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Sociology of Digital Governance to Propose Better Solutions for Living in Smart Cities

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Abstract
In this research, the researchers seek to present a mechanism for the sociology of digital governance to study better ways to live in smart cities. The research method is mixed in terms of how to check the data; Because it uses both quantitative research strategies (in expert data) and qualitative method strategy (in interview content analysis). In terms of the nature of the data, the current research uses both quantitative and qualitative methods. This article is included in basic-applied research. Because the research is exploratory and its main purpose is to identify the environmental drivers related to the subject of the research, the research is of a fundamental type.

Based on the obtained results, the first scenarios in the areas of intelligence, participation-oriented, transparency, structural arrangements, integration, culturalization, and stabilization are the best, and the sixth scenario and to some extent the fifth scenario show the worst possible situations. The second to fourth scenarios are mostly based on the least changes in the main factors and showed progress in only one factor and regression in one factor.

The results of the research showed that capacity building creates the right to access information, increase law enforcement, discipline urban management mechanisms, andstrengthen internal platforms to network and secure information in the direction of urban smartness. Through the

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implementation of the requirements of digital governance, he made fundamental actions.

1. Introduction

The system of urbanization and its rapid process in developing countries causes a massive influx into cities and the emergence of a swollen service sector, widespread marginalization, hidden unemployment, and the emergence of dual social networks of immigrants in cities. In other words, urbanization is one of the most important phenomena of the present age, to the extent that there is talk of an urban revolution in the world. In such a situation, urbanization will be accompanied by many consequences, such as the distribution of injustice, the spread of social damage, and increasing social heterogeneity, and help to spread all kinds of social, economic, and cultural crises until the post-modern point of view emerged as an important style from the 1960s and the underlying criticisms were introduced to modern rationalist thought. Man, as the main factor in the city, whose wants and needs were formed from the beginning, was forgotten in urban discussions for a long time, and on the other hand, the car, which was once invented to facilitate and improve the quality of life, especially urban life, and has become the dominant element of cities (Dadfar and Bandarabad, 1400). There are about 2 billion people on earth who live in cities, that is, about half of the human population lives in an urban environment. This number is increasing, which creates big problems for more people, increased traffic, increased noise, increased energy consumption, increased water consumption, and land and waste pollution. Therefore, the issue of security, along with sustainability, is expected to be addressed in cities that use their brains. One of the common methodologies for creating a smart city is the Internet of Things (IoT). IoT connectivity is the heart of the city that makes a smart city. Such as sensor networks, wearable devices, mobile applications, and smart networks that have been developed to use the most innovative city connection technology to provide services and better control of citizens (Rondik and Hassan, 2021).

More than 50% of the world's population lives in cities today. Supporting such an urban population requires huge efforts from the point of view of urban management. In addition to these problems, the impact of urbanization on the global climate has also been in the spotlight. Therefore, solutions are needed to solve these challenges. Smart city technologies, in a broad sense, will be an integral part of such solutions. This has led major global ICT players to launch their respective smart city initiatives. For good reason, the smart city market is estimated to be in the hundreds of billions of dollars by 2020, with annual spending approaching $16 billion. In the conditions of change and unprecedented challenges, smart governance should increase the ability of its funds and resources not only to function in normal conditions but also to adapt to unforeseen conditions, and respond to shocks, changes, and threats. Considering all aspects of smart governance helps local authorities to be best prepared with a long-term orientation and appropriate action plans for urban development (Nagyin, 2020). In this perspective, the urgency and need for a transformative perspective on urban governance facilitated by information and communication technology, which includes smart urban governance as a method based on context and a socio-technical method for managing cities, is felt:

1) The problems of technocratic and corporate "smart" governance require smart urban governance.
2) The theoretical focal points of smart urban governance show its transformational potential in managing urban challenges.

Based on these arguments, it is recommended that researchers and practitioners use smart urban governance to manage the most severe urban challenges with accessible urban issues, promote demand-based governance practices, and shape technological intelligence more socially (Solistio et al., 2019).

