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Ranking the Components of Smart Network Governance in the Banking System using Analytical Network Process (ANP) Technique

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Abstract

This research aimed to rank the components of smart network governance in the Iranian banking system. This article discusses the prioritization of the governing elements of smart grids identified from the research conducted by the researcher is discussed. This research was carried out quantitatively and with a simple survey method. The participants of this research were managers and experts of the country's banking system. Participants were selected via purposive sampling with the criterion of at least 10 years of experience in banking management, at least a master's degree, and with the study field of preferably management. The data analysis was done using the method of network analysis process. Super Decision software was used for data analysis. The research results show that the components of the smart network governance model compiled in order of priority include behavioral factors, stability and economic prosperity, mechanism factors, legal considerations, structural factors, comprehensive development, and information and communication technology.

Keywords: *Network, governance, smart governance, banking system, ranking of components*

Introduction

The world today is certainly facing challenges that are caused by the transformations resulting from the progress of science and industry and the design of new organizational and social needs. A serious challenge for the public sector is the production of public goods and services. Network governance has been proposed as one of the desirable methods of governance in the sense of increasing the ability to solve sustainable problems in the fields of political, social, and economic systems (Rashidi et al., 2021:75). This governance is done by cooperation between different stakeholders in the government, improving participation increasing the integration of different resources, taking advantage of the capabilities of different stakeholders and supporting collective action (Kashyap e et al., 2020:33).

One of the most important changes created by network governance is the elevation of the network's role in the process of policy formulation, implementation, and coordination of policy-making programs and the provision of public services. The two main dimensions of network governance are network structure and actors. Actors of the network are determined to lead a specific program in line with the goal of the network and cooperate (Martin, 2003:255).

Network governance has been used with various meanings. However, the most common denominator of all these concepts is that this concept provides a special tool for policymakers and policy analysts to deal with complex issues. Complicated issues are the issues that have little time to answer, hence,

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the cost of failure to answer them is high. They also include such issues as health or transportation that are essential needs of citizens and many actors are responsible for solving them. Network governance has also been used as a method of dealing with complex issues such as rapidly changing political spheres or the issue of coordination among many actors. From the normative perspective, network governance is used as a desirable form of administration, which is established as a result of flexibility and the availability of participation (Modbek and Montez, 2006, 168)In general, high . attention to complex issues indicates a specific dual situation in the future. Each of these dual situations indicates uncertainty about the future of multi-criteria decision-making (Roghani et al., (2020). In one of the reports of the World Bank (1989) about the African continent, governance is defined as "the exercise of political power to manage the affairs of a nation". The Ottawa Governance Institute considers governance to include institutions, processes, and regulations in society that determine how power is exercised, how important decisions affecting society are made, and how different interests find a place in such .decisions. (Kazmin, 2016)

One of the issues that analysts in this field, especially thinkers in the field of political science, have always been concerned about is the issue of the democratic functioning of networks. The question was whether there is a possibility of monopoly of some actors and some procedures and methods in the networks. The relationship between network governance and democracy is ambiguous. On the one hand, the non-hierarchical nature of governance allows new groups to enter politics. Processes; on the other hand, governance by spreading the political effects of representative institutions to citizens strengthens democracy (Abdullah et al., 2018:6). However, network governance has certain characteristics that seem incompatible with the basic values of democracy. For example, networks lack many binding formal arrangements for democratic processes; for example, there is the possibility of not establishing transparency, accountability, and methods by which people's participation in the network is expected to strengthen. There are even other doubts about the democratic nature of the networks. This criticism has been raised about governance, which is relatively unpopular Therefore, it has the weakness of political network legitimacy and accountability. Also, it is stated that one of the governance tools and one of the main issues in network governance is network management (Kashyap et al., 2020:33). The meaning of smart governance is to provide a platform for the integrated management of banking affairs. This platform should provide services and interactions between customers and the bank to achieve effective and efficient smart network governance. The most important effective tool in this field is the use of FAVA (including communication infrastructure, hardware, and software) i.e. use of intelligent processes and information-based decision-making. The interaction and participation of all private public and governance factors is one of the requirements to achieve smart governance. The development of the dimension of smart governance, due to its fundamental nature, becomes the basis for the development of other dimensions of smartness. (Hosseini et al.,2022:96). According to the results of the research, shows that by using the intelligent system, the status of "success of the organization's network management" can be examined numerically and more accurately (Yari et al.,2021). The banking system plays a role as a part of the country's economic system, and in the best case, it can effectively fulfill the assigned missions. The effectiveness of the banking system will be possible when the other elements and parts of the puzzle and economic complex of the country are also located in their right place have a proper performance and can have a convergent interaction and participation with each other. The connection and integration of economic issues with the banking industry is an undeniable phenomenon, in such a way that

