Indian Journal of Fundamental and Applied Life Sciences ISSN: 2231– 6345 (Online)
An Open Access, Online International Journal Available at www.cibtech.org/sp.ed/jls/2015/02/jls.htm
2015 Vol. 5 (S2), pp. 816-825/Marandi and Ghalavandi
Research Article

IDENTIFYING BARRIERS TO ACCEPTANCE OF MOBILE BANKING IN KESHAVARZI BANK BRANCHES IN WEST AZERBAIJAN PROVINCE BY USING FACTOR ANALYSIS

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ABSTRACT
The resent study has been conducted with the aim of identifying the barriers to acceptance of mobile banking in Keshavarzi Bank branches in West Azerbaijan. This study is applied and a descriptive factor analysis in terms of purpose and data collection method respectively. Statistical population of the study included managers and employees of Keshavarzi Bank branches in West Azerbaijan; a sample size of 340 persons was selected through stratified random sampling. Instrument of data collection was a researcher-made questionnaire containing 30 items. In order to measure the validity of most questionnaires, the opinions of the experts and professors of the field were sought. Besides, in order to measure the reliability of the questionnaires, the Cronbach's alpha was calculated which was 0.867. Research results revealed that there is a relationship between environmental barriers, administrative barriers, technical barriers, financial barriers, and cultural-social barriers, and the acceptance of mobile banking in Keshavarzi Bank, and environmental barriers have the highest impact.

Keywords: *Mobile Banking, Environmental Barriers, Administrative Barriers, Technical Barriers, Financial Barriers, Cultural-Social Barriers, Exploratory Factor Analysis*

INTRODUCTION
At the current time, organizations are faced with change in the form of dynamic environmental processes, and are compelled to adapt to environmental barriers. Information technology (IT) has resulted in changes in works in the organizations. By looking at the social changes trend in recent decades, we realize that organizations have to adapt themselves to future changes. If an organization wants to survive and ensure its survival, it must properly react to the changes occurring in the environment (Laukkanen, 2007).
Change exists in all phenomena of the world and this is not limited to a specific range. Change existed before creation of mankind and will exist for ever; one of the issues faced by the societies and organizations from a long time ago is the emergence of new phenomena and discussion of changes, the occurrence of which greatly affects performance of that society and organization, and paying attention and reacting to these changes significantly influences their success and failure (Omekwu and Eteng, 2006).
Most today organizations are imbued with political, social, economic and technological changes. Stability, certainty and steadiness have ceased to exist. Currently, organizations can contact all around the world and exchange information through using information and communication technology (ICT) and by applying information systems (IS) in the shortest possible time. Information and communication technology greatly affects organizations' architecture (Thelen *et al.*, 2004). Based on the present condition of the world and published reports, total production of knowledge and innovation from 1993- the year in which information architecture flourished and was applied in IT- to 2004 has been more than the total production of knowledge and innovations the world had achieved until 2004, because information age has created a situation in which all the ideas which were not applicable until 1993, could be implemented by using ICT, and this is the reason for communities rapid growth and development of social justice (Rabiee, 2004).
Given the existing conditions and pervasiveness of IT and ISs, using these tools is essential for staying in the global competition and doing organizations' activities. In other words, given the current conditions, organizations have no choice but to turn to these tools for survival. In an environment faced with ongoing

technological changes, organizations are always faced with this challenge that when they have to invest in new information technology (Hsu and Lin, 2008).

By entering the 21st century, electronic areas are rapidly expanding, among which are e-learning, e-commerce, electronic medicine, e-procurement, e-marketing, e-banking, e-democracy, e-citizenship, e-government and eventually, e-life.

Over the past few years, mobile commerce has been considered as the newest branch of e-commerce, and technology advances and innovations has caused its applications to grow and develop (David, 2007).

With the rise and development of wireless networks, today, a new generation of e-commerce applications has emerged, which is known as mobile commerce. Mobile commerce is being carried on through thousands of mobile gadgets such as cell phones, personal digital devices, digital notebooks and even wireless car dashboards. Mobile commerce has many advantages; for example, it reduces time and space constraints, and billions of dollars in market value is transferred (Mozhdehi *et al.,* 2007).

