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**Smart Cities, Concept and Coverage**

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**Key words:** Smart cities, Sustainable development, Environment

**SUMMARY**

Smart city concept is a new fashionable approach in few years. It includes people, information and communication technologies, economy, natural environment, infrastructure, lifestyle and public administration etc. Smart cities can be accepted a new form of sustainable development in urban areas. It represents a new city model which aiming to improve quality and performance of urban service for better interaction between citizens and government.

Smart cities not only a new management approach for cities but also aim to alleviate many critical problems accompanying the current overwhelming urbanization process, for example, security, transportation, electrical, water and gas distribution, environment pollution, and limited natural resources. The basic principle of smart cities is to use advanced technologies in the management of cities. Smart phones, mobile devices, telecommunication networks, digital cameras, public data bases, sensors in urban area, smart cards, social media, vehicles are main technological parts of the smart cities. Smart city applications also provide a great interoperability of the public and private sector.

Human population is getting increase and needs of them are also increase, however sources of the world are limited. Smart city applications save more time, energy and labor, in addition it enables to be used limited resources of the world efficiently. There are some smart city applications around the world and one of the main goal of these projects is to improve the life quality of citizens. In this study concept, coverage and benefit of the smart cities was investigated and was tried to make some determinations for sustainable development and environment.

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## 1. INTRODUCTION

The population living in the city is increasing around the world. According to the United Nations, 66% of the world's population will live in urban areas by 2050 (United Nations, 2015). Nowadays all countries have people living in the urban areas (Figure 1). The human have some basic needs such as food, housing etc. but modern people who live in urban area have a lot of needs such as clean food, clean water, energy, transport, communication, comfortable residential area and other common services like security, education, health etc. The governments have to provide all needs of the citizens which mentioned above.



Fıgure 1: Urban Population (% of total) (World Bank 2018)

The source of the world is limited but human population is getting increased all around the world (Table 1) and most researchers say that most of the growth over the next two decades is predicted to be in urban centers in what are currently low and middle-income countries. Increasing human population is also pressing in environmental issues pollution, habitat loss, intensive farming practices and the consumption of finite natural resources, such as fresh water, arable land and fossil fuels.

Table 1: Population of the World and Major Areas, According to the Medium-Variant Projection (United Nations 2015)

| Major Area | Year / Population (millions) | | | |
|---|---|---|---|---|
| | 2015 | 2030 | 2050 | 2100 |
| World | 7 349 | 8 501 | 9 725 | 11 213 |
| Africa | 1 186 | 1 679 | 2 478 | 4 387 |
| Asia | 4 393 | 4 923 | 5 267 | 4 889 |
| Europe | 738 | 734 | 707 | 646 |
| Latin America and the Caribbean | 634 | 721 | 784 | 721 |
| Northern America | 358 | 396 | 433 | 500 |
| Oceania | 39 | 47 | 57 | 71 |

Around of the world despite representing only about 2% of the geographic area and accommodating over 50% of the world population, cities today produce 80% of greenhouse gas emissions and consume 80% of the total resources of the world. (Yigitcanlar et al. 2018). Increasing in people living in urban areas, bring with decrease in people living in rural areas thus it giving rise to challenges regarding some environmental problems such as air pollution, congestion, waste management and also human health. The European Union European

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Commission, 2014) have set ambitious climate and energy targets for the coming years, there is an urgent need to develop smart solutions to overcome the challenges of urbanization (Ahvenniemi et al. 2017).

Climate change is one of the most important problem of human being in last century, 'smart cities' came to the scene as a potential panacea to, somehow, reverse or ease the impacts of ill urbanization, industrialization, and consumerism practices. Although the initial rationale for the smart city developments was mostly related to environmental concerns (Yigitcanlar et al. 2018).

However, with the rapid development of the economy and the acceleration of urbanization, some pollution occurs. A huge amount of domestic and industrial wastes flow into the air, soil and water resources and it results a serious damage of the ecosystems and also, giving rise to extensive challenges regarding human health (OECD, 2012). According to the estimation of international organizations urbanization will going on and more and more people will live in urban area. The main question how will we provide the needs of the people living in urban area and how will we protect the natural sources for deliver the next generations. The answer of these question is depend on smart cities and sustainable applications.

## 2. SMART CITY CONCEPT

### 2.1. Smart City Concept and Definition

Cities can be accepted the main reason of air, soil and water pollution, greenhouse gas and also climate change, at the same time cities have an important role in fighting against pollution and climate change and the deployment of new intelligent technologies is seen as key factor in decreasing greenhouse gas emissions and improving energy efficiency of cities. These technologies need to be smart, thin, integrated, resource efficient and cost efficient. (Ahvenniemi et al. 2017). These new technologies should have an impact on citizens' wellbeing and financial sustainability. In European Union's (2011) view the smart city concept supports the idea of environmental sustainability as its main aim is reducing greenhouse gas emissions in urban areas through the deployment of innovative technologies. All of these technologies and applications can be called smart cities.

The concept "smart city" was introduced already in 1994 and since 2010, after the appearance of smart city projects and support by the EU, the number of publications regarding the topic has considerably increased (Jucevicius et al. 2014).

