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Identifying the constituent factors of open governance in public institutions

M. Mirzapour[1], S. Tootian Isfahani[2,*], G.R. Memarzadeh[1], G.R. Hashemzadeh Khorasgani[3]

[1]Department of Public Administration, Science and Research branch, Islamic Azad University, Tehran, Iran
[2]Department of Public Administration, West Tehran branch, Islamic Azad University, Tehran, Iran
[3]Department of Industrial Management, South Tehran branch, Islamic Azad University, Tehran, Iran

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ABSTRACT

BACKGROUND AND OBJECTIVES: Open governance is considered an important tool to solve complicated issues in countries, increase efficiency, and build public trust based on indicators like information transparency and public participation using Information and Communication Technologies. Therefore, considering that no research with this title has been conducted in Iran, this research was studied in the municipalities of Tehran Province, Iran, with the aim of identifying the factors that constitute open governance in Iran's public institutions.

METHODS: The present study is mixed-method research. In the qualitative part, interviews and theme analysis were used, while the quantitative part used a descriptive method. The study population in the qualitative section consisted of university experts and specialists who were knowledgeable about the subject of the study. Purposive sampling was used, and after conducting 20 interviews, theoretical saturation was achieved. This study was conducted in the first half of 2023. The study population in the quantitative section consisted of all senior managers of municipalities in Tehran Province, estimated to be around 440 individuals. Using the Cochran formula, 205 individuals were selected as the sample. Data was collected using both library and field methods. A 23-item questionnaire with a Likert scale was constructed, and validity and reliability were checked in all sections. SPSS-24 software was used for the descriptive part, and Smart PLS 3 software was used for analysis, including Pearson's correlation test, one-sample t-test, and structural equation modeling.

FINDINGS: The findings indicated that the dimensions of open data, open service and open process were found for the establishment of open cooperation. By performing the first-order factor analysis, the factor loadings between the indicators and dimensions of the model were in a favorable condition. On the other hand, in the second-order factor analysis, the factors open data, open service, and open process were determined at 0.964, 0.968, and 0.955, respectively, which were considered significant according to Student's t-test.

CONCLUSION: Three key factors are needed to establish open governance. The open process includes policy changes, approval of necessary regulations, modification of organizational structures and activities. Providing open service, including systems and platforms that allow greater participation of civil society and other urban actors. Open data includes publishing public data, reporting on the performance of managers and public institutions in established platforms.

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*Corresponding Author:
Email: tootian.sedighe@wtiau.ac.ir
Phone: +989123963497
ORCID: 0000-0002-1794-8215

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INTRODUCTION

Governance is one of the most important and controversial concepts in political science, which refers to the methods used by governing institutions in society to manage resources and perform their duties. Governance in public institutions is also referred to as the set of process and mechanisms that they use to make decisions implement and monitor their work (Ferlie, 2017). Municipalities, as one of the public institutions and responsible for various departments of urban management, operate based on government policies to provide services to the citizens of their region and improve the urban situation. Considering that municipalities in Iran, as institutions with a close relationship with citizens, are highly dynamic and changeable and play a very important role in urban management and governance, therefore it is very important to examine governance and management practices in these institutions (Arzam *et al*. 2020). Nowadays cities face challenges like environmental issues, resource management, urban crises, and similar items (Dagar *et al.,* 2023). In this regard, public institutions, including municipalities in Iran, face numerous challenges that can be categorized into several sections: management and organization, finance and human resources, corruption, monitoring and auditing. In general, the issues mentioned are only a part of the challenges that Iranian municipalities face in providing quality public services and improving urban management. To tackle these issues, policymakers and urban managers should prioritize improving management structures, enhancing the quality of human resources, establishing effective auditing and monitoring systems, and promoting transparency in delivering urban services (Ashnavar *et al*., 2021). Open governance is used as a management method to create transparency, participation, trust and people's presence in the public decision-making process at the local and international level (Mumladze, 2023). This management approach aims to enhance the connection between individuals and public institutions. To achieve this objective, it operates based on principles such as transparency, participation, trust, and accountability (Nabatchi *et al.,* 2017). Open governance is an integral part of the innovation policy in the public sector based on information technology, which is on the agenda of many governments today (Gao *et al.,* 2023(. Hence, the aim of this study is to identify the dimensions, components, and indicators of open governance in Iran's public institutions, particularly the municipalities in Tehran province, and provide a theoretical framework for analyzing these dimensions and indicators. The findings of this research can be valuable for public sector managers and for the purposes of review and evaluation. The insights gained from assessing the performance of the municipalities in Tehran province can be used to enhance governance practices in Iran.

