

Assessing the possibility of creating “smart cities” in Khabarovsk Territory and its economic consequences

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Abstract. Current article deals with the problem of territorial development in terms of innovative approaches associated with the integration of the “smart city” project management systems. The analysis of the basic approaches to the formation of the “smart city” definition has been conducted; the basic tasks assigned to this system from the point of view of the applied process of administration of the basic social and economic processes proceeding in the system of municipal formation have been estimated. The analysis of the main problems of the “smart city” project implementation, typical for any territorial unit regardless of the impact of internal and external environment factors of the innovative project realization has been carried out. The possibility of implementing the “Smart City Khabarovsk” project in terms of the innovative project’s “risk map” was assessed. The analysis of the results of the project for the economy of the municipality, based on the potential specifics of the “smart city” system, its impact on the organization of economic relations, the impact on financial transactions in the Khabarovsk Territory and the city of Khabarovsk, and on the socio-economic activity of the population of the region.

1 Introduction

The current conditions of economic development dictate strict requirements for newly created infrastructure projects related to the development of individual territorial entities, which is explained on the one hand by the impact of scientific and technological progress (its innovative component), while on the other hand by the sharp rise in the cost of resources [1]. Those form the impossibility of implementing innovation and innovative projects (including technology) based solely on extensive ways of technological and

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economic development of individual territories. Due to its special geographical location, the territory of the Russian Far East should be the flagship of innovative development in terms of implementing the concept of “smart cities”, which is due to its proximity to three major Asian innovation centers (China, South Korea, and Japan). However, in the current conditions, it is necessary to note the gap in scientific knowledge related to the assessment of the possibility and economic consequences of creating “smart cities” in the Far Eastern Federal District (in particular, Khabarovsk Territory), due to the lack of a unified concept in the formation of the content of the concept “smart city” and the lack of systematization of the problems from the perspective of the regional component. Thus, the key problems of this study should be the following: standardization of conditions for the implementation of “smart city” projects in the conditions of formation of a unified conceptual idea of the content of the definition of this concept; assessment of the possibility of its creation, as well as possible economic consequences for the territory of Khabarovsk Territory.

2 Material and methods

The aim of the research is to study the problem of development of separate territorial formations of the Russian Federation in conditions of realization of innovative projects of “smart cities”. To achieve the goal, first of all, it is necessary to solve the following tasks: to research definition (content) of the “smart city” concept; to determine and standardize the main problems of implementation of innovation projects with regard to regional characteristics; to assess possibility of “smart city” creation on the territory of Khabarovsk region; to analyze possible economic consequences of “smart city” creation for the Russian Federation constituent entity.

In the scientific research general scientific research methods were used, among which it is possible to allocate the following:

1. The method of analysis used to study the content of the “smart city” definition, quantitative assessment and impact on the economy of the Russian Federation constituent entity, which is the territory of the project implementation.

2. The method of synthesis, which allowed assessing the national and regional problems of the implementation of projects of “smart cities” both in the Russian Federation and constituent entities, to assess the possibility of its implementation on the territory of Khabarovsk Territory.

3 Results

Analyzing modern points of view on the “smart city” concept, it is necessary to note the absence of a unified approach to the formation of its definition, succinctly describing the structural concept of creating such management systems. Thus, in the scientific literature there are definitions representing a “smart city” as:

- 1) a management system that uses innovative technologies to operate economic and technological processes that ensure the continuous activity of the municipality [2-4].

- 2) communication and information system with integrated elements of IoT, focused on internal tasks to improve the well-being and comfort of individuals living in the territory of the municipality [5, 6];

- 3) a structured system focused on optimizing resource allocation management to improve the quality of life of the population (considering blockchain and big data technologies [7-9].

Studying the available definitions, the authors concluded that the “smart city” is a system of administration of social and economic processes occurring in separate territorial

formations. The key objective of those in the context of multitasking should be the goal associated with increasing the efficiency and comfort of organizing processes of life of individuals and legal entities by achieving synergy effect through the association of engineering, information and communication, social and business infrastructures into a single intelligence unit.

In order to reveal basic problems which are typical for “smart city” system it is necessary first of all to consider main tasks assigned to “smart city” system. Among such tasks the following are allocated:

1) the task of optimizing the timing of management decisions based on relevant and current information about the state of both the entire infrastructure and its individual elements;

2) the task of availability of primary social and economic services, ensuring the availability of vital services (including the implementation of economic transactions);

3) the task of operating large arrays of data, providing the availability of basic services;

4) the task of integrating the artificial intelligence system in order to simplify the process of finding the necessary information, orienting to the consumption of the demanded service.