whenever there is talk of the economy and improvement in the economic situation, a task is quickly assigned to the banking network and a significant share of the supporting factors is directed to the banking industry. According to most economic experts in Iran, this country has a bank-oriented economy. This coefficient of adhesion is evident; accordingly, the banking network is expected to support and promote economic goals. Therefore, in such a situation, compliance with banking requirements and standards, to maintain the health of the bank's mechanism in the cycle of equipping and allocating financial resources under stable conditions, is of particular importance and emphasized by all those involved in the country's economic system (Gholamhosseini, 2021). Modern banks have shifted their function from purely administrative, economic, and industrial entities into socio-political institutions that must be sensitive to the surrounding environment (Mohammadkha et al., 2020) Considering the above, it can be said that in a general classification, banks are facing the following two main challenges: A) Internal organizational challenges that are directly the result of the performance and operations of the bank's internal organization according to the decisions made by the decision-making authorities, including the shareholders, the board of directors and other influential elements of the bank. B) External organizational challenges that are the result of communicating policies adopted by decision-making authorities such as the Islamic Council, the government, and the judiciary. (Gholamhosseini, 2021). The purpose of this research is to rank the components of smart network governance in the country's banking system using the analytical network process (ANP) technique. This article aims to rank the identified components derived from the research conducted using the network analysis technique so that bank and non-bank senior managers can use them in their organizational decisions.

Review of theoretical foundations and Background Research

In the most common usage, governance refers to the movement from the previous approach called governance (a top-down legislative approach that seeks to regulate the behavior of individuals and institutions in a specific and detailed manner) to governance (an approach that attempts to regulate the parameters of the system in such a way that individuals and institutions act within it and as a result self-regulation is created and the system achieves the desired results) or it emphasizes the replacement of “exercising power over” with “handing over power to” (Rashidi et al., 2021). A combination of different motivations and the desire to pursue organizational goals in intermediary organizations causes a general set of governance rules to be established. Traditionally, governance in commercial enterprises focuses on the role of the board of directors in representing and protecting the interests of shareholders (Jalali Khanabadi et al., 2019: 3).

Governance in public administration, in addition to paying attention to the activities of the aforementioned boards, mainly considers the supervisory and budgeting role of government organizations. This role of government organizations becomes more important regarding the activities of private organizations that conclude contracts for the provision of public services. (Hale and Lane, 2005).

The transition from government to governance includes two basic processes. First, an increasing number of actors outside the official boundaries of the government have entered the governance process, and this process relies on networks of interconnected actors from the public, private, and volunteer sectors instead of a hierarchy defined by the government. Second, the internal organization of the government has become more complex and multi-level and has been influenced by subnational and transnational institutions (Thomson, 2005).

Some also define governance as "structures and processes by which members

of society make decisions, regulate laws, and share power" (Folke et al.,2005). Smart governance includes political and active participation, citizen services, and smart use of e-government. In addition, smart governance refers to the use of new communication channels, such as electronic government or "electronic democracy" (Pereira et al., 2018:145). Numerous researches that have been conducted in the field of "management" of networks emphasize the point that concerning the relative independence and self-control of the actors, how can the government manage the network in the best way? In response to this question, some researchers have turned to defining frameworks for evaluating network efficiency (Pervon and Millward, 2001) and some have emphasized the role of network structure and management roles (Kennis and Pervon, 2007). Kurt and Klijn (2011) state that to provide optimal performance, the importance of management skills is greater compared to the network structure. Network governance works effectively if the networks function properly (Lewis, 2011).

Smart network governance in the country's banking system has the following dimensions:

Structural factors: according to the opinion of the majority of experts, the type of organizational structure is effective for the activities of the organization and the flexible organizational structure is more suitable for network activities. In this type of organizational structure, there are multiple specializations, collective decisions, decentralized organization, and communication between horizontal and bilateral levels. In modern organizations, flexibility and speed of carrying out innovative processes are important factors and these organizations show more openness, adaptability, and creativity (Jutsin, 2015:238). Mechanism factors: This index expresses concepts such as political rights, freedom of speech and political and social gatherings, freedom of the press, the degree of representation of rulers from different social classes, political processes, and holding elections, etc. (Juda, 2013).

