JUSTIFICATION OF THE CHOICE OF THE CONCESSION MECHANISM FOR PROJECTS ECONOMICALLY EFFICIENT FOR THE INFRASTRUCTURE OWNER

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Abstract. In modern economic realities, the state is playing an increasingly important part, managing the economy to achieve greater social efficiency. From this standpoint, the crucial aspect of efficient application of the concession mechanism is the selection of project proposals that have socio-economic practicality. The purpose of the paper is to justify the choice of the concession mechanism for projects economically efficient for the infrastructure owner. The authors conclude that upon justifying the choice of the concession mechanism, it is important both to analyse the economic efficiency with the benefit of the best analytical practices of investment management in conjunction with budget efficiency evaluation and to assess the specific risks and probability deviations, factoring in the specifics of projects on creation of public railway infrastructure in order to evaluate and subsequently monitor the comparative advantages of the concession over the state law and other PPP tools.

1. Introduction

Upon preparing any infrastructure project, it is prudent to compare the efficiency of application of different methods of its implementation to select the most suitable one, which would be effective both for the state and for the investor (business) (Flyvbjerg, 2014; Naumenkova et al., 2019). Without delving into the discussion of the concept of "efficiency", we shall note that the most common approach to describing economic efficiency is its expression through the "economic effect" as the difference between income and expenses for the estimated type of activity (Panina, & Popov, 2016; Rogova, & Yalyalieva, 2016; Ivanov et al., 2019). With this approach, efficiency is mathematically expressed as the proportion (share) of the effect in costs, which in Western science and practice is determined by the ROI indicator.

By all means, the array of relevant indicators characterizing the economic efficiency is much wider. Furthermore, the logic of the selection of relevant indicators is to a large extent connected both with the specifics of the evaluated object, and with the position of the subject in whose interests this evaluation is performed – in the context of the subject matter of this research, it is the owner of the public railway infrastructure. For example, to conclude a state contract, it is necessary to have the entire amount of funds in the budget for the planning period, whereas the application of public-private partnership (PPP) mechanisms is also possible in the absence of the necessary resources in full in the budget (Iossa, & Martimort, 2016; Van Buiten, & Hartmann, 2015; Mishchenko, & Mishchenko, 2016; Shtal et al., 2018). It is also important to consider the availability of budget funds at a certain stage of the project. For example, in projects with an "availability fee", the provision of a "capital grant" by a public partner (concession grantor) to a private partner (concessionaire) in the amount of 20-30% of the total cost of creating an object can reduce the amount of fixed payments at the stage of operation (concession grantor payment) by an average of one third and, as a result, reduce the total overpayment.

A comparative evaluation of the possible ways of implementing the infrastructure project does not replace the procedure for selecting the most effective (necessary) project for the state from the possible (considered, under development), it is performed primarily to determine the best legal, financial and technical conditions for the implementation of a specific, already selected project (Goloshchapova et al., 2018; Zatsarinnyi et al., 2017).