Mobile gadgets penetration rate is higher than any other technology because it is used by the members of the society today as a public device, and this has caused the mobile commerce to become a global revolution, which is spreading in developing country as quickly as in developed countries (E-commerce Development Office, 2007).

One of the services offered with the help of cell phones is banking. Mobile banking has achieved many successes around world. Cell phone is not only used for paying restaurant bills and purchases invoices in countries such as the Philippines, Japan and Singapore, but also used for financial operations (Mozhdehi *et al.,* 2007).

Acceptance of mobile banking speeds up banking operations and provides banking services for all people without time and space constraints. Besides, it saves clients' and employees' time and the need for different bank branches with larger spaces is eliminated. Rejection or non-acceptance of mobile banking wastes a lot of resources, increases additional expenses, and delays banking services delivery. Since cell phone is a device possessed almost by everyone today, a kind of e-banking can be taught by proper awareness and clients do their banking affairs without presence and waste of time (David, 2007).

Given the implementation of mobile banking in Keshavarzi bank, low number of transactions carried out by using mobile banking in clients' banking operations has prompted the researcher to detect the reason for this. While mobile banking software is installed on clients' cell phones, clients do not check their balances by using their prepaid cell phones and prefer to go to the bank branches and hear the amount of their account balance from the bank clerk or to have them do their banking operations. The researcher further investigates the problem through this study to detect the barriers to the acceptance of mobile banking in Keshavarzi bank. According to the study conducted by Mozhdehi *et al.,* (2008), distrust and lack of security in technology were reported to be among the barriers to electronic banking; while, according to the study conducted by Bid *et al.,* (2010), lack of sufficient time and unavailability of cell phone were reported to be barriers to e-banking. Use of cell phone in banking is a completely new subject in e-commerce and e-banking; so it is a new topic considered by the researchers; however, there is not many studies in this regard. One of the most important subjects in this regard is the reasons for non-acceptance of this technology; and it is more addressed in developing countries (Mozhdehi *et al.,* 2008).

Given the rapid development of banking around the world, lack of sufficient time, and availability of cell phones and the stuff like that, the need for awareness of the reasons for non-acceptance of mobile phone technology in Iran is increasingly addressed (Bid, 2010).

As per the government's emphasis on moving towards e-government, implementation of mobile banking is among the basic priorities of banks; however, since traditional banking services system is being changed, there has been no study conducted to figure out the barriers to mobile banking in Keshavarzi bank. The significance of this subject is realized when we find out that this study is a step towards the banks' main goal, i.e. customer orientation; so it addresses the importance of bank clients' attitude as the most important capital of banking system.

By knowing that using cell phones for doing banking operations allows the client to carry out his/her transactions without being present in the bank, the advantages of this makes it easy to access to bank

branches in different geographical locations and receive bank services without time constraints even on holidays. Besides, accelerated process of banking is another outcome of its accomplishment; by turning to home banking and with the use of cell phones, the volume of undue traffic reduces.

Furthermore, by promoting e-commerce, the need for building banks with larger spaces for delivering services to clients of Keshavarzi bank branches decreases, security increases and clients' and employees' time is saved more, and it is not possible to achieve all of these without detecting barriers to mobile banking.

On the other hand, this effort includes theoretical benefits such as offering solution for developing mobile banking users in other banks in Iran as well as presenting the barriers affecting its non-acceptance, particularly in Keshavarzi bank.

Implementation and acceptance of mobile banking by the clients is faced with some barriers and problems. Lack of studies on the detection of acceptance barriers, and lack of consensus and trust regarding the priority of barriers and problems have prompted the researcher to conduct the present study. In some experts' opinion, technical barriers including technical infrastructure and systems development practices are of high priority and importance, while others say nontechnical barriers including security, skilled human resources and clients' trust are of higher importance and priority.

These different disagreements among the experts and lack of studies in this regard have made the researcher more serious and more interested for doing the present study. Using cell phone in banking operations is a pretty new subject in e-commerce and e-banking, so it is a new topic considered by researchers, while there is not much work in this regard. One of the most important discussions in this regard is the reasons for non-acceptance of this technology, which is discussed more in developing countries (Mozhdehi *et al.*, 2008).

