

Assessing construction costs for agricultural facilities: organizational and technological strategies

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Abstract. The relevance of the study is caused by the complexity of calculations when determining the cost for construction of agricultural facilities due to the multi-parameter system, which includes volume, structure, areas and objects of investment. Ensuring the effectiveness of capital investments through the use and implementation of advanced and latest solutions, technologies and other conditions of the investor in relation to the level of technical equipment and quality of the facility will allow obtaining a competitive facility and a profitable result. As a result of the study, the theoretical foundations of managing the cost of an investment and construction project were studied, an analysis of management methods and practical recommendations for justifying the cost of an investment and construction project were carried out in order to develop recommendations for cost reduction. The methodological basis of the study is: system analysis, methods of expert assessment, comparisons, analogies, analysis of absolute and relative indicators and others. To solve the problems, a combination of general scientific methods such as scientific observation, comparison, measurement, abstraction, modeling, induction and deduction, historical method, abstractions and concretizations, alongside specific methods including economic-statistical, analytical-calculation, functional-cost, and expert approaches were used. The practical significance of the work carried out is the development of a method for assessing cost management of an investment and construction project. The developed method has all the prerequisites for successful application in the real activities of the organization under study.

1 Introduction

In modern realities, assessing the cost of an investment and construction project at various stages of the life cycle is greatly complicated by the lack of methodological unity of the methods and approaches used. At each stage, specific methods are used, often with weak coherence and consistency, which makes it difficult to manage investment and construction projects and achieve planned project results. Resolving a set of systemic problems of project

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management is possible on the basis of improving the methodology for valid assessment of the cost of an investment and construction project, which will contribute to the successful implementation and completion of the investment and construction project [1, 2].

2 The main part

Cost is the fundamental factor in investment and construction projects, viewed as a dynamic system attribute that evolves throughout the project's development, encompassing the overall expenditure of resources and the execution of all tasks to attain the project's objectives.

