

DOI: 10.26794/2587-5671-2025-29-5-6-20

UDC 336.648(045)

JEL G38

The Development of a Scientific and Practical Approach to Selecting a Public-Private Partnership Model for Implementation of an Investment Project in a Region

E.B. Tyutyukina, A.M. Gubernatorov, D.A. Egorova

Financial University under the Government of the Russian Federation, Moscow, Russian Federation

ABSTRACT

Subject: financial and economic relations associated with the implementation of an investment project (hereinafter referred to as the project) using public-private partnership (hereinafter referred to as PPP) models in a constituent entity of the Russian Federation (hereinafter referred to as the region). **Objective:** to develop of a scientific and practical approach for justifying the selection of the most suitable PPP model for implementing the project in a given region from the perspective of both private and public stakeholders. **Tasks:** to identify factors influencing the use of PPP in the regions, as well as approaches to choosing a PPP model for project implementation based on content analysis; to develop and test an algorithm for selecting a PPP model for project implementation in a specific region; based on the results obtained, justify different levels of use of PPP models in the regions; propose modifications to PPP models that can be implemented in the Russian economy. **Methods:** content analysis to identify factors influencing the use of PPPs in the regions; grouping method and scenario approach to develop an interactive matrix for selecting potential PPP models for project implementation; correlation and regression analysis to identify factors influencing the use of PPP models in the regions; a method for calculating the efficiency of PPP projects for both public and private partners using formulas. **Results:** An algorithm for selecting a PPP model is proposed, which acts as a funnel to select models for project implementation in a specific region. At the first stage, potential PPP models are identified using an interactive matrix. Then, at the second stage, the feasibility of using a particular PPP model in the region is assessed based on financial and economic factors identified through correlation and regression analysis. The commercial, budgetary, and socio-economic feasibility of each PPP project is evaluated at stages three through five. Finally, the most suitable PPP model is chosen based on an integrated assessment at the sixth stage. Based on these results, differences in demand for PPPs across regions are demonstrated, as well as the necessity and suggestions for developing customized PPP models.

Keywords: PPP models; algorithm for selecting PPP models; factors for selecting a PPP model; integrated assessment of a PPP project; reasons for not using PPP models; modified PPP models

For citation: Tyutyukina E.B., Gubernatorov A.M., Egorova D.A. The development of a scientific and practical approach to selecting a public-private partnership model for implementation of an investment project in a region. *Finance: Theory and Practice*. 2025;29(5):6-20. (In Russ.). DOI: 10.26794/2587-5671-2025-29-5-6-20

INTRODUCTION

Currently, Russian legislation defines the possibility of using a wide range of models (forms) PPP in the implementation of investment projects¹ grouped according to various criteria [1].² The division of models into classical PPPs³ and quasi-PPPs⁴ is carried out according to the organizational criterion [2, 3]. Classification criteria are not used in the context of this study.

In accordance with Russian legislation, various PPP models can be used in the implementation of the project. The alternative choice of PPP models is provided even for the space industry by the new federal laws⁵ adopted in 2024. Each PPP model in Russian legislation is regulated by a separate legislative act, since it has specific features of goal setting, facilities being created and ownership rights to them, financing, government support measures, and management, which ultimately determines its advantages, disadvantages, and risks [4–7].

Among the main PPP models in 2020–2023, CS prevails, both in terms of the number of concluded PPP projects and the volume of investments.⁶ Each PPP model has its own industry priorities.⁷ Almost all

models are implemented at the regional and municipal levels (with the exception of the NWPC). Consequently, it is the regions that play the main role in using PPP as a mechanism to stimulate private investment in the economy. In 2020–2023, PPP models were used to launch projects in 63 regions of the Russian Federation.⁸ The largest number of projects in 2020–2023, both in terms of number and volume of investments using all PPP models, were launched in the following regions: Perm region, Republic of Tatarstan, Krasnodar region, Moscow and Sverdlovsk region.⁹ During the analyzed period, a quarter of the regions did not utilize the PPP (Public-Private Partnership) mechanism at all. In regions where PPP models are used, CA is still considered the most promising and profitable form of cooperation [8].

In this regard, the authors propose a scientific and practical approach to the choice of a PPP model, taking into account the established practice of using PPP models, the specifics of the project, and the level of economic development of the region. The proposed approach can be used by public and private partners to determine the comparative advantage of PPP models in the implementation of projects in the region.

OVERVIEW OF APPROACHES TO CHOOSING A PPP MODEL FOR PROJECT IMPLEMENTATION

Choosing the most appropriate PPP model is a rather complicated process. According to the authors, various factors should be taken into account when choosing a PPP model.

supply and sanitation, MSW management, (municipal solid waste) education and science, school education, incidents and dormitories, industrial production; IP — housing and communal services and the urban environment, culture and leisure, mass sports; LCC — heat supply and gas supply, medical industry, electrical installation, SIC — chemical and automotive industry, ferrous metallurgy, IPPA— chemical industry, mining, transport and logistics complexes, industrial production. pipe industry and metal structures,

⁸ Excluding new regions.

⁹ Calculated by the authors according to the Rosinfra Information Resource website. URL: <https://dpo.rosinfra.ru/base-projects?page=2> (accessed on 10.05.2024).

¹ Rosinfra information resource. URL: <https://dpo.rosinfra.ru/base-projects?page=2> (accessed on 30.03.2025).

