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Research paper



The Identification of Alternatives and Changes in Scenarios for the Development of Regional Build Clusters

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Abstract

The article deals with the creation of a general scheme for managing the structure of an integrated association under the influence of a complex of external and internal factors. This is the basis for identifying development scenarios or alternatives to the development of associations such as the construction cluster. Also, the article presents a method for detecting construction cluster development scenarios by comparing different building cluster management systems. The described models can be the basis for conducting expert appraisal and calculating the quality indicators of the management of associations on the basis of public-private partnership.

Keywords: *building cluster, development scenario, management model, public-private partnership.*

1. Introduction

The process of transformation of the economic system depends on the choice of methods and timing for identifying the factors that influence transformation. To date, there is practically no solid research on the methods of assessing the effectiveness of management of associations with the participation of the state, taking into account the share of state influence. There are also insufficient studies to identify alternatives and change scenarios for their development. For a detailed study of these problems, the study proposes a new organizational structure of the association of construction holdings, the so-called building cluster (BC). The BC structure is based on public-private partnership, accumulates modern trends in the transformation of production and organizational structures, investment activity and combines a number of characteristics of such organizations as a development company, investment company, financial company and design company. BC is an association of enterprises and organizations on the initiative and under the chairmanship of the state to solve the problem of the construction of certain objects that are important sectoral significance within the framework of regional programs and projects under the condition of state procurement, financing, subsidization, regulation and provision of state guarantors of implementation these projects and programs.

All structures, including economic ones, are in the development of such key stages: origin, growth, maturity, regressive transformation (crisis) and disappearance or disintegration. At the origin and growth, the process of transformation of systemic qualities occurs through the birth of a new structure or as a result of a conflict with conservative established trends in management. Maturity expresses the stationary state of the organization's structure. In regression, there is a disorganization transformation, as a result of which the old structure gives way to a new one.

The current research on the assessment and identification of development scenarios or alternatives to the development of associations of the BC type or the regional BC, which appears as the largest cluster in a certain region of the state, is endowed with certain resources and features and has legitimate advantages and disadvantages.

The paper [1] describes the peculiarities of management of associations with public-private partnership forms, in particular identifying the risks arising in the decision-making process of management of these associations. In [2 to 6], key recommendations for the implementation of strategic management in dynamic conditions of the transformation of economic systems, in particular, in the conditions of creation and management of integration associations in conditions of uncertainty of the type of construction cluster. In [7], methods of quality evaluation in the activities of companies are considered, but not so much attention is dedicated to the evaluation of the effectiveness of decision-making activities of the associations of companies. The paper [8, 9] describes the principles of managing the stability of structures in business and the investment process in general. In work [10] the mechanisms of management and modeling of the development of integration associations are presented, which may be useful in modeling the development of associations with state participation of the BC type.

The purpose of the study is to create a general scheme for managing the structure of the integrated association, which is the basis for identifying development scenarios or alternatives to the development of associations of type construction cluster. In addition, the goal is to develop a method for detecting BC scenarios through comparisons of BC control systems.

Structural changes in the economy manifest themselves in changing the values of elements, parts and proportions, as well as qualitative characteristics of the system, and this often leads to a change in the overall quantitative and subsequently qualitative characteristics of the economic system. For example, in the post-socialist system, the transformation of the economy and its structural changes have their own special laws. Today it is already

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possible to identify the general features that characterize the process of transformation, as well as to reflect the special features that are inherent to each individual state that went through this path. The main features are the availability of private property, healthy competition, the introduction of freedoms, etc.

The processes of change in general have certain regularities. In the case of the creation of BC on the basis of public-private partnership principles, the peculiarities of the process of transformation and change of scenarios of development are:

- organizational structures are unstable in a transition economy, because the economy is unstable and inadequate;
- availability of many options or alternatives for development;
- the existence of contradictions between traditional economic structures and new market structures;

With the strengthening of the economic system, transitional structural structures are volatile and rapidly changing.

