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Examining the Challenges of Smart Cities and the Necessity of Establishing Good Governance

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Abstract

The smart city is a thought-provoking concept that has garnered increasing attention from academic communities and citizens in recent years. This concept presents new horizons in urban planning and governance for urban managers, decision-makers, and policy-makers. However, like any phenomenon, it faces several challenges that must be addressed to show how urban governance is necessary in smart cites. The overall aim of this research is to present the challenges of smart city formation within the context of urban governance and to explain the necessity of establishing good governance for the management of smart cities. This research, after describing the theoretical foundations, dimensions, and components of a smart city, raises the challenges facing the smartening of cities in Iran. Using the Delphi technique and analytic hierarchy process (AHP) and drawing on the opinions of 15 experts, it addresses the necessities of creating a good governance model in smart cities. This research is applied-developmental in terms of purpose and mixed (quantitative and qualitative) in terms of nature, with a descriptive-documentary-survey method of implementation. The results indicate that there are five main challenges facing the creation of a smart city, including economic, educational, technical, governmental, and policy challenges. Considering the explanation of the characteristics of good urban governance, it is necessary for this governance to serve as a way to control and improve conditions for readiness to smarten cities and as an effective solution for the sustainable development of smart cities.

Keywords: Smart City, Good Governance, Smart Governance.

Introduction

Cities inherently face complex and extensive challenges that can be resolved through a systematic approach. In other words, the rapid population growth disrupts urban balance and makes sustainability unachievable with current management methods. Therefore, old institutions and methods of management and governance are in conflict with the current complex and changing world. As a result, urban planners around the world are trying to develop solutions for the development of cities in the 21st century, considering all dimensions of urbanization in this era, and meet the expectations of the new world. This is where the concept of the smart city is raised as a necessary and thoughtful approach in the administration of cities.

The smart city has been proposed as a way to use high technologies to address critical problems related to urban life, such as traffic, pollution, congestion, and poverty. It should be noted that many governments consider smart cities a solution to prevent global warming, population growth, and the reduction of energy resources [1].

Technology is crucial for economic competitiveness and sustainability, but without social infrastructure and citizen involvement, smart cities cannot succeed. Therefore, good urban governance in smart cities provides a completely society-centered model with greater and facilitated communication capabilities through new

technologies, which emphasizes synergy, cooperation, and constructive interaction between technological systems and social structure.

In fact, the society that is redefined in the smart city needs a new form of urban governance. Good governance in smart cities enables two-way communication and active information in all stages of planning and project design, cooperation and sharing of information and experiences, the creation of collective knowledge, the provision of integrated and quality services, and increased speed. The smart city ideals in exploiting digital services to improve the way a city functions are not only achieved by investing in sensors and technological solutions, but this issue requires desirable urban governance. Increasing studies in the field of smart governance is one of these efforts to achieve better governance of smart cities [2].

The aim of this research is to express the criteria for the formation of a smart city and the challenges ahead in the movement towards the smartening of cities. In fact, this research intends to examine the challenges facing smart cities after describing the theoretical foundations, dimensions, and components of a smart city and to address the necessities of creating a good governance model in smart cities through in-depth analysis. In general, it can be said that this research seeks to answer the following questions:

- What is a smart city and what are its criteria in the global literature in recent decades?
- What are the most important challenges in the field of smartening cities in Iran?
- What is the necessity of creating a good urban governance model in order to achieve the goal of a smart city in Iranian cities?

Research Necessity

Given the growth of technology and its increasing impact on human life today, the following are among the main factors that highlight the need to implement correct methods of urban governance alongside the establishment of a smart city:

Urban Development and Urban Growth of cities

When urbanization occurs rapidly, it increases the vulnerability of society and weakens urban resilience. Today, more than half of the world's population lives in cities. The rapid growth of cities puts pressure on civil society organizations and governments to provide appropriate and affordable services for immigrant groups and lower classes1.

The challenge of how to deal with increased energy consumption due to the increase in the human population is often one of the main challenges in less developed countries that the world faces today. Also, one of the most important factors in government policy is energy supply security. In fact, cities are responsible for 75% of energy consumption and up to 80% of greenhouse gases in the world. This is where smart city projects are introduced to create sustainability in cities. Smart city projects have become more widespread and popular in various cities around the world in recent years. The development and growth of cities and the complexity of urban management have convinced local governments to move towards more effective use of technology to improve the quality of urban spaces and provide better public services. In fact, although the smart city is a new phenomenon in urban planning literature, it has been spreading rapidly in recent years[1].

