# A comparison study of central governments' participation in smart cities projects in China and Russia

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**Abstract.** The opposing roles of the central governments of China and Russia in the projects of "smart cities" continue to arouse interest in the academic world. This article compares and contrasts the roles that the central governments of China and Russia play in stimulating the development of smart cities. The influence of the concept of a smart city is quite wide. At the federal level, the concept allows the formation of a digital society, as well as a digital economy, which are priority areas for the country's development in order to increase its economic indicators, in particular GDP. At the regional level, the concept allows for the comprehensive development of cities with the aim of ensuring a high standard of living in society as well as improving the efficiency of regional and municipal governance. Using a wide range of data, the paper offers an analysis of the practical differences between the two states. In addition, the document will consider proposals for a "smart city" put forward by the governments of the two countries, and draw conclusions about the significance of these differences in the success and functioning of "smart cities".

**Key words:** Smart city concept; Government of Russia; Government of China; City administration; Digitalization.

## 1 Introduction

A 'smart city' is a city that uses technological solutions to improve the management and efficiency of the urban environment [1]. The question of the introduction of modern technologies into the life of cities has been studied since the 20th century. Thus, the first publication related to the problem of the «smart» city was presented in 1988 in the collection of the third workshop on operational water management «Computerized decision support systems for control of water resources use in Houston» and is dedicated to analyzing the operation of «smart» remote terminals for managing the complex water supply and distribution network in Houston [2].

The urgency of the problem is high due to the growing needs of society along with the development of science and technology. Smart cities are increasingly seen as a model of

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modern urban development, combining digital infrastructure, digital services and smart citizens to offer an improved quality of urban life [1]. The concept of a "smart city" has been perceived by governments and developers around the world as a tool for progress, but the degree of coincidence of their goals and objectives differs from one jurisdiction to another [3].

In particular, there are very noticeable differences between the central governments of China and Russia regarding their attitude to smart cities. Given the importance of the Chinese and Russian economies to the global market, it is important to understand the differences between their approaches in order to get an idea of the success of any potential smart city project. This document will compare and contrast the roles that the central governments of China and Russia play in stimulating the development of smart cities.

To achieve this goal, the text of the article will consider the theoretical concepts of a "smart city" in Russia and China, cases related to the participation of the central Government of China and the Government of Russia in the development of this concept in the countries.

## 2 Methodological approach

The study is based on qualitative research methods that include the study of legal acts, as well as practical cases related to the introduction and development of the concept of "smart city" in the countries under consideration. This method of study was chosen because documents may reflect the role that central governments intend to play in "smart city" projects, in turn cases are aimed at demonstrating trends in the development of implementation practices.

As objects of information were used government documents of China and Russia, regulating introduction, development of "smart cities" and digitalization in the studied areas. In order to consider the concept in China, the following regulations were analysed:

–   The National Standard for Smart Cities. This set of guidelines outlines the technical requirements and regulations for smart city construction and management in China [9].

–   The Cyber Security Law. This law ensures the cybersecurity standards and privacy of data in all smart cities projects [10].

–   The Social Credit System. This system monitors citizen's behavior and compliance with smart city projects [11].

–   The Big Data Regulations. These regulations ensure compliance with ethical standards in data collection and usage [12].

–   The National Plan for New Urbanization. This plan provides developers with guidelines and frameworks for smart city projects [13].

In order to study the concept in Russia, the following documents were considered:

–   The Strategy for Developing Smart Cities in the Russian Federation. This strategy aims to promote intelligent urban infrastructure, R&D, and collaboration between urban communities and companies [14].

–   The Information Security Doctrine. This set of guidelines ensures the security and protection of data in smart city projects in Russia [15].

–   The National Data Management System. This regulates data infrastructure in Russia's smart cities to ease future replication [16].

–   The Digital Economy Development Program. This program establishes the structure for the country's goals to innovate, modernize economy, and digitize urban areas [17].

–   The National Urban Planning Policy. This policy outlines how existing urban areas may transform into intelligent, innovative enclaves positively transforming the citizens' well-being [18].

# 3 Results

## 3.1 Analysis of regulatory legal acts

Based on the analysis of regulatory documents of Russia and China, the following results were obtained. In 2018, the Government of Russia initiated the national program "Digital Economy of Russia "Digital Economy of the Russian Federation", that include the Smart City subprogram. The Ministry of Construction of the Russian Federation is engaged in the implementation of this project. On February 4, 2019, the Ministry of Construction of Russia approved the standard of the federal project "Smart City" [14]. In particular, it should be noted that in April 2020, the Ministry of Construction of the Russian Federation presented the rules for granting subsidies to regions for a "Smart City". In recent years, there has also been continuous construction and modernization of the legislative sphere.

In Russia, "Smart City" is defined as an approach to the development of a city using digital tools to improve the quality of life, quality of services and management efficiency with the mandatory satisfaction of the needs of current and future generations in all relevant aspects of life. A smart city is characterized by the functioning of highly intelligent integrated systems in the following areas: urban environment, safe city, digital city, management, investment climate, human well-being [19].

