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THE ALGORITHM OF STRUCTURING A LARGE INFRASTRUCTURE PROJECT IN THE FORM OF PUBLIC-PRIVATE PARTNERSHIP

Abstract. The Public-Private Partnership (PPP) is one of the most crucial tools for modernisation development of the state management system, a new concept of cooperation between the state and business. Therefore, it is highly significant to develop the scientific approaches to structural arrangement of infrastructure projects in the form of PPP. The first step towards this is the construction of algorithm of this process, which has been made in this paper.

The state is actively participating in the realisation of large infrastructure projects. A new legislative base, which regulates the priority of the infrastructure, is being formed. With the realisation of the planned projects, only a range of transport accessibility problems is solved. Whereas, the issues of development of transit potential of the country, the increase of transport accessibility of various regions, bolstering the mobility of population, etc. remain open.

An ambitious task to create an alternative transport "arteriole" through the Russian Federation territory may be solved by means of the Russian elaborations of the innovative transport technology on the basis of magnetic levitation.

In order to justify the feasibility of such a large project in the form of PPP, the structuring algorithm has been developed, which enables assessing the project at all viewpoints, starting from the moment of the idea of its realisation to the point of its operation, to determine the time costs, and other constituents of the process influencing the project.

The elaboration is based on a dialectical approach to the study of the innovative development, the application of scientific methods of the analysis and synthesis, classification, expert's assessments, mathematical statistics, the geographical image of the data, which enable ensuring the reliability of the results and the validity of conclusions.

Creating instruments for structuring aims at exploring and expanding mechanisms of cooperation between the state and private business within PPP.

Keywords: algorithm, project structuring, public-private partnership (PPP), concession, transport.

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АЛГОРИТМ СТРУКТУРИРОВАНИЯ КРУПНОГО ИНФРАСТРУКТУРНОГО ПРОЕКТА В ФОРМЕ ГОСУДАРСТВЕННО-ЧАСТНОГО ПАРТНЕРСТВА

Аннотация. Научно-техническое развитие не только повышает комплексную безопасность и устойчивость транспортной системы, но и способно обеспечить решение социально-экономических и оборонных задач Российской Федерации. В статье рассматривается реализация крупного инфраструктурного проекта транзитных транспортных коридоров на основе магнитолевитационной технологии с применением механизмов государственно-частного партнерства (ГЧП). Данная форма взаимоотношений государства и бизнеса не имеет широкого применения в России, поэтому разработка научных подходов к структурированию такого проекта весьма актуальна. Для обоснования эффективности проекта в форме ГЧП автор с помощью законодательных и нормативных документов в области строительства, ГЧП, регулирования государственной политики разработал алгоритм структурирования. Примененные научные методы анализа и синтеза, классификации, экспертных оценок, математической статистики, графического изображения данных позволили обеспечить достоверность и обоснованность выводов.

Ключевые слова: алгоритм, структурирование, проект, государственно-частное партнерство, концессия, транспорт.

Introduction

Public–private partnership in Russia originated in 1980s with privatisation. In 1990s, the commercial use of state-owned property was revived through conversion in to joint-stock companies and later through renting. The 2005 adoption of Federal Law on Concession Agreements (№ 115-FZ of July 21st, 2005) [1] is determined by objective necessity.

Every project under PPP is aimed at liquidating infrastructure gaps, solving tasks of public interest, such as transport, power engineering, social sphere, etc. As a rule, the project consists in construction, reconstruction, technical maintenance and operation of infrastructural facilities by a private investor who fully or partially construction/reconstruction of a facility by virtue of their own or attracted funds. The balance between the own and attracted funds

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is not fixed by any normative acts, and in most cases, it is the finances attracted from financing organisations to prevail in the projects.

The PPP projects cover long-term relations, allocation of risks and responsibilities between the partners.

The public partner (a state body) can partially finance the construction/reconstruction of the facility and fully finance technical maintenance and operation of it.

Allowing for complication and cost intensity of the construction/reconstruction of infrastructure facilities, PPP mechanisms are optimal tool which makes it possible to launch and realise projects.

