Designing a Model for the Evaluation of Electronic Banking Services with Combining AHP and Fuzzy ARAS Approaches (Keshavarzi Bank)

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Abstract: *The main purpose of the this research is to design a model for assessing e-banking services by combining the AHP and Fuzzy ARAS approaches. For this purpose, by reviewing the literature review, the indexes and areas were first identified by Selection of effective factors in accepting e-banking in four areas of strategic factors, technical (technological) factors, organizational factors and cultural factors. Then, using a paired comparison questionnaire, a questionnaire was distributed among a sample of 80 experts and managers of various branches in the Keshavarzi Bank in Tehran and the factors were ranked to analyze by using the fuzzy hierarchy process analysis method. According to the results, factor ranking in comparison with the main factors affecting the acceptance of e-banking in the Keshavarzi bank indicated the priority of technical factors, strategic factors, organizational factors and cultural factors. Also, in each of the following criteria, the factors were ranked. Then, using the obtained indices and the technique of the arrays of the selected branches of the bank were ranked in five districts of north Tehran, south Tehran, west Tehran, east Tehran and Tehran center. Using this technique and the importance of the experts to the questionnaire regarding factors and indicators, the results showed that the areas of Tehran's center, east Tehran, North Tehran, west Tehran, and south of Tehran, respectively, were the best.*
Keywords: *Model Design, Service Evaluation, Electronic Banking, AHP and Fuzzy ARAS*

I.   Introduction

Undoubtedly, the central role of banking systems in the functioning of economic systems is indisputable. In the industrialized countries, the role of banks has evolved rapidly over the last decade, and new tools with new technology have become available for banking services. Providing various services in the e-market and ease of accessing the required information has been the main cause of e-banking. Implementing e-banking requires a variety of infrastructures that recognizing these infrastructures and its implications and challenges when creating e-banking is a good guide for banks to achieving success. (George,A., & Kumar, 2014) There are two main reasons for the development and expansion of e-banking discussions, first reason is lots of savings that this type of banking offers, and many studies have been done to prove that e-banking is the cheapest type of banking, and second, banks in this way reducing their branches and also reducing many of their personnel through the provision of mechanized services. As a result, the main reason for accepting Internet banking is saving time and cost, and the lack of spatial and temporal constraints. The benefits of e-banking can be seen from two aspects of customers and financial institutions. From customers' point of view, it is possible to save costs, save time and access to multiple channels for banking operations. From the financial institutions view, such features are as creating and increasing the reputation of banks in providing innovation, maintaining customers despite spatial changes in banks, creating opportunities to search for new customers in target markets, extending the geographical scope of activities and setting up a perfect competition. Therefore, in the event of an error in the banking system, customer dissatisfaction is reflected in the reversal of the existing system and appetite for other banking systems and competitors. Or customers may also have negative oral advertising that will reduce the profitability and credibility of the bank.

On the other hand, the low customer confidence in providing electronic services and the lack of awareness of the active institutions with the mechanisms for attracting and retaining customers in the event of an error is another reason for the loss of customers.(Zineldin, 2006) Therefore, it is very important that, in the event of an error, the compensation strategies of the service are clearly identified and applied. In the absence of recourse to compensation by employing inappropriate compensation, the profitability of the banking system will be reduced and the banking system will face a loss of customers. Given the uncertainty and ambiguity in

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evaluating the effective factors in accepting e-banking, the present paper seeks to elaborate a model for evaluating e-banking services with a combination of AHP and fuzzy ARAS approaches in the Keshavarzi Bank.