Research background

Open governance was proposed as one of the newest concepts in the field of governance in the first decade of 2000, and they sought to create a solution to increase transparency and participation in governance process. This concept grew with the advancement of Information and Communication Technology (ICT) and is currently considered as one of the key concepts in the field of governance (Ingrams *et al.* 2020). In the (Table 1) some studies of recent years about open governance are discussed.

Literature review

While the concept of open government has a lengthy history, it was during the United Nations General Assembly in September 2011 that the significance of this principle was highlighted when the President of the United States, Barack Obama, specifically addressed the need to promote open government practices in other countries. This event is recognized as one of the most significant milestones that contributed to the emergence and advancement of the open government principle (Bouchet, 2013). OECD (2017) defines Open governance as "a governance culture that promotes the principles of transparency, honesty, accountability and stakeholder participation in support of democracy and inclusive growth". The United Nations Economic and Social Commission for Western Asia (UN ESCWA) define open government as "a government that is effective and efficient in carrying out its duties, its work is transparent and accountable, and everyone can access its services. It is also a Government that responds to the needs of its citizens, values their participation, experience and knowledge in decision-making, and relies on modern and emerging technologies to enhance its governance. ESCWA believes that improving participation, transparency and accountability are the primary goals of open

Table 1: A review of related literature on the models of open governance

Title	Researchers	Results
Offering an open data governance model to achieve administrative health by the establishment of e-government in Iran National Tax Administration	Sami *et al.* (2022)	This study has identified six components for open governance, including fundamental factors, intervening conditions, causal factors, infrastructure, strategies, and consequences. To achieve open governance, attention must be paid to these various factors and their interactions.
A model of assessing policymakers' inclination toward the open government in Iran	Momen Kashani *et al.* (2020)	This study has found that the inclination towards open government is a multi-dimensional concept, and policymakers' willingness and inclination towards it can be measured by six items: transparency, citizens' participation, collaboration, government responsiveness, support for innovation, and assistance in business development.
A model to detect the drivers of implementing an open government model in Iran's executive bodies: a case study of the Ministry of Interior	Abol-Maali *et al.* (2020)	This study has classified the network of themes into five main categories, namely the enforcement of laws related to free access to information, open governance data, technology implementation, government data and technology implementation to enforce programs, and gaining access to actual transparency. These categories represent key areas of focus that are critical for achieving open governance.
Open Government Maturity Models: A Global Comparison	Pirannejad and Ingrams (2022)	These researchers developed a model consisting of six stages that need to be taken to achieve open government, including the preliminary stage, transparency and responsiveness stage, open collaboration stage, platform stage, open democratic government stage, and governance stage. Each stage represents a progression towards more advanced and comprehensive open governance
An integrated model of digital open government	Wirtz *et al.* (2022)	This model offers policymakers a comprehensive framework to guide the implementation of digital open government initiatives. By outlining the key levels of technological infrastructure, development, process, services and business models, governance, and regulations, the model provides a roadmap for policymakers to follow.
Joining the open government partnership initiative: An empirical analysis of diffusion effects	Tavares *et al.* (2023)	The goal of this study was to investigate the reasons that motivate countries to join the international organization of open governments. The findings, based on data collected from 175 countries, show that open government diffusion is influenced by regional proximity, shared cultural features, governmental systems, and membership in international organizations.
An investigation of the factors influencing the open government from the perspective of a country	Ayinde *et al.* (2023)	This study was conducted on the secondary data collected from 137 countries to measure the factors influencing the open government on a global scale using multiple regression analysis. The article investigated the technical-social aspects of the open government by taking a look at the following five factors: the development of the e-government, free press, innovation capabilities, digital skills, and legal compatibility.
A model for the maturation of the open government: attracting the participation of civil society through social media	Lee and Kwak (2012)	This study proposes a model for achieving open governance that emphasizes transparent and interactive public participation. The model consists of five main stages: preliminary conditions, information transparency, free participation, open cooperation, and inclusive interaction. Each stage represents a progression towards more comprehensive and effective open governance.

