

## **EVALUATION OF THE EFFICIENCY OF PROJECTS IMPLEMENTED ON THE BASIS OF THE PRINCIPLES OF PUBLIC-PRIVATE PARTNERSHIPS**

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**Abstract.** This article analyzes the methodology for assessing the efficiency of projects implemented on the basis of the principles of public-private partnership (PPP). The stages of evaluation of the efficiency of projects, their implementation in the conditions of development of the regulatory and legal framework in the field of PPPs in the Republic of Belarus are disclosed. The article explores the specifics of assessing the efficiency of PPP projects abroad. An analytical review of foreign methods for assessment of the effectiveness of PPP projects has showed that the following indicators should be included in the national methodology: debt load (helps objectively assess the credit load of a private partner before attracting new loans and credits); Liquidity (solvency): an indicator of current liquidity, fast liquidity; Budgetary efficiency: assessment of the increase in the budget load as a result of the adoption of additional obligations, the risks of project implementation (the risk of underutilization of the facility), the discounted indicator of budget efficiency, the budget efficiency index, etc. It seems that the least developed are the issues of the balance of interests of the project stakeholders. Ignoring the need to take into account the interests of the parties in PPP projects increases the risks of the project, which can become a negative factor for the national economy of the country as a whole.

The authors formulated provisions for improving the current methodology for assessing the effectiveness of PPP projects in the Republic of Belarus.

For the purpose of the achievement of the aim, the authors apply generally accepted economic research methods.

**Keywords:** *effectiveness, evaluation, foreign experience, methodologies, public-private partnership (PPP)*

**JEL code:** H41, H42, H43, H54, L32, L33, G38

### **Introduction**

The implementation of public-private partnership (PPP) projects implies control by the management bodies over efficient use of financial, human and natural resources, which makes the assessment of the overall economic effectiveness of PPP projects actual. The actual methodological problem of implementing PPP projects is the lack of a unified methodology for assessing their effectiveness. As practice shows, the evaluation is carried out according to economic indicators, which are used both for investment projects and for PPP projects. The study has revealed that the effectiveness of PPP projects is assessed in terms of the financial performance of the project in the Republic of Belarus, including key indicators of the investment attractiveness of NPV, WACC, DPP, IRR, PI and financial stability indicators EBIT, EBITDA, DSCR; on the socio-economic efficiency of the project, which is determined taking into account the specifics and scope of PPP application.

The authors propose to set forward the object of the research: compare the national methodology for assessing the effectiveness of PPP projects with foreign methods, as well as to formulate provisions for improving the current methodology for assessing the effectiveness of PPP projects in the Republic of Belarus.

In order to achieve the target it's necessary to carry out the following tasks:

- to analyze the methods of assessment of the effectiveness of projects implemented on the basis of the principles of PPP;
- to disclose the stages of assessment of the effectiveness of PPP projects and their implementation in the context of the development of the regulatory framework in the field of PPPs in the Republic of Belarus;

- to explore the specifics of assessment of the effectiveness of PPP projects abroad.

There are applied methods of general scientific research in economics: economic analysis and synthesis, logically – constructive, qualitative methods including the methods of the analysis of normative acts.

The theoretical and methodological grounds of the paper are the normative acts regulating PPP, works produced as by Belarusian so foreign scientists and Internet sources.

## **Research Results and Discussion**

Public-private partnership (PPP) is a relatively new concept in the Republic of Belarus, therefore the understanding of its basic principles varies among public and private sector representatives. Nevertheless, the PPP Center was established at the Economic Research Institute of the Ministry of Economy of the Republic of Belarus in April 2014, which was transferred to the structure of the National Agency for Investments and Privatization in September 2016.

The PPP center has such functions as:

- evaluation of proposals for the implementation of PPP projects, including the concepts of PPP projects;
- maintenance of PPP projects' list approved by the Interdepartmental Infrastructure Coordination Council (IICC);
- organizational, technical and information support for the work of IICC;
- participation within its competence in the improvement of legislation regulating PPP issues, including the preparation and evaluation of PPP projects;
- preparation of methodological and methodological materials on PPP issues, including preparation and implementation of PPP projects;
- organization of advanced training of specialists of state bodies, private organizations, banks and other interested parties on PPP issues;
- ensuring interstate exchange of experience in the development of PPPs, including participation in expert working groups on PPP.

