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INTRODUCTION TO PROCESS PLANNING OF SERVICE BY USING QUALITY FUNCTION DEVELOPMENT CASE STUDY: ELECTRONIC BANKING SERVICES

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Abstract

Purpose: Today, organizations are faced with unique challenges in the customers' service sector. The current study intends to design the process of providing electronic services with the choice of electronic banking service for testing the proposed approach (using

Quality Function Deployment).

Design/methodology/approach: In this regard, a four-stage approach based on quality home design was used, which initially relates the needs of customers from bank electronic services to basic requirements of these services, and finally extends them to physical conditions and characteristics of equipment required for this category of services. The data needed in the study process were collected by the 196 customers or the QFD team and validated by content analysis.

Findings: This article is an introduction to the relations between the most important factors of service providing process design in electronic banking industry. The study discussed and supports the requirement for creating the infrastructure needed to electronic banking which is aligned with the needs of bank customers. In this case study, after performing the calculations of QFD tables, the relative weights of identified indicators were obtained. Accordingly, among the customers' needs, the need for security and information confidentiality had the utmost importance. The index of being economic had the highest priority in the Table 1. The indices of confidentiality and performance with equal weights had the best priorities in the Table 2. The indices of approving the transactions and orders and ease of use with an equal weight had the highest priorities in the Table 3. Finally, the indices of updating and systems development had the best priorities in the QFD has Table 4.

Originality/value: In this study the new way for process planning of electrical banking service has adopted to have more accurate prioritization of customer needs. The road of designing have extended from customers' needs and functions of e-banking services to the dimensions of service quality, e-banking services features and terms indicators of providing banking e- services. In fact the study seeks to explain and differentiation of the key concepts involved in the design of service process and Service designer should have special attention to prioritize of these factors.

Keywords: **Process Service Planning; Quality Function Deployment; Customer Needs; Electronic Banking Services; Service Dimensions; Features of Service; Term Indicator**

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INTRODUCTION

E-commerce development, entry to the markets or membership in organizations such as the WTO requires an efficient banking system. However, financial and credit institutions such as banks are today faced with unique challenges in designing the process of

providing services and pursue different strategies to deal with these challenges [1]. Among the various options facing the institutions, the impact of product design plays an important role in the effectiveness and quality [2]. Service design helps to identify the strategic objectives of the organization and customers' needs and apply them in services [3]. Considering this as well as the importance of the development of e-banking systems, the current study intends to design the process of providing electronic services with case study in banking industry and based on Quality Function Deployment (QFD). In fact, this paper aims to explain and breakdown effective key factors in designing service providing process which designer teams should have especial attention to prioritization of them to ensure customer needs are fulfilled.

Significant advances in the field of information and communication technologies in recent decades have evolved all aspects of human life, and today, new concepts such as e-government, e-commerce, e-banking, insurance and e-learning have become an integral part of life. More than anything, the technology has affected the areas of trade and business, and in the meantime, the banking industry has experienced significant change as far as by increasing use of advanced information and communication technology systems in the banking industry and moving toward electronic banking, many of the traditional banking activities have been outdated, and this field has turned to the industry of information processing [4].

Experts in management have enumerated the customer satisfaction among the most important tasks and priorities of organizations management and considered the necessity of constant and sustainable commitment of senior managers to provide customers' satisfaction as the main precondition for success [5]. Customers' satisfaction in the first place requires identifying their needs and demands and then transferring these demands into a situation that goods and services are produced. Due to the increasing complexity of economic, social and cultural systems, this would not happen spontaneously, but requires systematic approaches and procedures to turn these concepts into an organizational process [6].

However, changing the demands, needs and expectations of customers is an undeniable fact. Thus, it should be first determined what the customer really wants, and then, the efforts would be made to realize them. For the same reason, every day, new management techniques are introduced to gain competitive advantages with a customer-oriented perspective. In the meantime, one of the most important quality management techniques is Quality Function Deployment (QFD) technique that allows interaction between manufacturing, marketing and sales sections. As one of the modern methods of quality engineering, QFD starts from the market research and identification of the product customers. In its analysis process, meanwhile identifying the needs and requirements of customers, it tries to include them in all stages of design, production and control.

Indeed, customers are not only buyer of a good or service any more but also they are active and affective members in all business activities [7].

Given that applying customers' demands in the process of providing services would play an important role in the success of service organizations such as banks, the following questions may be faced by a designer of service process:

- What is the priority and significance of customers' demands from the perspective of the recipient and the service provider?
- Do these two perspectives significantly differ or they are highly similar?
- How can lead from the needs and expectations of customers to the terms providing services through designing quality houses?