government, regardless of its definition" (Bakleh and Denner, 2021). However, there is no single and universally accepted definition of open government and it generally includes different approaches, definitions and principles and considers different legal, historical or cultural aspects of countries around the world (OECD, 2016). But (almost) all definitions include the same basic concepts of transparency, accountability and participation (Matheus and Janssen, 2020). For example, the European Union has no official definition of open government. However, in its vision on public services European Commission (2015) it stated that open government includes three main aspects: open data, open service and open process. The principle of open data is to provide free access to government data in an open and usable form for all. This data can be provided through public databases, web service sites, government websites and other sources. This principle increases transparency and stability in governments. The principle of open service deals with the provision of government services in an open and accessible manner for all. These services can be provided online and people can use them easily and quickly. This principle increases participation and stability in governments. The principle of open process deals with creating opportunities for participation and transparency in government processes. This includes creating opportunities for citizens to participate in decision-making processes, providing clear and understandable information about government processes, and creating opportunities to handle citizens' complaints and opinions. This principle increases accountability and stability in governments. Therefore, the principles of open data, open service and open process have been proposed with the aim of increasing transparency, participation and accountability in governments and public institutions in decision-making processes and providing services to people and civil society (Millard, 2018). Open governance and open data: Open Government encompasses the more limited concept of Open Government Data (OGD), which involves the idea that in most government and public entities data should be freely available to everyone to use and republish as they wish, without restrictions from copyright, patents or other mechanisms of control, as they were financed by public money and constitute public good. Open Data Charter (ODC) was created in 2015 by 70 countries and international organizations to promote the openness

of government data and the development of the digital economy and innovation. This charter is based on 6 key principles of government data openness, including: data openness, transparency, usability, provision of technology infrastructure, development of data-oriented programs, and international and government cooperation (Matasick *et al.,* 2020). The conceptualization of Open Government Data also emerged from the concept of Open Data (OD), which developed worldwide in parallel and in response to the development of intellectual property and the rise of their commercial value, especially with the acceleration of the circulation and accumulation of information through the web (the data revolution) (Kitchin, 2014). Open Governance and e-Government: Electronic Government (e-Government) is a strong enabler of open government when it supports the same principles. E-government is mainly related to the use of modern ICT technologies by government and local authorities to provide better public services to citizens (Lytras and Şerban, 2020). However, there is a clear difference between e-government and open government, the latter being a governance issue. In fact, new ICT technologies facilitate open government and allow innovative approaches; but open government can be implemented even with low penetration of ICT technologies (Criado *et al.,* 2018). Many UN agencies uses interchangeably the terms "e-government" and "digital government", as no formal distinction is made between them among academics, policymakers and practitioners. In many countries, the term e-government is embedded and institutionalized in national policies and strategies, though in some cases reference is made to digital government as the next phase of e-government. United Nations Department of Economic and Social Affairs (UN DESA) does not differentiate between e-government and digital government in its worldwide surveys (Janowski, 2015). Janssen and Estevez (2013) used the terms "e-government", "transformational government", and "lean government" to illustrate the stages of evolution in an electronic government and argued that a lean government is represented by platform-based governance (Tahmasebi *et al.,* 2020). Open government can be added to the above cycle. The above four stages are not distinct but are involved in a process of evolutionary progress (Millard, 2018). Fig.1 by Millard (2018) explains the process of open governance and its place with other governances.
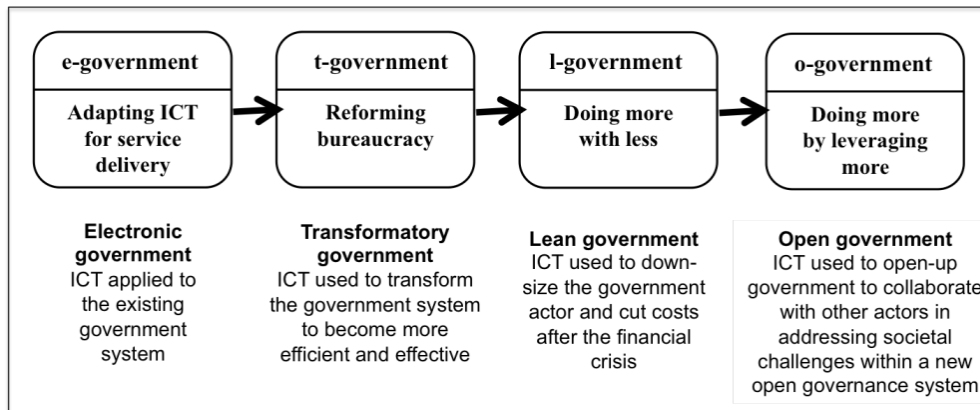
Fig. 1: The evolutionary process of an open government (Millard, 2018)