² Legal, functional, organizational, managerial, financial and economic.

³ A concession agreement (hereinafter referred to as the CA), an agreement on public-private, municipal-private partnership (hereinafter referred to as the PPP/MPP agreement).

⁴ Life cycle contract (hereinafter referred to as LCC), lease agreement with investment obligations, offset contracts with investment obligations, investment agreement (hereinafter referred to as IA), agreements on protection and promotion of investments (hereinafter referred to as IPPA), special investment contract (hereinafter referred to as SIC), corporate competitiveness improvement programs (hereinafter referred to as CCIP), territories of advanced development (hereinafter referred to as the TAD).

⁵ Federal Law No. 196-FZ dated 02.07.2024 “On Amendments to Certain Legislative Acts of the Russian Federation”; Federal Law No. 302-FZ dated 08.08.2024 “On Amendments to the Federal Law “On Public-Private Partnership, Municipal-Private Partnership in the Russian Federation and Amendments to Certain Legislative Acts of the Russian Federation”.

⁶ Rosinfra information resource. URL: <https://dpo.rosinfra.ru/base-projects?page=2> (accessed on 28.03.2025).

⁷ CA is mainly used in the following industries: housing and communal services and the urban environment, heat

In particular, S.P. Kurdjieff and V.N. Shkred [9] consider it necessary to evaluate the statistics of the current development of the PPP market in the regions, the investment climate of the region, and the availability of financing tools. V.N. Parakhina, O.A. Boris, G.V. Vorontsova [10] identifies three groups of factors: institutional (development of the regulatory framework and PPP management bodies in government agencies), competence-based (availability of experience and competencies from partners), socio-economic (investment attractiveness of the region and its potential). The necessary level of competence of public and private partners is also noted by D.M. Kolosova and K.A. Kuzmin [11]. The impact of the socio-economic situation on the number of PPP projects being implemented is empirically substantiated by E.A. Fedorova and A.A. Gubanov [12]. According to T.G. Shelkunova and A.V. Dvadnenko [13], D.V. Baibulatova [14] the development of PPP is influenced by the availability and quality of the institutional framework at the regional level. The trend of digitalization of the economy, according to I.M. Shor [15], should also be considered as a factor in the development of PPP. M.A. Adamenko [16] notes the need for transparency of data on the economic development of the region. The same opinion is expressed by M.A. Fedorova [17], who also considers financial support for PPP projects from the authorities to be an essential factor. The mechanism of financial support for PPP projects at the regional level was studied by D.K. Aliyev [18]. According to A.A. Rabadanova [19], the expansion of the use of PPP models by industrial enterprises is influenced by the financial participation of the state and the conditions of monetary policy. I.V. Kosorukova, O.V. Loseva and M.A. Fedotova believe that state financial support should be provided only if regional projects and their performers are attractive to investment [20].

Open sources suggest approaches to choosing a PPP model for project implementation. In particular, the Ministry of Economic Development has

approved a methodology for assessing the comparative advantage of using the PPPA/MPPA and LCC models (hereinafter referred to as Methodology-894).¹⁰ In its development, A.A. Kuznetsov [21] proposes a methodology for modeling cash flows for public and private partners to identify the comparative advantage of these two PPP models. O.S. Salomatina and E.N. Kukina [22] propose a choice between CA and LCC based on the results of a SWOT analysis of the project in the region. N.G. Radchenko [23] considers a two-stage approach to the formation of a PPP mechanism in the region, noting the need to take into account the experience and rating of the best regions. According to T.M. Barbysheva [24], when choosing the optimal PPP model, it is necessary to take into account external and internal factors of regional development, and the key factor should be an assessment of the effectiveness of the project for various participants, including the population.

THE ALGORITHM FOR SELECTING A PPP MODEL FOR THE IMPLEMENTATION OF AN INVESTMENT PROJECT IN THE REGION

Based on the study of the authors' research, as well as the opinions of practitioners involved in the implementation of PPP projects in the regions, we propose an algorithm for selecting a PPP model for both public and private partners. The algorithm includes six stages.

Stage I. Selection of potential PPP models for project implementation.

Based on the analysis of panel data on projects launched using various PPP models for the period 2020–2023,¹¹ the characteristic features of its application were identified for each model: the sphere of economy, the level (municipal, regional, federal), the volume

¹⁰ Order No. 894 of the Ministry of Economic Development of the Russian Federation dated 30.11.2015 "On Approval of the Methodology for Evaluating the Effectiveness of a Public-Private Partnership Project, a Municipal-Private Partnership Project and Determining their Comparative Advantage".

¹¹ Rosinfra information resource. URL: <https://dpo.rosinfra.ru/base-projects?page=2> (accessed on 10.05.2024).

Table 1

Selection of PPP Models Using an Interactive Matrix

PPP models	The economic sphere in which the project is being implemented	The share of private investment, %	Project implementation level	The volume of investments, million rubles*
LCC	Electricity generation, heat and hot water supply	100	Municipal	min – 57 230; average bill – 69 514; max – 81 798
Investment agreement		100	Federal	min – 5 000; average bill – 9 000; max – 13 000
Concession agreement		40–90	Federal	min – 2 526; average bill – 29 371; max – 41 000
The PPP Agreement		35–90	Regional	min – 10; average bill – 10 517; max – 15 302
The MPP Agreement		6–69	Municipal	min – 116; average bill – 771; max – 2 576
SIC 1.0		100	Regional	min – 750; average bill – 17 050; max – 120 738
SIC 2.0		100	Municipal	min – 18; average bill – 24 490; max – 227 192
IPPA		100	Federal	min – 32 200; average bill – 36 500; max – 40 800
			Regional (possible implementation)	-

Source: составлено авторами / Compiled by the authors.

