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Presenting a Model of Digital Transformation Based on Artificial Intelligence in Municipal Services and Improving Customer Satisfaction through the Development of Electronic Business Strategies (Case Study of Tehran Municipality)

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Abstract

Digital transformation in large organizations is possible through a complete study of customer experience, identifying needs and designing new banking services along with creating and developing a business ecosystem. In this research, an attempt has been made by using a mixed method through 200 questionnaires and in-depth interviews with 15 experts using the snowball sampling method of actors to provide a model of digital transformation based on artificial intelligence in municipal services and improve customer satisfaction through the development of business strategies. and electronic work (the study of Tehran municipality). In this research, data and information after determining the structural model by extracting in three stages by thematic analysis method (open coding, axial coding and selective coding) with Max Kyuda software (2018) It has been analyzed and finally, according to the interviews, the components of digital transformation of banking services and improvement of customer experience and satisfaction have been extracted. In this study. Eight main themes of the qualitative section: municipal technological management, municipal technological marketing, system and electronic quality of services, improving the quality of municipal technological services, technological software and hardware infrastructure, customer experience management, organizational culture and risk management were identified.

Keywords: information technology, electronic municipality, digital municipality, service quality, structural equations

1. Introduction

Due to the various functions of municipalities in the economic system of the countries, they have always been the attention of the government and researchers as well as policy makers, and this attention is more than other countries due to the economic and monetary conditions of Iran. Municipalities, by collecting micro and macro capitals of the people, direct these funds to various economic projects that are useful for the country's macro economy and also provide various services to depositors (Eftakhari Sinjani). , 141 0). Naturally, with the growth of competition in the country's municipal system, on the one hand, the development and change of the needs of

customers and the market in all three components of municipal services, resource allocation and resource allocation, on the other hand, the municipality must continuously provide new products, otherwise, the share And their role in the municipal market decreases (1). Simultaneously with the increase in the number of new services offered to the market, the life cycle of services decreases and in this situation, the development of new services becomes an important management issue (2).

Conducting research in the field of smart electronic municipality will greatly contribute to the expansion of theoretical and field research in the field of smart electronic urban management. It will also improve the performance in the field of smart electronic municipality and improve and increase the efficiency of this system, which in turn will make a leap forward. success in this field. It is obvious that the digital revolution in financial services is coming, but unfortunately its impact on the municipal players in Iran has not been taken seriously. Continuous changes in the digital world bring the potential to reduce the role of organizations, but it can help municipalities in providing better quality, faster and cheaper services needed by institutions and people in their daily lives. In order to be on the positive wave of these changes, municipalities must free themselves from the trap of organizational narcissism and understand that simply following the law and waiting for interest rates to increase cannot prevent the loss of their market share. Obviously, if the quality of smart electronic services in municipalities is not given enough attention, the negative effects of this dissatisfaction will have a direct impact on the profitability of municipalities. One of the main factors affecting the growth and improvement of the quality of smart electronic services in municipalities is good governance. Therefore, the construction of the concept of "electronic governance" has played an important role in shaping the existing electronic goals in the information society of municipalities and moving from traditional systems to modern systems. Therefore, it is very necessary and important to design a suitable model of smart digital governance in order to improve the quality of smart electronic services and ultimately the profitability of municipalities, especially the post of municipality which is digital in nature. Therefore, the main goal of this research is to provide a model for the establishment and development of a digital intelligent system to promote and improve the quality of technological services and financial development of the municipality using a mixed analysis approach.

2- Theoretical foundations and research background

The world has been amazed by the rapid advances in technology over the past few decades. Technologies have affected everything, especially organizations (1). Digital organization can be defined as the use of advanced telecommunication technology and networks to transfer resources and information in the urban system. Two important concepts of electronic municipality are electronic transfer and electronic registration services as well as resources (2).

Therefore, digital municipality means that all municipal activities are done digitally and offline, and municipal operations that were only available to customers inside the municipality branch are also available outside the municipality. Among the factors that encourage organizations to use smart electronic systems are the convenience and profitability of municipalities, easy access to the Internet, cost efficiency, increasing the number of Internet users, etc. Online organization, mobile municipality and tablet municipality, check deposit via mobile phone, tax changes, electronic invoicing and online bill payment are popular digital municipality services with lower cost and zero error(3).

The quality of services provided to customers is essential for the profitability and survival of the organization, therefore paying attention to the quality of services for service organizations such as municipal services, insurance, etc. plays an important and essential role. The quality of municipal services is defined as the customer's opinion or attitude regarding the excellence of the service provided in the municipal environment (4).

