Application of the controlling mechanism and sustainable development principles in the implementation of construction projects

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Abstract. The relevance of the study is determined by the need to ensure sustainable functioning of construction enterprises by increasing the efficiency of investment projects through the use of controlling mechanisms and application of the ESG concept. As a result of the research, the interrelation of project implementation processes by management phases was analyzed, problems in terms of control of investment and construction projects were identified and directions for improving the control mechanism with the application of the ESG concept were proposed. The purpose and main result of the study is to develop measures to improve the methods of control over the timing of implementation of investment and construction projects, taking into account compliance with the principles of the ESG concept.

1 Introduction

The main tasks of the project implementation process regulation is to ensure observation of the plan of construction and installation works execution and evaluation of the plan-fact analysis of the project, which will allow, if necessary, to make appropriate additions through a set of organizational, managerial, technical-technological, financial and economic solutions, allowing to improve the efficiency of the implemented project as a whole. This procedure is based on the regular application of the same tasks on the basis of a set of available information base, which consists of a variety of different data, such as: observation of the progress of the project, schedule plan, actual data on the scope of work and the feasibility of changes in the project [1-4].

The implementation of the mechanism of value-oriented operational planning of investment and construction project realization is presented in Figure 1 [5].

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At the same time, it is possible to transform and change the input data about the project based on the application of various techniques and mechanisms used during the project implementation. In order to achieve such results, a comprehensive information support is required, involving documents such as [6]:

1. Planning (relevance, goals and objectives of the project);
2. Distribution of tasks by executors (departments, services, divisions);
3. Budgeting of different levels (short, medium and long-term financial plans developed by different responsibility centers);
4. Generation of accounting data (the order of work of various departments on the basis of approved regulations and with the help of various technical means that allow reliable assessment of cash flows);
5. Control of results and plan—fact analysis (justification of the algorithm and methodology that help to determine changes in planned indicators for various groups of indicators);
6. Assessment of the reasons for changes;
7. Analysis of weaknesses of the proposed evaluation system;
8. Adjustment (a set of measures to achieve the initial objectives and identify those responsible for the work).

2 Materials and Methods

In fact, the advantage of using control of the investment and construction project is the focus on the upcoming period, taking into account certain trends that ensure the stability of functioning and growth of value in the current period, which is reflected in the value-oriented operational planning of the development project [7].

The effectiveness of control over the implementation of investment and construction project, taking into account various forms of financing the implementation of construction projects, associated with the definition of effective methods of analysis and evaluation of capital management [8].

In recent years, modern research in the field of construction economics and real estate management shows the presence of many unresolved problems in different areas, but I would...
like to emphasize such major problems as insufficient application and use of the ESG concept in the implementation of construction projects. Therefore, there is a need to develop a methodology for compiling a management system for investment and construction projects, based on the analysis of the existing potential of construction organizations that implement them [9]. As it is known, no project can be successfully implemented without highly qualified management personnel with all the necessary competencies in the field of construction project management. At the same time, we should not forget about other aspects of the project realization success, such as: economic forecast, availability of information about the market segment, taxation, innovations in construction, changes in the legislative base, etc.

In this regard, it should be noted that the success of construction project realization depends on many of the following factors:

1. management of capital construction objects;
2. information support;
3. conceptual foundations of capital construction facilities management

The management of an investment and construction project involves the performance of all operations, which are divided into certain directions (Figure 2), each of which has the purpose of solving a number of problems of legal, financial, economic and design-technical nature.

Fig. 2. Directions of construction project management
The main goal of any planning is to increase the efficiency of project implementation and achieve the set objectives without using additional resources. This approach is based on the system of marginal utility, when the company's assets bring maximum benefit exactly in the state in which they are at a given time. It should be noted that along with many problems of the construction sector there are key ones, without which the effective development of the industry is impossible — it is the lack of highly qualified personnel, high-performance machinery and mechanisms and sufficient level of financing [10].

Based on the above, we can conclude that the problem of efficiency of investment and construction project realization should be considered in two aspects:

- The development of new, modern methods of evaluation, which take into account a set of different indicators, including expert ones;
- Identification of fundamentally new systems of assessments and indicators, based primarily on production and technical data [11].

In order to make rational management decisions on the development of development management strategy of development organizations, it is necessary to implement a number of measures step by step (Table 1).

Table 1. Sequence of measures in the development of development management strategy of construction organizations.

