

Mechanisms for the Effective Sharing of Risks of Seaport Concession Projects

Anatoliy Shakhov^a, Varvara Pitera^a, Olha Sherstiuk^a, Volodymyr Botsaniuk^a and Igbal Babayev^b

^aOdesa National Maritime University, 34, Mechnikov str., Odesa, 65026, Ukraine

^bAzerbaijan Project Management Association, City Point Business Center Jalil Mammadguluzade str., 102A, Baku, AZ1078, Azerbaijan

Abstract

The subject of the research is the risk management models and mechanisms of concession projects of seaports. The purpose of the paper is to develop a mechanism for the effective risk sharing in the implementation of concession projects in seaports. The following tasks are solved in the article: analysis of the practice of the implementation of concession projects in the seaport; development of the risk identification mechanism for stakeholders of concession projects in the port; development of the mechanism for finding the level of mutually acceptable risks for stakeholders of the seaport concession project. The following results were obtained: on the basis of the risk management theory, a conceptual model for managing the risks of seaport concession projects was developed; a classification model for stakeholder risk of concession projects was proposed; a risk matrix for stakeholders of concession projects in the seaport was built; a risk-sharing mechanism between the stakeholders in the implementation of concession projects in seaport was developed based on the method of the risk management according to ISO 31000. Sharing of risks between the stakeholders of the concession project in the seaport is based on the assessment of the parties' capabilities in managing specific risks and the cost of managing them for each of the stakeholders.

Keywords 1

Risk, Seaport Concession Project, Acceptable Risk Level, Stakeholder, Risk Matrix

1. Introduction

According to the National Transport Strategy of Ukraine for the period until 2030, an unsatisfactory level of transport and logistics technologies and multimodal transportation reduces the competitiveness of the transport environment. To maximize the geographical position of Ukraine as a transit country, urgent measures should be taken to ensure the organization of freight traffic between the countries of Europe, Asia and the East [1].

It is necessary to increase the efficiency and competitiveness of the transport industry, improve the legal mechanism of public-private partnerships, strengthen interaction between the public and private sectors, public authorities and local authorities, carry out necessary reforms, including the introduction of decentralization, especially through coordinated public policy initiatives. The above principles will provide a solid foundation for the sustainable development of the transport industry and creation of a free and competitive transport services market [2-4].

The concession of state stevedoring companies is a direct implementation of the National Transport Strategy, and the implementation of pilot concession projects in Ukrainian ports will accelerate the process of attracting investors to implement projects in other ports. In addition, the

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EMAIL: avshakhov@ukr.net (A. 1); varuwa@ukr.net (A. 2); olusha972@gmail.com (A. 3); radaonmu@gmail.com (A. 4); igbalbabayev@gmail.com (A. 5)
ORCID: 0000-0003-0142-7594 (A. 1); 0000-0001-5849-9033 (A. 2); 0000-0002-0482-2656 (A. 3); 0000-0001-6963-8086 (A. 4); 0000-0002-1787-7859 (A. 5)



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project involves attracting not only private investment, but also modern technologies and solutions in the port industry, and will have a positive impact on the transport industry as a whole [5].

2. Analysis of Literature Data and Resolving the Problem

Implementation of concession projects is one of the most effective and most applicable mechanisms of public-private partnership in international practice. They are used when the state does not have enough financial, human, managerial and other resources to provide services to the population [6-8]. In addition, concessions for the state are a way to attract managerial resources and business technologies to implement priority tasks throughout the country, as well as reduce budget expenditures [9-11]. Concession projects as one of the instruments of public-private partnerships seem to be a rather successful mechanism, which makes it possible to equally take into account the interests of the state and private investor [12].

Initially, the most common form of concession agreements was agreements under which ownership of the concession object is retained by the state. Nevertheless, many countries have legislatively fixed the possibility of the existence of mixed forms of concession agreements providing for partial or full transfer of the object to a private investor [13].

