The use of Intelligent Solutions in Romanian Cities

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All over the world we find smart solutions which are implemented for improve quality of life. The smart solutions make daily activities more easily, efficiently and represent a real support for city development. The paper aims to analyze and presents the necessity of use smart solutions in Romanian cities. Also, the paper highlights the advantages of smart cities and the stage of urban area from our country in term of smart cities.
Keywords: *Smart City, Smart Solution, Quality of Life, City Development*

1 Introduction

This paper analyses the level of use of smart solutions in Romanian cities and the future tends of these about this kind of development.
The first part presents the concept of smart cites. The second part focuses on the analysis of advantages of smart cities. The third part presents the necessity of smart solutions use in Romanian cities. The paper ends with the presentation of the impact of smart solutions and how to use them for smart city development.
The concept of the *smart city* has been introduced to highlight the importance of Information and Communication Technologies (ICTs) in the last 20 years [14].
In literature the term smart city is used to specify a city's ability to respond as promptly as possible to the needs of citizens.

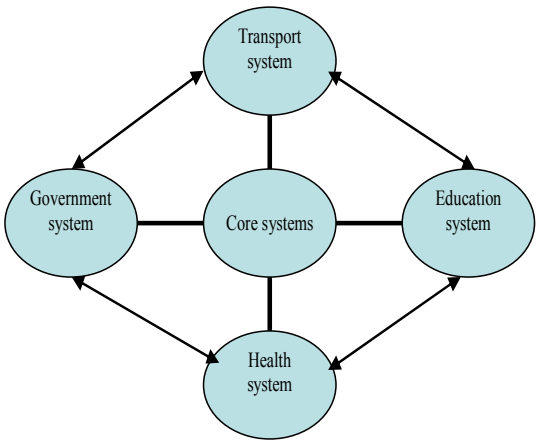

Fig. 1. The core system of a smart city

Quality of life and city development are profoundly influenced by the core systems (Figure 1) of a city: transport, government services and education, public safety and health [5]. So, we must to start analyze and development of city for these four areas.
Research has focused to study these four areas - education, health, transport, public administration - which are identified having high priority. For these areas was highlight the use of new technologies of employers.
Literature review highlights that various aspects referring to improve life in a city are mentioned in connection to the terms of smart city like: transportation, education, public administration, health care, security/safe, green, efficient and sustainable, energy etc.
In literature [5], [6], [9] is shown that the most important area for start to transform a city in a smart one is the transportation system. This area has in view to use the modern transport technologies. Smart transportation systems are the best example of the harmony between development of city and modern technologies.
The term smart city is also used in literature [2], [4], [5], [14] regarding the education of its inhabitants. A smart city has therefore smart inhabitants in terms of their educational grade. The intelligent systems represent an important part of future educational process. The intelligent systems will affect the way in which the information is received, used, understand and learned by users. If the inhabitants will be educate, they will know to work for city development and they will have in view the limits of natural resources. An intelligent educational [6] system is based on three elements: interconnection (a resource sharing technology education), instrumentation (accumulation of necessary data) and intelligence (making decisions that enhance the learning process).
In other literature [8] the term smart city is referred to the relation between the city government or public administration and its citizen. Good governance as an aspect of a smart administration often also referred to the usage of new

channels of communication for the citizens, e.g. "e-governance" or "e-democracy" [8].
The health system is the other area which is highlight like a good solution for a smart city and this implies to use modern technologies to better results [5]. The smart health systems have in view to improve the quality of life for patients, allowing timely diagnosis and therapies and, reducing health care costs, reduce time for access to hospital.

2 Modern City

The term smart city has attracted a lot of attention in recent years. Since the end of the last century many cities have initiated smart city initiatives.
A useful definition to start to call a city "smart" is when "investments in human and social capital and traditional (transportation) and modern (ICT) infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory government" [4].

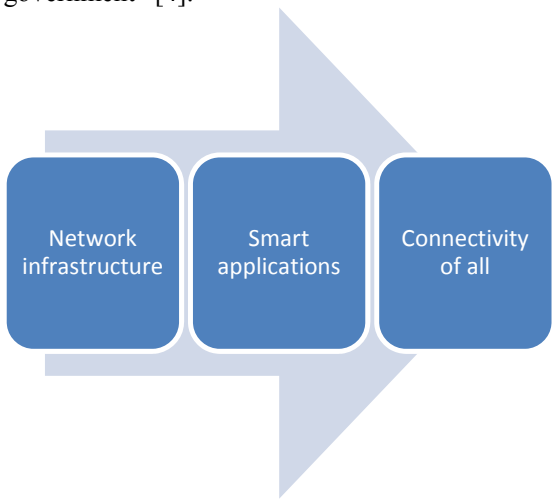

Fig. 2. The steps for a smart city

From the countries which implemented smart cities from the entire world have identified three distinct levels [12], [14] (Figure 2):

- The first step for the smart city is based on the physical telecommunications network infrastructure, comprised of the wiring, the wireless, together with any servers and routers required for operating the infrastructure.
- The second layer constitutes applications that facilitate operations in the city, like traffic control, etc. Such applications will be provided by many vendors, using the provided infrastructure.
- The third step is based by ubiquitous or connectivity of all.