The legal basis for PPP development in the Republic of Belarus consists of the following normative-legal acts:

- The Law of the Republic of Belarus "On Public-Private Partnership" dated December 30, 2015 No. 345. Which is aimed to attract investments into the economy of the Republic of Belarus, defines the legal conditions for PPPs, regulates public relations that develop in the process of concluding, executing and terminating PPP agreements (Law of the Republic of Belarus " On Public-Private Partnership projects", 2016);

- Decree of the Ministry of Economy of the Republic of Belarus "On Public-Private Partnership" on July 27, 2016 number 49. It contains the forms of the concept and the passport of the PPP project, the list of risks for the projects is stated, as well as the instructions "On the requirements of the concept of the public-private partnership project, to the feasibility study of the proposals for the public-private partnership project and to the tender documentation" and "On the evaluation of proposals for the implementation of public-private partnership projects"(Decree of the Ministry of Economy "On Public-Private Partnership projects", 2016);

- National Infrastructure Plan (NPI) 2016-2030, which facilitates the analysis of the state of the infrastructure of the Republic of Belarus; The formation of a common vision of the existing infrastructure needs of the state in various sectors of the economy for the current and long-term perspective with a view to efficiently planning the available resources and forming a strategy for the infrastructure development of the Republic of Belarus; Implementation of infrastructure projects taking into account their priority; Determine the amount of the budget deficit to finance the existing infrastructure needs and the necessary actions of the state to overcome it; Implementation of measures to improve the state of the environment through the introduction of new technologies and infrastructure development; Development of PPP in the Republic of Belarus (National infrastructure plan 2016-2030, 2015).

However, the legal basis of PPPs, to the present day, to some extent contradicts the Budget, Investment and Tax Codes, land legislation. Therefore, it is necessary to carry out a complex of works on the settlement of legislative contradictions, to meet the interests of public and private partners.

Legislatively it is determined that PPP in Belarus can be carried out in different spheres: road and transport activities, communal services and public services, health, social services, education, culture, law enforcement, energy, agro-industrial complex and in other spheres. The NPI for 2016-2030 estimates the need for investment in the main areas of the infrastructure of the Republic of Belarus (Table 1).

Table 1

**Assessment of the need for investment in the main areas of infrastructure for medium and long-term prospects  
(Million US dollars)**

<b>Infrastructure directions</b>	<b>Until 2020</b>	<b>2021-2030 years</b>
<b>TOTAL,</b>	<b>18 060.3</b>	<b>44458.3</b>
including:		
social infrastructure	2870.3	6885.2
transport infrastructure	5600.0	17441.0
energy infrastructure	1757.9	2609.2
utilities	7832.1	17522.9

Source: *National infrastructure plan 2016-2030 – Republic of Belarus, 2015*

The analysis of the financing costs of the infrastructure of the Republic of Belarus in the framework of the national infrastructure plan shows that the amount of annual investments in the period from 2006 to 2014 was about \$ 2 billion. The total investment requirement for the period from 2016 to 2030 is estimated at 62, 3 billion US dollars. If the previous volumes of financing are preserved, only about \$ 30 billion would be invested in the construction and reconstruction of the infrastructure, which is 48% of the total need for investment in infrastructure facilities. Thus, the infrastructure gap (deficit) is projected at \$ 32.3 billion, or \$ 2.15 billion annually (National infrastructure plan 2016-2030, 2015).

In this regard, we believe that PPP will be an effective mechanism for attracting investments and technologies in the implementation of infrastructure projects in the Republic of Belarus. PPP can significantly accelerate the pace of implementation of projects, given that in recent years, there has been a trend towards a decrease in the allocation of funds from the budget. Thus, PPP as a new form of interaction between the state and the private sector will allow:

- to overcome the limited possibilities of budgetary financing for the implementation of social and infrastructure projects;
- to develop the country's economic potential;
- to use effectively the advantages of a private partner in order to improve the quality of life of the population and the quality of the services provided;
- to increase the efficiency of management of public infrastructure facilities with limited budget financing opportunities for these purposes.

Since the implementation of PPP projects presupposes strict control over the effective use of financial, human, natural resources, the issue of assessing the overall economic effectiveness of projects implemented on the basis of PPP principles becomes actual.

At the moment, a serious problem for the implementation of PPP projects is the lack of an unified methodology that could be used to assess the effectiveness of these projects. In practice, similar algorithm is used for the implementation of PPP projects both in Belarus and abroad. The evaluation is carried out according to economic indicators, which are used for both investment projects and PPP projects.