Concessions are differentiated by country and by sector of economy (industry). For some countries, this form of concession is more suitable when the right of ownership is always reserved by the state (France). For others, options are possible when ownership can pass to a private investor (as in the US) [14].

For an investor, the benefit of the concession is not only access to traditionally closed sectors of the economy and the possibility of building the infrastructure necessary for enlarging your business (for example, building terminals in a port to intensify cargo handling) [15].

The benefit also lies in the sharing of risks, as well as in sufficiently high guarantees of repayment of funds. In addition, in the future, the investor will have the opportunity to receive regular projected incomes [16].

State strategies and programs implemented in the transport industry of Ukraine and based on the use of only budget funds do not allow the implementation of large-scale strategic projects in ports. Therefore, the country's authorities have embarked on a broad attraction of private investment and the rapid development of public-private partnerships in the sea trade ports of Ukraine.

3. The Purpose and Objectives of the Research

The purpose of this work is to develop a mechanism for the effective sharing of risks in the implementation of concession projects in seaports. The following tasks are solved in the article: analysis of the practice of implementing concession projects in the seaport; development of a risk identification mechanism for stakeholders of concession projects in the port; development of a mechanism for determining the level of mutually acceptable risks for stakeholders of the seaport concession project.

4. Materials and Methods of the Research

In Ukraine, the mechanisms of public-private partnership were fixed several decades later than in other countries. The Law of Ukraine "On Concession" itself was adopted only in 2019, but until today it has not been an effective mechanism of public-private partnership.

According to the Law of Ukraine "On Concession", a concession is a form of public-private partnership, which provides for the right to create and / or build (new construction, reconstruction, restoration, overhaul and technical re-equipment), and / or to manage (use, operation, maintenance) the object of the concession by the concessor to the concessionaire, and / or provides for socially significant services in an appropriate manner and on the terms determined by the concession agreement, and also provides for the transfer of the most part of the operational risk to the concessionaire and covers the demand risk and / or supply risk [17].

International experience in managing seaports shows that among many sources of financing, modernization and updating of port infrastructure facilities, concession is the most attractive tool for raising funds. The concession involves the implementation of socially significant projects, while the private management of the concession subject is urgent (from 3 to 50 years) [17]. The development strategy of the seaports of Ukraine for the period until 2038, as well as the Law of Ukraine “On Seaports in Ukraine”, involves reforming the port industry and attracting private investment to modernize and create port infrastructure facilities on the basis of concession agreements [18].

According to the Strategy, the directions of development of seaports should be determined taking into account their main cargo flow and current market conditions. The implementation of the Strategy is carried out by fulfilling plans for the short, medium and long-term development of seaports [18]. Over the nine months of the Law “On Concession” in Ukraine, two concession projects have started to be implemented, i.e. in the port of Kherson and Olbia.

The port of Kherson was transferred to concession for 30 years, and the port of Olbia - for 35 years. The company Risoil-Kherson being the winner of the concession tender has been investing 300 million UAH in the development of the port of Kherson for four years, which is 40% more than established by the requirements of the competition. And QTerminals from Qatar has been investing 3.4 billion UAH in the port of Olbia for five years.

At the same time, the property of the ports remains in state ownership at the end of the term of the concession agreements and is transferred to the state with all facilities built or modernized by the investor during the period of its operation.

The commercial seaport of Chornomorsk in the Odesa Oblast may become the third Ukrainian port to be transferred to concession. A container terminal and a ferry service will be offered to investors for concession there. According to the Ministry of Infrastructure of Ukraine, concession projects are also being prepared in the seaports of Odesa, Mariupol and Berdyansk [19].

For the state, the implementation of concession projects in the port is, first of all, an instrument of economic growth and an increase in the level of port competition, and, consequently, the level of services provided to shipowners and cargo owners.

In recent years, the ports of Ukraine have rapidly lost their market share in cargo turnover. In accordance with the provisions of the feasibility study, the concession project in the ports provides for the transfer of state property to a private partner for a specified period for the purpose of carrying out activities in the construction and operation of seaports and their infrastructure and taking certain investment obligations for the partnership object.