Note: * It was determined based on data on projects launched in 2020–2023.

of investments for each level (minimum, average and maximum check), the share of co-financing of investments by each partner.

The results obtained make it possible, taking into account the experience of the regions in using PPP models, to form a funnel for selecting potential PPP models based on the specified conditions of the project implementation – the economic sphere and the volume of investments. An interactive matrix for selecting PPP models was developed using the Excel environment (a fragment is presented in *Table 1*).

The algorithm for working with the matrix is as follows:

1) selecting a sphere in the corresponding window “Economic sphere in which the project is being implemented” gives a list of possible models in the “PPP Models” window;

2) selecting a model in the “PPP Models” window from the proposed list provides the following data:

- possible investment volumes in the “Investment Volume” window, linked to the “Project implementation level” window. This allows you to determine the level of project implementation (if it is not defined by the specified conditions) or the possibility of implementation at the level determined by the project conditions;
- the interval values of the share of project financing by a private partner in the “Share of private investment” window;
- a list of all possible government support measures in the “Government support measures” window.

Thus, for each model from the proposed list, a decision is made on the possibility of its

use. As a result, a list of potential PPP models for the implementation of the project is being formed.

Stage II. Assessment of the possibility of implementing PPP models in the region based on the results of correlation and regression analysis.

A review of the literature has shown that the use of PPP models in project implementation is influenced by a combination of regional development factors. For the study, 12 factors were selected, systematized into three groups (investment and credit ratings of the region, financial support of the region) (*Table 2*). The indicator characterizing the use of PPP models in the region is the volume of transactions for each PPP model. The empirical base was formed in general for all regions of the Russian Federation over nine years (2015–2023). The sample included the regions that launched the implementation of the PPP model during the analyzed period, namely: 62 regions — CA, 20 regions — SIC 1.0 and SIC 2.0, 15 regions — IA, 10 regions — PPPA and MPPA.¹² The statistical method of correlation and regression analysis is used as a mathematical tool for data processing.

The results showed that no significant factors were identified for any of the PPP models.¹³ Nevertheless, correlation analysis has shown that there are correlations between transaction volumes for various PPP models and almost all factors that can be taken into account when deciding whether to use a specific model (*Table 2*). At the same time, there is a multidirectional influence of factors for different PPP models.

Correlation and regression analysis was performed to identify the impact of three factors on the implementation of PPP models in a particular region: the region's investment rating (X_0), the region's debt burden (X_{10}), and the amount of subsidies from the federal

budget provided to the region's budget (hereinafter referred to as subsidies to the region's budget) (X_{11}). *Table 3* shows regions with statistically significant regression analysis results, according to which the level of debt burden and the amount of subsidies to the region from the federal budget are significant factors for the implementation of the IA and SIC models, and the amount of subsidies for the CA model.

To assess the possibility of using the PPP models selected at the first stage for the implementation of a project in a particular region, one can compare the value of the corresponding factor in the region with its regional average value in Russia as a whole. For example, according to *Table 2*, PPPA/MPPA models can be used in project implementation if the values of factors X_3 , X_4 , X_6 – X_8 are higher in the region, and factors X_9 , X_{10} , X_{12} are lower than the corresponding regional averages. To use the CA model, it is important that the value of factor X_{11} in the region is higher than the regional average.

A similar approach can be used for regions with the identified most significant factors (*Table 3*).

The next stages of the algorithm are related to evaluating the effectiveness of the project using various PPP models. It should be noted that according to the Methodology-894, the financial efficiency of the project and the socio-economic effect are calculated, and if available, a comparative analysis of the use of budget funds in the PPPA/MPPA and LCC models is carried out. However, it should be noted that the absolute indicators used in the methodology (NPV as financial efficiency and socio-economic effect) will determine the different effectiveness of the project (commercial and socio-economic) depending on the PPP model. Based on this, we propose our own approach to a comprehensive assessment of the comparative advantage of PPP models.

Stage III. Evaluation of the commercial effectiveness of the project.

Each PPP model affects the cash flows from the current and investment activities

¹² Rosinfra information resource. URL: <https://dpo.rosinfra.ru/base-projects?page=2> (accessed on 10.05.2024).

¹³ The resulting R-square, respectively, is: 0.24 (according to CA), 0.04 (according to IA), 0.03 (according to MPPA and PPPA) 0.15 (according to SIC).