Analyzing the possibility of creating a “smart city” in the Khabarovsk Territory, the only economically feasible project from the investment point of view can be the creation of a “smart city Khabarovsk”, which is due to the fact that the municipality is the largest formation in the Far East and Khabarovsk Territory in particular, with a population of 617.4 thousand people at the end of 2021 and an area of 389 sq. km. Assessing the problems of creating a “smart city Khabarovsk”, it is necessary to note the presence of common problems [3, 4], typical of any investment project of this type regardless of the geographical location of the subject, among which the following can be identified:

1) the lack of uniform approaches to the financing of innovative smart projects, which is explained by the long-term nature of their implementation, high dependence on the availability of technology and the high volatility of their cost;

2) presence of destructive influence of the state and municipal apparatus, which slows down the process of informatization of urban systems due to the legislative and corruptive components;

3) unbalanced state technological policy, allowing simplified construction of communication relations between the main participants of innovation projects (due to which an interested concessionary cannot find a timely reliable response to its desire to invest in the implementation of “smart projects”);

4) the presence of a de-integration component of the cities’ development. Taking into account the application of “smart technologies”. It is determined by the lack of coherence of urban development projects with the current projects of “smart technologies” application;

5) shortage of specialists, able to practically implement possible projects on construction of “smart cities”.

In addition to the general problems characteristic of each innovative project to create “smart cities” for the Khabarovsk Territory (the project to create a “smart city Khabarovsk”), there are specific problems, among which the following may be distinguished:

1) low population density in the Far East, which was 1.15 people per 1 sq. km as of 2021, which under the conditions of the implementation of the “smart project” can form the problem of economic efficiency of implementation, and the problem of structural concentration of the Khabarovsk Territory population, relative to the created “comfort center”;

2) economic disproportion of the cost of resources required for the implementation of innovative “smart city” project, which in relation to the Khabarovsk Territory remote from the largest European logistics centers forms an excessive pricing, reaching 75% of the prime rate, which actually forms the higher costs for the implementation of innovative projects using IT-technologies;

3) the presence of significant disparities in the development of information, economic and transport communications in comparison with the European part of the country, which requires additional investments in the modernization and development of existing communication (information) systems prior to implementing the “smart city” project (to ensure equal starting conditions for the innovative project).

Evaluating the possibility of implementing the “smart city Khabarovsk” project let the authors analyze the possible risks [10] of the project implementation in the territory of Khabarovsk city municipal formation (table 1), based on the assumption that if the innovative technological project is implemented then there will be the following classification system of risks:

- 1) the risk of insufficient funding;
- 2) the risk of infrastructure readiness;
- 3) the risk of illegal influence;
- 4) the risk of technological base unavailability;
- 5) the risk decline in social and economic activity of the population.

Table 1. Assessment of the possibility of implementing the “smart city Khabarovsk” project (compiled by the authors)

Risk	Risk content	Possibility of realization in the territory of the project’s implementation
Risk of insufficient funding	Lack of possibility to finance all stages of “smart city” project realization that will require adjustment of terms of its realization and technological filling	Probability of risk realization can be assessed as high, which can be explained by a significant budget deficit of Khabarovsk city district in 2022 of 131 290 thousand rubles [11], and the Khabarovsk Territory budget deficit of 11 963 842.53 thousand rubles [12] (with public debt of 51 093 012 thousand rubles in Khabarovsk Territory). It should be noted that it is possible to minimize the probability of realization of this group of risks by attracting private concessionaires (from Asian region in particular), as well as combining federal projects into a single network (for example, the construction project of the campus with the “city” system).
Risk of infrastructure readiness	Absence of possibility to integrate innovative elements of “smart city” system due to dilapidation (technological	Probability of risk realization can be assessed as high, which can be explained by difficult climatic and geographical conditions, the distance

	backwardness) of the existing city infrastructure	between major settlements, as well as the systematic deficit of municipal budgets [13], which causes high wear of the current infrastructure with low rates of its restoration. In order to minimize the probability of risk realization it is possible to propose a segmented implementation of the “smart city” project.
Risk of illegal influence	The impact of illegal elements on the “smart city” system in order to steal personal data, as well as the violation of its operation.	Risk realization probability can be assessed as moderate, which can be explained by an 8% decrease in cybercrime in Russia in 2021-2022. To minimize the risk, projects to improve financial and computer literacy in Khabarovsk and Khabarovsk Territory could be proposed.
Risk of technological base unavailability	Inaccessibility of information and technological environment of “smart city” due to significant differentiation of incomes of the population.	Probability of this risk can be assessed as moderate, due to a 12.7% increase in average per capita income in 2022 compared with 2021, which means that 70% of Khabarovsk’s population will have access to basic technologies. To increase accessibility of technologies it is possible to implement state programs of technological provision of socially vulnerable categories of citizens.
Risk of decline in in social and economic activity of the population	Decrease of cultural and economic education (activity) of citizens due to the shift of aspects of interpersonal communication to the virtual sphere.	Probability of risk realization can be estimated as low, which is due to the high social and economic activity of the population of the city of Khabarovsk and Khabarovsk Territory focused on the formation of real interpersonal communication [14]. Risk minimization is possible by setting restrictions on certain types of services.