Iran had a balanced urban and urbanization system until 1335, in which less than one-third of Iran's population lived in urban areas. In 1363, the share of the population in urban and rural areas of the country became almost equal, and now we see that in many provinces of the country, the majority of the population is urban [3].

Demographic Changes

Population growth, which has always been one of the main topics of sociology, economics, culture, politics, and other related issues, shows that the average world population is increasing, and this population increase averages 8% per year. Studies have shown that in recent decades, the world's population growth has had a significant upward trend, and it is expected that by 2050, a population of more than 9 billion people will live in the world.

Iran is no exception to this rule, and the statistics of the United Nations show that among 224 countries, Iran is the nineteenth most populous country in the world, and one percent of the world's total population lives in Iran. Iran, in the last official census of 1395, had a population of 79,926,270 people, and it is predicted that this number will reach 93,553,000 people by 2050 [3].

Research and development in smart city programs are very suitable and efficient due to the attention to the problems and issues caused by population growth in the coming years. Smart cities, due to the use of a flexible, reliable, and secure information and communication infrastructure, improve the quality of services, and can also provide sustainable economic growth in proportion to the increase in population through high standards of living and job opportunities, welfare, and access to facilities[4]. A smart city must be able to accommodate the population of a city and consider the considerations and statistical studies of that city. In fact, smartening the city is a way to answer such problems that are created due to the development of the urban population and urbanization [5].

Environmental Effects of Urbanization

As mentioned earlier, the rapid growth of the urban population and urbanization has increased pressure on urban infrastructure, and managers in the position of urban governance are trying to cope with the growing demand for various types of energy, water, and transportation. Increasing demands in cities and urban services cannot be solved by adding urban infrastructure, because cities face physical, environmental, and economic limitations for growth [6]. In fact, cities are like engines of economic growth, accounting for 80% of global gross production [7].

The issue of smartening the city is raised considering the above challenges. A smart city makes a significant amount of urban information available and potentially improves the efficiency of physical infrastructure and contributes to the process of sustainable urban development and improving the quality of life[6].

Transportation Problems

Most transportation systems in the world lead to a threat to sustainability, social and economic justice, and environmental issues. The transportation system needs changes in the way of travel, planning, strategies, and design to reduce the negative effects associated with transportation, which is why in many countries, various movements and strategies have emerged to reduce the problems caused by transportation and increase sustainability in the transportation sector [8]. Smart transportation systems in cities have received much attention due to their capabilities, applications, and importance in the fields of supervision, traffic management, safety, and services in smart cities. It can be stated that planning in the field of vehicle networks can effectively reduce traffic problems in urban areas [5].

Economic Problems

Economic sustainability is a key factor in smart cities, yet financial constraints often hinder their development.

Countries often face a diverse set of economic challenges, and cities play a fundamental role as economic drivers [9]. In today's world, cities have become centers of economic growth, and it is predicted that by 2050, 600 of the world's largest cities will account for 60% of the world's gross production [10].

The main motivation for cities to become smart lies in their desire for economic development. During the economic crises of 2008 and 2009, it became clear that each city competed with other cities, but in ways that they had not experienced before. Cities were not only competing with their neighbors in the state or at the national level, but also in the global arena and in the global supply and demand networks and the Internet with other counterparts on the other side of the world [11]. For these reasons, planning for smartening cities is necessary to be placed in the global ranks in the field of fundamental changes in new management approaches (smart urban governance), which can support the combined and network government, entrepreneurial citizens, and workers in the global economy[12].

Therefore, the need for innovative and intelligent strategies to deal with economic crises is considered a global necessity. Economic crises in today's world have requirements that create motivation to overcome resistance to

change and turn problems into opportunities, and in a way, the most prominent driver for the development of smart cities is the need to generate more wealth as well as the existence of economic crises.

Technological Development and Bureaucracy Problems

Today, there are more than 7 billion mobile phone subscriptions worldwide. This figure was about 738 million in 2000. Also, about 2.3 billion people worldwide use the Internet. The rate of broadband penetration in the world has increased about 12 times from 2007 to 2015, and more than half of the world's people have access to it [13]. In addition to all these advances, we are witnessing a reduction in the costs associated with accessing technological devices such as cheap mobile phones, free social media, and cost-effective methods for accessing large amounts of information. This provides better tools and opportunities to understand, communicate, and predict urban functions.

New technologies do not automatically lead to smart cooperation between urban actors and will not create the ground for a better city. Attention to the link between social structure and technology is necessary for the realization of a smart city, and researchers have always emphasized the development of constructive interaction between technology systems and the network of urban actors [14]. The reason for this can be that without smart users to interact, smart services will remain unused.