With regard to concessions, in particular, it is evident that upon assessing the economic efficiency from the perspective of the owner it is hardly advisable to evaluate it solely proceeding from the volume of paid services (the conventional approach to concluding concession agreements in previous practice) (Shi et al., 2018). It is noteworthy that the current legislation of the Russian Federation on public-private partnerships contains a peremptory requirement to assess the economic efficiency of the project (Sergi, 2019; Herasymovych, 2019; Herasymovych, 2018), which is performed at the stage of its consideration, the general evaluation algorithm is displayed in Figure 1.
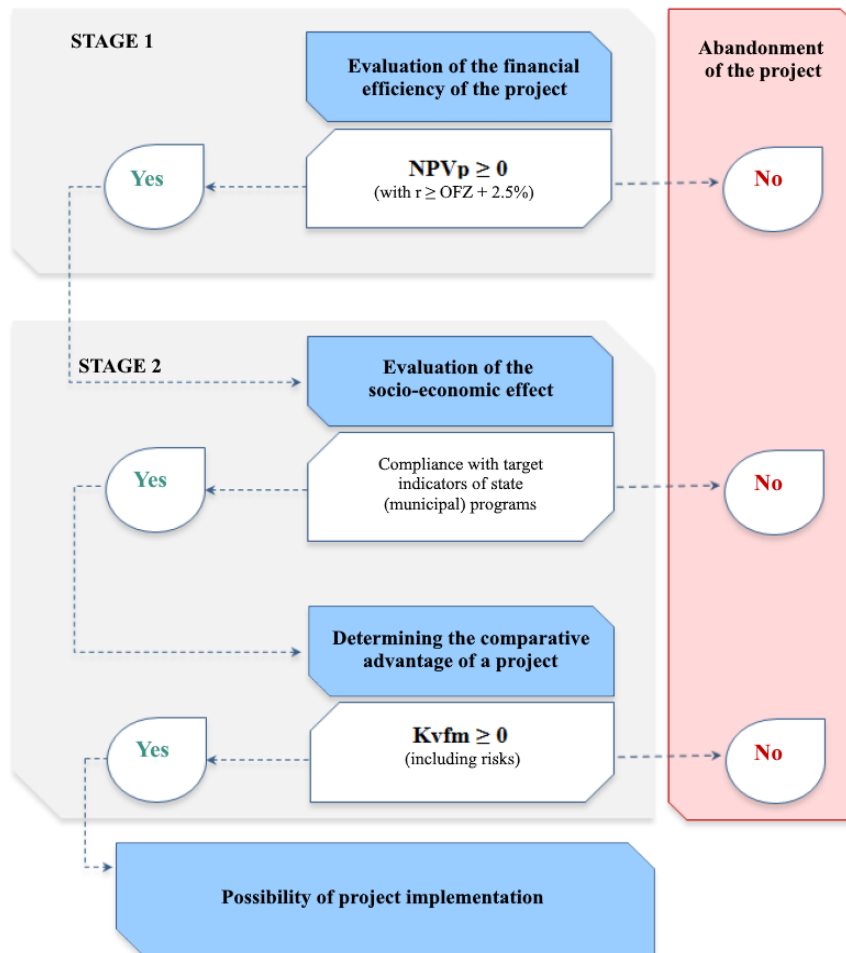
Fig. 1. Algorithm for assessing the effectiveness of a PPP/MPP project and determining its comparative advantage
Source: Recommendations on the implementation… (2016)

It should be noted that this algorithm, in general, corresponds to the basic concepts of assessing the project efficiency in investment and project management (Gribov and Nikitina, 2013; Holovach, & Holovach, 2020; Lakhmetkina, 2018; Mazuret et al., 2017), although it rouses certain censure from analysts (Justification of the effectiveness…, 2017), who suggest that the large-scale use of the relevant evaluation procedures without their detailed algorithmization and a clearer selection of evaluation criteria can actually lead to a paralysis of the public-private partnership system in the near future. At present, the procedure for justifying the choice of PPPs as a form of implementing an infrastructure project, stipulated by federal legislation on PPPs, does not have a wide law enforcement practice and is characterized by market participants as unsustainable and requiring improvement (Tkachenko et al., 2019; Tkachenko et al., 2020).

Proceeding from periodical publications, the establishment of a procedure for justifying the choice of PPPs as a form of infrastructure project implementation, which is stipulated by federal legislation on PPPs, to a large extent, truly was a response to negative realities – often PPP projects are accepted for implementation in cases where, from the standpoint of the state, a toolkit of public procurement would be considerably more efficient (Mereminskaya, 2017; Iossa, & Martimort, 2015; Rudenko, 2018; Rudenko et al., 2016; Levchenko, 2015). With that, a process has been launched to introduce this non-tested institution into the concession legislation, which raises concerns among market participants (Justification of the effectiveness…, 2017). Studying international

experience in this field also does not provide an unambiguous answer to the question of effective ways to solve the issue of substantiating the efficiency of the application of PPP mechanisms, including concession ones, for the implementation of infrastructure projects.