Behavioral factors: The goal of network governance is to coordinate and harmonize complex products and services in competitive and uncertain environments such as the digital ecosystem. Network governance can monitor the changes in the existing network between connected products and services and achieve their harmonization with policy assistance to these products and services (Berkowitz and Hemkarn, 2014:95). All-round development: All-round development includes political development, economic development, social development, and human development (Sadaqt et al., 2018: 96).

Legal considerations: It is to pay attention to high-handed documents, multiple licensing of cement, amendment of laws and procedures, development of technology, and development of mass communication networks (Manourian and colleagues, 2019: 109). Information and communication technology: Information technology is generally considered as an umbrella term that includes a flat umbrella due to its wide range of equipment, programs, services, and basic technologies (Abadi and Khosravi,2019).

Economic stability and prosperity: lack of uncertainty and predictability of economic conditions is necessary for the investment and economic growth of the country. From the point of view of officials, stability means not changing conditions (Khalilian Ashkaziri, 2018: 36).

The smart network governance model in the banking system is based on the results obtained from the research that was carried out to design and compile a model for network governance in the country's banking system, as in Figure (1).

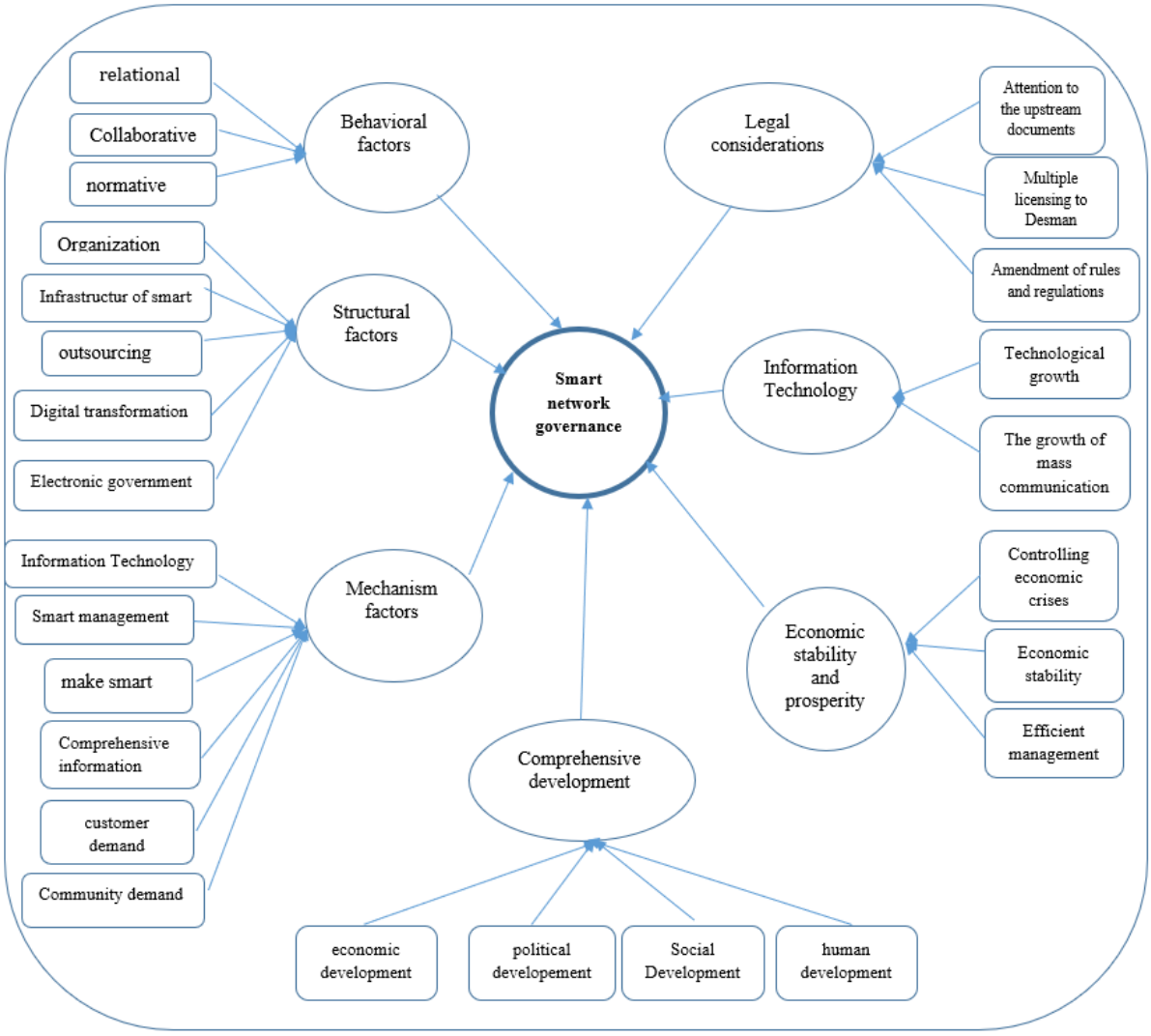

Figure 1. *Smart network governance model in the banking system*

Loss and Ritala (2023) conducted research entitled "Institutionalization of network governance: creating mutual value by restraining and avoiding conflict in inter-organizational networks". This research has created a conceptual model with regulatory, normative, and cultural-cognitive dimensions for the institutionalization of network governance It is assumed that the three dimensions play a role in facilitating or suppressing emotional and cognitive conflicts and ultimately either increase or decrease the benefits of the shared network. By testing the model on a sample of 145 companies in Germany, it was found that affective conflicts are detrimental to shared network benefits, while cognitive conflicts are beneficial. In addition, it was found that each dimension of regulatory, normative, and cultural-cognitive governance has a special role in facilitating or suppressing both types of conflict. Capucho et al. (2023) conducted research entitled "Creating the Resilience of urban infrastructure through network governance". Based on the content and social network analysis of more than 1,000 direct interactions between committee members, it was reported that network governance, as an element of broader hybrid governance, not only produced acceptable agreements for immediate water redistribution, but also improved the system it has also facilitated mutual understanding, conflict resolution, and mobilization of external resources for long-term infrastructure improvements.

Hosseini et al. (2022) conducted research to "identify the antecedents and consequences of smart governance through the fuzzy Delphi approach". The results of the research indicated

that among the antecedents are smart infrastructure, smart interaction, government, and electronic governance, rule of law, smart people and organization, smart management, information-based smartness, knowledge society, smart security and agility, openness, and decision-making. General guidance, rationalism and creativity, and process re-engineering had the highest priority. Among the suffixes are efficiency and effectiveness, sustainable development, cost reduction, corruption reduction, increasing transparency, inclusive justice, and ethics, protection of citizen rights, creation of electronic democracy cooperation and data exchange, comprehensive