FROM THE FANTASY WORLD TO REALITY: SMART CITIES

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ABSTRACT

The world today is witnessing a rapid and significant development in information and communications technology. The community is based on digital technologies. The concept of traditional cities has evolved into digital cities based on intelligent cities and smart cities seeking change, innovation and creativity. They seek to create an environment-friendly environment conducive to pollution that stimulates learning. This contributes to enhancing the satisfaction and happiness of individuals.

The research began with a focus on the term smart cities and the identification of technological patterns of cities smart, identify the basic components, as well as the most important requirements of smart cities as well as identify the challenges facing smart cities.

Keywords: *Smart city, Smart governance, Internet of things (IoT), Artificial intelligence.*

1. INTRODUCTION

The development of information and communications technology has been reflected mainly in the form of life and the way in which different activities are implemented. This will lead to the emergence of a society in a modern style and style based on digital technologies. The concept of smart cities has emerged as a way to achieve more efficient cities and protect the environment from pollution. Our smart control and understanding of urban planning, is to improve urban performance in real time [1]. It is a place of life full of innovation and creativity [2].

The term Smart Cities is not limited to the use of modern digital technologies but is spread in many sectors as there is no specific definition of Smart Cities [3].

- Smart City Concept

In the international context, in order to achieve the objectives established in the Kyoto Protocol, the Smart City concept was born and has been adopted by many institutions (e.g. European Commission, Setis-EU, OECD, etc.) which labeled as "smart" initiatives and projects relevant to cities sustainability [4].

When smart cities invest in traditional infrastructure, human capital and technology, this contributes to growth , a new lifestyle that is full of innovation and a solid governance of all resources [2]. Smart City is a city that monitors and integrates the conditions of all its vital infrastructure, can better optimize its resources, plan its preventive maintenance activities, monitor security aspects while maximizing services to its citizens [5].

2. SMART CITY TECHNOLOGY

Smart cities normally have lots of applications, Including cloud-based services, Internet of things, artificial intelligence (AI), Mobile phones, integrated sensor networks throughout the city, a semantic network, and many collaborative platforms, Can perform many tasks that in turn increase the quality of cities, but the core element of the smart city is the technology that allows data collection and communication and use to improve efficiency [6].

• Cloud Based Services

This service allows you to save your various files via servers connected to the Internet, through which you can save your files, access them through several devices, only All you need is to connect your devices to the Internet, and you have an account with a company that offers this service. One of the most important benefits of cloud services, it guarantees you to save many files, and edit the storage capacity in your device [7].

- **Internet of Things (IoT)**

According to [8] Network of physical devices, home appliances and other components embedded with electronic devices, computers, sensors, engines and communication that enable these devices to communicate and exchange data .

The building blocks of IoT:

IoT comes to life when its multiple building blocks simultaneously operate and communicate with each other [9]:
- ✓ **Application and user interaction.**
- ✓ **Cloud server Network (connectivity) Internet access.**
- ✓ **Gateway.**
- ✓ **Physical objects and devices Objects**.

- **Artificial intelligence (AI)**

Artificial intelligence is a branch of computer science, which is a specific behavior and characteristics that are followed by computer programs so that they can simulate the mental abilities of people in their different modes of work. The most important of these abilities is the ability of the machine to learn and draw conclusions and decisions, . [10].

- **Mobile technology**

Mobile technology is exactly what the name indicates, technology that is portable; it refers to any device that you can carry with you to perform a wide variety of "tasks". It is technology that allows those tasks to be performed via cellular phone, PDA, vehicles, laptops, etc. [11].

- **Networks of sensors**

A sensor network Is a set of sensors (Such as heat, humidity, vibration, light, etc.) and then transmit information about the phenomenon wirelessly to the data processing center to benefit from it without the presence of human in the place of physical phenomenon [12].

- **Semantic Web**

Semantic Web (SW), A new revolution in the world of the Web where information can be processed by computers rather than by human orientation in the current Web. The semantic Web therefore allows the browser or client software to search, find, and share information instead of us [13].

2.1 Smart City Components

There are Six Components that support a strong foundation on which to build a Smart City. No one component can stand on its own, but together provide the strength necessary to embrace change successfully:

- **Smart Connections**

A smart city is one that meets the needs of its citizens by providing the necessary connections, see the figure(1) [14]:
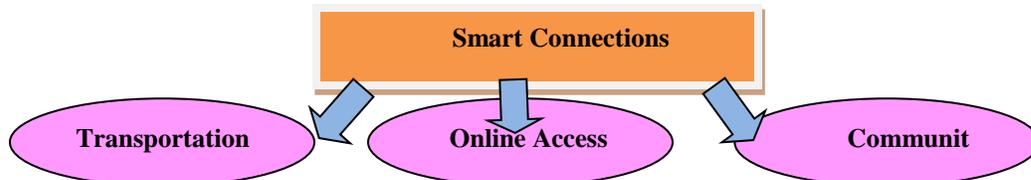

Figure (1): Smart Connections

- **Smart Economy**

Smart City Economy provides high quality high paying jobs while supporting local business to compete globally by [15]:
- The strategic and tactical use of information that is valuable and capable of giving a competitive edge in the decision-making process.
- The availability of a department to coordinate the efforts of economic agents.