According to the terms agreed between the stakeholders of the concession project, implemented, for example, in the port of Kherson, for the first three and a half years after the end of the transitional period, a private investor will be required to make priority investments to solve the operational and environmental issues [23–37].

The implementation of concession projects in ports corresponds to the main goals of the Strategy for the Development of Seaports of Ukraine for the period until 2038, since attracting a private investor will increase the competitiveness of the port industry, bring modern technologies and standards of port activities, provides for the attraction of private investment in the industry and is based on assumptions about an increase in cargo handling volumes.

The implementation of the concession project in the port is aimed at preserving the state ownership of the concession object, increasing the value of state assets at the expense of private capital, introducing better management experience and improving the quality of services for stakeholders of the concession project in the port. The stakeholders will be considered as: the state; a private investor (concessionaire); local authorities (City Council, Regional State Administration); port staff; citizens; port business (customers – cargo owners, carriers); financial institutions (banks); regulatory authorities (seaport administration, environmental inspection, border authorities, customs service).

As a result of the implementation of the concession project in the port, the state receives additional receipts from the payment of the concession fee paid by the Concessionaire for the right of concession during the project implementation.

The state partner loses the need to make mandatory investments in the renewal of assets transferred to concession to ensure their safety and the possibility of further use by the state stevedore. A private investor gets the opportunity to manage state assets for a long time, benefits from more

efficient use of existing assets and related infrastructure transferred to concession, construction of new capacities and optimization of port operations.

City Council and Regional State Administration receive additional receipts from land fees. In addition, the local budget receives funds from the payment of personal income tax, as well as additional receipts in the form of a fixed contribution to the development of the city's infrastructure in a set amount from capital investments that will be carried out by the concessionaire. Financial organizations get the opportunity of crediting a private partner in the concession project implementation and receive a profit by charging interest on the financing provided.

The port staff gets the opportunity to have training, participate in other activities to improve their skills while maintaining jobs and ensuring the market level of wages. Cargo owners and carriers receive additional capacities for transshipment of goods, as well as a decrease in operating costs and an increase in transshipment speed due to the renewal of transshipment equipment and optimization of business processes in the port.

The Ukrainian Sea Ports Authority receives additional receipts due to an increase in revenues from port dues because of an increase in the number of ship calls to the port and due to a part of the concession fee in the event of a change in concession legislation. Also, the cost of maintaining the facilities transferred to the concessionaire is reduced.

Participation in concession projects requires a thorough analysis of risks and their reasonable management both by the concession provider and the concessionaire.

Risk can be defined as an activity associated with overcoming uncertainty in case of inevitable choice, during which it is possible to qualitatively and quantitatively assess the probability of achieving the intended result, failure or deviation from the target [12, 17].

According to ISO 31000, risk is the effect of uncertainty on a target [20].

The complexity of the effective implementation of concession projects in the seaports of Ukraine lies in the inconsistency of the goals of each of the project stakeholders. It should be noted that when implementing concession projects in the port, a certain stakeholder pursues its own goal, which is often not consistent with the goals of other project stakeholders. Based on this, we can talk about the presence of a variety of risks that are different for each stakeholder and do not coincide with other participants' risks in the concession project.

As part of the concession project implementation in the port, an important stage is the development of a mechanism for finding the area of all project stakeholders' mutually acceptable goals.