II.   Literature review

In an investigation conducted by Ecer (2017), Mobile Banking, which integrates software, hardware, and people, is a new platform for banks, determining the function of mobile banking services helps accountants identify better policies to improve their position. The purpose of this study is to create an integrated model for evaluating banking services by combining ARAS's fuzzy analytical hierarchy process. In this study, the priority given by FAHP is aligned with the ARAS methodology for evaluating and ranking mobile banking services. In addition, in order to study the application of this proposed model, a case study is presented in Turkey. The findings show that facilitating conditions play a decisive role in the adoption of mobile banking, and consequently, self-efficacy, privacy risk and security risk are in the next ranks. As a result, the proposed model helps to overcome problems in the process of evaluating mobile banking services and increases the productivity of mobile banking services activities. A study by Laukkanen (2016) states that all innovations respond to consumer resistance and that overcoming this opposition must occur before the product is approved. Factors driving service innovation resistance remain unclear. To better understand this behavior, the present study examines how five theory-driven adoption barriers—usage, value, risk, tradition, and image – as well as three consumer demographics—gender, age, and income—influence consumer adoption versus rejection decisions in Internet and mobile banking. Data from two large nationwide surveys conducted in Finland (n = 1736 consumers) test hypotheses comparing by using binary input model. Study results find that the value barrier is the strongest inhibitor of Internet and mobile banking adoption. In addition, the image barrier slows mobile banking adoption, and the tradition barrier explains the rejection of Internet banking. Gender and age significantly predict adoption and rejection decisions. Ismail Poor and Azargoon (2016) in their study examined the role of effective factors in attracting customers of electronic banking services. According to the studies of this group, in the process of providing banking services, recognizing customer behavior and its factors in increasing the quality of electronic services is effective. To increase the quality of Internet banking services, researchers have considered several factors as effective. Response time, service scope, customer relationship, availability of financial information, ease of use, security, designing a suitable graphic environment are among the most effective factors in attracting Internet customers. According to Lin (2011), rapid advancements in mobile phone technology and devices have made mobile banking more attractive in mobile commerce and financial services. Using the theory of innovation publishing and knowledge based trust literature, this study is a research model for assessing the effect of innovative features (perceived comparative advantage, ease of use and adaptability), and knowledge based trust (ability to understand, benevolence, and integrity) on behavioral attitudes and intent about adopting (or continuing to use) banking. A mobile phone has been surveyed across potential and repeated customers based on a survey of 368 participants (177 for potential customers and 191 for repeat customers) using the structural equation modeling approach for the research model. The results show that perceived comparative advantages, ease of use, compatibility, competence and integrity significantly affect attitude, which in turn leads to behavioral intention (or continued use) of mobile banking. In addition, the results showed that attitudes toward mobile banking are different between potential and repeat customers.

Bond & Hsu (2011), in a study conducted in the banking industry in the United Kingdom, has been studying the quality of services related to accepting and applying new banking techniques, including Internet banking, among students. The results of this study indicate that the traditional and old habits of people, lack of government support, weakness of communication systems and low network speed are among the major barriers to the expansion of new banking techniques.

III.   Analysis

3-1. Analytical Hierarchy Process
3-1-1. Comparison of effective factors in accepting e-banking
In this section, we compare the factors affecting the acceptance of e-banking, which includes four criteria of strategic factors, technical factors, organizational factors and cultural factors.
3-1-2. Comparison of the sub criteria of strategic factors
In this section, we compare the sub criteria of strategic factors that include four criteria of legal issues, human resources, support of senior managers and type of needs and preferences of the customer.
3-1-3- Comparison of the sub criteria of technical factors
In this section, we compare the sub criteria of technical factors that include two criteria of cooperation and inter-organizational interaction and the efficiency and effectiveness of services.
3-1-4. Comparison of organizational sub-factors
In this section, we compare the organizational sub-factors that include three criteria for the use of Internet banking services, education and awareness and acceptance (technology acceptance).

3-1-5. Comparison of the criteria of cultural factors

In this section, we compare the sub criteria of cultural factors that include four criteria for ease of use, accessibility (availability), interoperability and maximum prevention of document data changes.

