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Measuring Banks' Automated Service Quality: A Re-Examination and Extension in an Islamic Country

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Abstract: This study seeks to discover the answer to this question by reviewing the literature and other studies in Iran and other countries: What factors are the main factors in customer satisfaction of electronic banking services in Iran? The main objective of this paper is investigating and studying the most important factors in the field of e-banking services in a islamic country and customer 's evaluation of the electronic banking services. The authors validate a measurement model for customer satisfaction evaluation in e-banking service quality 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). This paper provides a model with 7 factors on the following dimensions: convenience, accessability, 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.

Key words: Electronic banking · Customer satisfaction · Customer service quality · Service quality models

INTRODUCTION

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. A report from Booz Allen and Hamilton, for example, claims that the Internet poses a very serious threat both to the customer base of the traditional banking oligopoly and to its profits [1].

Customers now demand new levels of convenience and flexibility in addition to powerful and easy to use financial management tools, products and services that traditional retail banking cannot offer. Internet banking has allowed banks and financial institutions to provide these services by exploiting an extensive public network infrastructure [2].

As a result, the quality of electronic banking services (e-banking) 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 [3].

This paper presents a conceptual model that attempts to show the relationships that exist between salient variables. It is a simplified description of the actual situations. Conceptual models in service quality 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 [4].

Due to cultural and environmental effects, consumers in different countries have different perception of what service quality is. Thus, managers who seek to develop service standards may not succeed unless they are aware of the value of environmental differences between countries in terms of economic development, political ideology, cultural value system and other culture-specific factors.

This study seeks to recognize the factors that can affect service quality perceptions in the e-banking sector by constructing a model to measure the quality of e-banking services in Iran.

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Online Banking: 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 [5].

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 [6].

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 [1].

People are becoming more comfortable with banking online and they believe that it will become necessary for all community banks to offer online-banking services. Esser in 1999 and Simpson in 2002 noted that the benefits of e-banking include: (1) competitive advantage, (2) customer retention and attraction, (3) increased revenues, and (4) reduced costs [7].

Ebanking 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 [8].

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 [9].

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.

Behavioural Adoption Theories: The following sections provide an overview of behavioral adoption models. Theories such as Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM).

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 finally salient beliefs influence attitude. Davis [11] introduced TAM as an extension of the TRA but with more focus on computer usage context [12].

The Theory of Planned Behavior (TPB) is an extension of the Theory of Reasoned Action (TRA) to explain computer usage behavior [13].

Theory of Reasoned Action (TRA): Many technology adoption research studies have used theory. According to this theory, an individual's intent to adopt an innovation is influenced by his attitude toward the behavior and subjective norm. Subsequently, a person's behavior is determined by his intention to perform the behavior. The attitude toward performing the behavior is an individual's positive or negative belief about the performing the specific behavior. In fact, attitudes are comprised of the beliefs a person accumulates over his lifetime.

These beliefs are created from experiences, outside information, or from within the self. Only a few of these beliefs, however, actually influence attitude.

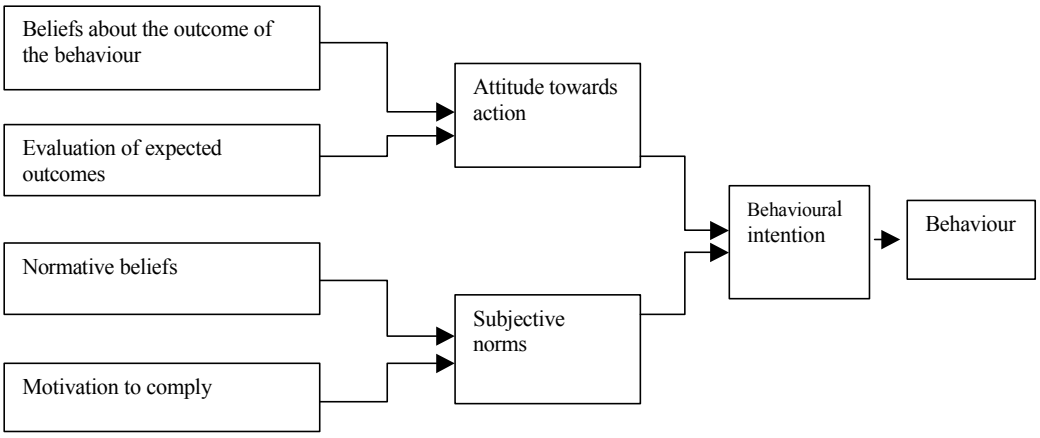

Fig. 1: A Theory of Reasoned Action (TRA) model
Source: Yahyapour (2008)