In addition to the above-mentioned cases in the necessity of smartening cities and using the strategies of desirable governance, there are other cases that strengthen this necessity, including social and cultural crises, public demands, other population problems such as traffic, the migration of elites, the waste of resources such as water and energy, and ... the need for proper management and ...

Research Methodology

This research employs a descriptive-analytical approach. From the perspective of its objective, it is considered fundamental-theoretical, given its aim to elucidate the concept of smart cities and the necessity of good governance within them through an in-depth study of existing literature. This study involves a systematic review and analysis of relevant academic literature and other research, utilizing two primary sources: academic literature databases and Google Scholar. The scope of this research is limited to scholarly articles, academic journals, and papers from reputable scientific conferences. Given the interdisciplinary nature of the concept, the search encompasses studies in management, urban management, technology and communication sciences, and urban planning.

Theoretical Foundations

Smart City

The smart city is a concept that has garnered considerable attention in urban planning in recent years. Understanding this concept is the first step toward creating a smart city. However, a brief review of the related literature reveals that the concept of the smart city is highly contentious. Indeed, the emergence of similar terms such as intelligent cities, virtual cities, knowledge cities, and digital cities has added to the conceptual confusion surrounding this term [15].

Although some argue that a universally accepted definition of a smart city that fully explains its nature has not yet been established, this problem is critical because, despite this weakness, it becomes difficult to pursue urban development strategies in the context of moving towards smartening cities, as well as measuring their performance [16].

The field of smart cities is currently developing rapidly, and many different solutions are emerging in the market. It is estimated that more than $100 billion will be invested in smart city applications by 2030 [17].

One of the most influential definitions in academic literature was presented by the Vienna University of Technology in 2007: "A smart city is a city performing well in a forward-looking way in the six characteristics (smart citizens, smart transport, smart governance, smart living, smart economy, and smart environment), built on the smart combination of assets and activities of self-decisive, independent and aware citizens. It can also be stated that a smart city is an efficient and sustainable city that provides a high quality of life for its citizens and aims to

address urban challenges (improving transport, optimizing resource use, improving health and safety, improving social development, supporting economic growth, and participatory governance) through the use of information and communication technologies in services and infrastructure, cooperation between key stakeholders (citizens, universities, government, and industry), and investment in social capital [18].

The Three Dimensions of a Smart City

The conceptual components of a smart city can be divided into three categories: technology, human, and institutions. A city can be considered a smart city when investment in these three specific areas of development occurs and leads to sustainable growth and an improved quality of life [19].

