

Quality of strategic management under ambiguity: Assessment within the framework of sustainable development*

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Abstract

Amidst a high and increasing level of ambiguity, the quality of strategic management when ensuring the achievement by an enterprise of a sustainable development trajectory becomes particularly important. The issues of formation and efficient implementation of the strategic management mechanism bring into focus the task of finding tools for assessing the quality of strategic management. Meanwhile, the agenda of developing the tools to assess the quality of strategic management of an enterprise from the standpoint of achieving a sustainable development trajectory under ambiguity remains poorly understood. In this regard, the purpose of this study is to improve the quality of strategic management of industrial enterprises operating under uncertainty by developing and testing on the example of individual enterprises of the Donetsk region a toolkit for assessing the quality of strategic management in the context of an enterprise achieving a sustainable development trajectory. To reach this goal, this study uses a synthesis of systemic, cybernetic and synergetic approaches. For this purpose, within the framework of the study, a conceptualization of the main notions was carried out and theoretical and methodological approaches to the interpretation of the notions of “strategic management,” “sustainable development” and “strategic uncertainty” were proposed. Based on the author’s approaches to the interpretation of the main notions, it was suggested to assess the quality of strategic management in terms of the goal of such management, which is to achieve a sustainable development trajectory. Using the author’s approach, an assessment was made of the quality of strategic management of industrial enterprises in the Donetsk region in the context of their achievement of sustainable development. Approbation of the proposed tools led to the conclusion that the integral

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assessment indicator for all analyzed enterprises did not have an unambiguous and unidirectional downward trend. The foregoing indicates the absence of a stable trend towards the attractor for the analyzed period for all the enterprises in question, which makes highly topical the search for reserves to increase the efficiency of strategic management of industrial enterprises in the Donetsk region, which constitute the prospect for further research.

Keywords: strategic management, ambiguity, uncertainty, sustainable development, assessment, attractor, bifurcation point, industrial enterprise

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Introduction

The non-linear character naturally inherent in most economic processes, together with the randomness, multi-factorial nature and complexity of the system of interconnections and interdependencies of ongoing processes and phenomena, along with the scarcity and a high rate of obsolescence of information about them, allow us to speak of a high degree of uncertainty in the functioning of today's socio-economic systems as a global trend.

Meanwhile, the specific conditions for the functioning and management of industrial enterprises in the Donetsk region, associated with an unstable military and political situation, economic blockade, unrecognized status, rupture of economic ties with stakeholders, significant institutional changes, predetermine the formation of trends that provoke a significant increase in uncertainty.

In such conditions, while uncertainty is “an integral part of business” [1, p. 405] all over the world, in the specific conditions of functioning of industrial enterprises of the Donetsk region, it reaches an exceptionally high level. At the same time, these trends, in addition to increasing uncertainty, provoke a reduction in the adaptability of the enterprise strategic management systems by reducing the diversity of their tools.

The foregoing allows us to conclude that there is a specifically high level of uncertainty in the functioning of industrial enterprises in the Donetsk region, all of which significantly complicates the processes of strategic management and strategic decision-making, rendering the issues of assessing the quality of such management highly topical.

Considering the issues of assessing the quality of strategic management in the context of achieving sustainable development, the issues of determining a set of key indicators for such an assessment are of interest and debatable. Moreover, the assessment of the quality of management, in our opinion, should be made from the point of view of the goal of such management, which is to achieve a sustainable development trajectory.

In this regard, the analysis of approaches to assessing the achievement of sustainable development by the system is of interest. It is appropriate to mention that a significant part of the studies devoted to assessing the degree to which a system achieves a sustainable development trajectory [2–9] consider sustainable development at the macro- or meso- level and interpret it as a balance of economic, environmental and social components, transferring the assessment of achieving sustainable development into an assessment of the balance of these components. This approach does not correlate

with the author's interpretation of the term "sustainable development" and is not suitable for assessing the achievement of a sustainable development trajectory at the level of individual enterprises.

A number of researchers [10–14] project the approach described above to the micro level, evaluating the economic, environmental and social components of an enterprise's sustainable development. In our opinion, such an assessment illustrates to a greater extent the impact of the operation of the enterprise on the development of the region, rather than reflects the quality of enterprise's management through the prism of achieving its own strategic goals.

