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PUBLIC-PRIVATE PARTNERSHIP IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT IN UKRAINE

Purpose. Analysis of the state of public-private partnership (PPP) in Ukraine and identification of areas for improving the use of the PPP mechanism to attract domestic and foreign investments.

Methodology. Comparative analysis methods indicated a stabilization of the number of PPP projects. The method of analysis and synthesis allowed proving that the insufficient adaptation of Ukrainian legislation to the needs of PPPs is not the main factor in stakeholder opportunism. Mathematical methods are also used, on the basis of which a mathematical model for predicting risks was developed.

Findings. The analysis of the level of non-adaptation of Ukrainian legislation to the needs of PPPs confirms that this is not the main factor in the opportunism of private stakeholders. The significance of the level and uncertainty of risks for PPP investors is confirmed. It is indicated that the involvement of bank loans by stakeholders can form a multiplicative mechanism for increasing risks. Areas for legislative change to increase the effectiveness of PPPs are indicated. A departure from the state-centric PPP model is proposed. The concept of competitiveness PPP projects in the investment market is proposed.

Originality. A mathematical model for taking into account the influence of uncertain risks is developed to increase the effectiveness of PPP project insurance. It is proposed to introduce changes in the distribution of losses by risk in the implementing PPP projects. It is proposed to introduce insurance for the risks of PPP projects and to use companies organized on the PPP principle for this purpose.

Practical value. The proposed approaches to reducing the impact of risks on stakeholder opportunism are capable of ensuring an increase in investments in PPP projects.

Keywords: *public-private partnership, sustainable development, risk sharing, risk insurance*

Introduction. A condition for sustainable development of Ukraine is the structural modernization of the economy, one of the tools of which, due to the lack of organizational, human, and financial resources, is public-private partnership (PPP). The experience of previous years indicates that expectations from PPPs do not correspond to the achieved results, in particular, given that sometimes such a result was “privatize the rewards” from public-private partnership projects. Moreover, not all PPP projects meet the requirements of “fit for purpose” in the interests of the state. This is observed not only in Ukraine, but also in countries with a developed socio-economic system.

First of all, the above requires abandoning the focus exclusively on the economic results of partnership projects and broadening the view on the transformation of institutional approaches in this area. Therefore, especially given the needs of the country’s post-war reconstruction, the task of radically changing the scale of PPPs, going beyond traditional project management, intensifying the involvement of international stakeholders in PPPs as guarantors of achieving results, introducing new methods for reducing risks for private stakeholders, and creating a synergistic system, when each of the projects contributes to the formation of sustainable

socio-economic conditions, and these conditions ensure the effectiveness of the PPP ecosystem.

First of all, this requires a combination of the “value for money” and “fit for purpose Sustainable Development Goals (SDGs)” approaches. This is based, in particular, on the experience of Germany, where the regulatory framework limits the focus of PPPs solely on achieving financial results. In Ukraine, there is no possibility of continuing the “wait and see” policy of directing the PPP mechanism to achieving the SDGs even if significant economic results are achieved in individual PPP projects, since the sustainable development goals are not fully mentioned even in the relevant law.

Economic, political, and social sustainability creates a favorable ecosystem for the PPP process. Unsustainability creates additional risks for public-private partnership projects in each of these areas. Since ensuring sustainability is a function of institutional structures, when distributing responsibility for risks between PPP stakeholders, this must be fully taken into account for all types of risks.

Literature review. A significant number of researchers have devoted their scientific works to various aspects of private-public partnership. This is evidenced, in particular, by a thorough review of research on the topic by Narbaev, et al. [1]. This review notes that sustainable development is becoming an integral topic of scientific works in this area today. In their study of successful

practices of public-private partnership in other countries of the world [2], scientists emphasize the presence of a favorable economic environment as an indispensable condition for the effectiveness of PPP mechanisms, one of the main features of which is the stability of macroeconomic indicators [2].

The scientific works of Ukrainian researchers also widely consider the possibility of using the public-private partnership mechanism to achieve the Sustainable Development Goals. Thus, in the article [3] it is proposed to use PPP to solve the problem of reducing greenhouse gas emissions. Unfortunately, this approach is limited by the Law of Ukraine "On Public-Private Partnership" No. 2404-VI, dated 2010, where the list of PPP application areas does not fully reflect the SDGs, in particular, the goal of avoiding air pollution is not indicated. These restrictions somewhat narrow the possibilities of using the PPP mechanism as an accelerator for the development of green infrastructure, which is used in other countries of the world, because it requires additional formalization in the regulatory and legal field in Ukraine.