If municipalities want to increase their efficiency by providing new services, it is necessary to consider important and influential factors such as municipal performance, technological service quality, transparency, ease of use, perceived profitability and low perceived risk by financial technologies and Pay attention to the reliability of municipalities. Also, in order to ensure their survival in the wave of digital changes, municipalities must consider two basic steps: first, the successful management of past technologies, and the second step of governance is the emergence of a huge number of new innovations (6), in the meantime, the penetration of

digital technology governance into the municipal sphere. A paradigm shift in the municipality has created what is known as smart digital governance today. (7) In a simple definition, digital governance means organizational structures for the development and allocation of organizational resources in the field of digital transformation (8). The purpose of this mechanism is to advance the organization's digital actions as best as possible. In the last decade, intelligent digital technologies were able to change the role of information technology in organizations as a whole. Smart e-governance includes new styles of leadership, organization, new methods of discussing and making decisions about organization policies, listening to customers' demands and providing information and services. This type of governance has taken a step beyond simple services and seeks to establish external interactions, expand customer orientation through the participation of customers in making decisions, strengthen democratic institutions and processes, and pay attention to the needs and public priorities of organizations (9). Therefore, the development of smart e-governance is a practical solution to increase transparency and organizational participation (9). Based on this, the establishment and development of this type of governance is one of the most important issues of every government and non-government organization, which should be considered by their managers. The evidence indicates that so far few studies have been done in relation to smart electronic governance models and its establishment and development patterns in organizations, especially municipalities in the country. Digital transformation, especially in governance, is achieved through a complete study of experience and analysis of existing needs and identification of new needs of municipalities, and these are the consumers of municipal services who are the driving force behind the innovative development of municipalities and are considered the most important dimension of smart municipality. (11) Developments The digital field of the municipality has caused the municipalities to take advantage of the new channels of the digital municipality to provide digital services to customers, increase profitability and reduce operating costs (12) and in the optimal intelligent governance ecosystem, which is a social and technical environment consisting of people, organizations and technologies. Smart digital create value by creating cooperative and competitive relationships with other players in the chain and network. (13) This ecosystem not only affects the value chain of a business, but also other components such as manufacturers of complementary products or equipment, outsourcing companies, regulatory organizations. , financial institutions, research institutions, media, universities and even competitors under management. (14) Optimal smart governance can make digital municipalities align with these developments, maintain and increase market share, and also improve digital experience. With the help of information technology experts, customers design digital products based on the understanding of customers' digital needs and present them to customers through the networks in the business ecosystem. (15) In fact, digital smart ecosystems with rapid prototyping, short product development cycles , initial trial marketing, option-based cost compensation, venture capital increase customers' access to new digital services. (16) On the part of municipalities to provide digital facilities, which is a process of providing facilities using the Internet, technology, artificial intelligence, analysis And big data analysis and credit scoring algorithms are alternatives, by creating a chain of cooperation with other parts of the municipal ecosystem such as landtechs, they provide quick and smart credits to applicants. This process has three main components, including the use of digital channels, the use of digital data. and it includes focusing on the experience and interaction with the customer and affects the way of providing municipal services. (17) Therefore, developments such as the digital revolution, increasing the penetration rate of the Internet, smart phones, the entry of venture capitalists and accelerators in the path of business development Digital as well as the development of digital municipal business ecosystems in recent years has strongly influenced the way digital services are provided. It is clear that municipalities must operate in the business ecosystem in order to be empowered to survive in a digital world, to meet the increasing expectations of customers and also to develop their products and services, and if municipalities do not react to the new conditions, they risk losing Communication with customers, reduction of support for the municipality's brand and reduction of profitability will be faced. Despite the mentioned necessities, we are witnessing that many municipalities are facing countless political and legal, economic, technological, social, and cultural obstacles in the digital municipality business ecosystem. In this regard, in a 2017 research, Dap emphasized the importance of modern and smart online municipality and added that modern online municipality is significantly more personal, simpler, intuitive and convenient for the customer. Customers themselves are at the heart of the digital municipality ecosystem with their secure online accounts.

In 2019, Galazova and Magomava emphasized the importance of fintechs, blockchains, the role of legislators and laws, as well as the impact of new financial technologies in the effective networking of the digital municipality ecosystem in their research titled "Transition from traditional municipality to digital municipality". . In a research, Shokralhi et al. (2024) examined the relationship between the digital evolution of electronics and new information technologies through the use of artificial intelligence and organizational innovation. Perlman stated in a research in 2017 that digital service ecosystems include four main players: market users, market service providers, digital infrastructure and the government. The disruptions and trends of digital municipality in 2020 have pointed to the connection between fintech ecosystem and digital municipality through optimal governance in the provision of digital services.

In 2021, Angrani, Hepsari and Muslim published research results under the title of factors affecting the customer in the use of digital municipality, in which factors such as habit, price value, hope for performance, social impact, employment behavior from the customer's perspective were mentioned.

Matuskaya, Vechkinzova and Birakov in a research called Organizational Ecosystems: Identifying Latent Innovation Opportunities to Increase Their Long-Term Competitiveness Based on the Technology Enhancement Model in 2022 concluded that ecosystem organization by organizations due to the greater number of innovative technologies and the possibility of disposing of ownership Spirituality creates opportunities to form new profit centers and provides competencies and new opportunities and prospects for growth.