A number of researchers offer a more extensive list of components for assessing the sustainable development of an enterprise. Thus, the authors of [15] suggest highlighting the information component, along with the social, environmental and economic components. The study [16] proposes to expand the list of components for achieving sustainable development trends to the following set: financial, technological, production, organizational, marketing, innovation, investment, social, environmental.

The author of another study [17], suggests expanding the list of components to the following four indicator groups: social, environmental, economic, risk-related. However, it seems possible to conduct a risk analysis for each of these indicator groups. In addition, it is more expedient to present risk analysis as a separate stage of the enterprise's sustainable development management mechanism, and not as an additional component, including it in the assessment stage along with the economic, social and environmental components.

The study [18] suggests a radically different method. Its author affirms that the assessment of the sustainable development of an enterprise can be made "through three main

characteristics: the presence of completed innovations; the degree of participation in the organization of the development of these innovations; identifying the main reasons why innovation activities were not carried out" [18]. At the same time, the justification for assessing sustainable development solely through the prism of the innovation component is questionable. Thus, the introduction of innovations, of course, can lead to qualitative and quantitative changes in the structure and/or trajectory of the system's behavior which transfer the system from the point of strategic equilibrium to the point of bifurcation, allowing the system to move to a higher level of organization, to increase the efficiency of its functioning, to increase potential and competitive advantages and, as a result, to achieve strategic goals of a higher level. Meanwhile, the introduction of innovations is associated with high risk, which does not guarantee a transition to a stable trajectory at the bifurcation point. The implementation of these risks can initiate a transition to the goals of a lower level and a lower order of system organization. In addition, innovations are not the only factor capable of moving the system from a strategic equilibrium point to a bifurcation point.

A somewhat more extensive list of components is offered in the study of Trubitskoy and Borodulya [19]. These authors suggest that we evaluate the sustainable development of an enterprise as per four components: financial, marketing, production, and innovative sustainability. Having in mind that the authors equate the concepts of "sustainability" and "sustainable development," we point out that the above set of indicators considers sustainable development/sustainability in statics, and not in dynamics, and the suggested assessment methodology does not imply the presence of an object and/or a scale for comparative analysis.

Source [16] mentions that "speaking about the stability of an organization, one cannot

but talk about the stability of the processes taking place in it” [16]. The authors of the study also provide key characteristics of sustainable processes: rhythmicity, flexibility, parallelism, elasticity and continuity. While agreeing with the need to take into account the stability of processes, we note that the above list is not exhaustive.

In summary, we'd like to point out that the wide coverage in the scientific literature of the issues of determining a set of key indicators for assessing the degree of achievement of a sustainable development trajectory did not result in the formation of a unified approach to identifying the components of such an assessment and, moreover, to identifying a set of key indicators.

In this regard, the purpose of the study is to improve the quality of strategic management of industrial enterprises operating under ambiguity by developing and testing on the example of individual enterprises of the Donetsk region a toolkit for assessing the quality of strategic management in the context of an enterprise achieving a sustainable development trajectory.

1. Conceptualization of the notions of “sustainable development” and “strategic uncertainty” in the context of the strategic management of industrial enterprises

The goal set requires clarification of the categorical apparatus of the study.

A number of works of domestic and foreign researchers are devoted to the issues of improving the categorical apparatus by interpreting the definition of “strategic management”. The systematization and identification of limitations in the application of these approaches from the point of view of strategic management under ambiguity in the context of achieving the trajectory of sustainable development given by the author in [20] made it possible to form a

theoretical and methodological approach to the interpretation of the notion of “strategic management.” Thus, by strategic management we mean proactive management of an enterprise based on the implementation of its strategy by creating competitive advantages through a flexible response and adaptation to environmental challenges, focusing the activities on consumer needs, as well as taking on the human capital as the basis for the formation of competitive advantages aimed at achieving a sustainable development trajectory.

Postulating the achievement of the trajectory of sustainable development as the main goal of strategic management under ambiguity, the issues of conceptualization of this notion become relevant.

Taking into account the diversity of approaches given in the scientific literature to the definition of the notion of sustainable development discussed earlier in [21], it seems appropriate to generalize them and to form a unified approach to the interpretation of the notion of sustainable development from the point of view of strategic management under ambiguity. Thus, within the framework of strategic management under ambiguity, by sustainable development of an enterprise we mean a controlled transformation process that characterizes qualitative and quantitative changes in the structure and/or trajectory of the behavior of the system and/or the external environment of functioning, arising from a violation of stability caused by high dynamism and amplitude of external disturbances, as well as the uncertainty of the external environment of functioning, transferring the system from the point of strategic equilibrium. It is characterized by the correspondence of strategic goals and results, to the point of bifurcation, which allows the system moving to a higher level of organization, increasing the efficiency of its functioning, growing potential and competitive advantages and, as a result, achieving strategic goals of a higher level.