For this purpose, the goals of each stakeholder of the concession project are clearly defined. The following stakeholders' goals are proposed for consideration:

- for the state:

$$G_S = f(S_{CH}, S_{LP}, S_T), \quad (1)$$

where S_{CH} – the volume of cargo handling; S_{LP} – the labour productivity level of port staff; S_T – the level of tax revenues to the budget;

- for private investors:

$$G_P = f(P_{Pr}, P_{SL}, P_{SP}, P_{SSE}, P_{CM}), \quad (2)$$

where P_{Pr} – profit; P_{SL} – stability of the state regulatory system; P_{SP} – stability of the state political system; P_{SSE} – stability of the state socio-economic system; P_{CM} – availability of guarantees and compensation mechanisms from the state;

- for local authorities:

$$G_L = f(L_T, L_{AB}), \quad (3)$$

where L_T – the level of tax revenues to the local budget; L_{AB} – compliance with architectural and construction standards;

- for port staff:

$$G_C = f(C_{NW}, C_{ASL}, C_{TS}), \quad (4)$$

where C_{NW} – the number of workplaces; C_{ASL} – the average wage level; C_{TS} – the level of technical safety;

- for regulatory authorities:

$$G_A = f(A_C, A_V, A_H, A_{PT}), \quad (5)$$

where A_C – the level of compliance with customs formalities; A_V – the level of compliance with border formalities; A_H – the level of compliance with sanitary formalities; A_{PT} – the level of port dues;

- for citizens:

$$G_W = f(W_{ES}, W_{SM}), \quad (6)$$

where W_{ES} – ecological safety of the region; W_{SM} – compliance of the concession project with social, moral, historical and architectural motives of the population;

- for port business:

$$G_B = f(B_{SPT}, B_{IE}), \quad (7)$$

where B_{SPT} – processing time of ships; B_{IE} – observance of the interests of enterprises operating in the port and handling ships and cargo.

These target indicators are the basis for finding an area of mutually acceptable solutions that can be effectively implemented in the seaport.

Suppose there are N stakeholders ($n = 1, 2, \dots, N$) of the concession project. The number of target indicators is M ($m = 1, 2, \dots, M$). Then G_m is the value of the target as a result of the successful concession project implementation. Let us take as λ_{nm} the weight coefficient of the m -th indicator for the n -th stakeholder. The weight coefficient λ_{nm} is determined by an expert method based on the conditions:

$$\sum \lambda_{nm} = 1, 0 \quad \forall n = 1, \dots, N; \sum \lambda_{nm} = 1, 0 \quad \forall m = 1, \dots, M. \quad (8)$$

The objective function is:

$$Z = \sum_{n=1}^N (\pm G_m \cdot \lambda_{nm}) \rightarrow \max. \quad (9)$$

Wherein a “+” sign is put if the stakeholder of the concession project is interested in the growth of the target value. After defining the goals of all stakeholders of the concession project, it is necessary to discuss risk management for each of the project stakeholders. Taking into account the above, an urgent task is to develop a mechanism for distributing risks between the stakeholders of the concession project in the port and to determine a mutually acceptable level of risks that will be reasonable for the project stakeholders.

Let us consider approaches to risk management in relation to concession projects in seaports. One of the risk management mechanisms is the transfer of risks to the stakeholder of the concession project in the port, which will best control the risk at the lowest cost. This approach implies the risk-taking stakeholder's freedom to make decisions about how the risk is controlled. Risk transfer is a key aspect of maximizing the effectiveness of the concession project in the port. Another approach is a method of avoiding risks, which leads to a change in the parameters of the concession project in the port, to its termination or refusal to implement it at the planning stage.

Risk minimization mechanisms imply a decrease in the probability of negative consequences of activities through insurance, making subcontracting agreements, obtaining guarantees from the project concessionaire in the seaport [21, 22].

Risk acceptance, as a risk management method, is appropriate for those risks that the concession project stakeholder cannot effectively manage.

The sharing of risks of concession projects in the port is an effective tool for the sharing of responsibilities and cash flows between stakeholders, which creates additional incentives for them to fulfill their obligations.

It should be taken into account that, since the state is responsible for the final project result, and the concession project is directly implemented by a private partner, there is a division of responsibility (risks) between the stakeholders, which leads to the fact that project risks cannot be transferred exclusively to one of the parties to the agreement and shared between them. Each of the stakeholders of the concession project in the port has different opportunities to influence risks, and, accordingly, the cost of managing them.

