Production distortions: methods and approaches to assessment

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Abstract: The key point in the development of any economic system is the balanced formation of various conditions that reflect the economic, social, political, infrastructural and technological aspects of the process under study. The indicated priorities are traced in the organization of economic activity in various sectors of the economy, including the sphere of construction production and services. The presented work was an attempt to determine the vector of the construction industry sustainable development, based on the allocation of imbalance indicators and a system of criteria that reflect uniform development and growth. The following methods were used by us as the research methods: synthesis, a method of multi-stage analysis and functional dependence, the method of financial ratios, design and construction, etc. The study reflects a theoretical approach to assessing the existing imbalances based on a criteria-based assessment of sustainable development of construction production in a single economic space of the country. The priority of regional development in the general concept of sustainable functioning necessitates consideration from the point of view of the cause-effect relationships and the formation of the indicators system for quantitative characteristics, taking into account socio-economic, environmental production, which determined the identification of sub-indexes of causation (efficiency conditions), intermediate results (environmental standards) and the consequences (the result of energy savings). The practical significance of the work lies in the development of proposals to improve the sustainability of the domestic organizations involved in the construction industry. The proposed methodological approach is universal and can be used for various sectors of the economy, including for assessing the sustainable development of agricultural production.

1. Introduction
In the context of the economy digitalization, the issues of expanding the information base for increasing the efficiency of the organizations’ management are being updated. Most of the companies operating in the domestic and foreign markets use the set of financial indicators as the main criteria as a tool for assessing the final results of economic performance and basic information to develop a sustainable development strategy. There are approaches to the study of the regional systems’ sustainable development level in the global scientific community, however, most studies are based on a review of regional economic systems as a whole, with respect to construction production, the study, which requires more focused research in relation to this economy sector is fragmented. The existing system of criteria cannot fully give a reliable assessment of the companies’ development cause-effect relationships in relation to the goal for the long term.
For construction, sustainable development is seen as part of financial growth and economic efficiency. It is also considered in the context of assessing financial imbalances, which take into account the amount of generated financial resources and the amount of labor costs, realized natural wealth [7]. O. G. Shashkova believes that in order to maintain such proportions it is necessary to maintain a balance in the use of the region’s resources and take into account the interests of the consumers located both inside the system and outside it [8]. According to M.Yu. Kalincikov, sustainable development can be achieved by fully securing all types of resources and compliance with all applicable laws [2]. As G.G. Muftiev notes, this state is achieved on the basis of a balance between production volumes and social needs. [4]. V.V. Leontyeva considers the achievement of sustainable development from the standpoint of assessing factors of a climatic nature [3]. V.M. Bautina, V.V. Kozlov focus their attention on the stability of development and the implementation of all national economic functions [1]. O. Ya. Frolova identifies the sustainable development through a material-resource system capable of self-organization, ensuring a balance of economic, social, environmental and production criteria [6]. Thus, we can conclude that there is no single approach to determining the sustainable development of the construction production, which requires a more in-depth approach to identifying indicators, principles, and criteria for achieving economic growth.

2. Results
The intervals of the estimated development imbalance accounting system in construction should be established in terms of the methodological tools’ use taking into account the current legislation requirements and the requirements of the “Concept of the Sustainable Regions Development” [12]. The assessment should cover socio-economic and environmental characteristics in an appropriate model. Comparison of the indicators estimates is possible on the basis of the functional equivalents, which can be expressed at the initial stage of the study in the format of determining the construction production principles of sustainable development with the division into the elements: stability (takes into account factors of the economic efficiency of the industry as a whole), ecology (the impact of negative impact on society is assessed and the environment from the sale of investment facilities in the regions, the level of the new technologies integration in the production process.), energy saving (the amount of energy consumed, the level of new technologies use for renewing the alternative energy sources) (Fig. 1). This approach provides an opportunity to provide a reasonable integrated system for assessing the sustainable development of the construction production.

It is also possible to use this set of criteria for evaluating an individual construction object, but when compiling the selected elements of the sustainable development, it is necessary to use the same functional element. To the environmental assessment described by this information group of criteria in relation to the individual construction objects, the data on the possibility of further reuse, recycling and energy resources reuse are investigated.
The principles of the building production sustainable development in the regions

Stability
- The principle of interests’ balance;
- Principle of unity;
- Principle of freedom;
- Principle of responsibility;
- The principle of functional integration;
- The principle of advancing or warning;
- The principle of functional integration;
- The principle of informatization

Ecology
- Principle of return;
- The principle of the infrastructure environmental friendliness;
- The principle of environmental safety;
- The principle of economical use of natural resources;
- The precautionary principle (environmental assessment of an investment project).

Energy saving
- The principle of functionality;
- Principle of innovation;
- Optimization principle;
- Principle of return;
- Principle of engagement;
- Safety principle.

**Figure 1.** The construction industry sustainable development principles

Assessment of the construction production sustainable development in the regions is carried out in accordance with the selected scenarios that reproduce the life cycle of the investment construction project. The mechanism for determining the assessment of indicators of the construction production sustainable development is presented in Figure 2.