The definitions of smart cities are various and there are several researchers explored in this area. Smart city can be defined as "An urban centre of the future, made safe, secure environmentally green, and efficient because all structures –whether for power, water, transportation, etc. are designed, constructed, and maintained making use of advanced, integrated materials, sensors, electronics, and networks which are interfaced with computerized systems comprised of databases, tracking, and decision-making algorithms" (Hall et al. 2000). According to the Partridge (2004), a city that actively embraces new technologies seeking to be a more open society where technology makes easier for people to have their say, gain access to services and to stay in touch with what is happening around them, simply and cheaply.

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Belissent (2010) defines smart city "smart or other adjectives associated with technological innovation, such as "future" or "digital" city, a city that uses ICTs to make the critical infrastructure components and services of a city–administration, education, healthcare, public safety, real estate, transportation, and utilities–more aware, interactive, and efficient.

Piro et al. (2014) defines a city that intends as an urban environment which, supported by pervasive ICT systems, is able to offer advanced and innovative services to citizens in order to improve the overall quality of their life

All smart city definitions are primarily aim at sustainability, liveability, productivity and governance.
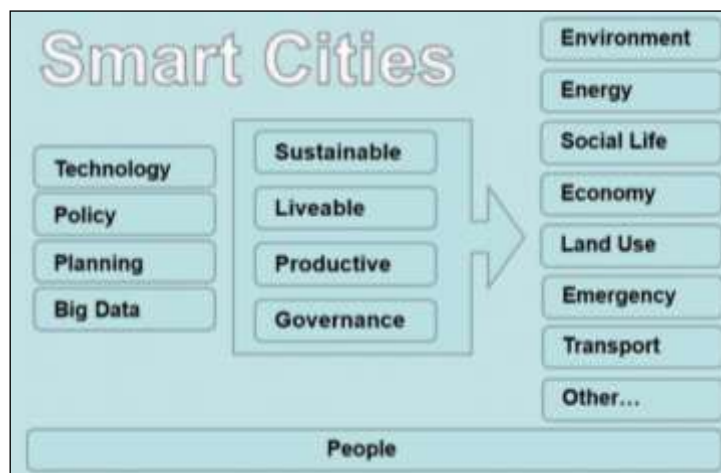


Figure 2: A concept model of smart city

Smart cities are related to Information and Communication Technologies (ICT) based urban innovation, such as use of ICTs to deliver better urban services, dealing with growing urban problems due to increasing urbanization, without the proper establishment of policies focused on well-being. One of the main objectives of smart cities is increasing the quality of life in the city and better interaction between citizens and government.

## 2.2. Smart City Applications

Smart cities are characterized by a new way of governing with the use of technology and the consequent increase in the public administration capacity of improving the quality of life of citizens, provision of public services and democracy (Anthopoulos and Reddick, 2016). Many cities around the world declared themselves as smart city or try to transform in to smart city.

There are many information and communication technology applications around the World. Main goal of these projects is to improve the life quality of citizens. The growing interest in the smart city concept and the needs to solve the challenges related to urbanization lead to several private and public investments in the technology development and deployment. This can be seen in the high number of smart city initiatives, city implementation projects and jointly-funded public research projects. There are over 250 smart city projects underway across 178 cities around the world (Praharaj et al. 2018). The global market for smart city solutions and services is expected to grow from $ 40 billion in 2017 to $ 94 billion by 2026

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(Pyzyk, 2017). According to the Anthopoulos (2017) Smart city has been recognized as a forthcoming dominant market, which is estimated to reach the amount of $3 trillion U.S. by 2020.

Around the world two types smart cities applications is appear. One type of is completely newly built cities we can see it in United Arab Emirates Abu Dhabi-Masdar city. Other type cities are renewed for current infrastructure systems, South Korea-Seul, Singapore, Spain-Santander and Barcelona, Austria-Vienna, Holland-Amsterdam, Denmark-Copenhagen, USA-Newyork etc. These two types smart city approaches focused on same targets such as;

- Transformation; traffic monitoring and optimization, transport services,
- Public administration; automatic and optimized administrative procedures
- Public safety; Monitoring of public places and crime prevention
- Social services; tourism assistance, location based services, content sharing
- Health care; remote patient assistance,
- Urban Planning and smarter building; building control and monitoring
- Environment; environmental monitoring
- Energy; efficient management of energy resources (Piro et al. 2014).

## 3. CONCLUTIONS

Nowadays smart cities are a global phenomenon but there isn't any consensus or agreement on "what a smart city is?" and "What is the main outcome of a smart city project?" There are a lot of researches to answer these questions around of the world. According to the some of these researches smart cities have not been adequately conceptualized and not been widely adopted yet.

Smart city projects depends on technology, policies, big data and also accurate spatial data. A large amount of data is produced by different devices such as sensors and internet of things in the context of smart cities. The achievement of smart city projects depends on public policies and the readiness of stakeholders who are government, public and private sector and citizen.

According to the some researchers the main aim of smart city projects is to provide better life quality for the citizens. But, the target of the smart city projects must be sustainable cities to keep limited resources, environment and also to keep the World to deliver the next generations.

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