

# Presenting a Model of Customer Experience Management in Mobile Banking Industry for Commercial Banks Customers in Dubai

Maryam Abadi <sup>a</sup>, Hamidreza Saeednia\*<sup>b</sup>, Abbas Khorshidi <sup>c</sup>

<sup>a</sup> Department of Management, UAE Branch, Islamic Azad University, Dubai, United Arab Emirates

<sup>b</sup> Department of Business management, North Tehran Branch, Islamic Azad University, Tehran, Iran.

<sup>c</sup> Department of Educational Management, School of Management, Islamic Azad University, Islamshahr Branch, Tehran, Iran.

Received 10 May 2020; Revised 10 November 2020; Accepted 30 November 2020

## Abstract

The current research has been conducted to provide a model for customer experience management in the mobile banking industry for customers of commercial banks in Dubai. An explorative mixed methods research (qualitative and quantitative) was used in the research. Data were gathered in both qualitative phase (based on grounded theory) and quantitative phase (based on cross-sectional survey method). In the qualitative phase, population consisted of academic specialists and experts (university professors in the field of management) selected by judgmental sampling method of snowball sampling type. Data were gathered using a semi-structured interview. Data gathering reached theoretical data saturation in the twenty-fifth interview, so interviews were stopped at this point. The results of coding based on grounded theory led to the identification of 170 open codes, 24 axial codes, and 7 selective codes including value, cognitive, motivational, sensory, physical, behavioral, and communicative ones. In the quantitative phase, population consisted of 100,000 users (equal numbers of men and women) of mobile banking services. Given that the community variance was not available, Morgan and Krejcie table were used to determine the sample size that was calculated at 384 individuals. Data analysis in the quantitative phase confirmed the findings of qualitative research according to chi-square ( $\chi^2$ ), goodness of fit (GFI), adjusted goodness of fit (AGFI), and root mean squared error of approximation (RMSEA) indices.

**Keywords:** Customer Experience Management, Mobile Banking, Value dimension, Cognitive dimension, Motivational dimension.

## 1. Introduction

In recent decades, the growth and spread of information technology has enhanced organization competition, particularly in financial organizations. It is believed that having access to information technology is the main key to survival in the competitive environment. The emergence of some phenomena such as e-business, e-commerce, and e banking is one of the main impact of spreading of information technology in the economic dimension. Today, many banks around the world offer their services through mobile phones. All countries will be influenced by integrating the global economy, thus, we have no choice but to use electronic banks in the long run. On the other hand, a growing number of customers have the technological knowledge and prefer a technology-based service to the service delivered by employees (Karjaluo, 2002). It is not easy to meet customer needs through traditional bank systems in the country and it is necessary to pave the way for obtaining an appropriate technology. Up to now, given the topic of customer experience management in the mobile banking industry for commercial bank customers, many studies have been done on customer relationship management (CRM) and many techniques, methods, and software have been created to help organizations in this field more than before. Next to customer relationship management, what engages organizations today is an experience that customer gains

service quality from that organization. This experience and memory, which customer gains through all interactions with employees, services, and products of the organization, will play a determinative role in the quality and continuity of customer relationship and customer loyalty (Jafari Taheri, 2016).

## 2. Theoretical Framework

For the first time, Halbrock & Herchman, (1982) discussed the concept of customer experience. The concept of customer experience primarily dealt with customer rational decision-making. Then, it covered factors, which pay attention to customer behavioral aspect (Orly, 2005). For defining customer experience, Mascaren, Casavan & Bernachi, (2006) focused on having a real-time experience of the organization services in mind. Vertnik & Russ, (2007) defined customer experience as an attitude and symbolic and sensory mood, which is created by marketer and customer in pleasant, significant, and memorable condition; this experience can be both tangible and intangible. Paulson & Lee, (2004) defined customer experience as a fascinating action which is commonly created between its creator and customer; it is a state in which customer understands values that stick to their mind. They believe that features of customer experience should include five aspects or traits such as freshness, learning, personal communication, being surprising or amazing, and customer engagement.

\*Corresponding author Email address: h\_saeedniya@iau-tnb.ac.ir

When technology advanced from the 2G GSM to the 3G Universal Mobile Telecommunication System (UMTS), higher network speed and faster download speed allowed real-time video calls. LTE and the subsequent LTE-A offered enhanced network capacity and reduced delay in application-server access, making triple-play traffic (data, voice, and video) access possible wirelessly, anytime anywhere. (Mukherjee, 2015) 4G truly constitutes mobile broadband. Although 3G was the first mobile broadband standard, it was originally designed for voice with some multimedia and data consideration; whereas 2G was intended as the first digital mobile voice communication standard for improved coverage. The data rate has improved from 64 kbps in 2G to 2 Mbps in 3G and 50–100 Mbps in 4G. 5G is expected to enhance not only the data transfer speed of mobile networks but also the scalability, connectivity, and energy efficiency of the network. It is assumed that by 2020, 50 billion devices will be connected to the global IP network, which would appear to present a challenge (Haotong, 2020).

