

A Model for Online Banking Services Quality by Behavioral Adoption Theories

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Abstract: The rapid spread of technology has made the Internet the best channel to provide banking services and products to customers. Banks now consider the Internet as part of their strategic plan. It will revolutionize the way banks operate, deliver and compete, especially because the competitive advantages of traditional branch networks are eroding rapidly. This paper provides a model based on different service quality models and theories such as Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB). As a result, the quality of online banking services has become a major area of attention among researchers and bank managers due to its strong impact on business performance, lower costs, customer satisfaction, customer loyalty and profitability. This paper provides a model with 7 factors on the following dimensions: convenience, accessibility, accuracy, security, usefulness, bank image and web site design. Some of these factors have a significant statistical difference between males and females. These dimensions are determinants of customer's quality perception in e-banking services and this paper presents new directions in a service quality research and offers new directions to researchers and managers in providing service quality improvement and enable management to identify quality problems and help them plan the launch of a quality improvement program, thereby improving the efficiency, profitability and overall performance.

Key word: Behavioral adoption theories % Online banking services % Service quality

INTRODUCTION

Virtual banks or "branchless banks" are a relatively new concept used to define banks that do not have a physical location such as a branch, but offer services only through the Internet and ATMs to deposit or withdraw funds [1].

Online banking differs in many ways from traditional branch banking. One of the most notable differences concerns the connection to the bank's information processing system. Previously, customers have had a relationship with a bank's front-desk employee, who has had access to the bank's information system.

In online banking, customers have direct access to a bank's information system from home, work, school, or any other place where a network connection is available. In this new situation, the customer is defined as an end-user of the bank's data processing system. In end-user computing, the user's personal computer plays a pivotal role [2].

An Online Banking User Performs at Least One of the Following Transactions Online:

- ☒ Check account balance and transaction history.
- ☒ Pay bills.
- ☒ Transferring funds between accounts.
- ☒ Request credit card advances.
- ☒ Order checks.
- ☒ Manage investments and trade stocks.

From a bank's perspective, using the Internet is more efficient than using other distribution mediums because banks are looking for an increased customer base [3].

Behavioral Adoption Theories: The following sections provide an overview of behavioral adoption models, note similarities and differences between them and discuss each theory. The theories discussed are Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB) and Technology Acceptance Model (TAM).

Table 1: Delivery platforms for electronic banking

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

These models follow the Attitude-Behavior paradigm that suggests that actual behavior is declared through intention toward the behavior. Intention is influenced by attitude and subsequently salient beliefs influence attitude [4].

Electronic Banking Services: Electronic banking is a wide range concept and included several ways of accessing to banks via an electronic channel like a computer, television, mobile phone or ATM. Internet banking is the most used type of Electronic banking.

Burr (1996) describes electronic banking as an electronic connection between bank and customer in order to prepare, manage and control financial transactions.

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

Moreover, PC Home Banking allows customers to do their banking services only on PCs that have been installed the assigned software package, such as Quicken and Microsoft Corp.'s Money [5].

Online Banking in Iran: The trend of developing and expanding IT throughout the world, especially in a developed country on the one hand and commercial relationships between countries and nations on the other hand, have prompted Iranian banks to undertake widespread and extensive activities in line with applying computer systems in their banks in 1980s and 1990s.

With this trend, consumers' knowledge and awareness has been enhanced regarding automated banking operations by gradually expanding access to the Internet and of PCs.

As a result, Iranian commercial banks consider electronic banking among their future planning, along with improving their methods and movement toward modern banking [6].

Movement toward electronic banking is an ambiguous and unstable step without first creating its infrastructure. Electronic banking will only be able to move and secure a stable position with an integrated and comprehensive software and hardware system [7].

Activities and measures banks are making to prepare a comprehensive integrated automation plan indicate that banks have also realized the need to provide infrastructure with a comprehensive and integrated automation system. At present, creating an integrated, comprehensive automation plan is at the top of the banks' agenda in order to move toward developing modern banking. After implementing these plans, the banks will enjoy the readiness required for electronic banking.

Electronic Banking in Other Countries: Through a review of the literature, this section describes the degree to which Internet banking as been adopted in countries of the world.

Electronic Banking in Estonia: The first Internet bank in Estonia was introduced in 1996. Estonia has a relatively high penetration of personal computers and Internet access, with 45 percent of the Estonian population (ages 15-74) being Internet users.

