SMART CITY: THE CASE STUDY OF SAINT-PETERBURG 2019.

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ABSTRACT

This paper investigates the problems of implementing the concept of a “smart city” as a strategic direction in the development of modern cities. The authors explore the relevance of the concept of "smart city" in modern cities on case study of Saint-Petersburg. The methods applied in the research were analysis and synthesis of modern theory of smart cities, interviews of more than 107 people living in the different part of the city Saint-Petersburg, which was used in conduction with modern smart city theory. The findings of current research discovered the high level of people interest to greening of smart cities and more active using green technologies in the development of smart cities.

Keywords: smart city, green city, sustainability, urban infrastructure, urban planning, urban development, urban management.

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INTRODUCTION

Over half of the planet now lives in cities, and more than two-thirds of the world's population will be urbanized by 2050. In Russia today, 73% of the population lives in cities, with 17% in million-plus cities. Due to growth of urban population and more active using of digital technologies in cities was based the new direction in science, "smart" city, and its priority firstly was oriented on the techno-sphere safety. The "smart city" was considered as a concept for the integration of several information and communication technologies (ICT) and the Internet of Things (IoT Solutions) for the effective management of urban infrastructure and more active involvement of the urban community in the issues of municipal management. The concept of "Smart City" is very flexible. Each city chooses priority directions of development. The "smart" cities include Seoul, Singapore, Barcelona, Moscow, Kazan, etc. In this study, we consider the development of smart city concept on the case study in St. Petersburg.

LITERACY REVIEW

The concept of "smart city" emerged relatively recently. And there is no unambiguous and generally accepted interpretation of this term. The very concept of a smart city was born in the late 90s. It was then that the progressive part of humanity for the first time realized that the future was behind the development of the IT sector in the researches of Brilhante, O., & Klaas, J. [2], Lu, H. P., Chen, C. S., & Yu, H. [7].

It is curious that initially this idea developed exclusively in a social, ecological and environmental context.

It is possible to give the following definition: it is the integration of all communication and information technologies for the effective management of the urban system. According to the concept of "smart city", all these technologies are used to solve a number of important tasks such as:

- Rational use of all objects of urban infrastructure also in cyber security by Vitunskaitė, M., He, Y., Brandstetter, T., Janicke, H. [8] and catalyzing urban energy sustainability Haarstad, H., Wathne, M. W. [9];
- Comprehensive landscaping also resource management based on fog computing in smart city systems by Wang, T., Liang, Y., Jia, W., Arif, M., Liu, A., & Xie, M. [10];
- Operational collection and transmission of data to city officials also in the era of big data Bibri, S. E. [4], information systems by Ismagilova, E., Hughes, L., Dwivedi, Y. K., & Raman, K. R. [6];
- Establishing close ties between the city management and local residents and developing an integrative framework as it is presenting in the articles of Chourabi, H., Nam, T., Walker, S., Gil-Garcia, J. R., Mellouli, S., Nahon, K., Scholl, H. J. [1], Desdemoustier, J., Crutzen, N., Cools, M., & Teller, J. [5].

So the main goal of the "smart city" program is to increase the efficiency of all municipal services. Today there are seven main signs of a smart city such as:

- Attraction of ordinary urban residents to management issues;
- Availability of intelligent traffic management systems;
- Reasonable approach to street lighting;
- The introduction of a citywide and affordable Wi-Fi network;
- Active use of solar panels;

- The presence of a warning system for citizens about emergencies through sms-messages.
- Minimum use of cash to pay for goods and services.

The main technologies of the smart city today include wireless sensor networks, various online platforms, sensors (for example, to monitor traffic, air pollution levels, etc.), electronic maps and applications.

The device of a smart city According to the concept we are considering, a smart city consists of seven structural components (parts) - three main and four auxiliary. These are:

1. Smart economy (development of information and communication technologies, a favorable environment for innovation, the availability of an online booking system).
2. Smart financial system (non-cash payments, availability of ATMs and terminals, transparency in the distribution of tenders).
3. Smart city management (openness of the municipal administration, close ties between local authorities and ordinary people).
4. Smart public transportation.
5. Smart infrastructure.
6. Smart lighting.
7. Smart residents.

The concept of smart city start from technological context, after it evacuated to social sphere (Fig 1.) and now we can see strong tendency of its development to ecological sphere (Fig.2.). So the concept of “green city” and the concept of “smart city” start to integrate to each other and we can see it today on the case study of many global cities.