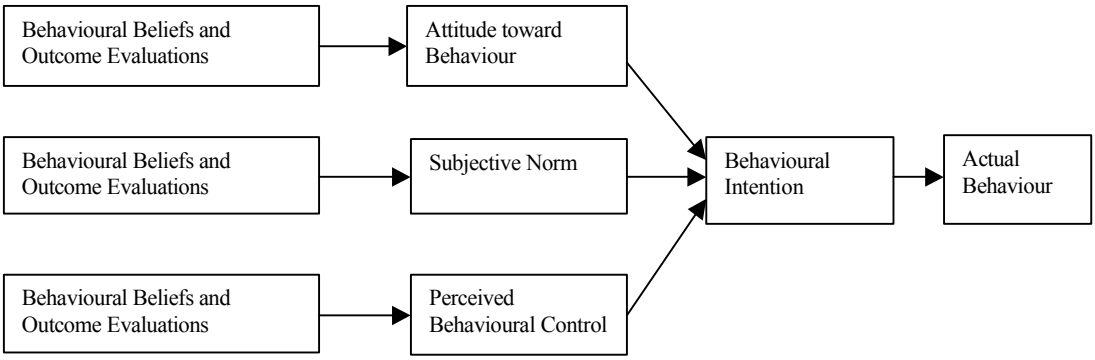

Fig. 2: The Theory of planned behavior (TPB) Model
Source: Yahyapour (2008)

Subjective norm is beliefs about what others will think about the behavior; in other words, the perceived influences of social pressure on an individual to perform or not perform the behavior. "The person's belief that specific individual or groups think he should or should not perform the behavior and his motivation to comply with the specific referents [14].

Fishbein in 1980 proposed that variables not included in the model can affect intention and then behavior.

The Theory of Planned Behaviourr (TPB): The Theory of Planned Behavior (TPB) is one of the most widely used models in explaining and predicting individual Behavioral Intention (BI) and acceptance of IT.

TPB is an attitude–intention–behavior model, which posits that an individual's behavior is determined by perceived behavioral control and intention. A attitude, subjective norm and perceived behavioral control, in turn, determine intention.

The TPB proposed that an individual's intention to perform an act is affected by his attitude toward the act, subjective norms and perceived behavioral control [13].

According to TPB, an individual's behavior is determined by BI and perceived behavioral control and BI is determined by attitude toward behavior (A), subjective norm (SN) and perceived behavioral control (PBC). Attitudes toward behavior reflect one's favorable or unfavorable feelings of performing a behavior. SN reflects one's perception of others' relevant opinions on whether or not he or she should perform a particular behavior. PBC reflects one's perceptions of the availability of resources or opportunities necessary to perform a behavior [17].

The Technology Acceptance Model (TAM): Researchers and practitioners have widely used the Technology Acceptance Model (TAM) to help to predict and make sense of user acceptance of information technologies [2].

TAM, introduced by Davis (DATE), adapts the TRA model, specifically to model user acceptance of information technology (IT). The goal of TAM is to explain the what determines computer acceptance capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while being both cost-conscious and theoretically justified. TAM adapted the TRA model to the domain of user acceptance of information technology, replacing the TRA model's attitudinal determinants with two beliefs: perceived usefulness and perceived ease of use. TAM was found to be a simpler, easier to use and more powerful model to uncover what determines user acceptance of IT, while both models where found to satisfactory predict an individual's attitude (satisfaction) and behavioral intention. In addition, TAM's attitudinal determinants outperformed the TRA model's much larger set of measures [15].

The two important variables in TAM are:

- Perceived ease of use (PEOU) is defined as the degree to which a person believes that using a particular system would be free of effort.
- Perceived usefulness (PU)is defined as the degree to which a person believes that using a particular system would enhance his or her performance [16].

PEOU and PU are influenced by external variables. External variables vary according to the context. Different variables have been used as external variables in TAM research, including computer anxiety, computer self-efficacy, playfulness, information richness, task characteristics and experience [17].

TAM helps senior managers responsible for offering and developing banking products on-line and information systems developers predicate users' behavioral intentions. This can lead to actual changes and modifications in people's behavior when thinking about and using Internet banking technologies. This knowledge, or at least additional insight, allows information systems developers to devise ways to make as system appear easier to use and allows banking and technology experts to develop new ways to support the needs and expectations of Internet banking customers [18].

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, Cronbach's alpha measures how well a set of viewed variables describe a latent structure.

As you see in (Table I) Cronbach'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 discriminant 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 discriminant validity is confirmed. Structure validity is measured with the help of AVE, which must be higher than *0.5* or there about.