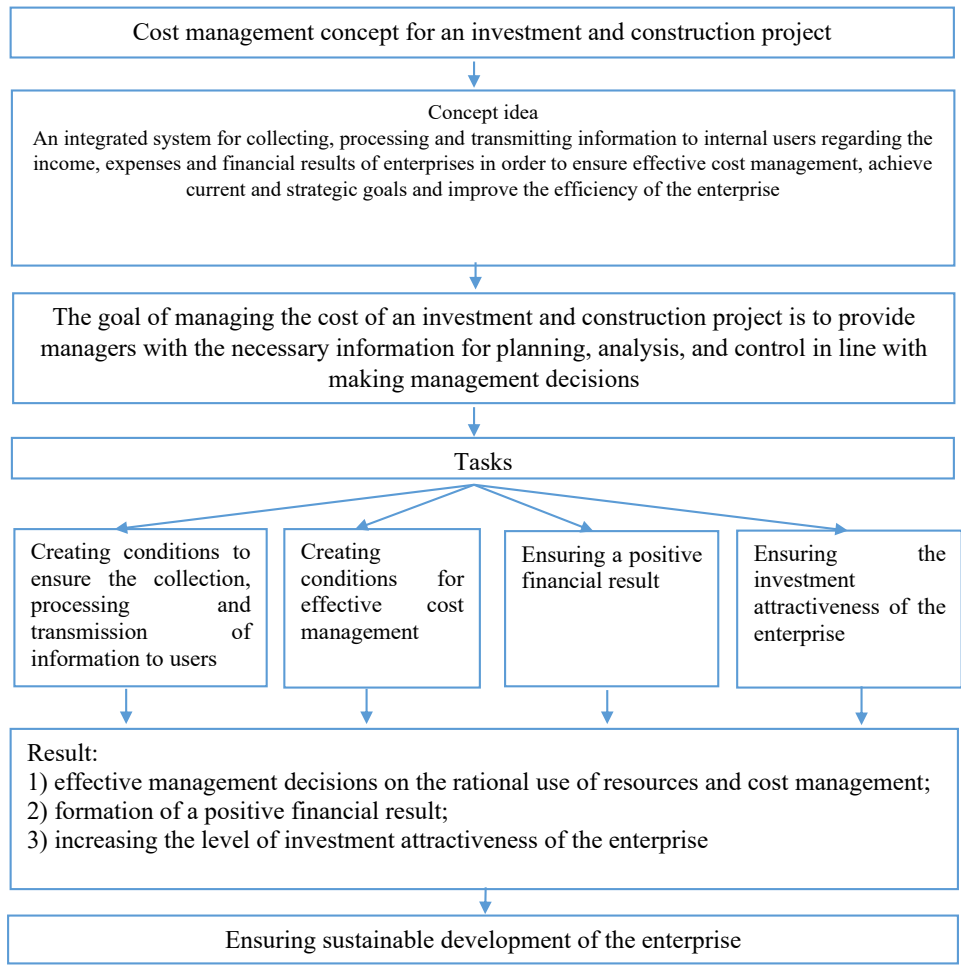


Fig. 1. Cost management concept for an investment and construction project

It is important to determine the level of qualitative, quantitative and value characteristics of information for the formation of the necessary information base for the cost management system of an investment and construction project.

The use of the concept of managing the cost of an investment and construction project in the practice of management systems increases the level of analytical work in enterprises of any type, contributing to the growth in the number of standard developments in management analysis and expanding the possibility of comparing and generalizing its results.

Since the cost management system for an investment and construction project is an integrated, complex system that has a specific goal and objectives, the author's understanding of the concept of cost management for an investment and construction project is presented in Figure 1.

Construction cost management and thorough cost assessment serve as vital tools for maximizing the effective utilization of funds by selecting solutions that meet the project's quality standards at the best possible price.

Tasks for estimating construction costs:

- creation of financial models taking into account various project implementation scenarios;
- control and management of design work to maintain the cost of the project model and its price optimization;
- conducting accurate financial estimates in accordance with various methods for determining the cost of work;
- monitoring of average market prices for building materials;
- selection of a pool of potential suppliers or contractors, holding tenders;
- monitoring of construction risks;
- technical supervision over the volume and quality of construction and installation work;
- control over the effective and targeted use of funds.

It should be noted that the introduction of a cost management system for an investment and construction project at domestic enterprises is a fundamental condition for increasing the efficiency of production and economic activities of an enterprise in terms of managing costs and income [3].

In line with the implementation of cost management of an investment and construction project at enterprises in the construction industry, it is necessary to take into account the specified information characteristics when analyzing certain indicators of current activities. In this regard, enterprises need to have an appropriate system for analyzing and interpreting data in terms of making management decisions in accordance with the goals.

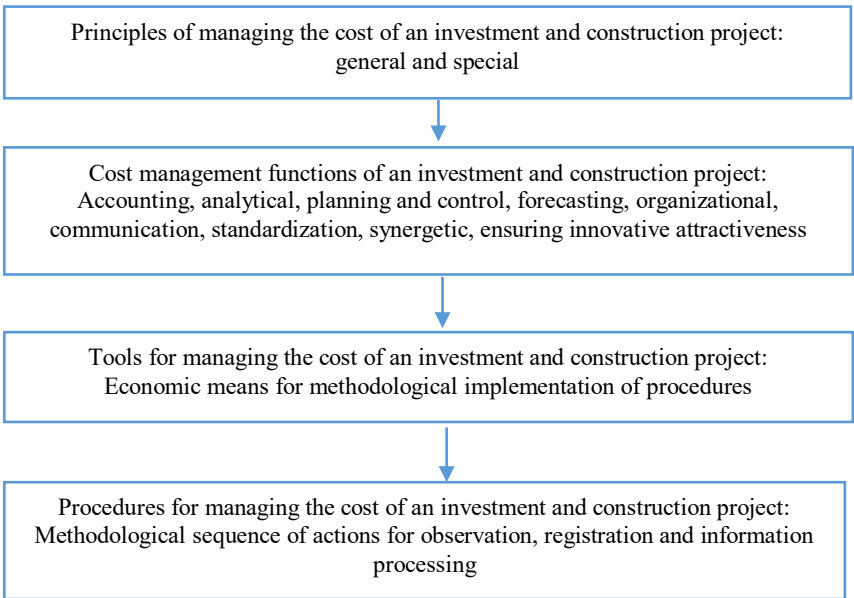


Fig. 2. Structure of the cost management mechanism for an investment and construction project

Also, the cost management system for an enterprise's investment and construction project should be based on certain forms of internal reporting that managers can use in their work. The formation of such reports should be based on a detailed study of the methodology and organization of accounting for operational activities and management accounting for other ordinary activities of the enterprise [4].

Based on the principles, functions, and tools, we propose to outline the structure of the mechanism for managing the cost of an investment and construction project of enterprises in the construction industry, which is presented in Figure 2.