2. Analysis of the Basic Methodology for Evaluating the Efficiency of Concession Projects

In most countries that actively use PPP mechanisms, the procedure for substantiating the comparative advantage (VfM) of the selected form of project implementation in a certain form is mandatory and involves both preliminary qualitative and a more detailed quantitative analysis. As a rule, the principles of such an evaluation are enshrined in legal acts, and the methodology is advisory in nature. With that, in most countries there is a tendency to reduce the role of quantitative evaluation of VfM upon making managerial decisions. Moreover, in countries with the most developed practice of applying PPP mechanisms, the VfM principle is applied to any projects involving budget participation, including those implemented through public procurement. International practices also indicate that upon performing a quantitative evaluation of the comparative advantage of a particular form of an infrastructure project implementation, it is prudent to factor in a number of features of those forms under consideration that affect costs, for example, transaction expenses, non-financial benefits, etc. (Justification of the effectiveness…, 2017).

Experts at the National Centre for Public-Private Partnerships believe that introducing provisions in the concession legislation, which would provide for an evaluation procedure concerning the efficiency of concession agreements, and determination of their comparative advantage, is premature and in the current situation would only create additional barriers to attracting private investment in infrastructure development (Justification of the effectiveness…, 2017). According to the said experts, the current methodology for assessing the effectiveness and determining the comparative advantage of PPP and MPP projects, approved by Order of the Ministry of Economic Development of Russia No. 894 dated November 30, 2015, requires improvement in the following parts (Order of the Ministry of Economic Development…, 2015):

1) approaches to determining the prerequisites for assessing risks and the values of probable deviations of costs (risks);
2) consideration of the specifics of application of PPPs and public procurement in methodology (transaction expenses, the availability and possibility of attracting budget financing, "competitive neutrality");
3) expansion of the list of criteria for a qualitative analysis of the possibility (prudency) of PPP application in relation to the public procurement;
4) changes in approaches to the analysis and monitoring of performance indicators and the comparative advantage of PPP projects.

The integration of the justification of comparative advantage into concession legislation should be based on the following principles:

1) introduction only on market readiness, improvement of the methodological base and the formation of the methodology application practice upon evaluation of the PPP projects;
2) selective mandatory application, primarily in relation to projects with significant budget participation;
3) should not apply to the utilities sector and small projects;
4) the purpose of implementation is to assist at the stage of structuring, and not efficiency control at the implementation stage;
5) criteria, procedure and principles are enshrined in the legislation, the methodology is approved in the form of recommendations (guidelines).

We shall further turn to the basic efficiency evaluation methodology of concession projects, and note that its basis is the conventional methodology for efficiency evaluation in investment design (Kolankov et al., 2013). In modern conditions, the methodology for investment project evaluation includes several key sections: evaluation of the project concept, including technical, legal and marketing analysis; evaluation of the need for investment resources and financial solvency of the project; evaluation of the economic efficiency of the investment project; evaluation of project risks, sensitivity of key indicators to implementation scenarios (Podshivalenko et al., 2017). From the evaluation results, the information can be obtained on: the possibility of project implementation; the required amount of investment; profit margin at a certain risk level.

The statutory and methodological basis for evaluating investment projects is the UNIDO standards (Manual for Evaluation of Industrial Projects, 1986) and the domestic statutory and instructional documents developed on their basis. The legal basis for the assessment is the federal legislation on investments and investment activities. We shall further outline the key points in evaluating an investment project, the general scheme of which in its basic version contains three stages, namely:

– Studying the concept and the proposed sequence of investment project implementation (Kabir, 2016). It is important to understand that upon evaluating a greenfield project, the final efficiency will be expressed in cash flows from the company's activities, while with a brownfield project and a project within the company it is important to calculate the indicators of additional profit, return and ROI (Kostina, 2015). For most investment projects, fair is the rule, according to which the performance indicators increase along with the planning horizon, since each project requires a certain time to reach 100% capacity, and long horizons account for longer periods of generating positive cash flows (this period only ends at the time of the need to update equipment, which rarely occurs earlier than 10 years) (Orlova, 2016).