Setting the Task

The rise of investments in transport, power, social and communal infrastructure by 6−10 % annually can bolster Russia's economy within the next 5−7 years. The analysis of infrastructure budget for the last 5 years showed their dropping tendency approximately by 10 % annually. At the same time, the share of private investments in the development of infrastructure does not even reach 3 % of all the finances [2].

The potential for cooperation between the state and the private sector is immense, and yet, despite colossal reserves, it is hardly used. Over the course of 5−6 years, owing to governmental bodies, financial organisations, business community, the situation began changing drastically. This became also possible owing to active development and application of PPP mechanisms.

It is necessary to popularise and promote PPP tools. One of the options of scientific support of these processes is the development of an algorithm that would specify all phases of structural arrangement of the project.

Apart from modernisation and infrastructure development, the application of PPP mechanisms in Russia can increase efficiency of government-owned property management and growth of income from the government-owned assets. In addition, an obvious advantage of PPP over privatisation policy is the possibility for the state to retain the property right for these facilities.

PPP is one of the most crucial instruments of modernisation development of the state management system, being a new concept of relations between state and business. Therefore, it is highly important to develop the scientific approaches to structural arrangement of infrastructure projects in the form of PPP. The first step towards this is the construction of the algorithm of this process, which has been made in this paper.

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Assumptions

Employing the mechanisms of PPP, the state in the conditions of budget deficit acquires the possibility to realise a project without increasing the debt ratio, reduce expenditures for pre-project planning at the expense of private initiative tools, and attract new competencies during the construction/reconstruction, operation and technical maintenance.

The private partner is given a guarantee that their investments should be returned, which is very important especially in volatile macroeconomic conditions.

Possible forms of realisation of the infrastructure project are given in the fig. 1 [3].

Unlike governmental procurement, when all expenditures for preparation works, construction/reconstruction and operation are fully covered by the budget, in PPP projects the expenditure commitments are distributed in time: the expenditures for preparation activities are distributed among the parties, a significant part of expenditures for construction/reconstruction is born by the private party, the increase of strain on budget takes place only at the stage of operation. As a rule, the budget saving at the stage of construction/reconstruction of an object is higher in total, than overpayment at the stage operation.

The state is actively participating in the realisation of large infrastructure projects. To coordinate this work, on October 15th, 2016, the Government of the Russian Federation issued the Decree № 1050 "Of the Organisation of Project Activities in the Government of the Russian Federation" [4].

By the Order of the Government of the Russian Federation № 793-r of April 26th, 2017 [5], the amendments were adopted, which are subject to inclusion in the List of Large Projects with the government involvement (hereinafter referred to as the List), including the infrastructure projects, which are financed within the Federal Target Programme and by the Russian National Wealth Fund finances, which are subject to monitoring. The List was approved by the Order of the Government of the Russian Federation № 449-r of March 18th, 2016 [6]. According to the amendments, the List encompasses 71 projects, among which there are:

- roads – 24;
- railway transport facilities – 6;
- water transport facilities – 7;
- air transport facilities– 6;
- bridges – 2;
- power engineering – 5;
- medicine – 6;
- science – 3;
- stadiums – 7;
- other items – 5.

