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**FROM SMART CITIES TO SMART NATION: SCALABILITY
POTENTIAL**

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Abstract

This article is concerned with analysis of economic effects of smart cities in the Russian Federation. The authors state that UN sustainable development goals (SDGs) that may be adopted in Russia across all levels of governance would serve as performance indicators applicable to smart cities, while modern information and communication technologies (ICTs) would become valuable tools for reaching these goals. National criteria applied to smart cities may be based upon international standard ISO 37122 («Sustainable cities and communities – indicators for smart cities»). The findings showed that Russian cities and their socio-economic and spatial development as of now do not fully meet the requirements of this standard. However, the need to accelerate the socio-economic development of the country and its integration into global economy require adoption of a similar national standard designed to replace the departmental standard of smart city developed by the Ministry of Construction of the Russian Federation. Moscow's experience of transition to the «smart city» platform may serve as a regulatory sandbox for other regions and cities willing to become data-driven entities which will serve as an additional driver of their socio-economic development. Russia has at its disposal tremendous and underutilized knowledge, management resources and technical expertise for successful operation of smart cities growing out into regional and eventually national levels (smart cities-smart regions-smart nation).

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1. Introduction

Urbanization has become a global trend of the 21st century. Huge human and technological resources are concentrated in the megacities across the world. Currently, the world's population is about 7.7 billion people, 55% of whom (4.2 billion) already live in cities. Between 2018 and 2050, India, China and Nigeria together will account for 35% of the world's projected urban population. According to UN forecasts, by 2050 the world population will continue to grow: in India there will be 416 million people more, in China 255 million people more, and in Nigeria 189 million people more (United Nations, 2018). Today, the most urbanized regions are North America (in 2018, 82% of its population lived in cities), Latin America and the Caribbean (81%), Europe (74%) and Oceania (68%). The level of urbanization in Asia is now approaching 50%. In contrast, Africa remains mostly rural, with only 43% of its population living in urban areas. In the future, by 2050, according to various estimates, urban population will constitute between 66 to 70% of the world's population (6.7 billion people. according to UN forecasts), and as statistics show, most of the resources of residential and utilities services are consumed by the people living in the cities.

In 2019, three-quarters of Russia's population already live in cities generating not only a large share of the country's GDP, but also new models of interaction between the population and the government. However, it is obvious that the growth of urban population entails multiple problems associated with the need to provide citizens with high standard of living, implying well-paid jobs. Cities play a key role in Russian economy, but increasingly face challenges that impede their effective development: accelerated deterioration of urban infrastructure (more than 60% on average in the country), deficit of local budgetary spending, urban environmental problems, need to establish efficient relationships among municipal authorities, business community and citizens to ensure sustainable development of society, and eventually eliminate wide-spread corruption.

Under the circumstances, without the use of modern information and communication technologies (ICT), it is impossible to solve the problems above (Alpopi & Silvestru, 2016). Moreover, taking into account the risks of impending recession of the world economy, increasing attention in many countries of the world is paid to search for new drivers of socio-economic development. One of such drivers, in our opinion, can become so-called smart cities", where, using ICT, municipal authorities will be able to identify points of growth, create new jobs, generate cash flow, eliminating municipal budget shortfall. Innovative technological projects created in these cities are expected to transform all spheres of municipal life and then may be replicated on the regional and national levels.

2. Problem Statement

The world is on the brink of another recession cycle. Russia needs a new concept of sustainable development which may be based upon modern ICT for implementing global sustainable development goals (SDGs) adopted on the national, regional and municipal levels. The UN members are expected to independently develop their own strategies, plans and programs for sustainable development, taking into account the UN Secretary-General's recommendations. The SDGs will act as a benchmark, allowing countries to align their plans with their global commitments.

Provisions of the Presidential Decree №204 "On the national goals and strategic objectives development of the Russian Federation for the period up to 2024" (the May Decree of 2018) secured Russia's commitment to the UN SDGs. The objectives set in this decree should be achieved by 2024 via implementation of national projects in 12 areas of strategic demographic development; health development (SDG 3); education (SDG 4); residential and urban environment (SDG 11); environment (SDGs 13, 14, 15); safe construction and high-quality roads (SDG 9); productivity and employment support (SDGs 8 and 9); science development (SDGs 4, 6, 7, 8, 9, 11, 12, 13, 14, 15); development of the digital economy (SDGs 8 and 9); culture (SDGs 4, 8, 9); support for small and medium-sized enterprises and individual entrepreneurship (SDGs 2, 3, 8, 9); development of international cooperation and exports.