In the last five years, many new ideas have been developed in terms of urban life. One of the most successful concepts is ubiquitous city. This idea was born in South Korea, and wants to be a new model of sustainable economy based on more efficient use of communication solutions, transportation and natural resources. This city manages information technology ubiquitous.
In order to create a complete U-city, we will need to create new smart solutions for water management, traffic and even health care.
This model city was and is being investigated and implemented in European Union cities such as Oulu city in Finland. All information systems from the city are linked and everything is connected to an information system through technologies such as wireless networks.
The concept of ubiquitous city or U-city has been developed into a huge international research and is also known as Smart Cities in other countries. This city is a smart city model based on the use of computer systems to exchange data such as cloud computing, open date. The first level of this new model of urban life is one in which houses, streets, offices and transport communicate with each other can be accessible from anywhere.
The first U-city was implemented in South Korea (e.g. New Songdo) and Japan (e.g. Osaka) and delivers information anytime, anywhere to anybody, using interconnected information systems and ubiquitous ICT solutions over the city [3].
There are lots of advantages to this new system: energy and all natural resources are spent more efficiently and synchronization tasks much easier to accomplish.

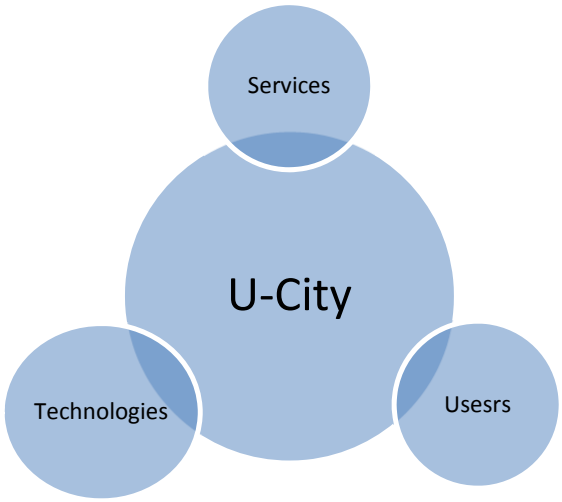

Fig. 3. U-city [12]

U-city is based on ubiquitous computing and IT solutions to improve the quality of life (Figure 3). These cities use information and communication technology to connect the activities which taking place in a city. In Oulu city in Finland was implemented a UBI - urban interaction program, coordinated by the University of Oulu. This solution is based on hotspots - public interactive screens that facilities effective communication between citizens and government.

All over the world we can identify a lot of smart city (Table1) in different level of development and is evident that this concept is used to define an urban evolutions based by modern technologies.

Table1. Smart cities over the world

City	Short Description
Helsinki	Helsinki as a Smart city cluster, including also the Helsinki region, in particular focusing on mobile and wireless technologies and applications.
Lisbon	Lisbon's ambition as a smart city is to improve the city's liveliness and quality of life, namely through the active involvement of citizens in the city's governance model. Lisbon aims to become an international hub for world scale companies, benefiting from the bridge Lisbon represents between Europe, Africa and America.
Manchester	Manchester using modern technologies to promote community engagement, capacity building and social capital
New Sondgo	To use ubiquitous computing in the city is the first objective.
Osaka	Osaka is based by ubiquitous information systems in city area.
Oulu	In the last years Oulu becoming the city of technology and an innovation city. Aim to become the most highly developed city in Finland and Northern Europe.
Barcelona	Barcelona had in view to implement of ICT to pursue social and urban growth. Smart City concept was used as a strategic tool and the pillars are infrastructures, open data, innovation service, human capital.

The international practice shows that the evolution of smart city is based on:

1) Ubiquitous computing;
2) Wireless;
3) Readiness for change, because ICT evolution implied to be ready to use new solutions every time.

