Application of Strategic Management Principles as Tool to Improve Quality of Construction Technological Process

O Kluchnikova, O Pobegaylov
Department Building Organization, Don State Technical University, pl. Gagarina, 1, Rostov-on-Don 344010, Russia
E-mail: oc41@bk.ru

Abstract. The article focuses on the basic theory and practical aspects of the strategic management improving in terms of enhancing the quality of a technological process: these aspects have been proven experimentally by their introduction in company operations. The authors have worked out some proposals aimed at the selection of an optimal supplier for building companies as well as the algorithm for the analysis and optimization of a construction company basing on scientific and practical research as well as on the experimental data obtained in the experiment.

1. Introduction
Rationalization of the principles of strategic planning and management of a construction company makes a critical issue of applied and scientific nature.

An increase in the quality of supplying processed raw materials and ready-made products by means of establishing rational corporate structures calls for a justified scientific approach. The theory offers a detailed discussion of some private aspects of project management basing on up-to-date technologies. However, the practice features some general methods basing on aggregate indexes and oriented at the final result.

The authors aim at studying justification of choosing some rational managerial structures and methods of construction via experiment and also at presenting their research made in 2015-16.

Presently, a more effective approach to conducting managerial procedures at a building company is complex strategic management that presupposes unification of the sectoral methods of management. The principal scientific method of this research is a synthesis of a new scientific approach to strategic management basing on some existing heterogeneous elements, each of which taken separately is controlled by a specifically oriented functionality. All of which being united may effectively control the entire system.

To reach the objective, the authors had to deal with the following objectives:
- study of the meaning, principles, and methods of constructing managerial corporate structures;
- analyze the content and types of managerial solutions;
- determine the optimal criteria of evaluating managerial options for a building company in the process of complex strategic management;
- present the results of the experiment aimed at introducing complex strategic management at LLC Kontek-Stolitsa, the building company.
2. An analysis of some publications, most relevant to the subject of research

The problem of strategic management by means by applying a complex approach has not been presented enough in scientific and methodological publications. Basically, there have been discussed a few separate methods of management or the results of synthetic of two methods, at least. The research and substantiation of complex managerial strategies is viewed as a supplementary subject in the work of V.V. Kostiuchenko [1] "The System Organization and Management of Construction", in which the concept of unifying the methods in a single system-dependent complex. The article "Investments in Unstable Economical System" [2] by O.A. Pobegailov justifies the economical efficiency of the corporate systems of strategic planning, constructed as a complex of independent systems. A.A. Karpov in his book "Strategic Management and Effective Business Development" [3] argues that a complex planning of costs and the management of investment processes should provide for the promotion of every corporate method of management of commercial and industrial operations, because the business society supports a popular belief that one method may dominate over others and neglect any "peripheral" managerial approaches.

In their article [4] O.A. Pobegailov and O.V. Kliuchnikova “Rationalization of Strategic Management Principles as a Tool to Improve a Construction Company Services” maintain that the lack of the mechanism of implementation of the management strategy hampers a timely and efficient decision making, which may negative impact on the principal operations of the company causing losses and unjustifiable risks. The authors highlight that strategic management may only work along with other methods and organigrams to guarantee an intellectual and effective mechanism of a highly practical nature. A formal claim of establishing strategic management and mechanism of implementing managerial solutions, lack of communication and feedback among the subjects of management - these items are described as a global issue of the production strategy and management in the book by David Hussey "Strategic Management. From Theory to Implementation" [5].

Other sources, e.g. "Business Strategy: Managing Uncertainty, Opportunity, and Enterprise" J.C. Spender [6], "The Complexity of Cooperation" by R. Axelrod [7], "Return of Influence: The Revolutionary Power of Klout, Social Scoring, and Influence Marketing " by Mark Schaefer [8], point at the need of developing a functional and operational concept of strategic management that presupposes a complex management of investments, expenses, processes, resources, and production.

