European Journal of Computer Science

Analysis of the Features of the Implementation of Smart City Concept in Russia

Tamara L. Salova [a], [*]

[a] Sochi State University, Russian Federation

Abstract
The article studies the concept of Smart city, which relies on the introduction of a set of technical, communication and information solutions into the infrastructure of a modern city in order to ensure a high quality of life for the urban community. The analysis of the specifics of developing a strategic line for the implementation of this concept in Russia is carried out.
Keywords: smart city, comfortable urban environment, transport infrastructure, landscape architecture, organization of public spaces.

1. Introduction

Smart city has undergone a number of significant transformations over the past two decades: from the creation of the idea, the definition of concepts and the introduction of individual fragments in various cities of the world to the implementation in quite a full range in the city-state of Singapore. It should be recognized, that the concept of Smart city is still not fully developed. Each of the cities in the world, which is included in the rating of Smart cities develops this idea in its own way. Each of the cities has its own specifics of the embodiment.

Based on the ratings of four independent companies from different countries: Forbes, PwC, Juniper Research (international Agency for marketing research) and EasyPark (Swedish IT-company) – the «five» of the smartest cities in the world (Vedomosti.ru, 2019):

1. Singapore, the main element of which is street traffic – it's smart traffic lights that minimize the number of congestion, road sensors that measure the density of traffic flows, smart Parking, with a centralized base of vacant seats and, finally, the first batch of unmanned vehicles. In Singapore, the idea of Smart city is implemented within the framework of a larger program Smart nation (2006–2020) in five main areas: smart planning; smart environment; smart real estate; smart living; smart mobility (transport infrastructure). Naturally, all these areas are based on fairly advanced information and communication technologies and solutions. Singapore can be seen as a modern, far-reaching standard of implementation.

2. London, with smart Parking, application-Navigator for the selection of optimal modes of transport, payment system for the right to use the car in a busy area, investment in the bus network, etc.

3. New York, known for advanced security systems and optimization of traffic flows, as well as distinguished by intelligent street lighting and intelligent garbage bins.

[*] Corresponding author
E-mail addresses: salova@mail.ru (T.L. Salova)

4.   Barcelona, which implements large-scale environmental projects – the introduction of renewable energy, cost-effective irrigation systems, air pollution noise sensors and fixing water losses.

5.   Copenhagen, with a developed infrastructure for Cycling, equipped with sensors for traffic jams and air pollution, as well as the promotion of Smart solutions for home management and lighting.

Russia has its own way of entering the information civilization, one of the aspects of which is the concept of Smart city. It is interesting to analyze the specifics of the development of a strategic line of implementation of this concept in our country.

2. Discussion

In July 2017, the state national program «Digital economy of the Russian Federation» (Program «Digital economy…, 2017) was approved, one of the priority directions of which is the integration of innovative technologies into the infrastructure of cities that improve the environment of comfortable living.

The Ministry of construction and housing and communal services has developed the Project «Smart city», which was launched in Russia in 2018 in a pilot mode, and since 2019 has become mandatory in the framework of two national projects – «Housing and urban environment» and «Digital economy». As part of the Project, the Ministry intends to systematize existing IT-solutions for the formation of a comfortable urban environment and develop mechanisms for their implementation throughout the country. The Ministry will use the achievements of the Russian state atomic energy Corporation «Rusatom», the Russian state Corporation for the development of high-tech industrial products for civil and military purposes «Rustekhnologii», and the Russian company for the development of the nanoindustry «Rusnano». The project includes the management of transport and pedestrian flows, the organization of a comfortable and safe environment, Smart housing and communal services, the introduction of digital technologies in all areas of the urban economy to ensure the quality of life in Russian cities.

One of the main points of the creation of Smart cities is strategic planning, considering the city as a single system that combines a variety of factors of development. We should emphasize information and communication and intellectual technologies, progressive improvements in all spheres of public life, including not only the economy but also education and culture. At the same time effectively use the social and environmental potential of the city.

A truly Smart city is, first of all, a city of Smart decisions based on the strategic thinking of the subjects that determine the vectors of development of the territory. The following can be considered healthy trends:

–organization of dialogue of managers with scientists, business-communities, local authorities, progressive youth;

–attraction of investors, their selection, support of those who are focused on resource-saving, environmentally safe production;

–support of the enterprises producing innovative products and providing employment to local skilled professionals.