Due to the sharing of risks, the cost of a concession project can be significantly reduced in comparison with the cost of its implementation by each individual stakeholder. Moreover, their financial capabilities differ significantly. The consolidation of the financial capabilities of all stakeholders makes it possible to cover a greater volume of the concession project risks and thus

guarantee its greater stability.

The risk assessment of concession projects in the port should be carried out on the basis of objective data, taking into account the goals of each of the stakeholders.

The mechanism for the effective sharing of risks of the concession agreement stakeholders stipulates that the total risk transferred to the private investor of the concession project should not exceed its maximum possibilities for covering it.

Also, the risk is transferred to the concession project stakeholder, which is better able than other stakeholders to prevent or compensate for the risks.

The total government risk should take into account budget constraints and should not include the risks of a private investor.

Therefore, in case of the presence of I risks of the concession project ($i = 1, 2, \dots, I$), for private investor P the condition must be met:

$$\sum_{i=1}^I R_{iP} \leq C_P \quad (10)$$

where C_P – financial capabilities of private investor P , intended to cover the i -th risk.

If there are N stakeholders ($n = 1, 2, \dots, N$) of the concession project with financial capabilities to compensate for risks C :

$$C_1 > C_2 > \dots > C_N \Rightarrow R_N \rightarrow \dots \rightarrow R_2 \rightarrow R_1. \quad (11)$$

For state S with allocated state budget funding B for compensation of the i -th risk, the following expression is valid:

$$\sum_{i=1}^I B_i \geq \sum_{i=1}^I R_{iS}. \quad (12)$$

The mechanism for distributing risks between the stakeholders of the concession project in the port is based on the following principles:

- to identify the stakeholder of the concession project who can better control the consequences of the exposure to the risk. One of the criteria of this principle is the possibility of insuring risks: thus, risks from the consequences of which one can be insured are recommended to be borne by a private investor, and those that cannot be insured are left to the state;
- to determine the concession project stakeholder, which has more opportunities to manage the probability of risk occurrence;
- to determine the concession project stakeholder, who has an ability to eliminate the consequences of the risk at a lower cost.

Let us present the mechanism for managing the risks of concession projects implemented in the seaports of Ukraine (Figure 1).

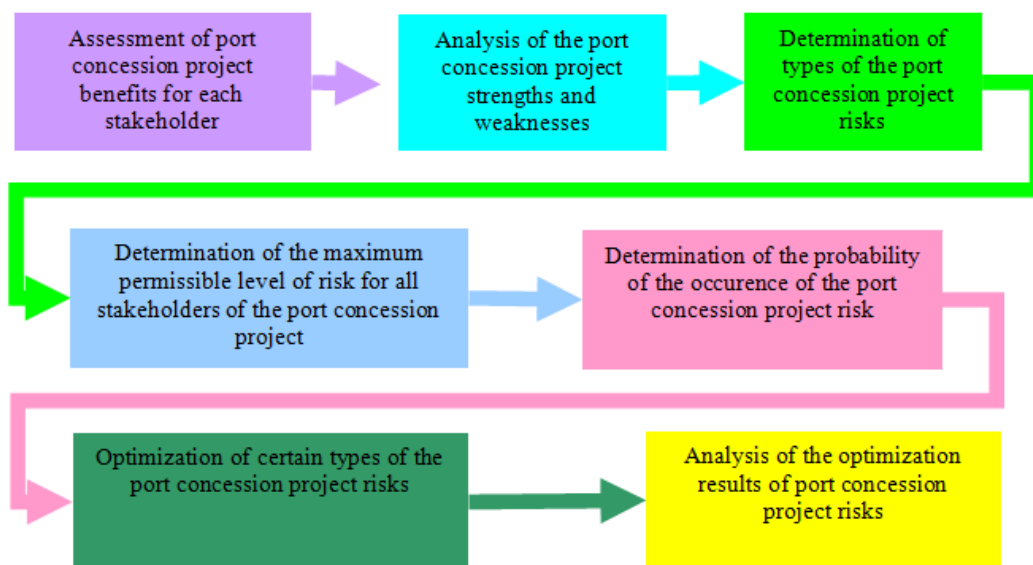


Figure 1: Conceptual Model for Risk Management of Concession Projects Implemented in Ports