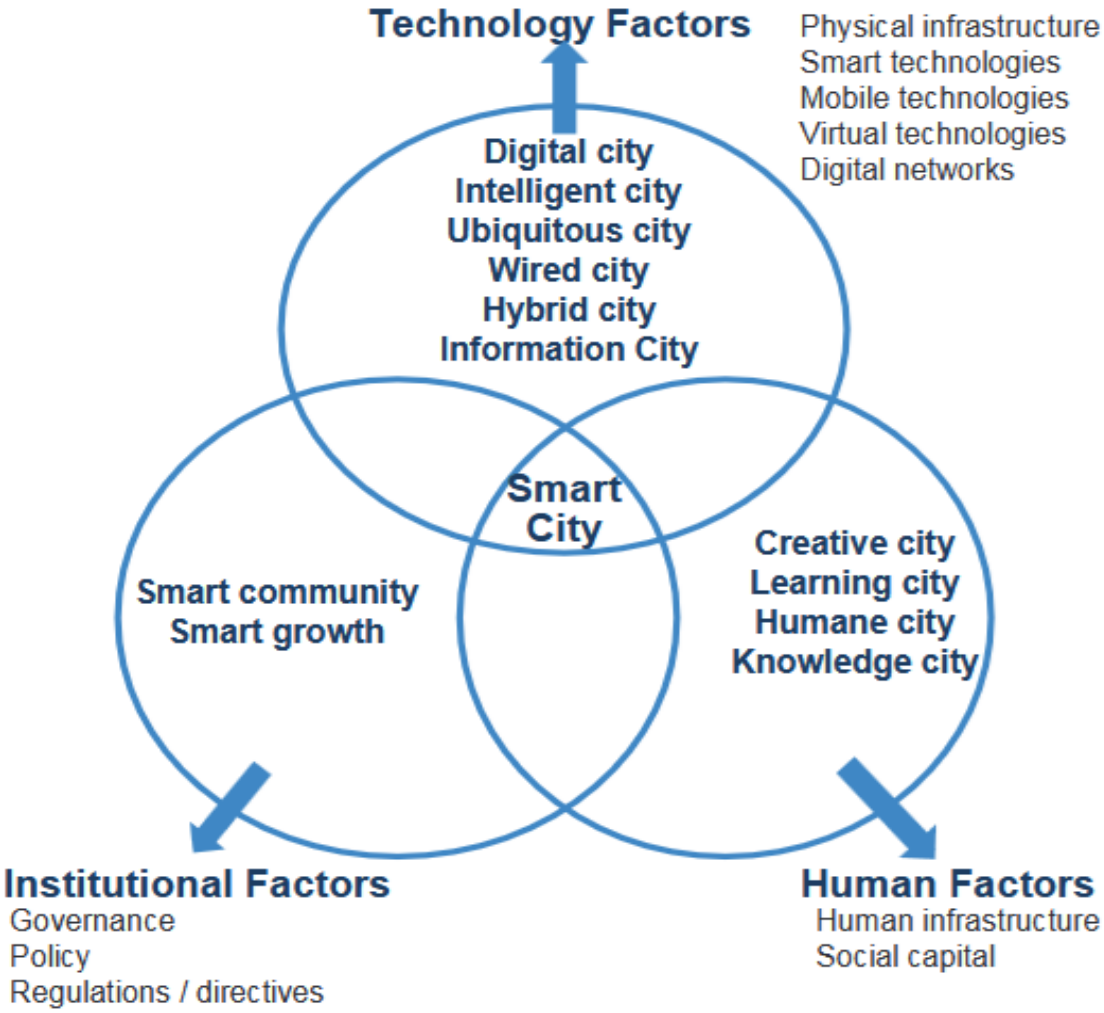

Figure1. Fundamental Components of Smart City [14].

Furthermore, the concept of a smart city is largely a fuzzy concept and consists of various dimensions and characteristics. According to the findings of Nam and Pardo (2011), there is a spectrum of conceptual proportions regarding the smart city. These conceptual proportions are categorized into technological, institutional, and human dimensions, as illustrated in the diagram below:"

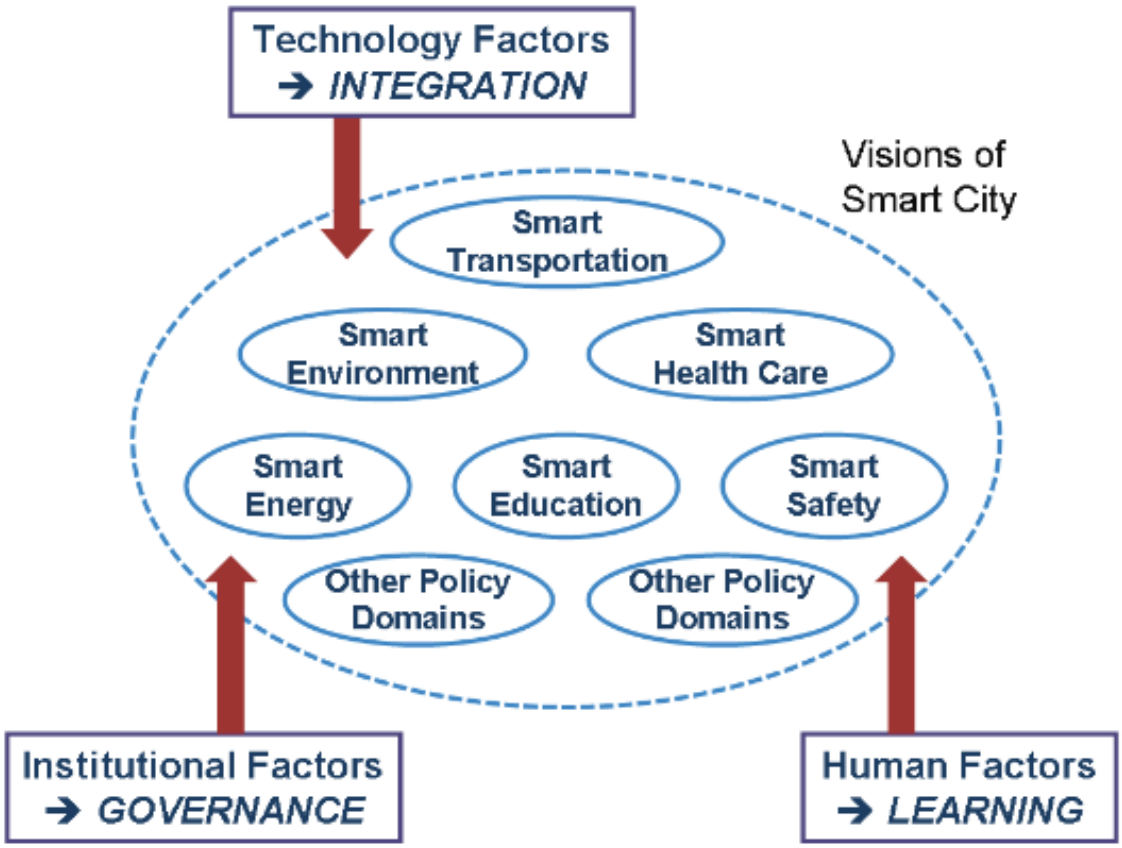

Figure2. Fundamental Components of Smart City [14].

