Integral multi-criteria evaluation of construction sector competitiveness

Abstract. The absence of both a unified approach to the integral evaluation of the construction sector competitiveness and adequate economic and mathematical models to measure the level of competitiveness were the cause of criteria complementing and supplementing, and development of a technique, which makes it possible to integrate all the indicators into a single system to determine region’s ranking according to the level of competitiveness and further development strategy. The approach has been tested on the six chosen Russian regions: Belgorod, Voronezh, Kursk, Smolensk, Orel, and Bryansk regions.

Keywords: Competitiveness; Integral Evaluation; Construction Sector

1. Introduction. Increasing the competitiveness of the construction sector of the economy is of paramount importance. The effective functioning of this sector can create new jobs and improve the development of the related sectors of the economy. In this regard, a need to determine an integral objective criterion to evaluate competitiveness and indicators of its evaluation for effective managerial decisions aimed at increasing the level of regional development arises.

2. Brief literature review. The main framework of the study is based on the works of the leading Russian scientists and experts in theoretical foundations of the concept of competitiveness, such as G. L. Azoev (1996) [1], M. I. Gelvanovsky (1998) [2], R. A. Faltkhudinov (2000) [3], etc.; and in the research of the construction sector development and management, such as Yu. V. Vertakova (2005) [4], V. A. Voronin (2006) [5], I. V. Milgunova (2008) [6], V. Z. Chernyak (2003) [7], etc.

The works of the foreign scientists, who made a significant contribution to the development of the theory of competition and competitiveness, are also used in the study. They include the works of I. H. Ansoff (1989) [8], P. F. Druker (2009) [9], F. Gouillart and J. Kelly (2000) [10], S. V. Krivenko (2014) [11], K. Lewin (1951) [12], M. E. Porter (1985) [13], T. L. Saaty (1989) [14], I. I. Cherlenyak (2014) [15], etc.

The analysis of the works on the problem under study led to the following conclusions:

1) the analysis of the works of the authors mentioned above has shown that there is still a narrow disciplinary approach to the problem of construction sector competitiveness;

2) a unified approach to the systematization of the criteria of the analysis and evaluation of the level of the construction sector competitiveness has not been defined;

3) the techniques proposed by the authors are not fully adjusted to the construction sector competitiveness evaluation as a whole, and mainly assess the competitiveness of individual businesses.

3. The purpose of the article is to develop a technique for integral multi-criteria evaluation of the construction sector competitiveness.

4. Results. The analysis of the competitiveness evaluation issues allowed substantiating the multivariance of the indicators and conditions of competitiveness, relativity of this category which, consequently, leads to the complexity of its definition. In our opinion, there is no single and universal concept of «competitiveness». That is why, it is necessary to use a combination of quantitative analysis and competitiveness evaluation techniques.

There is a need for competitiveness evaluation techniques at meso-level (sectors, complexes) in terms of determining the relationships of individual structural elements of the construction sector, in which each next level is based on the grounds of the previous one, and, in addition, has its own elements and characteristic features and provides the grounds for a higher level.

Typically, competitiveness is evaluated using four calculation methods: 1) based on the comparison of the quality and the price of an object; 2) a differential method; 3) an integrated method; 4) a mixed method.

The above-noted methods do not allow determining the level of competitiveness with absolute accuracy and do not take into account its changes; they are not adapted to the requirements of today’s market relations, which can change the conditions of objects’ competition, including geographic market fractions, advertising companies, etc.

We offer an aggregate (integral) technique of evaluating the construction sector competitiveness, based on the theory of effective competitiveness. In accordance with this technique, the
most competitive is that construction industry complex, in which the work of all the interrelated economic entities and their units (construction companies and enterprises producing construction materials) is organized in the best possible way. Many external and internal factors influence the effectiveness of their activities; that is why a multi-criteria evaluation of the resource efficiency is required. It is necessary to group the criteria (indicators) of competitiveness. Then, it is reasonable to divide them into four groups according to performance, economic entity financial status, effectiveness of final product sales, competitiveness indicators.

These groups include the following criteria:

- Group 1: production cost figures, return on assets, construction works effectiveness, and labour productivity;
- Group 2: financial stability criteria, turnover figures;
- Group 3: profitability criteria, utilization rate, the coefficient of final product merchandising;
- Group 4: quality indicators and pricing policy analysis.

Formally, meso-entities’ competitiveness can be represented as follows:

\[ KC_{meso} = F(y_\lambda) + KC_{prod,i}, \quad (1) \]

where \( KC_{meso} \) is meso-entities’ competitiveness, \( F(y_\lambda) \) are the parameters characterizing the construction sector at the meso-level (meso-entity), \( KC_{prod,i} \) is the indicator of the competitiveness of the \( i \)-th mini-entities (enterprises producing construction materials, construction companies, etc.), which are parts of the \( s \)-th meso-entity.

A large number of indicators are involved in the calculations, and they have different dimensions. These criteria are reduced to uniform characteristics in order to adequately involve them in the process of analyzing and construct the aggregate indicator. These factors can act as stimulants and desstimulants.

Taking into account the above-said, a technique similar to the one used to calculate Human Development Index in the United Nations can be applied to transit to uniform characteristics for 6 years. This is in the need of transforming the development of raw material into competitiveness level and making effective managerial decisions for the regional development of this sector.

Thus, on the whole, the grading of competitiveness criteria can be grouped according to investments, the amount of work performed at construction sites, the beginning of capacity utilization.

Evaluation includes the following stages: criteria determination, calculation of their weighting, adjustment of indicators determining their weighting, the formation of an aggregate indicator for each group of criteria and their adjustment determining their weighting (Figure 1).

Thus, the proposed technique makes it possible to integrate all the indicators into a single evaluation of construction sector competitiveness, rank the regions in terms of their competitiveness, and identify a strategy for the further development tending to the reference value.

5. Conclusion. Previously used techniques are not adapted to evaluate the construction sector competitiveness as a whole; they evaluate mainly the competitiveness of separate business entities.

A technique for integral multi-criteria evaluation of the construction sector competitiveness has been developed to solve this problem. In the developed technique the factors influencing the construction sector competitiveness have been identified, the specified indicators have been grouped, and the mechanism for calculating the integrated indicator has been defined.

Practical approval of the developed technique allowed ranking the six studied regions in terms of construction sector competitiveness level and making effective managerial decisions for the regional development of this sector.
ACCOUNTING, ANALYSIS AND AUDIT

Fig. 1: Algorithm of integral multi-criteria evaluation of construction sector competitiveness
Source: Authors’ elaboration

<table>
<thead>
<tr>
<th>Tab. 1: Ranking of the regions’ construction sector indicators of the competitiveness level</th>
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Source: Source: Authors’ own calculations

References


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