptance of this technology will increase. Hence, training customers for learning mobile banking is another practical suggestion.

- As structural trust was recognized in the extent of person's trust, the more it can trust to technological and legal structures, the person will receive less risk and will have more trust to banking system. Hence, Saderat bank must build trust in customers at area of technological and legal structures.

The highest risk that customers perceive it in use of mobile banking is *loss of money* or decrease in financial value due to transaction costs, *forgotten password,* stealing mobile phones, errors and deficiencies existed in the mobile phone system, telecom and mobile banking system.

Then, the risk is related to performance of communication system and the risk related to performance of mobile banking system, i.e. people have doubt about proper performance of communication system and mobile banking system and perceive risk from that area. Hence, it is suggested to Saderat bank to make effort for reducing *risks* of *customer using necessary actions and advertisement methods.*

Suggestions for future studies

It is suggested to conduct this study in a wider range in order to test the capability of generalizing its results to all consumers of Iran's banking system, because consumers' behaviors are more likely different in use of mobile banking due to difference on social class of individuals, for which separate studies are required. Effect of culture on acceptance can be an interesting issue for further studies in future.

- This study has been conducted by sampling from branches of bank Saderat, and it might not represent population of banking customers. More comprehensive studies at this area can result in more reliable results.

- It is suggested to examine important role of advertisements in acceptance of mobile banking in further studies.

- Validation of the proposed model is another suggestion in this study, which is mentioned in a favorable condition in terms of extent of use of mobile phone in Iran, so that it has a high potential for using mobile banking.

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