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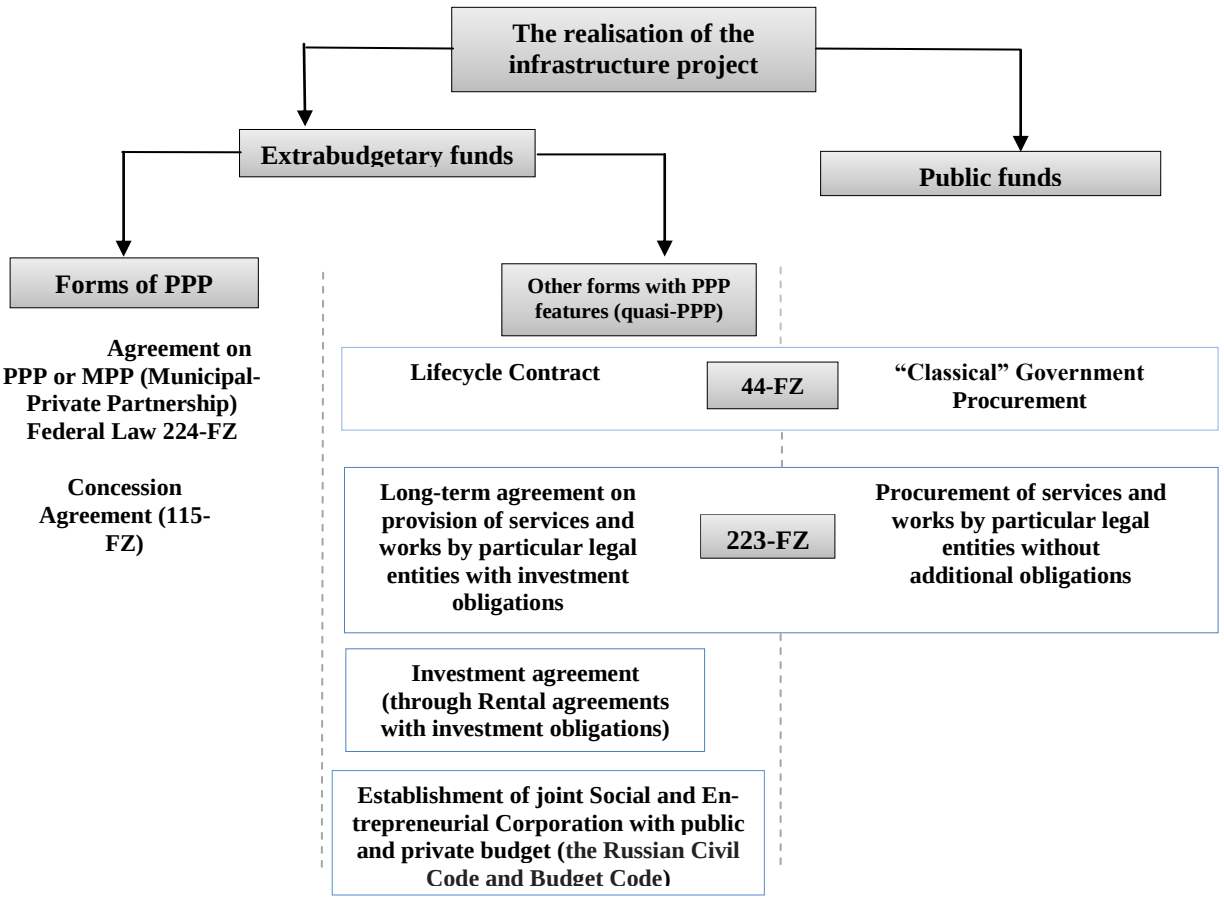

Fig. 1. Possible forms of realisation of the infrastructure project

Forty-five projects on the List relate to the construction of the transport infrastructure objects.

The infrastructure operators at their levels also take efficient steps. For instance, in 2017 the amount of JSC "RZD" investment programme made almost 500 billion rubles [7]. The realisation of the large projects has been prioritised. Among these projects, there are the modernisation and development of the railway infrastructure of the Eastern Polygon, the development of the Moscow transport system, the reconstruction of the section Mezhdurechensk – Taishet, the development and upgrade of the railway infrastructure on the approaches to the Azov and Black basin seaports, etc. [8].

Despite significant efforts of the transport branch to upgrade and strengthen the infrastructure, there is a huge number of bottlenecks, the elimination of which requires cutting-edge technologies and justified forms of the realisation of the projects with the governmental involvement, whose official representatives are eager to develop and drive forward the realisation of the infrastructure projects in terms of long-term partnership [9].

With the realisation of the planned projects, only a range of transport accessibility problems is solved. Whereas, the issues of development of transit potential of the country, the increase of transport accessibility of various regions, bolstering the mobility of population, etc. remain open.

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Magnetic Levitation-based Transport Systems for Intercontinental Transportation

In political, engineering and business circles, an opinion on the necessity of creation of inter-country and intercontinental transit transport corridors (TTC) in the territory of Russia, in the directions of East−West and North-South has been established.

This opinion stands on the results of the processes of the world economy globalisation, which are followed by the circulation of capitals, materials and human resources. The centres of production are rapidly developing in Asia and Southeast Asia – China, India, Indonesia, Malaysia, and Thailand. Hence, the role of transport connections is rapidly growing which are to ensure uninterrupted and timely delivery of raw materials and production to various areas of the world [10].

