Financing the construction of transport infrastructure as the basis for sustainable development of the regional economy

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Abstract. Dependence of the regional economic development from efficiency of financing of the construction of transport infrastructure is analyzed and proved in this article. Effective mechanism for infrastructure projects financing, public and private partnership, is revealed and its concrete forms are formulated. Here is proposed an optimal scenario for financing for the transport infrastructure, which can lead to positive transformations in the economy. Paper considers the advantages and risks of public and private partnership for subjects of contractual relations. At that, components for the assessment of economic effect of the implementation of infrastructure projects were proposed simultaneously with formulation of conditions for minimization risks. Results of the research could be used for solution of persistent problems in the development of transport infrastructure, issues of financial assurance of construction of infrastructure projects at the regional level.

1. Introduction

Development of the qualitative transport infrastructure is one of the main conditions for ensuring the economic growth of the regional economy, increase of the competitiveness, efficiency and optimization of costs of the real sector of economy and growth of the quality of life of the population. Increase of investments in transport infrastructure is a proven and reliable way to stimulate economic growth. In the short term, an increase in the amount of investments in construction of transport infrastructure creates new workplaces. In the medium term it stimulates economic growth, and in the long term it reduces transport costs of enterprises and improves the quality of life of the population of the region. Besides, qualitative transport infrastructure increases the mobility of the population, which is able to move more actively between city sectors and regions, including between jobs. It improves the structure of the labor market, leads to the general increase in the incomes of the population and ultimately stimulates consumption, which is one of the main factors of economic growth. Unfortunately, current condition of the transport infrastructure in most regions does not allow to reduce the specific transaction and transport costs of business organizations and to activate the “clusterization” of economy [1-3]. That's why pressing task is to find new sources of financing for the construction of transport infrastructure. Considering that design, construction and expansion of large infrastructure projects take years, decisions on funding mechanisms must be taken as soon as possible.

Strengthening the processes of globalization and increasing of the transit role of individual regions in Russia assumes the integration of transport system of regions of the country in the international legal mechanisms and the world practice of management by the transportation process. In general, in terms of indicators of the length, density and quality of transport infrastructure, Russia essentially lags from
the world standards. However, it is precisely that this circumstance raises confidence in large capacity of the regional market for financing for the transport sector. According to the information of the Federal Road Agency, one of the incentives to increase the construction and modernization of the Russian transport infrastructure is the growth of the motor transport mobility of the population and the growth of the cargo turnover between regions. That's why for successful integration into the world transport infrastructure, it is necessary to create a stable financing system which considers the specifics of transport as an infrastructure sphere at the regional level.

2. Materials and Methods

Historically, the development of transport infrastructure falls on the shoulders of the state. This is due to the fact that, firstly, a significant part of the infrastructure performs a social function and does not assumes income generation, so these projects have no interest for the private investors. Secondly, due to the high capital intensity of many infrastructural facilities, they are not able to bring that level of profitability that the private investor will be interested in, so state takes their realization on. AT that, enlargement of the budgetary expenditures on infrastructure is limited in many countries in the next few years, as the high leverage and budgetary deficit of the most countries force them to reduce infrastructure costs [4].

Nowadays, government of the Russian Federation is still actively investing financial resources in the development of transport infrastructure. Funds which were allocated for the construction of highways from the federal budget are received in the regions in the format of transfers. However, it is obvious that deviation between planned and actual investments increases every year. At that, it is absolutely unacceptable to reduce the financing of construction and modernization of transport infrastructure, especially in regions that critically need it.

It is obviously that financing processes should be based not only on budget opportunities, but on the various forms of public and private partnership. It makes sense to turn to world experience in this area for creation of the associations of investors who able to finance capital-intensive construction procedures. Extra-budgetary financing of infrastructure projects in developed countries is performed by a group of private and institutional investors who invest either in paid-in capital as participation in financing, or provide loan financing through redemption of bonds, investments in fonds with corresponding investment declaration or lending projects directly. At investment into the infrastructure projects, every group of investors has their own goals and objectives, as well as the restrictions prescribed in the investment declaration [5].

Balanced development of the economy of the Russian Federation and its separate spheres is inextricably linked with the choice of forms of financing for strategically and socially significant projects. It is quite clear that such a method can not be the only source of financing, in contrast, it must be some multi-channel complex of special financial instruments, one of the key blocks of which should be the public and private partnership.