At the same time, Baluk, et al. [4] point to the possibility of indirectly stimulating the environmental direction of development of the Ukrainian energy sector by using the potential of PPP. The study by Baluk, et al. [4] also notes that the effectiveness of PPP projects in the energy sector, which are characterized by a long implementation period, is largely determined by the sustainability of the systemic interaction of society, the economy and energy systems.

The study by Zapatrina, et al. [5] indicated that in the process of selecting PPP projects, Ukrainian institutional structures pay insufficient attention to the importance of the criterion of achieving the SDGs, which negatively affects the support of Ukrainian PPP projects by international financial structures, whose activities are aimed specifically at implementing the SDGs. An example of this is FAST-Infra Group, which even developed the SI Label criterion for the feasibility of participating in sustainable infrastructure projects. Financial support for a private PPP participant by these structures also depends on how much its participation in the value chain of previous periods corresponds to the SDGs. For this purpose, the corporate sustainability reporting (CSR) of this PPP project participant is checked. Maurya, et al. [6] indicated that there is a need to introduce management tools to counteract opportunism of private partners into the PPP process. A significant number of scientific works have been devoted to this issue, which indicates the significance of this problem. At the same time, the management tools that researchers propose for this purpose, in particular, social networks [7] and the orientation of institutional structures to use PPP primarily for social needs [8] are not relevant for Ukraine given the urgent need for post-war reconstruction.

When developing mathematical models of PPP, scientists point out the presence of complex relationships between factors influencing the effectiveness of public-private partnership projects [9], but the traditional use of regression-correlation analysis, in particular, the ANOVA method [10] to take these relationships into account is not a sufficiently relevant approach.

Shuliuk, et al. [11] indicate that the long period of implementation of public-private partnership projects

in Ukraine entails significant financial risks, primarily for private partners. The reason for this is the instability of economic processes and the instability of the macroeconomic environment.

At the same time, the importance of using the PPP mechanism for Ukraine's post-war reconstruction, which is convincingly proven in the study by Kruhlov, et al. [12], requires a detailed study of the state of PPP in Ukraine, identifying areas for improving the use of the public-private partnership mechanism to attract investment. It is also relevant to develop a mathematical model for predicting uncertain risks. This should help overcome opportunism in investing even in long-term PPP projects.

The purpose of the article is to study the state of public-private partnership in Ukraine and identify areas for improving the use of the public-private partnership mechanism to attract domestic and foreign investments.

The objectives of the article are to introduce a mathematical model for predicting the risks of public-private partnership projects; identify the main factors of opportunism of private stakeholders, and develop proposals to reduce the impact of risks on attracting investors to public-private partnership projects.

Methods. The study used both general and special methods of scientific knowledge. Thus, comparative analysis methods indicated stagnation of the PPP process, which is a sign of a decrease in the effectiveness of the PPP mechanism in attracting investments. The application of the analysis and synthesis method indicated that the insufficient adaptation of Ukrainian legislation to the needs of PPP is not the main factor in the opportunism of private stakeholders. It was confirmed that the significance of the level and uncertainty of risks restrain investment. Mathematical methods were also used, on the basis of which a mathematical model for predicting risks of an uncertain nature was developed, which allows the implementation of insurance mechanisms for PPP projects. This also allows improving the "Methodology for identifying risks of public-private partnership implementation, their assessment and determining the form of their management" regulated by the Resolution of the Cabinet of Ministers of Ukraine No. 232 of 2.16.2011, where by default risks are defined only as stochastic – which, in particular, is indicated by the presence of the indicator "risk probability" in the table in Appendix 2. The irrelevance of such an approach is confirmed in the article by Shuliuk, et al. [11].

When developing the model, fuzzy logic and tensor analysis methods were applied.

For the implementation of the model, fuzzy influences will be found that form new relationships between factors, which, accordingly, increases the uncertainty of forecasts, especially in difficult socio-economic conditions.