Focusing on the high and growing level of uncertainty that is permanently inherent in the external and internal environment of enterprises in the Donetsk region, which has a significant impact on the process and efficiency of strategic management, we point out that ignoring it in the process of forming strategic management tools seems counterproductive.

At the same time, we see the presence of cardinal differences in the approaches to the definition of this notion reflected in the literature. In this regard, the issues of formation of the author's theoretical and methodological approach to the interpretation of the notion of "strategic uncertainty" are being updated. By this, we mean the strategic uncertainty as a situation in which the current state of knowledge is such that the order or nature of things is unknown, the consequences, degree or level of circumstances, conditions or events are unpredictable, and reliable probabilities of the possible outcomes of the implementation of strategic decisions cannot be determined whereby the implementation of proactive strategies can lead to potential benefits.

**2. Formation of an approach
to assessing the quality
of strategic management
within the framework
of an industrial enterprise
achieving a sustainable development
trajectory under ambiguity**

An analysis of approaches to assessing the quality of strategic management of enterprises within the framework of their achievement of a sustainable development trajectory made it possible to identify their common features, given by the author in [22], which impede their efficient application in the process of strategic management of an enterprise operating in conditions of uncertainty.

In this regard, a set of requirements was formed and a scientific and methodological approach

was proposed to assess the quality of strategic management within the framework of an enterprise's achieving sustainable development under uncertainty, which is a formalized process consisting of eight consecutive stages [22].

Note that the approach proposed in [22] is focused on the goals of supporting managerial decision-making in the process of strategic management within the framework of achieving a sustainable development under uncertainty and can be used with a proactive approach to management. The task of this study is not to assess the management decisions made in response to the predicted change in the parameters of the external and/or internal environment, but to assess the retrospective. Thus, the requirements for the approach used for the retrospective assessment of the quality of strategic management are significantly lower, which allows us to simplify this approach to the following steps:

1. Statement of previously defined strategic goals in the form of a set of parameters, their ranks and weight coefficients of significance of the target parameters of sustainable development;
2. Defining the attractor as an "ideal" point corresponding to the above set of parameters;
3. Collection of actual parameter values (from analysis of the enterprise reporting data);
4. Determining the distance to the "ideal" point for each of the target parameters in relative terms;
5. Integral assessment of the degree of achievement of sustainable development;
6. Assessment of the trajectory of the system in the context of achieving sustainable development.

The approach is based on the author's methodology for assessing the degree of achievement of each of the strategic goals set for the sustainable development of an enterprise under uncertainty, presented as a definition of the "distance" to achieve such a goal. This makes

it possible to calculate the integral assessment of the degree of achievement of sustainable development of an enterprise as a percentage of the remoteness of the coordinates of the system's current position in an m -dimensional phase space from the "ideal" point. In terms of synergetics, a set of internal and external conditions that contribute to the "choice" by the system of one of the options for sustainable development in the process of adaptation; the ideal final state to which the system tends in its development is called the attractor [23, p. 29]. In other words, the attractors are evolutionary goals at the appropriate level which all systems strive for under the influence of time-varying factors [24, p. 22].

Considering the quality of strategic management through the prism of the concept of sustainable development, we note that the interpretation of sustainable development in accordance with the author's definition (see above) indicates the following important aspects:

- ◆ sustainable development is a dynamic transformational process which actualizes the analysis not of static indicators, but of the trajectory of movement;
- ◆ sustainable development arises as a result of a violation of stability, i.e. keeping the system's parameters unchanged indicates the absence of sustainable development;
- ◆ sustainable development is associated with a violation of the strategic balance, i.e. it arises as a result of a discrepancy between the strategic goals and the results and is a process of moving from current results to strategic goals, overcoming the specified gap. Meanwhile, the achievement of the goals set presupposes the formation of strategic goals of a higher level. Thus, a system characterized by sustainable development is permanently in a "non-ideal" state;
- ◆ transition to the strategic goals of a higher level is made at the bifurcation point. The

bifurcation points may involve branching not only to stable, but also to unstable trajectories, as well as to determine the transition to goals of a lower level and a lower order of organization of systems, which does not correspond to the concept of sustainable development.