In China, the central government defines a smart city as "a new concept and model that uses next-generation information technologies, such as the Internet of Things (IOTs), cloud computing, big data, to promote intelligent urban planning, construction, management and services for cities" [20]. Digitalization, networking and intelligent urban development, in particular in the field of urban governance and services, promoting data exchange, as well as building a more open interaction between government and society based on cooperation, are highlighted as priorities in the implementation of smart city concepts in China. In particular, a separate emphasis is placed on social justice and harmony, i.e. the use of digital means should lead to social cohesion [21]. Since 2015 China's provincial governments have published more than 40 documents related to the development of the digital urban economy. Although there is currently no generally accepted concept of a "smart city", numerous approaches highlight various aspects of this phenomenon and cannot develop a single concept.

Despite the differences in the approach to the development and implementation of the "smart city" concept, China and Russia are characterized by a centralized digital transition system. In this regard, the Governments of the two countries act in the following roles: initiator, organizer, coordinator, controller, consumer.

Both Russia and China have put forward robust regulatory legal acts to ensure smart city's effective implementation within their territories. However, some significant differences exist between their regulatory acts: while the National Standard for Smart Cities in China and Strategy for Developing Smart Cities in the Russian Federation in Russia's are about development, The Social Credit System is absent from Russia's legislation. In contrast, the National Data Management System is not explicitly mentioned in China's regulatory legal framework. Russia's Information Security Doctrine aims to secure data privacy and security, while China's Cyber Security Law similarly focuses on cybersecurity [22].

## 3.2 Project and case analysis

Consider the practice of implementing smart city projects. China is one of the leading countries in the implementation of smart city projects, with efforts being undertaken to modernize urban infrastructure and public services. Smart city projects in China are backed by both central and local government policies, which are aimed at addressing urbanization

challenges such as energy consumption, air pollution, and traffic congestion [23]. The country has established 500 smart city pilot projects, which are integrated with emerging technologies such as big data analytics, IoT, artificial intelligence, and cloud computing [24].

The Wuhan Smart City Project was one of the first in the country to introduce the idea of a smart city. Focusing on intelligent traffic management and control, intelligent public administration, intelligent public services and intelligent energy applications, the project provides solutions to improve civil services in the fields of transport, energy, public safety, medical care and other areas. Wuhan has also made significant progress in other areas, such as urban architecture and landscape design, sustainable development and the use of environmentally friendly building materials [25].

The implementation of some of the most extensive smart city projects in China, such as Tianfu New Area and Xiongan New Area, has significantly enhanced urban life. The projects have been focused on sustainable urban planning and development, optimized resource allocation, improved transportation, and intelligent public services.

Guiyang Smart City Project is an innovative smart city development launched in Guiyang, the capital of Guizhou Province. Guiyang is one of the first Chinese cities to introduce an integrated urban ecosystem consisting of traditional infrastructure, information and communication technologies and high—quality services to create an innovative "smart city" model. The key goal of this project is to develop a modern, high-quality city where citizens can live and work in harmony with the environment. Guiyang's smart city technology covers traffic management and control, urban governance and public services, urban information and data security, smart transportation and smart healthcare [26].

Hangzhou Smart City Project has been widely recognized for developing a "super connected" smart city based on its smart city strategy "combining the best of people and machines". This project is aimed at meeting the needs of citizens in modern life, recreating a "confident, smart and sustainable" city using advanced technologies such as 5G, industrial Internet, artificial intelligence and big data. The main attention is paid to the creation of intelligent urban infrastructure, the deepening of intelligent management, improving the convenience of citizens, the quality of life and social development [27].

In recent years, the Chinese government has put forward a number of proposals for the creation of "smart cities", including the China-Singapore Suzhou Industrial Park [28], and Shenzhen Qianhai [29]. Both projects are implemented by the central Government and not by local authorities, which demonstrates the importance of the central government in promoting progress in this area.

Despite the success of smart city projects, China is still facing several challenges, including data management and privacy concerns, high implementation costs, and the lack of clear regulatory frameworks [30].

Russia has also embarked on the implementation of smart city projects to address problems related to urbanization, energy consumption, and improve citizen well-being. The government has prioritized investments in the development of smart cities through collaborations between municipal authorities and businesses [31]. The use of emerging technologies such as big data analytics, sensor networks, and renewable energy sources has been integrated into smart city projects in Russia. The central government of Russia adheres to a more restrained approach to the development of "smart cities". With the exception of the Kaliningrad Innovation Zone, proposals for the creation of "smart cities" in Russia were mainly initiated by the private sector [32].

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One of the most striking Russian government projects are the innovation center "Skolkovo" and the initiative "Smart City of Moscow". These projects are designed to modernize urban infrastructure and integrate cutting-edge technologies. While these projects have shown progress in improving the urban experience, challenges such as the lack of cooperation between stakeholders and the need for more financial investments have been observed [33].