Consider the factors $x_1, x_2, x_3, \dots, x_i$, where $i = 1, 2, 3, \dots, n$. Let these factors belong to the set $\Gamma_V (x_i \in \Gamma_V)$ and, as they change over time, they form relations x_j , where $j = n + 1, n + 2, \dots, m$. These relations, accordingly, belong to the set $\Gamma_D (x_j \in \Gamma_D)$. Then the function can be considered

$$y = \Psi(x_1, x_2, x_3, \dots, x_{n+m}),$$

which corresponds to the fuzzy digraph $S = (V, D, \Gamma)$ that is

$$\Psi(x_1, x_2, x_3, \dots, x_{n+m}) \equiv \mathcal{S}.$$

In this digraph: V is the set of vertices, D is the set of arcs, and Γ_V and Γ_D , are, respectively, the sets of their weights. In this case, the adjacency matrix of the digraph should not be considered as a matrix of elements that are equal to zero or one and is a vector

$$m^T = (\underline{m}_{0ijh}, \underline{m}_{1ijh}).$$

The fuzziness of the specified vector can be calculated as its entropy [13]

$$\Theta(\underline{m}) = -\underline{m}_{0ijh}\underline{m}_{0ijh} - \underline{m}_{1ijh}\underline{m}_{1ijh},$$

where h is the dimension of the extension of the adjacency matrix.

Then each mathematical operation Y between vectors \underline{y} and \underline{m} will correspond to a third-rank tensor T^Y , for which

$$\begin{pmatrix} Y_1(m) & 0 \\ Y_0(m) & 1 \end{pmatrix} \begin{pmatrix} Q_0(m) \\ Q_1(m) \end{pmatrix} = \begin{pmatrix} R_0(m) \\ R_1(m) \end{pmatrix},$$

where $Q(m)$, $R(m)$ are relations that are related as follows

$$Q(m) = D^{-1}[Y(m)]R(m).$$

This provides an opportunity to formalize the defuzzification of fuzzy parameters and their relationships and more relevantly predict changes in the risks of PPP projects.

Results. International organizations, primarily the World Bank, note the need to direct PPPs to achieve the SDGs [14]. Achieving the SDGs should not be viewed solely as charity by private stakeholders of PPP projects. This also provides macroeconomic, political, financial, and social sustainability to the environment of the PPP process, and helps reduce the risks of public-private partnership projects. The above aspects of sustainability are not only a consequence of significant private investments, but also a stimulating factor for them.

At the same time, a review of Ukraine's legal documents in the field of PPPs indicates that the goals specified in them do not fully comply with the Sustainable Development Goals. Thus, in the Law of Ukraine "On Public-Private Partnership" No. 2404-VI (2010), only eight of the specified areas of PPP application directly or, to a greater extent, indirectly relate to the SDGs, of which seventeen are known to have been identified. A review of those projects (except concession projects) that were implemented in the period 2015–2024 and those that are being implemented in the current year confirms this. They partially correspond only to goals 3, 6, 7 and 11 [15].

At the same time, the mechanisms of PPP in Ukraine today are aimed more at: attracting additional financial resources to the economy, increasing budget revenues, getting rid of economically inefficient state-owned enterprises through the transfer under the guardianship of partners, etc., that is, achieving mainly economic goals [16].

Since the definition of sustainable development goals and priorities of the PPP process is absent even in the relevant Laws of Ukraine, primarily in the Law "On Public-Private Partnership", it is advisable to accompany each project at the stage of its preparation with a systematization of stakeholders (stakeholder map) with a specification of achievements in the process of implementing the SDG project. This can reduce the level of opportunism of private stakeholders, whose activities are aimed, in particular, at achieving the SDGs, for example, the above-mentioned FAST-Infra Group.

Today, the significant dynamism of external influences does not provide an opportunity for prompt adaptation to the challenges of legislation on public-private partnership. The implementation of state policy in the field of PPP is also complicated by: a lack of qualified personnel, failure to provide adequate practical legal protection to investors, a significant level of corruption, etc. At the same time, the specified state of institutional support is not as significant for the opportunism of private stakeholders, as it is noted in some scientific works [11].

The thesis about the significance of the specified impact is refuted by a comparison of the level of development of institutional support for PPPs in Ukraine and the Europe-Central Asia region as a whole and changes in this level over the years according to the World Bank [14] (Table 1).

As the data presented in Table 1 show, Ukraine is even ahead of the countries of its region in some indicators. Another positive sign is the improvement of the specified indicators for Ukraine in comparison with the period before and after the start of large-scale hostilities.

At the same time, a detailed analysis of the public-private partnership program indicates the presence of significant problems. Most of the agreements (~86 %) of public-private partnership are concession agreements and only ~14 % are agreements on joint activities. As of 01.01.2025, according to the Ministry of Economy, Environment and Agriculture of Ukraine [17], only 11 % of contracts are being implemented, which indicates both a significant trend of reducing the number of projects that are in the process of implementation and, in general, the effectiveness of attracting investments using the public-private partnership mechanism.