Among the factors mentioned in the figure above, 6 components are considered as the main components of a smart city in theoretical foundations, and their definitions are given below;

1. Smart Economy

Smart economy refers to the competitiveness of the city with a focus on innovation, entrepreneurship, trademarks, productivity, labor market flexibility, and integration into the domestic market. Information and communication technologies (ICT) are used to develop e-commerce and e-business and increase opportunities related to the production and provision of services and innovations, as well as new products, services, or business models [16].

The common goal of actions under the title of smart economy is to strengthen the strengths and economic competitiveness of cities in national and global markets. The smart economy emphasizes the necessity of national competitiveness through innovative business and flexible labor markets. The smart city can improve its economic situation by creating and strengthening social networks for entrepreneurship and collaboration with various stakeholders (e.g., universities, businesses, and non-governmental organizations) to foster innovation through the creation of think tanks [20]. In the smart city, in addition to increasing access to the Internet with optimal bandwidth for citizens and businesses, it is also necessary to enable the use of electronic methods in business processes (such as e-shopping, e-banking) [21].

2. Smart Environment

Smart environment refers to the natural living conditions in cities, pollution and resource management (e.g., reuse and replacement of resources, etc.), as well as environmental protection. Solutions that create a smart environment in smart cities can include effective waste management, the use of renewable energy, green urban planning, and information and communication technology to improve the city's ecological systems [16]. the smart environment emphasizes the necessity of responsible resource management and sustainable city planning. This characteristic of smart cities mainly involves improving issues such as managing existing buildings and the city's energy

infrastructure through the use of innovative technology (such as solar energy) to reduce energy consumption and carbon dioxide emissions, as well as more efficient management of water and waste. In fact, the natural beauty of the city can be enhanced by reducing pollution and greenhouse gas emissions and striving for environmental protection. Smart cities promote energy consumption reduction and also benefit from technological innovations in this field.

3. Smart Governance

Smart governance is mainly described by effective and efficient public management, the quality of public services, and the participation of residents in decision-making about the city. Information and communication technology in electronic management is used to improve democratization and service delivery, as well as to support decisions made by government authorities [16].

Smart governance specifically addresses citizen participation at the municipal level. The governance system is transparent and allows citizens to participate in decision-making. Information and communication technology facilitates citizen participation and access to information and data related to the management of their city. By creating a continuous and efficient governance system, barriers to communication and cooperation can be eliminated. In fact, this feature creates the ground for transparency at all levels and the inclusiveness of programs. These measures are usually based on electronic services and increase cooperation and connection between the city's administrative body, residents, businesses, and institutions [21]. The main goal in this area is to strengthen discussion groups to engage citizens, create a system for sharing information, limit bureaucratic processes, and strengthen social, media, and human resource networks to involve stakeholders in decision-making [20].

4. Smart Living

Smart living encompasses various aspects of quality of life. City officials should pay special attention to the health, safety, culture, and living conditions of residents. An important aspect is also stimulating tourism and information on entertainment events, leisure activities, and nightlife. Social initiatives support the use of information and communication technology to create or improve existing lifestyles, as well as to improve the safety and health of residents [22].

It seeks to improve the quality of life of citizens by providing safe and healthy living conditions. Citizens in smart cities have easy access to health services and care, electronic health management, and various social services. In fact, with the main focus on improving the quality of life of citizens, smart cities have good opportunities for actions in home automation (e.g., smart homes, smart building services), the development of services that empower citizens to improve access to health services (e.g., e-health, document management) and ensures that residents are connected to social services through innovative technology [23]. There are also information and communication technology-based opportunities to increase public safety, such as surveillance systems, emergency service networks that can reduce emergency response times [21].

5. Smart People

Smart people relates to the competencies and education of the city's residents, as well as social interactions related to integration and public life and connection with the world. Information and communication technology serves to increase people's creativity and innovation and increase access to education and training [16].

It also means the quality of social interactions, cultural awareness, open-mindedness, and the level of citizen participation in social life. Smart people also refers to human and social capital, so that smart cities should start with human capital [24]. To achieve smart people, measures such as computer-aided education, lifelong learning programs, emphasis and focus on education, workshops and programs on appropriate skills (e.g., sustainability, cultural awareness) [21]. Distance learning and online education support plans should be implemented, which seems that the era of the corona pandemic in the world created this possibility for people in different cities and countries to get closer to the concept of intelligence and smart people by observing health guidelines.