The analysis highlight that a smart city is more than technology and infrastructure it is a universe of smart applications and platforms which are empowering citizens in innovative ventures. The strong idea is that a smart city is a strategy and an objective for every urban area and in some part of the world is a reality [11].

3 Smart City Advantages

According to recent studies [1], [2], [3] and [9] major advantage is related to improving quality of life.

All the cities who implemented smart solutions had in view to improvement of citizen everyday life. In the last years by implementing smart solutions in different countries from European Union was made:

- Increasing the employment rate of employment for men and women aged between 20 and 64 years, while employing a larger number of young people, older and low-skilled people, coupled with a better integration of legal immigrants;
- Improving the conditions for research and development in order to increase investment levels and stimulate research, development and innovation of new indicators;
- Reduction of greenhouse gas emissions compared, increasing the share of renewable in final energy consumption and achieve increased energy efficiency;
- Improving education levels by reducing drop-out rates and increasing the proportion of persons aged 30-34 years with university degrees or equivalent qualifications;
- Promoting social inclusion by reducing poverty and eliminating the risk of poverty.

The most significant advantages (Figure 4) are improved of citizen transportation, the access to city resources (libraries and public buildings, malls, networks etc.) and the opportunities for the employment and local growth [1].

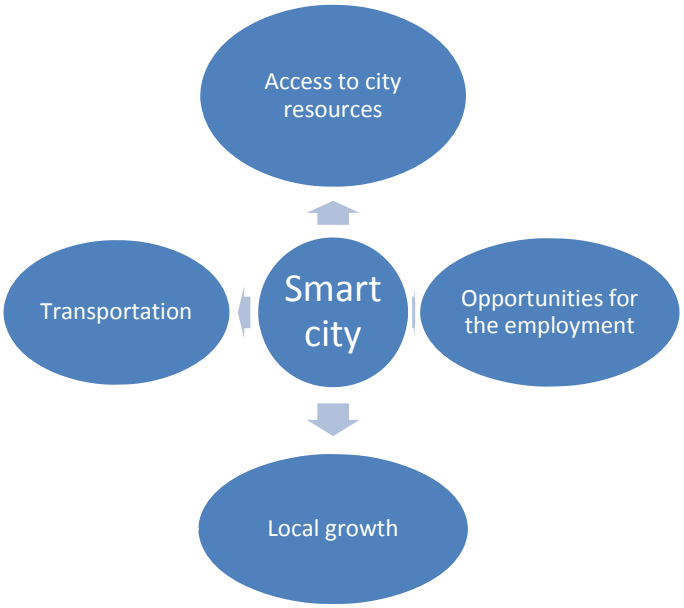

Fig. 4. Smart city advantages

All these advantages highlight the need of implementations smart solutions in our country.

4 Smart Cities in Romania

For our country we must to point that a smart city is a strategy not a reality yet.

In Romania, starts from the steps identified above and according to data from Eurostat regarding the use of modern technologies, most cities are still found in the first step of the smart evolutions. In this step in which is trying to improve telecommunications network infrastructure are most of the cities of our country.

According to Eurostat, between 2006 and 2010 internet access in Romanian tripled, but it is still one of the lowest in the European Union member states with 42% of households having access to an internet connection while only 23% have broadband access in 2010, the lowest in the EU27 [19], [20] . The percentage of people using the Internet to make phone calls and video calls is higher than the percentage the country shows for other Internet usage categories, probably due to the fact that a significant part of its population works abroad. In addition, in Romania, the usage of social media websites among Internet users is lower than in other EU countries [19].

In the report of European Smart Cities Organization [9] is highlighting that some of most important of our cities are in the first step of smart development (Figure 5). From this point of view, the results and performance of implemented smart solutions find our cities on the end of the ranking. The cities from our country are in this situation because they are in the first step of developing and implementing smart solutions.

Only few cities have initiative in implemented smart solutions. These cities are the most important cities regarding number of citizens, industry and cultural impact (Bucharest, Brasov, Sibiu, Timisoara, Craiova and Cluj-Napoca).

Start from these we can identify three possibilities of implementing a smart city that can be used in Romania.

- The first version refers to the use of facilities offered by technology and communications solutions cloud computing, open data in areas that we have identified as basic (administration, education, health and transport). In this variant is aimed at integrated operations center. This can facilitate access and share information, coordinate city resources and can predict and solve problems faster.
- The latter refers to the use of efficient solutions for producing electricity using wind power and photovoltaic solar panels capture solar energy, free energy, clean and green. In this variant, monitor and reduce carbon dioxide emissions and an efficient use of natural resources are the important results.
- The third option refers to investments made in a number of elements that create a high standard of quality of life for citizens and visitors, and tourist areas - parks, museums and historical centers.