According to the mentioned materials, in this article, the researcher is looking for an answer to this basic question, what is the sociology of digital governance in line with better ways of living in smart cities? Theoretically, the importance of this current research is that it looks at the issue of digital governance from a new and sociological point of view and for the first time explores it in a context provided by the approach of urban intelligence. The concepts and principles that are used in the link between the sociology of digital governance and urban smartness have not necessarily been used by other previous researchers and the researcher's investigations have shown that other previous researches did not attempt to answer the questions raised in this research. From the practical point of view, the importance of the current research is that the urban management institution, including the municipality and the city council, can use the results and achievements of this research to improve the state of urban management and create a digital society with accepted cultural norms, and if the current research achieves a solution and a favorable model in the city of Tehran, it can be extended to other cities in the country.

2. Theoretical foundations and research background
Digital governance
Governance means the structures that determine how to perform responsibilities and duties, and determining governance mechanisms, can lead to greater effectiveness of actions and transparency in organizational responsibilities. In the meantime, managing and monitoring the digital transformation of an organization requires new management methods, new capabilities, and competencies for leadership. An organization can successfully establish digital governance at the organizational level if it can create a forward-looking, comprehensive, and innovative plan for survival in the digital era in the organization (Delon et al., 2018). A digital ruler, according to the duties and competencies he needs to be effective in this responsibility, determines, directs, and monitors digital-oriented measures in the organization and aligns the direction of activities with the organization's overall goals. The presence of digital governance will prevent the wastage of resources and will increase the effect of digital transformation measures (Mejer, 2015). Digital governance means an organizational structure for the development and allocation of organizational resources in the field of digital transformation. The purpose of this mechanism is to advance the organization's digital actions as best as possible. Digital governance is also derived from the macro concept of governance. Every organization is managed by a governing body (a person or a group of people who are responsible for its most important actions). One of the activities that every organization with every mission and vision does continuously is governance. Digital governance plays an important role in controlling the process of this fundamental change in the organization by determining the duties of individuals in line with advancing the goals of digital transformation (Indiasazi et al., 2020).

Urban intelligence
The smart city has been proposed as the axis of transformation and development of the millennium and means the opening of new concepts in urban planning (Hardianti et al., 2019), which combines the capabilities of the real and virtual worlds to solve urban problems. The huge amount of data

produced in the city space, together with the developments in the field of information and communication technology, creates unique opportunities to deal with the big challenges of cities (Sumero and Bohata, 2019). One of the most important foundations of a smart city is access to real-time information on the actions and choices of citizens (Khodadadi and Abbaspour, 1991). The advantages of smart growth include increasing density, integrating activities within the city, internal development, combining uses, reducing land consumption and reducing the distance between work and life, more useful use of space, reducing energy consumption, reducing environmental pollution, reducing the use of private transportation and increasing the use of public transportation, maximum access to urban services, etc., which can increase the quality of the urban environment. Because smart urban growth emphasizes issues such as mixed uses, the use of compact buildings, and the creation of pedestrian neighborhoods (Rondik et al., 2021). A smart city takes into consideration the increase in the quality of life with the development of electronic devices in the city at the same time and raises the issues of sustainable development along with participatory governance in urban management (Hataminejad and Mansouri Zasat, 1400).

To live better
Almost from the beginning of the 1970s, the assumptions of the development paradigm were seriously questioned. Many problems have plagued humanity, including increasing poverty, inequality, human sacrifice, environmental disasters such as pollution at the local and global level, the increasing scarcity of freshwater resources, erosion of soil resources, destruction of forests, destruction of biodiversity, and the immorality that governs the previous patterns of development, were initially noticed by experts and experts; Therefore,

as a result of these problems, the old paradigm of development faced fundamental challenges and led to the introduction of a new paradigm of development by experts, namely sustainable development (Rehbar et al., 2018). In general, three categories of factors have contributed to the spread of the idea of a better urban life (Zahedi and Najafi, 2016):

- The dysfunctional results of the implementation of structural adjustment policies that were formulated to deal with the global economic crisis in the 1980s;
- The relentless and unstoppable increase in poverty, hunger, and inequality in the world;
- Worrying destruction of the environment and natural resources as a result of the use of technologies.