In the research entitled Digital transformation in the manufacturing industry under the optics of digital platforms and ecosystems, which was published by Okano, Antones and Fernandes in 2021, they pointed out the importance of perspective in the business ecosystems of the organizational field. They examine the transformation process of digital governance of manufacturing companies. And they consider five cases that differ in the degree and depth of connection of companies in digital reality. According to the theoretical and empirical studies of the subject, it can be said that despite the necessity of aligning municipalities with global digital trends, a comprehensive research on digital municipal governance ecosystems that examines all the actors and factors influencing each one and its impact on improving the quality and financial development of customer satisfaction has not been accepted. Therefore, by answering the questions raised, this research is able to make a significant impact in identifying the components and indicators of improving digital municipal business ecosystems and improving customer experience and satisfaction, and also lead to the development of scientific fields.

Also, despite the compilation of a limited theoretical background in the field of development of ecosystems for improving the quality of digital and smart municipalities, despite the scattered views in this field and the placement of previous studies in the initial stages of consensus regarding the development model of digital governance and how it is related to the improvement of the quality of services and its financial development among researchers and experts have not been achieved, and as a result, each researcher has investigated several dimensions and limited factors in his own opinion, and a research that provides a comprehensive look at smartness in a comprehensive municipal ecosystem, especially the post of municipality, the key players and factors affecting this ecosystem Identifying and finally investigating the impact of intelligent transformation, increasing the quality of technological services and ultimately financial development of municipalities has not been taken into account. As a result of this research, it examines the existing gaps and in order to provide a model of digital transformation based on artificial intelligence in municipal services and improve customer satisfaction through the development of electronic business strategies (Tehran Municipality's case study).

3- Research method:

The research method in this research is of applied type. In terms of the audience, the present research is an applied research, in terms of the goal, it is of an analytical type, and in terms of the process, it is a mixed (qualitative-quantitative) research. In qualitative research, there is no predetermined framework such as a model, and this framework is designed based on data that will be collected, and considering that the purpose of the research is to examine the necessary infrastructure to provide a model of electronic smart municipality, the purpose of the research is to discover and It is an exploratory research. The exploratory method is especially

useful when there is insufficient knowledge about a phenomenon. The exploratory method can be followed by searching literature, talking to experts in the relevant field and conducting interviews with individuals or groups, reading various texts and writings, consulting with professors and experts. The main goal of exploratory research is to know the situation about which there is no necessary information.

In this research, it is based on the classification of mixed data collection methods (qualitative-quantitative). The method of collecting the required data in the research group is a combination of exploratory research, which was carried out in the following two consecutive stages.

In order to analyze the theme analysis method and to analyze the validity of the proposed model, the statistical inference test method has been used. Experts' opinions are used to check the validity of the research data collection tool.

. In this way, another person (one of the elites of this field) has classified the codes into concepts without knowing how to integrate the codes and concepts created by the researcher. Then the concepts presented by the researcher are compared with the concepts presented by this person. Finally, according to the number of similar and different concepts created, the Kappa index is calculated

In the second phase of the research, which is the quantitative phase, the structural equation method and smart.pls software are used to validate the model, and the research model is tested using the partial least squares technique.

In the qualitative part, validity was confirmed through descriptive description, homogeneity matching (triangular) and reflectivity and cooperation, and reliability was calculated through Holstein's coefficient, and the number of this coefficient was 0.712, which is greater than 0.6. Therefore, the reliability of the qualitative part is desirable. In the quantitative part, the viewpoint of 30 people was used to measure the validity of the quantitative part. Because it has been used for 30 people, the value of CVR must be above 0.33, which is true in all cases. Also, the necessary condition for confirming the indicators based on CVI is that this value should be greater than 0.79. This condition is also valid for all indicators. The results of validity calculation in the quantitative section are shown in Table 1.

Table 1: Content validity ratio and questionnaire indicators

Result	CI	CR	Questionnaire items
confirmation	0.81	0.81	Support of municipal managers for innovative activities
confirmation	0.95	0.67	Using the mechanisms of M Novin in the middle Municipal systems
confirmation	0.88	0.95	Deployment Hu sh Artificial in Ara E Services urban
confirmation	0.90	0.81	Using the strategy Proportionate ones with Head F Take it and keep it Customers N
confirmation	0.88	0.61	Attracting committed and dedicated people p
confirmation	0.83	0.41	Behavioral competency of forces
confirmation	0.88	0.41	Increased presence in the media and competitive market
confirmat	0.88	0.54	The ability to answer and react fast to needs

