A model for assessing the strategic sustainability of business entities under the dysfunction factors' influence

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Abstract. The fundamental basis for the multilevel socio-economic systems' resources cross-functional integration in the Russian economy is the activation of their development potentials through the transformation processes. The transformation of the development potentials set into the final result is carried out through the use of appropriate technologies, innovations, information and ensures the achievement of economic growth parameters through the effective strategic decisions' adoption. When coordinating the economic interests at the level of the functions' implementation, the tasks and strategic management in the resources' cross-functional integration process, an additional product is formed, the value of which depends on the efficiency of transforming the potential aggregate into the "new resources", characteristic of the new technological structure economy. The article presents a comprehensive methodology for assessing the strategic sustainability of the business structures. On the example of the regional construction market and business units with a different structure of production costs, the changes in production volumes and sales resulting from dysfunctional changes in the economy are determined. And also, the transformation costs' volume aimed at the transition of the system to a new resource state under various scenarios of the external environment development is calculated. Implementation of the proposed model for assessing the strategic sustainability of business structures in the management practice allows the most rational use of the main types of available resources under the dysfunction factors' influence.

Introduction

The special characteristics that shape the market space of the world's leading economies are the integration and globalization processes. These processes lead to an acceleration of the cyclical reproduction, increase the level of uncertainty and the degree of variability in the organizational and managerial decisions' adoption [1]. The flip side of the changes is the decrease in the business entities' structured management level, which is further exacerbated by a sharp drop in the economic development pace caused by the epidemiological situation in early 2020.

Negatively directed foreign economic impacts lead to a violation of the imbalances in the structure and nature of the key management functions' relationship. The functions' implementation violation of planning, organization, coordination, motivation and control indicates the presence of economic dysfunction in the business entities development [2]. The study of the dysfunctions' theory found the greatest progress in the framework of general approaches in institutional modeling. Modeling of dysfunctions makes it possible to identify the causal relationships and inverse relationships, to

substantiate the behavior of subjects, to identify in quantitative terms the change in their conditions [3], [4].

The study of the dysfunctions' theory found the greatest progress in the framework of general approaches in institutional modeling. Modeling of dysfunctions makes it possible to identify the causal relationships and inverse relationships, to substantiate the behavior of subjects, to identify in quantitative terms the change in their states.

This condition can be triggered by the influence of both external and internal variables. Internal factors are in the control zone and the negative impact of one of the control functions can be localized or compensated by another. As for the external factors, the business entity cannot always have a direct impact on it, which complicates the adaptation process to the changing conditions. However, other entities are also under the influence of external factors, which allows us to testify to the potential opportunities' existence for maintaining the strategic stability of business units located in the influence zone of the negative impact factor.

External disturbing influences have a unique impact on each business unit, that is, the depth of the dysfunction and the degree of destructive impact are due to the characteristics of the internal structure and the maturity of the socio-economic system as a whole [5], [6].

However, the logical question is the ratio of the degree of dysfunction and the preservation of strategic stability of business entities. Definitely, economic growth is possible only with a certain depth and dysfunction quantity. The simultaneous effect of internal and external dysfunctions often leads to the system destruction: the dysfunctional state that arises within each function strengthens each other, the controllability of the system decreases, which makes it extremely unstable [7], [8], [9].

At the same time, the release of market space allows economically stable and strong business entities to occupy the vacant market niche, most often due to the transition to a new stability state.

The formation of a "new" strategic stability under negative dysfunctional impact is possible if there is a sufficient quantity, quality and structure of resources (primarily material, technical, labor, financial) necessary to maintain the normal functioning of the business entity.

This kind of transition requires additional costs of individual resources and changes in the structure and cost of all the business entity resources.

Methodology and methods of research

Identification of the dysfunction impact nature on business entities is possible through the development of a comprehensive methodology for assessing the strategic sustainability, taking into account the transformation costs aimed at moving the system to a new resource state.

Strategic sustainability assessment should include:

1.   a change in the production dynamics and products sales caused by exposure to dysfunctional variables, taking into account changes in profitability indicators [10].

2.   accounting for transformational costs aimed at the transition of a business entity to a new resource state, in order to transfer to a "new" strategic stability state.