The first efforts were caused by the concerns of several thinkers who believed that humans are destroying their environment, the environment they have historically lived in and are biologically dependent on (Ana Viswezi et al., 2018). This is the first evolution and revolution in attitude that occurred in the late 1960s and was characterized by the debate about the quality of the environment against economic growth. Accordingly, a delegation of development and environment experts met in Switzerland in June 1971 and focused on the issue of protecting and improving the environment as an urgent need of developing countries (Salamrouzi and Sheikhi, 1400).

Digital sociology
Digital sociology is emerging as a new field of research that has increased in importance in today's world. Digital sociology examines the impact of digital technologies on social behavior and interactions, culture, and individual and group identity. Unlike traditional sociology, which usually

examines human relations in the physical space, digital sociology examines human relations in the digital space, such as social networks, online markets, etc. (Khosrojardi, 2018)

3. Literature Review

The summary of internal and external research related to the research topic is as Table (1):

Table (1) summary of Internal and External Research

Row	Research Topic	Researcher and Year	Research Method	Research Results
1	Pathology of Digital Governance in E-Government	Bikzad and Jalilinejad (1400)	Qualitative Analysis Method	Digital governance indicators should be done in the form of organizational assessments and structural barriers should be eliminated in organizations.
2	Investigating the effects of the smart city on the livability of cities (9th district of Mashhad metropolis)	Hataminejad and Mansouri Etminan (1400)	Multi-Criteria Decision-Making Method	District 1 of Mashhad Municipality District 9 is smarter than other areas in terms of smart city standards.
3	Explanation of Smart City Principles and Strategies with Sustainability Approach in the Field of Crisis Management	Mulai (1400)	Qualitative Study	The sustainable smart city approach with smart city management and intelligent processes, provides benefits such as accelerating management of issues and services, integration of decisions and actions of officials and people, transparency and monitoring and controlling violations, reducing unnecessary travel, and saving energy.
4	Presenting a Techno-Economic Model of Sustainable Communication Infrastructure in Smart City Using Fiber Optic Access Network	Asgari Rad et al (1400)	Content Analysis	Providing basic connectivity in the smart city with the proposed model, in addition to meeting technical requirements, will reduce the cost of network creation, reduce the vulnerability to a variety of threats and increase the reliability and security percentage.
5	Conceptual Framework for Digital Judicial Transformation in the Direction of Digital Governance	Kondari and Rouhani(2020)	Method of Omkhite	Effective dimensions and components include enablers (including two layers of infrastructure components and technological components), applications (including challenges, incentives, and opportunities), judicial ecosystem (including two layers of internal stakeholders and external stakeholders), digital transformation governance, digital transformation roadmap (including three layers of vision, goals, and plans) and digital transformation journey (including five stages).
6	Measurement and Evaluation of Smart City Indicators in Ahvaz Metropolis	Guidance and Partners(2020)	T-test method	Zones 3 and 2 have the most favorable conditions and Zones 1 and 5 have the most unfavorable conditions in terms of smart city indicators.
7	Designing a Governance Reform Model with Digital Governance Approach	Abolmaali and Pourezat(2020)	It's mixed up.	Effective dimensions for implementing digital governance require reengineering of cultural، technological، and economic systems as the most important factors for reforming the administrative system.
8	Integration of business models in the smart city	Farjood et al (2020)	It's mixed up.	Finally, the results include a seven-part model, which is derived from the combination of literature on business models in the field of smart cities.

Row	Research Topic	Researcher and Year	Research Method	Research Results
9	Investigating the Driving Drivers for the Implementation of Smart City	Tokody and Shuster (2021)	Hypothesis Test	International and European standardization efforts demonstrate the importance of a holistic approach to cities and urban issues as complex systems, as well as the relationship between cyber-physical systems and smart cities in the field of urban sensitization.
10	Security and Smart City: A Systematic Review	Laouf et al. (2020)	Conceptual Development	We propose three clear categories for categorizing security interventions in smart cities: those that use new sensors but traditional stimuli, those that seek to make older systems smarter, and those that introduce entirely new functions.
11	Smart Innovative Cities: The Impact of Smart City Policies on Urban Innovation	Caragillo and Dilbo (2019)	Structural equations	Cities that are more than average EU participants in smart city policies are also more inclined to patent. This effect is stronger for high-tech patents, while for technically more precise definition classes is reduced.

