

## smart city

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### abstract

A smart city is a city that, based on information technology and telecommunications, tries to transform lifestyles and activities while meeting the needs of citizens through planning, design, development, and modernization of communities to enhance the sense of place, preserve natural and cultural resources, fairly distribute development costs and benefits, and increase integration. ecological in the short and long term, as well as increasing the quality of life by expanding the range of transportation, employment and housing options in a financially viable manner. The existence of a smart and digital city in any country can pave the way for a gradual, logical, scientific and economic presence, which is currently the criterion for measuring scientific power and power. Countries are to use and produce knowledge. This article examines and analyzes the smart city and examines and analyzes in detail the importance and need, the dimensions of the smart city, and the challenges facing these cities.

**Keyword:** Smart City, Information Technology, Infrastructure, Development

### Introduction

A smart city is a city that performs well in economy, governance, transportation, and environment, and has network infrastructure in the city that enables political and social efficiency, and uses information and communication technology (Jabbarzadeh et al., 2019). A large body of literature acknowledges that the main aspect of smart cities is technology and how organizational characteristics and capabilities affect technology implementation (Sharviehpour et al., 2014). Building a smart city requires integrated measures at different levels of the municipality and social context. A

smart city is a holistic concept. The goal of a smart city is to pursue various goals appropriate to the city's conditions and priorities, and to improve the quality of life (Salehi Panahi et al., 2014). Smart cities are the latest manifestation of a completely neoliberal approach to the production of urban space. Smart cities generally seek to create orderly, predictable, and standardized spaces and relationships, where citizens should be able to That guidance, prompting and control. If there is civic participation in a smart city, citizens play a role in it, instead of being proposers, decision-makers or leaders, in the form of a participant, experimenter or actor who provides feedback or suggestions (Reispour and Majedi, 2022). The criteria and infrastructure for creating a smart city depend on three types of factors: human, technological, and institutional. To create a smart city, attention should be paid to strengthening and coordinating these three factors in planning. Infrastructure is central and fundamental to the concept of a smart city. Technology is an enabling factor for a smart city, but it is not necessarily the most critical and important factor. The combination, connection and integration of systems and infrastructure is essential for a city to become smart. The core systems are not discrete and isolated, but have become a multidimensional and complex network of diverse systems interconnected in a synergistic manner that distributes better and optimal performance. A key part of a smart city is fundamentally changing the way services are delivered, and delivering a smart city is not primarily about technology, but about improving and transforming services. Perspectives are important for a better future. A smart city should envision smart economy, smart governance, smart mobility, smart environment, smart people and smart living and how they interact. But having a vision for becoming smart alone is not enough, and actions in the field Legislation, policy, and organizational transformation are required. On the other hand, the penetration of intelligence into each subsystem of a city separately is not enough to create a smart city, but these dimensions must be considered as an organic whole. The ideal smart city structure should be balanced. Furthermore, there is no single answer to creating the perfect

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combination of aspects that make up a smart city. These aspects depend on the size of the city, its accessibility to other cities, and its access to service centers. Therefore, the role of the smart city designer is to collect these factors by considering the population size and appropriate functions (Saremi and Salimi, 2000). The existence of a smart and internet city in any country can provide the basis for the gradual, logical, scientific and economic presence of this valuable phenomenon, which is currently the criterion for measuring the scientific capacity and power of countries to use and produce knowledge. The comprehensive plan is a legal and technical tool for the intervention of organizations and municipalities in urban affairs. Therefore, the existence of deficiencies in the comprehensive plan disrupts the entire system of intervention in city affairs, and the strength or weakness of these plans will have a significant and significant impact on the process of urban revitalization and vitality. Therefore, constant evaluation of plans is essential to improve the efficiency and effectiveness of urban management and revitalization of the urban environment. E-learning will have the ability to create the necessary grounds for the quantitative and qualitative development of general and specialized education and provide a suitable opportunity to use experiences in the country for all people without time limits at all times of the day and week. In the smart municipality system, a person who is looking to build a building and applies for a permit from the municipality. After entering the municipality's network, the applicant enters the services they need, along with the specifications of the land they own and the building they want. Then, the smart municipality informs the applicant of the area that can be built and the floors of the building based on existing standards. Finally, based on the municipality's permit, the applicant enters the consulting engineers network and reaches an agreement with one of the consulting companies based on a suitable plan and price (Khanifer and Rashid, 2016).