In one of the most thorough comparisons of Internet penetration and Internet banking penetration conducted, Estonia and Scandinavian countries show similar patterns: 50% or more of internet users have adopted electronic banking.

Estonia, however, clearly stands out as an extreme case among Central Eastern European (CEE) countries. While one in four active Internet users in Europe also uses an Internet bank, 57% of the active Internet users in Estonia are also Internet bank users. This indicates that, in the case of Estonia, background features other than Internet penetration also play an important role in adopting Internet banking [8].

Electronic Banking in Taiwan: For several years, commercial banks in Taiwan have tried to introduce Internet-based e-banking systems to improve their operations and to reduce costs. Despite their efforts aimed at developing better and easier Internet banking systems, these systems have remained largely unnoticed by the customers and certainly were underused in spite of their availability.

In 2002, only about 33% of banking transactions in Taiwan were conducted via the Internet. A total of 1.25 million Taiwanese people reported having ever visited Internet banking sites in May 2002.

A need exists, therefore, to understand users' acceptance of Internet banking and to identify the factors that can affect a consumer's intention to use Internet banking. This issue is important because the answer holds the clue that will help the banking industry formulate marketing strategies to promote new forms of Internet banking systems in the future [9].

Electronic Banking in Turkey: Based on research of Turkish internet banking users, the selection of an Internet banking service provider is effected by security, reliability and privacy. The researchers identify three segments underlying the selection of the bank: (1) "speed seekers" (who view download speed, transaction speed, user-friendliness of the site and privacy); (2) second, "cautious users" (who value the reliability of the bank, security of the Internet branch, variety of services offered and loyalty) and (3) "exposure users" (who are more open to the influence of external factors such as advertising and suggestions from others).

Turkish customers have been found to be satisfied with the Internet banking services they use, with those who have more experience with Internet banking and use more of its services as being more satisfied and more likely to make recommendations to others [10].

Electronic Banking in China: In 1997, China Merchants Bank was first to launch the Internet payment system in China. Thereafter, Internet banking and telephone banking systems spread rapidly within mainland China. Chinese domestic banks are confident that electronic banking benefits will outweigh traditional banking services in the future. They are therefore eager to implement new technologies and services to penetrate the market and gain competitive advantage. Most retail banks in China now provide online banking as add-on services to the existing branch activities, while mobile banking is just starting to be implemented.

One barrier that prevents active online trading in mainland of China is the lack of regulation. Chinese consumers might be more concerned, therefore, about the risks of new and unfamiliar technology-based financial services, such as online and mobile banking [11].

Research Method: Among the research studies in which the coordinate matrix or covariance is analyzed, authors can point to factor analysis or Structural Equation Modeling (SEM), which has been used in this research.

In factor analysis, the goal is to summarize data or reach the latent variables. In structural equation modeling, the goal is to test the structural relationships in compliance with existing research theories and findings.

After pretesting and obtaining experts' and authorities' viewpoints, the completed questionnaire for this study was placed in the Web site of some of the banks and the FABACenter¹ to reach users of electronic banking services (ATMs, telephone bank, Internet banking).

For a final evaluation of the questionnaire, we applied the Cronbach's alpha method and the split-half method.

In this research, the independent variables are electronic service quality factors including convenience, accessibility, accuracy, security (privacy), usefulness, bank management and image and Web site design (design/content/speed). The customers' satisfaction with electronic banking services in Iran has been taken into consideration as a dependent variable.

The main objective of this research is to identify the factors effective in helping consumers feel satisfied with the electronic banking services in Iran.

Structural equations have been compared using ANOVA statistical testing of the average of the mark given to each factor among males and females.

Reliability: In part 1 of the total reliability of the questionnaire was calculated and as you see in the following table the calculated coefficient is 95%. And this is a very suitable number for our 50-item questionnaire and this indicates the high reliability of the questionnaire. Cronbach's Alpha has been calculated by SPSS software. This quantity ensures us the calculated results can be generalized.

For calculation of the coefficient of Cronbach's Alpha we must at first calculate the variance of the marks of each subdivision of the questions of questionnaire and total variance. Then we can calculate the quantity of Alpha coefficient through using the following formula:

¹A center for enhancing teaching and culture for e-banking in Iran

$$r_a = [J / (J-1)] \cdot [1 - (\sum S_j^2) / S^2]$$

And in this Formula:

J : Number of subdivision of the questions of the questionnaire or test:

Sj² : Variance of the subtest of j

S² : the total variance of the test

At the second stage Alpha has been the alpha has been calculated for various parts of the questionnaire. This part shows how consistent the questionnaire is concerning each factor. In all the parts the reliability is over 70% but in part 1 which seems to be acceptable in view of its percentage of 67% and it will not create any problem in the reliability of the results.