We can identify the basic parameters that characterize the concept of Smart city – is adaptability, intellectualization and focus on lifestyle. Smart city should be environmentally friendly, safe, open wide opportunities and provide the most comfortable life.

The national center of Informatization (NCI) is engaged in development of standards of Smart cities of Russia. A single center is necessary for coordinated work on a variety of projects, the number of which and the interest in it is growing every year. Development of standards and common criteria allows to generalize knowledge, combine efforts and ideas, accelerate construction, of course, provided, that the standards are dynamic and ready for changes in the implementation process (Namiot, 2016).

Projects of Smart cities, developed in different countries, differ from each other, have their own specifics, taking into account the economic, natural and social characteristics of a country. But the main functional areas, that are present in all projects, including Russian ones, are as follows:

−smart economy;
−smart mobility;
−smart urban environment;
−smart energy, smart water and gas supply;
−smart home and smart living;
−smart people.

Let us dwell on each of these areas.

Smart economy is, first of all, to attract investors. Here, it is important to select those investors whose projects will be environmentally friendly, safe and innovative. Unfortunately, there are cases when investors work not so much for the benefit of the city, but for the extraction of maximum profit. It is essential that investors of innovative production satisfy, first of all, the population of the city, and not just looking for sales channels.

When developing criteria for assessing Smart cities and building ratings, one of the leading positions is well-organized mobility and intellectualization of transport systems. Of great importance is the introduction of new modes of transport: cars with low emissions, monorails, high-speed trams. It is important to take into account the natural features of a city, for example, Copenhagen is considered the most «bicycle» city in Europe, and in Belgorod is the rehabilitation of the trolley as an environmentally friendly mode of transport.

The organization of the surrounding transport space is also important. This can be Smart parking with a centralized database of free places and traffic lights with intelligent switching mode, minimizing the number of congestion, air pollution and noise level sensors installed in particularly busy parts of the city. It is mandatory to take into account the aesthetic aspects of the design of the roadside area: stops, decorated with non-standard creative solutions, for example, all stops of the city can be in the form of bright, beautiful fruits or with light music benches. There can be thousands of options – the main thing that it became a habit.

Particular attention should be paid to the culture of driving and the culture of urban transport with the introduction of new forms of interaction with passengers, for example, the introduction of trams-cafes, as in Helsinki, or trolleybuses-cafes, as in Belgorod. Among the priorities is a significant improvement in the payment system.

Smart urban environment is, first of all, the surrounding nature and architecture, which are in the most harmonious ratio. Natural objects should be considered as eco-friendly design solutions with aesthetic and health-improving character. Architecture, ideally, should fit into the landscape design and match the appearance of the city as a whole.

Landscape architecture is the architecture of open spaces. Only landscape architecture and landscape design can solve a complex of problems associated with the formation of a truly comfortable space around a person, harmoniously combining artificial objects and natural components. The scope of landscape architecture includes landscape art, landscaping and improvement of residential areas, streets and roads, urban centers, industrial areas, historical sites, protected areas.

Architectural solutions are a certain ideology, brand, symbolism of the city, as well as beauty and originality. Architectural solutions are durable, so they require more reasonable study and protection from errors. Smart urban environment is Smart lighting, Smart waste management, video surveillance and security.

In Russia, the priority project «Formation of a comfortable urban environment» (Government.Ru, 2016). The passport of the priority project was approved by the Presidium of the Presidential Council for strategic development and priority projects in November 2016.

The comfort of the city for its residents is determined by factors such as:
−transport accessibility;
−walking services;
−availability of facilities for all categories of citizens;
−organization of public spaces;
−convenient layout of the street network.

In other words, a comfortable urban environment is a space that is maximally adapted to the needs of citizens. Public spaces include: squares, squares, embankments, pedestrian streets,

courtyards, children's and sports grounds. In the improvement of these spaces, great importance is attached to the residents of cities and public organizations.

Smart housing and communal services are Smart meters of energy consumption, water consumption and gas, emergency management, innovative methods of water purification, the process of joint production of electricity and heat, renewable generation of energy. The introduction of intelligent centralized networks in real time, the creation of a single city map of ground and underground facilities with the control of individual territories – is not a complete list of priorities. Well-coordinated work of managers and officials with self-government bodies is of great importance here.