4. Research gap and innovation

Based on the reviews of past research in the domestic and foreign fields, most of the studies in the field of digital governance indicators from the perspective of implementation mechanisms, influence on variables such as organizational transformation, performance, profitability, financial management, acceleration of processes, etc., were intended in various businesses and industries, and also the aforementioned research lacked insight into the dynamic capabilities and routines required for the development of governance from an ecosystem and systemic perspective and in the field of urban smartness. In particular, researchers such as Moulai (1400), Asgari Rad et al. (1400), and Kennedy and Rouhani (1399) discussed the basics and strategies of the smart city in the direction of effective management and improvement of urban smarting process and expressed theories in the direction of the implementation of the smart city by looking at the livability of the processes and the progress of urban convergence. According to this outstanding research, this article investigates how digital sociology can improve the quality of life in smart cities. It can be developed through dynamic capabilities to coordinate ecosystem innovation within urban structures, and thus lead to desirable achievements, for this purpose, through a case study of smart city initiatives, insights about the basic principles or underlying sub-routines for sensing, records, ng and reconfiguration capabilities from the perspective of digital transformation in the urban domain, which these principles and procedures are used to coordinate urban processes, through alignment, alignment and orientation to Urban activities are put on the agenda through governance mechanisms. On the one hand, based on internal and external research, since cities have taken on complex forms that include a limited area, an urban environment (a set of factors that affect the objects and subjects presented in the area), and citizens, they grow rapidly in time and space, and the modern city can be compared to a laboratory in which a person simultaneously creates and is a product of the surrounding environment. Historically, cities have never been considered "places for the growth of human talents and talents." Ancient cities were created to protect citizens from foreign enemies. In the pre-industrial era, cities were centers of trade and handicrafts and later became centers of industrialization. And only in the post-industrial era, the city has become the center of intellectual development and innovation in all parts of the urban

environment, marking a transitional stage for creating an intelligent society. For this purpose, the innovation of the present article in completing the research gap includes identifying the stakeholders of the digital society effectively the digital governance based on a smart city with a better view of living through a mixed strategy (qualitative-quantitative).

5. Materials and Methods
In the current article, the research method is mixed in terms of research method. Because it uses both quantitative research strategies (in expert data) and qualitative method strategy (in content analysis of existing technical and specialized resources). In terms of the nature of the data, the current research uses both quantitative and qualitative methods. The meaning of qualitative data is a place where, while studying documents about the characteristics and dimensions of humanistic cities and citizens' participation, it examines past research and examines internal and external sources. However, when it tries to score each of the statements of the questionnaire (components, indicators, etc.) with fieldwork (questionnaire), it is based on a quantitative method. So, in general, the current research is considered to be a mixed type of quantitative and qualitative. Therefore, in general, in terms of the nature of the data, it is quantitative-qualitative. Of course, it is necessary to mention that the format approach in this research is quantitative. The present research is included in basic-applied research. Because the research is exploratory and the primary exploratory method is knowledge, the research is of a fundamental type. At the same time, its achievements will be a benchmark for urban management, especially the municipality of the two districts of Tehran metropolis, so it is also considered practical. In the macro view, this research uses a sociological approach. Sociology, as one of the fields of

social sciences, investigates the behavior, structure, and evolution of human societies. Sociology is the understanding of the perceptions, attitudes, and behaviors of individuals and groups in society. Also, sociology investigates social relations, social systems, and the role and influence of various social factors on the behavior and development of societies. (Giddens et al., 2017)