The Instruction "On the evaluation of proposals for the implementation of public-private partnership projects" was approved in the Republic of Belarus in the summer of 2016, which establishes the methodology for evaluating proposals for the implementation of PPP projects, based on the method of assessment of the effectiveness of the PPP project and determination of the comparative advantage. When evaluating proposals for the implementation of a PPP project, an evaluation of the effectiveness of the project (prior to assessing the comparative advantage) are carried out according to the indicators of financial efficiency and the social and economic efficiency of the project (Table 2).

Table 2

**Evaluation of the effectiveness of the PPP project**

Index	Calculation procedure	Efficiency of the project
<b>Evaluation of the financial efficiency of the project</b>		
<b>Net Present Value (NPV)</b>	$NPV = \sum_{i=1}^T \frac{FCF_t}{(1+r)^t}$ <p><i>t</i> – year of project implementation (The first year is the year of the planned conclusion of the PPP agreement); <i>T</i> – total number of years of project implementation; <i>FCF<sub>t</sub></i> – free cash flow for the project in the year <i>t</i>, the corresponding net profit plus depreciation and interest payable minus investment costs; <i>r</i> – the discount rate used to calculate the financial effectiveness of the project.</p>	<i>NPV</i> > 0
<b>Weighted average cost of capital (WACC)</b>	$r = WACC = (C_e \times W_e + C_d \times W_d + C_b \times W_b) / 10000$ <p><i>C<sub>e</sub></i> – the cost of own funds of the private partner, %; <i>W<sub>e</sub></i> – share of own funds of a private partner, %; <i>C<sub>d</sub></i> – the cost of the credit (borrowed) funds %; <i>W<sub>d</sub></i> – share of credit (borrowed) funds, %; <i>C<sub>b</sub></i> – the cost of budget financing (republican and / or local budgets), %; <i>W<sub>b</sub></i> – share of budgetary financing (republican and / or local budgets), %.</p> <p>The value of the own funds of a private partner is taken equal to the bigger than the interest rate on government bonds with a maturity close to the forecast period, plus two to three percentage points or corresponds to a different reasonable interest rate.</p> <p>The cost of budget financing can be taken equal to the interest rate on government bonds with a maturity close to the forecast period. The share of own funds, credit (borrowed) funds and budget financing (republican and / or local budgets) is determined in relation to the investment costs of the project.</p>	<i>WACC</i> < <i>IRR</i>
<b>Additional evaluation of investment attractiveness</b>		
<b>Discounted payback period (DPP)</b>	$DPP = \frac{ NPV_q }{CF_{q+1}} + Q$ <p><i>q</i> – year in which the <i>NPV</i> last takes a negative value; <i>CF<sub>q+1</sub></i> – discounted free cash flow for the project in the year <i>q + 1</i>; <i>Q</i> – number of years to year <i>q</i> (inclusive).</p>	<i>DPP</i> < the project review period