### 2.1. Futuristic scenarios and 5G compliance

The society of 2020 will be a connected society. The IoT together with intelligent and integrated sensor systems and in-home sensor networks will change the way people lead their lives. “Smart living” people will require constant and ubiquitous mobile connectivity to the network to upload their activity data and IoT control commands leading to the generation of a “massive reporting” uplink data flow. Massive machine-to-machine communication and critical machine-to-machine communication will play pivotal roles in service delivery and industry operations. Vehicular ad-hoc networks (VANETs) are constantly developing. By 2020, VANETs integrated with cellular networks will be in operation as VANET cloud, leading to a smarter and safer transportation system (Tao, 2020).

When the number of devices connected to the Internet passes tens or hundreds of billions in the coming decade, the offloading of networked data on unlicensed bands will play a critical role in network load balancing, providing guaranteed bit rate services and a reduction in control signaling. Hence, it is important that 5G will be able to provide seamless compatibility with dense heterogeneous networks to satisfy the high demand of real-time traffic, so that end users will experience smooth connectivity to the network (Levanen, 2014).

### 2.2. Customer experience management framework

Customer experience management makes it possible to retain valuable and old customers. Customer experience management provides a forward-looking view of what customers expect and directly captures the customer's voice. It therefore creates all parts of the organization that can consider the customer's voice when making decisions. It is through this excellent focus on the customer that organizations can better protect themselves against customer apostasy and flight (Bae, 2018).

Implementing the CEM framework to support sustainable customer relationships is essential to the long-term life of the organization, and like any other business, the

commitment to it must be firm. In the case of customer experience management framework, all or none exists, which means that this framework may be implemented step by step or on a small scale, and as more experience is gained, its use in the organization will expand (Kiska, 2002).

The benefits of E-banking can be considered from two perspectives of customers and financial institutions. From the customers' point of view, we can mention cost savings, time-savings, and access to multiple channels for banking operations. From the point of view of financial institutions, it is possible to create and improve the reputation of banks through providing innovation, retaining customers despite the spatial changes of banks, creating opportunities to seek new customers in target markets, expanding the geographical scope of activities and establishing conditions. Named the perfect competition (Belinda, 2020).

E-banking has unique characteristics that may pose threats that include the form of this type of banking and the level of risk associated with traditional financial services, specific strategies, operational, legal, and credit risks. Increases.

These unique features of e banking are as follows:

- Changing customer expectations
- Increasing the phenomenon of Internet networks available to the public
- Reducing face-to-face interaction with customers of financial institutions
- The need to integrate electronic banking with computer systems of institutions Third party affiliation is essential for technical skills
- Increasing the threats and capabilities of publicly available networks.

Management should review each of these processes in order to adapt and develop the institution risk management practices that are required in relation to banking activities (Barouti Ardestani, 2006).

### 3. Objective Functions

In the present research, three objective functions were used to design optimal multi-objective derived and proportional fuzzy controller system as follows:

$$J_1 = \int_0^T (e_1^2 + \dot{e}_1^2) dt \quad (1)$$

$$J_2 = \int_0^T (e_2^2 + \dot{e}_2^2) dt \quad (2)$$

$$J_3 = \int_0^T (u_1^2 + u_2^2) dt \quad (3)$$

Where  $J_1$  is the error and the derived change in error from the first survey;  $J_2$  is the error and the derived change in error from the second survey. It is trying to reduce the error of both surveys by optimizing these two objective functions simultaneously.  $J_3$  function includes

consumption terms. Minimum of the function reduces consumption.

In the case of a turbulent torque, the following applies:

$$\tau_d = \begin{cases} 0 & \text{if } t < 2 \text{ or } t > 8 \\ 2|1 - \cos 20t| & \text{if } 2 \leq t \leq 8 \end{cases} \quad (4)$$

Design variables include fuzzy-derivative, integral-proportions coefficients, which are:

$$\vec{d} = [d_1, d_2, d_3, d_4, d_5, d_6, d_7, d_8, d_9, d_{10}, d_{11}, d_{12}, d_{13}, d_{14}, d_{15}] \quad (5)$$

These coefficients are achieved using genetic algorithm and multi-objective optimization.

In the research, NSGA-II correction algorithm is used for multi-objective optimization. These points are illustrated in pairs to each other in Figure 2, 3, 4. In addition, a few optimal points are selected from this collection.

#### 4. Research Methodology

The present research is functional in terms of purpose and qualitative in terms of data collection according to the nature of the research. In this study, Grounded theory and the "Systematic approach of Strauss and Corbin" were adopted. To collect the data required for two interviews, the researcher first designed a protocol for interviewing academic experts according to Table 2 and then a protocol for interviewing senior managers of startups according to Table 3.