Smart urban environment can not do without the implementation of projects of Smart homes and smart living in them. It is possible to distinguish the following types of work in this direction: identification and support of the construction organizations using the latest technologies in the field of building materials and finishing of houses, popularization of technologies of construction and service of so-called Smart houses. We can not do without friendly neighborly communities that ensure the safety of living, solve their own small household problems, assist in the socialization and education of the younger generation.

And finally, Smart people who define a new quality of life. People of the Smart city should be ready for innovations, have a high degree of responsibility, be able to solve modern scientific and technical problems, have the ability to think outside the box and quickly, maintain standards of behavior and accommodation. To achieve these goals, it is necessary to create a creative environment on the basis of clubs, exhibitions, cultural centers. And another position of the Smart city is a Smart conflict-free modern family focused on a healthy lifestyle and moral education of future residents of the Smart city.

In the ranking of Smart cities of Russia, Moscow has been ranked as the leader in the number of innovative sites (36 sites), the number of electro-filling stations, cameras of State Road Safety Inspectorate, companies providing services of car sharing. Also in the capital there are the best transport cards, public Services portal, unified medical system of EMIAS and good coverage of the city with public Wi-Fi systems. Innovative technologies of Moscow are exhibited in the pavilion «Smart city», which opened at the Exhibition of achievements of the national economy in 2016.

In second place is St. Petersburg with 24 objects of innovative infrastructure. The Northern capital has approximately 0.62 wireless Internet points per square kilometer. The number of electric filling stations is second only to Moscow.

The two capitals are undoubted leaders, mainly due to the availability of sufficient budgets. Less budget Kazan and Yekaterinburg occupy the third and fourth places. Stand out a large number of electric gas stations. Kazan has 19 innovation infrastructure facilities, the largest IT-Park and one of Europe's largest Technopark. Yekaterinburg broke the record for the number of ATMs: 3.23 ATMs per square kilometer.

The poor quality of the urban environment is mainly associated with limited local and regional budgets for improvement, frequent misuse of resources and corruption. Currently, the organization of a comfortable urban environment is one of the most important large-scale state development programs in Russia (Petrina, 2017).

Sochi, being the largest resort city, cultural and national center of the black sea region, claims to be among the ten Smart cities of Russia. The development of the tourism cluster is especially important, because it does not require large financial investments and therefore under the power of small businesses (Zhertovskaya, 2018). Intellectual and cultural tourism can give impetus to the development of all infrastructure of the resort city.

3. Conclusion

In Russia, intensive work is underway to introduce the concept of Smart city not only in the largest well-funded cities, but also in small towns and settlements. Despite the list of mandatory areas of development that meet international criteria, each city in Russia has so unique features of development that can claim to be a work of art with its own corporate lifestyle, urban planning and landscape design.

References

Government.Ru, 2016 – Government.Ru [Electronic resource]. URL: http://government.ru/projects/selection/649/ (accessed 23.05.2019).

Jertovskaya, 2018 – *Jertovskaya E.V., Yakimenko M.V.* (2018). Possibilities and perspectives of use of technology Smart City for the development of tourism areas. *Fundamental research,* №2, pp. 83-89.

Namiot, 2016 – *Namiot D.E., Shneps-Shneppe M.A.* (2016). About domestic standards for the Smart City. *International Journal of Open Information Technologies,* V.4, №7, pp. 32-37.

Petrina, 2017 – *Petrina O.A.* (2017). On the issue of state financing of reconstruction and modernization of municipal facilities. *Bulletin of the University,* 2017, №6, pp. 15-19.

Petrina, 2018 – *Petrina O.A., Stadlin M.E.* (2018). Comfortable urban environment: trends and problems of the organization. *Bulletin of the University,* 2018, №6, pp. 34-38.

Program «Digital economy..., 2017 – Program «Digital economy of the Russian Federation», 2017 – *Program «Digital economy of the Russian Federation».* Order of the government of the Russian Federation of July 28, 2017, №1632-p.

Vedomosti.ru, 2018 – Vedomosti.ru [Electronic resource]. URL: http://vedomosti.ru/ technology/news/2018/03/13/753343-analitiki-vibrali-samie-umnie-goroda-mira (accessed 23.05.2019).

Vidiasova, 2017 – *Vidiasova L.* (2017). Conceptualization of the «Smart City» concept: socio-technical approach. *International Journal of Open Information Technologies,* vol. 5, no.11.