<p><b>Internal rate of return (IRR)</b></p>	$\sum_{i=1}^T \frac{FCF_t}{(1+IRR)^t} = 0$ <p>Reflects the value of the discount rate at which <math>NPV = 0</math>. If <math>IRR &gt; r</math>, the project provides a positive NPV and a percentage of revenue equal to <math>(IRR-r)</math>. The investor compares the IRR with the rate of attracted financial resources (cost of capital, <math>CC</math>).</p>	<p><math>IRR &gt; WACC</math>, the higher the IRR, the more effective the project; <math>IRR &gt; CC</math></p>
<p><b>Profitability index (PI)</b></p>	$PI = \frac{NPV_t + I_t}{I_t}$ <p><math>I_t</math> – the cumulative amount of investment costs for the project (with discounting) in the year <math>t</math>.</p>	<p><math>PI &gt; 1</math></p>
<p><b>Debt Service Coverage Ratio (DSCR)</b></p>	$DSCR_t = \frac{CFADS_t}{P_t + F_t}$ <p><math>CFADS_t</math> – free cash flow available for the repayment of debt at loans (loans), the corresponding balance of cash at current (operating) activities minus the investment costs of the project (when planning to receive the income from the investment activities in the project, income is also recorded in <math>CFADS_t</math>) plus cash Contributions of participants and other sources of financing investment costs for the project in the year <math>t</math>; <math>P_t</math> – the principal amount of long-term loans (loans) repayable in the year <math>t</math>; <math>F_t</math> – the amount of interest and other financial costs of long-term loans (loans), payable in a year <math>t</math>.</p>	<p><math>DSCR_t = 1,2-1,5</math></p>
<p><b>Evaluation of socio-economic efficiency of the project</b></p>		
<p><b>Increasing the level of employment</b></p>	$E_{em} = T_a \times B_a \times N$ <p><math>T_a</math> – average term of stay of the unemployed on the account in the republican employment service, months; <math>B_a</math> – average monthly unemployment benefit per person, rubles; <math>N</math> – the number of unemployed people involved in additionally created workplaces in the process of project implementation, people.</p>	
<p><b>The increase in the quantity of provided budget services</b></p>	$E_{bs} = N \times C$ <p><math>K</math> – number of buyers of budget services, people; <math>C</math> – cost of budgetary services, rubles.</p>	
<p><b>Growth of gross regional product</b></p>	$E_{GRP} = P \times \Delta GRP \times R$ <p><math>P</math> – the population whose quality of life is improved as a result of the project through the provision of more services, increased accessibility of services or better services; <math>\Delta GRP</math> – the growth of the gross regional product per capita according to the projected estimates for the settlement year of the project, rubles; <math>R</math> – forecasted growth rate of gross domestic product due to the implementation of social activities.</p>	
<p><b>Social impact in healthcare</b></p>		
<p><b>Improving the quality of health care, maintaining public health</b></p>	$E_h = \Delta N_m \times (GRP_{man-day} + W_{ad} + C) \times N_p$ <p><math>N_m</math> – reduction of morbidity and a reduction in the number of absentee days for work due to sickness against the actual balance of working hours as a result of prevention and improvement of the quality of medical services, days; <math>GRP_{man-day}</math> – average daily gross regional product per capita, rubles / man-</p>	

	day; $W_{ad}$ – the average daily wage of the worker at stay in temporary disability, rubles; $C$ – cost of outpatient or inpatient treatment of one patient, rubles / man-day; $N_p$ – the number of people working in the area where the facility will operate.
<b>Increasing life expectancy and reducing disability</b>	$E_{le} = T_p \times R_d \times (GRP_{man-day} + B_d)$ <p><math>T_p</math> – total working-age population, thousand people; <math>R_d</math> – reduction of the incidence rate per type of disease per 1000 inhabitants; <math>B_d</math> – average amount of disability benefits, loss of breadwinner, etc., rubles / person-year.</p>

Source: author’s elaboration based on the study of the scientific literature

The dynamics of values according to the indicators predicted during the project implementation is also analyzed:

- gross profit and profit from sales of goods (works, services);
- earnings before interest and taxation (EBIT), corresponding to earnings (loss) before taxation plus interest expense;
- earnings before depreciation, interest accrued, as well as taxes from the profit (EBITDA), corresponding to EBIT plus depreciation;
- the net profit of the project;
- profitability of sales, calculated by EBIT and EBITDA, as well as net profit and other indicators.

The social and economic efficiency of the project is assessed taking into account its specifics and the scope of PPP implementation on the basis of identifying: qualitative (quantitative) social effects, in kind, which is not taken into account in calculating the financial effectiveness of the project and monetary social effects, that is, project results that are amenable to monetary evaluation according to a specially developed methodology (Table 3).

Table 3

**Evaluation of socio-economic efficiency of the project**

Social effect	Indicator
<b>Qualitative (quantitative)</b>	<ul style="list-style-type: none"> <li>- the number of created jobs;</li> <li>- raising the level of preschool education (the sphere of education);</li> <li>- reducing the number of accidents in the production and transmission of heat and electricity (energy sphere);</li> <li>- reducing the level of environmental pollution in the case of construction of waste processing systems (municipal services);</li> <li>- reduction of the harmful impact on the environment by expanding the use of modern trucks in the domestic market (transport sphere);</li> <li>- creation of conditions for competition in the market, which will be an incentive for improving the effectiveness of the work in the relevant field, and others, depending on the specifics of the project and the scope of PPP implementation.</li> </ul>
<b>Monetary</b>	<ul style="list-style-type: none"> <li>- the social effect of increasing the level of employment of the population;</li> <li>- the social effect of increasing the number of budget services provided;</li> <li>- the social effect associated with the growth of the gross regional product;</li> <li>- other indicators calculated by local methods.</li> </ul>

Source: author’s elaboration based on the study of the scientific literature

The total social and economic effect in monetary terms is defined as the sum of possible monetary social effects. In connection with the social orientation and the importance of infrastructure projects in the Republic of Belarus, when calculating the financial effectiveness of the project, the values of the total social and economic effect are taken into account.