– The marketing evaluation of the project also serves as an important component of the evaluation, as it allows to confirm the feasibility of sales plans, including various aspects of product selection (in our case, services for using public railway infrastructure), its positioning and promotion. In a significant number of cases, conducting only "desk" research for marketing evaluation is insufficient; in any case, an appropriate assessment requires a combination of several alternative sources of marketing information with a high relevance of research. The first stage of investment project evaluation also requires evaluating the stages of project implementation and its budget structure. This provides an understanding of the essence and concept of the project, and budget structure. In the absence of detected fatal flaws and system errors, the second stage of the investment project evaluation commences, otherwise, its concept is returned to the authors for revision, or a decision is made to abandon the project without finalizing its concept.

– Analysis of the source data. This stage involves a detailed study of project indicators by implementation stages, and allows to identify the feasibility of key indicators, including both the concept of the project and time. For example, the profitable side of an investment project is considered in conjunction with the marketing component. The expenditure side – from the standpoint of feasibility and elaboration of costs, their completeness, formation of reserves, etc. It is extremely important to verify whether the need for financing is fully defined, whether there will be cash gaps at any time period, and whether there are resources to cover them under adverse scenarios. In this regard, the availability and correctness of the calculation of the operating working capital of the project should be verified, in combination with the payment calendar for settlements with contractors, personnel and the budget (Prokopyeva, 2018). The given stage often requires a legal examination of the project. The result of the second stage of the investment project evaluation is the identification of flaws in the financial model, their materiality, and, as a result, the need and feasibility of adjusting the financial model.

– Stage of project interpretation. At this stage, the efficiency of the project, its financial viability, as well as risk are evaluated. It is important to consider the differences in evaluating the investment project efficiency from

the perspective of the subject of information; corresponding recommendations for consideration of differences and their reflection in the evaluation methodology are provided in Table 1.

Table 1. Net cash flow from the positions of various participants in the investment project

Cash flow budget	Concessionaire	Concession grantor	Bank
Operating cash			
Gross proceeds	✓	✓	✓
Material costs	✓	✓	✓
Wages	✓	✓	✓
Aggregate expenditure	✓	✓	✓
Taxes and fees paid	✓	✓	✓
Bank loan interest paid	✗	✓	✗
Investment cash			
Investments in fixed assets	✓	✓	✓
Financial investments (investments in financial assets)	✓	✓	✓
Asset sale proceeds	✓	✓	✓
Finance cash			
Attraction of equity (funds from shareholders)	✗	✗	✓
Borrowing proceeds	✗	✓	✗
Repayment of borrowings	✗	✓	✗
Dividends paid	✗	✗	✓

Source: adapted by the authors from the model presented in (Belyakova, 2006).

As for the risk analysis of the project, it is performed according to one of the conventional schemes, usually including an assessment of the project's sensitivity, scenario analysis, and break-even point determination. Statistical methods (simulation modelling), including the Monte Carlo method, can also be applied. Corresponding methods (sensitivity evaluation, scenario analysis, simulation modelling) should complement conventional project efficiency meters (NPV, IR, PI), with that, to evaluate a large investment project with immanent high risks, it is prudent to use appropriate methods in combination with each other. Particular attention should be paid to risks that cannot be accurately measured – legal, administrative, technological and other similar risks.

The third stage of evaluating the investment project consequentially facilitates the conclusion on whether it is efficient to participate in the project, which is carried out with consideration of the investment policy of the subject of investment activity, its existing investment portfolio, the availability of available funds, and also the compliance of the final calculated indicators of project efficiency with expectations, regulations, etc. To evaluate the investment project efficiency, a target set of indicators is applied, with that, net profit serves as the main indicator of business performance in many cases; it is intermediate upon evaluating the investment project efficiency and extremely important as it affects the system of key indicators of investment project efficiency, but not crucial.