The result of construction cost management is:

- bringing together all construction participants: financiers, designers, builders with the aim of successfully implementing the project on time, with proper quality and planned investments;
- development and implementation of working tools and reporting forms for construction cost management for related and separate divisions of financing, design, construction;
- summing up results and conducting analysis with the issuance of recommendations on existing and implemented projects with the aim of optimization, adaptation, improvement and applicability or inapplicability in current and future projects.

Thus, the use of the concept of managing the cost of an investment and construction project in the practice of management systems increases the level of analytical work in enterprises of any type, contributing to the growth in the number of standard developments in management analysis and expanding the possibility of comparing and generalizing its results [5].

The cost of an investment and construction project is a characteristic of the overall project and private subject activities and can manifest itself in potential and realized statuses, which, in turn, dictates the methodological basis for the research and management of this category.

The first status corresponds to the management block "assessment - planning - modeling", the second - to the block "organization - execution - control - regulation". The tectological boundary between these blocks involves the transformation of the planned cost of an investment and construction project into the actual value created in the design processes.

When considering the management block "assessment - planning - modeling", it is worth talking about the creation of a subsystem for advanced cost modeling of an investment and construction project, for example, in the form of a construction and resource supply schedule, a register of suppliers, logistics specifics, regular monitoring with the possibility of further model development and the prospect of digitalization and automation of project management. All of the above is a necessary condition for the existence of a cost management system for investment and construction projects based on a comprehensive, flexible, dynamic cost modeling methodology with regular systemic provision of information about the cost elements of the project.

For example, the results of estimated pricing are characterized by inaccurate estimates and pose risks for project execution. Grouping the costs of estimated calculations is not always comparable with budgeting: significant difficulties in comparability of these two planning stages relate to the costs of maintaining and operating construction machinery and mechanisms, and overhead costs. There is calendar uncertainty in the estimates, and the estimates do not take into account the production structure, which entails two negative consequences: a violation of the time principle of planning and a lack of consideration of the dynamic factor in the formation of real costs.

At the simplest practical level of planning the cost of an investment and construction project, it is necessary, first of all, to bring together the documentation forms of estimated pricing and budgeting, to supplement the estimate documents with an annex on the calendar distribution of the estimated cost of the project. Then it is necessary to optimize analytical

sections integrally in subsystems and in the system, effective hierarchical structuring, development of hierarchical directories of all subsystems, integration of all changes into the software, which will lead to a qualitative improvement in the management of investment and construction projects.

The development of a methodology that provides the block “organization - execution - control - regulation” must also have up-to-date categorization and methodological support. In economic science and practice, the category “added value” is widely used, which involves part of the cost of a product produced directly by an economic entity, added in the processes of production, sale or resale to the cost of material resources purchased externally. In this concept, an important financial component “falls out” from the chain of subjective influence on the product. The costs of raw materials and supplies are not taken into account.

The subjective production of value in this concept suffers precisely in the aspect of non-accounting for material costs, although the subject undoubtedly bears their burden, i.e. transforms its monetary resources into inventories and work in progress when creating the value of a construction project [5].

We will consider the created value in the aspect of taking into account subjective economic interests with a clear identification of participation in the investment and construction project, which requires using a differentiated approach to the formation of the system and its tectological principles, identification of participants in the investment and construction project and the specifics of the project life cycle. For example, a differentiated value chain for a contractor is based on the following processes: performance of work under a contract, provision of material, technical and other resources, control of work, compliance with rules and regulations, preparation of the facility for delivery. It is obvious that all processes must be reflected in costs and manifest themselves in the subjective phase of the project life cycle. Only under these conditions does the construction of a value chain make it possible to evaluate all cash and resource flows at reference points and subject phases, establish cost-generating factors in the activities of participants, and reliably assess the current status of an investment and construction project.

It is in the aspect of project management in the part attributed to a specific contractor that the category “created value” more accurately reflects the cost status of project work and allows the use of the earned value method in valuation. The current assessment of the created value of an investment and construction project at the construction stage allows us to determine the volume of work performed, analyze the state and dynamics of the implementation of subject project phases and the project as a whole. Indicators of created value make it possible to monitor emerging deviations, which may result in a change in the expected benefit. Determining these deviations reveals problematic items and serves as the basis for making management decisions to optimize the cost of an investment and construction project [6].