Table 1

Assessment of the level of development of institutional support for PPPs, points (1–100)

Assessments by thematic areas	Country/region			
	Ukraine 2020	Ukraine 2023	Europe and Central Asia Region 2020	Europe and Central Asia Region 2023
Project preparation	68	73	50	52
Procurement organization	65	74	69	70
Contract management	66	71	66	67
Project support for uninitiated proposals	75	83	59	64

Table 2

Financing needs for post-war reconstruction of Ukraine, billions of US dollars

Budget Financing Need	Years		
	2026	2026–2033	2027–2033
Budget-financed Recovery	2.12	22.29	20.17
Partners + Private Foreign Investment (including PPP)	1.06	88.07	87.00
Local business, people investment	–	63.56	63.56
Total	3.19	173.92	170.73

This creates significant obstacles to post-war reconstruction, since this process will require large financial costs and the resources of the state budget alone will not be enough for these purposes.

According to forecasts of international and domestic institutional structures, the private financial resources involved should cover the bulk of the country’s recovery costs at this time (Table 2). Table 2 was constructed using data from the Ministry of Economy of Ukraine [17] and the European Commission [18].

The insufficient level of participation of foreign and Ukrainian private investors in PPP projects is also confirmed by the data [19] by the dynamics of change and the level of the Investment Attractiveness Index of Ukraine (Fig. 1). This Index is characterized by changes of 1.5 times not only from year to year but also within one year. Thus, the ratio of the specified indicator for the second and fourth quarters of 2019 is 1.23 times, and for the third and fourth quarters of 2013 this ratio reaches 1.32 times.

The specified sharp changes in the Investment Attractiveness Index of Ukraine are possible only with an insufficiently significant level of investment, because the appropriate volume of investment forms the stability of the specified indicator to fluctuations in the volume of cash flows.

At the same time, the indicated dynamic changes in the Investment Attractiveness Index are not favorable for attracting large amounts of investment into the economy of Ukraine, in particular, into the process of public-private partnership and indicate not only the presence of deterrent factors for investors, but also the unstable nature of the national economy.

The values of the Investment Attractiveness Index of Ukraine for the entire studied period of 2013–2024 range from negative to neutral (Fig. 1) and have never reached the zone of positive values attractive to a private investor.

This indicator is significantly affected by military and political destabilization in the country [20]. The elimination of one of the mentioned risks – military – in the post-war period will positively affect the specified indicator.

Scientific research, as well as national and international legal and regulatory documents, indicate the risks of the state in the implementation of PPP projects.

When formalizing these risks, researchers and even international structures [21] focus on such threats as: unclear purpose of PPP; inability to fully protect state interests in the contractual process; poor quality control of project implementation.

Scientific studies also indicate significant risks for private stakeholders of PPP [11]. Such risks mainly include: delay in granting permits; frequent changes in the regulatory and legal framework; delay in budget financing. This approach leaves out of consideration the risks that are characterized by the greatest uncertainty: political, macroeconomic, personnel, technological, etc. Given the chronic lack of working capital among Ukrainian private investors and the high cost of attracting bank loans, PPP projects can pose significant risks for national private stakeholders even in the event of a delay in the return of investment resources, which is typical of unstable economic conditions.

Also, the success of public-private partnership projects will depend on the integral indicator of business instability, which will be influenced by the shortage of personnel, disruptions in energy supply, a significant level of bank loans, etc. This is indicated, in particular, by the inflation reports of the NBU [22].

The level of political, macroeconomic risks and the risk of business instability for the public-private partnership process will be significantly higher in comparison not only with economically developed countries, but even with developing countries, which are characterized by economic instability, which provokes an increase in these risks.

To assess these risks in the post-war period, a software package has been developed that implements the methodological approach proposed above (Fig. 2). The calculations use data from the National Bank of Ukraine [22], the State Statistics Service of Ukraine [23], and the World Bank [14].