Table 2
The Presence of Correlation Links Between the Volume of Transactions Under PPP Models and Factors in the Russian Federation as a Whole

Factor Characteristics		The average value by region for the analyzed period	The relationship between transaction volumes and factor characteristics in PPP models			
			CA	IA	PPPA/MPPA	SIC
1	2	3	4	5	6	7
I	Investment rating of the region (X_0)					
X_1	The volume of innovative goods, works, and services, million rubles	74 991,1	*	*	*	*
X_2	Investments in fixed assets, million rubles	390 856	*	*	*	*
X_3	The index of digital maturity of regions, k	7.5 ^a	*		Positive	
X_4	The cost of a fixed set of consumer goods (consumer basket), million rubles	0.02 ^b	*	Negative	Positive	*
X_5	The average monthly nominal accrued salary of employees, million rubles	0.064	*	*	*	*
X_6	Registered unemployment rate, %	0.65 ^b	*	*	Positive	Negative
X_7	Index of industrial production in the region, %	8.20 ^b	*		Positive	
X_8	Information openness, accessibility and transparency, %	83.60 ^c	*		Positive	
X_9	ESG ratings/ recklings, k	0.53 ^d	*		Negative	Positive
II	Credit rating of the region					
X_{10}	Debt burden level of the region, k	0.38 ^e	*		Negative	Positive
III	Financial support for the region					
X_{11}	Subsidies from the federal budget provided to the regional budget, million rubles	36 556.71 ^f	P ositive	*	*	Positive
X_{12}	Subsidies, million rubles	12 452.14 ^g	*		Negative	

Source: Compiled by the authors.

Note: * lack of relationships; calculated from the data: ^a URL: <https://www.cnews.ru/analytics/rating>; ^b URL: <https://rosstat.gov.ru/statistics/price>; ^c URL: <https://www.iminfin.ru/areas-of-analysis/rejting/rejting-regionov-po-urovnyu-otkrytosti-byudzhetykh-dannykh?territory=45000000>; ^d URL: <https://www.ra-national.ru/renkingi/rjenking-ustojchivosti-razvitiya-i-integracii-esg-kriteriev-v-deyatelnost-subektov-rossijskoj-federacii/>; ^e URL: <https://www.iminfin.ru/news/569-gosudarstvennyj-dolg-rossijskikh-regionov-v-2023-godu>; ^f URL: <https://www.budget.gov.ru/web/guest/0%91%D1%8E%D0%B4%D0%B6%D0%B5%D1%82>; ^g URL: <https://www.iminfin.ru/areas-of-analysis/budget/finansoviy-pasport-subjecta-rf/dokhody-sravnienie-po-regionam?territory=45000000> (accessed on 20.04.2024).

Table 3
Final Results of the Regression Analysis of the Influence of Factors on the Volume of PPP Transactions in Regions with Statistically Significant Results

Region	The regression equation	R-square	Fischer's F-criterion			Student's t-test			Factors influencing the development of PPP models in the region (positive (+), negative (-))
			actual value	critical value	adequacy of the model	actual value	critical value	significance of the coefficient	
1	2	3	4	5	6	7	8	9	10
Concession agreement									
Arkhangelsk region	$Y = 98\,791.39 - 114\,895 \times X_2$	0.52	7.6	0.01	yes	2.75	2.36	yes	The level of the region's debt burden (-)
Amur region	$Y = 999.53 + 0.204 \times X_3$	0.76	22.3	0.004	yes	4.72	2.36	yes	Subsidies to the regional budget (+)
Primorye region	$Y = 5103.86 - 77954.3 \times X_2 + 0.101 \times X_3$	0.77	10	0.05	yes	2.81/ 4.18	2.45	yes	The level of the region's debt burden (-); Subsidies to the regional budget (+)
St. Petersburg	$Y = -34\,431.2 + 571\,865.4 \times X_2$	0.82	33.8	0.004	yes	5.81	2.36	yes	The level of the region's debt burden (+)
Sverdlovsk region	$Y = 26.48 + 0.11 \times X_3$	0.56	9.07	0.004	yes	3.01	2.3	yes	Subsidies to the regional budget (+)
Investment Agreement									
Krasnoyarsk region	$Y = 6101.11 + 0.801 \times X_3$	0.72	17.61	0.004	yes	4.2	2.36	yes	Subsidies to the regional budget
SIC									
Nizhny Novgorod region	$Y = 13\,323.15 + 1.08 \times X_3$	0.55	8.62	0.004	yes	2.93	2.36	yes	Subsidies to the regional budget

Source: Compiled by the authors.

of the project. Therefore, the commercial effectiveness of the project will vary depending on the model used.

To assess the commercial effectiveness of the project, we suggest using the Discounted profitability index (hereinafter DPI), determined by the formula:

$$DPI = \sum_{t=1}^n \frac{CF_{C_t}}{(1+r)^t} \div \sum_{t=0}^n \frac{CF_{I_t}}{(1+r)^t}, \quad (1)$$

where CF_{C_t} is the value of net cash flow from current activities in period t , CF_{I_t} is the value of net cash flow from investment activities in period t , t is the step of the billing period, r is the discount rate¹⁴ at the step of the billing period, n is the number of steps of the billing period of the project.

The project is commercially effective if the DPI is > 1 . Accordingly, at this stage, PPP models are selected, using which the project is commercially effective for a private partner.

Stage IV. Assessment of the budgetary effectiveness of the project.

Each PPP model affects the cash inflows and outflows of budget funds, which, accordingly, affects the budgetary effectiveness of the project.