ion			
confirmation	0.95	0.61	Development and to Getting a job Smart technologies novel
confirmation	0.90	0.47	Increase in skills Professionals forces
confirmation	0.81	0.86	Accuracy and concentration of the system and employees in providing municipal services
confirmation	0.97	0.61	Technological facilities and equipment
confirmation	0.97	0.61	Reliability
confirmation	0.95	0.67	Ease of receiving and providing municipal services
confirmation	0.90	0.41	Ease of interaction
confirmation	0.81	0.73	Improving accountability and clarifying performance
confirmation	0.88	0.73	Development Programmers and consultants financial technologically
confirmation	0.95	0.41	Using cloud technologies with high security , High reliability and adaptability
confirmation	0.83	0.81	capacity building , Competence , flexibility Acceptance and speed of service
confirmation	0.97	0.81	From continuous to software modifications
confirmation	0.100	0.86	Compilation of strategy for software and hardware constructions
confirmation	0.81	0.54	Infrastructure flexible Information technology
confirmation	0.95	0.67	Tanu A a section to portfolio Actions and services
confirmation	0.81	0.61	Ara A Service T Consulting in terms of income financial full of letters Ha , after ha and capital passing Huh
confirmation	0.97	0.54	Protecting the privacy of customers
confirmation	0.100	0.67	-24hour follow-up, guarantee and service
confirmation	0.88	0.81	Gaining trust and increasing customer loyalty to the municipality

confirmation	0.97	0.73	Improving the satisfaction of customers and citizens
confirmation	0.81	0.100	Change in the logo of culture technologically Our system
confirmation	0.88	0.73	Flexible culture Acceptance and inclination To correct Service T
confirmation	0.90	0.61	Establishing a culture of change
confirmation	0.83	0.73	Implementation of learning culture
confirmation	0.95	0.67	adapt With the rapid change in the needs and preferences of customers
confirmation	0.90	0.41	Inflation reduction and tax regulations
confirmation	0.83	0.41	Reducing organizational problems
confirmation	0.83	0.41	adapt with Changes My fashion They are not strong urban
confirmation	0.95	0.81	Removing obstacles and political and economic problems

- The steps of qualitative analysis of the theme

The six stages of qualitative analysis of the theme are explained below:

First step: getting to know the data

In the first stage, the researcher immerses himself in the data in order to familiarize himself with the depth and scope of the content. Immersing in data means actively reading data and repeatedly reading data. At this stage, it is attempted to identify various factors related to the design of the model for improving the quality of banking technological services in Iran from the interview texts.

Second step: creating initial codes

At this stage, coding is done manually or through software programs. In order to code manually, the data should be done by writing notes or phosphorizing, etc. on the text being analyzed. For example, it is possible to specify the codes first and then match them with the summary of the data that shows the code. It should be noted that all data summaries are coded and arranged in the format of each code. At this stage, the indicators that are related to the purpose of designing a model for improving the quality of municipal technological services in Iran are extracted.

The third step: searching for themes

In this step, the different codes obtained from the previous steps are sorted into different potential categories and the coded data are sorted into specified categories. At this stage, the researcher begins to analyze his codes and considers how different codes can be combined to create a general category. At this stage, by checking the codes, the items with the same meaning are merged and duplicate codes are removed, and the indicators extracted from the text of the interviews are categorized.

In order to preserve the information of the interviewees, each of the interviewees is displayed with MIX code. The letter M stands for the interview, the letter I stands for the interview number, and the letter X stands for the initial code number extracted from the interview text.

The fourth step: Reviewing the themes

Whenever the researcher creates a set of themes and reviews them, the fourth stage begins. In this stage, the existing themes are reviewed and refined. First, the review is done at the level of the coded summaries, and in the next step, the validity of the themes is checked in relation to the data set. If the map does not fit the data set well, the researcher should continue coding until a satisfactory category map is created and then move on to the next step.

At this stage, the researcher must have sufficient knowledge of the different categories, how they fit with each other, and the whole story they tell about the data. The indicators obtained from the texts of the interviews, after categorization, are re-examined and additional indicators or those without lexical value are removed in order to present the research model, and the final classification is obtained.

The fifth step: defining and naming themes

Whenever the researcher achieves a satisfactory map of the categories, the fifth stage begins. In this stage, the researcher defines the themes presented for analysis and then revises them and re-analyzes the data. The nature of what a category discusses is determined by defining and reviewing which aspects of data each category contains. In the fifth step, the main and sub-themes of the research are named and a specific theme is considered for each category of extracted codes. In Table 1, the main and secondary themes of this research are mentioned.

The sixth step: preparation of the report

The sixth stage begins when the researcher has a set of well-defined themes. In this research, after examining and categorizing the descriptive codes that were obtained from the interviews with municipal experts, 37 subthemes were obtained, and after merging similar themes and removing additional themes, 8 main themes including: technological banking management, technological marketing Banking, gaining competitive advantage, improving the quality of banking technological services, technological software and hardware infrastructure, customer experience management, organizational culture and risk management were categorized. It should be noted that the categories analyzed in this research are not definitive and can only be cited for this research.

- The statistical population in the quantitative part was all the customers of different branches of Tehran municipality who use the technological services of the municipality in some way. According to the statistics announced by the Informatics Unit of the Municipality in 2023, the total number of customers of Tehran Municipality was about 123,000, of which 16% were legal people and 84% were real people, and about 78% of customers use the technological services of the municipality. Therefore, Cochran's formula was used to determine the sample size. Therefore, 384 questionnaires were distributed among the customers of Tehran municipality in a simple random manner in the form of simple stratified sampling. It is impossible to collect data from the entire statistical population.