3. Features of the Use of Specific Tools and Indicators for Evaluating the Efficiency of Investment Projects

Among the common key indicators of an investment project efficiency evaluation are the following (Maté et al., 2017): net present value (NPV); internal rate of return (IRR); profitability index (PI); discounted payback period for investments, and/or discounted profitability index for expenditures. It is also noteworthy that one of the issues in investment project evaluation in modern conditions is the choice of the appropriate combination of key performance indicators, as well as their improper interpretation from the standpoint of deciding on the feasibility of the project implementation. The first of the abovementioned issues is connected with the fact that the specified indicators relate to different periods of time, which complicates their comparison and procurement of adequate conclusions, and also requires consideration of many additional criteria with varying degrees of relevance

(inflation, refinancing rates, planning terms, etc.). To a certain extent, the correctness of the performed comparisons depends on the qualifications and mastery of the analyst.

In practice, the question arises of how substantially the appropriate methodology for evaluating the investment project efficiency should be modified in relation to concession projects for creating public railway infrastructure. With that, the toolkit for evaluation of economic efficiency of concessions for infrastructure projects, proposed in the dissertation research by E.S. Charkina (2015), is considered to be rather full-fledged. Proceeding from the theory and practice of general investment analysis, the authors propose the following methodology for infrastructure project evaluation with use of a concession mechanism. For convenience, we have summarized the methodology in Table 2.

Table 2. Elements of a comprehensive methodology for an infrastructure project evaluation with use of a concession mechanism

| Methodology Section	Estimated Performance Indicators	Methodological basis	Performance criteria	Regulatory framework
Financial model (financial efficiency)	Rate of return for equity Weighted Average Cost of Capital (WACC) Net present value (NPV) Internal Rate of Return (IRR) Payback Period (PBP) Discounted Payback Period (DPBP) Profitability Index (PI) Red Flag Assessment (RFA).	Cash flow discounting using weighted average cost of capital (WACC)	NPV>0 IRR>WACC PI>1	Methodology for calculating indicators and applying performance criteria for regional investment projects applying for state support at the expense of budgetary allocations of the Investment Fund of the Russian Federation
Budget efficiency	Performance Index for Budget (PIB)	The project budget performance indicator is defined as the ratio of discounted tax revenues to the amount of budget allocations	PIB>1	
Economic efficiency	Integral indicator of economic efficiency of an investment project ET	An integral indicator characterizing a part of the total for all years of the forecast period of the predicted value of the real volume of gross regional product that can be provided by the project	ET in the forecast period > 0,012%	

Source: compiled by the authors by Charkina (2015).

The above methodology is seen as characterized by exhaustive completeness and complexity, including in terms of the set of applied financial project efficiency ratios, as well as the availability of an appropriate regulatory and methodological basis, as well as practical testing, which can therefore be taken as the basis in evaluating the effectiveness of the concession project from the standpoint of the state. At the same time, the estimation algorithm should be refined and supplemented. Firstly, in terms of determining the comparative advantages of the project (including in order to ensure compliance with antitrust legislation). Recommendations for improving the procedure for evaluating comparative advantages are presented above. Secondly, it should consider the attributes and criteria of investment projects that are economically inefficient for the infrastructure owner in order to prevent violation of state interests by concluding concessions for such projects with state guarantees.
In particular, in the event of adverse consequences during the operation of the infrastructure associated with design defects, deviations from regulatory and design requirements during the construction and subsequent operation of the public infrastructure, negative environmental impacts, unforeseen circumstances and other similar facts, the economic indicators incorporated into the project may fail to be performed. We believe that the relevant

risks can (and should) be considered upon calculating the discount rate, which is an indicator that serves as the basis for calculating financial performance indicators of investment projects, in particular the ones provided in Table 2. Another reason for the non-performance of indicators is the overestimation of their values compared to actual ones. Ultimately, all the available methodologies for evaluating the efficiency of parameters laid down in projects mediated by concession agreements are aimed at evaluation of specific indicators, rather than at their verification. As a result, the distortion of certain indicators, both intentional and resulting from an error, can lead to an incorrect project efficiency evaluation and its erroneous acceptance for implementation.