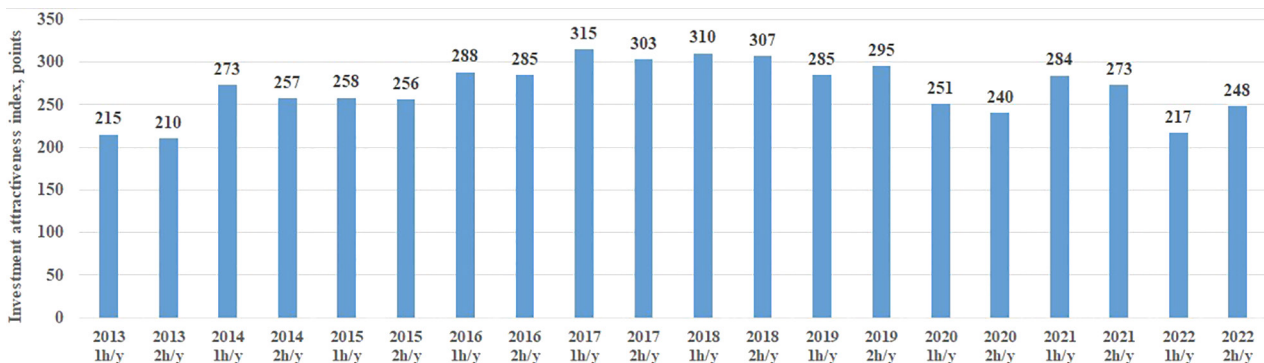


Fig. 1. Investment attractiveness index in Ukraine, scores on a scale from 0 to 5

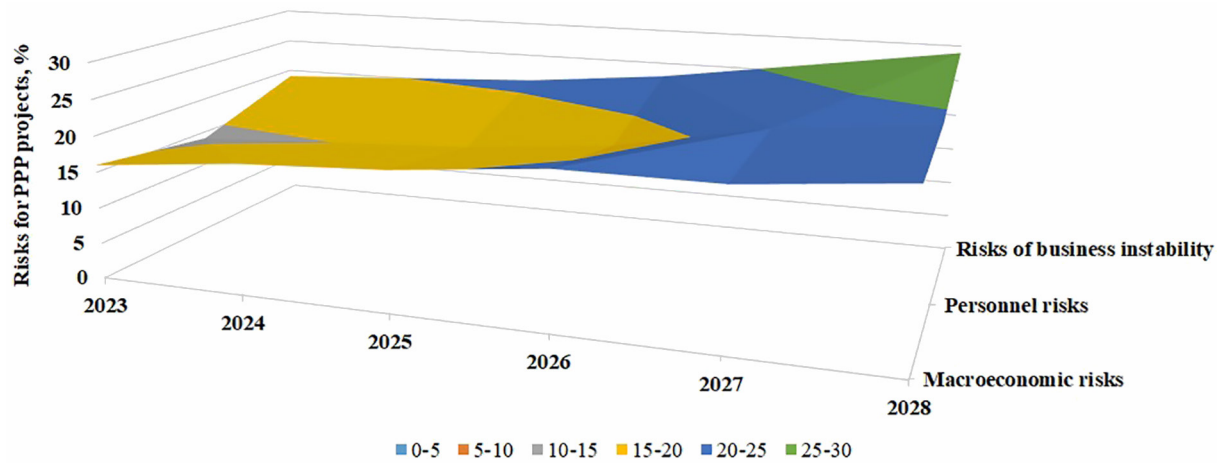


Fig. 2. Risks for PPP projects, %

Provided that large-scale hostilities cease by mid-2026, the use of the proposed model makes it possible to predict the growth of risks in the first post-war years.

As intermediate calculation results, Table 3 shows the values of the subvectors of the mathematical model's fuzziness integrated over the years, for the sake of simplicity of presentation.

Given the long-term trend of human resource shortage, it is nevertheless predicted that the personnel risk will increase by only three percent by 2028 compared to the corresponding indicator in 2025. Macroeconomic risks, with their growth in 2026 by 7 % compared to 2025, will subsequently decrease by 4 %. At the same time, the risks of business instability will tend to grow and in 2028 they will account for more than a third of the total indicator of the named risks, as indicated by the color markers of risk zoning according to their impact (Fig. 2). The increase in the risk of business instability coincides in the interval of 2025–2026 with the forecasts of inflation reports of the National Bank of Ukraine.

The risks for Ukrainian stakeholders of public-private partnership are exacerbated by the standardized requirement to pay for loans received only from the profits of PPP projects. This leads to the lack of a reliable guarantee mechanism for the return of funds invested in the project, which is a significant obstacle to the expansion of the PPP process, since 70–95 % of domestic investments are attracted credit resources [11]. At the same time, according to the legislation (Law of Ukraine “On

Public-Private Partnership” No. 2404-VI, 2010), financing of projects by a private participant in PPPs must be carried out without recourse. At the same time, servicing attracted credit resources only at the expense of project profits is often impossible if the projects are unprofitable due to the unpredictability of risks. This forms a multiplicative mechanism for increasing risks. In the absence of data on the volume of loans received for stakeholder participation in PPP projects, the factor of multiplicative increase in risks was not taken into account in the calculations.