MATERIALS AND METHODS

Research Methodology

The present study is applied and descriptive-correlational in terms of purpose and method of data collection respectively. Statistical population of the study includes managers and employees of Keshvarzi bank branches in West Azerbaijan province. Stratified proportional random sampling has been used in this study. Thus, a sample size of 340 persons was selected in proportion to their number in the statistical population randomly and by referring to valid tables.

In this study, first, indexes and barriers found by reviewing the literature through Delphi method were sent to the experts for review and evaluation, out of which barriers such as culture, climate, population and government's policy were not confirmed by the experts and 30 indexes affecting acceptance of mobile banking were identified and were put in the final questionnaire; the results obtained from the final questionnaire were employed for analysis and extracting factors incorporating these indexes. The variables extracted by reviewing the related literature are as follows:

- Environmental factor
- Administrative factor
- Cultural-social factor
- Technical factor
- Financial factor

Each questionnaire contains 30 questions and its face-validity has been measured by referring to the experts. The reliability of the instrument was measured in a limited study, and the reliability is 0.7 for the data collection instrument with respect to Cronbach's alpha, which is larger than 0.7, so the questionnaire has an acceptable reliability.

KMO (Kaiser-Meyer-Olkin Measure of Sampling Adequacy) Index and Bartlett's Test of Sphericity

In factor analysis, first, it should be ensured that the current data can be used for analysis. In other words, is there sufficient data for factor analysis? For this purpose, KMO index and Bartlett's test are employed.

By making use of questionnaires' data analysis, image 13-4 shows the results of KMO index and Bartlett's test:

Table 2: Results of KMO index and Bartlett's test

Test	Value
KMO index	0.882
Bartlett's test statistic (an approximate of chi square statistic)	6626.519
Degree of freedom (df)	171
Significance level	0.000

Since KMO index is equal to 0.882 (close to 1), the number of samples (number of respondents) is sufficient for factor analysis. Besides, the significance level of Bartlett's test is below 5% which shows that factor analysis is suitable for identifying the structure of factor model and the assumption that correlation matrix is known is rejected.

RESULTS AND DISCUSSION

Research Findings

a) First Factor: Environmental

This factor with the highest percentage of total variance, i.e. 19.07 and the Cronbach's alpha equal to 0.917 as well as 4 variables is named as environmental barrier, but the variable of lack of input and feedback for user was removed from factor analysis because of having a factor loading of 0.377, so the environmental factor is classified as follows with 3 variables:

Table 4-18: Environmental factors loading

Factor loading	Description	No.
0.956	Users' lack of trust and confidence	1
0.945	Lack of security	2
0.844	Lack of regulations and appropriate instructions	3
0.377	Lack of input and feedback for user	4

b) Second Factor: Administrative

This factor with the total variance of 15.123 and the Cronbach's alpha equal to 0.865 as well as 6 variables is named as administrative barrier:

Table 4-19: Administrative factors loading

Factor loading	Description	No.
0.825	Transfer and change of managers and decision makers	1
0.811	Bank's senior managers' strategic view and long-term planning	2
0.729	Keshavarzi bank's senior officials' lack of support and commitment	2
0.629	Organization of ICT management	4
0.570	Poor control and management of the project	5
0.543	Cross-sectoral coordination	6

c) Third Factor: Cultural-social

This factor with the total variance of 13.811 and the Cronbach's alpha equal to 0.813 as well as 5 variables is named as cultural-social barrier, but the variable of lack of competition in market was removed from factor analysis because of having a factor loading of 0.332, so 4 variables are classified under this factor:

Table 4-20: Cultural-social factors loading

Factor loading	Description	No.
0.937	Traditional banking system's stakeholder's resistance to mobile banking	1
0.769	Institutionalization of the culture of using features and capabilities of mobile banking in West Azerbaijan branches	2
0.744	Stakeholders' awareness of the benefits of mobile banking	2
0.332	Lack of competition in market	4
0.604	Fear of dependence on other rudiments for utilizing technology and knowledge of mobile banking	5

d) Fourth Factor: Technical

This factor with the total variance of 11.223 and the Cronbach's alpha equal to 0.869 as well as 10 variables is named as technical barrier:

Table 4-21: Technical factor loading

Factor loading	Description	No.
0.787	Lack of users' knowledge about ICT	1
0.707	Inappropriate broadband Internet lines	2
0.691	Poor infrastructures of IT	3
0.655	Lack of sufficient software and hardware facilities	4
0.588	Bank officials' familiarity with the structure and function of mobile banking	5
0.539	Internet lines' speed in banks	6
0.527	Low number internet service providers	7
0.511	Limited and low access of bank branches to web	8
0.505	Low quality of bank's specialists' technical knowledge	9
0.461	Insufficient number of specialists in bank	10

e) Fifth Factor: Financial

This factor with the total variance of 10.483 and the Cronbach's alpha equal to 0.842 as well as 5 variables is named as financial barrier:

Table 4-22: Financial factor loading

Factor loading	Description	No.
0.678	Covering costs of connection to web	1
0.637	Financing the investment in telecommunications infrastructure	2
0.634	Development costs of satellite and computer networks	3
0.618	Covering the costs of upgrading networks	4
0.557	Lack of funding	5

Testing Research Hypotheses

First Hypothesis; Cultural-social Barriers

According to table 4-23, data analysis showed that the t obtained from sample group (39.41) is larger than the critical value (1.96) and the observed significance level is below 0.05. Thus, it can be said that cultural-social barriers are among the barriers to the acceptance of mobile banking in Keshavarzi bank branches in West Azerbaijan.

$t_1 \geq t_0$

$39.41 \geq 1.96$

Table 4-23: Statistical hypothesis test of cultural-social barriers

Level of error	Critical value	Test statistics	Test results
0.05	1.96	39.41	Rejection of hypothesis (H_0)

Five dimensions were evaluated in this hypothesis as the main dimensions related to cultural-social barriers, but one of the variables was removed from factor analysis. The remaining variables are ranked and presented in table 4-24 along with the obtained mean score by using Friedman test.

Table 4-24: Ranking of cultural-social barriers indexes

Ranking	Mean rank	Considered index
1	8.47	Stakeholders' awareness of the benefits of mobile banking
2	8.35	Traditional banking system's stakeholder's resistance to mobile banking
3	7.74	Institutionalization of the culture of using features and capabilities of mobile banking in West Azerbaijan branches
4	5.62	Fear of dependence on other rudiments for utilizing technology and knowledge of mobile banking

Analysis of the considered indexes in the dimension of cultural-social barriers revealed that stakeholders' awareness of the benefits of mobile banking has the highest rank among the other indexes. Besides, fear of dependence on other rudiments for utilizing technology and knowledge of mobile banking has the lowest rank among the all indexes set forth in the dimension of cultural-social barriers.

Second Hypothesis; Administrative Barriers

According to table 4-24, data analysis showed that the t obtained from sample group (15.559) is larger than the critical value (1.96) and the observed significance level is below 0.05. Thus, it can be said that administrative barriers are among the barriers to the acceptance of mobile banking in Keshavarzi bank branches in West Azerbaijan.

$t_1 \geq t_0$

$15.559 \geq 1.96$

Table 4-25: Statistical hypothesis test of administrative barriers

Level of error	Critical value	Test statistics	Test results
0.05	1.96	15.559	Rejection of hypothesis (H_0)

Six dimensions were evaluated in this hypothesis as the main dimensions related to administrative barriers. The variables are ranked and presented in table 4-26 along with the obtained mean score by using Friedman test.

Table 4-26: Ranking of administrative barriers indexes

Ranking	Mean rank	Considered index
1	8.09	Transfer and change of managers and decision makers
2	8.01	Keshavarzi bank's senior officials' lack of support and commitment
3	7.70	Poor control and management of the project
4	6.43	Organization of ICT management
5	5.57	Bank's senior managers' strategic view and long-term planning
6	5.14	Cross-sectoral coordination

Analysis of the considered indexes in the dimension of administrative barriers revealed that transfer and change of managers and decision makers has the highest rank among the indexes of administrative

barriers. Besides, Cross-sectoral coordination has the lowest rank among the indexes set forth in the dimension of cultural-social barriers.