Further risk assessment and comparative advantage will be carried out if the project is recognized to be effective for these indicators. The comparative advantage is determined on the basis of the ratio:

- net discounted expenditures of the budget of the Republic of Belarus when implementing the project using the PPP scheme;
- net discounted costs for the facility when it is financed from the budget or with external government loans, external guaranteed loans (in case of their repayment from the budget) (PBV);
- the total amount of liabilities accepted by the state partner in case of risks in the implementation of the project under the PPP scheme and the budget scheme (PRV) (taking into account discounting).

Of course, this is not the whole list of indicators that can give the most full and correct idea of the effectiveness of PPP projects, so the issue of improving the methodology for assessing the effectiveness of PPP projects, for their proper choice, becomes topical.

In addition, it is relevant that at the stage of evaluating the proposals for the implementation of the PPP project an evaluation mechanism is established, which allows for regular performance calculations throughout the life of the partnership. In order to do this, to create a kind of monitoring system for assessment the effectiveness of PPP projects, reflecting the necessary changes in the scope of the project, as well as satisfying each project participant during its implementation.

The analysis of international practice shows that financial development institutions and commercial banks that finance the implementation of large-scale national economic projects, projects involving the state, use a system for monitoring development results, which allows assessing the contribution to development from the implementation of the entire portfolio of investment projects.

Monitoring of development results is carried out on a regular basis by the project groups International Finance Corporation (IFC) and Independent Evaluation Group (IEG), which is an independent division within the World Bank Group. Depending on the project implementation segment, the appropriate scale of assessments (Table 4).

Table 4

**Scale of investment project effectiveness evaluation**

Indicators	Projects	
	Real sector	Financial sector
<b>Financial:</b> the financial result from the project implementation should be higher than the value of the company's weighted average cost of capital ( <i>WACC</i> )	The real rate of return of the project in financial terms ( <i>FRR</i> ) is compared with <i>WACC</i> . Scale of assessment: - excellently: $FRR \geq WACC + 2,5\%$ -satisfactorily: $FRR \geq WACC$ - partially unsatisfactorily: $FRR \geq WACC - 2,0\%$ - unsatisfactorily: $FRR < WACC - 2,0\%$	The return on equity compared with the cost of equity capital ( <i>COE</i> ). Scale of assessment: - excellently: $ROE \geq COE + \text{risk premium}$ ; - satisfactorily: $ROE \geq COE$ ; - partially satisfactorily: $ROE < COE$ ; - unsatisfactorily: $ROE < \text{risk-free rate of return}$
<b>Economic:</b> should benefit society in addition to the benefits that investors receive	Economic rate of return on the project ( <i>ERR</i> ). A number of other indicators are used to assess the quality impact. Scale of assessment: - excellently: $ERR \geq 20\% + \text{Economic benefits, significant non-quantifiable}$ ;	Estimation of the contribution share of the project in the indicator of the overall efficiency of financial markets. Corporate loans and equity investments are valued by assessing the company's financial performance (before taxes) and determining the boundaries within which they may be distorted

	<ul style="list-style-type: none"> <li>- satisfactorily: <math>ERR \geq 10\%</math>;</li> <li>- partially satisfactorily: <math>ERR \geq 5\%</math>;</li> <li>- unsatisfactorily: <math>ERR &lt; 5\%</math></li> </ul>	<p>(subsidies, interest or exchange rate fluctuations, changes in the real sector). For trust funds, the volume and indicators of a significant share of the asset portfolio.</p> <p>Scale of assessment:</p> <ul style="list-style-type: none"> <li>- excellently: economic return on equity of the company (<math>EROE \geq COE + \text{risk premium}</math>);</li> <li>- satisfactorily: <math>EROE \geq COE</math>;</li> <li>- partially satisfactorily: <math>EROE &lt; COE</math>;</li> <li>- unsatisfactorily: <math>EROE &lt; \text{Risk-free rate of return}</math></li> </ul>
<b>Ecological and social indicators</b>	<p>Projects must comply with environmental and social standards of IFC's.</p> <p>Scale of assessment:</p> <ul style="list-style-type: none"> <li>- excellently: project indicators above the established standards of IFC's activities;</li> <li>- satisfactorily: the project meets the activity standards;</li> <li>- partially unsatisfactorily: the project according to several parameters do not meet the standards, but measures to eliminate inconsistencies are accepted;</li> <li>- unsatisfactorily: irresistible, obvious inconsistency with IFC standards without the prospect of taking corrective measures in a short time.</li> </ul>	
<b>Indicators of private sector development</b>	<p>The projects should improve the investment climate, attracting new investors to the national private sector, contributing to constructive changes in the legislative and regulatory framework, etc.</p> <p>Scale of assessment:</p> <ul style="list-style-type: none"> <li>- excellently: the project significantly improves the conditions for private sector development;</li> <li>- satisfactorily: the project has a clear positive impact;</li> <li>- partially unsatisfactorily: the project has negative consequences, expected for a short period of time;</li> <li>- unsatisfactorily: significant negative consequences for the development of the private sector (for example, a change in the competitive environment).</li> </ul>	