The Russian Federation is a natural bridge between the East and the West, the North and the South (fig. 2). The Asia-Pacific countries transport approximately 50 millions of tonnes of consumer goods to the EU. If part of this freight traffic is serviced by the Russian transport system, it may become a potential export product for the country. A similar situation is observed with the European countries, the Middle East and North Africa. The existing transport system cannot service even a small share of this product [11]. The transportation by the Trans-Siberian Railway makes only 1 % of the turnover between Asia and Europe [12]. The main advantage of the transportation from China to Europe by railway over sea transport is the speed. However, the commercial speed of train traffic on our railway mainlines is about 16 km/h, which is far lower than that in the USA, Europe and China. Taking this into account, the Chinese Government have approved the New Eurasian Land Bridge for carrying goods bypassing Russia. On January 15th, 2016 the first trial train Ukraine−Georgia− Azerbaijan− Kazakhstan−China departed from the port of Illichivsk (Odessa) [13].

The Transport Strategy of the Russian Federation up to 2030 does not tackle this challenge of time. In the current situation, the following strategic goals of the outrunning model of the development of transport may be formulated:

- to create the East−West and the North−South TTCs, which would by manifold exceed the existing mainlines by virtue of a cutting-edge transport technology;
- to make the private capital the basis for financing the outrunning model of the development model.

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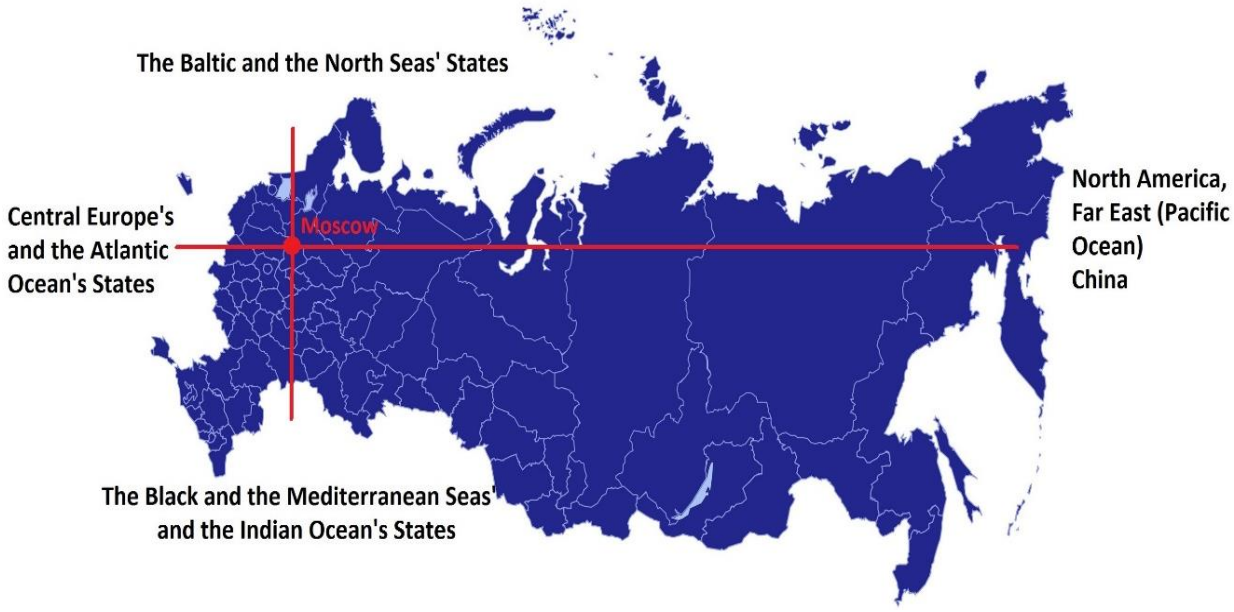

Fig. 2. Maglev transport technology-based TTC in the territory of the Russian Federation

In order to apply the existing legislation to the infrastructure projects within this study, the project of creation of the East−West TTC (hereinafter referred to as the Project) with the application of maglev technology has been considered.

To justify the feasibility of the realisation of such a large Project under PPP, its algorithm of structuring has been developed (fig. 3).

When developing the algorithm, the legislative and normative documents in the field of construction, PPP, and state policy regulation have been used.