In Table 2, Cronbach's alpha related to each dimension of the questionnaire is given:

Table 2-Cronbach's alpha related to each dimension of the questionnaire

Cronbach's alpha	Main structures
0.734	Directorate of Technological Municipality
0.738	Municipal technological water market
3.0 4 8	Gaining a competitive advantage
0/1 5 8	Improving the quality of municipal technological services

0.866	For technological software and hardware constructions
0.865	Customer experience management
0.898	Organizational Culture
0.749	risk management

4- Research results

In the field of demographic information in the qualitative section, Table 1 was designed.

Table 3: Demographic characteristics of experts

Percent	Abundance	Demographic characteristics	
82	9	Man	gender
18	2	Female	
10	1	Less than 35 years	Age
45	5	to 45 years 35	
45	5	years and more 45	
27	3	Masters	education
73	8	P.H.D	
63	7	to 20 years 10	Work Experience
37	4	Over 20 years old	
100	11	Total	

- Prioritizing variables using the fuzzy AHP approach

After the introduction of the fuzzy AHP method by Saati in the 1970s, many models in the field of fuzzy AHP have been presented by various researchers. In these methods, fuzzy and hierarchical concepts have been used in a combined manner.. In the first step, a questionnaire was prepared for pairwise comparisons and given to 15 experts, which was explained in the previous chapter, and the results of the questionnaire were It has been analyzed using MATLAB software. The results are as follows:

Table 4: Final weights of criteria for improving the quality of municipal technological services with the AHP approach

risk management	Organizational Culture	Customer Experience Management	For technological software and hardware constructions	Improving the quality of municipal technological services	Quality of system and electronic services	Municipal technological water market	Directorate of Technological Municipality	Criteria
0.1	0.16 3	0.161	0.151	0.17	0	0.17	0.19	V

25				8	.168	7	3	eight

Inconsistency rate: 0.02

According to the above table, municipal technological management, improving the quality of municipal technological services has the highest priority, and risk management has the lowest priority. Also, the compatibility rate is equal to 0.02, so the compatibility of the criteria with the purpose of the research is acceptable.

The output of MATLAB software for prioritizing subsets of improving the quality of municipal technological services according to experts' answers is as follows:

Table 5 :Rating of dimensions and components

rank	Weight	The subject of N sub	The subject of N Main
2	0.082	Protection Managers Municipality From Activities innovative	**Technological municipal management**
3	0.078	Deployment Mechanisms Naveen At domain Systems Municipality	
14	0.050	Deployment intelligence artificial At presentation Services urban	
5	0.074	use Strategy Hey proportional with the goal attraction And maintenance customers	
8	0.069	attraction the force human committed And Expert	
12	0.058	merit behavioral forces	**Marketing Municipal technology**
1	0.104	Increase Presence At media And Market competitive	
34	0.018	ability Response And reaction fast To needs	
7	0.071	Development And to employment technologies smart novel	
10	0.059	increase skills professional forces	**Quality of system and electronic services**
36	0.016	precision And Focus System And Staff At Presentation Services Municipality	
3	0.078	Possibilities And Equipment technologically	
35	0.017	Ability the trust	
28	0.028	ease At receive And Presentation Services Municipality	
13	0.055	ease At establishing Interactions	**Improving the quality of municipal technological**
16	0.048	improvement responsiveness And clarification Function	

37	0.012	Development Programmers And Consultants financial technologically	**services**
17	0.047	Use From technologies cloudy with security Top ,ability sure And compatibility Top	
30	0.026	Reinforcement ability, merit, flexibility acceptance And the speed Services	
19	0.043	Need Ongoing To Reforms software	**Technological hardware and software infrastructure**
20	0.044	Editing Strategy infrastructures software And hardware	
21	0.042	infrastructure flexible technology information	
22	0.041	variety a section to portfolio actions And services	
26	0.034	presentation services consultation At special the income financial payment ha, after The sizes And capital put Huh	**Customer Experience Management**
24	0.036	keep privacy Personal Customers	
25	0.035	Follow up, guarantee And Presentation 24 hour service	
23	0.038	catch the trust And Increase Loyalty Customers To Municipality	
27	0.030	Promotion satisfaction Customers And Citizens	
11	0.057	change At pattern culture technologically organization	**Organizational Culture**
29	0.027	culture flexibility acceptance And inclination to correction services	
18	0.045	Establishment Culture Creation change	
31	0.025	Implementation Culture learning	
15	0.049	conformity Find with Changes quick At needs And preferences Customers	**risk management**
33	0.021	Decrease swelling And The specifics tax	
5	0.074	Decrease Difficulties organizational	
9	0.061	conformity Find with Changes continuous Laws urban	
32	0.022	Elimination obstacles And Difficulties political And Economic	

- **Interpretive-structural modeling**

To check the significance of the relationships between the variables of the model, T-value has been used, which gives the t-statistic. At the 5% error level, if the value of the bootstrapping statistic is greater than 1.96, the observed correlations are significant. The t-statistic and bootstrapping value to measure the significance of relationships are also given in Figure 1.