Source: Nikonova I.A., Smirnov A.L., 2016

The matrices of development effectiveness evaluation include key and additional evaluation standards. For each project (product, service), a corresponding set of evaluation parameters is generated. Such matrices make it possible to assess the project's compliance with the minimum set of requirements (Table 5).

Table 5

**Matrix assessment of the effectiveness**

<b>Key evaluation standards</b>	<b>Relevance</b>	The project's relevance to the interests of stakeholders and the development strategy of the country is assessed; Degree of the Bank's participation in the implementation of the development strategy of other countries; Alignment of long-term development goals of countries with medium-term goals set in the Bank's development programs, etc.
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	<b>Effectiveness</b>	The degree of achievement of financial results is estimated
	<b>Efficiency</b>	The degree of correspondence between the results of spent resources is estimated
	<b>Risk</b>	Factors that affect the financial sustainability of the project, the achievement of the results of the development of the industry are determined
	<b>Contribution</b>	The Bank's contribution to the achievement of the development goals of countries is estimated (macroeconomic balance, socio-economic development, environmental protection)
	<b>General indicator of project implementation</b>	The overall contribution is assessed taking into account all the effects from the project implementation
<b>Additional evaluation standards</b>	<b>Mobilizing role</b>	Institutional development: the project's contribution to the development of the country, region is assessed; Increasing of the efficiency of the use of financial, human and natural resources. Contribution to environmental protection and social development: assesses the extent to which the impact of projects on the environment, public health, human resources
	<b>Indicator of the Bank's activity</b>	The quality of products and services provided by the Bank is assessed; Compliance of the Bank's activities with internal corporate principles; Stakeholder satisfaction

Source: Nikonova I.A., Smirnov A.L., 2016

Foreign practice of the activities of large banks and financial development institutions demonstrates the possibility of monitoring, monitoring and evaluation of actual results and reporting to national governments.

Andreeva E.S. believes that since PPP participants are the public and private sector, the PPP project evaluation indicators should be divided into two groups: the efficiency indicators of PPP projects for the state and for the private partner (Table 6) (Andreeva E.S., 2013). But, at the same time, there are economic indicators that are equally important for the state and for the private sector (NPV, PI, IRR, DPP).

Table 6

**Scorecard for assessing the effectiveness of PPP projects**

<b>Indicators of PPP effectiveness for the state</b>		
<b>Index</b>	<b>Method of calculation</b>	<b>Explanations</b>
<b>Ratio of private and budget investments (PBI)</b>	$PBI = \frac{\sum F_p}{\sum F_b}$ <p><math>F_p</math> – the amount of private funds allocated to the PPP facility; <math>F_b</math> – amount of budgetary funds</p>	The level of budgetary load reduction, the ideal ratio under PPP conditions is parity (50:50), but in modern conditions, the PBI = 1 is the minimum allowable condition, hence: PBI ≥ 1
<b>Reduction of the unemployment rate (U)</b>	$U = \frac{N_j}{N_u} \times 100\%$ <p><math>N_j</math> – number of new jobs created within the framework of the PPP project; <math>N_u</math> – the number of unemployed in the country (in the region).</p>	The possibility of PPP projects to create and maintain employment. With a positive value, unemployment decreases, the higher the U value, the better the further socioeconomic development of the region