THEORETICAL BASICS AND RESEARCH LITERATURE

The dramatic developments in the banking system can be divided into four periods. Each course of evolution has made it possible for the banking system administrators to minimize the wasted times in the competitive environment and deliver a higher range of services while increasing the speed, quality, accuracy and variety of provided services [8]. These periods are as follows:

1. First period: Automation behind the counter
2. Second period: Automation in front of counter
3. Third period: Connecting customers to the accounts
4. Fourth period: Systems integration and connecting the customer to all banking operations [9]

According to Guraau [10], electronic banking has many benefits for customers, companies and the banks as well, which are summarized in Table 1.

Table 1: Benefits of electronic banking for banks, costumers and companies [10].

Banks	Costumers	Companies
Increased market penetration	Reduced cost of access and use of banking services	Reduced available cost and use of banking services
Improved information management	Increased comfort and saving time	Fast and continuous access to information
Implementation of new technologies	Better management of cash	Increased comfort and saving time
Reduced transaction costs	Variation in service used	Speed up transactions
Responding faster and better to the market changes and evolving		Better management of cash
Use of the Internet to advertise and		

selling new financial product		
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Providing electronic financial services and the entry of banks into electronic markets seems to be inevitable. In the financial services market, growing environmental competition has caused a necessity to take advantage of new channels of service delivery. The newest channel of providing service in the banking industry is electronic banking. The role and sensitivity of financial and credit management and providing services tailored to different needs of the major segments of the society are as macro objectives of today's policy-makers of our country, Iran. Electronic banking services combine available different banking channels together. As a result, information management and customer relationship management would improve, which are associated with customer satisfaction, cost savings and generating more revenue for banks [11]. To succeed in the competitive banking industry, banks need to provide services with high quality to their customers. This needs to determine indicators that the customers use for quality assessment of systems providing electronic banking services. Considering these measures, the banks can take steps necessary to promote and improve the services provided and upgrade the systems proving electronic banking services [12].

Unlike traditional transactions, electronic banking uses different channels to deliver services to improve efficiency and competitiveness. Direct and fast impacts of e-banking on customer relationships cause increased speed and efficiency and reduced costs of banking, and its long term advantages include building trust, commitment and satisfaction in customers.

Wu et al. have acknowledged the rapid growth of e-services markets and considered the e-commerce and marketing activities of electronic services effective on increasing customers' understanding of such services. In their study, they introduced variables influencing customers' expectations of e-services as factors, including ease of use, speed of transaction, non-failure of equipment and non-disruption of site, 24-hours availability and non-sharing of personal information with other sites.

Analyzing the literature of articles published in the past three decades regarding the needs and expectations of users for acceptance and use of electronic banking channels, Hoehle et al. [13] could introduce the most important influential indicators in this context, including issues such as compatibility with consumer values and culture, being economic, access and comfort, being attractive, privacy issues, reliability and the security. Liao et al. [14] identified and measured consumer attitudes about the usefulness and willingness to use e-banking. The results suggest that the users' expectations about accuracy, safety, transaction speed, being user-friendly, users' involvement and ease of use are as the most important quality attributes of perceived usefulness of Internet-based electronic banking.

Joseph et al. [15] examined the satisfaction level of banking related to implementing technologies on providing new services in UK's banking industry. In this regard, after identifying the needs, demands and expectations of customers, they could categorize the factors into four categories of reliable and accurate banking services, customer services,

personalization services and detailed records by using exploratory factor analysis.

In 2009, Agarwal et al. [16] realized the need to determine the factors influencing customers' satisfaction with electronic banking services in the emerging economies (in development) such as India and performed a study among the customers in the northern part of India. According to the study results, factors such as security, reliability, speed of transaction, ease of use, easy access, being user-friendly and access to the latest information were identified as factors affecting customers' satisfaction with e-banking services.

Narteh [17] identified factors such as the availability of e-banking services, image of the bank and quality of perceived services as those effective on bank customers' satisfaction, which are considered as determining factors in their loyalty. Aladwani [18] introduced the challenges facing online banking and examined their relative importance. In this study, providing of Internet security and trust of customers were introduced as the most important drivers of online banking through which the users' expectations can be met.

ELECTRONIC BANKING FUNCTIONS

The country's banking system is responsible for creating and setting up the infrastructures required for e-banking in a wide economic area and range. Preparation necessary applications and software and their localization is another dimension of necessary conditions to promote electronic banking. Training directors, officials and employees of the banking system regarding the new banking approaches and its advantages is another aspect of preparation and development requirements of these services [19].

