

Delivering Smart City Experience

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Abstract: In this paper, ...

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1. Introduction

While the world population remains less than one billion until 1804, it increases dramatically in the following years [2]. Agricultural and Industrial Revolution, which began in England, was one of the reasons of this population growth by increasing the life expectancy of children and Industrial Revolution also accelerated the urbanization with the emergence of factories that contributed to the migration of vast number of labors from rural areas into cities in search of work in the factories [3]. Now, according to the United Nations World Urbanization Prospects report, more than half of the world population lives in cities [4]. Urban population growth led to the challenges, which affects the quality of life of the people living in cities, such as urban density, aging population, environmental impact, increased traffic congestion, overburdened healthcare system [10] [11].

We need to approach these problems differently. For example, one of our recourses to traffic congestion is adding the additional lanes, but it turned out that it does not work. Because more cars fill in that new lanes causing more congestion. This is the 20th century solution. In 21st century, we need to think differently about cars. Do we need to own car? Can cars drive themselves? Will we use cars on demand? These are the 21st century solutions [9].

2. What do we need to make a city smart?

What is a smart city? Today, in 2017, there is no agreed definition [9]. According to Wikipedia, the smart city is “an urban area that uses different type of electronic data collection sensors to supply information used to manage assets and resources efficiently” [1].

There is something really obvious in delivering smart city experience that the solutions are very specific to the city. Because every city has own problems and the solutions should be specific and localized [9]. However, regardless of the way how the solutions are implemented, there are some essential Information and Communication Technology (ICT) requirements to make a city smart [8]. These are [8] [12]:

- Fiber optic or wireless broadband internet should be available to all citizens and accessible across the city. Broadband internet connectivity is significant because it will be enable to continuous data transmission between devices, data-centers and the digital applications that are built upon these exchanged data.
- Smart devices, agents and sensors should be used to supply real-time data that will help the city make informed decisions.

- Web-based applications and e-services utilizing the data that is collected by the city-wide-sensors should be developed. Besides, e-services developed by various sectors such as local business, transportation, health services etc. are critical to create smart urban spaces, energy efficient buildings, safety and security services, traffic management.
- The data that is collected should be opened up to everyone who may want to consume it. Sharing the data can lead to help smart city evolution by creating a competitive environment and delivering more socially services.

To make a city smart, we need to consider about another most common term, Internet of Things (IoT). Because IoT is one of the technologies that is going to form our world and of course our cities. IoT integrates physical infrastructure with digital systems. In the context of smart cities, it plays a significant role in the applications of monitoring and data collection such as habitat monitoring, indoor and outdoor environmental monitoring, human health and well-being monitoring etc. [7].

In the cities, data can be produced by the variety of the sources such as smart phones, computers, environmental sensors, cameras and even people and now we call that data as big data. Big data has a great potential to find out problems directly from data itself through data analytics techniques. Furthermore, big data systems, which stores, processes and mines the data in an effective manner to produces information, can be used to supply information that will allow to come out the better smart city applications [13].

3. How can we deliver the smart city experience?

There are well-defined components of the smart city, such as mobility, governance, environment, and people as well as its applications and services such as healthcare, transportation, smart education, and energy [13].

Figure 1 Six main pillars of smart cities [5] depicts the six main components that underpin delivering smart city experience [5]:

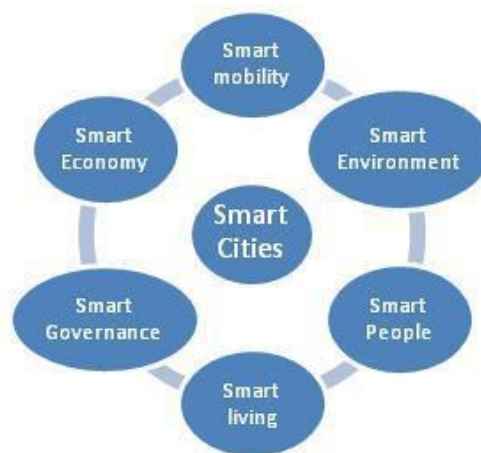


Figure 1 Six main pillars of smart cities [5]

Smart Mobility

When people began to give priority on their comfort, they started using cars to get around. The result of this trend is the traffic congestion in the urban areas. To solve this urban issue, optimizing only public transport is not enough, all transportation services need to be optimized within the city [14] and be simplified for city dwellers and visitors. This can be achieved by focusing on the basic transportation elements such as routes, travel information, shared transportation etc. [7]

Smart traffic management is one type of the implementation of smart mobility that utilizes the data, which is collected through various channels such as GPS-enabled devices, CCTV cameras etc., to reduce traffic congestion, to increase traffic safety and to detect suspicious car activities [7].

Smart People

People living in cities are a crucial parameter for smart cities to thrive because they have to possess the sufficient technical skills to benefit from the facilities provisioned by their smart cities [7]. Smart people means the improvement in the competence, lifelong learning, and developed educational system for city dwellers [5].

Smart people are also the people that participates in the sustainable development and the management of their cities, and they try to make their cities better places to live [16].

Smart Environment

Urban population growth exacerbates CO₂ emissions levels, consumption of environmental resources and waste discharge. That's why, one of the greatest challenges of urban areas is supplying the environmental services, which are vital not only for the people living in cities but also for the people in rural areas, such as water, electricity, waste management etc. in a sustainable manner [15].

Smart environment can improve the quality of environment, conserve natural sources, enhance pollution management, and adapt climate change impacts by benefiting from renewable energy sources, reducing the carbon emissions, and developing energy efficiency [5].

Smart Living

Smart living is about performing some fundamental factors such as health, housing, culture, safety, and education to develop greater places to live and work [7]. The idea of smart living is also related to making the buildings that we live in more harmonious with the people and environment [5].

Elderly!

Smart Governance

Smart governance encompasses giving people high-quality public services with the involvement of the public in the decision-making process, which is the main feature of smart governance, and doing government actions transparently [5].

In the concept of smart governance, government practices are focused on the elements such as openness, participation, accountability, effectiveness and coherence. ICT plays a significant role in accomplishing these elements to deliver smart governance experience to the society [7].

Smart Economy

Smart economy is an economic approach whose drivers are innovation, art, culture, and cutting-edge technologies [5] [7].

In smart economy model, inhabitants of cities struggle to keep their natural sources management sustainable and they know without this its economy will not work expectedly [16].

4. Conclusions

In smart city solutions, there is no target market. Target is everyone in the city.

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