Challenges of Open Government Adoption: According to Ruijer and Meijer (2020), the difficulty of open government data as an innovation is finding out how to scale the availability of open data. According to Nam (2015), open government is expected to provide social and economic benefits through public use of government information. However, as open government matures, it may face more administrative and technological difficulties. According to Kopec and Sheldrick (2020), the obstacles to the adoption of open government include: Lack of financial resources insufficient time Nonfunctional websites Restrictive regulations and Lack of information available· The data release process is fraught with problems. such as lack of data openness due to organizational capabilities and culture, legal and regulatory issues, especially those related to privacy and security, technical problems such as lack of support infrastructure due to fragmentation, lack of knowledge and skills among public administrators involved in All stages of the data generation process (Gascó-Hernández *et al.,* 2018)· Therefore, based on previous studies and literature review, open governance is one of the important concepts in the field of public administration and is considered in different countries as a strategy for sustainable development and improving the quality of public services. In Iran, the establishment of open governance is considered as an important challenge in the field of public administration, which is very important for Iran public institutions due to the benefits it brings. Therefore, knowing the dimensions and components of open governance is necessary for these managers to better understand the concept of governance. Therefore, the main question of this research is, what are the dimensions and indicators of open governance public institutions of Iran (Municipalities of Tehran Province, Iran)? The present research was conducted in Iran, Iran in 2023.

MATERIALS AND METHODS

The present study employs an applied research approach with the aim of proposing an open governance model for the municipalities in Tehran province, Iran. The study utilizes a mixed-method approach, combining qualitative and quantitative data. The qualitative portion involves interviews and theme analysis, while the quantitative section utilizes a descriptive methodology. The study begins by exploring the research topic qualitatively with a limited number of participants. Based on the qualitative findings, the researcher proceeds to construct the desired tool. The study aims to understand the characteristics, components, and indicators of open governance by examining expert opinions gathered through interviews, followed by quantitative analysis to produce comprehensive findings. Population, Sampling Method, and Sample Size in the Study: The study population in the qualitative section consisted of university experts and specialists who were knowledgeable about the subject of open governance in municipalities, particularly in the areas of local government and municipalities in Iran. These experts possessed the following characteristics: familiarity with the subject of open governance, at least 7 years

Table 2: Demographic statistics of interviewees

Variable	category	Frequency	Variable	category	Frequency	Variable	category	Abundance
Work place	chancellor of Azad Islamic University	5	Education	PhD	13	Age	Below 39 years	2
							40 to 45 years	10
	The experts of the districts and municipalities of Tehran	8		Master's degree	7		46 to 50 years	4
				Female	5		Over 50 years old	4
	Informed professors in the field of this study	7	Gender			Work experience	Under 15 years	6
				Man	15		16 to 20 years	8
							Above 20	6

of experience at the level of senior management, and a doctoral degree for academic experts or a master's degree for experts with managerial experience in the relevant field. A purposive sampling method was used in this study to select the participants. In this method, the selection of sample cases is based on the researcher's study objectives and the nature of the research. The study reached theoretical saturation after conducting 20 interviews (Table 2). It is worth noting that the interview process was conducted in the first half of 2023.

The study population in the quantitative section consists of all senior managers of municipalities in Tehran province, Iran, which is estimated to be around 440 individuals. In this study, the Cochran formula was used to determine the sample size, and based on this, 205 individuals were selected as the sample (Cochran, 1977), (Eqs. 1 and 2). In addition, a stratified random sampling method was used to select the statistical samples in this study.

$$n = \frac{z^2 pq}{1 + \frac{1}{n}\left(\frac{z^2 pq}{d^2 - 1}\right)} \tag{1}$$

$$205 = \frac{3.8416^2 * 0.5 * 0.5}{1 + \frac{1}{440}\left(\frac{3.8416^2 * 0.5 * 0.5}{0.05^2 - 1}\right)} \tag{2}$$

Data Collection Method and Tools: Two methods were used to collect data in this study: the library method and the field method. In the library method, information was collected by studying books, journals, online sources, and databases. After selecting the sources, the texts were extracted, translated, and analyzed to identify the primary components and indicators of the research based on theoretical and practical foundations. The field method was carried out in two ways. First, for exploratory interviews, a number of university experts were purposefully selected, and after necessary coordination, interviews were conducted with them at their workplace. Then, for collecting the required data in the quantitative section, questionnaires were distributed among the statistical samples after necessary coordination. The collected data were entered into the system and analyzed. The interview questions included demographic information, a questionnaire based on the literature, and interviews with experts. The interview questions included demographic information and a questionnaire derived from the literature and interviews with experts. The questionnaire consisted of 23 items with a five-point Likert scale, which was developed by reviewing the theoretical and practical foundations and the results of exploratory interviews (With the primary and secondary coding of the exploratory interview texts, the theme analysis of the Braun and Clarke method has been done)) Table 3). According to Braun and Clarke, theme analysis is a method to recognize, analyse and report the patterns in qualitative data and a method for analysing textual data that turns scattered and diverse data

into rich data, and when viewing the text, a proper understanding of Irrelevant information, qualitative information analysis, systematic observation of person, group, situation, and converting qualitative data into quantitative data are used. The concept of theme shows important information about data and research questions and to some extent shows the meaning and concept of the pattern in the collection. The results of data analysis are presented using the qualitative approach of theme analysis in the form of main themes, sub-themes and concepts. Based on Braun and Clarke's approach, in this research, for theme analysis, six phases of getting to know the data, creating initial codes, searching for themes, revising themes, defining and naming themes, and finally a report have been prepared (Braun and Clarke, 2006).