The elaboration is based on a dialectical approach to the study of the innovative development, the application of scientific methods of the analysis and synthesis, classification, expert's assessments, mathematical statistics, the geographical image of the data, which enable ensuring the reliability of the results and the validity of conclusions.

The developed enlarged algorithm enables us to consider the Project at all viewpoints, starting from the moment of the idea of its realisation to the point of its operation, to determine the time costs, and other constituents of the process influencing the Project.

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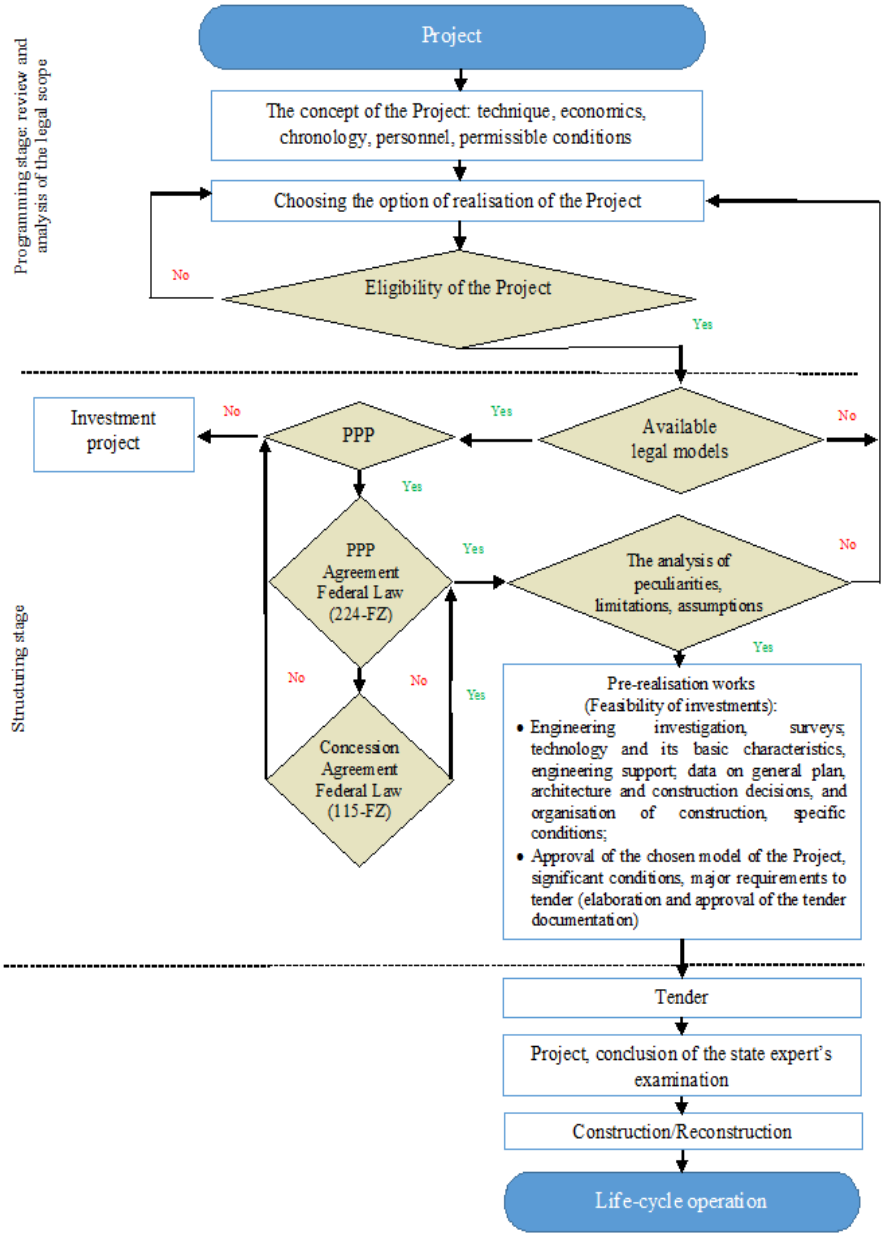

Fig. 3. The algorithm of structuring a large infrastructure project in the form of PPP

The test application of the algorithm to the East−West TTC enabled us to obtain the following results.