To assess the budgetary effectiveness of the project, we propose using the discounted yield index of budgetary funds of the budgetary system of the Russian Federation (hereinafter — DPI_{BS}), taking into account the participation of different levels of the budgetary system, which have their own requirements for the level of profitability:

$$DPI_{BS} = \left(\sum_{t=1}^n \frac{CI_{FB_t}}{(1+r_{FB})^t} + \sum_{t=1}^n \frac{CI_{RB_t}}{(1+r_{RB})^t} \right) \div \left(\sum_{t=1}^n \frac{CO_{FB_t}}{(1+r_{FB})^t} + \sum_{t=1}^n \frac{CO_{RB_t}}{(1+r_{RB})^t} \right), \quad (2)$$

where CI_{FB_t} is the amount of funds received from the federal budget and state extra —

¹⁴ It is traditional to use the cost of capital (in %) raised to finance the project for each year of the project's implementation as the discount rate.

budgetary funds from the implementation of the project in period t (cash inflows); CI_{RB_t} is the amount of funds received from the budgets of the subjects of the Russian Federation and municipalities from the implementation of the project in period t (cash inflows); CO_{FB_t} is the expenditure of federal budget funds from the implementation of the project in period t (cash outflows); CO_{RB_t} — expenditures of the budgets of the subjects of the Russian Federation and municipalities from the implementation of the project in period t (cash outflows); r_{FB} is the discount rate for federal budget expenditures at the step of the billing period;¹⁵ r_{RB} is the discount rate for expenditures from the budgets of the constituent entities of the Russian Federation and municipalities at the step of the billing period;¹⁶ t is the step of the billing period; n is the number of steps of the billing period for project implementation.

The project has budgetary efficiency if the $DID_{BS} > 1$. Accordingly, at this stage, PPP models are selected, using which the project has budgetary efficiency.

Stage V. Assessment of the socio-economic effectiveness of the project.

We propose to evaluate the socio-economic efficiency index ($SEEI$):

$$SEEI = \frac{\sum_{t=1}^n SEE_t}{\sum_{t=0}^n CF_{I_t} + \sum_{t=1}^n CO_{FB_t} + \sum_{t=1}^n CO_{RB_t}}, \quad (3)$$

where SEE_t is the socio-economic effect obtained in the period t .

For projects using PPP models implemented within the framework of national projects (hereinafter referred to as the national project), the target indicators of the corresponding national project are taken as the SEE_t indicator, the values of which are calculated based on the

¹⁵ It is determined by the Order of the Ministry of Economic Development of the Russian Federation dated November 30, 2015 No. 894 "On Approval of the Methodology for Evaluating the Effectiveness of a public-Private partnership project, a municipal-Private partnership project and determining their comparative advantage."

¹⁶ The same.

results of the project implementation. Only those targets that can have monetary value are taken. The availability of SEE_t from the project implementation will be in the event that at least two targets can be calculated for the project.¹⁷

The denominator of formula (3) characterizes the funds invested in the project by private and public partners during the entire duration of the project.

During the project implementation, the value of SEE_t will be the same regardless of the PPP model used. However, the socio-economic effectiveness of the project will vary in different PPP models. A project with a higher $SEEI$ value will be more effective.

Stage VI. The selection of a PPP model for project implementation based on an integrated assessment.

The selection process involves projects that have commercial and budgetary effectiveness. The choice of a PPP model should be based on a multi-criteria approach that takes into account the criteria of commercial, budgetary and socio-economic efficiency. The advantage of this approach is considered in the works of a number of authors [25–28].

For an integral assessment of the effectiveness of the project, a point method is proposed, according to which:

- for each criterion, one point is assigned to a less effective project, then the points increase as efficiency increases;
- the maximum score for all three criteria characterizes the most effective PPP model for project implementation.

The algorithm was tested when selecting a PPP model for the implementation of standard investment projects for the construction of secondary schools in Tyumen Region (*Table 4*).

Despite the initially obvious choice of a CA model, the results of the assessment from the

perspective of a public partner and his social responsibility show the same possibility of implementing CA and IA.

CONCLUSIONS

The study showed why the CA model is so popular, while other forms of PPP are not widely used in the regions. It helps to understand how to make them more attractive.

For the regions, the availability of a wide range of infrastructure facilities¹⁸ and strategic objectives for their development necessitate the attraction of private investment. For almost 20 years of use, the CA model has become a well-developed tool for implementing large infrastructure projects. For a private partner, the attractiveness of the CA model is determined by a combination of factors: the financial participation of the public partner in the implementation of the project (including capital grants, the concession fees and the minimum guaranteed income); state support measures such as provision of preferential land and environmental management conditions, and tax benefits, the possibility of attracting significant amounts of external investment into projects through bank loans and the issuance of concession bonds); For a private partner, the attractiveness of a CA model is determined by several factors: the financial contribution of the public partner to the project (including capital grants, concession fees, and minimum guaranteed income), state support measures such as provision of preferential land, environmental management conditions, and tax benefits, the possibility of attracting large amounts of external investment through bank loans and the issuance of concession bonds, simplified procedures for concluding a CA agreement (including electronic application processes), and a detailed payment mechanism with provisions for special circumstances.

Other PPP models, including for the implementation of infrastructure projects, despite also having a number of advantages, are inferior in attractiveness to the CA model.

¹⁷ This approach is defined by the Order of the Ministry of Economic Development of the Russian Federation dated November 30, 2015 No. 894 "On Approval of the Methodology for evaluating the Effectiveness of a public-private partnership project, a municipal-private partnership project and determining their comparative advantage."

¹⁸ Infrastructure facilities and projects are understood in the context of federal laws on concession agreements and agreements on public-private, municipal-private partnership.