To describe the demographic characteristics, whose data was obtained from the questionnaire, Spss-24 software was used. In the inferential part, to answer the research questions, Pearson's correlation test, one-sample t-test, structural equation modelling (confirmatory factor analysis) was used using Smart Pls 3 software.

The reliability and validity of the measurement instrument: In the qualitative section, the validity of the research tool was confirmed by 5 professors familiar with the field of study. To calculate the reliability of the test-retest method, a sample is selected from among the conducted interviews, each of which is repeated in a short time interval. Then, the specified codes were compared in two-time intervals for each of the interviews. The retesting method is used to evaluate the stability of the researcher's coding. In each of the interviews, the codes that are similar in two-time intervals are marked as "agreement" and the codes that are not similar are marked as "disagreement"(Mohammad Beigi *et al.,* 2015). The method of calculating the reliability between the coding done by the researcher in two-time intervals is shown through Eq. 3 in Table 4:

$$\text{Percent reliability} = \frac{2\left(\text{Number of agreements}\right)}{\text{Total number of codes}} \times 100 \qquad (3)$$

In Table 4, the reliability coefficient between the done coding was 78.65%, which indicates its acceptability.

Calculation of reliability between two coders: In order to calculate the reliability of the interview with the

Table 3: Information relevant to the implemented questionnaire

Concept	Dimensions	Indicator	Item number
Open governance	Open data	6 indicators	21-26
	Open service	6 indicators	27-32
	Open process	11 indicators	33-43

Table 4: Reliability coefficient between coding

Row	Interview code	Total number of codes	Number of agreements	Number of disagreements	Reliability of the test
1	8	16	6	1	75
2	17	17	7	2	82.3
	Total	33	11	3	78.65

Table 5: Calculation of reliability between two coders

Row	Interview code	Total number of codes	Number of agreements	Number of disagreements	Reliability of the test
1	5	18	7	2	78
2	12	17	7	2	82.3
3	18	15	5	3	66.7
	Total		33	11	3	75.7

intra-theme agreement method of three coders, one of the professors in the relevant field who is familiar with coding was requested to participate in the research as a secondary coder. Further, the researcher coded the number of two interviews with this research colleague and the percentage of agreement within the subject that is used as the reliability index of the analysis has been calculated using the (Eq 3), (Mohammad Beigi *et al.,* 2015). In this research, the reliability coefficient between the two codes was 75.7%, which indicates its acceptability (Table 5).

In the quantitative part, to check the validity of the main variables, the convergent validity of AVE and the divergent validity of the Fornell-Larcker matrix were used, as well as Cronbach's alpha and the Composite Reliability (CR) were used to check the reliability (Table 6).

- Cronbach's alpha value higher than 0.7 is an acceptable reliability indicator.
- If the value of Composite Reliability (CR) for any structure is above 0.7, it shows the internal stability suitable for the measurement model.

Table 6: Validity coefficients of the main variables of the model

Component	alpha Cronbach's	reliability Shared	AVE	Fornell-Larcker Matrix		
open data	0.744	0.787	0.552	**0.743**		
open service	0.753	0.844	0.644	0.342	**0.803**	
Open process	0.798	0.918	0.651	0.331	0.47	**0.807**

Table 7: Modifying primary codes, extracting secondary codes and defining and labeling themes

Interviewee code	Index (extraction of themes)	Dimensions (definition of themes)	Concept (renaming themes)
Open governance	Open data	Reporting on the performance of managers and institutions	I15.I17. I18.I20.
		The activity of mass media to broadcast news	I19.I16.
		Establishing the infrastructure for monitoring and control and feedback on this	I16.I19. I15.I13.
		Using the information channels of global organizations and organizational networks	I5. I4.
		Strengthening communication systems	I4. I6. I11.I13. I14.
		Making all actions of the government accessible to the public	I15.I17. I18.
	Open service	Distributing services and conveniences in a fair manner	I18.I17. I12.I7.
		Establishing the infrastructure necessary to maximize citizens' participation	I6. I4. I9.
		Relaying people's demands	I10.I11. I16.
		Network relationships among all stakeholders and civil society activists	I17.I18. I20.I15.
		The participation of the government, citizens, and private institutions	I16.I12. I9.
		Freedom of expression	I6. I3. I5. I8. I10.I12.
	Open process	Training leadership skills	I13.I14. I16.I18.
		Revising and modifying activities	I19.I17. I12.I9.
		Integrating policies	I8. I6. I5.
		Offering full-scale support to people	I3. I6. I8. I10.
		Reducing organizational hierarchies	I9. I8. I3.
		Introducing independent institutions	I4
		Public policies	I5. I7.
		Inter-sectoral collaboration	I8. I10.I11.
		Establishing required communication and equilibrium	I11.I13. I16.I17.
		Employing people with expertise in urban matters	I17.
		Training future managers	I17.I19. I14.I7. I6

