

Strategies for the sustainable development of the PPP-based economic system

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Abstract. The article is devoted to the implementation of public-private partnership (hereinafter - PPP) in modern Russia, which is forced to reorient its policy in the field of implementation of key PPP projects in order to maintain the focus on the strategy of implementing sustainable development in the economy. This problem is not covered in domestic literature and is extremely superficially touched upon in foreign literature, which determines the need for its consideration. The purpose of the work is to study data on the implementation of the PPP model in modern Russia with a focus on a sustainable development strategy. The key problem is the conclusion of transnational PPPs. Methods: analysis, synthesis, data comparison, formalization and generalization of key conclusions and proposals. The results provide an analysis of the likely comparison of data on transnational transactions concluded in the Russian Federation and their impact on the overall economic growth of the country. There are also suggestions for optimizing the further development of this area and its possibilities for optimizing the PPP model. The work includes the analysis of statistical data, as well as official information provided in open sources. In conclusion, an overview of possible publications and further research in the field of PPP and the development of sustainable development policy of the Russian economy is presented.

1 Introduction

All countries of the world are more or less focused on the implementation of sustainable development (SD) policies. The latter is expressed in the desire to achieve rational environmental management through the development of science and technology and in this way to organize a higher standard of living for the population. But, the pursuit of innovation led to the spread of another idea – the concept of technological sovereignty, which put the idea of innovation at the forefront, and rational environmental management ceased to be so actively discussed in the domestic literature.

On the other hand, the provision of public services, the development of urban areas and the restoration of worn—out infrastructure are just some of the Government's programs that require extensive resource mobilization at the local and national levels. In this regard, the

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expansion of society and the improvement of living standards have burdened public authorities with even more complex responsibilities. And in this regard, the desire to expand the scope of concluding a public-private partnership agreement was not surprising. But, in recent years, new trends have emerged in this system.

Of course, as the researchers note, PPP has benefited governments by involving the private sector not only as an executive axis, but also as a means of sponsorship. But this system is aimed at long-term partnership, while in recent years the Russian investment market has lost a huge number of participants [1-2], who withdrew from it due to the aggravation of the political situation or by decision of the governments of the countries of former partners.

As a result, domestic researchers consider PPP as widely used in public infrastructure projects, and are usually referred to as an agreement that attracts private parties to provide public services in accordance with a contractual agreement [3]. A partnership of this form may have certain characteristics that distinguish PPP from the traditional approach, in which the government is the main investor in the project, but there are also serious advantages. In particular, individuals can invest not only material resources, but also knowledge, experience, skills and abilities that are considered extremely important, especially in modern realities.

According to the traditional model, the public and private sectors usually enter into a long-term contract in which, for example, the contractor is responsible for providing funds, designing, building, operating the facility and some other commonly considered responsibilities [4-6]. It is worth noting that PPP is recognized as an innovative alternative that is suitable for «particularly complex contracts» and includes various solutions, for example, on project ownership, risk allocation, etc., which potentially differ depending on the type of project [7-8].

Given the benefits provided by PPPs, many countries and public authorities have used this approach over the past few decades, and this has led not only to a change in terminology, but also to the development of special expertise and definitions. Thus, the issue of transnational PPP agreements is interpreted in different ways, and there is no clear formulation of this topic in both international law and national legislation. As a result, Russia applies a system of cassation agreements that have the force of law for the duration of the implementation of a transnational PPP, while EU countries use proven national laws that regulate issues of cross-country cooperation. On the other hand, there are numerous papers devoted to discussing issues such as categorization, definition and practice related to PPPs. And of course, they make it difficult to get a specific general understanding of this concept. Not to mention the fact that this problem is also influenced by the different development of PPP in different countries, as well as its international application, which expands the perception and characteristics of this type of partnership. At the same time, there is a limited amount of research that seeks to provide a clearer understanding of the basic practice of PPP and to consider this concept from a more holistic point of view [9-10].

As a result, researchers, conducting an analysis of the current situation in the world, say that there is a need to share experience in the field of concluding PPPs and implementing the SD strategy, however, at this stage, the economies of all countries suffer from the fact that there are a number of obstacles to such interaction [11-12].

Both domestic and foreign experts point out that the implementation of PPP at the transnational level is not only a promising growth and development of competitiveness in various sectors of society, but also an opportunity to further strengthen the overall positions of countries in the world, as well as support the growth of the standard of living of the population [13-14]. However, it is believed that existing publications are not enough to attract the attention of governments and radically change the current situation. It is important to note that already today all researchers agree that a large proportion of developments in the field of the importance of PPP for the implementation of SD lies in research conducted by Asian scientists, while Russian scientists, despite being among the 10 leading research groups on

this topic, are still inferior to other countries in terms of the number of publications and the degree of depth of the PPP and SD studies themselves [15-16].