In different countries, the processes of transformation differ primarily in the differences in the economic situation: the measure of the implementation of economic reforms, the level of balance of the state economy, etc. The transition from a centralized economic system to a market economy is determined by national peculiarities, the starting level of economic system development and the factors that arise as a result of the transition period.

In the transition economy, there are three main factors that influence the processes of transformation:

- regularities of the transformation of the economic system;
- global trends in the transformation of the economy;
- a change in the centralized economy and its transition to a market economy.

The course of the transformation process also depends on the choice of methods and timing for determining these factors. To implement the transformation process, it is necessary to develop a management model for BC, which will allow to identify alternatives to the development of this association. Management of the BC and choice of strategies for its development is carried out by its top management on the basis of the processing of the collected information about the state of the BC management system.

In fig. 1. The general scheme of control of the BC structure is shown. Creating such an integrated entity management framework is the basis for identifying development scenarios or alternatives to the development of cluster type associations. In this scheme the following parameters can be distinguished:

K_1– total costs for monitoring and improving the quality of works and services when introducing innovations and conducting qualitative transformations of the system with the inclusion of the form of public-private partnership (PPP);

K_2– costs for the construction of a specific object in the project implementation or program, taking into account PPP;

K_3 – costs for improving the efficiency of the implementation of services or works;

K_4 – Reaction of the market on the results of BC work;

K_5 – state guarantees.

The last parameter should include the guarantee of completion of construction in predetermined terms, optimization of total costs when implementing a project or program, etc. Such factors have external and internal nature, as the state in the integration of the BC acts as a participant and partner with other construction companies and organizations that belong to it. In the model of control of BC in Fig. 1, in addition to the five parameters of $K_1, K_{2.....} K_5$, the main quality factors are also mentioned: A_1, A_2...A_5. The indicated model is generally simplified and based on the principles of Anderton's regulation: profit is a function of the volumes of production that is subject to market requirements, profit is a function of product quality, in the case of BC, this may be the quality of the implementation of the construction project. Basis of choice of strategies for its development

For structures of the BK type with the participation of the state, it is important to clearly identify the actions of the leadership in terms of modeling and forecasting the development of situations within the BC and beyond. The main function of management of BC from the head is to determine according to the model (Fig. 1) development strategies or alternatives to BC development. In addition, it is important to adjust the current activities of the BC under the influence of these main external factors. This coordination should be carried out simultaneously in all indicators to ensure effective management and rational choice of BC development strategies.

The complex of internal and external factors that influence the transformation and implementation of BC development strategies can be represented in the form of the interrelation of the four groups of events that follow from the BC activity: external inputs, external outsourcing, internal and external outputs (Fig. 2).

Each factor (Figure 2) is influenced by each of the five parameters of the $K_1, K_{2.....} K_5$ and five qualitative factors of the A_1, A_2...A_5. Specified in Fig. 1 model can be the basis for effective expert evaluation and calculation of quality indicators of BC management. Since BC in our view is a structure initiated by the state and the state is a party to this structure, ie, the PPP mechanism is used, then the effectiveness of management can be seen as an indicator of the influence of the management system on the achievement of tasks for the development of the subjects of the integral association, taking into account the influence of the complex of external and internal factors.

To assess the effectiveness of BC management and the choice of management strategy, it is necessary:

1. To define the parameters.
2. To construct a model for the identification and evaluation of external and internal factors that influence the development of BC.
3. To form a method of choosing an effective BC management model.
4. To choose strategies of BC development according to the chosen model of management.
5. To take into account the participation in this process of the state through public-private monitoring of the effectiveness of decision-making by the leadership of the BC.

Assessing the effectiveness of management and choosing the appropriate development strategies can be done by analyzing the strategies already implemented and the results of past management activities. In this case, it is very difficult to allocate a quantitative component, separating it from external and internal factors that dynamically influence the development of the BC (the state of fixed assets, the state and availability of labor and financial resources, quality and professionalism of the human resource, the level of transformation of the economic system, etc.). Also, the assessment of the effectiveness of management can be calculated by forecasting the performance indicators of BC management, which is also a complex task.