Figure 1. Framework for smart city initiatives

Source: Chourabi, H., Nam, T., Walker, S., Gil-Garcia, J. R., Mellouli, S., Nahon, K., ... & Scholl, H. J. (2012, January) [1]

Figure 2. The conceptual basis of the green city

Source: Brilhante, O., & Klaas, J. (2018) [2]

These are the basis theory but as we said before the concept of "Smart City" is very flexible and each city chooses priority directions of development.

METHODOLOGY

Methods

The study is based on the method "Interview" which was done with residents of Saint-Petersburg. Due to the lack of information on the subject of 'smart city', the limitations of time for research and the difficulties surrounding communication between the researcher and the visitors with speech, language and communication difficulties, two methods were thought to be the most appropriate: "Interview".

2.2. Data collection and analysis

The total number of interviewed residents is 107 people from 20 till 40 years old, who lived currently in Saint-Petersburg. The statistical distribution of interview results presented below.

Data Analysis

In our research we investigate the point of view of Saint-Petersburg residents about the case study of smart city saint-Petersburg. Our interview shows that 35,5% of people are sure that smart city should be comfortable for living and its correlated with theoretical concept of smart city also they say about importance of eco-friendly urban environment and techno-sphere safety.

Figure 3. What is for you smart city?

Source. Authors

Among priorities of the development of smart city in saint-Petersburg residents present opinion about importance of the development modern urban infrastructure and modern technologies. Also 28% of interviewed residents said about importance of green zones in the city.

Figure 4. What do you think is most relevant today for the development of modern "smart" St. Petersburg?

Source: Authors

RESULTS AND DISCUSSION

Theory of smart cities demonstrate the influence of greening city economy and we can notice that the concept of smart cities intergate with the concept of green cities [1,2]. It exist not only in science but also in practice, because if we will compare the ranking of smart cities and the ranking of green cities we will find the same cities: London and New York are in Top 50 smart city governments [3] and in the top 10 of green cities [11]. So by our research we can see that technological innovation in urban development are important for residents and in the same time people prefer to live in green and eco urban zone.

CONCLUSION

By the case study of Saint-Petersburg, the city located in Europe from 1703 year with population 5, 3 mln. people we can see the evaluation of the concept of smart city from technological point to greening technologies and integration of the concept of green and smart cities into one with sustainable basis.

REFERENCES

- [1] Chourabi, H., Nam, T., Walker, S., Gil-Garcia, J. R., Mellouli, S., Nahon, K., ... & Scholl, H. J. (2012, January). Understanding smart cities: An integrative framework. In *System Science (HICSS), 2012 45th Hawaii International Conference on* (pp. 2289-2297). IEEE.
- [2] Brilhante, O., & Klaas, J. (2018). Green City Concept and a Method to Measure Green City Performance over Time Applied to Fifty Cities Globally: Influence of GDP, Population Size and Energy Efficiency. *Sustainability*, 10(6), 2031.
- [3] Top 50 smart city governments. Available at: <https://static1.squarespace.com/static/5b3c517fec4eb767a04e73ff/t/5b513c57aa4a99f62d168e60/1532050650562/Eden-OXD+Top+50+Smart+City+Governments.pdf>
- [4] Bibri, S. E. (2019). On the sustainability of smart and smarter cities in the era of big data: an interdisciplinary and transdisciplinary literature review. *Journal of Big Data*, 6(1), 25.
- [5] Desdemoustier, J., Crutzen, N., Cools, M., & Teller, J. (2019). *Smart City appropriation by local actors: An instrument in the making*. *Cities*, 92, 175-186.
- [6] Ismagilova, E., Hughes, L., Dwivedi, Y. K., & Raman, K. R. (2019). Smart cities: Advances in research—An information systems perspective. *International Journal of Information Management*, 47, 88-100.
- [7] Lu, H. P., Chen, C. S., & Yu, H. (2019). Technology roadmap for building a smart city: An exploring study on methodology. *Future Generation Computer Systems*.
- [8] Vitunskaitė, M., He, Y., Brandstetter, T., & Janicke, H. (2019). Smart cities and cyber security: Are we there yet? A comparative study on the role of standards, third party risk management and security ownership. *Computers & Security*, 83, 313-331.
- [9] Haarstad, H., & Wathne, M. W. (2019). Are smart city projects catalyzing urban energy sustainability?. *Energy Policy*, 129, 918-925.
- [10] Wang, T., Liang, Y., Jia, W., Arif, M., Liu, A., & Xie, M. (2019). Coupling resource management based on fog computing in smart city systems. *Journal of Network and Computer Applications*.
- [11] : Top 10 greenest cities in the world. Available at: <https://www.ecowatch.com/top-10-greenest-cities-in-the-world-1881963132.html>

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