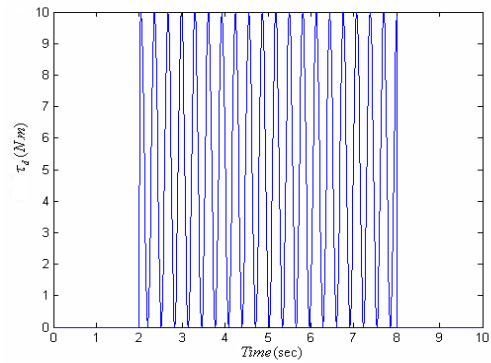


Fig. 1. Turbulence torque of the path

Table 1  
Design variables

			$K_p$			$K_d$				
$K_{p0}$	$K_{d0}$	$\alpha$	$P_m$	$P_s$	$\theta_s$	$P_m$	$P_s$	$\theta_s$	$\Delta K_p$	$\Delta K_d$
$d_1$	$d_2$	$d_3$	$[d_4, d_5, 1]$	$[d_6, d_7, 1]$	$d_8$	$[d_9, d_{10}, 1]$	$[d_{11}, d_{12}, 1]$	$d_{13}$	$d_{14}$	$d_{15}$

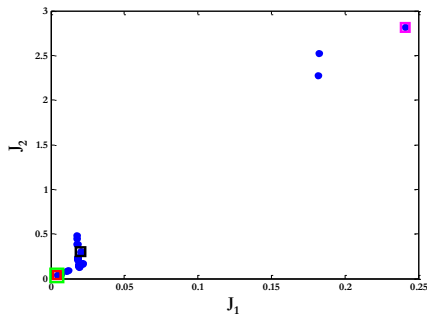


Fig. 2. Pareto of objective functions 1 and 2 relative to each other

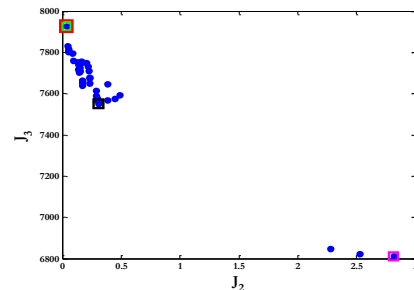


Fig.4. Pareto of objective functions 1 and 4 relative to each other

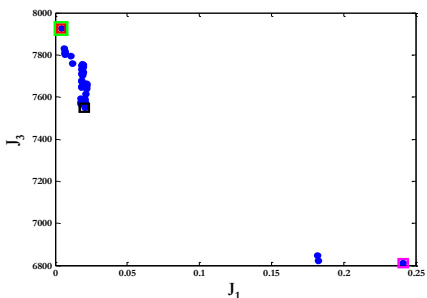


Fig. 3. Pareto of objective functions 1 and 3 relative to each other

According to the Figures 2, 3, 4, most of the population is optimal; this accumulation has been created in the optimal area, and we are looking to find the most optimal part in the population diagram.

The objective functions are investigated relative to each other. Four spots are shown in the diagram. The red spot represents the lowest value of objective function 1; the green spot represents the lowest value of objective function 2; the pink spot represents the lowest value of objective function 3; and the black spot represents the lowest value of total objective function.

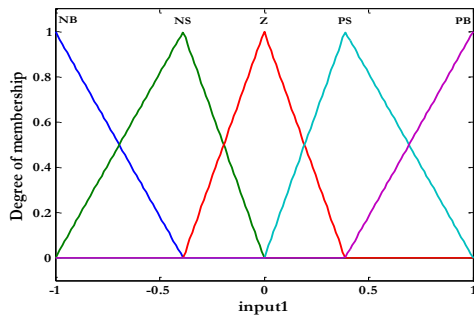


Fig. 5. First input membership function

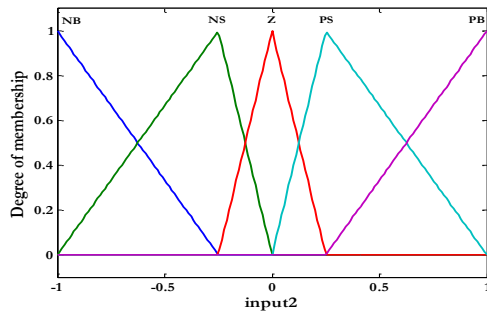


Fig.6. Second input membership function

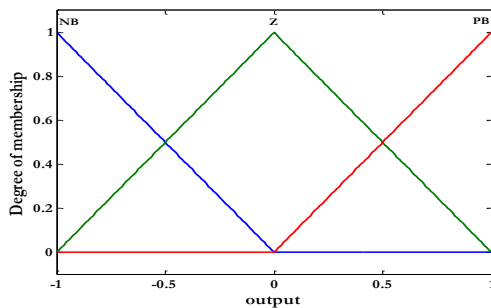


Fig. 7. Output membership function

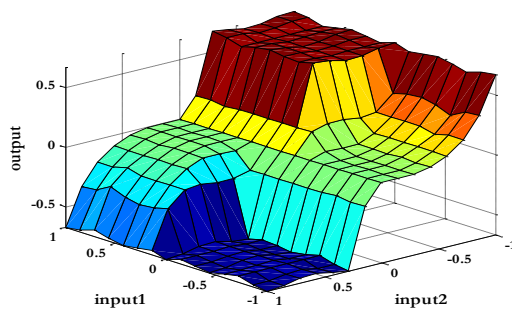


Fig. 8. Optimized fuzzy surface

The theoretical framework of the research is relied on the results of past researches and using available articles and models. This requires an in-depth study of available literature, theories, and models in the field of customer experience management and banking. In the following, literature review is provided through bringing some national and international findings in the field of research. The theoretical and study framework will be completed by

studying more deeply and comprehensively in the process of completing the dissertation and literature review.

In a research conducted in 2015 entitled "Factors affecting the adoption of online banking in Poland," more than 27 million banking users in Poland agreed to use Internet banking, while the number of users who have been actually using Internet banking was 13.5 million. In addition, the use of Internet banking in Poland was 33% in 2014, while the use of Internet banking in the other 28 members of the European Union was 44% in 2014 ( Stanisław Szopiński, 2015).