Assessment of the sustainable development indicators

- Economic
- Environmental
- Social

Existing assignment or design decision

Functional indicators

Technical indicators

Technical requirements (established in legislative acts)

Socio-economic and environmental requirements (customer requirements)
Figure 2. The mechanism for determining the assessment of the construction production sustainable development indicators

The proposed mechanism for determining the construction production sustainable development includes obtaining the quantitative results of the construction production impact on the environmental, economic and social conditions for the functioning of the regional systems in accordance with the concept of sustainable development, as well as technical indicators and functional elements for the individual investment objects. An enlarged scheme of quantitative indicators is presented in Table 1.

Table 1. Quantification of the sustainable development principles.

| Group                | Indicators                                                                 |
|----------------------|-----------------------------------------------------------------------------|
| **Stability**        | Causation Subindexes                                                        |
|                      | The proportion of profitable organizations in the total, %.                 |
|                      | Expenditures on the scientific developments in obtaining the new materials, technical systems, million rubles; |
|                      | Balanced financial results;                                                |
|                      | The growth rate of the volume of work performed;                           |
|                      | The amount of the investment funds from the federal sources, financial institutions in the innovative activities of construction organizations per 1 million rubles |
| **Ecology**          | Subindex intermediate result                                                |
|                      | The proportion of environmental investments, %                             |
|                      | Share of the organizations using renewable energy sources                   |
| **Energy saving**    | Consequence Subindexes                                                      |
|                      | Export of innovative products as a share in total exports, %.              |
|                      | The proportion of the advanced technologies used in production, units       |

The presented system of indices is a basic characteristic of the quantitative side of the construction sustainable development and is fundamental in determining the concept of managing the regional system. At the same time, taking into account the territorial features, it is necessary to introduce indicators characterizing imbalances in the production sector into the proposed system, the dynamics of which are presented in Table 2.

Table 2. Analysis of the imbalance indicators’ dynamics in construction for 2005-2018.

|                          | 2005  | 2015  | 2016  | 2017  | 2018  | 2018 to 2005, [%] | 2018 to 2015, [%] |
|--------------------------|-------|-------|-------|-------|-------|------------------|-------------------|
| The degree of the fixed assets depreciation | 44.6  | 47.3  | 50.0  | 48.4  | 46.1  | 103.4            | 97.0              |
| The proportion of the unprofitable organizations,[%] | 34.0  | 32.8  | 31.1  | 32.1  | 34.7  | 102.0            | 105.8             |
| The ratio of the average wage growth rate to the housing price growth index and [%] | 106.1 | 108.2 | 105.6 | 104.9 | 94.2  | 87.1             | 87.0              |
| The ratio of the investment growth to output, [%] | 98.5  | 87.6  | 90.2  | 114.9 | 108.3 | 109.9            | 123.6             |
| The Accounts payable of the organizations engaged in the construction activities, billion | 487.968 | 3829.93 | 3939.52 | 4327.86 | 4338.74 | 889.14          | 113.28            |
rubles Accounts receivable, billion rubles 396, 446 2522,7 10 2744,0 24 3108,8 64 3427,0 43 864,4 135,8 GDP physical volume index at current prices 94,8 95,1 95,7 98,8 104,7 110,04 110,09 GDP share, % 5,3 5,8 5,3 6,7 6,2 116,9 106,8 The ratio of the investment growth and the construction proportion in GDP, % - 105,9 133,8 104,3 106,8 - 100,8 Construction in progress, thousand houses 20,4 7,7 7,1 6,3 7,9 38,7 238

3. Discussion
The presented results indicate an increase in the contribution of the construction production to the overall dynamics of GRP. A cumulative result is characterized by this indicator in 2019. So, for the first quarter of the reporting period, the value of the indicator reached a value of 3.3%, for the first half of the year growth was fixed at 4.9%. Positive dynamics is characterized by a decrease in the fixed assets depreciation in 2018, compared with 2017 by 4.8%. The investment activity of the regions has a significant impact on the volume of the work performed. In 2018, the positive dynamics was supported by an increase in investment resources in the fixed assets by 4.3%. However, the imbalances are observed in the growth rate of “the construction in progress” by 25.3% compared to the base year 2017. The growth in accounts receivable and accounts payable is characterized by the same pace, which may indicate a deterioration in the financial performance of construction companies and the occurrence of imbalances between the amount of financial resources and labor costs. The vector of the negative factors in 2019 and the beginning of 2020 is manifested in the insolvency of customers, weather conditions, deterioration of mechanisms, increased cost of material resources, increased competition. The construction sector is characterized by inertia, which manifests itself in a slow response to economic crises, but a longer recovery after eliminating imbalances in the post-crisis period.

4. Summary
The development of the construction industry is at the stage of the large-scale changes, which are associated not only with increasing the level of the consumer protection, industrial development, but also with an increase in the level of the construction production greening. The main task is to eliminate the imbalances in the economic environment of functioning, ensuring the rights of the participants in shared construction and reducing the level of risk at various stages of the investment project. The studies have shown that there are imbalances in the financial system, the production cycle, wage growth and the construction work volume. The identified imbalances are system-forming, which requires the measures development by the state and professional communities, the actions of which should be carried out with their simultaneous participation. Their role may be manifested in the creation of a mechanism for the continuous employment of workers in the construction industry, the expansion of the information and analytical base based on the creation of electronic platforms and the innovative development of the construction institution expertise.

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