Third Hypothesis; Financial Barriers

According to table 4-24, data analysis showed that the t obtained from sample group (12.87) is larger than the critical value (1.96) and the observed significance level is below 0.05. Thus, it can be said that financial barriers are among the barriers to the acceptance of mobile banking in Keshavarzi bank branches in West Azerbaijan.

$t_1 \geq t_0$

$12.87 \geq 1.96$

Table 4-27: Statistical hypothesis test of financial barriers

Level of error	Critical value	Test statistics	Test results
0.05	1.96	12.87	Rejection of hypothesis (H_0)

Five dimensions were evaluated in this hypothesis as the main dimensions related to financial barriers. The variables are ranked and presented in table 4-28 along with the obtained mean score by using Friedman test.

Table 4-28: Ranking of financial barriers indexes

Ranking	Mean rank	Considered index
1	6.28	Development costs of satellite and computer networks
2	6.07	Financing the investment in telecommunications infrastructure
3	5.88	Covering costs of connection to web
4	5.13	Covering the costs of upgrading networks
5	4.45	Lack of funding

Based on the Analysis of this factor, it can be said that in the dimension of financial barriers, development costs of satellite and computer networks has the highest rank among other indexes. Besides, the lowest rank belongs to lack of funding.

Fourth Hypothesis; Environmental Barriers

According to table 4-29, data analysis showed that the t obtained from sample group (19.970) is larger than the critical value (1.96) and the observed significance level is below 0.05. Thus, it can be said that environmental barriers are among the barriers to the acceptance of mobile banking in Keshavarzi bank branches in West Azerbaijan.

$t_1 \geq t_0$

$19.970 \geq 1.96$

Table 4-29: Statistical hypothesis test of environmental barriers

Level of error	Critical value	Test statistics	Test results
0.05	1.96	19.970	Rejection of hypothesis (H_0)

Four dimensions were evaluated in this hypothesis as the main dimensions related to financial barriers, but the variable of lack of input and output for the user was removed from factor analysis. The remaining variables are ranked and presented in table 4-30 along with the obtained mean score by using Friedman test.

Table 4-30: Ranking of environmental barriers indexes

Ranking	Mean rank	Considered index
1	8.87	Lack of security
2	8.74	Users' lack of trust and confidence
3	8.11	Lack of regulations and appropriate instructions

Based on the Analysis of this factor, it can be said that in the dimension of environmental barriers, lack of security has the highest rank among other indexes. Besides, the lowest rank belongs to lack of regulations and appropriate instructions.

Fifth Hypothesis; Technical Barriers

According to table 4-31, data analysis showed that the t obtained from sample group (12.742) is larger than the critical value (1.96) and the observed significance level is below 0.05. Thus, it can be said that technical barriers are among the barriers to the acceptance of mobile banking in Keshavarzi bank branches in West Azerbaijan.

$t_1 \geq t_0$

$12.742 \geq 1.96$

Table 4-31: Statistical hypothesis test of technical barriers

Level of error	Critical value	Test statistics	Test results
0.05	1.96	12.742	Rejection of hypothesis (H_0)

Ten dimensions were evaluated in this hypothesis as the main dimensions related to technical barriers. Variables are ranked and presented in table 4-32 along with the obtained mean score by using Friedman test.

Table 4-32: Ranking of technical barriers indexes

Ranking	Mean rank	Considered index
1	7.66	Poor infrastructures of IT
2	7.50	Lack of users' knowledge about ICT
3	7.83	Internet lines' speed in banks
4	7.45	Insufficient number of specialists in bank
5	7.16	Low quality of bank's specialists' technical knowledge
6	6.44	Inappropriate broadband Internet lines
7	6.23	Low number internet service providers
8	5.59	Limited and low access of bank branches to web
9	5.33	Bank officials' familiarity with the structure and function of mobile banking
10	4.29	Lack of sufficient software and hardware facilities

Analysis of the considered indexes in the dimension of technical barriers revealed that poor infrastructures of IT have the highest rank among the other indexes. Besides, Bank officials' familiarity with the structure and function of mobile banking as well as lack of sufficient software and hardware facilities have the lowest ranks among the all indexes set forth in the dimension of technical barriers.