To choose one of these options or a combined version depends on the characteristics of the city. After a SWAT analysis we can to choose one of

these solutions.

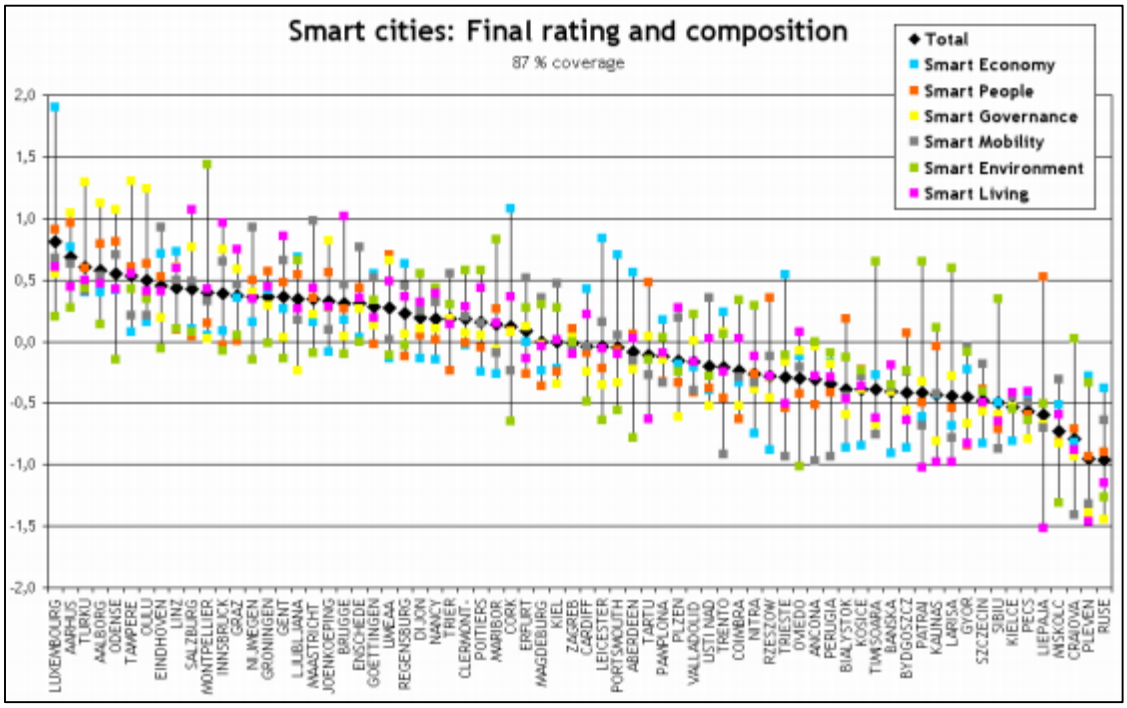

Fig. 5. Final rating in term of using smart solutions[9]

Currently, in our country the most important initiatives are in field of efficient solutions for producing electricity. Among these initiatives would remember Sibiu, Brasov and Bucharest.

The Sibiu city wants to implement a project which aims to equip the city and its neighborhoods an integrated energy system, optimized both in terms of energy efficiency and in reducing carbon dioxide emissions. This project will be submitted in December 2012 at the European Commission's Directorate General for obtaining European funding [17].

About Brasov can be said to be the first city in the country that has "intelligent street lighting". In this sense was obtained European funding. Modernizing public lighting will be done by achieving integrated solutions ensure the modernization of public lighting and supervision, monitoring and interaction with high-risk areas and situations producing the municipality criminal phenomena [16].

Bucharest was among the top 24 cities selected to receive grants of type "IBM Smarter Cities Challenge", in this context the mission benefiting IBM Executive Service Corps (ESC) [15].

In 2010, IBM Smarter Cities Challenge launches a grant program created by IBM Corporation. The purpose of this program was to select a number of 100 cities worldwide to benefit from an analysis of the possibilities of becoming intelligent.

The analyses conducted in 2011 in Bucharest were set a number of priorities that can improve quality of life.

5 Conclusions

To use efficient the resource and this implied smart solutions is essential for improve quality of life. The main goal of cities in our age is sustainable development. In our society to use efficiently the non-renewable resource is essential and a support for evolution. Because of this is essential to use smarter solution. For smart and sustainable growth of a city is important to promoting a use more efficient of resource, a competitive economy and an economy base on knowledge and innovation.

We can conclude our research that in our country the smart cities are in the strategy level and not a reality.

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