SD is considered the most important topic on which the authors write, as it affects both emissions into the environment, various kinds of pollution, and, most importantly, attempts to find a way out of the situation. But, there are a huge number of obstacles that both proponents of SD and foreign researchers face. The first and main one, of course, is the modern world order based on the sale of energy resources, cars and other types of transport that run on oil. This is too large a cluster of the economy, which cannot be fully replaced by modern developments to improve the environment. At the same time, in many countries, the issues of limiting or rationalizing consumption as such are not considered, which in turn also creates a number of difficulties for the full implementation of the SD strategy [17].

The digital economy has significantly influenced the change in the role and format of entrepreneurship for regional socio-economic systems [18-19].

To attract interest, it is necessary to have a modern mechanism for providing loans and subsidies, which would contain all the criteria for subsidizing interest rates [20].

These issues raised by the authors are more relevant than ever, as they develop infrastructure [21].

All of the above suggests the need to consider the topic of SD implementation through the PPP model.

The purpose of the work is to study data on the implementation of the PPP model in modern Russia with a focus on a sustainable development strategy.

To this end, it is necessary to familiarize yourself with statistical data, to analyze the current situation in the country and in the world.

2 Methods

To achieve this goal and address key issues, the following methods are used in the work:

an analysis of domestic and foreign literature has revealed key problematic issues, such as the lack of systematization and regulatory support for PPP, both at the international level and within individual states;

the analysis and synthesis of the data obtained by comparing statistical data showed the trends in the development of PPP in the Russian Federation until 2022 and after, which allows us to identify the key areas in which modern agreements are concluded;

Formalization and generalization as methods of data processing have allowed us to put forward a number of proposals that may be useful both for individual studies, as a support for further developments, and for representatives of the private and public sectors.

It should be noted that in the course of the work, general data were considered and microfactors were not included in the study, which makes it possible to study the topic in more depth from the perspective of more structured issues and problems.

3 Results

According to the data provided by the Rosinfra Platform, it is possible to compare the statistics of the conclusion of PPP over the past 5 years (Fig.1)

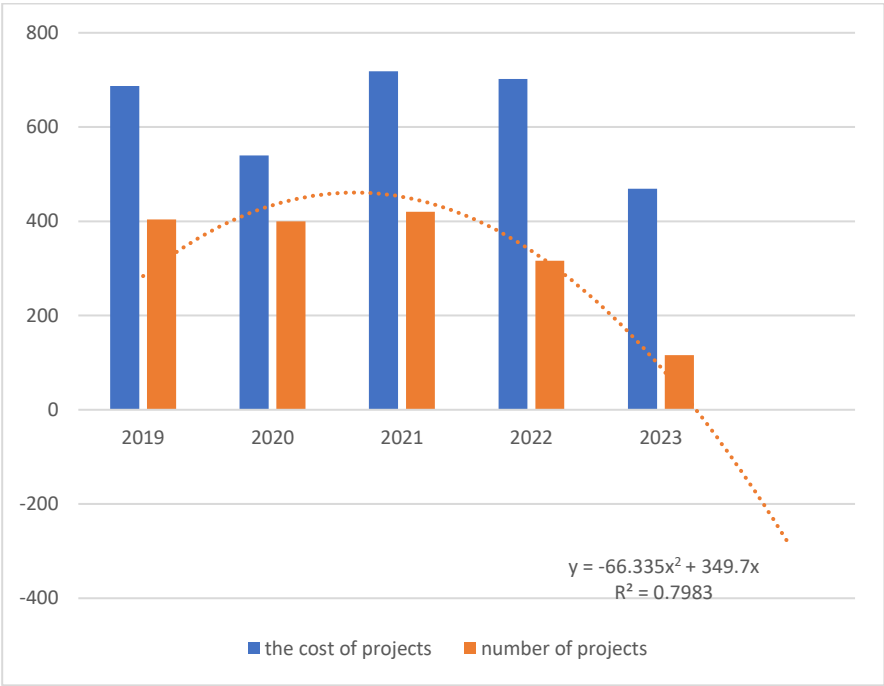


Fig. 1. Statistical data on the conclusion of PPP in the Russian Federation over the past 5 years (excluding unfinished and closed projects)

Based on the data presented in Fig.1, in the near future, the Russian Federation expects a number of difficulties in implementing PPPs. But the presented data does not take into account the planned projects, so in the near future more than 5,000 projects are being developed and considered, which should attract more than 3.9 trillion rubles to the Russian economy. However, these projects include the following list of areas:

- science (which covers the possibilities of digitalization and automation of education and sports);
- construction (first of all, orientation is done on roads and artificial structures – dams, canals, sewage treatment plants, etc.);
- culture (education, cultural events, etc.)