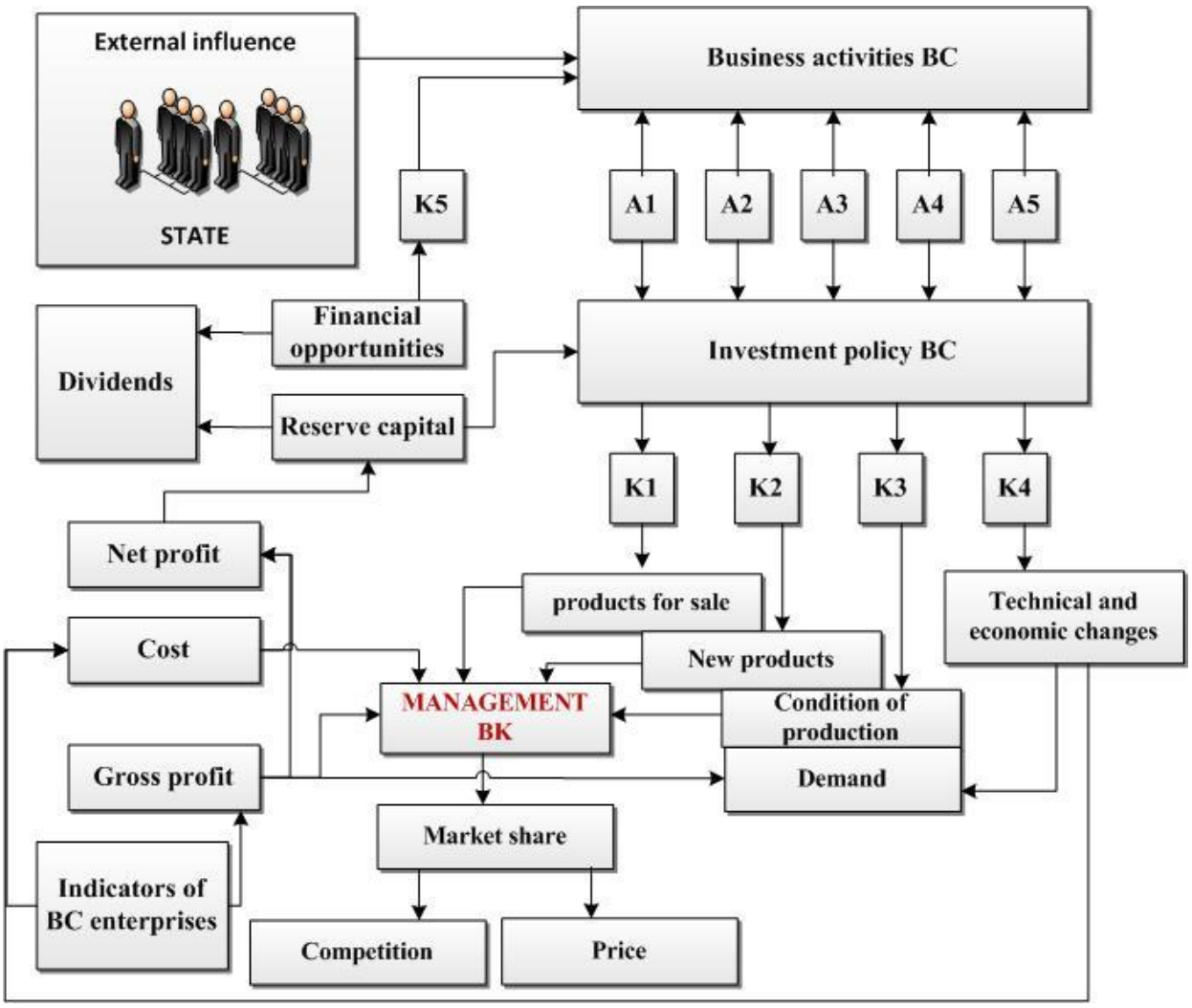


Fig. 1: The general model of management of BC, which is the basis of choice of strategies for its development

To compare different control systems of BC and relevant development strategies is a simulation of a situation based on the analysis of past performance.