The involvement of foreign partners in PPP projects can be facilitated by both reducing the level of these risks, for example, by using their insurance instruments, and by properly distributing them with the state partner. A certain problem is the share of each partner in risk distribution, since the level of some risks depends exclusively on the state partner. For example, unpredictable changes in prices for fuel, electricity and other resources, the level of inflation, changes in Tax legislation, inconsistency of profile laws with the tasks of PPP intensification, etc.

Also, complex integrated public-private partnership projects should be applied in post-war reconstruction, which will lead not only to an increase in their cost, but also to an increase in the risks of their implementation. The increase in risks in crisis conditions may be such that it will jeopardize not only the implementation of a specific project but also, in general, the PPP process in Ukraine.

At the same time, the variability of the economic and political landscape in Ukraine significantly reduces the possibility of a long-term partnership between the state and Ukrainian entrepreneurs, who are traditionally focused on reducing the payback period of invested capital. This is possible in the case of the formation of stable cash flows from the project implementation in a short period and the proper division of the risks of the PPP project between stakeholders, the uncertainty of which increases significantly for long-term projects. The above allows using, by analogy with the competitiveness of the enterprise [24, 25], the concept of competitiveness of public-private partnership projects on the domestic and international investment market for this purpose.

For this purpose, the following definitions are proposed:

Table 3

Integrated by year values of the fuzziness of the subvectors of the mathematical model

For years	Fuzziness of the macroeconomic risk subvector	Fuzziness of the personnel risk subvector	Fuzziness of the business instability risk subvector
2023	0.00	0.00	0.00
2024	0.00	0.00	0.00
2025	0.04	0.03	0.02
2026	0.10	0.06	0.12
2027	0.21	0.11	0.26
2028	0.27	0.21	0.54

- on the domestic investment market, the competitiveness of public-private partnership projects is determined by the appropriate level of conditions for the implementation of investments, which consist in the ratio of risks and benefits in comparison with other types of investment activity;

- on the international market, the competitiveness of public-private partnership projects is determined by the ratio of risks and benefits of PPP projects in different regions of the world.

One of the obstacles to achieving the specified competitive level is the above-mentioned risks for stakeholders of Ukrainian PPP projects. As it is known, the correct identification and assessment of risks is only part of the general mechanism for neutralizing their impacts. This is especially important for unstable economies, where significant fluctuations in risks are possible, as indicated by changes in the Investment Attractiveness Index (Fig. 1). Therefore, an important factor is the level of integration of insurance instruments into the general PPP management scheme, since it is this integration that is a factor not only in stabilizing the level of risks, but also in their effective neutralization.

To reduce the opportunism of investors to participate in public-private partnership projects, it is proposed to introduce insurance not only of investments but also of the risks of PPP projects, for example, in the case of negative profitability of projects due to an unforeseen increase in risks.

For this purpose, in particular, it is proposed to establish insurance companies whose activities are aimed at reducing PPP risks, and the organization of these insurance companies should be based on the principle of public-private partnership. Such insurance companies will increase the level of control over the implementation of PPP projects, and the participation of the state in the insurance process will allow for the proper distribution of responsibility for risks. An important factor for neutralizing investor opportunism is also constant monitoring of risks in order to timely take measures to neutralize them, and it is advisable to assign this function to insurance companies as the most interested party.

Also, as indicated above, when determining PPP priorities, the need to achieve the Sustainable Development Goals in the process of public-private partnership is often overlooked. This, in addition to solving social and environmental problems, is of significant importance for improving the investment climate, since achieving the SDGs is one of the incentives for Western investors. Therefore, it is advisable to integrate public-private partnership projects in Ukraine with international programs aimed at achieving the Sustainable Development Goals. This will allow the use of targeted donor financial resources in these projects, in particular those aimed at achieving the SDGs, which can, firstly, increase the volume of investments in PPP projects and, secondly, reduce opportunism among a wide range of investors.

At the same time, to reduce risks for investors, achieving the SDGs should not affect the consideration of the ratio of stakeholder costs and investment profitability of public-private partnership projects.

It is also necessary to move away from the approach where the state grants a private partner a concession,

lease, etc., an infrastructure facility, capital construction, or a combination thereof, only for participation in the distribution of future profits. It is worth including the provision of social services, which are part of the national socio-economic system, in the PPP agreement, as this will ensure the sustainability of the public-private partnership ecosystem.

Verification of the focus of PPP projects on achieving sustainable development should be carried out in the following areas:

- social focus of projects, primarily meeting the needs of socially vulnerable segments of society;
- achievement of environmental goals;
- acquisition of long-term economic significance for communities, regions, and the country as a whole;
- scaling ability;
- ability to positively transform the socio-economic environment of the state;
- comprehensive involvement of stakeholders in the PPP process.