3-2. ARAS technique

In this section, after ranking and weighing the criteria, the ARAS method has been used by the ARC process to prioritize the banking centers in order to rank them. Therefore, according to the ARAS questionnaire, ranking of selected branches of Keshavarzi Bank in five areas of Tehran city in the north, south, east, west and center of Tehran was identified based on 13 factors:

1) Strategic factors (support of senior managers, legal issues, human resources, and type of customer needs and preferences)

2) Technical factors (including such things as ease of use, accessibility (availability), adaptability to existing infrastructures (interoperability), maximum prevention of document data changes

3) Organizational factors (including issues such as collaboration and inter-organizational coordination and the efficiency and effectiveness of services)

4) Cultural factors (including acceptance of technology), education and awareness of the use of Internet banking services)

Therefore, five selected branches of the Keshavarzi Bank in 5 areas of Tehran based on effective factors in accepting electronic banking are considered. For the numbering in each house, according to the severity of the criterion for each alternative, numbers 0 to 4 are used, with 0 showing the lowest degree and the number 4 showing the highest degree. According to the results and calculation in this section, the ranking of the centers based on these criteria indicates the priority of Tehran Center, Tehran East, North Tehran, Tehran West and Tehran South.

IV.   Conclusion

The main purpose of this study was to design a model for evaluating e-banking services with a combination of AHP and fuzzy ARASH approaches. To do this, by reviewing the literature review, the indexes and areas were first identified. Therefore, effective factors in accepting electronic banking were selected in four areas: strategic factors, technical factors, organizational factors and cultural factors. Strategic factors include the ability of managers to identify and understand environmental factors and issues, technological factors including the creation of new products and processes, and major technological changes, organizational factors including factors affecting how an organization works well with its environment. And cultural factors include the atmosphere in the organization to advance the goals and objectives of the organization. Each of them has sub-criteria. Strategic factors include the sub-criteria of senior management support, legal issues, human resources and the type of customer needs and preferences; technical factors include ease of use, accessibility (accessibility), adaptability to existing infrastructures (interoperability), maximum prevention of document data changes. Each of them has sub-criteria. Strategic factors include the sub-criteria of senior management support, legal issues, human resources and the type of customer needs and preferences; technical factors include ease of use, accessibility (accessibility), adaptability to existing infrastructures (interoperability), maximum prevention of document data changes; Organizational factors include such issues as collaboration and inter-organizational coordination and the efficiency and effectiveness of services and cultural factors including acceptance of technology, education and awareness of the use of Internet banking services. Then, using a paired comparison questionnaire, a questionnaire was distributed among a sample of 80 experts and managers of various branches in the Keshavarzi Bank in Tehran and the factors were ranked to analyze by using the fuzzy hierarchy process analysis method. According to the results, factor ranking in comparison with the main factors affecting the acceptance of e-banking in the Keshavarzi bank indicated the priority of technical factors, strategic factors, organizational factors and cultural factors. Also, in each of the sub criteria, the ranking of factors was made and the results in the technical factors section indicate the priority of the inter-organizational cooperation and coordination criteria and the efficiency and effectiveness of the services, respectively. In the strategic section, the results indicate the priority of human resources, the support of senior managers, and the importance of the same issues of law and the type of customer needs and preferences. In the organizational factors section, the results indicate the priority of technology, education and culture's acceptance of Internet banking services. In the cultural sector, the results also showed the same priority of ease of use and maximum prevention of database changes, after which accessibility criteria and interoperability were met. Then using the ARAS technique, the ranking of the selected branches was concentrated in five urban areas of north Tehran, Tehran, south, Tehran west, Tehran east and Tehran. Using this technique and the importance of the experts to the questionnaire regarding the factors and indices, the results showed that the priority of Tehran Center, Tehran East, North Tehran, Tehran West and South Tehran were prioritized for better areas.

4-1- Future suggestions

Future suggestions regarding the current research include the following:

1) Comparing the results with other banks

2) Use of other multi-criteria decision making techniques such as (SWARA, TOPSIS, ANP & DEMATEL)

3) Considering other variables affecting the quality of banking services such as social responsibility, quality dimensions and ...

4) Evaluation of banking performance using structural equation model approaches

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