information systems, and information sharing revision of laws and immediate response to the challenges, the realization of unity and improvement of the quality of life respectively had the highest priority. Rashidi and colleagues (2021) have conducted research entitled "The effect of network governance application on elements of crisis management in natural disasters in crisis-related organizations of Kohgiluyeh and Boyer Ahmad provinces". The results showed that network governance has a positive relationship with the elements of crisis management. The greatest influence of network governance on the elements of crisis management includes crisis forecasting (0.78), dealing with crisis (0.75), crisis preparedness (0.74), and revival and reconstruction after the crisis (0.62), respectively. Therefore, it is necessary that network governance as an interactive method in accidents and crises, in the management of natural crises in Kohgiluyeh and Boyer Ahmad province, in the stages of predicting crises, dealing with crises, and preparing for crises, and finally, the stage of revival and reconstruction should be used.

Owaska et al. (2021) conducted research entitled "Network Governance Arrangements and Rural-Urban Synergy" aiming to identify the kind of network governance arrangements currently existing, the way they can be improved, and whether evolutionary governance paths can be identified. This research has completed the analysis of governance by examining the spatial understanding or combination of different spatial lenses the rural-urban governance arrangements under study rely on, and also the role of smart development in the context under study. The research results emphasize the importance of power-sharing and collaborative decision-making in ensuring balanced and mutually beneficial interactions.

Research Methodology

The research method of this article is quantitative. In terms of the applied-developmental goal and terms of the research method, the present research is survey research. After conducting interviews and distributing the Thomas Saati AHP pairwise comparison questionnaire, data was collected and after analyzing them, the rank of each component of smart network governance was determined. In this research, Tomas Saati's Analytical Network Process (ANP) method was used to identify the rank of smart network governance components and the weight of the model criteria. This method was used to comprehensively investigate the effect of the identified components in the decision-making of bank managers. In the ANP method, we used the pairwise comparison to judge decision-makers on different elements in the network To do so, decision-makers need to express their judgment by entering a number using the basic scale provided by the clock. Then the weighting of the criteria was done, for which Super Decision software was used. Then, to rank and evaluate the key components affecting smart network governance for the Iranian banking system, the network analysis decision-making technique was used. This technique is based on the concept that the selected option should have the smallest distance from the positive ideal (A+) and the largest distance from the negative ideal (A-). In this research, the relevant questionnaire was sent to the managers of Saderat Development Bank through organizational automation, and the questionnaire was completed after conducting a telephone interview and necessary explanations. A total of 10 interviews and supplemental questionnaires were conducted in this research effort was made to include in the research those people who, in addition to the willingness to participate in the interview also had sufficient information about the factors of smart network governance and had

practical experience of this issue in their records. The snowball technique was also used to select people and each of the interviewees was asked to provide the researcher with a list of people who have the desire and expertise to participate in the research.