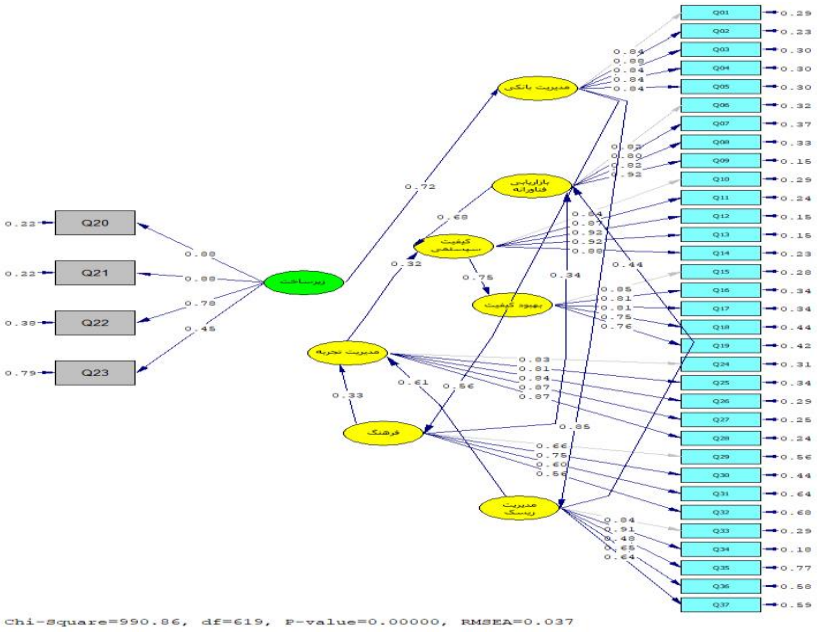

Figure 1: Model validation output using structural equation model method

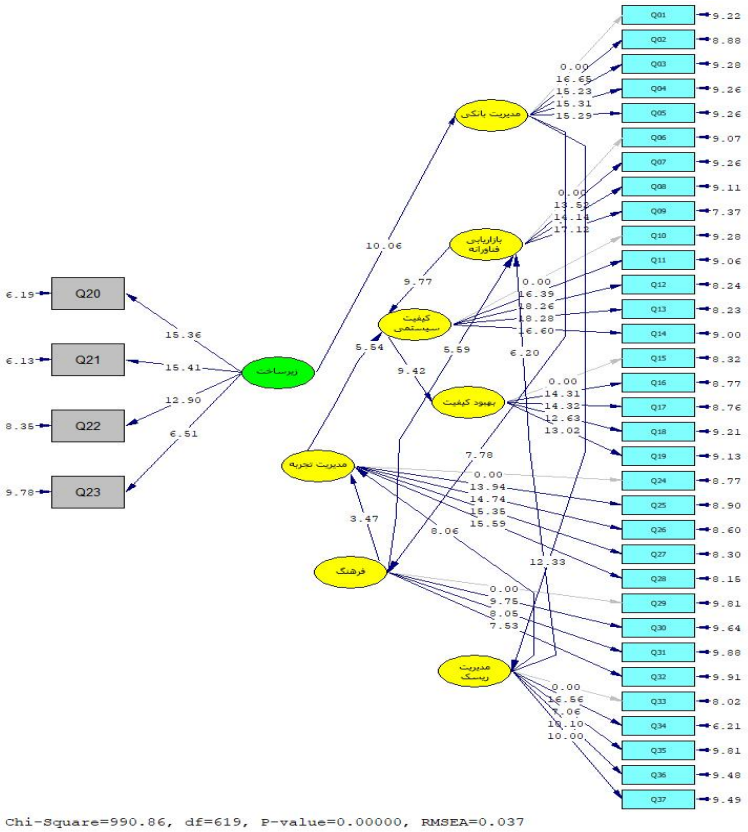

Figure 2: Significance of relationships between variables using structural equation model method (T-Value)