Finally, 28 indexes were classified in order of rank and the related barrier in the following table:

Related barrier	Index	Rank
environmental	Inappropriate broadband Internet lines	1
environmental	Organization of ICT management	2
Cultural-social	Development costs of satellite and computer	3
Cultural-social	Low number internet service providers	4
environmental	Financing the investment in telecommunications infrastructure	5
administrative	Covering costs of connection to web	6
administrative	Fear of dependence on other rudiments for utilizing technology and knowledge of mobile banking	7
technical	Limited and low access of bank branches to web	8
Cultural-social	Bank's senior managers' strategic view and long-term planning	9
administrative	Bank officials' familiarity with the structure and function of mobile banking	10
technical	Cross-sectoral coordination	11
technical	Covering the costs of upgrading networks	12
technical	Lack of funding	13
technical	Lack of sufficient software and hardware facilities	14
technical	Inappropriate broadband Internet lines	15
administrative	Organization of ICT management	16
financial	Development costs of satellite and computer	17
technical	Low number internet service providers	18
financial	Financing the investment in telecommunications infrastructure	19
financial	Covering costs of connection to web	20
Cultural-social	Fear of dependence on other rudiments for utilizing technology and knowledge of mobile banking	21
technical	Limited and low access of bank branches to web	22
administrative	Bank's senior managers' lack of strategic view and long-term planning	23
technical	Bank officials' familiarity with the structure and function of mobile banking	24
administrative	Cross-sectoral coordination	25
financial	Covering the costs of upgrading networks	26
financial	Lack of funding	27
technical	Lack of sufficient software and hardware facilities	28

Discussion and Conclusion

According to the research findings, environmental barriers have the greatest impact among the establishment barriers of mobile banking in Keshavarzi bank branches in West Azerbaijan. In order to minimize the environmental barriers, it is necessary that managers and experts of Keshavarzi bank branches in West Azerbaijan firstly raise the network security to the required standards for establishment of mobile banking; of course, desirable level of network security greatly affects clients' trust, which is an important factor for removing environmental barriers. The client needs a sense of trust in order to carry out monetary transactions through mobile banking. On the other hand, simple, reliable, efficient and smooth technologies can greatly affect fostering a sense of trust in bank's clients. In addition to what was mentioned, the bank needs to minimize the environmental barriers by formulating and implementing appropriate guidelines and procedures.

Following environmental barriers, cultural-social barriers have the most impact among the establishment barriers of mobile banking in Keshavarzi bank branches in West Azerbaijan. In the dimension of cultural-social barriers, it was demonstrated that stakeholders' awareness of the benefits of mobile banking has the

highest rank among other indexes. For this purpose, it is suggested that stakeholders' awareness can be raised by proper advertising. Accomplishing this important matter requires culture building and all-out attempt for providing the cultural context for development of mobile banking in Wesr Azerbaijan.

Administrative barriers are rank third in terms of impact on establishment barriers of mobile banking in Keshavarzi bank branches in West Azerbaijan. In the dimension of administrative barriers, it was demonstrated that transfer and change of managers and decision makers has the highest rank among indexes of administrative barriers. This shows that strategic planning is necessary in e-banking, which seems to outline the best strategic path towards 20-year outlook. Besides, as it is seen, bank's senior managers' strategic view and long-term planning is considered one of the important indexes in administrative dimension. Thus administrative stability and setting logical time intervals can be further considered by the officials for promoting activities and operations.

Technical barriers are rank fourth in terms of impact on establishment barriers of mobile banking in Keshavarzi bank branches in West Azerbaijan. In the dimension of technical barriers, it was demonstrated that poor infrastructures of IT as well as lack of users' knowledge about ICT and bank officials' familiarity with the structure and function of mobile banking have the highest rank among other indexes of this dimension. It is suggested that bank's managers and experts improve IT infrastructures to remove technical barriers, and take measures to raise users' knowledge about IT and bank's officials' familiarity with structure and function of mobile banking. Finally, there are financial barriers, and in this dimension, development costs of satellite and computer networks have the highest rank among other indexes. Attracting private sector investments as well as foreign investments surely can resolve this matter in banking system towards development of mobile banking.

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