- Also, should values $CR > AVE$
- AVE value above 0.5 indicates acceptable convergent validity (Habibi and kolahi, 2017)
- In the analysis of Structural Equation Models using the Partial Least Squares (SEM-PLS) method, which is usually analyzed with Smart Pls software, for a reliable diagnosis that indicates the existence of partial correlations between the indicators of a structure and the indicators of other structures from the Fornell-Larcker criterion is used. The Larcker-Fornell criterion refers to the fact that the square root of the explained variance values (AVE) of each construct is greater than the correlation values of that construct with other constructs. The values on the main diameter of the matrix must be greater than all the values in the column (Azar *et al.,* 2011) Therefore, divergent validity is also confirmed.

Findings

As explained in the materials and methods section, in the qualitative section, Brown and Clark's theme analysis method was used, the steps of which are shown together in (Table 7).

Validity check of dimensions and indices of the model was done from structural equations and factor analysis of the first and second type using smartpls3 software. (Fig. 3 and Fig. 4) show the output of the software.

The strength of the relationship between the Dimensions and Index is shown by the factor loading. Factor load is a value between zero and one. If the factor load is less than 0.3, the relationship is considered weak and it is ignored. A factor loading between 0.3 and 0.6 is acceptable, and if it is greater than 0.6, it is very desirable. Therefore, according to Figs. 3 and 4 and the values of Table 8, the first-order factor analysis for the model indicators is confirmed.

Table 9 shows the coefficients of the path and the values of the t-student test. If the t-student test values are greater than 2.58, the path coefficient is significant at the 0.05 level, so the dimensions of open governance are also confirmed. the establishment of open governance requires factors to bring about transparency, participation, and the responsibility of the government or administration.
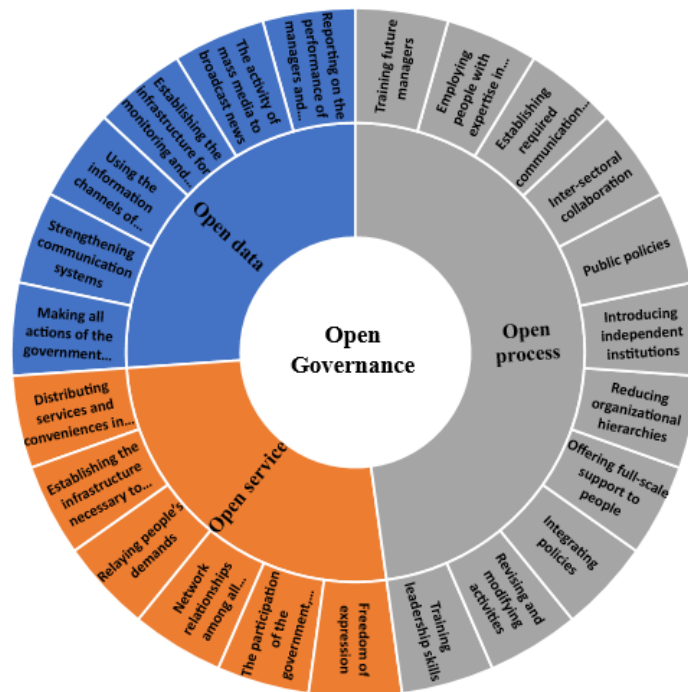