6. Smart Mobility

Smart mobility refers to accessible services and access to information and communication technology, as well as sustainable transport. Electric public buses are just one example of this type of service [16].

Smart cities seek to promote the movement and transportation of people, goods, and vehicles in an urban environment. The goal of smart mobility actions is to enable a smart city to provide efficient transport with less environmental impact. The most common actions implemented through cities and municipalities based on this feature are better responding to the mobility needs of citizens with the wise use of urban planning that changes methods of individual transport to public and encourages the use of non-motorized transport (such as bicycles) and the integration of electric vehicles[25].

Smart mobility supports more efficient transport systems (e.g., non-motorized options) and promotes new social attitudes towards the use of vehicles that ensure citizens' access to public transport. Information and communication technology in the field of smart mobility, like many other fields, increases integrated productivity.

Good Urban Governance

The World Bank defines good governance in two parts. In the first part, good governance is subject to the political system of an organization, institution, or government to create a strong power enforcement mechanism through legitimate popular vote - from the lower levels of society to the top - and bring an optimal executive scale to reform and improve the conditions of the region. Applying this political power actually involves a systematic approach to reforms to achieve sustainable development and creates a situation in which, through reforms at the national level, a kind of national integration in social and economic development is created, and the second part of the definition includes the concept that good governance provides social and economic resources for human development. The mechanism devised under the title of good governance is a composite mechanism for today's humans that helps create a growing and progressive social space to achieve economic development [26].

In the United Nations Development Program, good governance includes the mechanisms, processes, and institutions through which citizens, groups, and civil society institutions realize their interests and meet their obligations. Therefore, urban governance can be defined as: the correct and efficient guidance and management of society within the framework of the rule of law, logical and fair decision-making with accountability and responsibility, public participation and strategies of this kind. It is obvious that in realizing this, the interaction of citizens and the socio-political forces of civil society with the government is essential.

Table 1. Definitions of good urban governance's components[27]

Dimensions	**Ddefinitions**
Participation	The process by which statesmen are freely chosen, and there is also a suitable platform for active citizen participation in the community.
Accountability	A process where the government and the private sector are accountable to the citizens
Effectiveness and Efficiency	Political stability and the implementation of appropriate policies to enhance the general level of society by the government and the private sector with the participation of citizens and government supervision.
Equitable and Inclusiveness	All citizens must have equal opportunities to access services and equal opportunities for personal growth.
Transparency	It means the free flow and accessibility of information to all citizens, as well as the transparency of the process for approving policies.
Rule of law	Establishing a legal and legitimate framework and ensuring its observance by all, as well as promoting it in society.
Responsibility	including the acceptance of responsibility by officials and citizens and respect for autonomy and equal rights among citizens
Consensus oriented	All citizens must have their interests considered directly and indirectly by legal institutions, and all groups and citizens should be considered for decision-making in all matters.

Therefore, it is evident that urban governance approaches are rapidly changing as cities strive to adapt to and overcome the challenges of the twenty-first century. As local governments face the demands of urban development, cities are becoming more susceptible to climate change, migration, security concerns, and a more fragile global economy [28].

Basic Principles of Good Governance

To have good urban governance, the government, considering national integrity and values in the city development plan, must pay attention to the following:

- Policymaking based on consensus-building
- Accountability at all levels
- Transparency beyond expectations
- Efficiency and effectiveness at various stages
- Avoiding acts of corruption (equity)
- Establishing a rule of law mechanism[26].

The above content and the opinions and views expressed regarding the smart city indicate that although moving towards smartening cities is necessary and undeniable in today's world, considering the growth and progress of technology and the needs of today's humans, there are certainly challenges in the path of this type of transformation. Research shows that although the smart city has moved towards the application of modern technology in cities and, with the six dimensions mentioned in the fields of economy, citizenship, urban life, environment, transportation, and governance, it is trying to create a super-combination between urban life and unbridled technology, but in the meantime, it certainly faces challenges in the path of managing this new method of administering city affairs.

Research Findings

To explain and examine the existing challenges on the path of smart cities, in this section, using the opinions of 15 experts and specialists in the fields of urban planning, management, technology and information, and economics, in two Delphi stages, we reached the most important challenges facing smart cities in the country.

The Delphi method is a well-known technique in policy-making and urban management research that is used to achieve consensus among experts. In this research, the classic Delphi method with three stages was used to collect and analyze the opinions of experts.