In his study, Noori [20] examined the obstacles, problems and challenges of electronic banking. Noori [20] believed that the creating and development of e-banking requires having some appropriate economic and social infrastructures, including convenient networking and telecommunications, secure information sharing, legal infrastructure and cultural preparation of the society and businesses for accepting and use of e-banking services. Noori [20] also explained that this method of banking can increase the bank dependence on service providers and software vendors designing and implementing such electronic systems. These encompass the technical feasibility in relation to the availability of hardware, software and knowledge of how to develop e-banking system to meet the needs of users. If the equipment are expected to do something not capable of, technical unfeasibility conditions would be faced; also, if people are unable to buy or rent software required for their equipment, they would face with economic and financial unfeasibility conditions. In addition, the cost of developing e-banking system and its application should not be less than the interest that can be achieved through the development of the banking system, and have to bring some benefits to the bank [21].

In connection with electronic banking functions, through a review of studies and help from experts and elites in the field of electronic banking, some were identified. These functions were evaluated in terms of various aspects such as infrastructures, culture, being

economic, effectiveness, safety and revenue-generating for banks, which are presented in Table 2, along with a brief description about each of them.

Table 2: Functions of e-banking services.

Function	Description
Being economic	They should lead to cost savings, temporal and spatial independence and environmental conservation
Security	It means knowing the customer and the bank, as well as data protection during the process of its transfer. Security issues in electronic funds transfer are summarized in four parts of accessories, computers, terminals and bank cards [22].
Compatibility with values and culture	It is related to adapting the e-banking tools and methods with people’s culture, spirit and knowledge; people long accustomed to traditional methods and are not willing to give up easily them [23].
Performing detailed audits	Banks are faced with the challenge of ensuring the presence of effective internal control. Thus, e-banking controls and sensitive activities should be audited independently.
System impermeability	The board and senior management should apply a comprehensive and appropriate monitoring method to manage bank relationships with external sources and dependence on third parties supporting e-banking support.
Training Electronic Banking	Lack of effective training for the use of new technologies, and consequently, feeling insecurity by clients, are as inhibiting factors in the development of electronic activities.
Telecommunications infrastructures	Include the use of global broadband Internet, satellite systems, fiber optic lines, broad mobile and fixed phone network [24].
Approval of laws and legislation	Legal and judicial procedures need to be developed appropriately to be able to solve problems that may result from electronic relationships of various parties of banking operations.
Applying greater control	Become possible by reducing the time of the operation in automated systems, reducing human errors in the operation, integration of different channels and optimal management of information.
Increased revenue for	In providing banking services electronically, through providing fee services and increased investment due to

banks	increased deposits, the banks will earn more income.
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QUALITY DIMENSIONS OF ELECTRONIC SERVICES

Quality is a common and familiar term that different interpretations have been made of its concept and application. However, the common feature of all definitions is the compatibility of the product or service with the customers' needs and expectations. Quality begins from the client, and any attention to the product or service, regardless of the customer's opinion, would not be necessarily followed by quality. Thus, quality is usually defined based on the compliance of the product with features considered by the customer or the extent to which the product can meet the customer's previous expectations [25].

Quality of service is the difference between the normative expectations of the client and his perception of services performance or immersive judgment of the customer regarding the superior nature of service compared to similar services with its outstanding advantages [26].

Parasurahman et al. defined five dimensions of tangibles, reliability, responsiveness, assurance and empathy for quality of services. According to the model introduced, the contradiction between the customers' expectations and perceptions of services has been considered as the core concept of service quality. For this purpose, they designed a scale called as SERVQUAL. SERVQUAL is based on the view that the customer's assessment is the most important determinant of quality of service. This assessment is described as a gap between what the client expects as quality of service from the providers of a specific service and his assessment of the performance of a specific provider.

Yoo et al. [27] provided a model in the area of assessing the quality of electronic services, which includes four dimensions of ease of use, artistic design, processing speed and security system. Field et al. [28] introduced dimensions such as designing website, reliability, security and customer service for measuring the quality of electronic services. Cristobal et al. [29] also identified the dimensions of customer service-providing, customized management, website design and safety. The study found that the perceived quality influences the customer's satisfaction and satisfaction affects the customer's loyalty.

Zeihntmal et al. [30] introduced five sets of criteria related to the customer's perceptions of quality of electronic services that included content and availability of information, convenience and usability, security, graphical design and reliability. In 2005, they provided the scale of quality of electronic services "ES-Qual". This model is to evaluate the quality of internet sales websites that has been presented in the form of four dimensions of efficiency, fulfillment, system availability and Privacy. They also provided the "E-RecS-QUAL" model to assess the quality of improving and corrective services in three dimensions of responsiveness, compensation and contact [31]. Typically, the two mentioned models are used together in evaluating electronic services, which has been used in this study and given in Table 3.

Table 3: Seven dimensions of ES-Qual and E-RecS-QUAL models [31].