This list includes the most ambitious and costly projects, while housing and communal services, supply chains and communications turned out to be among the poorly funded or in the sphere of interests of individual individuals who seek to improve their city/district/subject.

And it can be noted that, in general, there is a tendency to shift orientation in the process of concluding agreements. And in order to identify cause-and-effect relationships, you can use Pearson's correlation analysis. The independent variable (x) is the year, as Figure 1 clearly shows the dynamics of changes in the number of projects. The dependent variable (y) is the number of significant (large-scale projects) concluded within the framework of a PPP. The calculation is carried out according to the standard formula:

$$r_{xy} = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2} \sqrt{\sum_{i=1}^n (y_i - \bar{y})^2}},$$

where $\bar{x}$ $\bar{y}$ are the arithmetic mean values for x and y, respectively (An example of calculating the Pearson correlation coefficient// <https://statpsy.ru/pearson/primer-pearson/>)

Table 1. Correlations of the number of PPPs in the Russian Federation over the past 5 years

N	Independent variable (x)	Dependent variable (y)	$X_i - X_{mean}$	$Y_i - Y_{mean}$	$X_i - X_{mean} * Y_i - Y_{mean}$	$(X_i - X_{mean})^2$	$(Y_i - Y_{mean})^2$
1	2019	404	2	-72,8	-145,6	4	5299,84
2	2020	400	1	-68,8	-68,8	1	4733,44
3	2021	420	0	-88,8	0	0	7885,44
4	2022	316	-1	15,2	115,2	1	231,04
5	2023	116	-2	215,2	-430,4	4	46311,04
total					-529,6	10	64442,8

The sum of the independent variables: $x=10105$; $y=1656$

Arithmetic mean values for independents: $x= 2021$ $y=331.2$

Having calculated the deviations for each point in the table, we get their total amount, and substitute the obtained values into the Pearson formula indicated above

$$r_{xy} = \frac{-529,6}{\sqrt{10 \times 64442,8}} = \frac{-529,6}{802,7} = 0,659$$

It follows from the calculations that there is a relationship between the year and the number of PPP projects implemented. Since 0.659 is close to one, it can be said that it is necessary to identify specific cause-and-effect relationships. First of all, it is certainly the political situation that determined the recession during the pandemic, as well as after the beginning of the escalation of the conflict between Russia and Ukraine. The next factor that seems to be extremely significant today is the reorientation of the Russian economy towards Asian partners, who in turn see the need to develop the following areas:

Scientific and technical achievements in the field of digitalization and automation;

Development of road infrastructure;

Improving the communication and communication system by promoting telecommunication systems;

Minimization of the use of natural resources, especially in the energy consumption system;

Search for new energy sources and so on.

On the other hand, it is important to note that in the last few years all countries have been striving to reorient their PPP policies. According to the data provided by the Rosinfra Platform, the lack of investment has always been a problem for many countries (for example, in 2020 Russia needed 36% of foreign investments for the implementation of important projects, at the same time the United States needed 27%, and the leading EU countries – 7%). To date, countries have revised their policies and have begun to give preference to projects that provide socially significant effects, but this has only led to an increase in investments from states. Thus, in the Russian Federation, government investments have increased in such sectors as education, rail transport and the industrial and technological sphere. While in the EU countries there are a number of difficulties in the selection and subsequent implementation of PPPs. Thus, in 2023, the EEC (Economic Commission for Europe) developed principles for the consideration of PPPs, within which it is necessary to include the interests of the public and organize a competition for the best PPP project, which may be useful for all EU member states. But in general, today there is also an increase in public investments in various social projects, such as education and science, which require participation, provided that the existing situation of the population is maintained.

On the other hand, the Russian Federation continues to implement cross-border PPPs (Table 2)

Table 2. Modern cross-border PPP projects with the participation of the Russian Federation

Partners of the Russian Federation	Number of projects	Key areas
Eurasia, South America	1 unfinished project	Energy industry
Asia-Pacific region, EU, Africa	5 unfinished projects	Energy industry, transport
Countries of Asia and the Middle East	12 projects under implementation and under completion	Water and energy complex, transport, science, sports, culture, education, telecommunications

As shown in Table 2, the key and relevant to date are implemented within the framework of partnerships with countries in Asia and the Middle East, while the selected areas are closely related to the ideas of SD development, since the latter also assumes that all stakeholders will ensure the provision of services in such a way that the state's goals of providing The services and profits of a private investor were mutual, and the effectiveness of these relationships depends on how much risk is distributed among the participants. In addition, SD is based on ideas close to international standards of effective environmental management, which are based on the search for a replacement for depleted natural energy resources and the formation of new conditions for society in the environment that man has preserved. This means that it is necessary to preserve as many natural habitats and species that inhabit the planet today as possible.