In the first round, experts were asked to list the most important challenges of the smart city based on their experience and studies. In the second round, the challenges were ranked and confirmed, and the governance components were reviewed, and the data were analyzed quantitatively, and an agreement of more than 70% was considered as the confirmation criterion.

The third round included the final consensus and confirmation of governance components in solving challenges, and after analyzing the responses, the final version, including 5 main challenges and 8 governance components, was prepared and presented to the experts for final approval.

Components that had more than 80% consensus were included in the final research model.

Table 2. Delphi results of expert consensus on smart city governance challenges

Challenges of the Smart City	First round of Delphi	Second round of Delphi	Third round of Delphi	**Result**
Policymaking and Decision-making	65%	74%	83%	**Accept**

Managerial and Governance-related	70%	85%	95%	**Accept**
Economic	67%	76%	88%	**Accept**
Educational and Cultural	65%	71%	85%	**Accept**
Technical and Operational	67%	76%	92%	**Accept**

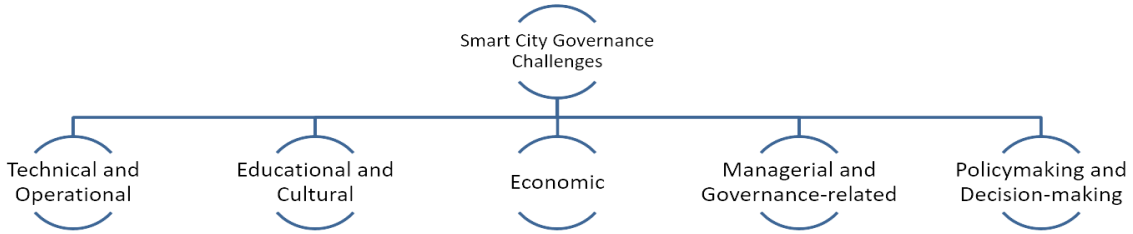

Figure2. Smart City Governance Challenges.

In examining the concepts of Smart cities and the challenges surrounding their establishment, while considering good urban governance, it is necessary to mention what sub-sections each of these challenges includes and what issues they address in the smart city.

Policy and Decision-making Challenge:

Due to the lack of integration and purposeful planning in the policy-making process, as well as the absence of aligned trustees and officials and conflicting regulations, planning and policymaking regarding smart cities have faced challenges in decision-making and policy development.

Management and Governance Challenge:

Furthermore, from a legal standpoint, appropriate laws and the decision-making authority regarding cities face uncertainty. Organizations such as the Ministry of Communications, the Supreme Council of Cyberspace, ICT, etc., are considered trustees whose authority is not clearly defined at the city level and often overlaps.

Among the obstacles to achieving smart cities is the disunity and dispersion among urban management agencies and institutions. Each of these institutions has its portal for providing services in the virtual space, and there is no effective synergy and communication between them. Also, the variety and multiplicity of systems, electronic cards, and citizen portals in different agencies disrupt the urban management system. Although efforts have been made in recent years to create an integrated system, the results indicate that it has not yet had much impact on the smart management system.

Technical and Operational Challenge:

Failure to pay attention to the necessary infrastructure for establishing a smart city, as well as managers' limitations and risk aversion, lead to technical and operational challenges.

Economic Challenge:

In the financial and economic field, the first and most important issue is the necessary budget for the establishment of a smart city, which is always a significant concern in metropolises due to their dependence on public and government budgets, and often private sector investments also face profitability problems.

Educational and Cultural Challenge:

Although the use of smart tools has increased among people in recent years, often all their capabilities are not used correctly, and the entertainment aspects are more considered by users. Therefore, it is necessary that through

a collective movement, culture-building and raising the level of public knowledge about the use of existing tools, the Internet of Things, and being a smart citizen occur."

In the following, using the AHP method, we will examine the components of good urban governance in responding to the challenges raised. AHP is one of the most credible multi-criteria decision-making methods that is used especially in complex management and urban policy-making issues. This method allows pairwise comparison between options and extraction of optimal weights.