Based on the analysis, the authors conclude that the possibility of implementing a full-fledged multifunctional “smart city Khabarovsk” project should be assessed as “low”, while the integration of individual elements of the management system as “moderate”, which can be explained by the fact that there is no possibility to finance all preparatory and design activities. So, for example, the typical model of creation of “smart city of Rybinsk” that is situated in infrastructurally developed European part of the country with population of 197.4 thousand people (3.13 times less than Khabarovsk population) and area of 101.4

sq. km (3.8 times less than Khabarovsk population) requires funding of not less than 3.5 billion rubles. When estimating the cost of a similar project for the “smart city of Khabarovsk” it is necessary to note the potential need for budget investment of at least 17.85 billion rubles, not including costs associated with the preparatory infrastructural activities.

Assessing the growth rates of budget investments in Khabarovsk for 2016-2021, it should be noted the lag in the growth rate of budget investments from the changes of the total amount of the city district budget expenditures, which led to a decrease in their share from 12.6% in 2016 to 10.9% in 2021. In author’s opinion, this trend is characteristic of most local budgets, which is explained by the high dependence of municipalities on inter-budget transfers from the higher budget.

At the same time, a comparative analysis of changes in social and economic development and the activity of various Russian Federation territories in the sphere of budget investment has revealed that more municipalities have worsened their socio-economic situation in regions with a lower growth rate of budget investment, which led to a decrease in their rates of social and economic development (Table 2).

Table 2. Indicators of variation of Russian Federation constituent entities by the share of capital investments in GRP (compiled by the authors)

Indicator	Number of Russian Federation constituent entities				
	<0	0 – 9.99%	10 – 19.99%	20 – 29.99%	>30%
Average chain growth rate of budget investments					
Change in the rate of economic development					
Increase	5	9	9	7	8
No change	1	3	1	2	0
Decrease	7	15	9	7	1

Such a pattern suggests that active investment in the creation of engineering, industrial and social infrastructure facilities forms an impetus to economic growth. Studying the composition of the territories that provided the highest growth rates of budget investments and demonstrated a marked improvement in the socio-economic situation, the authors conclude on the fairness of the thesis about the positive impact of budget capital investments for municipalities with different levels of development.

However, the low level of budgetary potential of municipalities does not provide an opportunity to implement investment projects only at the expense of local budgets. This indicates the inertia of investment processes in the regions, their predetermination by the decisions taken at the federal level. Radical change in the current system is possible only in conditions of a comprehensive reform of not only the mechanism of budgetary regulation, but also approaches to the implementation of the policy of spatial development in general.

Therefore, in case of increasing the share of budget investments in the budget of Khabarovsk and attracting resources of federal and territory budgets (under the possibility of concession agreement) for creation of “smart city” system the economy of Khabarovsk can feel the following effects:

- 1) reduction of energy consumption by 50-55%, which will provide savings of up to 10 million rubles in annual terms for all subjects of the “smart city”;
- 2) increase in the speed of passenger traffic up to 38% and in the passenger flow itself up to 20%, which will increase the replenishment of the city’s budget up to 28 million rubles in annual terms;
- 3) increase of the municipal budget revenues through the systematic collection of fines up to 30%, or 35 million rubles;

4) formation of commission receipts for the use of “smart city” services to the amount of up to 5 million rubles in annual terms.

Budget investments are one of the tools for financial implementation of the “smart city” system. The increase in investment expenditures for these purposes, including the involvement of inter-budgetary transfers from the federal and regional budgets, is considered one of the conditions for overcoming the disproportions of territorial development by the authors.

4 Discussion

During the analysis it has been established that on the territory of Khabarovsk region, namely, the Khabarovsk city district municipality, the “smart city” project implementation at the current stage of economic and technological development is not possible. However, not agreeing with the opinion of some authors who consider that the system of “smart city” should cover all spheres of life of the municipality, it is necessary to note the possibility of using assumptions in the formation of territorial concepts of development of “smart cities.” They provide for the creation of a system to administer individual socio-economic processes carried out in relation to the available types of services on the territory of a particular municipality, considering current external and internal environment conditions. It makes it possible to narrow down the realization of the “smart city” concept to the process of innovative administration of specific operations which significantly simplify the process of life activity in a specific territory.

5 Conclusion

The problem of territorial development in a continuous process of digitalization of the internal and external environment is one of the pressing problems of the modern economy. Ignoring the emerging trend of development using innovative approaches forms negative economic and social consequences that affect the development of both the economy and society. It reduces the quality and comfort of life of the population of the country, forms imbalances in its demographic distribution and concentration, which, in conditions of imbalance forms catastrophic gaps in the living standards of the federal center and regions. In these conditions, the most significant, in authors’ opinion, is the positive impact of budget investments in the creation of the “smart city” system on the socio-economic situation of territories.

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