Network analysis decision making method

The ANP method is one of the multi-criteria decision-making methods (MADM), which is similar to the AHP method; however, in this method, criteria or sub-criteria or options have dependencies or relationships. The AHP method can be considered a special mode of the network technique. If there is a problem in which the criteria have a relationship with each other or the sub-criteria have an internal relationship, it cannot be resolved through the AHP method because the problem goes beyond the hierarchical mode and creates a network mode. In this case, the problem should be solved through the ANP method. The AHP method is considered a special type of the ANP method (Dutt et al., 2016).

Research Findings

In this section, the researcher examined the profiles of banking experts in terms of gender work experience, and age, the analysis of which are given in Table (1).

Table1.
Demographic statistical analysis of experts

Variable	Variable levels	frequency	percent
age	40-50	3	30%
	50-60	5	50%
	60 and up	2	20%
gender	man	10	100%
work experience	10-20	5	50%
	20-30	2	20%
	30and up	3	30%
	sum	10	100%

Data Analysis

First step: developing a decision model

Smart network governance for Iran's banking system using the network analysis decision-making technique includes seven subcomponents. These factors include behavioral factors structural factors, mechanism factors, comprehensive development, legal considerations, information and communication technology, economic stability, and prosperity. In this way, to evaluate and prioritize the key components affecting smart network governance for the banking system of Iran using the network analysis decision-making technique, the network analysis model should be used because the hierarchical structure is not true in this case. In this way, the network structure will be designed in the form of Figure (2).

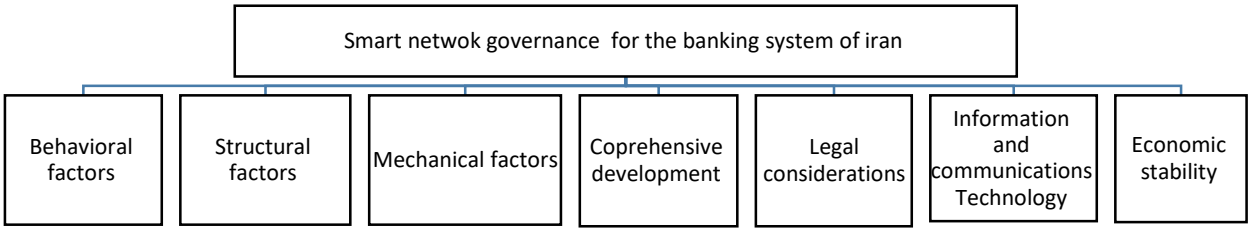

Figure2. *network structure of the model*

As can be seen in the figure, smart network governance for the banking system of Iran is related to its subcomponents, and there are strong internal connections between each of the subgroups, so it is necessary to perform pairwise comparisons for them as well. First, pairwise comparisons are made for the elements of smart network governance for the banking system of Iran. In the last step, pairwise comparisons are made within the group concerning the target. It should be noted that models such as those presented for smart network governance for Iran's banking system and discussed in the research literature are the result of multivariate statistical analysis methods such as factor analysis. This group of different variables is effective in the variable of intelligent network governance for the banking system of Iran such categories place the variables in clusters that are highly correlated with each other, or more precisely, their common variance or covariance is large, and they have little common variance with other groups. For this reason, the network structure was considered only in the subgroups of smart network governance elements for the banking system of Iran, which seems logical because these elements have a strong relationship with each other and, to be precise, have interactions with or mutual effects on each other.