The work relating to the creation of the Concept of the Project will take 18 months, provided that an official request is obtained, in order to work out a national scale transport Project, with the interests of the state taken into account. Based on the conclusions of the Concept, a choice will be made to determine the way the Project will be realised. This stage will take approximately 3 months, considering the scope of the Project.

The review and analysis of the legal framework that were conducted enable us to determine the validity of the Project itself and to move on to the legal model of the Project. The PPP form possesses significant advantages over an investment

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project, since the allocation of a land for a linear object is carried out without its being bought by a private partner. Among the available forms of PPP, the concession agreement will be the advantageous. Acting on the basis of concession, the state represented by a large number of regional administrations, in the territory of which the construction of TTC is intended, will entitle the concessionaire to utilise the land to implement new transport technologies. The private partner bears the expense that relate to fulfillment of the obligations within the concession agreement – the creation of TTC with the application of innovative technologies which have been developed by the Russian scientists and specialists.

After working out all peculiarities, limitations and assumptions, the feasibility of investments is carried out. This stage should be carried out in parallel with the development of the legal model of the Project, right after the option of the realisation was chosen. The approximate duration of the stage is two years. Simultaneously with it, the certification of the elements of the system and elaboration of the normative base are conducted.

The stage of tender when dealing with a national scale project may be omitted, as the Project aims at the realisation of the priority vectors of a strategic development of the Russian Federation.

During the course of the next three years, the design will be done in parallel with the development of the initial permissive documentation, then the government experts' review (six months), and the construction (7.5 years).

The ready sections are put into the operation stage by stage, which enables us to start developing the near-by territories and the accompanying infrastructure before the launch of TTC.

The enlarged schedule of the realisation of the Project is given in the fig. 4.

The relevance of this approach is justified by the necessity of applying the accepted succession of actions in design and construction of the objects to the legal norms, with the established practice of the application of PPP mechanisms taken into account.

It is obligatory to develop approaches to structuring and assessing the projects of PPP, considering the best international practices.

The assessment should be made both at the stage of design (programming), with the aim to determine the priority projects and at the possibilities to use them by virtue of PPP mechanisms, and at the stage of structuring the specific project, with the aim to determine and justify the best possible conditions for its realisation.

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Stages of the project	Terms in months														
	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180
The development of the concept of the Project															
Approval of the model of the Project															
Justification of the investments															
Project															
The initial permissive documentation															
The government experts' review															
Certification of the elements of the system															
Construction															
The elaboration of vendor documentation															

Fig. 4. The schedule of the realisation of the Project of the East−West TTC

Undertaking assessments is especially important for large and medium projects, as well as for the projects with direct public financing, full or partial reimbursement of the investor's expenditures at the expense of the budget (projects with availability payments, and minimum revenue guarantee).

At each stage of the assessment (the programming stage and the structuring stage) the similar criteria should be used for assessment of the infrastructure projects:

- social and economic efficiency (at the programming stage – the qualitative assessment and the enlarged quantitative calculation, at the structuring stage – a more detailed quantitative calculation) for the assessment of the feasibility of the project realisation;
- qualitative (expert) criteria of the comparative advantage in order to choose the form of the realisation of the infrastructure project, and to assess the possibility of the application of PPP mechanisms;
- quantitative (calculation) criteria of the comparative advantage in order to determine justification (relevance) of the application PPP mechanism.

The results of the assessment are the integral part of the documents for approval and confirmation of the decision to make up the agreement (the realisation of the project) in the form of PPP [14].

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Conclusion

The large infrastructure projects, especially the transport ones, should be given special attention by the government, as the state of the transport system directly influences the ecological, scientific and technical, economic and military elements of the national security of the state. The technological breakthrough in the development of the Russian Federation's transport system is capable of realising social and economic as well as defense priorities, and significantly increase the transport security level of the state.

The development of the maglev transport technology, as a crucial stage of the transport development, encourages drastic improvement of the technical and economic characteristics of the transport system of our country [15]. The tested Russian elaborations of the innovative transport technology based upon magnetic levitation are capable of solving an ambitious task to create an alternative transport "arteriole" through the Russian Federation territory.

Creating instruments for structuring aims at exploring and expanding mechanisms of cooperation between the state and private capital within PPP.

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