Table 4

Testing the Algorithm for Selecting a PPP Model for Implementing an Investment Project

No.	Algorithm Stages	Potential PPP models				
		CA	IA	MPPA	PPPA	IPPA
1	Stage I. Selection of potential PPP models for project implementation					
2	Economic sphere	CA	IA	MPPA	PPPA	IPPA
3	Investment volume, level, share of co-financing, state support measures	CA	IA	MPPA		
4	The result of the selection based on the results of stage I	CA	IA	MPPA		
5	Stage II. Assessment of the possibility of implementing models in the region based on the results of correlation analysis					
6	Subsidies to be transferred from the federal budget under agreements, million rubles	Yes				
7	The level of the region's debt burden		Yes	Yes		
8	The region's Digital Maturity Index		No	No		
9	The cost of a fixed set of consumer goods (consumer goods basket)		Yes	Yes		
10	Registered unemployment rate, %			No		
11	Index of industrial production in the region, %		No	No		
12	Information openness, accessibility and transparency, %		Yes	Yes		
13	ESG-ratings/recklings		Yes	Yes		
14	Subsidies		Yes			
15	The result of the selection based on the results of stage II*	CA	IA			
16	Stage III. Evaluation of the commercial effectiveness of the project	0.786** (2 points)	0.243*** (1 point)			
17	Stage IV. Assessment of the budgetary effectiveness of the project	0.260 (2 points)	0.001331 (1 point)			
18	Stage V. Assessment of the socio-economic effectiveness of the project	0.000325 (1 point)	0.000411 (2 points)			
19	Stage VI. Selecting a PPP model for project implementation based on an integrated assessment					
20	Total (sum of lines 16–18)	5 points	4 points			
21	For a private partner (line 16)	2 points	1 point			
22	For a public partner (sum of lines 17 and 18)	3 points	3 points			
23	From the perspective of social responsibility of a private partner (sum of lines 16 and 18)	3 points	3 points			

Source: Compiled by the authors.

Note: * The decision was made based on the fact that more than half of the factors had a positive impact on the implementation of the model. ** Cash flows from operating activities include payments from the competitor in the form of investments and maintenance payments. *** These cash flows also include tax benefits from the main activities of the private partner.

From the perspective of the regions, disinterest in the implementation of projects using PPP models has, first of all, a financial basis, namely:

- in almost all PPP models (CA, IA, PPPA/MPPA, SIC, IPPA), co-financing of the project is possible from the public partner (in PPPA/MPPA models, the minimum return to the private partner is also guaranteed). But for this, the budgets of the regions and municipalities must have the necessary funds. In addition, in accordance with budget legislation, the use of budgetary instruments is limited to the fiscal year and/or the planning period, without taking into account the possibility of exceeding the validity period of the approved limits of budgetary obligations. However, large projects have a pre-investment and investment stage, usually more than two years. At the same time, the public partner must report on the targeted use of budget funds in the year of achieving the KPI;

- in PPP models (IA, SIC, IPPA), it is possible for the public partner to provide tax incentives for taxes credited to regional and local budgets, as well as preferential land and environmental management conditions, which causes the occurrence of tax shortfalls, and non-tax revenues of regional and local budgets.

For the private partner, the disinterest in using PPP models is explained by a combination of reasons:

- lack of practice of co-financing by the public partner in the IA, SIC, IPPA models;

- risks of low profitability (lack thereof) for infrastructure facilities created using IA, PPPA/MPPA models and owned by a private partner after the completion of the agreement;

- an unregulated procedure for securing the ownership rights of a private partner to an object created as a result of a project using IA, PPPA/MPPA models;

- a lengthy and costly procedure for the private partner to submit and approve tender documents (in particular, on PPPA/MPPA and IPPA);

- lack of effective mechanisms for judicial and pre-trial (or out-of-court) dispute

resolution (negotiations, mediation, etc.) between partners.

In addition, as shown by the results of the correlation analysis (*Table 2*), the necessary level of socio-economic development of the region (industrial production index, digital maturity, information openness) must be in place to implement the IA, PPPA/MPPA and SIC models. At the same time, a number of factors (consumer basket, unemployment rate, ESG ratings/recklings, debt burden level) have a multidirectional impact on the use of models, which can also be taken into account when choosing them. For example, a high level of registered unemployment may prompt regional authorities to conclude a PPP as a measure to reduce it. At the same time, for the implementation of projects using the SIC model, this indicator may indicate an insufficient qualification of workers in the region. It should also be noted that the use of the PPP mechanism largely depends on the political will of the regional leaders and their team. For example, in Arkhangelsk region and Primorye region, the number of CA contracts increases with a decrease in the region's debt burden. In St. Petersburg, on the contrary, in the context of an increasing debt burden, the conclusion of the CA is considered as a measure to increase budget revenues (*Table 3*).

The proposed algorithm for selecting a PPP model was developed based on the existing experience in their implementation in the regions. Using the algorithm allows you to select alternative PPP models for the project, evaluate the possibilities of their implementation in a particular region, and calculate the comparative advantages for each of the partners, including private ones, from the perspective of traditional and socially responsible investment.

Further development of the PPP mechanism based on the results we have obtained, as well as the position of the PPP market participants, should be carried out in terms of expanding the use of PPPs by industry through the use of combined PPPA/MPPA mechanisms, as well as

their combination with classical PPP models. This request exists in foreign countries, in particular, in the United States, the issue of creating a new form of PPP in the field of microelectronics and IT infrastructure is being considered.¹⁹

To create modified PPP models in the Russian economy, it is necessary: the state's systemic request for cross-industry PPP formations; lifting the ban on private investor involvement of companies directly or indirectly under state control; creation

of customized financial instruments;²⁰ the possibility of admission of development institutions on the side of a public partner, so that all support measures can be provided centrally within one project office with the potential to use a variety of combinations of PPP models; the development of inter-industry collaboration on technical and innovative projects, with direct involvement of representatives from public authorities in these projects.