Model	Quality dimensions	Descriptions
Main dimensions of E-S-Qual	Efficiency	Speed and ease of use of services
	Fulfillment	Providing all the possible services and products
	Availability	Proper functioning, all the time and in all places
	Privacy	System security and protection of customers' information
Improvement dimensions of E-Recs-Qual	Responsiveness	Effectively resolving of problems through the system
	Compensation	Compensation of problems caused to the customers
	Contact	Helping customers by online operators

TECHNICAL FEATURES AND CHARACTERISTICS OF E-BANKING SERVICES

Shahraki [7], in his study, mentioned that quality includes a set of features and characteristics of goods and services that supply the customer satisfaction. He considered the quality of banking services in six dimensions, including: Acceptance of Islamic rules, Confidence, Credibility, Tangible factors, Empathy and Accountability [7].

Ghaffari et al. [32] performed a study in 2012 with the aim of identifying the most important factors affecting the quality of banking services, and finally, the relationship between these dimensions and customers' satisfaction and providing solutions. With literature review and using experts' opinions, they extracted specifications and features of e-banking services, indices such as ease of use, time-saving, operations accuracy, ability to perform various banking operations, presence of advanced information technologies, sense of security and freedom in doing banking issues [32].

In a study, Gonzales et al. [33] examined the customers' satisfaction of e-banking services using the QFD. To assess technical features and specifications of e-banking services, they used factors such as orders confirmation, marketing broad efforts, increasing the number of banking services on the Internet, ensuring security, customizing and enhanced profitability [33].

Following consultation with specialists and experts in banking issues, Zanjirchi et al. [6] could extract the technical requirements to achieve the expectations and demands of customers of banking services, including identifying problems and meeting the needs of employees, staff training, proper guidance and directing of customers, presence of ATMs

and waiver or discount on banking services fees [6]. Technical requirements to achieve customers' expectations and demands are explained in Table 4.

Table 4: Technical specifications of e-banking services.

Technical specifications	Descriptions
Verifying transactions and orders	Implementation of an automatic system that informs customers on confirming the measures undertaken [33].
Customizing capability	One of the advantages displayed by virtual machines is a high capacity of personalization [33].
Standardization	Standardization and implementation of standards in activities leads to more efficiency, more profitability and reduced cost and time.
Transactions with greater speed	Proper speed of systems used in providing services to customers at times of network traffic is of great importance [34].
Flexibility in choosing the method of transaction	Providing services through various channels of service- providing [35].
Ease of use	Designing systems in such a way that the use of the services provided would be simple for the customers [34].
Possibility to receive various required financial reports	Announcing circulations conducted with the decentralized account, sending installments maturity and announcing bills and the possibility of receiving bills.
Ability to perform various banking operations	In general, customers prefer using different services centered on a basic service with a multi-service feature [30].

TERMS OF PROVIDING SERVICES

Competition among enterprises and firms for higher market share and the customers' efforts to achieve more satisfaction have made the firms to seek a privileged position in the market and also the customers to look for clues to the best suppliers. Achieving these goals is in close relation to analyzing two concepts: Quality of products and customers satisfaction. Evaluating these two concepts in the service markets is more sensitive and more important due to the special features of services and is also of particular significance for service provider organizations. Thus, exploring the relationships between these two concepts it seems to be effective in improving the level of services provided by banks on one hand and achieving greater customer satisfaction on the other hand. How to achieve

this issue can be as significant issues of service providing organizations, particularly the banks.

The rapid developments in information technology and communications have caused extensive political, economic and social changes. Increased public access to the Internet has created a special place for use of information technologies. To succeed in the competitive e-banking industry, banks are required to provide high quality services to their customers. This needs to determine indicators that the customers use for measuring the quality of provider systems of electronic banking services. Considering these indicators, the necessary steps to improve the quality of services provided and to upgrade provider systems of electronic banking services would be taken [36].

Following numerous reviews in their study in 2001, Jun et al. [37] identified seventeen factors influencing the quality and improvement of e-banking services and classified them in three categories. In this study, the variables of ease of using systems, systems reliability, systems stability and lack of systems error, systems attractiveness, security of systems and information about provided services were reviewed and considered as a basis for developing hypotheses [37].

In 2003, Chen and Chang developed a general model for online purchase process, which represents a complete process for online shopping from personal computers to satisfaction after the purchase. The ease of use of the systems, systems stability and systems speed are variables considered in the model presented in this study [38]. In 2003, Park et al. [39] introduced two factors of the awareness of information with quality about the provided services and the security of provider systems of services as influencing indices on the electronic shopping behavior of the customers [39].

