Management of industrial development projects in special economic zone

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Abstract. The article examines the problem of improving the efficiency of industrial development project management in special economic zones (SEZ) at various stages of their life cycle. Conducted analysis of functioning features of SEZs in the context of implementation state policy on their development in the Russian Federation (RF), with subsequent determination of the nature of prevailing trends and changes in the application of this tool in the macroeconomic environment to promote economic activity. To solve the problem posed in the study, the authors have developed a method for evaluating the effectiveness of industrial development project management in SEZ, which consists in using the benefits and advantages of the preferential management regime in the activities of construction organizations implementing similar projects. The purpose of the study is to improve the methods of assessing the effectiveness of management activities for implementation project activities in the SEZ based on a balanced spatial arrangement of construction objects. The result of the research is the development of a model that describes the role of SEZ in ensuring improvement of the industrial and construction sphere of the state and the creation of a project management assessment method that considers provisions of spatial development strategy.

1 Introduction

Nowadays, the importance of SEZs in the development of industrial and construction sectors of the country's economy is due to their position in the programs for the strategic development of sectors in the national economy. According to the "Strategy for the development of the construction industry of the Russian Federation until 2035", published on the official website of the Ministry of Construction and Housing and Communal Services of the Russian Federation, the current goals and objectives in the field of industrial construction...
development is the formation of a solid platform for emergence of construction organizations that are able to implement large-scale ICPs characterized by technical complexity and uniqueness at all stages their life cycle [1]. Another goal is related to the need to ensure sustainable technological renewal and expansion of existing methods for managing construction projects [2]. It is important to note that within the framework of the given strategic guidelines, it is important to reduce the importance of influence of administrative barriers on the process of creating construction projects [1,2]. It is assumed that SEZs will transform the existing approach to project management into a different form, which will combine the advantages of this tool for promoting economic activity with classical approaches to assessing the effectiveness of management and implementation of ICPs in various directions. The result of this reformatting of project activities will be the possibility of achieving the goals of scientific, social, and economic programs to improve aspects of the country's industry and construction industry at the federal and regional levels.

Statistics of recent years show that there are several difficulties for industrial and infrastructure construction, which are expressed in the systemic problem of lack the significant diversification of other sectors in country's economy. This is largely since the mining and sale of minerals acts as a key export-oriented industry, forming the country's trade balance. Another aspect is the multilayered and complex nature of oil and gas sector, which provides work for many other sectors of economy, including construction, industrial and infrastructural areas. Table 1 shows the structure of demand for industrial construction in various sectors of economy, expressed as a percentage of fixed assets put into operation.

![Table 1](https://doi.org/10.1051/e3sconf/202343107043)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Investments in fixed assets, billion rubles</th>
<th>As a percentage of the total, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining operation</td>
<td>35 485</td>
<td>9.0</td>
</tr>
<tr>
<td>Manufacturing industries</td>
<td>27 136</td>
<td>6.8</td>
</tr>
<tr>
<td>Provision of electricity</td>
<td>20 171</td>
<td>5.0</td>
</tr>
<tr>
<td>Water supply</td>
<td>2980</td>
<td>0.7</td>
</tr>
<tr>
<td>Commercial real estate</td>
<td>71 171</td>
<td>17.7</td>
</tr>
<tr>
<td>Communication</td>
<td>7 372</td>
<td>1.8</td>
</tr>
</tbody>
</table>

It should be noted that this distribution of demand for implementation of industrial projects is justified by the country's high dependence on raw exports of minerals, which is get particular importance in structure of country's GDP, affecting the development in other sectors of economy. Solving the problem of reducing the dependence of the construction industry on the oil and gas sector is one of the key goals for improving industrial construction within the framework of the implementation of the "Strategy for the Development of the construction industry until 2035"[1] it is necessary to systematically abandon the export-raw materials model of economic development and transition to an innovative path of development. Currently existing industrial enterprises accumulate enough labor resources and can provide a high level of labor productivity. However, there is a serious difference in wages between regions within the same industry, depending on the location of industrial enterprises, which leads to a disparity in the economic development of some territorial subjects of RF with others. The reason for all this is the lack of coordination of sectoral and industrial development plans of the Russian Federation with the policy of spatial, territorial, and urban development of the subjects of RF, the largest urban agglomerations, strongholds, and non-agglomeration territories. The creation and implementation of unified coordination plans that consider the location of industrial enterprises with the state policy in the field of
urban planning and spatial development would solve the problem of income inequality and ensure a high level of socio-economic development in the country.