Analysis of the world experience in the field of interaction between the state and commercial structures allows to assert that financing within public and private partnership differs depending on the sequence of stages of the realization of the agreement on the construction, commissioning and usage of transport infrastructure facilities. Author outlines the following financing methods:

1) BOT (Build - Operate - Transfer). This method describes the stages of creation and transfer of rights for the object. First two phases are performed by private investors, and after a contract period, the infrastructure object is transferred to the state. Terms of use of the object by private investors can be prolonged in cases when there is such a need, for example, if the profitability of the object was below the predicted in the specified period. Application of this format of financing is possible with the construction of paid high-speed vehicle roads, pipelines, tunnels and airports. Such projects require a significant amounts of investments, but in principle they can not be transferred to private corporate structures;

2) BTO (Build - Transfer - Operate). This method provides a different sequence of work: after creation of the object, it is transferred to the ownership of the customer, the state. After this private
corporate sector receives the right on operation by the created infrastructure facility. This format is mainly used in the cases when the interests of the state consist in maintenance of the control in relation to the infrastructure facility and prevention of the establishment of other conditions for its use;

3) BOO (Build - Own - Operate). This method assumes that private investor builds an infrastructure facility, and then gets the opportunity for registration of ownership with the right to rule it on the certain conditions. Obviously, this funding format is based on the unlimited period of relations between parties, so it is very attractive for private investors;

4) BOOT (Build - Own - Operate - Transfer). This method allows to establish the following sequence of rights of private investor in relation to the infrastructure facility: at the end of the construction phase, they are vested with the rights of ownership and management of the object, but after the expiration of the period established by the contract, the object is transferred to the state;

BBO (Buy - Build - Operate). At usage of this method on the first stage of work there occurs an acquisition of the object if the object exists, but it needs reconstruction, restoration, expansion or modernization. Otherwise, investor secures rights for the object, which is supposed to be created. At the following stages, construction, reconstruction or modernization are performed with subsequent rights to manage the facility. This format of co-financing of capital-intensive projects provides much more extensive rights for private corporate structures which act as investors.

3. Results
Author proposes to consider listed financing formats as the basis for the formation of adapted mechanisms of public and private cooperation in construction and modernization of transport infrastructure in regions and in the country. But, in our opinion, the most appropriate format for financing for the Russian Federation within public and private partnership must become a BOOT method which provides the conclusion of an agreement between the state and a private investor who provides financing, construction and operation of the facility. In this case, ownership of the object of transport infrastructure belongs to the state and the private investor receives right to own and use the object within the time period stipulated in the contract.

Undoubtedly, usage of the new organizational and financial mechanism which is based on partnership between the state and private investors makes it possible to identify a number of advantages for sustainable development of the regional economy [6]:

- attraction of the non-governmental financing for investments in objects of state significance;
- reducing of governmental expenses for maintenance and operation of transport infrastructure facilities including municipal;
- provision of cost-effective management of project realization through the transfer of management functions to a private investor;
- improvement of the business and investment climate of the region.

On the basis of abovementioned, author developed entirely new instrument of financing for infrastructure projects of the region in the framework of public and private partnership conformably to the Russian Federation, which is realized through the issuance of revenue-yielding bonds. This instrument is the infrastructure financing. Author presented the mechanism of financing for infrastructure projects with the help of revenue-yielding bonds in the diagram below (figure. 1).
Figure 1. Financing mechanism for infrastructure projects of the region of the Russian Federation with the help of revenue-yielding bonds

Subject of the Russian Federation establishes specific project organization which issues revenue-yielding bonds. Guarantees are issued with the interest of cushioning of risks for potential investors on emitted securities. Vneshekonombank, the Investment Fund of the Russian Federation or the region, the International Bank for Reconstruction and Development and the European Bank for Reconstruction and Development can become guarantors on this. Except of guarantees, completion of obligations certified by the revenue-yielding bonds can be provided the pledge of the further requirements, which consist of expected incomes or cash receipts from the infrastructural facility exploitation. Specialized organization develops engineering documentation, buys constructional materials, payment for services for design and construction in the process of creation of infrastructural facility, manages the revenue received and accounts for settlement of obligations on the funds received during the placement of revenue-yielding bonds purchased by qualified investors.

Source of repayment of revenue-yielding bonds and time of the project transfer of the ownership of the subject of the Russian Federation in accordance with the proposed scheme will differ depending on the infrastructural facility:

1) all the revenue items of the regional budget or specific receipts from the transport tax will provide the repayment if project doesn't bring any income. In this case Construction and manufacturing group gives the complete infrastructural facility in the property of the subject of the Russian Federation upon completion of the construction;

2) if infrastructural object generates the money flow than nominal value and coupon yield will be repaid through variable fare, transport fees and other things, and the transfer of the ownership to the subject of the Russian Federation will be performed upon the expiration of the payback period;

3) project which provides the repayment of the nominal value of the revenue-yielding bonds and coupon yield through mixed financing will be transferred of the ownership to the subject of the Russian Federation due to the project agreement.