#### **The necessity and importance of a smart city**

Adam Smith (1766) first noted that talent and jobs were moving from the countryside to the cities, and that cities were becoming the core of political and economic power in societies. He

believed that if this trend continued in the future, it would lead to the establishment and flourishing of new businesses and innovations in urban areas due to the dense division of labor and a larger market. Urban areas are therefore essential for national economic growth because they are productive and dynamic. Strong urban economies are therefore necessary to provide the resources needed for private and public sector investments in infrastructure, education and health, improving living conditions and poverty. The existence of a city or large urban areas with diverse assets, skills, and businesses does not necessarily lead to high levels of innovation does not lead; But it is considered one of the factors affecting innovation, because there are many variables that affect innovation at urban levels, but to achieve better results, we must reduce the scale of the study to reach urban innovation systems. Unprecedented levels of urbanization and rapid urban growth and related activities in existing cities have created complex infrastructural and social problems due to the chaos and disorder they create, and have brought to the fore the importance of the role of sustainability in urban planning and development. For sustainable urban development, cities are under global competitive pressure and therefore, cities that can create the ground for innovation and adapt to smartness will be successful. This problem can be solved through a systematic approach; Therefore, smart city, as a new concept, has been at the forefront of urban discourse in recent years to address urban problems and improve the lives of future cities (Asayesh and Mahinizadeh, 2013).

#### **History of smart city**

The term smart city and its roots can be traced back to the smart growth movement that emerged in the late 1980s, which advocated new urban planning policies. The term smart city was first used in Australia and Blacksburg, USA, just as information technology and Communications supported social participation, reduced digital disruption, and increased access to services and information. Smart cities emerged as a tool for visualizing urban fabric, but evolved slowly after the 1990s until the early 2000s, when the pace of growth accelerated. Smart cities have become more common. In principle, the year 2000 can be considered the starting point for

smart city developments and the introduction of information technology into urban planning, and it is from this date that the smart city has evolved to mean any kind of technology-based innovation in the field of urban planning and the development of urban functions. The California Institute is among the first institutions to focus on how to make communities smart and how to design cities based on information and communication technology. Chorabi and his colleagues in 2012 introduce eight main factors in an integrated framework for the smart cities initiative. The factors are: 1-management and organization, 2-technology, 3-governance, 4-policy, 5-people and communities, 6-economy, 7-infrastructure, 8-natural environment. In addition, they introduce technology as a meta-factor and consider seven other factors to be influenced by this meta-factor. It is clear that with the continuous growth of technology, there is no end point for research in this field, and many researchers are always investigating and understanding new dimensions of this issue. What all researchers agree on is the belief that the transition to smart, flexible and sustainable cities takes time and that each city must follow a different path according to its characteristics, so that this transition from the traditional mode must be compatible with the complex, dynamic and evolving nature of cities and be able to continuously update its visions as a need and ultimately provide general guidelines for action (Bayat,2022).

### **Smart city goals**

A smart city is a city that, based on information technology and telecommunications, tries to transform lifestyles and activities while meeting the needs of citizens through planning, design, development, and modernization of communities to enhance the sense of place, preserve natural and cultural resources, fairly distribute development costs and benefits, and increase ecological benefits in the short and long term, as well as increasing the quality of life by expanding the range of transport, employment and housing options in a financially viable manner. A smart city is often defined by its objectives, which seek appropriate solutions to manage this complexity, particularly by addressing the negative consequences of urbanization. Global and higher quality of life

for urban populations. The ultimate goal of a smart city is to provide smart services across all vital city capabilities. A look at smart city projects around the world reveals various goals, differences, and similarities, as follows: : 1- Carbon reduction 2- Achieving energy efficiency 3- The impact of information and communication technology in the development of specific industries in the fields of multimedia or knowledge-based industries 4- Achieving the highest quality living environment for residents 5- Developing green spaces within the city 6- Developing accessible advanced information infrastructure 7- Achieving economic growth and quality of life simultaneously 8- Developing sustainable communities 9- Ensuring social harmony among different groups of residents 10- Evolving the city as a living laboratory for continuous and ongoing improvement (Momani et al., 2014).