Kentama, (2014) in a research entitled "identifying and measuring dimensions of customer experience," dealt with identifying and measuring dimensions of customer experience. The research measured customer experience in seven dimensions including environment, profit, convenience, availability, desirability, motivation, and trust.

Gou San, (2014) suggested that people's lifestyles have been changed differently by spreading the Internet access protocol and developing 3G and 4G technologies. This change in people's lifestyles has provided commercial aspects for banks to offer valuable mobile banking services.

Chan Ling & Maadley (2013) conducted a research entitled "assessing the effects of customer experience on the intention to buy." They suggested that motivational experience and social experience have a positive effect on the intention to buy. There are also mutual relationships between customer dimensions (sensory experience, motivational experience, and social experience).

Konjkav Monfared & Mirhosseini, (2013) conducted a research entitled "Factors affecting the acceptance of mobile banking by customers of Saderat Bank branches in Yazd" aimed at better explaining and understanding the behavior of using mobile banking. They concluded that all factors identified in the framework have a direct or indirect effect on users' actual use of mobile banking and the received benefits ranks first.

Aboee Ardakan & et al, (2013) in a research entitled "value-creating features of mobile payment systems from the customer's point of view (case study: Safir system services in the Export Development Bank of Iran)" concluded that features of payment system with mobile bank depends on portability, ease of access, availability, and compatibility dimensions, respectively.

## 5. Research Method

The study is an applied research in terms of purpose, exploratory mixed method in terms of data (qualitative and quantitative), and grounded theory (qualitative phase) and cross-sectional survey (quantitative stage) in terms of conducting research method.

The study is an applied research in terms of purpose because the purpose of applied research is to solve problem and finally to obtain information to make decisions. In other words, the purpose of the researches is to develop applied knowledge in a specific field and move towards practical application (Khorshidi, 2011).

Mixed method research is a research that is conducted using a mixed of both quantitative and qualitative research methods. Accordingly, the main features of mixed method research are affected by how to use the two categories of quantitative and qualitative methods that depend on two factors: how much importance is given to each of the two categories and how to sequentially use quantitative and qualitative methods. If the researcher wants to develop a measurement tool to study the current state of an issue and to observe quantitative variables, it will be primarily necessary to gather qualitative data in order to provide the necessary ground for making that measurement tool, and then he/she can gather quantitative data by the aforementioned tool in the next step. In the present research, the researcher is looking for a ground about an unknown situation (customer experience management). In this regard, she has first gathered qualitative data. Conducting this step described countless aspects of customer experience management. By applying this initial identification, formulating a framework for customer experience management became possible. Then, she evaluated the framework by making a questionnaire that was the result of a qualitative step. The current research is divided into quantitative and qualitative phases in terms of conducting method, which is based on grounded theory in the qualitative phase and cross-sectional survey in the quantitative phase.

Grounded theory is the theorizing process from specific observations in the form of more comprehensive theory, i.e. a theory that appears in people's daily lives. To this aim, a theory is extracted by inductive methods from everyday experiences, interactions, documents, literature, and observations, which are discovered, developed, and conditionally and temporally approved by systematically gathering data and analyzing data related to the phenomena. The application of grounded theory method is to develop a theory inductively and to try to properly understand and feel everyday events. It is also an attempt to understand participants' world as they make it. Grounded theory can make connections between concepts and produce abstract concepts from events and objective matters that may be difficult to do with quantitative researches. In the present research, a framework was developed for customer experience management in the mobile banking industry by studying scientific and legal documents, interviewing with experts, summarizing data, and holding brainstorming sessions. In the quantitative phase, cross-sectional survey method was used. In the present research, data has been gathered from the sample in a certain period to describe a population from which the sample was extracted.

**6. Research Findings**

Descriptive statistics (mean, skewness, and kurtosis) were used to summarize the contents, and the results are shown in Table 2.

Table 2  
Descriptive statistics of research items

Table 2- Descriptive statistics of research items			
Items	Mean	Skewness	Kurtosis
Absolute values	5.49	-1.274	1.809
Relative values	5.45	-1.020	2.039
Background values	5.35	-0.512	1.180
Knowledge audit	5.34	-1.287	1.370
Service quality	5.32	-1.474	1.575
Customer satisfaction	5.18	-1.904	1.179
Bank loyalty	5.12	-0.427	2.820
Customer loyalty	5.93	-1.142	2.435
Needs recognition	4.78	-1.651	2.51
Main services	5.49	-1.244	2.183
Customization	5.35	-1.174	1.390
Promise realization	5.34	-1.174	2.54
Mixed marketing	5.32	-1.150	2.29
Emotional tendencies	5.25	-1.512	1.089
Security	5.12	-1.35	1.770
Software	5.1	-1.150	2.019
Hardware	5.62	-2.314	3.769
Staff evaluation	5.86	-2.050	3.039
Citizenship behavior	4.91	-0.512	-2.089
Flexibility	5.52	-2.305	2.370
Behavioral tendencies	5.65	-0.474	2.575
Customer expectations	5.69	-0.904	1.179
Performance	4.14	-0.457	3.020
Follow-up	5.40	-0.142	3.135
Value dimension	5.54	-1.023	2.309
Cognitive dimension	5.21	-1.53	1.707
Motivational dimension	5.1	-1.140	5.091
Sensory dimension	4.87	-1.561	2.15
Physical dimension	5.43	-1.872	1.730
Behavioral dimension	5.23	-1.447	1.755
Communication dimension	4.03	-0.427	3.011

As shown in Table 2, among the dimensions of framework for customer experience management in the mobile banking industry, the value dimension (5.54) and the communication dimension have the lowest mean (4.03). Among the components of framework for customer experience management in the mobile banking industry, customer loyalty component has the highest mean (5.93) and the performance component (4.14).