Second step: pairwise comparisons(PWC(among factors elements

To make pairwise comparisons, the opinions of experts should be used, and there are two ways to do this. The first way is unanimous judgment, in which case the group must agree on each member of the decision-making group of the pairwise comparison matrices. This method will be ineffective and very slow when the number of members increases or the power of members is unequal, or when they hide their real opinions for some reason. Also, there will usually be a lot of disagreement. Another way is to make judgments personally. In this method, members comment on pairwise comparisons alone, and then the geometric mean of their opinions is used to determine the values of the comparison matrix. In this method, the matrix obtained from the opinions of each person is calculated and its inconsistency is determined, and the inconsistency rate of the group matrix is also calculated, and it is possible to determine the people whose opinions are far from the group. In group decision-making for network analysis, a maximum of 10 to 15 people is usually used because the increase in the number of members of the decision-making group will increase the lack of agreement and distort the results of the model. The same is true for group decision-making methods such as the Delphi method and brainstorming. Therefore, in this research, 10 experts were asked to comment on the pairwise comparisons of the network, and their opinions were combined using the geometric mean. In Table (2) you can see the paired comparisons between the elements of smart network governance for the banking system of Iran.

Table2.

Comparison of smart network governance elements for the banking system of Iran

smart network governance Dimension	Behavioral factors	Structural factors	Mechanism factors	Comprehensive development	Legal considerations	Information Technology	Economic stability and prosperity
Behavioral factors	1	2	3	4	5	6	4
Structural factors		1	2	3	4	5	3
Mechanism factors			1	2	3	4	4
Comprehensive development				1	2	3	3

smart network governance Dimension	Behavioral factors	Structural factors	Mechanism factors	Comprehensive development	Legal considerations	Information Technology	Economic stability and prosperity
Legal considerations					1	2	2
Information Technology						1	3
Economic and stability prosperity							1

The inconsistency of pairwise comparisons is 0.00885 and is less than 0.1, so these comparisons are consistent and acceptable. After making pairwise comparisons by experts integrating their opinions and calculating special vectors related to each of the matrices, an unbalanced super matrix is formed, as you can see in Table (3).

Table3.
Unbalanced supermatrix

unbalanced matrix super	Behavioral factors	Structural factors	Mechanism factors	Comprehensive development	Legal considerations	Information Technology	Economic stability and prosperity
Behavioral factors	0	0	0	0	0	0	0
Structural factors	0	0	0	0	0	0	0
Mechanism factors	0/251	0	0	0/308	0/192	0/464	0
Comprehensive development	0/17	0	0/25	0	0/174	0/255	0
Legal considerations	0/129	0	0/25	0/096	0	0/281	0
Information Technology	0/449	0	0/5	0/593	0/634	0	0
Economic stability and prosperity	0	0/634	0	0	0	0	0

After calculating the non-matrix super matrix, the rhythmic super matrix is calculated as shown in Table 4.

Table 4.
balanced super matrix (

balanced super matrix	Behavioral factors	Structural factors	Mechanism factors	Comprehensive development	Legal considerations	Information Technology	Economic stability and prosperity
Behavioral factors	0	0	0	0	0	0	0
Structural factors	0	0	0	0	0	0	0
Mechanism factors	0/251	0	0	0/094	0/192	0/464	0
Comprehensive development	0/028	0	0/062	0	0/163	0/250	0

balanced super matrix	Behavioral factors	Structural factors	Mechanism factors	Comprehensive development	Legal considerations	Information Technology	Economic stability and prosperity
Legal considerations	0/129	0	0/25	0/096	0	0/283	0
Information Technology	0/201	0	0/5	0/593	0/634	0	0
Economic stability and prosperity	0	0/634	0	0	0	0	0

The final weights are obtained from the exponentiation of the weighted super matrix, which can be seen in Table 5.

Table 5.
matrix the final weighted super

final weighted matrix super	Behavioral factors	Structural factors	Mechanism factors	Comprehensive development	Legal considerations	Information Technology	Economic stability and prosperity
Behavioral factors	0	0	0	0	0	0	0
Structural factors	0	0	0	0	0	0	0
Mechanism factors	262/0	0	262/0	262/0	262/0	262/0	0
Comprehensive development	19/0	0	19/0	19/0	19/0	19/0	0
Legal considerations	185/0	0	185/0	185/0	185/0	185/0	0
Information Technology	362/0	0	362/0	362/0	362/0	362/0	0
Economic stability and prosperity	0	45/0	0	0	0	0	45/0

As can be seen, the weights will converge to the power of the super matrix, which is proven by Saati (1980) through the properties of Markov chains and probability matrices. In this way, the obtained prioritization will also be in Table (6).