In this stage, 15 experts evaluated the impact of each component on solving the challenges through pairwise comparisons. A numerical scale of 1 to 9 hours was used for evaluation

Table 3. Pairwise comparison matrix of good governance components in responding to smart city challenges

components	Transparency	Accountability	Effectiveness and Efficiency	Consensus oriented	Participation	Rule of law	Equitable and Inclusiveness	Responsibility
Transparency	1	3	5	7	5	4	6	5
Accountability	1.3	1	4	6	3	5	7	6
Effectiveness and Efficiency	1.5	1.4	1	3	2	4	6	5
Consensus oriented	1.7	1.6	1.3	1	3	5	7	6
Participation	1.5	1.3	1.2	1.3	1	4	6	3
Rule of law	1.4	1.5	1.4	1.5	1.4	1	3	2
Equitable and Inclusiveness	1.6	1.7	1.6	1.7	1.6	1.3	1	4
Responsibility	1.5	1.6	1.5	1.6	1.3	1.2	1.4	1

Table 3. The final weight of good governance components in responding to smart city challenges

components	weight
Transparency	0.32
Accountability	0.22
Effectiveness and Efficiency	0.12
Consensus oriented	0.12
Participation	0.08
Rule of law	0.04
Equitable and Inclusiveness	0.03
Responsibility	0.02

The results indicate that transparency, accountability, and efficiency have the most significant impact on good governance in smart cities, while responsibility and equity have the least weight. Furthermore, a consistency ratio of less than 0.1 confirms the reliability of the results, indicating their scientific validity.

Conclusion

Considering the challenges identified, it is evident that establishing good and smart urban governance is an unavoidable necessity for the deployment of a smart city. Good urban governance resolves conflicts of interest within agencies through comprehensive and integrated management, streamlines clear policies, and systematizes decision-making and policy-making processes. In the realm of the smart economy, it evaluates the economic priorities of the smart city and prioritizes enabling and leveraging the private sector to achieve them. In the education sector, it contributes to the enhancement of public knowledge, awareness-raising, and the creation of influential groups, while supporting platforms for information dissemination and advocacy. These actions lead to the creation of a good and smart governance system that minimizes the challenges of smart city deployment in operational and technical areas.

Therefore, good urban governance is considered one of the main requirements for the establishment of a smart city. Governments need to take steps to change traditional governmental and urban management systems in collaboration with the private sector and public participation, and prepare themselves to face the world of the future, in which the role of technology and information will increase day by day. Elevating the role of good governance in the administration of smart cities is of utmost importance. The results of this research indicate that, from the perspective of experts, the components of transparency, accountability, efficiency, consensus-building, participation, rule of law, equity, and responsibility are, in order, of importance and necessity.

Strategies

Based on the above findings, the following strategies are proposed to improve urban governance:

Strategies to Strengthen Transparency:

Establish open information systems for citizens and managers to access urban data in various fields.

Develop smart management dashboards to provide transparent reports on the performance of urban institutions.

Implement Open Data policies to increase public trust and improve decision-making in the areas of transport, energy, and urban services.

Real-time monitoring of urban projects with public dissemination of financial and performance data of municipalities.

Strategies to Enhance Accountability:

Create citizen reporting platforms for public oversight of the performance of urban managers.

Deploy artificial intelligence systems to analyze public complaints and feedback for faster response to problems.

Establish a performance rating system for urban managers based on the degree of responsiveness to the needs of citizens.

Improve oversight mechanisms for urban budgeting to prevent corruption and mismanagement.

Strategies to Increase Efficiency:

Implement Citizen-Centric Services to accelerate the delivery of urban services.

Automate urban administrative processes through digital technologies and artificial intelligence.

Optimize urban infrastructure to reduce the costs of energy, transportation, and waste management.

Develop integrated urban management platforms to coordinate between different institutions and prevent duplication.

Strategies to Strengthen Consensus-Building:

Establish urban governance councils with the participation of various stakeholders (government, private sector, civil society).

Hold multi-stakeholder workshops for major decision-making in the area of smart city.

Use participatory models in urban policy-making to better understand the needs of citizens and businesses.

Create electronic survey systems to receive citizen feedback in urban decision-making.

Strategies to Increase Public Participation:

Develop digital citizenship platforms for greater interaction between people and urban institutions.

Hold workshops and educational campaigns on smart city and new technologies.

Create economic incentives for start-ups active in the field of smart city.

Support Open Innovation platforms to attract new ideas in urban management.

Strategies to Improve Rule of Law:

Revise urban laws and regulations to adapt to technological developments.

Develop legal frameworks to support urban start-ups.

Establish specific regulations to protect citizen data in the smart city.

Clarify the laws on data ownership and urban information.

Strategies to Strengthen Equity:

Support disadvantaged groups in accessing smart city services.

Create policies for equitable distribution of digital infrastructure in deprived areas.

Develop free educational projects in the field of smart technologies for low-income citizens.

Increase monitoring of the allocation of urban resources to reduce inequalities.

Strategies to Increase Responsibility:

Develop a code of ethics for urban managers and decision-makers.

Develop management empowerment programs for urban managers.

Implement accountability and punishment mechanisms for management violations in the area of smart city.

Raise public awareness of citizenship rights in the smart city.

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