As of October 2019, it is evident that the whole structure of these national projects lacks certain modern ICTs in each of 12 areas of national strategic development, which impedes successful implementation of the Decree. It is advisable to consider Russian smart cities experience where such ICTs have led to substantial growth of gross regional/local productivity.

3. Research Questions

Forthcoming recession will certainly impact national economy due to resource-based export-oriented economy constituting 1/3 of its GDP. That's why there is a need for smart public governance based on modern ICTs which will allow to identify and develop new sources of growth in all 12 priority domains of social-economic development. Some Russian cities have already accumulated certain knowledge in these areas.

Research and practice-related questions encompass: What ICTs are used in Russian smart cities and what's their role in local economies? What international and national legislation may be applied in this area? What are the measurable consequences of private and public investments in ICTs leading to the desirable changes in the structure of Russian economy in order to counter the expected recession? What other resources are necessary to develop and maintain models of smart governance on the local, regional and federal levels? What are their characteristics, and how do they contribute to the overall outcome? Why are they important, and how critical are they? What smart cities governance practices can be replicated on regional and federal levels?

4. Purpose of the Study

We believe that academic research can effectively support evolution of smart public governance from smart cities to smart regions and then to smart nation, accelerating national economy growth on various levels. Sharing the best experience of national development of smart cities will predictably lead to sounder and more elaborated models of smart governance as opposed to initiatives utilizing trial-and-error approach alone.

Research objective is to find new solutions to accelerating economic development of the country offering bottom-up model of strategic growth based on international and Russian ITCs implementation in all areas of human life in the cities.

5. Research Methods

Multidisciplinary approach in the qualitative data analysis embracing strategic management, public governance, international and national law and economics was used to cover all areas of scientific interest and draw necessary conclusions.

6. Findings

Presently, the intellectualization of urban development is accompanied by a complex digital transformation: public governance in a smart city is carried out on the basis of data accurately collected and processed using ICTs (making a "data-driven city"), which are a key element of the urban ecosystem and of its individual components - smart housing, smart energy, smart transport, smart healthcare, etc. (Kamolov & Korneyeva, 2018). Using this research approach, some Russian scientists identify smart cities of the fourth (Singapore) and fifth (Tokyo) generations.

The world is changing very quickly. The ICT's progress cannot be stopped. Smart cities were originally proposed as a contingency measure to deal with municipal economy deterioration during the global financial meltdown of 2007-2009 by the high-tech giants such as IBM, Cisco, Google and others as a way for them to sell their products (sensors, big data, machine learning and AI solutions, etc.) to local governments' entities to reduce costs and increase efficiency of municipalities (Calabrese, Costa, Levaldia, & Menichini, 2018; Buijsen et al., 2018). The goal of smart cities of generation II was to improve the quality of life, improve the efficiency of municipal services and meet the needs of urban residents through ICT. The "Plan for the Development of Moscow as a Smart City until 2030" adopted just last year (in 2018) outlined the goals as follows:

- ensure sustainable growth of life standard of Moscow citizens and favorable conditions for business and other activities using of digital technologies;
- provide centralized, end-to-end and transparent city governance based on big data and artificial intelligence;
- improve efficiency of public spending, including introduction of public-private partnerships in the area of ICTs (Official website of the City Manager of Moscow, 2018).

Presently, given severe drop in incomes of the Russian population, new goals become operational – increasing the level of well-being of Russian citizens, which can be achieved not only by increasing their incomes (Stepnov & Kovalchuk, 2018), but also by reducing the costs associated with urban living (rates, taxes, fines, etc.) and accelerating the socio-economic development of the country on the basis of stimulating the growth of consumption as a consequence of increasing the level of well-being of the people. The SDGs should serve as guidelines for the ideal performance of a smart city. The term of "sustainable smart city" is more and more often mentioned by urbanists in the most developed countries of the world.