In the author's opinion, availability of raising funds from a large number of investors with relatively low costs makes revenue-yielding bonds one of the most perspective forms of the private financing of transport infrastructure. But, unfortunately, lack of experience and shortcomings in order and
mechanism of sovereign guarantee provision on it prevents the implementation of the new instrument of financing in the form of revenue-yielding bonds.

4. Discussion

But some features of realization of projects of the construction of transport infrastructure facilities, in particular the long terms of their realization necessitated the development of approaches to the process of assessment of the efficiency of joint projects of state and corporate business communities [7].

The most difficult task in the basis of the assessment of efficiency of investments in construction of transport infrastructure is the absence of sufficient regulatory and methodological support for conceptual foresight of the consequences of investment. Development of transport infrastructure is considered as a part of complex processes of economic development of the regions, inter-industry exchange, reproduction of consumed resources. Presence of information on predictable traffic flows on newly introduced transport infrastructure does not allow to perform a full assessment of realization of investment project. On the author's opinion, only analysis of long-term trends in socio-economic development makes it possible to give the most reliable forecast of realization of investment infrastructure projects. Transport infrastructure projects are large-scaled and have a significant impact on socio-economic, environmental, manufacturing and other systems of the region, that generates the occurrence of both positive and negative effects.

Analysis of the assessment of efficiency of realization of infrastructure projects is built primarily on the economic impact assessment [8]. This economic effect consists of many components, namely:

- reduction of transport costs in the cost structure of goods, works or services, obtained at the expense of reduce of the distance of transportation, improvement of objects of infrastructure, optimization of the traffic conditions, etc.;
- reduction of material losses through the reduction of the time of transportation of pay loads, increase of traffic safety;
- redistribution of freight turnover and passenger turnover between different types of transport and routes;
- strengthening of competition for various modes of transport.

Economic impact of the project realization can be calculated with comparison of the total social costs in existing conditions in comparison with the design conditions. Together with economic efficiency, it is also necessary to consider the possibility of the social effect of the project, which can be expressed in reduction of time losses at the transportation of passengers, redistribution of incomes between territories of the region, creation of the workplaces for the time of construction and during the operation of the transport infrastructure facility. It should be noted that it is difficult to assess social effects from the construction of transport infrastructure facilities because these criteria are difficult to quantitative and monetary estimates. Detailed quantitative and substantial analysis, confirmed by the statistical data is necessary for assessment of such an effects. External economic criteria for the effectiveness of projects often have a higher priority preliminary to investment profitability at financing of the transport infrastructure facilities, because infrastructure projects are often implemented for the achievement of social efficiency [9, 10].

It is necessary to fulfill the following conditions for minimization of risks at the realization of infrastructure projects and assessment of the efficiency of partnerships between the state and business structures:

- participation in the project of private investor is intended to ensure the improvement of the quality of services provided in comparison with the independent realization of the project by state authorities or by the region;
- with the participation of private investor, time for the project realization should be reduced;
- local residents and users approve the attraction of private capital;
- competition among potential private investors;
- on the state and regional legislative level there is no prohibition for the attraction of private business in this sphere or in the realization of the particular project;
- project results are measurable, and the costs are paid completely;
- project itself or works on it activate innovative processes;
presence of positive experience in realization of projects within public and private partnership.

5. Conclusions
So, attraction of private capital to the financing and management by infrastructure projects will eliminate the deterioration and modernize the transport infrastructure. Improvement of the transport infrastructure on the meso level will not only contribute to the growth of the gross regional product, but also it leads to the qualitative changes in the reproductive process. As a result, projects of the public and private partnership in transport infrastructure will receive the priority, because of their high capital intensity, significant impact on the development of the region's economy and mobility of the population.

References
[1] Romanovich M and Simankina T 2016 Procedia Engineering 165 1587 – 1594
[2] Hammes J and Nilsson J 2016 Economics of Transportation 7-8 53-64
[3] Adolf K, Alberto E and Wang T 2015 Transportation Business & Management 4 25-33
[4] Puchkina E and Susskaya A 2014 Actual issues in economics and law 4 (32) 170-174
[5] Borboni A, Aggogeri F, Merlo A, Pellegrini N, Amici C 2015 International Journal of Advanced Robotic Systems, 12, art. no. 42. DOI: 10.5772/60052
[6] Botlík J and Botlíková M 2014 Procedia - Social and Behavioral Sciences 110 361-372
[7] Ognjenovic S, Ishkov A, Cvetkovic D, Peric D and Romanovich M 2016 Procedia Engineering 165 954–959
[8] Lukichev S and Romanovich M 2016 Procedia Engineering 165 1717-1721
[9] Chulkova A, Lukiche S and Romanovich M 2016 MATEC Web of Conferences 86 02019
[10] Priadko I N, Mushchanov V P, Bartolo H, Vatin N I and Rudnieva I N 2016 Magazine of Civil Engineering 65(5) 27-41