The impact factor of technological software and hardware infrastructure on technological municipal management has been obtained as 0.72. Also, the value of t statistic is 10.06. Therefore, it can be claimed with 95% certainty: technological hardware and software infrastructures have a positive and significant impact on the management of smart municipalities. The impact coefficient of smart municipality management on organizational risk management has been obtained as 0.85. Also, the value of t statistic is 12.33. Therefore, it can be said with 95% certainty: Technological municipal management has a positive and significant impact on risk management. The impact coefficient of technological municipal management on organizational culture has been obtained as 0.56. Also, the value of t statistic is 7.78. Therefore, it can be claimed with 95% certainty: Technological municipal management has a positive and significant impact on organizational culture. The coefficient of impact of risk management on technological marketing of the municipality has been obtained as 0.44. Also, the value of t statistic is 20.6. Therefore, it can be claimed with 95% confidence: risk management has a positive and significant effect on municipal technological marketing. The coefficient of influence of organizational culture on municipal technological marketing has been obtained as 0.34. Also, the value of t statistic is 5.59. Therefore, it can be claimed with 95% certainty: organizational culture has a direct and significant impact on municipal technological marketing. The coefficient of impact of risk management on customer experience management has been obtained as 0.61. Also, the value of t statistic is 8.07. Therefore, it can be claimed with 95% certainty: risk management has a positive and significant impact on customer experience management. The coefficient of influence of organizational culture on the experience management of municipal customers is 0.335 and the value of t-statistic is also 3.48. Therefore, it can be claimed with 95% confidence: organizational culture has a positive and significant effect on customer experience management. The impact coefficient of municipal technological marketing on the system and electronic quality of services has been obtained as 0.68. Also, the value of t statistic is 9.77. Therefore, it can be claimed with 95% certainty: the technological marketing of the municipality has a positive and significant effect on the system and electronic quality of services. The impact coefficient of customer experience management on system quality and smart services is 0.32 and the t-statistic value is 5.54. Therefore, it can be claimed with 95% certainty: customer experience management has a direct and significant impact on system quality and smart electronic services. The coefficient of influence of system quality on improving the quality of municipal technological services is 0.75 and the t-statistic is 9.42. Therefore, it can be claimed with 95% certainty: the system and electronic quality of services has a direct and significant impact on improving the quality of smart municipal services.

5. Conclusion

The results showed that smart infrastructure and technological hardware have a direct and significant impact on the management of technological municipality. Smart municipality starts with the development of digital culture. The migration towards digital municipality has requirements that include the entire ecosystem of the municipality. In one word, to create smart municipal infrastructures, it can be said that smart software, integrated architectures, transferring customers to the digital space, integrating the information technology team with the business and marketing team and managing the technological municipality were requirements. Technological municipal management has a positive and significant impact on risk management. The current hypothesis is confirmed by the research done by Messing et al. (2010). Building a digital municipality from the beginning provides the possibility of creating a flexible technology infrastructure and correct management of the information technology municipality, which leads to the creation of an ideal state of risk management. It also helps to optimize the municipal balance sheet to achieve a higher return on investment than the income and ensures compliance with the continuous changes of the municipal laws instantly.

Using cloud technologies with security, it is better for smart municipal websites to have enough technical capabilities to ensure that the data sent by customers to the municipality is not hacked. Electronic municipality systems must have sufficient security standards to protect the financial and personal information of customers. According to the findings, the more favorable perceptions customers have of protecting their privacy in e-municipality, the more trust they will have in e-municipality. Accordingly, it is necessary to use technological mechanisms that can prevent the theft of online customer information by third parties; In addition, conditions should be provided for customers to ensure that electronic municipal systems do not use their personal

information for other purposes without their permission. One of the limitations of this research is the cross-sectional nature of the research, which limits the generalizability of the results. The use of cross-sectional data does not help us in interpreting the design of the digital transformation model of banking services and improving customer experience and satisfaction through the development of business ecosystems in municipalities. Therefore, it is suggested to carry out longitudinal studies to increase our knowledge regarding the possible relationship between causes and effects. The statistical population is only related to 15 experts, so the research results cannot be generalized to all branches, specialties and other scientific trends. Due to the limited statistical population, the research cannot be generalized to the whole country. The research is cross-sectional, so it is difficult to draw conclusions about causality and analyze all the influencing factors.

The suggestions based on the research results are: increasing the security of cyber information and digital automation, improving the internal communication of research and development units and designing services and marketing, helping to increase the digital experience of employees, helping to increase the digital experience of customers, helping to increase collaboration with Ecosystem players, focusing on open and innovative banking, attracting specialized human resources, organizational agility and flexibility, creating marketing and sales methods for digital services, helping to increase the level of organizational digital maturity, personalizing digital services, providing the possibility of outsourcing alternative services. Helping to increase digital business processes is helping to increase organizational digital culture and skills.

It is suggested to conduct further research based on larger samples and in other similar organizations in other countries. It is suggested to use experimental and semi-experimental research to investigate this issue.

References

[1] Mohammad Shokrollahi, Elham Eftekhari, Mina Mostahfezian, & Hamid Zahedi. (2024). The Complex Relationship, Between The Culture Of An Organization And Its Significant Impact On Promoting Novel Principeles Entrepreneurship Within Knowledge Based Companies, In Iran. Educational Administration: Theory and Practice, 30(7), 903–910. https://doi.org/10.53555/kuey.v30i7.6886

[2] Khatoon, S., Zhengliang, X., & Hussain, H. (2020), "The Mediating Effect of customer satisfaction on the relationship between Electronic banking service quality and customer Purchase intention: Evidence from the Qatar banking sector", SAGE Open, 10(2). pages 215824402093588.