6. Society and statistical research sample
Many formulas and solutions have been proposed by statistical experts to determine the size of the statistical sample. The sample size should be determined in such a way that the researcher does not incur excessive costs in addition to access to correct statistical inferences. Interpretive structural modeling is a structured method to establish relationships and understand the relationship between the elements of a complex system, which was introduced by Warfield in 1974 (Atesh Souz et al., 2015). This modeling is an interactive process in which a set of different and related elements are structured in a comprehensive systematic model (Azer and Bayat, 2017). This type of modeling seeks to direct the relationships between components in a system. In the method of interpretative structural modeling, it is necessary to obtain the opinions of experts and analyze them. Among the selection criteria of experts, we can mention the scientific mastery of urban management concepts, practical experience in the field of macro-urban management, as well as the willingness to participate in the research process.

7. Findings
MAXQDA software version 2018 was used to analyze the conducted interviews. For this purpose, 13 conducted interviews were entered into the software as documents, and the line-by-line analysis of these texts resulted in the identification of 202 open codes. It should be noted that determining

the axis of the codes was problem-oriented. By categorizing and determining the main axes of these codes, the following results were obtained.

In the following, the frequency of the main topics in each axis is given.

According to the above tables, the interview topics and codes were categorized into the 8 main dimensions of clarification, central participation, culturalization, intelligence, accountability, stabilization, integration, and structural arrangements. Many variables extracted from the interview were the same as the variables obtained from the general questionnaire. According to the frequency table, components such as process transparency, collaborative decision-making, implementing green economy, securing information, creating an organic structure, paying attention to social capital, networking, and collaborative decision-making were among the most important and frequent items mentioned by the experts; As mentioned, many of these components were measured and counted in the first step; But 10 variables were added to the total of 57 variables that were not included in the first step.

Table (2): frequency of main issues in the axis of clarification

Dimensions	Environmental drives	Abundance	Dimensions	Environmental drives	Abundance
Accountability	Accountability	10	Clarification	The right to access information	11
	Law Oriented	6		Process transparency	15
	Commitment	8		Transparency of workflow	6
	Demand	14		Process Modeling	4
	Total	38			
Stabilization	Attention to e-Government	3		Discipline	3
	Attention to the environmental sphere	5		Total	39
	Implementing the Green Economy	15	Pivotal participation	Crowdsourcing	12
	Total	23			
Integration	Software Infrastructure	4		Participatory Decision Making	14
	Aggregate data and information	7		Participatory Transparency	7
	Information Security	3		Update Partnership	6
	Privacy	12		Development of group and council services	5
	Intellectual Property Information	14		Publicization	3
	Hardware Equipping	4		Total	47
	Total	44	Cultivation	Education (citizenship)	5
Structural Arrangements	Organic Structure	9		Reducing social problems	3
	Agility	5		Strengthening Cultural Sites	6
	Specialization	3		Pay attention to social capital and social health	3
	Knowledge-based	6		Total	17
	Pivotal Team	4	Intelligence	Service Optimization	5
	Organizational Innovation	4		Exchange of data and information between citizens and related entities	3
	Effective Management	3		Networking	2
	Total	34		Total	10

8. Analysis of indirect effects

To use Mic Mac software, 67 parameters were included in a cross matrix and were rated using the opinion of 20 experts. The final matrix of experts' opinions was created using the mode of these experts' opinions. After entering the variables and the final matrix of experts' opinions on the degree of connection between these variables as software inputs with the titles of direct effects matrix (MDI) and potential direct effects matrix (MPDI), the output matrices with the titles of indirect effects matrix (MII)) and the potential indirect effects matrix (MPII) was obtained.