According to the results of Delphi analysis related to each of dimensions and components of framework for customer experience management among customers of commercial banks in Dubai, it can be stated that the communication dimension has the highest weight mean (0.85). Cognitive (0.82), behavioral (0.81), physical (0.80), motivation (0.80), value (0.79), sensory dimensions (0.76), respectively, are ranked next in terms of mean weight.

In order to answer the first question of the research “what is the right framework for customer experience management in the mobile banking industry for customers of commercial banks in Dubai?” it can be stated that the framework for customer experience management in the mobile banking industry for customers of commercial banks in Dubai has 7 dimensions and 24 components. The framework is schematically shown in Figure 9.

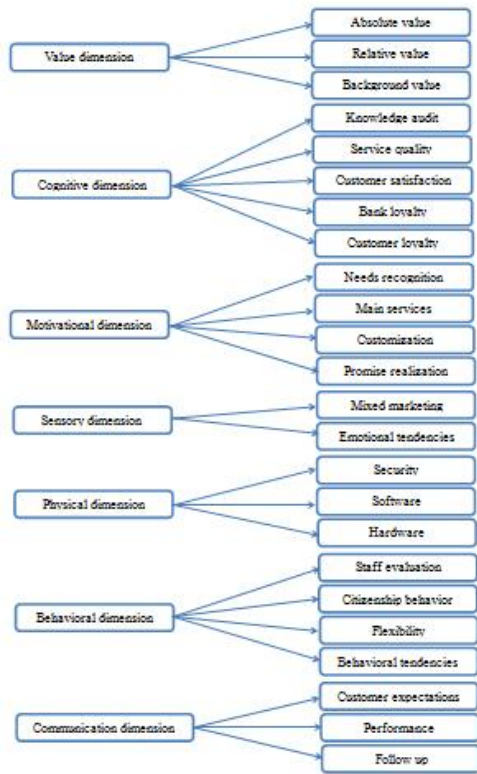


Fig. 9. Framework for customer experience management in the mobile banking industry

Table 3  
Goodness fit indices of dimensions in the framework for customer experience management in the mobile banking industry for customers of commercial banks in Dubai

Dimensions	Motivational	Cognitive	Value	Sensory	Physical	Behavioral	Communication
$\chi^2$	1.65	2.65	1.88	1.24	2.17	2.25	1.75
GFI	0.93	0.85	0.90	0.94	0.90	0.96	0.93
AGFI	0.91	0.80	0.87	0.94	0.92	0.91	0.90
RMSEA	0.069	0.06	0.03	0.031	0.061	0.063	0.041
CFI	0.95	0.92	0.93	0.98	0.94	0.92	0.93
NFI	0.95	0.92	0.91	0.96	0.93	0.92	0.92
NNFI	0.95	0.94	0.92	0.97	0.93	0.95	0.93
IFI	0.97	0.95	0.94	0.98	0.93	0.94	0.93

As shown in table 3, all goodness fit indices of dimensions in the framework for customer experience management in the mobile banking industry among customers of commercial banks in Dubai were confirmed.

### 7. Discussion

Nowadays, banking is becoming simpler thanks to the Internet and it will become increasingly digitalized in the future. Whether it is micro-banking or mobile-based banking, technology plays an important role in our day-to-day transactions. The Internet of Things has started an endless revolution towards the future of banking. Therefore, both customers and banks have to adapt themselves to this new trend Hadizadeh Moghadam, (2012).

Maybe sometime in the future, no technology will be able to cover our financial transactions more than mobile phone technology. The invention of SMS has provided many

options for banks, but the entry of smartphones into the market has made mobile-based banking the main option in the last decade. Today, mobile banking applications are not considered as additional benefits for customers, but they are considered an essential part of the customer-bank relationship, so the absence of these facilities will even change the bank on behalf of the customer. However, these examples of technology were just enough to get started. Apple, Samsung, Android, Walmart, etc. are using features as NFC that everyone can use to pay and proceed their work just by shaking it (Lexton and Maundo, 2014). The Insider Business Retail Bank report (quoted by Andrew et al., 2016) conducted on 1,500 young people under the age of 20 shows that 27% of these people used mobile phones to pay their bills in stores. Person to person payment apps such as “Venmo” have also been greatly appreciated for their ease of use in banking, reducing the customer's need to turn to ATMs for receiving cash, and the easy payment process. These technologies can reduce the need for cash. In short, smartphones are becoming the basis for the future of banking among young customers, who are making a huge financial impact on the banking industry over the next decade (Boyle, Katalan, & Martins, 2014).