Such inequality is demonstrated in the distribution volume of construction work, which year the Central Federal District (CFD) has taken the lead in recent years, followed by the Volga Federal District (VFD), the Ural Federal District (UFD) closes the top three leaders. A similar situation is observed in the distribution of construction enterprises, where the Central Federal District also takes precedence, in which a record 1,098 enterprises operate [3].

Over 70% [4] of special economic purpose territories are concentrated in the Central Federal District and the Volga Federal District, which again confirms the need to form unified urban planning and spatial development plans that consider the importance of strategically correct placement and subsequent construction of industrial facilities. At the same time, about 60% of the engineering and technical infrastructure and land ready for construction in the SEZ remains empty and is not used, which forms an irrational distribution of budget funds for the development of the SEZ instrument [5].

Thus, within the framework development of industrial and infrastructure construction, it becomes obvious that in strategic development documents the role of instruments to promote economic activity (SEZs, industrial techno parks, sites, clusters, etc.) should become the leading one, since they have important advantages that will provide the industry with a stable growth of orders for the construction industry for the implementation of such ICPs and related with them infrastructure. The use of tools for the integrated development of territories within the framework implementation of strategic development goals for the improvement of industrial construction will consolidate the efforts of construction industry for the implementation of industrial facilities, engineering, and transport infrastructure, ensuring balanced spatial development and increasing the level of social and economic development of regions.

In addition to the development of industry, the use of tools for integrated development of territories contributes to increasing their demand on the part of business, contributing to an increase in the inflow of investments and optimizing budget financing. As part of the study, we will form Table 2, in which we will reflect the existing documents of strategic development construction industry, indicating the position of industrial construction, tasks and goals that need to be solved and implemented.

Table 2. Comparative scientific literature analysis on the SEZ interaction

<table>
<thead>
<tr>
<th>№</th>
<th>Strategic Development Document</th>
<th>Tools for improving industrial construction</th>
<th>Tasks and Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Strategy of innovative development of the construction industry until 2030 [2]</td>
<td>Using the cluster approach (SEZ, industrial parks, sites)</td>
<td>Updating of engineering and transport communications</td>
</tr>
<tr>
<td>2</td>
<td>Strategy for the development of the construction industry and housing and communal services until 2030 with a forecast until 2035 [1]</td>
<td>Territorial planning tools (SEZ, industrial clusters, sites, etc.) and full-cycle ICS integrator enterprises</td>
<td>Reducing the impact of administrative barriers that preventing the implementation of ICPs.</td>
</tr>
<tr>
<td>3</td>
<td>Strategy for the development of the construction materials industry for the period up to 2020 and further perspective up to 2030 [6]</td>
<td>Forecast balances of supply and demand for building materials to quickly track fluctuations in the market</td>
<td>Improvement of the system of spatial placement of enterprises of the construction industry</td>
</tr>
</tbody>
</table>
Based on the results of analysis the program documents devoted to the research topic, the practical need for the development of methods and tools for managing the implementation of industrial and construction development projects in SEZ conditions was established. In view of this, the purpose of the study is to form a model that determines functional purpose of SEZ in implementation of ICPs of various directions, and a method for evaluating the effectiveness of project activities that considers specific economic conditions. To achieve the set goal of scientific research, the following tasks have been identified that need to be successfully solved:

1. To systematize the advantages of SEZs that have an impact on project activities
2. To identify the functional responsibilities of participants in implementation ICPs in the SEZ, reflecting the specific conditions of management
3. To conduct a comparative analysis of project activities under normal and preferential conditions
4. To characterize the importance of the "one window" principle in the framework of developing a methodology for managing the implementation of industrial development projects

2 Methods

- Theoretical and comparative analysis
- Systematization
- Synthesis
- Modeling
- Functional matrix of responsibilities

The scientific value of research lies in the development of a methodology for assessing the effectiveness of management and implementation projects at various stages of their life cycle.

At the first stage of the study, it is necessary to systematize the advantages of SEZs that are important for improving the efficiency of project management. Figure 1 shows ways to improve industrial and infrastructure construction within the framework of their interaction with SEZ.