These variables are the most important influencing factors on the development of digital governance based on urban intelligence with a sustainable approach, which includes: participatory transparency, popularization, privacy, creation of organic structure, agility, networking, and service optimization. The right side of the figure and the northeast part show the two-dimensional variables. These variables have two common characteristics of high influence and high influence, which are divided into two categories of risk and target variables. Risk variables are formed above the diagonal line of the northeastern region and have a great capacity to become key players in the system. Various public

transport options are located in this area. The influencing variables are located in the southeast part of the figure and can be called non-result variables. These variables are the result of independent variables, and if the independent and influential variables have a positive trend, they have e low influence Thesehese variables do not have a key and important role in the future of Tehran, but they should not be completely forgotten. Adjustment variables are placed near the center of the figure. In facTheya regulatory mode and sometimes act as a secondary lever. Based on the policies that planners use for their goals, these variables can be upgraded to influential variables, determining variables, or target and risk variables. These indicators play the most and most important role in regulating the relationships between variables for the sociology of digital governance in Tehran, and they can contribute greatly to Tehran's urban development in the future by maintaining a balance between other indicators. These variables are among the regulatory variables of the research, which include: reducing social problems, strengthening cultural places, developing group and council services, and making demands.
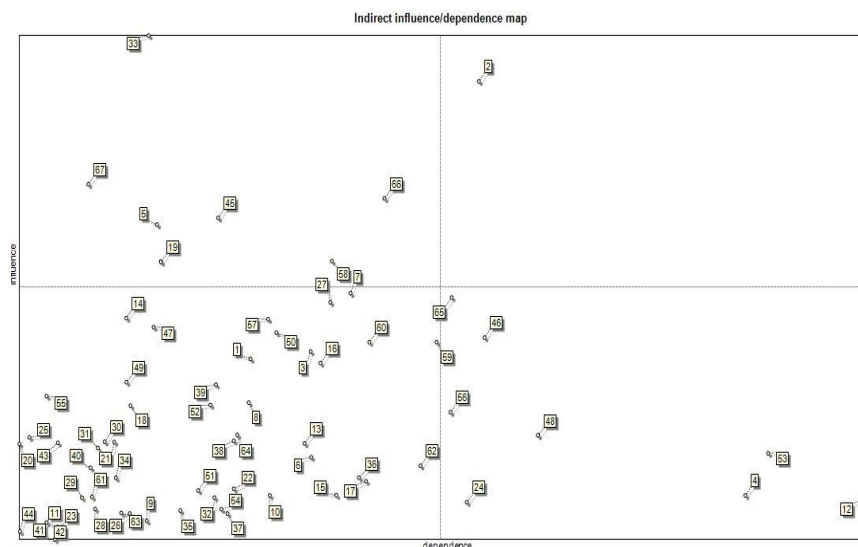

Figure (1): Cross effects map based on indirect effects matrix (MII)

As it is known, the most key variable that has a high influence and is controllable and has a great impact on other variables is "the existence of various transportation options in the city". The ranking of variables according to influence is as follows in Table No.4.

The ranking of the variables according to the influence (dependency) is as follows.

As it is known, the most key variable that has a high influence and is controllable and has a great impact on other variables is "the existence of various transportation options in the city". The ranking of variables according to influence is described in Table 6.

The ranking of variables according to dependence is described in Table 7.

Table (3): Classification of variables based on software output

Influential variables		Participatory clarification, popularization, privacy, creation of organic structure, agility, networking, and optimization of services
Bivariate variables		Hardware equipment, privacy, participation timing, participatory decision-making, crowdsourcing, attention to electronic government
Influential variables		Data and information exchange between citizens and related institutions, attention to the environmental field, the right to access information
Discrete independent variables	Discrete independent variables (near the origin of coordinates)	Information security, software infrastructure, specialization, implementation of green economy, workflow clarification
	Secondary leverage (above the diagonal cut)	Aggregation of data and information, intellectual property of information, team-oriented, process transparency, process modeling, discipline.
	other	Education (citizenship), effective management, organizational innovation, knowledge-oriented, responsibility, law-abiding, commitment, Knowledge-based, Responsibility, Law-Oriented, Commitment
Regulatory variables (near the center of the diagram)		Reducing social problems, strengthening cultural places, developing group and council services, making demands