[3] Ananda, S. (2017), "Bank marketing: Issues, challenges, and strategies in a globalized competitive environment. In Banking sector in Oman: Strategic issues", challenges and future scenarios (pp. 29-45). Muscat: College of Banking and Financial Studies.

[4] El-Chaarani, H., & El-Abiad, Z. (2018). The impact of technological innovation on bank performance. El-CHAARANI H. and El-Abiad, (2018.(

[5] Fairooz.H. M. M., & Wickramasinghe.C. N. (2019). Innovation and Development of Digital Finance: A Review on Digital Transformation in Banking &Financial Sector of Sri Lanka. Asian Jornal of Economics, Finance and Management, 1(2), 69-78.

[6] Raza, A., Ahmad Rather, R., & Saeed Bhutta, U. (2020), "An assessment of corporate social responsibility on customer company identification and loyalty in banking industry: a PLS-SEM analysis", Management Research Review . Emerald Publishing Limited 2040-8269.43(11), 1337-1370.

[7] Stanley, J., & Briscoe, G. (2010). The ABC of digital business ecosystems. arXiv preprint arXiv:1005.1899.

[8] Sardana, V., & Singhania, S. (2018). Digital technology in the realm of banking: A review of literature. International Journal of Research in Finance and Management, 1(2), 28-32.

[9] Sarel, D., & Marmorstein, H. (2003). Marketing online banking services: the voice of the customer. Journal of Financial Services Marketing, 8, 106-118.

[10] Senyo, P. K., Liu, K., & Effah, J. (2019). Digital business ecosystem: Literature review and a framework for future research. International journal of information management, 47, 52-64.

[11] Arsanjani, A., Gholipour Soleimani, A., Delafrooz, N., & Taleghani, M. (2019). Challenges of the Iranian E-Banking Business Model in Digital Transformation. Journal of Money and Economy, 14(3), 389-419.

[12] Dapp, T. F. (2017). Fintech: the digital transformation in the financial sector. Sustainability in a Digital World: New Opportunities Through New Technologies, 189-199.

[13] Lee, I., & Shin, Y. J. (2018). Fintech: Ecosystem, business models, investment decisions, and challenges. Business horizons, 61(1), 35-46.

[14] Lindgren, P. (2016). The business model ecosystem. Journal of Multi Business Model Innovation and Technology, 4(2), 1-50.

[15] Okano, M. T., Antunes, S. N., & Fernandes, M. E. (2021). Digital transformation in the manufacturing industry under the optics of digital platforms and ecosystems. Independent Journal of Management & Production, 12(4), 1139-1159.

[16] Pidun, U., Reeves, M., & Schüssler, M. (2019). Do you need a business ecosystem. BCG Henderson Institute, 11.

[17] Wewege, L., Lee, J., & Thomsett, M. C. (2020). Disruptions and digital banking trends. Journal of Applied Finance and Banking, 10(6), 15-56.

[18] Anggraeni, R., Hapsari, R., & Muslim, N. A. (2021). Examining Factors Influencing Consumers Intention and Usage of Digital Banking: Evidence from Indonesian Digital Banking Customers. APMBA (Asia Pacific Management and Business Application), 9(3), 193-210.

[19] Galazova, S. S., & Magomaeva, L. R. (2019). The transformation of traditional banking activity in digital.

[20] Paloniemi, R., Evange.lia A., Joanna C., & Dimitrios B. (2015). Public participation and environmental justice in biodiversity governance in Finland, Greece, Poland and the UK. Journal of Environmental Policy and Governance, 25, 330–342

[21] .Ilyas, M. (2016). E-Governance Practices and Models; Options for Pakistan, Institute for Strategic Studies. Journal of Research and Analysis (ISSRA), 43-64.

[22] Madon, Sh. (2015). ICT4D and E-Governance. The International Encyclopedia of Digital Communication and Society. First Edition.

[23] Perlman, L. (2017). Competition aspects of digital financial services. ITU-T Focus Group Technical Report, (03), 17-50

[24] Baghbadorani, M. F., & Harandi, A. (2012). A conceptual model for business ecosystem and implications for future research. International Proceedings of Economics Development and Research, 52(17), 82-86.

[25] Mohammad Shokrollahi, Elham Eftekhari, Mina Mostahfezian, & Hamid Zahedi. (2024), Adoption of Strategies of Electronic Digital Innovation and Transformation and New Information Technologies Via Application of AI based on Organizational Culture Within Commercial Companies , power system technology journal, Volume 48 Issue 2, 418.

[26] Fairooz.H. M. M., & Wickramasinghe.C. N. (2019). Innovation and Development of Digital Finance: A Review on Digital Transformation in Banking &Financial Sector of Sri Lanka. Asian Jornal of Economics, Finance and Management, 1(2), 69-78.

[27] Madavan. K,. & Vethirajan.C. (2020), "Customer Satisfaction on E-Banking Servises of Public and Private Sector Banks in Puducherry Region– an Empirical Analysis", International Journal of Management (IJM), 11(6), 649-664.