Based on the use of the proposed mechanism for distributing risks between the stakeholders of the concession project in the port, the state bears the following risks: legal risks; the risk of delays in the issuance of licenses, permits and lease of land plots; the risk of a decrease in the level of tax revenues to the budget; the risk of delays in the commencement of construction works planned within the concession project; the risk of losing control over state assets; the risk of violation of the regional environmental safety standards.

The private investor also bears significant risks.

These include:

- the risk of additional obligations arising during the implementation of a concession project under an agreement made within public-private partnership, related to the need to settle the obligations of state-owned enterprises, the objects of which must be transferred to public-private partnership (partially or completely);
- the risk of exceeding operating or capital costs compared to those expected when preparing a feasibility study for a concession project;
- the risk of termination/absence of financial support from the state; the risk of a decrease in the volume of cargo transportation;
- the risk of the need to reduce prices for port services due to the loss of competitive advantages;
- the risk of instability of the regulatory, political and socio-economic system.

Within the research, an analysis of the risks arising from the implementation of concession projects in ports in accordance with ISO 31000, as well as the Resolution of the Cabinet of Ministers of Ukraine "Methodology for identifying risks of implementing public-private partnerships, assessing them and determining the form of their management" was carried out [9, 12].

Six categories of risks were identified:

1. Regulatory - risks related to the legal aspects of the implementation of the concession project in the port and have a potential threat to reduce the efficiency of its implementation, as well as the project quality and integrity. This category includes risks associated with the preparation and approval of documents regulating the fulfillment of the obligations of stakeholders within public-private partnerships. In addition, this group includes legal risks, in particular, risks associated with the proper application of current legislation or delays in the development and making decisions necessary for the concession project implementation;
2. Environmental - risks associated with the impact of the concession project on the environment;
3. Social and political - risks associated with general political factors, as well as the risks of the impact of the concession project on employees of state-owned enterprises and the local community;
4. Market - risks associated with the deviation of actual income from the forecast due to a decrease in the volume of cargo handling or the level of prices for services that are planned to be provided within the implementation of the concession project in the port;
5. Financial - risks of deviation of the financial indicators of the concession project in the port from the planned ones due to the occurrence of macroeconomic factors, changes in customs or tax legislation, as well as the ability of the concessionaire to attract financing on the stipulated conditions;
6. Technical - risks that are directly related to the implementation of the measures and operating activities provided for by the concession project during its term.

Most of the risks can only be assessed qualitatively, based on an expert analysis of the probability of their occurrence and their impact on the implementation of the concession project in the port, while a quantitative assessment is possible only for those risks that have a direct impact on the project financial indicators.

The mechanism for analyzing the risks of concession projects implemented in ports is offered, taking into account the choice of the method for conducting risk assessment, as well as predicting the participation of stakeholders in incurring a certain type of risk (Table 1).

Table 1

Risk sharing mechanism for concession projects in ports (S – state; P – private investor; QA – qualitative risk assessment; QSA – quantitative assessment /sensitivity analysis)