Table (4) The ranking of variables according to influence

67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
41-41	44-44	11-11	23-23	42-42	9-9	26-26	63-63	35-35	28-28	54-54	12-12	24-24	29-29	32-32	51-51	61-61	10-10	4-4	15-15	22-22	17-17	34-34	36-36	40-40	62-62	6-6	53-53	31-31	20-20	13-13	43-43	21-21	38-38	25-25	48-48	64-64	56-56	18-18	52-52	55-55	8-8	39-39	49-49	16-16	1-1	3-3	60-60	59-59	46-46	47-47	57-57	14-14	27-27	65-65	7-7	19-19	58-58	5-5	45-45	66-66	67-67	2-2			

Table (5) The ranking of the variables according to the influence (dependency)

67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
20-20	44-44	25-25	55-55	42-42	9-9	23-23	41-41	29-29	67-67	40-40	61-61	28-28	30-30	21-21	34-34	14-14	63-63	49-49	26-26	18-18	9-9	33-33	35-35	19-19	5-5	51-51	32-32	39-39	54-54	37-37	38-38	22-22	64-64	8-8	1-1	57-57	10-10	3-3	6-6	27-27	58-58	15-15	7-7	17-17	60-60	62-62	56-56	65-65	24-24	46-46	48-48	2-2	4-4	53-53	11										

Table (6) ranking of variables according to effectiveness

Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
Variable	33-33	2-2	67-67	66-66	45-45	5-5	58-58	19-19	7-7	14-14	57-57	27-27	65-65	46-46	50-50	60-60	3-3	1-1	16-16	18-18	52-52	55-55	8-8	64-64	25-25	48-48	38-38	21-21	43-43	13-13	20-20	6-6	53-53	31-31	40-40	36-36	34-34	22-22	17-17	15-15	4-4	10-10	61-61	51-51	29-29	12-12	24-24	28-28	54-54	35-35	63-63	26-26	37-37	9-9	42-42	11-11	44-44								

Table (7) ranking of variables according to effectiveness

Rank	...	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Variable	...	25-25	11-11	42-42	23-23	29-29	43-43	67-67	40-40	28-28	31-31	30-30	21-21	63-63	14-14	49-49	26-26	18-18	9-9	33-33	47-47	5-5	19-19	35-35	52-52	51-51	39-39	45-45	54-54	37-37	38-38	64-64	8-8	22-22	1-1	57-57	10-10	13-13	6-6	16-16	27-27	58-58	15-15	36-36	7-7	60-60	66-66	59-59	56-56	65-65	24-24	2-2	46-46	48-48	4-4	53-53	12-12

9. Scenario writing

To identify the most important factors affecting the development process and its imaginable situations in the future, 20 experts in urban affairs and digital transformation were asked for their opinions, and finally, 7 main factors and 21 situations were defined by summing them up. These factors include clarification, central participation, culturalization, intelligence, accountability, stabilization, integration, and structural measures.

The mentioned factors can be imagined in different situations in the future. According to the investigations, these situations are predicted in 3 modes. In the table below, you can see the different states of these factors, which are necessary for developing scenarios.

Table (8): Factors affecting development and its imagined situations

Dimensions	status code	Factors	Dimensions	status code	Factors
Clarification	S1	The right to access information	Accountability	P1	Accountability
	S2	Process transparency		P2	Law Oriented
	S3	Transparency of workflow		P3	Commitment
	S4	Process Modeling		P4	Demanding
	S5		Stabilization		
	S6	Discipline		I1	Attention to e-Government
Pivotal participation	M1	Crowdsourcing		I2	Attention to the environmental field
	M2		Integration	I3	Implementing the Green Economy
	M3	Participatory Decision Making		Y1	Software Infrastructure
	M4	Participatory Transparency		Y2	Aggregation of data and information
	M5	Timing of Participation		Y3	Information Security
	M6	Development of group and council services		Y4	Privacy
	M7	Popularization		Y5	Intellectual Property Information
				Y6	Hardware Equipping
Cultivation	F1	Education (citizenship)	Structural Arrangements	T1	Creating an organic structure
	F2	Reducing social problems		T2	Agility
	F3	Strengthening Cultural Sites		T3	Specialization
	F4	Pay attention to social capital and social health		T4	Knowledge oriented
				T5	Team Oriented
Intelligence	H1	Service Optimization		T6	Organizational Innovation
	H2	Exchange of data and information between citizens and related entities		T7	Effective Management
	H3	Networking			