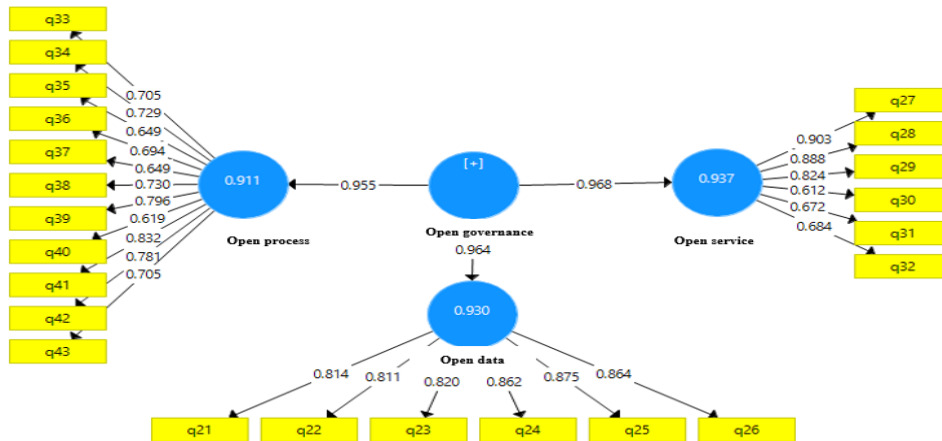Fig. 2: Display dimensions and indicators of open governance

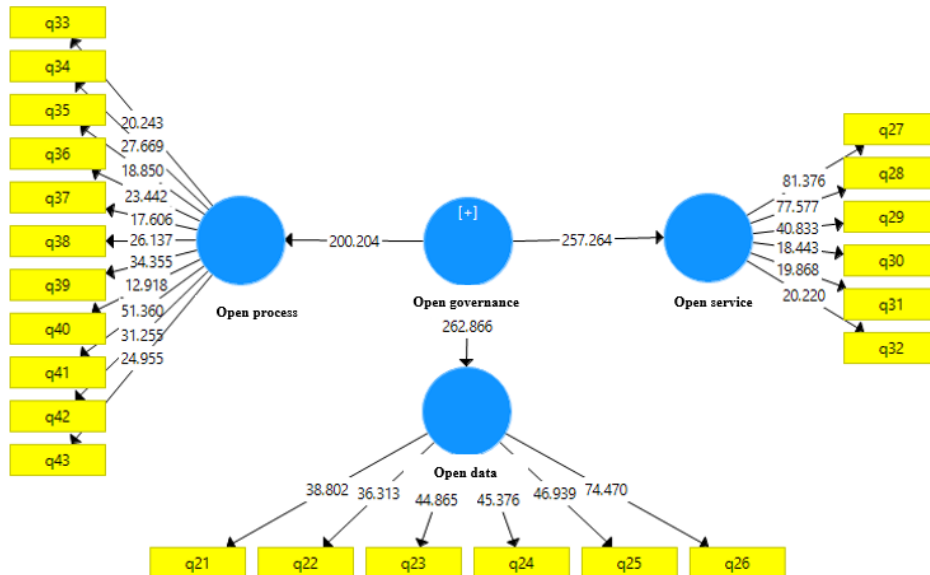Fig. 3: Significance of the main research model based on path coefficients and factor loadings

Fig. 4: Significance of the main research model based on T-Student

Discussion

The present study was carried out to designate a practical model for the establishment of open governance in Iran's public institutions by conducting a case study in Tehran Province's municipalities. Thus, after reviewing the related literature and various models offered by researchers in the field of open government/governance and interviewing the elite using thematic analysis, three dimensions were detected as the variables of the present study. The three dimensions included open service, open data, and open process. The reliability and validity of both qualitative and quantitative sections were corroborated in the study. The dimensions are investigated in more detail below. Open data included reporting on the performance of managers and institutions, the activity of mass media to broadcast news, establishing infrastructure for monitoring and control and the feedback to this, using the information channels of global networks and organizational networks, strengthening communication systems, and making a government's

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Table 8: Factor analysis of the first type between indicators and dimensions of the model

Concept (renaming themes)	Dimensions (definition of themes)	Index (extraction of themes)	Factor load values
Open governance	Open data	Reporting on the performance of managers and institutions	0.814
		The activity of mass media to broadcast news	0.811
		Establishing the infrastructure for monitoring and control and feedback on this	0.82
		Using the information channels of global organizations and organizational networks	0.862
		Strengthening communication systems	0.875
		Making all actions of the government accessible to the public	0.864
	Open service	Distributing services and conveniences in a fair manner	0.903
		Establishing the infrastructure necessary to maximize citizens' participation	0.888
		Relaying people's demands	0.824
		Network relationships among all stakeholders and civil society activists	0.614
		The participation of the government, citizens, and private institutions	0.672
		Freedom of expression	0.684
	Open process	Training leadership skills	0.705
		Revising and modifying activities	0.729
		Integrating policies	0.649
		Offering full-scale support to people	0.694
		Reducing organizational hierarchies	0.649
		Introducing independent institutions	0.73
		Public policies	0.796
		Inter-sectoral collaboration	0.619
		Establishing required communication and equilibrium	0.832
		Employing people with expertise in urban matters	0.781
		Training future managers	0.705