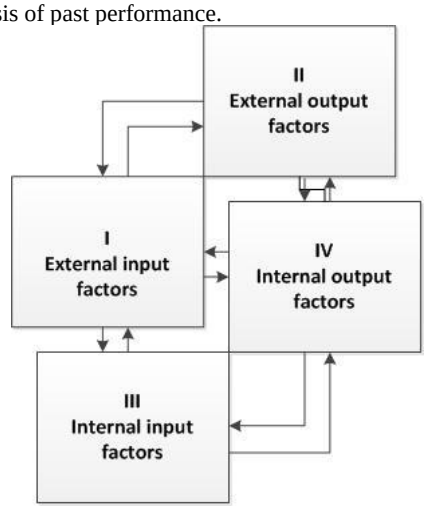


Fig. 2: The general model of the interconnection of internal and external factors that influence the development of BC

To simplify the model, all factors that can influence the outcome of the activity remain stable. Algorithm for detecting BC scenarios comparison of control systems of BC:

1. Create a list of criteria that are divided into two groups. The first group includes criteria that determine the different aspects of the control system. The second group includes criteria that determine the impact of the management system on the efficiency of BC activities. The significance of the criteria for these groups can be determined by expert means. It is empirically possible to establish significance for the first group at the level of 0,3, and for the second at the level of 0,7. Also, weighted coefficients of significance are assigned to each of the criteria within the declared groups. In total these weights are equal to 1.

2. Weights of criteria within groups are determined by experts on a certain scale, which allows one to prioritize one criterion over another.

3. Rationing the values of each criterion. The best value is 1, and the worst part is the best value. Let e_{ij}, $i=\overline{1,m}$, $j=\overline{1,n}$ – j-th criterion belonging to the i-nd group. In our case $m=2$. When $c_{ij}\in[0,1]$ – normalized value of the determined criterion, and α_{ij} – its absolute value, then the valuation can be realized by the formula:

$$c_{ij}=\frac{\alpha_{ij}}{\max\{\alpha_{ij}\}}$$

4. When ζ_{ij} – weighting factor of the criterion α_{ij}, then the normalized weighted value is defined as follows:

$$C_{ij}=\zeta_{ij}c_{ij},$$

$$\sum_{j=1}^{n}\zeta_{ij}=1$$

and , at fixed $i=\overline{1,m}$.

5. In the next step, the total integral indicator in the group is calculated:

$$\Psi_i=\sum_{j=1}^{n}C_{ij}$$

and is standardized according to the known formula:

$$\overline{\Psi}_i=\frac{\Psi_i}{\max\{\Psi_i\}},$$

where $\overline{\Psi}_i$ – is the normalized integral index of the group..

6. The general indicator of the efficiency of the BC management system and the set of strategies that this system proposes for implementation is determined from the formula:

$$\Psi^*=\sum_{i=1}^{m}\theta_i\overline{\Psi}_i,$$

where Ψ^* – the general indicator of the efficiency of the control system of the BC, - weight coefficients, which determines the significance of the groups of criteria.

The proposed method of calculation allows us to calculate the quantitative estimation of the systems of the efficiency of control of the BC, which can be used for comparison of systems and for the withdrawal of the development strategies offered by these systems. The method is suitable for the evaluation of management systems, which include the form of public-private partnership, which allows timely monitoring of the efficiency of public financing of the construction project at all stages of its life cycle, to calculate the economic effect of the implementation of BC development strategies. The results of the calculations can be used by the expert environment and the project team to increase the efficiency and quality of BC management on the basis of PPP, which increases the competitiveness and value of enterprises included in this BC.

Conclusions

Today, it is important to increase the influence of the innovative component in the activities of construction companies through the implementation of the form of public-private partnership. The article proposes such a form of integration of the enterprises of the construction industry as a construction cluster. This association is initiated by the state and the state is also a party to the association as a full partner.

In order to identify scenarios of development or alternatives to the development of associations of this type, a general model for managing the structure of the integrated association and a method for comparing BC management systems was proposed. Having made a rational choice of the management system, the strategies of the BC development, which are the basis of such a system, are immediately determined.

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