<table>
<thead>
<tr>
<th>Management actions</th>
<th>Tasks to be accomplished to achieve positive results</th>
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</thead>
<tbody>
<tr>
<td>1. Assessing the potential and identifying the capabilities of a development organization</td>
<td>Audit of the assets of the development organization with the involvement of professional audit firms in order to obtain reliable and substantiated data</td>
</tr>
<tr>
<td>2. Analysis of the position occupied by the development organization in the real estate market and assessment of the market capacity</td>
<td>Determining the firm's market share in the development services market and planning activities according to the existing demand allows for flexible capacity management</td>
</tr>
<tr>
<td>3. Matching development opportunities and market needs</td>
<td>Determining the imbalance between the level of management personnel and the developer's available assets by identifying development reserves, prompts informed management decisions</td>
</tr>
<tr>
<td>4. Making managerial decisions aimed at the development of a development organization</td>
<td>Strategy development, contributes to the effective development of the development organization and rational management taking into account the real estate market trends</td>
</tr>
<tr>
<td>5. Control and evaluation of the implementation of the set tasks for managing the development of the development organization</td>
<td>Assessment of the level of achieved goals and identification of reasons for deviations from the planned results, determination of measures for their elimination</td>
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</table>

Among the most important factors affecting the effectiveness of development management of a development organization are the following:

- Fundamental achievability of the set goal within the set timeframe;
- Scientific validity of planned activities;
- Interest in objective performance assessment;
- Accessibility of organizational, economic and management procedures for the performers to understand.

The development of the proposed concept should, first of all, go through a consistent detailing and interrelation of goals and objectives of management by performance indicators at the stages of strategic planning and implementation of the planned plans of the development company [11].
Effective management of an organization is inextricably linked to the understanding of key concepts and ideas about management approaches. Below we will consider three basic approaches to company management, which are subdivided into: systemic, process and situational.

3 Results

The mechanism of anticipatory self-control is necessary to carry out the plan-fact analysis mentioned in point 2. The meaning of this approach is very simple—the penalties applied are less harmful to the contractor than penalties for late delivery. This method is effective both for the contractor (tries to deliver the work on time, without violating the quality, without penalties) and for the customer (reducing the time of the project).

The sequence of actions for using this method consists of 3 main stages:

Stage 1: The customer informs the contractor about the main parameters of the methodology (what are the penalties and for what).

Stage 2: Contractors, on the basis of their production program identify the necessary reserves and agree them with the customer.

Stage 3: The customer agrees on the change and calculates the amount of fines.

We propose to take the mechanism of anticipatory self-control as a basis for the developing control mechanism and supplement it with the following elements:

1. Planning and reporting documents detailing the calendar plan schedule in accordance with the levels of management and implementation;

2. Methodology for assessing the performance of the investment and construction project realization;

3. Reflection in planning and reporting documents of the reasons that caused deviations and the possibility of their elimination at lower levels of management;

4. Possibility to make management decisions at lower levels, which in turn activates personal initiative and responsibility of the plan executors at different management levels;

5. Higher level managers accept/not accept lower decisions.

The calendar plan schedule contains detailed information about the time of realization of the whole construction project and the composition of individual types of work. On the basis of the calendar plan of the schedule is made, the production plan financial plan of the project, material and technical supply plan and others. And their realization implies parallel achievement of goals. So the delay in project supply leads to failures in all plans concerning the construction project: downtime in production; under-received interest and others.

\[ R_i = \frac{x_f}{x_p}, \quad (1) \]

where:

- \( x_f \) is the actual value of \( i \)-th work performed;

- \( x_p \) is the planned value of \( i \)-th work.

This efficiency refers to a specific performer of work (worker). Each worker belongs to a specialized brigade, the efficiency of which is calculated as follows:

\[ R_y = \sum_{i=1}^{n} \frac{y_f}{y_p}, \quad (2) \]

where:

- \( y_f \) is the cost of work actually performed by the team in the reporting period (day, week, decade, month, etc.);

- \( y_p \) is the planned cost of work performed by the team in the reporting period for the same period.
\[ R = \sum_{i=1}^{n} R_y = \sum_{i=1}^{n} R_x \]

In addition, the performance of the project realization is made up of the simple sum of the performance of individual performers. Then the control centers within their competences will be: worker; foreman; project manager; chief engineer; general director.

In order to increase the efficiency of the construction project realization, in our opinion it is necessary to connect the planned indicators of the project realization with specific executors of the project by time. For this purpose it is necessary to introduce production tasks for a worker/unit, brigade, project manager by time. So the project manager has a plan of realization of the construction project, which he breaks down monthly and weekly plans for brigades. The foreman, in turn, breaks down the brigade plan into production tasks for links/workers (Fig. 3).

Fig. 3. Brigade plan for production tasks

The project manager, based on the production plan (schedule calendar plan), determines the nomenclature and scope of work to be performed for the month. Then he distributes the list and scope of work for each brigade at the planning meeting with foremen. Brigadiers in turn distribute the list and scope of work by weeks and days of the month. Then determine the specific performer of the work.

4 Conclusions

The presented method of assessment at implementation should not cause resistance to changes due to the fact that it is possible for performers at all levels to "veil" low performance in some works at the expense of high performance in other works in the short term. In the future, intensifying the implementation of works in the areas with low performance and completing them on time will not result in penalties from the management.

References


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