Here are some of the results of Business Insider's research on young people under the age of 20:

- 71% of these people claim that having a bank application on a mobile phone is very important;
- Also, 60% claim that the ability to pay by these applications is very important;
- 50% of these people made payments through these programs last month;
- 27% of these people used their mobile phones to pay in stores last month (Andro et al., 2016).

Given this information, it is clear that banks need to spend significant resources on digital services. Because customer experience from the provided services can guarantee a significant role in the future success of the banking industry (Mozat Jamshidi & Zare, 2014). There are many definitions for customer experience. However, everyone agrees that customer experience should involve interaction with people, processes, or organization system. Some have claimed that experience involves interaction with product, while others have claimed that experience involves feelings or emotional reactions that result from these interactions. Overall, customer perception is at the heart of what the customer experience is engaged with. Therefore, customers were asked about this, and approximately 50% of respondents chose this definition: Customer experience is a set of all customer interactions with products, services, and people related to an organization with a particular brand (Janfarsa, 2008).

### 8. Conclusion

In order to answer the main question of the research “what is the dimensions, components, and construct indicators of framework for customer experience management in the mobile banking industry among customers of commercial banks in Dubai?” the mixed method (a combination of qualitative and quantitative methods) and exploratory

mixed method were used. In the qualitative phase, 177 open codes (items) were obtained by studying scientific and legal documents, interviewing with experts, and summarizing data. After categorizing these codes and deleting some conceptual codes, finally 170 items in the form of 24 components and 7 dimensions were categorized. Then, by conducting the Delphi method and brainstorming during the selective coding phase, some items were removed and some were added. In addition, dimensions and components were changed, and finally 170 items were obtained in the form of 24 components and 7 dimensions.

These results are in line with the findings of Aboee Ardakan et al. (2013), Farokhi Ostad et al. (2013), Konjkav Monfared and Mirhosseini (2013), Kim and Lee (2013), Chan Ling and Maadley (2013), and Gou San (2014).

In comparison with the current research framework, which has seven dimensions including motivational, value, behavioral, sensory, cognitive, physical, and communication, with other, it can be said that the researcher tried to study all aspects of the subject by studying different angles and directions meticulously, and to explain and expand their meaning by looking at the hidden angles. Although the concepts may apparently overlap, it could be understood given the components of each of following dimensions that these categories are very different from each other in many ways in addition to the apparent similarity between the names of some components of the provided framework in the research with the basic framework. In the current framework, the researcher tried to study the subject comprehensively and holistically by adding both value and physical components. Although the UAE and the city of Dubai are among the most important cities in the field of business, this country is an Islamic country with its own Islamic concepts and beliefs. Therefore, if we want to study it, we should consider, study, and explore the religious and belief issues that make the infrastructures of the culture governing this country. With this perspective, the distinguishing point of the framework provided in the current research can be considered as paying attention to infrastructural principles and values and physical environment of the studied community. On the other hand, one of the factors affecting each user and customer's behavior and actions can be considered the environment in which they are active. If this category is ignored, organization activities can be ineffective and useless, because each behavior is rooted in the culture governing the environment that directly directs these behaviors. Since the UAE is an Arab country, efforts should be made to study Arab culture comprehensively and planning should be done so that the governing culture in the environment is clearly reflected in the goals and actions of organization.

For the value dimension, the researcher tried to study the value dimensions in the studied community more and more deeply by presenting the three components including absolute values, relative values, and background values. For physical dimension, the researcher tried to study the hidden angles related to this dimension in terms of security and safety by adding three components including security,

software, and hardware. It should be noted that while an organization is trying to ensure its customers that their information is confidential and no one but them is aware of it, on the other hand, it should try to meet increasing and growing customer needs by updating the software and hardware used by it. If customers understand that they can trust their organization and keep their information safe with the organization, they will invest with more courage and boldness, which will eventually lead to the development and growth of organization and achievement of goals more and more easily.

For each of the dimensions, the researcher also tried to study the subject more superficially and deeply by adding a wide range of indicators about each of them in order to be able to provide a comprehensive and complete framework in this field by studying more comprehensively.

Second finding of the current research was identifying seven dimensions for customer experience management framework in the mobile banking industry in both qualitative and quantitative phases. Identified dimensions include value dimension, cognitive dimension, motivational dimension, sensory dimension, physical dimension, behavioral dimension, and communication dimension.

Third finding of the current research was to identifying 24 components in both qualitative and quantitative phases obtained by using interview, axial coding, and Delphi technique. The components include absolute values, relative values, background values, knowledge audit, service quality, customer satisfaction, bank loyalty, customer loyalty, needs recognition, main services, customization, promise realization, mixed marketing, emotional tendencies, security, software, hardware, staff evaluation, citizenship behavior, flexibility, behavioral tendencies, customer expectations, performance, and follow-up.

Fourth finding of the current research was identifying 177 indicators in the qualitative phase, of which 170 indicators were confirmed at the end of the quantitative phase.