In their research, Gonzales et al. [33] studied the customers' satisfaction on e-banking services using QFD. They extracted factors such as telephone support, improvement of information technology, upgrading the security systems, customer feedback and reduced operating costs as terms of electronic banking services [33]. In their study in 2013, Divandari et al. [12] identified variables such as ease of using e-banking services provider systems, systems stability, systems security, systems speed, systems attractiveness and the usefulness of employing these systems as factors contributing to the improvement [12].

In connection with providing electronic banking services, through review the studies and getting help from experts and elites in the field of electronic banking, some factors were identified that are given in Table 5 along with a brief description of them.

Table 5: Terms of providing e-banking services.

Terms of Providing Services	Descriptions
Development of culture of proper use	Cultural readiness of the society for accepting and using e-banking services and providing suitable and quick solutions for cultural promotion [40].
Convenient access to the bank e-services	Accessible everywhere for 24 hours, seven days [41].
Information Security Management System	Software development and increased security in the systems [42].
Website optimal designing	Web pages should be designed simply to accelerate data loading [33].
Phone support services in the event of a problem	Creating an active, up to date and responsive unit for addressing the complaints and criticisms against the bank services [43].
Presence of laws related to electronic banking crimes	The development of these services requires legislation to document electronic documents [23].
Updating and expanding of systems	Downloading and installing the latest software of updating, security updating packages.
Existence of necessary guidelines and signs	Necessary guidelines at every stage of doing transactions should be provided to the customers [44].
Systems stability	Capability of used technical systems in the provision of services on an ongoing basis, without error and without a glitch [12].
Attractiveness of using systems	Systems should be designed in such a way that the use of Internet banking services would be attractive and interesting for customers [45].

Quality function deployment

Service quality plays a key role to stay in success in the intensively competitive market. For instance, service quality affects loyalty of customer to the company and customer viewpoint in positive way. Unlike the considerable advantages of current tools and methods, the opinions of customers and their requirements are not identified and related to the service design process [46].

Quality Function Deployment (QFD) approach as one of the modern methods of quality engineering starts from the study of market and identification of the product customers. In its process of review and analysis, meanwhile identifying the needs and requirements of customers, it tries to include them in the entire processes of design, manufacturing and control [47].

Based on the definition by America Suppliers Institute (ASI), QFD is consisted of a system to translate the customer's demands to the appropriate demands of the organization at every stage, from research to product design and development, manufacturing, distribution, development and marketing, sales and services [48]. They have also defined QFD as a systematic methodology for translating the voice of the customer to technical requirements, applied terms, display and documentation of information translated in the form of a matrix, which ultimately leads to improving the quality of product or service [49].

House of Quality is a matrix in which the relationship between WHATs and HOWs is determined. Various structures of house of quality have been provided in different literature and texts of QFD, all of which while following the same principles and logic, are used in several cases.

METHODOLOGY AND RESEARCH PROCESS

The present study is an applied research in terms of objective and a descriptive-surveying one in nature. The study population in completing the first researcher-made questionnaire included Maskan bank customers in a province of Iran. To determine the validity of the questionnaire, the opinions of a number of university professors and experts in e-banking of Maskan bank were used. A preliminary sample was also used to measure the questionnaire reliability. After collecting the questionnaires, the test reliability was assessed using Cronbach's alpha method. Accordingly, the validity of data collection tool is equal to 96.4%, which is seen as a good value based on the principles of research. Given that the population size in the industry of electronic banking services is unlimited and it was not possible to measure all members of the society, therefore, the sample variance was calculated according to the preliminary sample [50]. Using Cochran formula, the sample size was obtained as 196 customers. The mean method was used for giving weight to customers' demands. The QFD tables were also used to transform and reflect the demands of customers in electronic banking functions as well as finding the relationship between these functions and dimensions of quality of electronic services. In a survey of experts and specialists of Maskan bank in the central branch of the studied province, the entire population was used to complete questionnaires relating to these tables and to form the QFD team. This study consists of a six-step administrating process as Figure 1.

The questionnaire consisted of 15 questions, analyzed in a 7-option Likert scale. A number of questionnaires was distributed and collected in 6 branches of Maskan Bank in the city of Bushehr.

At first stage of the research, the demands of customers in the form of a questionnaire (in a 7-option Likert scale, consisting of 15 items) were distributed by classified randomized method among 6 branches of Maskan Bank in the province center. The analysis and importance degree of each need was evaluated. Finally, 10 items of customers' demands with the highest mean value in the sample were selected as Table 6.

Table 6: Relative weights of customers' demands.