Table 6.
The final weights of factors

Factors	**weight of factor**	**limit**
Economic stability and prosperity	362/0	195342/0
Information Technology	26221/0	141493/0
Legal considerations	44961/0	133518/0
Comprehensive development	19029/0	102685/0
Mechanism factors	18549/0	100094/0
Structural factors	27907/0	082873/0
Behavioral factors	27132/0	080571/0

Now, using the weights obtained for the elements of smart network governance for the Iranian banking system, we can go into the next stage of analysis and prioritize the key factors affecting smart network governance for the Iranian banking system using the ANP method.

Factor abbreviations

After receiving the questionnaires, the data was entered into the Excel software for data analysis, and the data was screened to ensure the correctness of the information entry. The survey data were merged using the average so that all opinions could be used for group decision-making. The reason for using the average is clear in the ANP method, the Euclidean formula is used to normalize the data. In this way, the effects of opinions that are somewhat inconsistent are adjusted by using the square of the sum of squares, and therefore there is no need to use the geometric mean in this part. The combined opinions are available in Table (7), which will be used to prioritize and evaluate the key components affecting smart network governance for the banking system of Iran by using it and the ANP method, using the weights obtained by the network analysis method. Table (7) shows the abbreviations of factors.

Table7.

Abbreviations of smart network governance factors for the banking system of Iran

Abbreviations	Factors
F1	Behavioral factors
F2	Structural factors
F3	Mechanism factors
F4	Comprehensive development
F5	Legal considerations
F6	Information Technology
F7	Economic stability and prosperity

First step: Normalize the decision matrix

We normalize the decision matrix using equation (1).

Relationship1

$$r_{ij} = \frac{r_{ij}}{\left(\sum_{i=1}^{m} r_{ij}^{2}\right)^{\frac{1}{2}}} \qquad (j = 1, \ldots, n)$$

Table 8.

Normalizing the decision matrix

F7	F6	F5	F4	F3	F2	F1	Factor
332459/0	2380952/0	4285714/0	1428571/0	4285714/0	2380952/0	2380952/0	A
16471/0	3395499/0	3395499/0	1455214/0	3395499/0	2425356/0	4365641/0	B
259699/0	311188/0	311188/0	2222771/0	4000988/0	311188/0	4000988/0	C
318278/0	281439/0	3517988/0	1407195/0	3517988/0	281439/0	3517988/0	D
203088/0	418121/0	3344968/0	0836242/0	418121/0	2508726/0	3344968/0	E
294025/0	3885143/0	4856429/0	0971286/0	1942572/0	3885143/0	2913858/0	F
2620433/0	325369/0	325369/0	183899/0	369824/0	276862/0	418331/0	G

Second step: weighting the decision matrix

We multiplied the weights of the factors obtained by the ANP method in the previous step in the normalization matrix. The data is shown in Table (9).

Relationship (2)

$$V = N_D \times W_{n*n}$$

Table9.

The weight of smart network governance factors for Iran's banking system obtained from ANP

Factor	F7	F6	F5	F4	F3	F2	F1
Final Weight	64600/0	067684/0	074214/0	026778/0	150393/0	101872/0	94860/0

The third step: determining the ideal positive and ideal negative solution positive and negative ideal situations are obtained as follows.

Relationship 3

$$A^+ = \{(max_i\ V_{ij} | j \in J_1), (min_i\ V_{ij} | j \in J_2) | i = 1,2,\dots,n\}$$
$$A^- = \{(min_i\ V_{ij} | j \in J_1), (max_i\ V_{ij} | j \in J_2) | i = 1,2,\dots,m\}$$
$$A^+ = \{V_1^+, V_2^+, \dots, V_n^+\}$$
$$A^- = \{V_1^-, V_2^-, \dots, V_n^-\}$$

Table10.

positive ideal and negative ideal values

036738/0	012654/0	0352737/0	0222486/0	083718/0	0411069/0	0617708/0	$^{+}$A
027515/0	0072057/0	0174459/0	0080139/0	0379466/0	0244488/0	0336888/0	$^{-}$A

The fourth Step : Calculate the size of the distance

The distance of each positive and negative ideal is obtained in the form of the following equations, which are given in the table below (11) & (12).

Relationship 4

$$d_i^+ = \left\{\sum_{j=1}^{n}(V_{ij} - V_j^+)^2\right\}^{\frac{1}{2}} \quad (i = 1,2,\dots,m)$$
$$d_i^- = \left\{\sum_{j=1}^{n}(V_{ij} - V_j^-)^2\right\}^{\frac{1}{2}} \quad (i = 1,2,\dots,m)$$

Table11.

distance of factors from positive ideal(

distance of factors from positive ideal	Factors
0403635/0	A
0331533/0	B
0251837/0	C
0284978/0	D
0393607/0	E
0577854/0	F
0349693/0	G

Table12 .
Distance of factors from negative ideal

distance of factors from negative ideal	Factors
0549766/0	A
0477363/0	B
0520258/0	C
0441252/0	D
0493284/0	E
0292035/0	F
0521102/0	G

The final ranking of indicators with the fuzzy ANP technique

In the final step of this study, taking into account the preference pattern and the internal relationships of the variables, using the fuzzy network analysis process, the final ranking and prioritization of the key factors affecting the smart network governance for the banking system of Iran was carried out.