3. Contemporary concepts of constructing and optimizing the rational corporate structure

At present, no construction complex is capable of adapting itself to operating in the new economical situation by apply the existing corporate management techniques alone. Today's conditions require new managerial approaches. thus in the forefront there come the market criteria of effectiveness; non-stop environmental changes call for the development of effective complex management systems. Those new opportunities born by the environment create in the company's management system additional issues and require fresh management solutions depending on the directions such changes take [7].

Management decisions, the basis of every managerial function, are accepted by the manager after a complex analysis of the company's inner and outer environment, its weak and strong points. it is aimed at ensuring a quality technological process.

To determine the optimal criterium in evaluating a quality control option in construction and assembly operations made my the company one may choose how fast is the response to any exterior and interior factors that affect the quality of technological processes. The authors have elaborated and confirmed experimentally the algorithm of a stage-by stage analysis and optimizing the building company's process of the complex strategic management [8].

Step 1 aims at the pre-project inspection of the company. At that, the main objective is to develop some verbal models [9]m reflecting the place the organization takes in the structure of super-systems and its relationship with external organizations and etc.

Step 2 is to develop a morphological model of the company in question that should formally include the following:
- company's functional structure;
- company's managerial structure;
- company's informational structure;
- company's resource structure;
- company's communication structure.

**Step 3** suggests a static analysis of the contractor's morphological model [10]. The analysis mainly targets at checking how the contractor's morphology matches a certain system of criteria, marked as K, that ensures the company's potential workability.

Should there's any discrepancy between the company and the criteria, the system is considered controversial, the analysis get returned to Stage 2 to specify the contractor's morphological model. Such a cycle may be repeated until every contradiction gets eliminated.

**Step 4** suggests a dynamic analysis of the contractor's morphological model. The analysis is mainly focused on checking how the contractor's morphology matches a certain system of criteria, marked as D, that supports the company's potential workability within the dynamics of performing its functions[9].

In case of discrepancy between the company and the criteria, the system is considered controversial, the analysis get return to Stage 2 to specify the contractor's morphological model.

**Step 5** enables optimization of the inspection bodies of the contractor (see Figure 1).

![Figure 1. Algorithm of Analyzing and Optimizing Contractor's Works.](image)

**Step 6** deals with interpreting and arranging the analysis results to be further presented as recommendations on what improvements should be made in the contractor's corporate and managerial structure[10,11].
The theoretical model of the management strategy basing on the complex evaluation of the quality of works and correspondence of the company and other technological enterprises of the branch; it also suggests acquisition of corporate approaches and forms of decision making at every stage of the company's operations. Analyzing contractors shows that many have preserved their linear and functional corporate structures. This becomes especially typical of those that produce building materials and automobile and construction machinery depots. At the same time, a number of dynamically developing companies review their corporate structure in view of the changing environment. Strategic management suggests a clear-cut spectrum of responsibilities of the subjects of management and also a transfer of a wholesome active functionality to facilitate the practical implementation of the whole mechanism of management. It reality, most managerial decision are associated with the general director which causes slower decision making and their lower effectiveness[12-14]. Complex management and creative approach suggest distribution of the functionality and responsibility sectors of managerial decision makers by managers. Thus, the top managers of the company determine the strategy of the company's development, its objectives, and, further on, they coordinate the work of managers responsible for execution and functionality, and also for the sphere of works of each particular division [4,16].

The company should foster its functional balance and managerial objectives, harmony of managerial processes, completeness of information and correspondence of the number and content of its workers to the volume and complexity of the company's operations.

In the process of analysis and optimization of the organization structures of the management, selection of a most rational option of interaction among participating companies in view of quality control of technological processes should be performed before and after optimization is over[17]. Thus, strategic management should span an analysis of correspondence and organization to the structure, power, an analysis of the benefit of distribution and resource expenses. As the outcome of strategic management, the company receives a production process, harmonized in view of expenses and losses, that ensures maximal gains for the company and justifies any investments made.