Analysis and Results: After collection of the data in this research the authors have used such software's such as Smart-PLS and SPSS for analysis the data:

Demographic Specifications: Because the general specifications of the sample group are important in survey studies, we now describe the specifications of our survey as measured by age, gender and education.

Among the respondents, 67% are male and the rest, namely 33%, are female. The frequency of males is therefore higher than females.

The frequency related to the respondents' education shows 10% have a high school diploma or lower, 30% have a Bachelor's degree, 46% have a Master's degree and 13% have a Ph.D.

In terms of the frequency with which respondents used electronic services provided by banks, the highest number of respondents have used the electronic services of Melli Bank followed by Mellat Bank, then Saman Bank.

Among the private banks, Saman Bank held the first rank in terms of the highest number of users who accessed electronic services.

Structural Equations Model: To test this research study's model, we have used data analysis with the help of structural equation modeling (SEM). Modeling of structural equations means creating a statistical model for the study of linear relations between latent (unviewed) variables and evident (viewed or observed) variables. In other words, structural equation modeling is a powerful statistical tool that combines a measurement model (affirmative factor analysis) and the structural model (regression of path analysis) into one statistical synchronic test.

Fitness and Appropriateness of the Model: Several criteria are used in the Smart-PLS for this work. One of the indices is reliability, a scale that measures the degree of confidence in the results. Reliability is measured by Cronbach's alpha, which is an outstanding method for assessing the reliability of a coefficient.

Cronbach's alpha is a coefficient of reliability and adjustment and measures the internal adjustment of the model. In other words, Cronach's alpha measures how well a set of viewed variables describe a latent structure.

As you see in (Table II) Cronach's alpha is high for all the factors (higher than 0.7). This indicates that the questions raised in each part of the questionnaire satisfactorily meet the required reliability and are suitable for measuring the factors. This enhances the degree of confidence in the results.

On the other hand, the composite reliability index, which is also higher than 0.7 for all factors, indicates that each factor has been appropriately described based on the evaluation and measurement questions. Composite reliability indicates how well each structure has been described by the viewed and observed variables. Quantities higher than 0.7 express how well the concerned structure has been described by the observed and viewed variables. In view of these results, the reliability of the data is confirmed.

Validity of Structure: Validity of the structure is another important item in analyzing structural equations and correlations among factors. A higher the degree of correlation indicates the questions were answered consistently and viewpoints coordinated. It is evident that the more coordinated the results, the more the results can be trusted and and inference and decisions made in view of the data.

At this stage, we used discriminate validity to study the structure validity. We used average variance extracted (AVE) between the factors. In this state, if the correlations between the factors are lower than the root *f*, this quantity the discriminate validity is confirmed. Structure validity is measured with the help of AVE, which must be higher than 0.5 or there about.

The last row in (Table II) is very important because it compares the relationship of the satisfaction variable with the seven other factors. As you see in (Table II) the factors 3th, 6th and 7th (accuracy, bank image and web site design) have the highest correlation with the satisfaction factor. On the other hand, the 4th factor (security) has the lowest correlation with satisfaction.

Table 2: The Coefficient of Cronbach's Alpha separated for each of the factors

Factors	AVE	Composite Reliability	Cranach's Alpha
F ₁ : Convenience	0.489825	0.760396	0.586442
F ₂ : Accessibility	0.504489	0.800467	0.671166
F ₃ : Accuracy	0.577323	0.872179	0.821306
F ₄ : Security	0.431697	0.866889	0.827697
F ₅ : Usefulness	0.451801	0.827976	0.749741
F ₆ : Image	0.412257	0.826504	0.75919
F ₇ : Website Design	0.421609	0.84942	0.796964
Satisfaction	0.348535	0.7684	0.646035

Table 3: Correlation between the factors

	F1	F2	F3	F4	F5	F6	F7	Satisfaction
F1	1							
F2	0.536859	1						
F3	0.54919	0.701055	1					
F4	0.436257	0.511105	0.572576	1				
F5	0.378325	0.414409	0.570732	0.450459	1			
F6	0.439815	0.591374	0.617246	0.437817	0.543574	1		
F7	0.556057	0.556533	0.611803	0.521874	0.579758	0.653871	1	
Satisfaction	0.564327	0.671489	0.712344	0.484801	0.640428	0.732133	0.720443	1

In (Table III) the quantities that have been placed in the diameter are the root of AVE. In view of the fact that they are higher than their identical pillar correlations, the validity of the factors is confirmed.