For the final ranking of indicators, the calculated internal priority vectors (W32, W22, W21) were entered in the appropriate columns of a matrix. As a result, a partitioned super matrix was obtained, where each part of this matrix shows the relationship between two clusters in one system.

Fifth step: Calculating the relative proximity to the ideal solution

The relative proximity of each factor of smart network governance for the banking system of Iran was calculated using equation 5which is given in table (14).

Relationship5

$$C_i = \frac{d_i^-}{(d_i^- + d_i^+)} \ , \ (i = 1,2, \dots, n)$$

Table14.
Relative closeness of smart network governance factors for the banking system of Iran

5766366/0	Behavioral factors	F1
4766366/0	Structural factors	F2
5075654/0	Mechanism factors	F3
4561948/0	Comprehensive development	F4
5000012/0	Legal considerations	F5
3357155/0	Information Technology	F6
5338245/0	Economic stability and prosperity	F7

Prioritization of smart network governance factors for Iran's banking system. Table (15) shows the prioritization of smart network governance factors for the banking system of Iran.

Table15.
Prioritization of smart network governance factors for Iran's banking system

Final weight	Factors	Final rank
5766366/0	Behavioral factors	1
5338245/0	Economic stability and prosperity	2
5075654/0	Mechanism factors	3

Final weight	Factors	Final rank
5000012/0	Legal considerations	4
4766366/0	Structural factors	5
4561948/0	Comprehensive development	6
3357155/0	Information Technology	7

Therefore, among the factors of smart network governance for the banking system of Iran behavioral factors are the priority, economic stability and prosperity are the second priority, mechanism factors are the third priority, legal considerations are the fourth priority, structural factors are the fifth priority, all-round development is the priority sixth and information and communication technology are the seventh priority.

Conclusion

This research aimed to rank the components of smart network governance in the Iranian banking system. The results indicated that among the factors of smart network governance for the banking system of Iran, behavioral factors are the priority, economic stability, and prosperity are the second priority, mechanism factors are the third priority, legal considerations are the fourth priority, structural factors are the fifth priority, Comprehensive development is the sixth priority and information and communication technology is the seventh priority. The results of the research are somewhat in line with the results of Akbari et al. (2023), Kazem Nasab (2021) Torabi and Farakhi (2022) Rasouli et al. (2017), and Pereira et al. (2018) and confirm the results of this research.

Discussion

Smart network governance means the application of information and communication technologies, analysis, and data mining in all sectors to improve the provision of information and services to all stakeholders, encouraging them to participate in decision-making and innovation processes, and requiring the government to be more accountable and Functions are more efficient and transparent. Smart governance is the way to achieve good governance for the development and improvement of service quality, which is paved by advances in communication and information technology, creativity and innovation, and competitive intelligence. Smart governance is at the heart of two major global developments, the information revolution and the governance revolution: Both of these changes are transforming the way society and government operate. The goal of the smart good governance strategy is to provide and facilitate governance for all groups, i.e. government civil society, and business enterprises. In general, the goal of smart network governance is agility crowdsourcing, creating capital and intellectual knowledge, increasing simplicity, ethics accountability, responsibility, and making governance transparent.

Based on the findings of this research, in the practical field, it is suggested that banks create appropriate activities to encourage people to participate in banking affairs. Facilitating guarantees, facilitating laws related to social capital in the field of women, and attracting their participation, correct and timely information on the bank's plans for loan payment is also necessary.

The issue of citizens' and institutions' trust in banks is very important. Accordingly, it is possible to attract their decision to create governance networks. More faith and trust in the bank for more economic support from banks and trust in the native patterns of smart network governance can be effective in creating trust and confidence. Behavioral training in the banking sector and its related institutions for a better understanding of the culture of participation, creating a culture in line with respect and compliance with the laws of national determination and belief in

the approach of participation, and developing a culture of risk-taking. So it is among the conditions that can be effective through behavioral training to bank managers and institutions and organizations involved in smart network governance.

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