Row	E-banking services should be	Scores	Relative weights
1	Perform transactions accurately and fast	6.20	0.111
2	Have appropriate temporal and spatial coverage	5.56	0.099
3	The relevant equipment and software would not crush and stop working	5.72	0.102
4	The site information be always updated	5.56	0.099
5	guarantee the information security and confidentiality	6.82	0.122
6	Inform unapproved transactions appropriately and timely	5.01	0.089
7	Examine customer demands and also address the complaints	5.14	0.092
8	Provide the possibility of establishing financial communication with other banks and service institutions	6.01	0.107
9	Menu options should have sufficient integrity to meet the needs of customers	5.17	0.092
10	Guarantee feedback on the accuracy of transactions	4.85	0.087

In the second stage, the average coefficients of customers' needs were placed in the column of QFD table and in correspondence with the row of basic requirements (functions) of electronic services, and their relationship degree between them was determined. In this application:

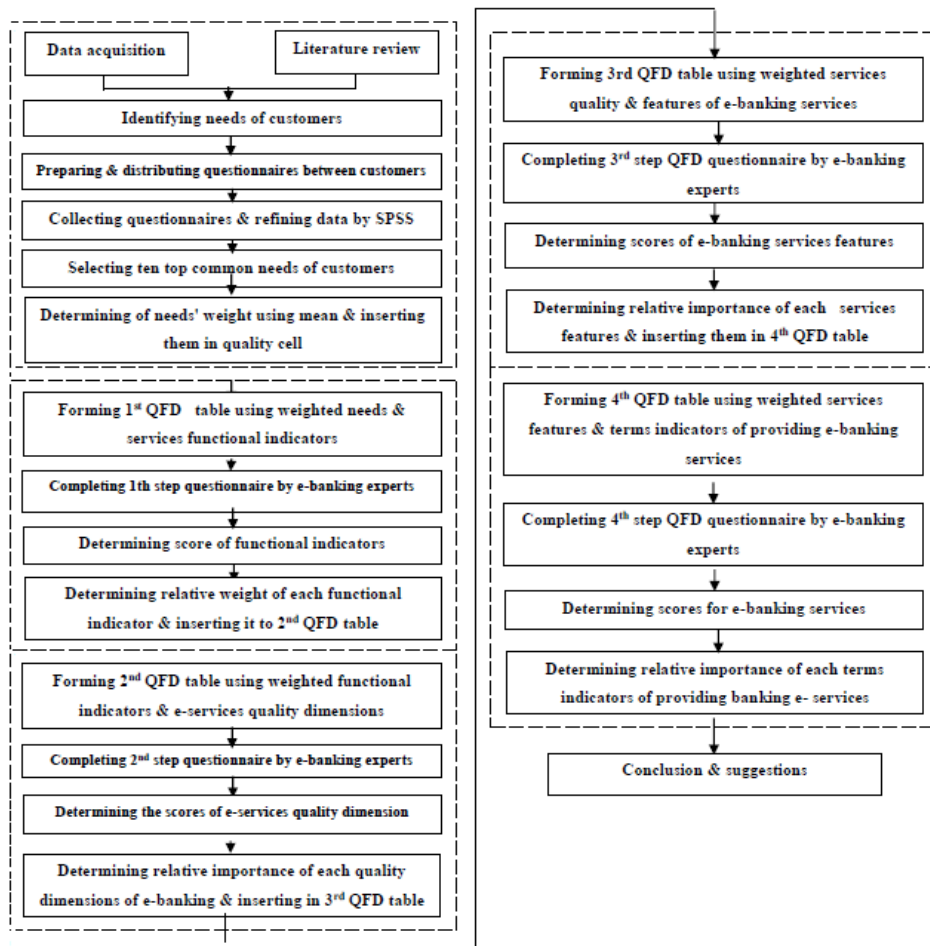
- Strong relationship degree (includes 9 points with the sign of ●)
- Moderate (includes 3 points with the sign of ○)
- Weak (includes 1 point with the sign of Δ)

The QFD table formed by QFD team consisting of experts in the field of e-banking in Maskan bank was completed. If there was a relationship between matrix cells, the proper scores were assigned to them (Table 7).

Table 7: House of quality.

Customers' demands	Weights	Functions of e-banking services									
		Being economic	Security	Compliance with values and ulture	Performing clear audits	Impermeability against external ors	Training electronic banking	Telecommunicati ons context and infrastructures	Legislation	More control over payment operations	Increased revenue for banks
Perform transactions accurately and fast	0.111			△	●	○	●	○		○	△
Having time and place coverage	0.099	●						●			○
Non- destruction and non-failure of equipment and software	0.102	○	○			○	○			○	○
Updating site information	0.099	○	○	○	△		○	○			△
Information security and confidentiality	0.122		●	○	○	●	△	○	●	△	
Notification of unconfirmed transactions	0.089		○					△		○	
Addressing the demands and complaints	0.092	△	△	○			○		○	△	△
Financial communication with other departments	0.107	●		△	○		△	○	○		○
Sufficient comprehensiveness of menu options	0.092	△		○							○
Providing feedback on the accuracy of transactions	0.087		○		○	△				○	
	Column Points	2.65	2.32	1.43	2.04	1.82	2.1	2.3	1.69	1.11	1.5
	Relative weights	0.14	0.12	0.08	0.11	0.10	0.11	0.12	0.09	0.06	0.08

Figure 1: Stages of doing the research.