Figure 1. Ways to improve industrial and infrastructure construction.
Thanks to the SEZ of technical-innovation type (TIT) and industrial-production type (IPT), it will be possible to accumulate the most important elements for development industry: innovations and production activities. These elements need to be implemented in the program of implementation of development projects. The role of the SEZ IPT in formation of an extensive path of development industrial construction, which will allow, thanks to the effect of scale and increase in production capacity, to provide organizations with enough building materials and resources to implement large industrial ICs.

TIT special Economic Zones specialize in creating conditions for generating innovations in the form of scientific and technical products and their subsequent bringing to industrial use [7-8]. For industrial construction, TIT SEZ is an intensification tool that will "strengthen" the activities of organizations with innovations in form of technologies, materials, products, etc.

The next aspect that is important for the development of industrial construction is the optimization stage of passing administrative procedures and reducing their impact on the timing of project. In many ways, the difficulties encountered in obtaining the necessary documentation for the implementation of ICs are associated with high bureaucratization.

Fig. 2 illustrates the functioning of the system-the "one window" principle operating in the SEZ, within the framework of industrial and infrastructure construction.

The SEZ has its own mechanism for passing administrative procedures, built on the principle of "one window". This principle is understood as a system of providing public services to SEZ residents and other interested persons in a simplified form [7-9]. Within the framework of this system, the authority to regulate land and property relations, organization of construction, connection to the networks of engineering and technical infrastructure is assigned to the management bodies of SEZ. Moreover, branches and state institutions and departments are based on the territory of SEZ, which are familiar with the specifics of providing the necessary documentation to permit activities on the territory of SEZ.

SEZs could accelerate the process of passing preparatory stages of construction, which is a significant advantage in implementation of industrial ICs, and the existence of their own ICS Enterprises.
The system of passing administrative procedures is a ready-made platform for improving the system of contractual relations and reducing the administrative burden.

At the second stage of study, it is necessary to identify the functional responsibilities of the project participants in the SEZ. Table 3 sets out functional responsibilities of ICP stakeholders in accordance with the stages of its life cycle in SEZ conditions.

Table 3. Functional matrix of responsibilities in the implementation of ICPs in the SEZ.

<table>
<thead>
<tr>
<th>Function (stage of ICP)</th>
<th>Project participant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Investor</td>
</tr>
<tr>
<td></td>
<td>Development corporation</td>
</tr>
<tr>
<td></td>
<td>Government of subject</td>
</tr>
<tr>
<td></td>
<td>Ministry of trade</td>
</tr>
<tr>
<td></td>
<td>SEZ Administration</td>
</tr>
<tr>
<td>1. Choosing a site for ICP</td>
<td>E, A, AP</td>
</tr>
<tr>
<td>2. Execution of an investment application</td>
<td>E, A, AP</td>
</tr>
<tr>
<td>4. Agreement between corporation development and investor</td>
<td>E, R, E, A, AP</td>
</tr>
<tr>
<td>5. Allocation of land</td>
<td>R, A, E, AP</td>
</tr>
<tr>
<td>6. Obtaining construction approvals</td>
<td>E, A, AP</td>
</tr>
<tr>
<td>7. Obtaining a positive conclusion of the expertise</td>
<td>E, AP</td>
</tr>
</tbody>
</table>

The matrix illustrates the distribution of responsibilities according to designations that mean the following: E – executor, R – responsible, A – agreement, AP – approval.

According to the results of compilation functional matrix of responsibilities, it was found that a significant part of the procedures for obtaining executive permits falls on the "shoulders" of the SEZ itself, which reduces the burden on construction organizations that directly perform construction and installation work, which positively affects timing of projects.

3 Results

The result of analytical work carried out to study the features of managing implementation of industrial development projects in SEZ is the development a method for evaluating project activities and a functional model illustrating the procedure for the formation of evaluation indicators and the structure of their formation. The formed model includes two sides subjects of project activity in the SEZ – an investor represented by a technical customer, contractors and other organizations involved in the implementation of the ICP, the other side subjects is the SEZ, represented by its administration and management company, as well as authorities of local municipality.
Proposed methodology for evaluating the effectiveness of project management is based on a similar principle and is aimed at measuring the degree of effectiveness efforts. Since conditions of investment and construction activity are characterized by a preferential management regime, it is necessary to evaluate each of the stages of the project life cycle:

\[
T_{\text{в.п.п.}} = \sum t_1 + \sum t_2
\]  