Measurement Equations: Measurement equations show how the factors are hypothesized through the questions. Furthermore, when we use the coefficient, the quantity of coefficient in the equation indicates the importance of the question. In other words, if the coefficient of the second question in the equation is higher than the other coefficients, this indicates the second question is a more important measurement of the factor. It also indicates the information load of this question is more than other questions.

If there is a question whether the fact that all respondents have chosen a particular choice in the same manner, we can say that this question has no information load.

$$Fac_1 = (0.64 * Q_{1-1}) + (0.67 * Q_{1-2}) + (0.10 * Q_{1-3}) + (0.67 * Q_{1-5})$$

For instance, in the said example, the effect of the question Q1-3 (in proportion to other variables) on the first factor is very little. On the other hand, if a person chooses the choice, "I greatly agree" in the first two questions and chooses the choice, "I agree" in the two succeeding questions, this person's opinion regarding the first factor is equal to:

$$Fac_{1score} = (0.64 * 5) + (0.67 * 5) + (0.10 * 4) + (0.67 * 4)$$

Other Measurement Equations Are as Follows:

$$Fac_2 = (0.64 * Q_{2-1}) + (0.67 * Q_{2-2}) + (0.10 * Q_{2-3}) + (0.67 * Q_{2-5})$$

$$Fac_3 = (0.63 * Q_{3-1}) + (0.70 * Q_{3-2}) + (0.76 * Q_{3-3}) + (0.69 * Q_{3-5}) + (0.71 * Q_{3-6})$$

$$Fac_4 = (0.59 * Q_{4-1}) + (0.76 * Q_{4-10}) + (0.88 * Q_{4-2}) + (0.71 * Q_{4-3}) + (0.79 * Q_{4-4}) + (0.72 * Q_{4-5}) + (0.80 * Q_{4-6}) + (0.84 * Q_{4-7}) + (0.32 * Q_{4-8})$$

$$Fac_5 = (0.88 * Q_{5-2}) + (0.80 * Q_{5-3}) + (0.50 * Q_{5-4}) + (0.67 * Q_{5-5}) + (0.70 * Q_{5-6}) + (0.93 * Q_{5-7})$$

$$Fac_6 = (0.69 * Q_{6-1}) + (0.62 * Q_{6-2}) + (0.62 * Q_{6-3}) + (0.44 * Q_{6-5}) + (0.50 * Q_{6-6}) + (0.73 * Q_{6-7}) + (0.69 * Q_{6-8})$$

$$Fac_7 = (0.68 * Q_{7-1}) + (0.67 * Q_{7-2}) + (0.53 * Q_{7-3}) + (0.68 * Q_{7-4}) + (0.55 * Q_{7-5}) + (0.74 * Q_{7-6}) + (0.64 * Q_{7-7}) + (0.50 * Q_{7-8})$$

Structural Equations: The coefficients of the path or in fact the coefficients of the equation of satisfaction factor on the 7 factors are as follows:

	1st factor	2nd factor	3rd factor	4th factor	5th factor	6th factor	7th factor
Satisfaction	1.03	1.06	0.78	0.29	0.54	0.65	0.55

It is very evident that the 1st factor (convenience) and the 2nd factor (accessibility and availability) play a more important role than other factors for satisfaction. On the other hand the 4th factor (Security) is not regarded as an important factor to the customers.

Test of Coefficients: If a coefficient is assessed in the statistics that coefficient must be tested and we can the model with its coefficient if that test of the coefficients indicates a number other than 0 for that coefficient. In structural equations we have 7 coefficients which have been displayed in the following table along with the quantity of (*T*). For each coefficient we have hypotheses as follows:

$$\begin{cases} H_0 : \text{Coef}_{F1} = 0 \\ H_1 : \text{Coef}_{F1} \neq 0 \end{cases}$$

It is evident that if the number of the statistical item *T* is higher than 1,96 the supposition of 0 is rejected. As a result coefficient is significant in terms of statistical considerations. But if the supposition of 0 is not rejected for a coefficient it means that in terms of statistics this coefficient is 0 and its identical factor will play no role in the equation.