Table 1: The Coefficient of Cronbach's Alpha separated for each of the factors

Factors	AVE	Composite Reliability	Cronbach'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 2: Correlation between the factors

	F^1	F^2	F^3	F^4	F^5	F^6	F^7	Satisfaction
F^1	1							
F^2	0.536859	1						
F^3	0.54919	0.701055	1					
F^4	0.436257	0.511105	0.572576	1				
F^5	0.378325	0.414409	0.570732	0.450459	1			
F^6	0.439815	0.591374	0.617246	0.437817	0.543574	1		
F^7	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

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 desiogn) have the highest correlation with the satisfaction factor. On the other hand, the 4th factor (security) has the lowest correlation with satisfaction.

In (Table II) 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:

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

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

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

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

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

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

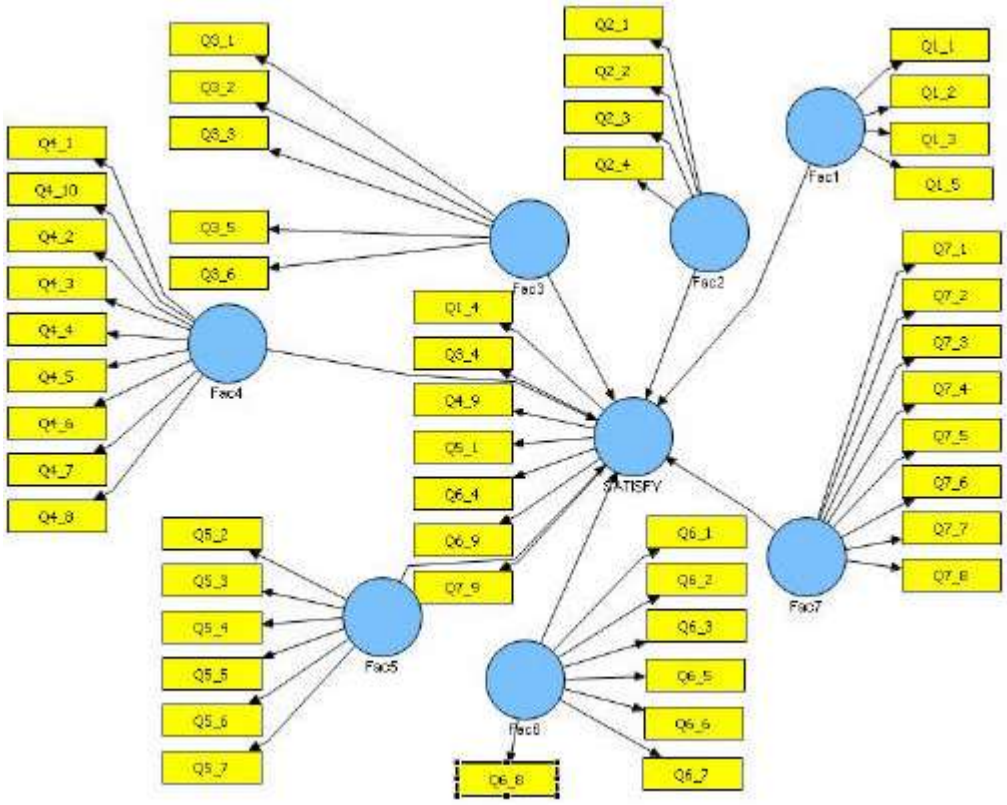

Fig. 3: Conceptual model of the research

Conceptual Model: The conceptual model of this research shows the relationship between the factors defined in this study. The conceptual model shows the relationships between the variables. The authenticity of each variable is tested with experimental data.

Figure (3) illustrates the conceptual model of the present research, which shows the relationships between the research variables.

In fact, the coefficients are the same as the coefficients of the equations. Of course, two types of coefficients are calculated in the software: standard coefficients and non-standard coefficients.

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, eespecially 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.

The more important issue is the fact that the reliability span is larger for the average and higher for females in all factors, including satisfaction. In other words, the dispersion and variety of viewpoints is higher among females than the males.

Among other results, we can highlight the relationship between the persons' higher education level and satisfaction. In view of the calculated and gained *P-value*, expectations increase with enhancements and increase among those with a higher education. Accordingly, the dissatisfaction level increases and a lower mark has been given to it.

In line with the abovementioned study we present the following suggestions:

- Because the quantity and degree of using bank's electronic services has a direct relationship with the level of education, enhancing people's knowledge and awareness can be an important factor in increasing the degree to which consumers use these services and how frequently they do so.
- Males are more suspicious of electronic banking services, therefore, there is an urgency to remove obstacles by paying attention to cultural affairs and by attracting males to use these services.

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