While the discussions on the essence of "smart city" among economists continue and there are multiple studies on this score (Hajduk, 2016), we would readdress them to the international standards of ISO 37100 series. The newest among them - ISO 37122 (Sustainable cities and communities – Indicators for smart cities) – was published on May 31, 2019. This standard provides all 165 ISO member states

with a set of indicators to measure the performance of cities in a number of areas, allowing them to draw comparative lessons from the experiences of other cities around the world and find innovative solutions to the challenges they face (ISO 37122:2019(en)).

The new standard complements ISO 37120 "Sustainable cities and communities – indicators of urban services and quality of life", which sets out the key indicators for assessing the provision of services and quality of life in the city (ISO 37120). Together, they form a set of standardized indicators that will provide common methodological approaches to measuring the sustainability of smart cities. The standards also provide guidance to cities on how to evaluate their activities to promote the UN SDGs. When used in conjunction with ISO 37101, which defines a management system for sustainable development in communities, with ISO 37106 of 2018 (Sustainable cities and communities – Guidance on establishing smart city operating models for sustainable communities) (ISO 37106:2018(en)) and ISO 37120, mentioned earlier, ISO 37122 will be able to help ISO member countries implement smart city projects. ISO 37122 is expected to be supplemented by ISO 37123 "Sustainable cities and communities – indicators for sustainable cities" by the end of 2019.

Russian cities, their socio-economic and spatial development cannot yet fully meet the requirements of ISO 37122. However, the need for such a movement is obvious and is connected with the competitiveness not only of our cities, but also of Russian regions and Russia as a whole, with its integration into the world economy, with the ability to use "smart cities" to accelerate the socio-economic development of the country (Kamolov, 2017). The project to create smart cities in Russia promises to become unprecedented on a global scale (after China) – it will cover 180 Russian cities.

In the absence of appropriate national standard, the Ministry of construction of the Russian Federation adopted its own departmental standard "Smart city", including such sections as:

- municipal government;
- smart housing;
- innovation for urban environment;
- smart city transport;
- smart public and environmental safety systems;
- ICT network infrastructure;
- tourism and services.

In addition to the departmental project passport, a methodology for launching the project in the Russian regions and municipalities has been developed. The "smart city solutions bank" is already operating - it is an open database of the world's best technologies and solutions in the field of urban economy.

As evidenced by experience of Moscow and St. Petersburg, Russia has already started a gradual transition from the model of "smart city", based on the improvement of business processes in certain areas of urban economy to the concept of "smart city as a service" (Polese, Botti, Monda, & Grimaldi, 2019). This is a natural transition to a platform approach in urban governance. The next stage, we believe, will be the transition to the concept of «smart regions and state as a service» to form a «smart nation» - this concept has already been officially adopted in Singapore and is currently promoted in China (Hurst, 2018).

7. Conclusion

Our research using methodology of relevant ISO standards shows that Moscow is undoubtedly a national leader in the introduction of "smart" technologies in Russia. Despite all the shortcomings, the level of digital services to the population in the Russian capital is one of the highest in the world (Maslova & Chiodelli, 2018). For example, in the UN index of e-services to the population, Moscow ranks number one, and number 8 by the level of implementation of "smart city" systems in the world. By 2030, Moscow should become a data-driven city, where decision-making is based solely on automatic processing and analysis of accumulated big data. This will require reliable and efficient interaction of all urban systems (energy, heat, gas and water systems, weather and ecology monitoring). Automation and robotization of urban processes will be actively carried out, all interaction of citizens, business and the Moscow city government will be carried out using the electronic document management system.

We believe that Moscow which is not only a city and a capital, but also one of the leading regions of Russia may serve as a regulatory sandbox for other cities and regions of this country. Its vast experience of using ICTs for generating additional gross regional product may be highly helpful for other constituent entities of the Russian Federation. We expect that the coming global recession will make Russian local and regional governments accelerate the process of creating local and regional data-driven platforms which will include relevant information grouped around corresponding SDGs adopted at every level of state power (federal, regional and local).

The authors also hope that ISO 37122 will soon be adopted by Rosstandart in the same way it was with the National standard «Sustainable development of the community. Indicators of urban services and quality of life» (GOST R ISO 37120-2015) which was completely identical to ISO 37120: 2014 with subsequent adjustment in the 2018 edition. This will contribute to Russia's moving in line with international standards on all levels of its communities.

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