The specified verification will contribute to the involvement of international financial structures in the restoration of the economy of Ukraine in the post-war period, whose activities are aimed in particular at the implementation of the SDGs.

In view of the above, the importance of blended finance increases due to the involvement of international financial institutions in the PPP process, primarily as guarantors of investments and to cover initial losses of projects. Therefore, in addition to the main PPP stakeholders defined by the legislation (Law of Ukraine No. 2404-VI, 2010), there is a need for the regulatory introduction of a new significant group of participants (not only as project stakeholders but also as parties supporting the PPP process), primarily international institutions. The involvement of the specified institutions will compensate for such a risk factor as an insufficient level of environmental sustainability necessary for the successful implementation of PPP projects. The existing experience of involving the EBRD and the International Finance Corporation in the concession agreement for the Chornomorsk seaport terminal should be scaled up and significantly expanded in terms of the areas of participation of international partners.

This is appropriate especially when implementing post-war reconstruction projects. External financial guarantees are also appropriate to cover non-commercial losses, in particular, due to the risks of political instability. For example, the Investment Guarantee Agency (MIGA) is focused on this. The first steps in this direction have already been taken – since the beginning of 2023, the SURE international trust fund has been operating in Ukraine, which increases the scope of MIGA coverage.

Another promising direction for the development of PPPs is the use of the mechanism of multilateral supranational or national partnership, in particular, with the involvement of small foreign investors.

Also, multilateral partnership should not exclude from consideration the inclusion of broad segments of the Ukrainian population in PPPs. There are financial instruments approved in the world to attract small investors: social impact securities (Social Impact Bonds) which also direct public-private partnership

to achieve social goals; “green” securities (Green Bonds), which are also aimed at implementing environmental goals; crowdfunding, which provides social support for PPPs, etc.

At the same time, attracting a significant number of small investors requires increased attention to the regulatory and legal formalization of risk sharing mechanisms. This is especially important due to the formation of prerequisites for increasing social risks in the event of disagreements with the distribution of profits and losses among a significant number of partners.

This approach is capable of ensuring a significant increase in the volume of private investment necessary for the post-war recovery of the Ukrainian economy. The social stabilization that the proposed approaches will bring to achieving the SDGs will be not only a consequence of the effectiveness of PPP projects, but also, to a certain extent, a prerequisite for the formation of an ecosystem favorable to public-private partnership.

The involvement of small investors is, as is known, a sign of a healthy investment climate, which is also a factor in reducing the opportunism of large investors.

In the case of using the mechanism of multilateral international partnership, this will also be facilitated by increasing the legitimacy of the PPP process, increasing the quality of its monitoring and reporting.

This can also ensure a departure from the state-centric PPP model, as it will contribute to equalizing the weight of partners, since the specified model causes a certain disproportion of this weight between the state and private business, intergovernmental investment structures, and international financial funds. The inequality of stakeholders in PPP is an obstacle to attracting significant international partners.

The Law of Ukraine “On Public-Private Partnership” No. 2404-V singles out concession, property management, and joint activities without the creation of a legal entity from a wide range of directions for PPP implementation defined by the World Bank (World Bank Group, 2025). This leaves out of the attention of interested parties PPP projects “from a clean slate”, for example, PPP in the construction, operation, and transfer of property complexes, as well as: PPP in reconstruction, operation, and transfer; leasing; service projects; turnkey construction. These directions of public-private partnership are particularly important for creating the prerequisites for sustainable development in the post-war period. First of all, the implementation of PPPs aimed at design, construction (reconstruction), financing, and operation becomes relevant. Also, if there is a need for accelerated implementation of infrastructure projects during the specified period, it is worth considering PPPs based on a package tender; PPPs aimed at implementing innovative technologies owned by private companies; PPPs that contribute to attracting various financial resources to ensure sustainable development of the regions of Ukraine and the country as a whole.

Conclusions. It is noted that although international organizations, in particular the World Bank, indicate that the public-private partnership process should contribute to the achievement of not only economic, but also social results, primarily formulated in the Sustainable Development Goals, and that these structures

note the need to direct PPPs to achieving the SDGs, this is not sufficiently stipulated in the legislation of Ukraine. This, accordingly, reduces the social focus of PPP projects. Since, as proven by research, this does not contribute to external investments, it is proposed to add a document “stakeholder map” to the implementation of each project, which should specify the Sustainable Development Goals achieved as a result of the project.