Fifth finding of current research was prioritizing indicators, components, and dimensions of framework for customer experience management in the mobile banking industry. Accordingly, these cases have been first extracted from the background and theoretical foundations by studying meticulously and scientifically the other models and framework provided on customer experience management and mobile banking. Second, academic specialists and experts were interviewed based on Delphi technique in 2 times and the opinions of 30 experts and specialists familiar with the subject were taken. Third, they were analyzed through Delphi technique and brainstorming. Finally, 170 items, 24 components, and 7 dimensions were prioritized as follows:

Value dimension includes three components: absolute values, relative values, background values. Cognitive dimension includes five components: knowledge audit, service quality, customer satisfaction, bank loyalty, customer loyalty. Motivational dimension includes 4 components: needs recognition, main services, customization, promise realization. Sensory dimension

includes two components: mixed marketing and emotional tendencies. Physical dimension includes three components: security, software, and hardware. Behavioral dimension includes four components: staff evaluation, citizenship behavior, flexibility, and behavioral tendencies. Communication dimension includes three components: customer expectations, performance, and follow-up.

## References

- Abbasinejad, H. & Mehrnoosh, M. (2006). Electronic banking (1st edition). Tehran, Iran: Samt Publication.
- Andrews, J.G. & et al., (2015) What will 5G be? *IEEE J. Sel. Areas Commun.* 32 (6) (2014) 1065–1082.
- Belinda L. Del Gaudio, Claudio Porzio, Gabriele Sampagnaro, Vincenzo Verdoliva, (2020) How do mobile, internet and ICT diffusion affect the banking industry? An empirical analysis, *European Management Journal*, 2020, In press
- Baochun, L. & Hong, X. (2013). Resource allocation with flexible channel cooperation in cognitive radio networks, *IEEE Trans. Mob. Comput.* 12 (5) (2013) 957–970.
- Cisco, (2015). Visual Networking Index. February 03, white paper at Cisco.com.
- Fathian, M., Shafia, M. & Shahrestani, M. (2009). The impact of research about electronic banking on increasing customer satisfaction in Banks (case study: Bank Melli Iran). The First Conference on the Executive Management, Tehran. 127-135
- Farrokhi Ostad, M., Pudineh, M., Sancholi, H. & Keyvani, Sh. (2013). Study the effect of e-banking service quality on customer satisfaction using Kano hybrid model and gap analysis. Conference on Management, Challenges, and Strategies, Shiraz.
- Fettweis, G., Krondorf, M. & Bittner, S. (2009). FDM—generalized frequency division multiplexing, in: 69th Vehicular Technology Conference, IEEE, 2009, 1–4.
- Gilaninia, SH. & Mousavian, S. (2009). Identifying the factors affecting customer tendency to use e-banking services. *Journal of Beyond Management*, 6(3), 103-133.
- Ghaffari, F., Jafari, P. & Amir Madhi, A. (2012). Study the relationship between dimensions of service quality and customer satisfaction in the banking industry: Comparative model of traditional and electronic services. *Iranian Journal of Management Sciences*, 24, 41-67.
- Haotong, C., Yue Hu, Longxiang Yang, (2020). Towards intelligent virtual resource allocation in UAVs-assisted 5G networks, *Computer Networks*, Inpress.
- Hassani, F. (2007). Study the status of electronic banking in Iran, *Etamad Melli Journal*, 7(1)16-30.
- Hosseini Hashemzadeh, d. (2009). Study the factors affecting customer satisfaction in Industrial and Mining Bank. *Journal of Business Management*, 2 (3) 63-82.
- HSBC. (2006). HSBC to offer mobile banking services. Retrieved 10 27, 2007, from HSBC: <http://www.computing.co.uk/computing/news/215376/8/hsbc-offer-mobile-banking>.
- Hassanzadeh, A. (2012). Mobile Banking. Information Technology Age, *Journal of Business Management*, 4(1) 25-38.
- Haghighi, M., Akbari, M. & Lalian P. (2010). Factors affecting insurer loyalty (case study: Iran Insurance Company). *Journal of Insurance Industry*, 25(1), 75-95.
- ICBC. (2004, 8 22). Mobile Banking (Short Message). Retrieved 12-14, 2007, from ICBC.
- Jacoby, J.W. and Chestnut, R.W. (1978), Brand Loyalty, New York: John Wiley and Sons.
- Jia, S. & et al. (2014). Analyzing and relieving the impact of FCD traffic in LTE-VANET heterogeneous network, in: IEEE Int. Conference on Telecommunications, 88–92.
- Joby, J.(2003). Fundamentals of Customer-Focused Management: Competing Through Service, Westport, Conn. Praeger.
- Jafarpour, M., Ghafoor, Fayazi, M. (2010). Study factors affecting the acceptance of mobile banking services in Parsian Bank. International Conference on Electronic Citizen and Mobile Phone, Tehran, September 12 and 13.
- Bae, J.S. & et al. (2018). Architecture and performance evaluation of MmWave based 5G mobile communication system, in: IEEE ICTC, 847–851.
- Jafari Taheri, H. (2016). Customer experience management in banks: Choice or obligation. Financial Market Group, *Financial Institutions. Banking System Expert*, 7 (6) 56-70
- Kahzadi, N. (2003). E-banking in Iran and the world. Proceedings of the Trade Conference. Electronic, Iran, Tehran: Bazargani Publishing Company.
- Konjkav Monfared, A. & Mirhosseini, M. (2013). Study the factors affecting the acceptance of mobile bank by customers of Bank Saderat Iran branches in Yazd. *Journal of Marketing Management*, 18 (3) 107-120.
- Levanen, T. & et al. (2014). Radio interface design for ultra-low latency millimeterwave communications in 5G era, in: Globecom Workshop - Ultra-Low Latency and Ultra-High Reliability in Wireless Communications, 1420–1426.
- Mukherjee, M. & et al. (2015). Reduced out-of-band radiation-based filter optimization for UFMC systems in 5G, in: Wireless Communications and Mobile Computing Conference, IWCMC, 1150–1155.
- Pekka Pirinen, A brief overview of 5G research activities, in: IEEE International Conference on 5G for Ubiquitous onnectivity, 17–22.
- Punniyamoorthy, M, & Prasanna M.R, (2007), an empirical model for brand loyalty measurement, *Journal of Targeting, Measurement and Analysis for Marketing*, 15, (4), 222-233.
- Rössler, B(2005), The Value of Privacy. Cambridge: Polity Press.
- Royal Bank. (2007). Mobile Banking. Retrieved 11 19, 2007, from Royal Bank Web site:



- <http://www.rbs.co.uk/business/banking/g4/mobile.ashx?referrer=hpb>
- Royal Bank. (2007). Mobile Banking. Retrieved 11 19, 2007, from Royal Bank Web site: <http://www.rbs.co.uk/business/banking/g4/mobile.ashx?referrer=hpb>
- Ravand, M. (2010). Identifying and prioritizing the factors of customer resistance in accepting and using banking in Sepah Bank of Iran. First International Conference on Management, Innovation, and Entrepreneurship, Shiraz.
- Ranjbarian, B., Rashid Kaboli, M., Sanaye, A. & Hadadian, A. (2012). Analyzing the relationship between perceived value, perceived quality, customer satisfaction, and repurchase intention in Tehran chain stores. *Journal of Business Management*, 11, 55-70.
- Saghtachi, M. & Seyed Javadin, R. (2006). Electronic banking and its history development in Iran, *Tadbir Journal*, No.170, pp. 30-36.
- Schaich, F. , Wild, T. (2015). Waveform contenders for 5G—OFDM vs. FBMC vs. UPMC, in: 6th International Symposium on Communications, Control and Signal Processing, ISCCSP, 457–460.
- Seyed Javadin, R. & Yazdani, SH. (2004). Study the factors affecting customer intention to use Internet banking services. *Knowledge Management*, 70, 45-61.
- Salminen A, Ikol-Norrbacka R(2010). Trust, Good Governance Unethical Actions in Finish Public Administration. *International Journal of Public Sector Management* 2010; 23(7): 647-668.
- Schwaig, K., Segars,A., Grover,V., & Fiedler,K(2013), A model of consumers' perceptions of the invasion of information privacy, *Information & Management*,1-12.
- ScreenTonic. (2007). Crédit Agricole to partner ScreenTonic. Retrieved 12( 8). 27-41
- Stanisław Szopiński, T. (2015). Factors affecting the adoption of online banking in Poland. *Journal of Business Research*, 69(11), 4763-4768.9
- Tao, S. (2020) Mining and Utilization of Special Information for Archives Management asedon 5G Network and Internet of Things *Microprocessors and Microsystems*, In press.
- The Banker. (2007). Top 1000 World Banks. London: The Banker.
- The Banker. (2007). Top 1000 World Banks. London: The Banker.
- Taghavifard, M., Zahedi Adib, M. & Torabi, M. (2012). Factors affecting the use of Internet banking services by customers (case study: Mellat Bank). *Journal of Iranian Research Institute of Information Science and Technology Research*, 3, 539-559.
- Van der Neut, N. & et al. (2014). PAPR reduction in FBMC systems using a smart gradient-project active constellation extension method, in:21st International Conference on Telecommunications, ICT, 134–139.
- Wang, Y-S. Wang, Y-M, Lin H-H, & Tang, T-I. (2003). Determinants of user acceptance of internet banking: An empirical study. [Electronic Version]. *International Journal of Service Industry Management*, 14(5), 501-520.
- Wendy W.N. Wan, Chung-Leung Luk, Cheris W.C. Chow.(2005) «Customers' Adoption Of Banking Channels In Hong Kong», *Nternational Journal Of Bank Marketing*, 23(3), 255-272.
- Wunder, G. , Gorgani, S.A. & Ahmed, S.S.(2015) Waveform optimization using trapezoidal pulses for 5G random access with short message support, in: IEEE 16th InternationalWorkshop on Signal Proc.: Advances inWireless Comm., 76–80.
- Zhang, S. & et al. (2014) 5G: towards energy-efficient, low-latency and highreliable communications networks, in: Proceedings of the IEEE ICCS, 197–201.
- Zivyar, F., Ziaei, M. & Nargesian, J. (2012). Study factors affecting customer satisfaction using Servqual Model. *Journal of Modern Marketing Research*, 3, 173-186.

Abadi, M., Saeednia, H., Khorshidi, A. (2021). Presenting a Model of Customer Experience Management in Mobile Banking Industry for Commercial Banks Customers in Dubai. *Journal of Optimization in Industrial Engineering*, 14(2), 215-223.

[http://www.qjie.ir/article\\_678825.html](http://www.qjie.ir/article_678825.html)  
DOI: 10.22094/JOIE.2021.678825