- The existence of strong relations between institutions, universities and various central and local administrations.
- Integration of scientific, technical knowledge.
- Confidentiality in the dissemination and obtaining of information in a legal manner.

- **Smart People**

Smart people it means investment in human construction. The intelligent person is characterized not only by rehabilitation and education, but also by the quality of social interactions related to public life and openness to the outside world [14]:
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- **Smart Living**

One smart city goal is to enhance the quality of life. Therefore, smart living is defined by providing a better life for citizens through health care, safety, quality of housing, social cohesion and other activities in society[16].

- **Smart Governance**

Smart governance has different areas and the figures (2) show its most prominent areas [17]:
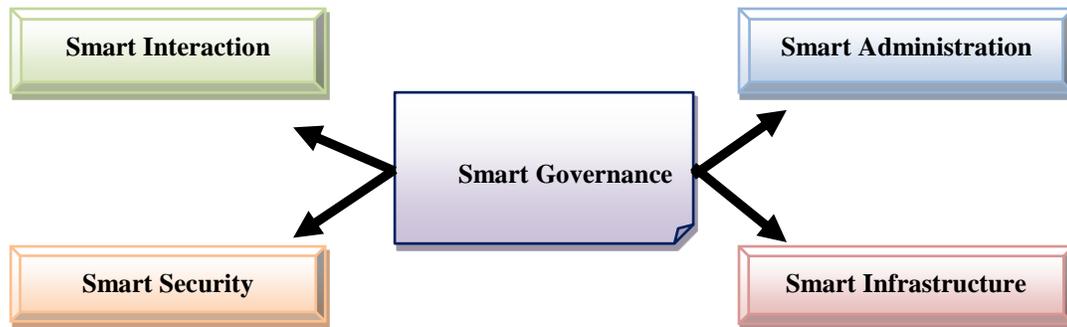

Figure (2): Areas of Smart Governance

- **Smart Environment**

A small world in which different types of smart devices work continuously to make human life more comfortable.

3. SMART CITY REQUIREMENTS
- **Communication Networks [18] :**
    a) **Local Area Network.**
    b) **Wide Area Network.**
    c) **Public Switched Network.**
    d) **Telecommunication.**
    e) **Wireless Networks.**
    f) **Satellite Networks.**
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- **Data collection techniques**
- **Radio –Frequency Identification (RFID):**

Radio Frequency Identification (RFID Is is a technology that uses electronic tags placed on objects, people, or animals to relay identifying information to an electronic reader by means of radio waves [19].
- **Sensor**

    It is a sensor that works to detect the physical ocean state where temperature can be measured, pressure measurement, and radiation where there are many types that can be linked to computers and through a set of software [20].
- **Surveillance Cameras**

Surveillance cameras are one of the most important requirements of the advanced era because they provide full control of the places without the need for people to follow them, thus saving time.

- **Content and data management tools**
- **Geographic Information System (GIS)**

A geographic information system (GIS), are computer-based systems that enable users to collect, store, process, analyze and present spatial data. [21].

- **Global Positioning System (GPS)**

Global Positioning System (GPS) Is an application for smartphones that depends on positioning and allows users to services in the field of positioning that one stands on them. [22].

- **Computer-Aided Design (CAD)**

Computer-Aided Design (CAD) is a system the use of computer technology to accomplish the document design process. The computer aided design system allows the representation and study of a product without manufacturing it, such as testing or simulating the behavior of an aircraft engine or wing [23].

- **challenges for Smart City**

Some of the problems associated with Smart City need to be highlighted. These problems are[24]:
- ❖ Retrofitting existing legacy city infrastructure to make it smart.
- ❖ Financing smart cities.
- ❖ Providing clearances in a timely manner.
- ❖ Dealing with a multivendor environment.
- ❖ Reliability of utility services.

4. CONCLUSIONS

Smart City is a way to transform traditional cities into more sustainable cities in a civilized world. The smart cities project requires a lot of research and depth so that all its components can be understood before smart cities can be applied or cities can be transformed into smart cities. Smart city projects must be comprehensive, multi-dimensional and integrate all areas of work in the city. All technological solutions must be understood as a tool that helps cities achieve their goals and address all challenges

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