Consider other projects related to the concept of "smart city" implemented in Russia. Yekaterinburg Transport Project is aimed at developing an intelligent transport system. The project was initiated by the Yekaterinburg District Council in order to reduce traffic jams, improve air quality and improve the quality of life of residents. Within the framework of the project, a new information system was developed, which includes cloud computing and Internet of Things (IoT) technology. The system automatically collects data from various sources, such as aerial photography, video surveillance, street sensors, vehicle tracking systems and audio-video systems, in order to optimize real-time traffic control and traffic light distribution throughout the city. The system is also expected to improve overall road safety and facilitate smoother transit [34, 35].

The Smart City of St. Petersburg Project: This Russian project, launched in 2013, aims to create a smarter and livable city center. The project is aimed at improving the quality of life of citizens, including providing better public services and infrastructure, promoting green and eco-friendly development and ensuring more active public participation in the decision-making process. To achieve these goals, the project included the installation of a citywide network of sensors and cameras. These devices allowed the city to monitor air quality and traffic levels, detect anomalies and take the necessary corrective measures, as well as measure and manage energy consumption levels. As part of the project, the city has also developed a mobile application through which citizens can access city services, contact the municipality, share ideas and provide feedback on various issues.

Similarities between smart city projects in China and Russia include the use of emerging technologies such as big data, Internet of Things (IoT), and artificial intelligence to optimize resource allocation and enhance public services. Both countries have also faced challenges such as high implementation costs, data privacy concerns, and regulatory challenges.

However, there are significant differences between the implementation of smart city projects in China and Russia. China's smart city projects are backed by national policies and regulations, while Russia's smart city projects are largely dependent on local governments and business collaborations. While the Chinese government has established over 500 pilot smart city projects, Russia has launched several smaller projects [34].

Moreover, smart city projects in China show significant progress in their integration of emerging technologies compared to Russia's smart city projects. China's smart city projects are seen as benchmarks for emerging technologies such as 5G networks and the Internet of Things (IoT), while Russia's smart city projects are viewed as relatively more traditional.

The implementation of smart city projects in China and Russia has shown remarkable progress in enhancing urban life. However, different approaches have been adopted in the implementation of smart city projects in both countries. China's national-level policies and regulations have provided the impetus for the successful implementation of smart city projects, while Russia's smart city projects have largely depended on business collaborations and collaborations between local governments. Despite the differences, both countries are facing similar challenges such as data privacy concerns, high costs, and regulatory challenges.

Moreover, there are differences in how the governments of the two countries finance their "smart cities" projects. The Chinese government has provided significant financial support to its "smart cities": the Suzhou Industrial Park received $2.5 billion in funding from the central government and another $2.5 billion in joint public-private investments [36]. For

comparison, most of the smart city initiatives in Russia were mostly self-financed with the support of third parties, not government agencies [37].

A comparison of indicators reflecting the application of the smart city concept in practice in China and Russia is presented in Table 1.

**Table 1.** Comparison of the smart city concept in China and Russia.

| Criteria | Russia | China |
|---|---|---|
| Year of consolidation of the "smart cities" concept | 2017 | 2015 |
| Number of smart cities | 237 [38] | 500 [24] |
| Developer and supervisor of the concept implementation | Russian Ministry of Construction | China Smart City Development and Research Center |
| Representative of "smart cities" | Moscow Yekaterinburg Saint Petersburg | Shenzhen Hangzhou Shanghai |
| Companies that are actively involved in the implementation of the concepts | Rosatom MTS | China Mobile China Telecom Alibaba |
| Model of digital transformation | Centralized | Centralized |
| Key implementation priorities | Emerging technologies, Big data, sensor networks, renewable energy sources | Big data, artificial intelligence, new generation information technology, high-tech equipment |

# 4 Conclusion

This article compares the roles that the central government of China and Russia play in stimulating the development of smart cities. The Government of both Russia and China can be the initiator, organizer, coordinator, controller and consumer of "smart city" projects.

As a result of the consideration of cases of implementation of the concept in the cities of the two countries, both similarities and differences were revealed. This makes it possible to clearly identify the vectors of conceptual development, taking into account the specificity of each country under consideration. From the point of view of the special priorities of the concept, Russia emphasizes the protection of the environment, in particular renewable energy sources. China, in turn, has placed greater emphasis on the use of new generation information technologies, particularly in the areas of urban safety and environmental management.

It is important to note that both countries need to pay special attention to data security, as data are at the heart of the whole concept. To do this, Governments need to periodically update legislation in this area, as well as take measures to monitor agencies whose responsibilities include monitoring the correct use of data and protecting against data leaks.

Turning to further consideration of this topic, it is important to highlight the existing methods of evaluating the effectiveness of cities' digital transformation, developed by both public authorities and private organizations. In particular, the construction of models for the Smart City concept implementation in Russia, Asian countries and European countries can act as a further direction of research.

We would like to note that the study of smart cities and directions of digitalization requires a separate focus on the location of the city, its starting infrastructure, economic and cultural development, since the key directions of digitalization of cities largely depend on these factors.

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