The theory and practice of investment analysis has developed many recommendations to prevent such kind of error (Tolstonogov, 2010; Cheremushkin, 2013). One of the key recommendations, in this case, is the mandatory presence of a detailed marketing analysis that underlies investment design (we shall recall that in our case, there is an investment project, which in terms of the distribution of financing, property rights and obligations, is structured precisely via a concession mechanism and indirect concession agreement). In addition, an audit of an investment project can be of significant benefit, the results of which, by all means, would enable a more reliable judgement on the feasibility of the parameters adopted as the design basis.

An important aspect of such an audit is the audit of the planning methodology, in the course of which experts specify the degree of reliability of the methods used to obtain the corresponding planned indicators. Surely, preference should be given to complex justifications with calculations supported by analysis using several of the most relevant methods with mandatory justification for the final choice of a particular forecasting (planning) methodology for project performance indicators. Finally, to assess the viability of projects, a comparative analysis of the key (both qualitative and quantitative) project parameters with analogues can be applied. The results of the comparative analysis will not only complement the idea of the expected economic efficiency of the project for the infrastructure owner, but are also a simple and fairly effective tool for identifying evident deviations in the planned indicators. Summarizing the above, it appears to be prudent to propose the following algorithm for substantiating the choice of the concession mechanism for projects that have economic efficiency for the infrastructure owner, presented in Figure 2 below.
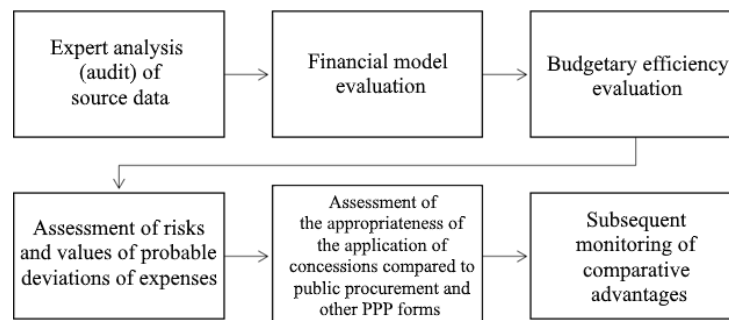
Fig. 2. Algorithm for substantiating the choice of the concession mechanism for projects with economic efficiency for the infrastructure owner

Source: authors' development.

Conclusions

Application of specific tools and indicators for evaluating the investment project efficiency largely depends on the purposes and objectives of the evaluation, and the evaluation subject (the recipient of the evaluation results). It is in accordance with specific purposes and objectives that it appears to be advisable to select an evaluation toolkit and its practical application, as well as target milestones – because, by and large, it is by comparing the

expected values of key performance indicators of the investment project with the target milestones that the investment project appraiser receives information for adoption of final decision on the feasibility of its implementation. For example, the indicator of internal rate of return (IRR) of the project, as a rule, is set individually by the investor, factoring in, in particular, the cost of borrowed capital and other indicators. In general, the procedure for evaluating investment projects requires a thorough study and application of a calibrated methodology, combined with appropriate analytical skills.

Thus, upon substantiating the choice of the concession mechanism, it appears to be important both to conduct an analysis of economic efficiency, relying on the best analytical practices of investment management in combination with an evaluation of budgetary effectiveness, and to evaluate specific risks and probabilistic deviations, with consideration of the specifics of projects for the creation of a public railway infrastructure for the purpose of evaluation and subsequent monitoring of the comparative advantages of the concession over state law and other PPP tools. Such an approach will facilitate the selection of a concession mechanism for projects that have economic efficiency for the infrastructure owner.

In order to formulate a coherent and predictable national policy regarding the implementation of new procedures in the preparation of PPP projects, a phased plan agreed upon with the market is required. It should include measures for the development of the methodological and statistical basis for effective justification of the efficiency of PPP application, as well as for their testing and gradual implementation in regulatory framework.

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