The inadequate level of the investment climate in Ukraine is also confirmed by significant fluctuations in the Investment Attractiveness Index over time, and by the fact that over the entire period studied, this indicator did not reach the level of values attractive to private investors.

At the same time, the thesis that the opportunism of private stakeholders of PPP is the result of an insufficient level of institutional support for the public-private partnership process in Ukraine is refuted.

It is indicated that as of 01.01.2025, the public-private partnership process is in stagnation. At the moment, according to institutional structures, only 11 % of contracts are in the implementation stage, but the needs for domestic and external financing of the post-war reconstruction of Ukraine indicate the necessity for significant activation of the PPP mechanism. That is why the analysis of the reasons for the opportunism of private stakeholders in participating in the Ukrainian PPP process has become relevant.

A group of risks for PPP projects characterized by a significant level of uncertainty is indicated: political, macroeconomic and threats to business instability. It is indicated that not only the level of risks but also their uncertainty is important for investors. Therefore, a model has been developed for assessing and forecasting the specified risks. This creates the prerequisites for improving the “Methodology for identifying risks of public-private partnership implementation, their assessment and determining the form of their management” in which risks are defined only as stochastic.

At the same time, it is indicated that the identification and forecast of risks is a significant, but not sufficient factor to reduce stakeholder opportunism. This necessitated the search for further steps to reduce this opportunism.

It is noted that since the state is responsible for part of the risks, this should change the approaches to distributing risks between PPP stakeholders. It is noted that the principles of risk distribution can be an obstacle to investment.

Also, to reduce the opportunism of private stakeholders, insurance of not only investments but also PPP risks is proposed. It is noted that insurance companies that will participate in this should also be organized on the basis of PPP.

The proposed directions for attracting international investors are: targeted donor financial resources aimed at achieving the SDGs, blended financing mechanisms for involving international financial institutions in the PPP process, using the multilateral supranational or national partnership approach, etc.

It is substantiated that a departure from the state-centric PPP model will also be a factor in reducing the opportunism of private stakeholders.

It is indicated that small foreign investors are an important financial resource and it is proposed to attract them using securities, in particular, “green” securities. It is noted that an important direction for overcoming the opportunism of such partners will be the regulatory and legal formalization of risk sharing mechanisms.

The importance of normalizing and including a “clean slate” approach in the mechanism of Ukrainian public-private partnership is indicated, in particular for PPP projects in construction, reconstruction, and turn-key construction. These areas of public-private partnership are particularly important for the country’s post-war reconstruction.

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Державно-приватне партнерство в контексті сталого розвитку в Україні

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Мета. Аналіз стану державно-приватного партнерства (ДПП) в Україні й визначення напрямів покращення використання механізму ДПП для залучення внутрішніх і зовнішніх інвестицій.

Методика. Методи порівняльного аналізу вказали на стагнацію процесу ДПП, що є ознакою зменшення ефективності механізму ДПП у залученні інвестицій. Метод аналізу й синтезу дозволив довести, що недостатня адаптованість законодавства

України до потреб ДПП не є основним фактором опортунізму стейкхолдерів. Також задіяні математичні методи, на основі яких розроблена математична модель прогнозування ризиків, зокрема невизначеного характеру.

Результати. За результатами аналізу рівня неадаптованості законодавства України до потреб ДПП підтверджено, що це не основний фактор опортунізму приватних стейкхолдерів. Підтверджена значущість рівня й невизначеності ризиків для інвесторів ДПП. Вказано, що вимога обслуговування залучених кредитів лише за рахунок прибутків від проєктів формує мультиплікативний механізм збільшення ризиків. Вказано на напрями змін у законодавстві для збільшення ефективності ДПП. Запропоновано відхід від державно-центричної моделі ДПП. Запропоноване поняття конкурентоспроможності проєктів ДПП на ринку інвестицій.

Наукова новизна. Розроблена математична модель урахування впливу невизначених ризиків на збільшення ефективності страхування проєктів ДПП. Запропоноване внесення змін до розподілу втрат за ризиками у процесі виконання проєктів ДПП. Запропоноване упровадження страхування не лише інвестицій, але й ризиків проєктів ДПП, і використання для цього компаній, організованих за принципом ДПП.

Практична значимість. Запропоновані підходи щодо зменшення впливу ризиків на опортунізм стейкхолдерів спроможні забезпечити збільшення інвестицій у проєкти ДПП.

Ключові слова: державно-приватне партнерство, сталий розвиток, розподіл ризиків, страхування ризиків

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