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# A Comparison Between Smart City Approaches in Road Traffic Management

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## Abstract

The population growth and economic development increase the need for mobility. As consequences, we can mention the environmental impact of CO<sub>2</sub> emissions and that the road accidents are among the top 10 causes of death worldwide. As a solution to this problem, the concept of Intelligent Transportation Systems emerged. Part of this concept is smart city approach, consisting in a combination of Internet of Things and Information and Communication Technology to manage city issues. After 2014, a lot of regulations were established by the European Parliament, regarding smart city concept implementation. The purpose of this paper is to present a comparison between the implementation of smart city approach in different locations from Romania.

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## 1. Introduction

Population is continuing growing in urban agglomerations and around them. Some consequences of this growth have led to increased consumption, increasing the volume of public infrastructure services, increasing the amount of waste which has directly influence on the environment by increasing pollution level.

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Based on the city size, we can see a lot of issues that should be solved: public health, safety residents, waste disposal, public transport, public lighting etc. More than that, we can see that nowadays technology can be seen as a critical factor in some basic activities on which a modern society is dependent. Some of these activities are: water supply, power and gas supply, food production, health services, remote communications, public administration, waste collection etc.

Governments prepared many plans to use the technology in order to simplify all these city issues. For locals' administrations, we can talk about smart management and administration. In this case local administration tries to make plans for the city thinking about how the taken measures can improve citizens life. Some examples related to transport management in a smart city are:

- Implementation of a system that can announce in real-time the timing for public transport in each station;
- Implementation of green transportation systems such as: public bike sharing systems, charging stations for electric and hybrid vehicles;
- Implementation of intelligent parking systems
- Implementation of intelligent traffic lights systems;
- Implementation of public lighting using alternative energies and intelligent sensors.

## 2. Smart city concept

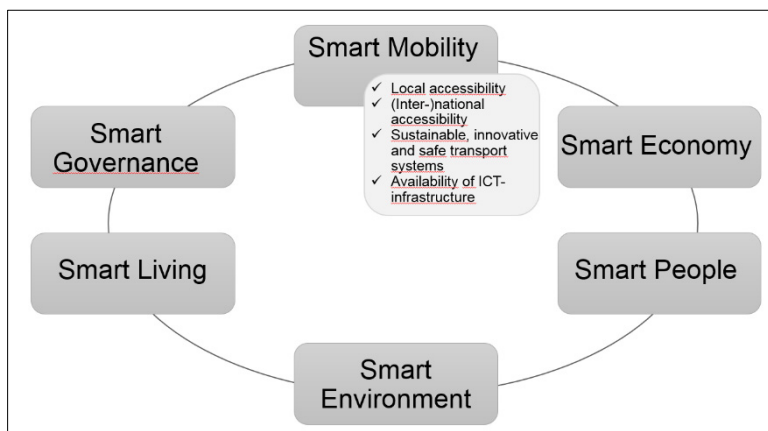
Smart city can be defined as an ultra-modern urban area that can be implemented based on a strategy that can improve the quality of life for citizens. As we can see, this concept is very complex involving “different sectors, multiple stakeholders, high inter-dependency, cross-sectoral cooperation, inter-departmental coordination, and novel dynamic, and interactive services” (Bastidas, V., Bezbradica, M., & Helfert, M., 2017).

Taking in account that this concept is considered as reference of several communities where quality of life is a priority we can say that are some goals that should be achieved. “The efficient use of resources and the reduction of wastes and emissions, in short sustainability, are key goals in the management of a smart city and the companies that operate in it. In this context, traffic and transportation activities produce a significant impact in the use of resources, and production of emissions, noise, and wastes” (Latorre-Biel, J.I., Faulin, J., Jiménez, E., & Juan, A.A., 2017). All these objectives should be sustained by polices and regulations that can supervise how they are implemented using smart city frameworks. The aim of these frameworks is to make a mapping between a smart city architecture and how this can align to a proposed smart city strategy.

## 3. Models in smart city analysis

### 3.1. Giffinger's approach

In order to describe a smart city, we can start from the model proposed by Giffinger. For each of those six characteristics are defined many factors. In Fig. 1 we can see the smart city model adapted to show the smart mobility indicators.



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