Therefore, it is important to review strategic decisions and policies related to PPP projects, which covers a wide range of issues that include, among other things, risk allocation, economic and financial assessment of PPPs, improvement of policies regarding the application of PPPs and the conclusion of contracts, both within the framework of transnational agreements and within the State. The latter represents the integration of economic and environmental sustainability. The interaction between sustainable development issues and other aspects of PPP has shown that the research community has focused on integrating sustainability issues into strategic and administrative decisions related to PPP. This highlights not only the importance of environmentally friendly projects, but also the vital role of implementing a PPP project with sustainable financial solutions.

Moreover, given the potential benefits of technology and digitalization, there is a special essence to taking advantage of the benefits provided by digital and technological solutions. In this regard, it is considered necessary to conduct a thorough study of the problems of PPP projects, which can be solved with the help of technological and innovative solutions, which, in turn, will lead to more sustainable and efficient implementation of projects using PPP.

4 Discussion

Today, all countries, to one degree or another, are making great efforts to enter a new stage of sustainable development. But if we solve this problem through the implementation of PPP, then the following is revealed:

firstly, PPP is a concept of the attitude of representatives of the private sector aimed at meeting the needs of society as a whole. While SD is also aimed at increasing the standard of living and meeting the needs of the population. Therefore, the implementation of SD through the conclusion of a PPP is a promising direction that can bring the country's economy to a new level;

Secondly, due to the fact that the new international partners of the Russian Federation focus primarily on the development of science and technology, social projects remain in the care of the state. Consequently, the state will join forces with the private sector in the implementation of its social and infrastructure projects, powers will be shared, and the interests of both parties will be protected on the basis of a contract. The partnership is bilateral, but the benefits are trilateral and this circumstance will allow us to maintain the necessary amount of investment in the social sphere of PPP;

Thirdly, the development of state programs and projects can be guided by the SD system, which represents a special direction of development, in the plane of spreading innovations and rational environmental management in order to increase the growth of the population's life.

But, all of the above is limited to such problems as:

the absence in the Russian Federation of a full-fledged and multilateral interpretation of PPP, a transnational agreement and a system for protecting the interests of the parties;

SD is of secondary importance, since the concept of technological sovereignty came to the fore, due to the state's desire for economic and technological independence from the West;

the transition of the initiative to conclude transnational PPPs to foreign partners, in particular to Asian countries, which led to a number of gaps in financing social projects, their completion and encouragement.

All this suggests that it is necessary to transform the legislative framework – to refine it and optimize it within the interests of the Russian state. In addition, it is important to review the policy in the field of PPP implementation and change the approach to the existing model of assessment, preparation of documents and implementation of the projects themselves. Also, due to the emergence of new PPP participants, it is important to keep motivated domestic investors and private partners, who ultimately should become the basis for the implementation of PPP in the Russian Federation.

But the most important proposal, which focuses on the prospect of SD development within the framework of the conclusion of a PPP and the general development of the country's economy, is to search for topics and projects that can attract old investors from Europe and thus restore relations with the West.

In this regard, sustainability focuses on strategic decisions and policies regarding PPPs, covering a wide range of topics such as investment, budget control, climate change, etc. It is also worth emphasizing that within the framework of the Sustainable Development Goals (SDGs) The UNECE has pushed the boundaries of sustainable development in combination with PPP and formulated this concept, giving priority to sustainable economic recovery and reconstruction, sustainable PPP and infrastructure financing, as well as «green» PPP, within which areas such as supply and procurement should develop, and these are just some of the key points that may turn out to be useful for forming a strategy for the rapprochement of the Russian Federation with Western countries.

However, these areas are also of interest to the countries of the East, which found themselves in a difficult situation due to environmental pollution and oil production. And today they are also interested in all possible areas related to SD, which makes them the most promising partners for the modern Russian Federation.

5 Conclusions

In conclusion, it is important to note that the proposals put forward and the identified problems are directly related to the policy implemented by the Russian state. On the one hand, perhaps due to the lack of relevant publications in the Russian literature, on the other, this may be due to the presence of global problems that are in the foreground and require a

speedy solution. But, in any case, the need to solve problems related to the conclusion and implementation of PPP is overdue in the Russian Federation and requires its resolution.

In this context, it can be assumed that in the near future the key research topics in this area should be:

the study of the regulatory framework, its changes and proposed solutions for this;

consideration of key projects of interest to investors from other countries and parts of the world;

description of the problem of the PPP models themselves, which require refinement and modernization, as well as a clear systematization of the rights and obligations of the parties.

These topics do not limit the possible research in the field under consideration, especially if we take into account the possibilities of comparing data with the implementation of the SD strategy.

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