We believe that modified PPP models can provide maximum multiplier effect for each of the parties and become a tool for implementing strategies for socio-economic development of the regions.

²⁰ A customized financial instrument has the characteristics that the user needs.

¹⁹ Lessons Learned from Public-Private Partnerships (PPPs) and Options to Establish a New Microelectronics PPP. The Institute for Defense Analyses. URL: <https://www.ida.org/research-and-publications/publications/all/1/1e/lessons-learned-from-ppps-and-options-to-establish-a-new-microelectronics-ppp> (accessed on 13.06.2024).

ACKNOWLEDGEMENTS

The article was prepared based on the results of research on the topic “Models of public-private partnership in investment activities used in the Russian economy: assessment and directions for improving efficiency, development prospects”, carried out at the expense of budgetary funds under the state assignment to the Financial University for 2024. Financial University under the Government of the Russian Federation, Moscow, Russian Federation.

REFERENCES

1. Shor I.M. Multicriteria classification of public-private partnership forms. *Vestnik NGUEU = Vestnik NSUEM*. 2023;(3):154–166. (In Russ.). DOI: 10.34020/2073-6495-2023-3-154-166
2. Afanas'eva N.V., Orlov P. Public-private partnership in the Russian Federation at the present stage: Trends and problems of development. *Ekonomika i upravlenie = Economics and Management*. 2023;29(11):1333–1348. (In Russ.). DOI: 10.35854/1998-1627-2023-11-1333-1348
3. Merzlov I. Yu. Institutional bases of public-private partnership development. *Russian Journal of Economics and Law*. 2021;15(3):455–472. (In Russ.). DOI: 10.21202/2782-2923.2021.3.455-472
4. Shohin S.O. Features and trends in the development of the legal framework of public-private partnership in the Russian Federation. *Yuridicheskii mir = Juridical World*. 2023;(9):22–24. (In Russ.). DOI: 10.18572/1811-1475-2023-9-22-24
5. Evloev T.I. Comparative analysis of the effectiveness of the implementation of forms of public-private partnership. *Modern Economy Success*. 2022;(4):62–66. (In Russ.).
6. Medzhidov Z.U. Forms of public-private partnership in Russia: A comparative study. *Vestnik Instituta ekonomiki Rossiiskoi akademii nauk = Bulletin of the Institute of Economics of the Russian Academy of Sciences*. 2022;(3):73–95. (In Russ.). DOI: 10.52180/2073-6487_2022_3_73_95
7. Kitaev S.V. Features of public-private partnership in Russia at the present stage. *Teorii i problemy politicheskikh issledovaniy = Theories and Problems of Political Studies*. 2023;12(8A):15–25. (In Russ.). DOI: 10.34670/AR.2023.85.91.005
8. Piven I.G. Partnership between the state and business in the context of economic transformations: Yesterday, today, tomorrow. *Ekonomika i predprinimatel'stvo = Journal of Economy and Entrepreneurship*. 2023;(10):758–762. (In Russ.). DOI: 10.34925/EIP.2023.159.10.153