Table 9: path coefficients and values t-student dimensions of open governance

Concept	Dimensions	Factor loadings between open governance and its dimensions	The value of t Student between open governance and its dimensions
Open governance	open data	0.964	262.866
	open service	0.968	257.264
	Open process	0.955	200.204

actions and undertakings accessible to the public. As indicated in the review of the related literature, one solution to increase transparency and responsiveness is to freely offer public information on matters like accidents and illnesses, information on municipalities' comprehensive plans, tenders, fiscal contracts, and the performance of public organizations and their employees. This was corroborated by the majority of the researcher, including Sami *et al.* (2022), Abol-maali *et al.* (2020); Lee and Kwak (2012), Momen

Kashani *et al.* (2020), and Pirannejad and Ingrams (2022). Open service included the fair distribution of services and conveniences, establishing infrastructure to maximize citizens' participation, relaying people's demands, establishing a network relationship among all stakeholders and activists in civil society, the participation of the government, citizens, and private institutions, and the freedom of expression. Establishing the required infrastructure, including platforms, IT systems to offer public information,

and exchange information for the participation and collaboration of civil society and other stakeholders in society with the governments, are among the most basic dimensions of governance, corroborated by Sami *et al.* (2022); Momen Kashani *et al.* (2020); Abol-maali *et al.* (2020); Pirannejad and Ingrams (2022); Wirtz *et al*. (2022); Ayinde *et al.* (2023). Open process included training people in leadership skills, revising and modifying activities, integrating policies, offering full-scale support for people, reducing organizational hierarchy, introducing independent institutions, public policies, inert-sectoral collaboration, establishing required communication and equilibrium, employing people specializing in urban matters, and training future managers. Any change needs a process. Thus, the establishment of open governance requires governments to pass through stages dealing with technical, legal, cultural, and structural aspects, as well as any other consideration needed for each type of government. This has been corroborated by researchers like Momen Kashani *et al.* (2020); Abol-maali *et al.* (2020); Pirannejad and Ingrams (2022); Ayinde *et al.* (2023).

CONCLUSION

The present study aimed to develop a practical model for the establishment of open governance in Iran's public institutions through a case study of Tehran Province's municipalities of Iran. The study found three dimensions of open governance: open data, open service, and open process. These dimensions were validated through qualitative and quantitative methods, including literature review and interviews with experts. The review of related literature and the majority of researchers' opinions suggested that open governance requires the free flow of public information, fair distribution of services, and infrastructure to promote citizens' participation. Additionally, open governance requires training people in leadership skills, integrating policies, and reducing organizational hierarchy. The study's findings suggest that open governance can be established by addressing technical, legal, cultural, and structural aspects. The study's theoretical implication is that it provides a practical model for the establishment of open governance in Iran's public institutions, which can be generalized to other sectors of Iran and other countries. The practical implications are that the model can be used to guide

policymakers and public managers in implementing open governance practices. However, there were some limitations to the study. The case study was conducted only in Tehran Province's municipalities, and the generalizability of the findings to other provinces and sectors may be limited. Future research can replicate the study in other provinces and sectors of Iran to test the model's validity and generalizability.

Suggestions

According to the findings, the following suggestions are presented to managers and employees of public institutions in Iran:

- In order to increase the awareness of managers and officials of public institutions about open governance, appropriate training courses should be held for them.
- To create policy integration, different policies should be coordinated and inspired by the model presented in this research.
- Public institutions should provide the basis for more activity of civil society by facilitating the conditions for creating organizations and establishing legal protections for them. Also, public institutions should take action regarding delegating responsibilities, holdings and providing the necessary conditions for people's trust in this sector.

AUTHOR CONTRIBUTIONS

S. Tootian did the literature review, experimental design, manuscript text and manuscript preparation. M. Mirzapour helped with the literature review, data collection and analysis and interpretation, and manuscript preparation. G.R. Memarzadeh and G.R. Hashemzadeh helped in reviewing the literature and preparing the manuscript.

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CONFLICT OF INTEREST

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and,

or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

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ABBREVIATIONS

AVE	Average Variance Extracted
CR	Composite Reliability
ICT	Information and Communication Technologies
OD	Open Data
ODC	Open Data Charter
OECD	Organization for Economic Co-operation and Development
OGD	Open Government Data
SDG	Sustainable Development Goals
SEM	Structural Equation Modeling
SEM-PLS	Structural Equation Models using the Partial Least Squares
UN	United Nations
UN DESA	United Nations Department of Economic and Social Affairs
UN ESCWA	The United Nations Economic and Social Commission for Western Asia

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