1 stage. Assessing the resource support state for the business entities, taking into account the changes in production volumes and products sales, profitability level. The model is a multicriteria problem of the form:

$$\begin{cases} \mathrm{K}_i \cdot V_i + A + Y + T + P \leq D_{max} \\ \qquad m_i \cdot V_i \leq M_i \\ \qquad R_i \rightarrow max \end{cases} \qquad (1)$$

where K_i – defines the commercial costs associated with the production i;

V_i – is the production volume i;

A – is a set of administrative costs that ensure the stable business entity functioning;

Y – is a set of management expenses that stimulate the business entity development;

T – is a set of taxes and payments to budgets of all levels;

P – defines the business entity profit;

D_{max} – *is the* maximum market capacity in which the business entity operates;

m_i – is the resource requirement of a business entity (resource consumption) directly involved in production *i;*

M_i – *is the* the availability of resources in the territory of the business entity presence for the products *i* manufacturing*;*

R_i – *is the* return on sales *i.*

The composition evaluation and the resources' structure involved in the production and sale of products will reveal the key resources that have the greatest potential for the transformation and transition of a business entity into a state of strategic sustainability.

2 stage. Calculation of transformation costs aimed at the transition of a business entity to a new resource state, provoked by the influence of the economic dysfunction factors.

The impact of economic dysfunction factors negatively affects financial stability, business reputation and liquidity of a business entity. As a result, the subject is forced to transform the key resources that form the production cost in accordance with the requirements of the economy and the market [11].

The processes of the resources' transformation under the influence of market forces are associated with additional costs, which characterizes the change in the resources cost, their composition and structure. Thus, the processes of resource transformation should be considered by comparing the value of costs and profits, taking into account the institutional parameters of the market.

The transformation costs (*Tf*) represent the costs of transitioning key resources to a new state, taking into account the financial and time costs.

Effective transformation of resources will ensure a reduction in the volume and cost of expenditure of cost items that form the cost.

At this stage of the assessment, it is important to take into account the business entity scope, since industry specifics determine the importance of the administrative, commercial, and managerial resources in the cost structure. Correct identification of the resources with high potential for transformation will increase the chances of a business entity to maintain its own stability.

The backbone industry that determines the country's economy development level and pace is the construction industry. The activities of business entities are of an aggregate nature, since the forces and results of activity of more than 80 sectors of the national economy are involved in the construction production process. At the same time, the result of the industry, materialized in the form of construction products, is consumed by all the business entities, regardless of location and industry, so construction is an integral development process for each of them.

The largest share in the construction cost structure, and, therefore, the greatest potential for the successful transformation are the commercial resources (material and technical and labor):

$$0 \le Tf \cdot \sum_{i=1}^{n} \sum_{j=1}^{m} (Hp_{LC_{mainij}} \cdot O_{LC_{main j}} \cdot C_{LC_{main_i}}) \le \sum_{i=1}^{n} \sum_{j=1}^{m} (Hp_{LC_{mainij}} \cdot O_{LC_{main j}} \cdot C_{LC_{main_i}}), \qquad (2)$$

$$0 \le Tf \cdot \sum_{i=1}^{n} \sum_{j=1}^{m} (Hp_{E_{mantij}} \cdot O_{E_{mant j}} \cdot C_{E_{mant_i}}) \le \sum_{i=1}^{n} \sum_{j=1}^{m} (Hp_{E_{mantij}} \cdot O_{E_{mant j}} \cdot C_{E_{mant_i}}), \qquad (3)$$

$$0 \le Tf \cdot \sum_{i=1}^{n} \sum_{j=1}^{m} (Hp_{M_{ij}} \cdot O_{M_j} \cdot C_{M_i}) \le \sum_{i=1}^{n} \sum_{j=1}^{m} (Hp_{M_{ij}} \cdot O_{M_j} \cdot C_{M_i})$$

(4)

where Hp_{ij} - is the consumption rate of the *i*-th resource type on the *j*-th work type, natural units;

O_j - volume of the *j*-th work type, natural units;

C_i - estimated price of the i-th resource type, rubles / natural units;

LC_{main_i} – labor costs of the main workers;

E_{mant} – expenses for the maintenance and operation of construction machinery and mechanisms, including depreciation for their renovation;

M_j – is the cost of materials used in construction work, building structures, parts, fuel, electricity, etc.

The economic transformation effect can be expressed as an increase in profit.

The profit amount in this case depends on the optimally structured business processes, a rational policy to provide inventory, making economically sound organizational and managerial decisions.

Profit dynamics (P_{Tf}) as a result of changes in the direct costs' key items cost will take the form:

$$P_{Tf} = P_{pl} + \sum(3\Pi_{main}^{pl} - 3\Pi_{main}^{Tf}) + \sum(M_{main}^{pl} - M_{main}^{Tf}) + \sum(P_{mant}^{pl} - P_{mant}^{Tf}) \tag{5}$$

The dynamics of the business entity profit caused by the economic dysfunction factors' influence can serve as an indicator of strategic stability and a factor in the efficiency of the key resources' transformation. The fluctuation of this indicator shows a decrease or increase in the stability as a whole, as well as the geographical and commodity characteristics. At the same time, it characterizes the degree of taking into account the criterion of financial and economic security, the risk factor and the uncertainty of the surrounding business environment.