In view of the fact all the coefficients are higher than 1.96 all the coefficients are effective on satisfaction.

Concerning the coefficients of structural equations there is also such a test and we refrain from presenting the table here due to the big size of the table.

But briefly speaking, the following questions are not effective on the said factor.

Q₁₋₃ 6 Fac₁

For example if we refer to structural equations the quantity of this coefficient in the equation is very little in proportion to other coefficients.

Q₄₋₉ 6 Satisfaction

Other coefficients are statistically significant.

Table 4: Test of coefficients of latent factors

Factors	T Statistics
Fac ₁ , convenience	8.7
Fac ₂ , accessibility	14.6
Fac ₃ , accuracy	16.3
Fac ₄ , security	6.7
Fac ₅ , usefulness	13.8
Fac ₆ , bank image	18.4
Fac ₇ , Web site design	15.8

CONCLUSION

According to this study, which was conducted for the first time in Iran, we see that those who use electronic banking services in Iran have a higher educational background. This indicates that those with less education use the bank's electronic services less than the educated people do.

Moreover, according to the findings the greatest number of the users of electronic services is the customers of governmental banks (Melli Bank and Mellat Bank). The third rank went to a private bank named Saman Bank. This could be due to customers having more confidence in governmental banks in Iran.

After calculating the variance average between factors (AVE), we found that the factors of accuracy, reliability, image, impression of the bank and management and Web site design are most correlated with satisfaction. The factors of security and privacy had the least correlation with satisfaction. This might also be due to the confidence customers have in electronic banking services, especially in governmental banks.

According to the results, some of the factors such as convenience, security and usefulness in conducting financial affairs did not show a great difference between males and females.

Regarding the factor of availability, however, the results did exhibit a difference between males and females. Availability appears to be easier for females.

According to the results gained for accuracy and reliability, males are more suspicious of electronic banking. In terms of the bank's image or impression, females had a better image and impression of the banking than did males.

Finally, we should say that no difference was observed in general satisfaction with electronic banking between males and females.

REFERENCES

- Haghighinasab, K., 2009. Acceptance of electronic banking services based on DTPB model for the customers of Mellat Bank and Saman Bank in Tehran. Approved paper for Banking Services Marketing International Conference, Tehran, (In Farsi)
- Hsu, M.H., C.H. Yen, C.M. Chiu and C.M. Chang, 2006. A longitudinal investigation of continued online shopping behavior: An extension of the theory of planned behavior, International J. Human-Computer Studies, 64(8): 889-904.

3. Johnson, S.E. and A. Hall, 2005. The prediction of safe lifting behavior: An application of the theory of planned behavior, *J. Safety Res.*, 36(X): 63-73.
4. Laforet, S. and X. Li, 2005. Consumers' attitudes towards online and mobile banking in China, *International J. Bank Marketing*, 23(5): 362-380.
5. Ozdemir, S. and P. Trott, 2009. Exploring the adoption of a service innovation: A study of Internet banking adopters and non-adopters, *J. Financial Services Marketing*, 13(4): 284-299.
6. Pikkarainen K., K. Tero, X. Heikki and S. Pahnla, 2006. The measurement of end-user computing satisfaction of online banking services: Empirical evidence from Finland, *International J. Bank Marketing*, 24(3): 158-172.
7. Sayar, C. and S. Wolfe, 2007. Internet banking market performance: Turkey versus the UK, *International J. Bank Marketing*, 25(3): 122-141.
8. Sadeghi, T., 2004. Examining the obstacles of formatting electronic banking in Iran, Master's Thesis, Allame Tabatabay University (in Farsi).
9. Safarzadeh, F., 2009. The examination of behavioral factors that influenced on traditional customers to adopt Internet banking, Approved paper for Banking Services Marketing International Conference, Tehran, (in Farsi).
10. Seth, N., S.G. Deshmukh and P. Vrat, 2004. Service quality models: A review, *International J. Quality and Reliability Manage.*, 22(9): 36-51.
11. Sohail, M. Sadiq, T. Shanmugham and A.A. Balachandran, 2002. E-banking and customer preferences in Malaysia: An empirical investigation, *Information Sci.*, 150(7): 207-217.