9. Kyurdzhev S.P., Shkred V.N. Analysis of the conditions for the development of public-private partnership in the territory of the Russian Federation. *Gosudarstvennoe i munitsipal'noe upravlenie. Uchenye zapiski = State and Municipal Management. Scholar Notes*. 2021;(4):104–110. (In Russ.). DOI: 10.22394/2079-1690-2021-1-4-104-110
10. Parakhina V.N., Boris O.A., Vorontsova G.V. Factors of economic efficiency of public-private partnerships. In: Yachmeneva V.M., ed. Sustainable development of the socio-economic system of the Russian Federation. Proc. 22nd All-Russ. sci.-pract. conf. (Simferopol, November 19–20, 2020). Simferopol: Arial; 2020:10–15. (In Russ.).
11. Kolosova D.M., Kuzmin K.A. Public-private partnership: Problems and solutions. *Ekonomika i biznes: teoriya i praktika = Economy and Business: Theory and Practice*. 2021;(12–1):189–193. (In Russ.). DOI: 10.24412/2411-0450-2021-12-1-189-193
12. Fedorova E.A., Gubanov A.A. Effectiveness of public-private partnership projects during the COVID-19 pandemic. *Finance: Theory and Practice*. 2024;28(3):6–18. (In Russ.). DOI: 10.26794/2587-5671-2024-28-3-6-18
13. Shelkunova T.G., Dvadenko A.V. improving public-private partnerships in Russia. *Ekonomika i biznes: teoriya i praktika = Economy and Business: Theory and Practice*. 2021;(11–3):178–181. (In Russ.). DOI: 10.24412/2411-0450-2021-11-3-178-181
14. Baibulatova D.V. Public-private partnership as a tool to foster business innovation activities in the digital technologies field. *Ekonomika nauki = The Economics of Science*. 2023;9(3):61–75. (In Russ.). DOI: 10.22394/2410-132X-2023-9-3-61-75
15. Shor I.M. Russian trends in the development of public-private partnership. *Vestnik MGPU. Seriya: Ekonomika = MCU Journal of Economic Studies*. 2023;(4):60–73. (In Russ.). DOI: 10.25688/2312-6647.2023.38.4.06
16. Adamenko M.A. Improving the financial mechanism of public-private partnership in the Russian economy. *Ekonomika i biznes: teoriya i praktika = Economy and Business: Theory and Practice*. 2023;(1–1):5–11. (In Russ.). DOI: 10.24412/2411-0450-2023-1-1-5-11
17. Fedorova M.A. Trends in the development of public-private partnership: Regional aspect. *Estestvenno-gumanitarnye issledovaniya = Natural Humanitarian Studies*. 2024;(5):391–397. (In Russ.).
18. Aliev D.K. Development of a mechanism for financial support of public-private partnership projects at the regional level. Cand. econ. sci. diss. Moscow; 2020. 161 p. (In Russ.).
19. Rabadanova A.A. Transformation of the institute of PPP in the new socio-economic conditions. *Regional'nye problemy preobrazovaniya ekonomiki = Regional Problems of Economic Transformation*. 2024;(12):331–336. (In Russ.). DOI: 10.26726/rppe2024v12tigvn
20. Kosorukova I.V., Loseva O.V., Fedotova M.A. Screening-evaluation of regional investment projects for the provision of state financial support measures. *Finance: Theory and Practice*. 2024;28(2):23–39. (In Russ.). DOI: 10.26794/2587-5671-2024-28-2-23-39
21. Kuznetsov A.A. Modelling of financial effectiveness and comparative analysis of public-private partnership projects and public procurement. *Vestnik MGSU = Vestnik MGSU: Monthly Journal on Construction and Architecture*. 2017;12(10):1180–1190. (In Russ.). DOI: 10.22227/1997-0935.2017.10.1180-1190
22. Salomatina O.S., Kukina E.N. SWOT-analysis of public-private entrepreneurship in healthcare in the Volgograd region. *Prikaspiiskii vestnik meditsiny i farmatsii = Caspian Journal of Medicine and Pharmacy*. 2021;2(3):51–57. (In Russ.). DOI: 10.17021/2021.2.3.51.57
23. Radchenko N.G. Regional practice of public-private partnership projects in the Russian Federation. In: Promising directions for the development of state and municipal governance. Proc. 1st Int. sci.-pract. conf. Simferopol: Arial; 2024:142–144. (In Russ.).
24. Barbysheva T.M. Development of public-private partnerships in the regional dimension. *Vlast' i upravlenie na Vostoke Rossii = Power and Administration in the East of Russia*. 2020;(4):133–145. (In Russ.). DOI: 10.22394/1818-4049-2020-93-4-133-145
25. Slepov V.A., Rodenkova T.N., Aliev J.K. Funding mechanisms evaluation in science and technical projects with public-private partnership. *Finansovaya zhizn' = Financial Life*. 2019;(4):62–66. (In Russ.).

26. Makarov I.N., Nekrasova E.A., Volkova O.A., Zhidkov N.S. Public policy and public-private partnership as a tool to support businesses and the public in a challenging economic environment: Political economy analysis. *Ekonomika, predprinimatel'stvo i pravo = Journal of Economics, Entrepreneurship and Law*. 2023;13(2):245–257. (In Russ.). DOI: 10.18334/epp.13.2.117213
27. Khe S.P., Kozlov D.A., Makarenko D.B., Borisenko A. Yu. Comparative analysis of methodical approaches to assessment of efficiency of implementation of PPP projects (by example of St. Petersburg). *Ekonomika i predprinimatel'stvo = Journal of Economy and Entrepreneurship*. 2017;(6):419–423. (In Russ.).
28. Tkachenko I.N., Savchenko Ya.V., Evseeva M.V. To the question about methodology selection and evaluation of effectiveness public-private partnership based on the interests of stakeholders. *Diskussiya = Discussion*. 2014;(8):81–89. (In Russ.).

ABOUT THE AUTHORS



Elena B. Tyutyukina — Dr. Sci. (Econ.), Prof., Department of Corporate Finance and Corporate Governance, Financial University under the Government of the Russian Federation, Moscow, Russian Federation

<http://orcid.org/0000-0001-5195-7230>

EBTyutyukina@fa.ru



Aleksey M. Gubernatorov — Dr. Sci. (Econ.), Prof., Department of Economics and Finance, Vladimir Branch of the Financial University under the Government of the Russian Federation, Vladimir, Russian Federation

<https://orcid.org/0000-0001-7695-7050>

Corresponding author:

AMGubernatorov@fa.ru



Daria A. Egorova — Cand. Sci. (Econ.), Assoc. Prof., Department of Corporate Finance and Corporate Governance, Financial University under the Government of the Russian Federation, Moscow, Russian Federation

<https://orcid.org/0000-0002-7981-2583>

DAEgorova@fa.ru

Author's declared contribution:

E. B. Tyutyukina — formulation of the problem, development of the article's concept, justification and choice of methodology, verification of conclusions.

A. M. Gubernatorov — collection of statistical data, description of the results, and formation of study conclusions.

D. A. Egorova — collection of statistical data, tabular and graphical presentation of results.

Conflicts of Interest Statement: The authors have no conflicts of interest to declare.

The article was submitted on 09.01.2025; revised on 16.02.2025 and accepted for publication on 22.02.2025.

The authors read and approved the final version of the manuscript.