The methodical completion of creating the value of an investment and construction project lies in the reasonable recognition of the project’s financial result, which has its own specific assessment both in general for the investment and construction project and in relation to each participant expecting an economic effect. For example, for a contractor that creates a significant part of the project’s cost, the financial result consists of the revenue received under the contract as it is completed, if the financial result of the contract at the reporting date can be reliably determined. This is the value created by the contractor for that part of the investment and construction project that fell within its competence, was fixed in the contract and taken into account under the contract. The basis for successful management of the implementation of investment and construction projects is obviously the conditions of systematicity, connectivity of all processes of value formation and their transparency for all subjects [7].

To make effective management decisions when implementing investment and construction projects, a unified methodological approach must also be provided in conjunction with budgeting and management accounting:

- unification of documentation forms and their contents;
- end-to-end classification of cost items and indicators;
- reduction of value formation processes into a common algorithm;
- use of unified software for cost management processes;
- availability of a complete information base.

The cost management system for an investment and construction project is based on production accounting and costing, followed by management control, budgeting, and internal (segmental) reporting [8].

It should also be noted that this process in construction organizations is directly related to the main stages of their activities, and therefore, it is possible to form a generalized algorithm presented in Figure 3.

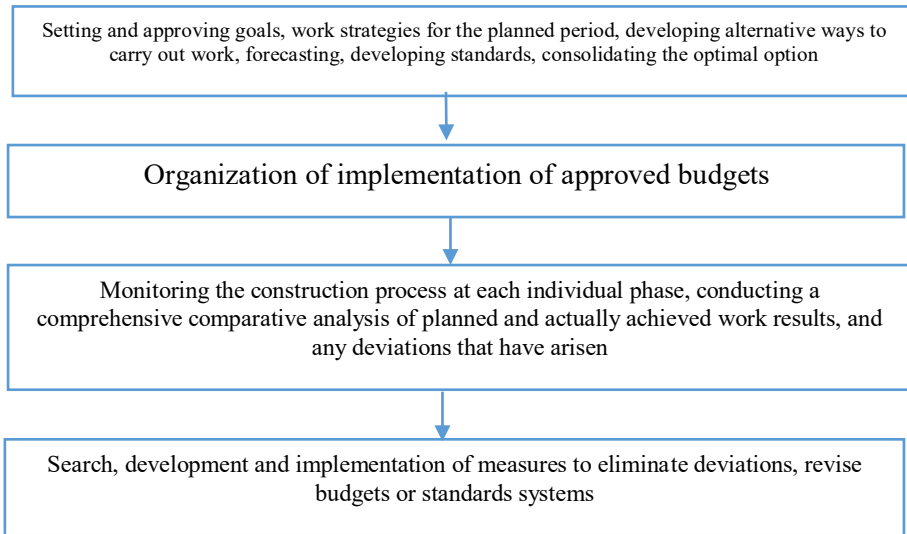


Fig. 3. Budgeting algorithm for construction organizations

The specifics of the industry under study also form some features:

1. The activity-based approach is used comprehensively: both in management (Activity-Based Management) and in budgeting (Activity-Based Budgeting), and is also reflected in the accounting and analytical system of an economic entity [8].

2. The technique of using “rolling budgets”, which allows you to revise the budget with respect to each nearest short-term period (for example, a month) (with the exception of construction organizations with a simple budgeting method, when it is rigidly set for a year).

3. A combination of “bottom-up” and “top-down” approaches, when “framework” standards depend on departments located at different levels of the hierarchy.

4. Expanding the planning horizon: it is necessary to take into account the duration of each individual project and develop either a short-term budget (up to 1 year), or long-term or medium-term budgets.

The basic budget for a construction enterprise can be called the construction budget or it is also called the project budget. The construction project is a construction object planned for implementation (residential building, shopping center, etc.). For individual construction

projects, it is necessary to draw up a plan where material, labor and other costs are deciphered in as much detail as possible.

3 Conclusion

The study outcome entails the creation of a model for assessing the cost of an investment and construction venture. This model offers a resolution to the challenge of enhancing value for both financial and non-financial stakeholders, aligning with the demands of the modern economy. The insights and key points from the study can be utilized by professionals in construction firms to enhance the cost management quality within these organizations. Specifically, the study introduces the categorization of cost metrics, an efficiency assessment model for cost management, a strategic roadmap, along with suggested techniques and advice aimed at enhancing the effectiveness of cost management within construction enterprises and projects.

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