<b>Increase in tax revenues to the budget (TR)</b>	$TR = \frac{TR_c}{TR_{c-1}} \times 100\%$ <p><math>TR_c, TR_{c-1}</math> – the amount of tax revenue for the current and previous periods, respectively.</p>	Shows how much the budget revenues increased as a result of PPP implementation. The higher the value of this indicator, the greater the benefit of the state
<b>Share of innovative products (<math>S_{ip}</math>)</b>	$S_{ip} = \frac{R_p}{R_t}$ <p><math>R_p</math> – revenue from sales of new or improved products; <math>R_t</math> – total revenue from sales of all products.</p>	Assesses the enterprise's ability to introduce innovative products. The higher is the value of this indicator, the more innovative is the enterprise
<b>Intellectual capacity (IC)</b>	$IC = \frac{V}{Q}$ <p><math>C_{HMM}</math> – the value of intangible assets; <math>Q</math> – output volume.</p>	It allows to determine the degree of application of innovations in the activity of an enterprise
<b>Indicators for assessing the effectiveness of PPPs for a private partner</b>		
<b>Return on assets (ROA)</b>	$ROA = (\text{Profit before taxation} / \text{Value of assets}) \times 100\%$	Characterizes the profit received by the enterprise from each ruble advances on the formation of assets
<b>Return On Investments (ROI)</b>	$ROI = (\text{Profit before taxation} / (\text{Balance sheet currency} - \text{Short-term liabilities})) \times 100\%$	Expresses the effectiveness of the use of funds invested in the development of this organization
<b>Profitability of equity capital (PEC)</b>	$PEC = (\text{Net income} / \text{Equity}) \times 100\%$	Characterizes the presence of profit in the calculation of capital invested by the owners of this organization
<b>Profitability of production (production activity) (<math>P_p</math>)</b>	$P_p = (\text{Net profit} / \text{Cost of sales}) \times 100\%$	It shows what profit the enterprise has from each ruble spent on production and sales of products
<b>Profitability of sales (<math>P_s</math>)</b>	$P_s = (\text{Profit from sales} / \text{Proceeds from sales of products}) \times 100\%$	Characterizes the specific weight of profit as part of the proceeds from the sale of products

Source: Andreeva E.S., 2013

Gabdullina E.I. developed an algorithm for assessing the effectiveness of regional PPP projects, which allows you to determine the feasibility, validity of the project, the best form of its implementation. At the second stage, this algorithm, conclusions are drawn about the value of partnerships, based on various types of the efficiency category (Table 7) (Gabdullina E.I., 2013).

Table 7

**Evaluation of the effectiveness of PPP participants**

<b>Efficiency of the project as a whole</b>	Public efficiency	Gross national product, employment and income level of the population, participation in the international division of labor.
	Commercial efficiency	

<b>Efficiency of participation in the project</b>	Efficiency for participants	Net present value; Internal rate of return; payback period; Need for additional financing; Weighted average cost of capital; Value of capital assets
	Regional, branch efficiency	Competitiveness of the enterprise, growth of incomes of the adjacent enterprises, the international integration, ecological safety
	Budget efficiency	Incomes to budgets of various levels in the form of taxes, excises, duties, etc.

Source: Gabdullina E.I., 2012

To assess the effectiveness, depending on the complexity of the project Gabdullina E.I. It is suggested to use various methods and tools, from the simplest calculations, to the most complicated analysis of "costs - benefits" (Table 8).

Table 8

**Methods for assessment of the comparative efficiency of PPP projects depending on the level of complexity**

<b>The level of difficulty</b>	<b>The name of the method</b>		<b>The base of comparison</b>
The highest	The complete analysis "cost-benefit"		Traditional project
Average	Public Sector Comparator	before the selection procedure of the winner of the competition	Traditional project
Average		after the procedure of selecting the winner of the competition	Traditional project
The lowest	Competitive bidding procedure		Other PPP project

Source: Gabdullina E.I., 2012

Thus, studies of the problem of the efficiency of PPPs are of great interest in the global professional community. In the methodologies studied, the evaluation of the efficiency of projects varies from rigorous optimization to multivariate generalization analysis, both for each project participant and for society as a whole.