Risk type of the concession project in the port	Assessment method	Predictive distribution
Legal risks		
Changes in the legal base for tax, customs, currency issues	QA	S
Setting prices, tariffs, fees in an amount that does not correspond to economically justified costs	QA	S
Nationalization, confiscation or other compulsory alienation of the concessionaire's property	QA	S
Changes in the the legal base in regulation of the operating activities of port operators	QA	S
Changes in the legal base on licensing and permits	QA	S
Untimely transfer of property to concession, land plots - to lease	QA	S+P
Failure by stakeholders to fulfill obligations under the concession project in the port	QA	S+P
Absence or insufficient level of settlement of certain issues of interaction of stakeholders of the concession project in the port	QA	S+P
Early termination of the concession project in the port	QA	S+P
Violation of the conditions for the return of property by the concessionaire to the state partner	QA	S+P
Environmental risks		
Risks of increased environmental pollution	QA	S+P
Environmental risks during and after construction	QA	S+P
Accidents and emergencies	QA	S+P
Social and political risks		
Potential unemployment of current port staff and difficulties in retraining / re-hiring these workers	QA	S+P
Disagreement of trade unions regarding the conditions for the implementation of possible projects	QA	S+P
Rejection of the new edition of the Law "On Concession"	QA	S+P
Impact of the project on the local community	QA	S+P
Changes by local authorities in the amount of land tax, changes in the terms for the land allocation	QA	S+P
Stakeholders' position regarding specialized warehouses	QA	S+P
Reduced staff productivity	QA	P
Lack of qualified personnel	QA	P
Market risks		
Fierce competition	QSA	S+P, basically P
Changes in the demand structure between the ports	QSA	S+P, basically P
Insufficient demand	QSA	S+P, basically P
Financial risks		
Inflation rate	QA	S+P, basically P
Hryvnia's exchange rate against foreign currencies	QA	S+P, basically P
The riskiness of investing in a project	QSA	P
The financial ability of the private partner to attract funding	QSA	P
The cost and duration of debt funds that can be raised in a concession project	QSA	P

Changes in tax, customs, tariff regulation	QA	S
Negative consequences of the concession project implementation for public sector enterprises	QA	S
Technical risks		
Supply of materials	QSA	S+P, basically P
Disadvantages of technology	QSA	S+P, basically P
Underestimation of costs	QSA	S+P, basically P
Impact on the environment	QSA	S+P, basically P
Compliance procedures for obtaining licenses and permits	QA	S+P, basically P
Future approvals for port development projects	QA	S+P, basically P
Cost overrun	QSA	S+P, basically P
Availability and conditions for the use of land plots and assets	QSA	S+P, basically P
Delay in completion	QSA	S+P, basically P
Obsolete technology	QSA	S+P, basically P
Incomplete / poor-quality performance of tasks by the contractor	QSA	S+P, basically P
Failure to achieve operational indicators	QSA	S+P, basically P

The implementation of concession projects in the ports of Ukraine will significantly increase the volume of cargo transshipment, and the infrastructure of stevedoring companies will be significantly updated and used much more efficiently. This is beneficial not only for the private investor, but also for the government side, as the financial and economic benefits from improved port operations will be shared between the public and private sectors.

5. Conclusions

The implementation of concession projects in the ports of Ukraine, and, consequently, the expansion of the transshipment capacities of the ports will lead to a significant increase in the contribution of ports to the state budget than under the “no change” scenario, when the state enterprise is financially limited to make the necessary investments. Thus, attracting a private investor through the implementation of concession projects in ports is the only expedient way to increase the transshipment capacity of cargo in the ports of Ukraine through private investment in port facilities.

The paper proposes a mechanism for finding the area of mutually acceptable goals of all stakeholders of the concession project being implemented in the port, based on the management of target indicators of stakeholders, taking into account the weight coefficient of a certain indicator for a specific stakeholder.

A conceptual model of risk management of concession projects in the port based on the ISO 31000 standard, as well as the Methodology for identifying risks of implementing public-private partnerships, assessing them and determining the form of their management was developed. A mechanism for distributing risks between the stakeholders of the concession project has been developed, which allows identifying risk situations for the state and private investors.

In further researches, the implementation of the proposed risk sharing mechanism in the implementation of concession projects in seaports is supposed to be carried out on the basis of the use of an information system, which will greatly simplify the procedure for achieving the goal. The use of the information system in the implementation of the proposed mechanism for distributing risks between the stakeholders of the concession project in the port will make it possible to determine the mutually acceptable level of risks that will be reasonable for the project stakeholders more clearly.

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