4. Experimental improvement of corporate structure while selecting an optimal supplier for the contractor
In order to check how the theory of our research works, there was performed an experiment aimed at introducing complex strategic management at LLC Kontek - Stolitsa, the building company.

The quality support of the contractor's technological processes was planned a system, including monitoring of the suppliers of raw materials and equipment at every stage of the bulk of operations. There has been developed a strategic management plan with a detailed functionality and degree of responsibilities of its divisions, including those responsible for resource supplies and their further processing during the technological process[5,18].

There has also been set up a system of qualitative and quantitative criteria that harmonize the interaction among consumers and suppliers in view of purchases; basing on this system, the right suppliers were picked out.

By analyzing the hierarchy, LLC Kontek - Stolitsa chose a most reliable supplier of concrete.

While searching for an optimal supplier of concrete for the contractor, the following hierarchy of objectives and criteria was synthesized: price, shipment terms and conditions, payment terms in view of sporadic supplies, supplier's reliability, supplier's reputation.

The mathematical model at choosing the supplier is a system of criteria n (i=1, n), that should be viewed in the matrix of paired comparisons of alternatives of the choice of the suppliers and determining importance of each of them to determine a new vector of priorities[19].

A group of possible concrete suppliers for the contractors has been specified as follows: LLC Beton Werk, LLC BetonBaza, LLC Zavod Arhitekturnovo Betona.

At the final stage of the method described above, the final decision is made as per the optimal supplier basing on priority calculations (Vi).

The following "Choosing the Best Supplier" diagram shows the data obtained (see Figure 2)
Considering the above calculations and global priorities, we may recommend LLC Beton Werk, producing building materials, as the optimal supplier for LLC Kontek-Stolitsa. Thus, we propose to use a common approach to investment decisions in the construction based on the theory of optimal control of discrete processes.

Practical calculations have shown the effectiveness of the proposed algorithm for making investment decisions that will help to avoid unnecessary decisions related to the selection of suboptimal investments. This condition can be used as a criterion for making a decision about investing in the project under consideration. From the conditions obtained analytical formula for determining the termination period of the investment [19,20].

In the management of the investment complex in the conditions of crisis the functioning of the regional investment-construction complexes are characterized by large cycles, respectively, and the risks of losses are large enough that allows the investor to require contractors transparency in the presented projects, as well as in the history of the activity in this area. Thus, at the tender, the investor may have to focus not only on the image indicators of the proposed projects, but also on their hidden, essential characteristics, which in turn allows us to manage the investment and only profit in the long run.

5. Conclusions
Imperfection of the existing organization management methods would not allow for the contractor to adapt to operations in the up-to-date economic environment. Basing on the organization management methods and criteria while grading an option of monitoring those construction and assembly activities that affect the quality of technological processes, the authors offer a universal algorithm of a stage-by-stage analysis and optimization of a building company in the process of complex strategic management in view of corporate approaches and forms of decision making.

Strategic management should result in production, harmonized by expenses and losses, to ensure maximal gains and fully justify the investments.

The highlighted performance criteria of the company's management structure enable a most effective contractor's interaction with the elements of macroenvironment, ensure the implementation of the corporate development strategy in the future, effectively distribute the worker's efforts and, finally, reach the objectives[20].

The theoretical model has been proven in practice: the supply of LLC Kontek-Stolitsa has increased 15 % thanks to eliminating disruptions and low-grade raw materials which facilitated a substantial advancement of planned schedules and production optimization.

The positive results obtained by optimization for a regular contractor (e.g. LLC Kotek-Stolitsa) in the environment in discussed may be described as effectiveness of the management system, interaction structure, effectiveness of the management mechanism, effectiveness of investment projects aimed at improving the corporate structure at the contractor's wide-scale capital expenses.
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