**Conclusions, Proposals, Recommendations**

- In conclusion, we note that the evaluation of the efficiency of PPP projects in the Republic of Belarus is carried out:
  - on the financial efficiency of the project, which includes key indicators of the investment attractiveness of NPV, WACC, DPP, IRR, PI and financial stability indicators EBIT, EBITDA, DSCRt;
  - on the socio-economic efficiency of the project, which is determined taking into account the specifics and scope of PPP application.
- In the Republic of Belarus, the methodology for the assessment of the efficiency of PPP projects is more focused on the assessment of the efficiency of the state's participation, rather than a private partner. This is due to the specific understanding of the PPP mechanism, which consists of saving budget funds, attracting private investments in activities that are not of interest to a private partner due to a long payback period, low profitability, etc.
- An analytical review of foreign methodologies for the assessment of the efficiency of PPP projects has shown that the following indicators should be included in the national methodology:
  - debt load, which helps objectively assess the credit burden of a private partner, before attracting new loans and credits;
  - liquidity (solvency): an indicator of current liquidity, fast liquidity;

- budgetary efficiency: assessment of the increase in the budget load as a result of the adoption of additional obligations, the risks of project implementation (the risk of underutilization of the facility), the discounted indicator of budget efficiency, the budget efficiency index, etc.

4. The Belarusian method does not fully take into account the effect of partnership, which can be assessed by comparing financial indicators with different project implementation options - only by the state, only by the private sector and by partnership. The existing approach does not reflect the benefits received by each participant and are often due to the manifestation of synergistic effects from interaction. The benefits of society are, in fact, excluded from the evaluation of the efficiency of the project.

It should be noted that the issues of the balance of interests of the project stakeholders are the least developed. Ignoring the need to take into account the interests of the parties in PPP projects increases the risks of the project, which can have negative consequences for the economy as a whole.

5. Thus, the authors formulated the following concepts:

- the PPP project should have the necessary level of efficiency for the stakeholders of the project - society, the state and the private sector;

- the PPP project should meet the needs of the region's social and economic development;

- the PPP project should be based on the financial, industrial, labor and natural resources of the region.

The public utility of the PPP project is a qualitative indicator and is based on the project evaluation by the population of the region. This indicator is introduced due to the need to include society in the development of PPPs in the region. Assessment of this indicator is carried out by sociometric methods.

The project evaluation should take into account the sectoral and territorial aspects of regional development and reflect the impact of project results on the development indicators of a particular industry and territory. In addition, the assessment should include indicators of the needs of the population, the breadth of the population's results of the project and others.

## Bibliography

Andreeva, E.S., 2013. "Evaluation of the effectiveness of public-private partnership projects: a methodological approach", *Vestnik Kazanskogo tekhnologicheskogo universiteta*, vol. 16, no. 12, pp. 300-303.

Gabdullina, E.I., 2012. "Evaluation of the effectiveness of PPP projects as a mechanism for interaction of power and business in the region", *Sovremennyye problemy nauki i obrazovaniya*, no.2.[Online] Available at: <https://science-education.ru/ru/article/view?id=5928> [Accessed 25 February 2017].

National Infrastructure Plan 2016-2030, 2015. *Osnovnyye napravleniya infrastruktornogo razvitiya Respubliki Belarus' v 2016 - 2030gg.* [The main directions of the infrastructure development of the Republic of Belarus in 2016-2030].[Online] Available at:[http://pppbeltarus.by/files/images/docs/nip\\_rus\\_web.pdf](http://pppbeltarus.by/files/images/docs/nip_rus_web.pdf) [Accessed 25 February 2017].

Nikonova, I.A. & Smirnov, A.L., 2016. *Proyektnoye finansirovaniye v Rossii. Problemy i napravleniya razvitiya* [The project financing in Russia. Problems and directions of development]. Konsaltbankir, Moscow, Russian Federation.

Board of Representatives and the Council of the Republic of Belarus, 2016. *O proyektakh gosudarstvenno-chastnogo partnerstva. Zakon Respubliki Belarus'*, 30.12.2016. no.345. [On public-private partnership projects. Law of the Republic of Belarus, 30.12.2016. no.345.[Online] Available at:[http://www.pravo.by/upload/docs/op/H11500345\\_1451595600.pdf](http://www.pravo.by/upload/docs/op/H11500345_1451595600.pdf) [Accessed 20 February 2017].

Ministry of Economy of the Republic of Belarus, 2016. *O proyektakh gosudarstvenno-chastnogo partnerstva. Postanovleniye ministerstva ekonomiki*, 27.07.2016. no. 49. [On public-private partnership projects. Decree of the Ministry of Economy, 27.07.2016. no. 49].[Online] Available at:[http://www.economy.gov.by/dadvfiles/002847\\_561801\\_49.pdf](http://www.economy.gov.by/dadvfiles/002847_561801_49.pdf) [Accessed 20 February 2017].



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