Using the prepared relations matrix, the column weights of functions were calculated. The importance degrees of customer needs were multiplied in the form of a matrix in each of the points under each column, including the numbers of 0, 1, 3, and 9. Some scores were obtained for each column. Then, for ranking, the relative scales were used. To calculate the columns scores in QFD tables, the below procedures were followed:

- i: Customers' demands and needs
- j: Electronic banking functions
- d_{ij}: Each relationship between (i) and (j)
- W_i: Importance of each demand

The scores or sheer weight of each of these functions was obtained from the following equation [51]:

$$W_j = \sum w_i \times d_{ij} \quad (1)$$

The following equation was also used to calculate the relative weights of each of the indicators in columns of the QFD table:

$$\text{relative weight of each column} = \frac{w_j}{\sum w_j} \quad (2)$$

Table 8: Phase II.

Electronic banking functions	Weights	Quality dimensions of electronic services						
		Speed and ease of using services	Providing all possible services and	Proper functioning, all the time and in all places	System security and protection of customers'	Effective resolving of problems	Compensation of created problems for customers	Helping customers by online operators
Being economic	0.14	●	○	●		○		○
Security	0.12	○		△	●	○	○	○
Consistent with values and culture	0.08	△	△	○	○		○	△
Conduct clear audits	0.11	○					△	
Impermeability against external factors	0.10	○		△	●			
Electronic Banking Training	0.11	△	△	△				○
Telecommunications infrastructures and context	0.12		○	○		●		△
Legislation	0.09		△		○		○	
Applying greater control over the operations	0.06	○			○	○		
Increased revenue for the bank	0.08		●				○	
	Column Points	2.62	1.78	2.19	2.67	2.04	1.22	1.31
	Relative priority	0.19	0.13	0.16	0.19	0.15	0.09	0.09

The weights obtained in the first QFD table were entered into the relevant table of the second stage. At this stage, using functional indicators of electronic banking and dimensions of electronic services quality dimensions, the second QFD table was formed. Like the previous table, this questionnaire was also completed by the QFD team, and the relationship between the options was examined with assigned proper scores to them. Then, using the relationships described in the first stage, the scores and relative weights of

columns belonging to the quality dimensions were calculated (Table 8). Three indices of speed and ease of use of services, proper functioning all the time and in all places, and the security of system and protection of customers' data achieved the highest scores.

The weights obtained at this stage were inserted into the third stage table. At this point using the indicators of quality dimensions of electronic services and indices related to the features and characteristics of e-banking services, the QFD Table 3 was formed. At this stage, the relationships between characteristics and quality dimensions were examined with the target of finding the priorities of these specifications to meet the quality dimensions of electronic service. After evaluating the connection between the options, assigning appropriate scores and performing necessary calculations, the relative weights of the columns related to technical features for entering the fourth phase QFD table were obtained. The points allocated to matrix cells of this phase are shown in Table 9. Three indicators of verifying transactions and orders ease of using e-banking services and greater reliability obtained the highest scores (Table 10).

Table 9: Phase III.

		Features and characteristics of e-banking services									
Quality dimensions of electronic services	Weights	Verifying transactions and orders	Ability to perform various banking operations	Flexibility in the methods of transaction	Customizing capability	The possibility of receiving various financial reports	Exemption or discount on commissions for banking services	Doing transactions with speed	Ease of use of services	Standardization	Greater reliability
Speed and ease of using services	0.19	○		○	△			●	●	○	
Providing all possible services and products	0.13		●	●		○	○				
Proper functioning, all the time and in all places	0.16					○			○		●
System security and protection of customers' information	0.19	●			○	△			△	○	○
Effective resolving of problems through the system	0.15	△	△	△	△			○	○	○	○
Compensation of created problems for customers	0.09	○					○				△

Helping customers by online operators	0.09			○	○	△		△			
	Column Points	2.7	1.32	2.16	1.18	1.15	0.66	2.25	2.83	1.59	2.55
	Relative Weigh	0.15	0.07	0.12	0.06	0.06	0.04	0.12	0.15	0.09	0.14

Table 10: Phase IV.