(1)

Where,
\[
T_{\text{в.п.п.}} \quad \text{the total duration of project and pre-project work during the implementation of the project in the SEZ, days, months;}
\]
\[
\sum t_1 \pi \quad \text{duration of project work in the SEZ, days, months.};
\]
\[
\sum t_2 \pi \quad \text{duration of pre-project work in the SEZ, days, months.}
\]

The determination of time difference in combining pre-project and project work with time spent working with government agencies is determined by the formula:

\[
\Delta t_{\text{в}} = T_{\text{в.п.п.}} - T_{\text{в.р.г.}}
\]  

(2)

Where,
\[
\Delta t_{\text{в}} \quad \text{the difference in time between the total duration of project and pre-project work (PPR) and total duration of obtaining documentation and permits from authorized government agencies, days, months.}
\]

Also, were developed the author's coefficient of the ratio of time for the implementation of pre-design and design works, including work with government agencies with time for the implementation of basic construction and installation works for the implementation of ICPs in the SEZ, as follows:

\[
K_c = \frac{\Delta t_{\text{в}}}{T_{\text{смр}}}
\]  

(3)

Where,
\[
K_c \quad \text{coefficient of the ratio of time for the implementation of pre-design and design works, including work with government agencies with time for the implementation of basic construction and installation works for the implementation of ICPs in the SEZ.}
\]

Based on the conducted research, we will form the author's model for the implementation of ICPs in the SEZ, considering the specifics of obtaining executive and permissive documentation (EPD) and the principle of "one window", which is shown in Figure 3.

Fig. 3. The model of ICP implementation in the SEZ, considering the specifics of obtaining EPD and the principle of "one window"
4 Discussion

The use of SEZs in ensuring effective management and implementation of industrial development projects implies the possibility of solving several systemic problems that significantly hinder the achievement of program goals set out in strategic development documents. We are talking about the formation of full-cycle investment and construction organizations that will have the necessary financial and material base for conducting turnkey investment and construction activities. In addition, the SEZ is tasked with forming a network of clusters by concentrating various factors of production on its own territory [2, 11].

However, there are organizational difficulties associated with an insufficient degree of elaboration differentiation of SEZ infrastructure itself – into budgetary and private [5].

When implementing an industrial IC, it is necessary to adhere to strict requirements for the organization of the construction process, which requires a significant amount of funds and resources that medium or small construction organizations do not have. Among other things, another important aspect is the need for an engineering and transport infrastructure that must meet the requirements and specifications for its creation and operation, which significantly increases the cost of constructing a construction facility. In this regard, often one of the leading investors in implementation of industrial ICs is the state that allocates funds from the budget.

However, such interaction of construction entities complicates the process of implementing industrial ICs, since there is no experience in using long-term concession agreements and an appropriate system (such as FIDIC) regulating the activities of public and private entities of construction process.

Such a form of public-private partnership (PPP) involves control over funds and resources, especially financial ones, which are invested by the construction parties in the implementation of industrial and infrastructure projects. Figure 4. illustrates the contradiction between industrial and infrastructural ICs in the terms of the concession agreement.

5 Conclusions

The authors of the article concluded that the developed methodology for assessing the effectiveness of industrial development project management in the SEZ will reveal the features of applying the advantages of preferential management regimes in the activities of investment and construction organizations. The existing problems that have developed in the construction sector and industry need to be solved by updating the methods and tools for Industrial IC, Infrastructure IC.
regulating and evaluating management activities in SEZ conditions at various horizons of planning the activities of project subjects. During scientific research, it was found that various types of SEZs can provide an opportunity to regulate and choose ways to improve industry-extensive and intensive development. The relevance of using SEZs in this aspect is due to the need to find a solution to ensure the implementation elements of spatial development policy [11] and the balanced placement of territories to promote economic activity in the context of their interaction with organizations of the construction sector of various directions. The practical value of the developed methodology in the presentation and systematization of SEZ advantages at various stages of project implementation management.

The scientific significance of the study lies in the formation elements of hypothesis for future research, which is that the improvement of industrial and infrastructure construction depends on how much the advantages of the SEZ, contributing to the formation of full-cycle integrators, will ensure the clustering process of the country’s economy, on the basis of this process it will be possible to determine environmental factors and a system of criteria that are necessary to launch and formation of full project implementation organizations.

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