### **The dimensions of the smart city**

The dimensions of a smart city can be explained in six parts: smart economy, smart mobility, smart environment, smart governance, smart life, and smart people.

#### **1-Smart economy**

Smart economy refers to cities with smart industries, especially in the areas of ICT and other industries that use ICT in their production processes. To achieve these goals, city managers must use information technology and other smart city infrastructure to position the city as a national communications center and provide opportunities to attract economic investment.

#### **2-Smart dynamics**

Smart mobility provides public access to new technologies and enables their use in everyday urban life. Smart mobility includes a set of technologies and equipment, including: advanced sensors and processors that enable interaction between different parts of transportation management (Global Positioning System (GPS), Dedicated short-range communications (DSRC), wireless internet, mobile phones, radio waves, road cameras and tracking equipment) provide and result in a reduction in: the number of trips, street congestion, travel distance and energy costs. Improving the health of citizens and their peace and safety are among the most important achievements of using this system.

### 3-Smart environment

Smart environment refers to the use of modern technologies to protect and maintain the urban environment. Smart environment paves the way for city planning and management by intelligently measuring indicators such as: air quality and pollutants such as the concentration of various pollutants (energy), consumption rate and intensity of consumption (buildings), energy consumption of each building (transportation), the rate of use of non-motorized transportation (waste management), the rate of waste recovery and water consumption.

### 4-Smart governance

Smart governance includes active and political participation, citizen services, and the intelligent use of e-government.

### 5-Smart life

Smart living encompasses many dimensions that sustainably improve the quality of life of citizens, such as culture, health, safety, housing, tourism, etc. The most important areas of smart living include: Having security such as a security system She pointed out integrated security systems (police, fire department, etc.) located throughout the city, access to health, improving the provision of health and medical services using information technology, developing tourism, and smart homes.

### 6-Smart people

The difference between a digital city and a smart city is smart people. People are smart in terms of their skills, level of education, quality of social interaction in terms of integration of public life and ability to accept the outside world. Other major issues that are considered in this dimension of a smart city include fostering a spirit of creativity, attracting participation Public participation in carrying out urban affairs, using information technology platforms to launch virtual education, integrating educational centers, and sites to attract new ideas were mentioned as a suitable platform for receiving ideas and public participation in social activities such as environmental protection associations or other similar matters (Baradran and Kazemi-Andrian, 2014).

### Technology in smart cities

Technology in a smart city should appear in all aspects and sectors and should not be limited to building some luxury smart items. Some urban

spaces such as parks, shopping malls, streets, etc. require a new perspective. While communications have evolved, Many of our urban spaces are no longer developed and are not compatible with generations. Smart cities are characterized by the availability of a wide range of technologies that are able to work together to deliver complex systems and solutions. Smart cities need robust and flexible technologies to help:1- Provide a common understanding of the core concepts for smart city infrastructure 2- Facilitate tools through the use of different types of devices to measure, record, store and exploit data from multiple sources, both fixed and mobile. The managerial and administrative challenges of a smart city and its various aspects have been raised by some experts. In some countries, public participation and political decentralization policies have not been implemented or are at the basic levels. To start the smart city process, the central government should put public participation and citizen empowerment on its agenda, in fact, access to information, open data, transparency and communication of the achievements of cities. It is smart, which is essential for it. Greater cooperation and greater integration of central government, local government and people. Active participation of people at different levels to solve problems and creation of special infrastructure by the government to make this happen is one of the The factors that drive the growth of smart cities are: Smart technologies are an important opportunity to reshape ideas and innovations in government to achieve transparency, democracy, and accountability (Behzadfar and et al., 2017).