The economic effect of the transformation can be expressed as an increase in profit.

The profit amount in this case depends on the optimally structured business processes, a rational policy for providing inventory, making economically sound organizational and management decisions.

Profit dynamics ($\Pi_{transf.}$) as a result of changes in the direct costs' key items cost will take the form:

$$\Pi_{transf.} = \Pi_{pl} + \sum_{i=1}^{n}(LC_{main_i}^{pl} - Ctf \cdot LC_{main_i}^{transf}) + \sum_{j=1}^{m}(M_{pl} - Ctf \cdot M_{transf}) +$$
$$+ \sum_{k=1}^{l}(O\sigma_{pl} - Ctf \cdot O\sigma_{transf}) \tag{6}$$

Results and Discussion

On the regional construction market there are about 50 business entities that have a different resources' set, and also use various methods and the ways to manage them. Three companies were selected as the basis for testing the proposed methodology for assessing the strategic sustainability of business entities, which are engaged in the construction of residential and commercial real estate within the same region with an annual revenue of 200 to 250 million rubles. In order to preserve the confidential data, the construction companies' names are conventionally designated.

Table 1. Cost structure by the construction industry business entities' resource elements, thousand rubles

	Business entity 1	Business entity 2	Business entity 3
Gain	251689	189016	202913
Material resources (M_j)	122786	113410	74875
Labor resources (LC_{main_i})	22325	37803	24958
Technical resources (P_{mant})	32720	13231	49917
Administrative expenses	45417	8506	16639
Profitability (R), [%]	11.3	8.5	18

The epidemiological situation forces the developers to rebuild the internal business processes and jeopardizes the production program's full implementation. The external dysfunctions' manifestation can be considered a weakening of the ruble and a possible shortage of imported building materials, which affect not only the construction pace, but also the sale prices of real estate. Under such conditions, it is possible to develop the construction industry in several scenarios:

1. Stagnation will last 2-3 months and this will not significantly affect the real estate prices in the primary market;

2. Stagnation will last 8-10 months with a reduction in transaction volume by 30%;

3. A protracted crisis with a fall in demand by 50%.

With the simultaneous impact of internal and external dysfunctions, the strategic stability of selected business entities is at risk, and economic growth is impossible. In such circumstances, construction companies seek, without prejudice to their own profit, to manipulate the cost structure in order to ensure a minimum profitability and prove their viability.

As already noted, the greatest potential for successful transformation have material, labor and technical resources, therefore, in the new conditions for the system functioning, the cost structure will look as follows:

Table 2. Change in the business entities' cost structure in the key resources' transformation various scenarios implementation, thousand rubles

	Business entity 1 scenario			Business entity 2 scenario			Business entity 3 scenario		
	1	2	3	1	2	3	1	2	3
Gain	251689	*201351*	125845	189016	*151213*	94508	*202913*	142039	101457
Material resources	128925	*98 299*	73672	119080	*90728*	6846	*78618*	59990	44925
Labor resources	24558	*17190*	15628	41583	*29108*	26462	*274453*	19218	19996
Technical resources	22904	*22904*	19632	9261	*13231*	7939	*34941*	49917	29950
Overheads	49959	*45417*	36334	9356	*8506*	6805	*18302*	16639	13311
Total expenses	226346	*183740*	145265	179282	*141573*	109252	*159317*	145673	108152
Minimum profitability, %	10.1	*8.7*	-15.4	5.1	*6.4*	-15.6	*21.5*	-2.6	-6.6
Profit (trans.)	-3098	*-10830*	47861	-6332	*-6427*	-30810	*7072*	-40159	-43220

Summary

The dysfunction factors' influence in the medium and long term, can lead to the enterprise bankruptcy. However, modeling scenarios for the business entity development by calculating the transformation costs, taking into account the cost items' importance degree in the cost structure, allowed us to develop an optimal development scenario for each business entity with minimal costs for the key resources' transformation. The most optimal scenario for the business entities 1 and 2 is the second development scenario, for the business entity 3 - the first development scenario.

Thus, under the dysfunction factors' influence on the business entity, the introduction of the proposed model into the management practice makes it possible to increase the efficiency of using key resources by transforming them into a new state, in order to transfer the business entity to a "new" state of strategic stability.

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