Features and characteristics of e-banking services	Weights	Terms of providing e-banking services									
		Expanding the culture of proper use	Presence of existing laws on crimes	Information security management system	Presence of guidelines and signs needed	Designing optimal	Services and support in case of problems	Convenient access to e-services	Attractiveness of using the systems	Updating and expanding systems	Systems stability
Verifying transactions and orders	0.15			△		△	○				●
Ability to perform various banking operations	0.07				○	○		●		○	
Flexibility in the methods of transaction	0.12	△		○	●			○	○	○	
Customizing capability	0.06	○	△		△	○			●	△	
The possibility of receiving various financial reports	0.06				△	△		○		○	
Exemption or discount on commissions for banking services	0.04				△			○		○	△
Doing transactions with speed	0.12	○		△	○	●		○	△	●	○
Standardization	0.15	○		●	○	○				○	
Ease of use of services	0.09	●		△	○	△	○		○	○	
Greater reliability	0.14	○	●	○		○	○			○	●

	Column Points	2.06	1.32	2.79	2.53	2.64	1.14	1.65	1.29	3.15	3.01
	Relative priority	0.10	0.06	0.13	0.12	0.12	0.05	0.08	0.06	0.15	0.14

SUMMARY AND CONCLUSION

In electronic banking, based on the type of services and expectations of the new services, the most appropriate communication tools should be used, and the most important and most effective tool at the beginning of electronic banking process is public access to electronic communications infrastructure platforms [52]. Systems should be designed in such a way that using the services provided by them would be easier for clients, and the required guidance on the steps to do transaction would be provided to the customers.

In this study, according to studies conducted on using QFD in the area of services, an appropriate research model proportionate to e-services was adjusted and documented. This article is an introduction to the relations between the most important factors of service providing process design in electronic banking industry [53]. The study discussed and supports the requirement for creating the infrastructure needed to electronic banking which is aligned with the needs of e-banking customers. Infact In this study the new way for process planning of electrical banking service has adopted to have more accurate prioritization of customer needs. The road of designing have extended from customers' needs and functions of e-banking services to the dimensions of service quality, e-banking services features and terms indicators of providing e-banking services [54].

After performing the calculations of QFD tables, the relative weights of identified indicators were obtained among the customers' needs, the need for security and confidentiality of information had the highest importance. Obviously, some people have been always afraid of new technologies [55]. This fear is more due to lack of familiarity with them, and thus, they assume that in case of using new technologies, they may be somehow harmed. Attention to precision and speed of transactions as well as having financial links are as the most important needs identified by the customers. Insufficient attention to meet these needs can provide customers' dissatisfaction. Among the indicators related to electronic banking functions, the factor of being economic with a weight of 0.14 had the highest priority, which implies the focus of Maskan bank on economic efficiency due to development of e-banking services [56]. However, in this regard, the factors of security and required telecommunications context and infrastructures were placed at next position with gaining the same rating. This represents a slight gap between the need and function, and increases the chance to design a process that will ensure the interests of both the provider and the service recipient [57]. The highest scores of quality dimensions of e-banking services based on e-banking functions include system security and protection of

customers' information (confidentiality), speed and ease of use of service (performance. In electronic banking, the focusing on the quality dimensions plays a key role in developing the organization's quality policy as a strategic axis.

In the section of services properties, the variables of verifying transactions and orders and ease of using e-banking services were identified as the most important indicators. Through better identifying of such characteristics in services provided and efforts to strengthen and develop these qualities, high-quality services can be provided to meet the customers' needs and demands as much as possible [58]. The conditions of providing electronic banking services should be considered as stated to be adapted to the technical characteristics of these services and to meet the demands of customers as well. Banks should pay special attention to the conditions of providing services, since the customers deal with these indicators much more when using electronic banking services, and thus, make their judgment on the services provided according to the terms of service providing. Among the indicators identified, three indices of updating and expanding the systems, systems stability and information security management system had the best priorities [58].

In total the study seeks to explain and differentiation of the key concepts involved in the design of service process. As the result Service designer should have special attention to prioritize of these factors.

Along the development of tools and technologies, banks are facing a big problem called cultural context weakness, which is the most important barrier in the realization and implementation of providing modern banking services. In addition to investment in infrastructure and human resources, the banking system needs to pay much attention to generating cultural readiness in the society for acceptance and use of electronic banking services. Hence, convenient and quick solutions should be adopted to promote the culture of using electronic banking services.

Increasing the capability of systems used to protect the information security. If the conditions necessary to meet this need are provided, public use of electronic systems will be expanded and facilitated. The risk of using such systems all decreases by maintaining high security conditions, and the customers' trust and satisfaction would increase.

Installing the latest software, updating them and security update packages with gradual and continuous effects on systems would improve the hardware performance of systems and enhance their security factor as well.

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