After determining the situations, the cross matrix of the mutual effects of these situations was formed and this matrix was completed again by asking the opinions of 13 experts, by inserting figures from 3 to -3. The number 3 means the most effect, the number 0 means no effect, and the number -3 means the most restrictive. By entering the final matrix of the mutual effects of the factors influencing the development (which is obtained from the mode of 13 other matrices) in the Scenario Wizard software version 3.41, several 2187 combined scenarios were extracted, which includes all possible possibilities in the future. Of course, all these scenarios cannot be analyzed and planned. With complex calculations, this software provides the researcher with the possibility of extracting scenarios with strong probability, scenarios with weak probability, and scenarios with a high probability of compatibility and adaptation.

10. Discussion and conclusion

Strong or probable scenarios: 2 scenarios

According to the outputs of the software, two scenarios have obtained the highest score of total impact with a large difference from other scenarios and the software has considered them as strong scenarios. These two scenarios can be seen in the table below.

According to the results, among the strong scenarios, one scenario includes the most favorable possible situations and one scenario includes the most unfavorable possible situations.

Weak scenarios (possible scenarios): 71 scenarios

The software considers 71 scenarios as weak scenarios. Although it can be reasonable to deal with weak or possible scenarios, it is impractical to plan for such a high number of scenarios.

Compatible scenarios (believable scenarios): 6 scenarios

Considering the limitations of dealing with weak scenarios, it seems logical to use compatible scenarios that are between strongly limited scenarios and weak broad scenarios. It should be noted that in the settings of compatible scenarios, the maximum amount of incompatibility is 2 units. Determining an inconsistency unit would make the proposed scenarios similar to strong scenarios. Based on this, 6 scenarios were obtained, which can be seen in the table below. The title of each situation is written inside each house, which can be followed according to the table "Factors affecting development and its imagined situations".

Table (9): Situations of strong scenarios

	Scenario 1
Make smart	Development of electronic services and businesses in domestic and foreign platforms (A1)
Central participation	Putting people in charge of programs (B1)
clarification	Clarification in all matters of organizational departments (C1)
Structural arrangements	Agile and creation of organic and flat structures (D1)
Integration	Development of hardware and software infrastructure (E1)
culture building	Creating and consolidating the discourse of digital transformation (F1)
Stabilization	Attention to the environmental areas and the green city (G1)
	Scenario 2
Make smart	Limitation of online services (A3)
Central participation	Ignoring people in plans and programs (B3)
clarification	Maintaining confidentiality in administrative processes (C3)
Structural arrangements	Hierarchical increase in structural levels (D3)
Integration	Employing human resources instead of software (E3)
culture building	Ignore Discourse (F3)
Stabilization	Neglecting environmental areas and the green city (G3)

Table (10): states of compatible scenarios

	Scn 1	Scn 2	Scn 3	Scn 4	Scn 5	Scn 6
Make smart	A1	A2	A1	A2	A3	A3
Central participation	B1	B2	B2	B2	B3	B3
clarification	C1	C2	C2	C2	C3	C3
Structural arrangements	D1	D2	D2	D2	D2	D3
Integration	E1	E3	E3	E2	E3	E3
culture building	F1	F1	F2	F1	F3	F3
Stabilization	G1	G2	G2	G3	G3	G3

Based on the obtained results, the first scenarios are the best, and the sixth scenario and to some extent, the fifth scenario show the worst possible situations. The second to fourth scenarios are mostly based on the least changes in the main factors and show progress in only one factor and regression in one factor.

10. Research Suggestions

According to the obtained results, in line with digital governance in line with urban smartness with a sustainable approach, it is suggested to strengthen electronic services and businesses on domestic and foreign platforms; Community members from different strata and with different tastes should be at the head of urban affairs. Crowdsourcing platforms should be used for collaborative management and intellectual assistance of society's elite; Clarity should be put on the agenda in all administrative and organizational matters; Justice and per capita distribution of urban welfare and entertainment should be done among the members of the society.

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