### Challenges of realizing a smart city

Smartness as an innovation brings opportunities and risks. A smart city as a hub for innovation becomes a laboratory for experimentation, entailing inevitable risks that necessarily arise through untested and novel experiments. The smart city initiative is not just an innovative driver, but an attempt to manage the risks of innovation. Failure to manage risk has led to the complete failure of innovation-driven public sector projects. As many as 85% of IT projects have failed due to challenges arising from the non-technical dimensions of innovation in large parts of the policy, organization and

management associated with risks. Common reasons include poor planning, poor business cases, lack of senior management support and leadership, lack of professional skills, misalignment between organizational goals and project objectives, vulnerability to political volatility, over-enthusiasm for technology and over-political pragmatism, incompatibility between new and old management systems, and Lack of technological knowledge. Furthermore, innovation in the public sector can be a paradoxical combination. Government organizations without competitive pressure for innovation, as well as structured bureaucracy, create resistance or disruption to change. The existence of additional risks makes it necessary to look beyond technology for effective political and managerial tools to deal with the risks facing smart cities (Pourahmad et al., 2018). Despite the many benefits of smart cities, their implementation is difficult and has faced numerous challenges. For this reason, many cities have failed to implement smart city strategies. A thorough and meticulous assessment of the factors affecting the realization of smart cities is a fundamental step in clarifying the challenges facing these cities. The multifaceted nature of smart city strategies has presented challenges to the operationalization of these cities. The following discussion addresses some of the most important challenges.

-Difficulty in managing human resources; placing human resources in the right position with regard to skills and knowledge.

-Creating change in public sector management is very difficult. Because it requires confronting society and governments.

-Strict rules for the provision of products and services that have challenged the access to ICT services in the 21st century.

- Discussion of privacy protection and a way to ensure that open data is not at risk.

- Limited financial resources, cities must be creative in securing funding. (Ameeb Marvi et al., 2022).

- Competitiveness and the lack of equal ability of cities to compete on a global scale given the global connectivity of cities

- Complex context and the need to accompany political agendas

- Possibility of failure in investments and ignoring local needs and priorities

- Existing smart city infrastructure can be old and outdated, hindering the realization of the smart city vision

- Lack of trained staff and the need for frequent updates.

- Lack of equal access to cyberspace and uncertainty about the accuracy of large volumes of data and information (Pourahmad et al., 2018)

Other challenges that may occur before reaching a smart city are as follows: 1- Economic challenges 2- Technological challenges 3- Management and administrative challenges 4- Theory challenges 5- Infrastructure challenges 6- Educational challenges

7- Urban design challenges 8- There are collaboration challenges. Some of the challenges related to the time after the implementation of the smart city are as follows:

1- Challenges arising from hackers and urban network design 2- The challenge of changing urban uses 3- The challenge of learning disabilities in the elderly 4- The challenge of implementation 5- The challenge of people 6- The challenge of teletechnology 7- The cultural challenge It is difficult to criticize smart cities, but solving their problems is even more difficult. Humans need to make their cities smart to optimize energy, solve problems, reduce unnecessary physical transportation, use clean energy, produce urban food workers, and strengthen relationships between people. Therefore, it is essential to have a comprehensive planning and participation in all scientific, administrative, and political sectors through local and global dialogues (Behzadfar and et al, 2017).

### **conclusion**

One of the new topics that has been proposed in recent decades to solve various problems of cities is the smart city. The managerial and administrative challenges governing a smart city and its various aspects have been discussed by some experts. has been raised. In some countries, public participation and political decentralization policies have not been implemented or are at the grassroots level. To start the smart city process, the central government must put public participation and citizen empowerment on its agenda. In fact,

access to information, open data, transparency, and communication of smart city achievements are essential for it. Greater cooperation and integration of central government, local government and people. Active participation of people at different levels to solve problems and creation of special infrastructure by the government to achieve this is one of the factors of prosperity in smart cities. Smart technologies are an important opportunity to rebuild ideas and innovations in government to achieve transparency, democracy, accountability. Despite the effective impact of smart city development in solving urban problems, smart city development has its own challenges. These challenges may occur before or after the creation of a smart city. Understanding the aforementioned challenges and their various dimensions can be a fundamental step in the practical smart city development. Among these challenges are the following: 1- Economic challenges 2- Technological challenges 3- Management and administrative challenges 4- Theory challenges 5- Infrastructure challenges 6- Educational challenges 7- Urban design challenges 8- Collaboration challenges.

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