Thus, the attractor, which is the "point of attraction" of the trajectories located in its vicinity, can be identified with the "ideal" point under the condition of a stable development of the system. Under such conditions, the system's trajectory will be in a constant motion in the direction of the target parameters, which are the attractor. It should be noted that the identification of the attractor with an "ideal" point corresponding to the target parameters of the system is expedient and becomes possible, in our opinion, only if it is considered through the prism of the concept of sustainable development.

A detailed description of the methodology for assessing the quality of strategic management within the framework of achieving sustainable development of an enterprise is given in [22].

3. An assessment of the quality of strategic management of industrial enterprises of the Donetsk region within the framework of their achievement of sustainable development

Based on the orientation of the approach to assessing the quality of strategic management of individual enterprises operating in conditions of uncertainty, its application to assess the quality of strategic management of industrial enterprises in the Donetsk region involves assessing individual enterprises in the industrial sector.

Setting the task of identifying common patterns and the general level of efficiency of the strategic management of industrial enterprises

in the context of their achievement of sustainable development, it seems appropriate to analyze the enterprises that have significant differences in such characteristics as: industry, legal form, type and range of products made, sales market, distance from suppliers of raw materials, the size of the enterprise, etc. In this regard, the following industrial enterprises of the Donetsk region were selected for analysis: Research and Production Association Yasinovataya Machine – Building Plant LLC (YMZ), “Milk River” Makeyevka Baby Food Plant Commercial Enterprise (“Milk River”) and the Skochinsky Coal Mine, a standalone subdivision under the Donetsk Coal Energy Company State Enterprise (the Skochinsky Coal Mine).

YMZ is one of the largest CIS manufacturers of mining equipment for coal mines, underground mines (uranium ores, potash, diamond-bearing among others), equipment for the construction of tunnels for railway transport, subways and highways [25].

The strategic goals of YMZ are defined and lie in the plane of reducing the share of coal mining enterprises in the overall structure of clientele and the overall growth in production and sales of the company’s products.

The strategic goal associated with a decrease in the share of coal mining enterprises in the overall structure of the clientele of the plant’s products is due to the low level of solvent demand of coal mining enterprises in the Donetsk region and, as a result, an increase in receivables. Thus, the strategic goal of reducing the share of coal mining enterprises, postulated by the enterprise management system, is, to a greater extent, a tool for reducing the level of receivables.

The strategic goal associated with increasing the volume of production and sales of the plant’s products is due not only to the desire to increase the financial result, but also to the incomplete utilization of production capacities (the average annual utilization of production capacities was less than 64%), as well as

the need to ensure the rhythm of production, the absence of downtime.

Thus, the set of parameters for assessing the degree of achievement of strategic goals can be reduced to the following: the share of sales of goods and services for coal mining enterprises in the total volume of sales of goods and services; the level of receivables; volume of production and sale of goods and services in general; financial result of the activities; work level of production capacity.

Despite the certainty of strategic goals and the set of parameters for their regulation in YMZ, the ranking and selection of the highest priority goals was not made. As a result, the weighting coefficients of indicators were not determined either at the stage of setting the strategic goals. This actualizes the issues of determining weight coefficients at the stage of assessing the quality of strategic management.

Determination of weight coefficients was made using the method of expert assessments. A survey form is shown in *Table 1*, the survey was conducted using the method of direct scoring on a scale from 0 to 10. The choice of the method is due to its simplicity and saving the time of experts, who were the top managers of YMZ.

Using the method of expert assessments allows us to assess the concurrence of the managers as to the priority of strategic goals. For this purpose, the concordance coefficient [26] is used:

$$W = \frac{12 \sum_{j=1}^m d_j^2}{n^2 \cdot (m^3 - m) - n \cdot \sum_{i=1}^n T_i}, \quad (1)$$

$$d_j = S_j - \bar{S}, \quad (2)$$

$$\bar{S} = \frac{1}{m} \sum_{j=1}^m S_j, \quad (3)$$

$$T_i = \sum_{l=1}^k (t_{li}^3 - t_{li}), \quad (4)$$

Table 1.

Survey Form

No.	Strategic goals set by the management of YMZ	Indicator for assessing the degree of achievement of the strategic goal	Assessment of the indicator's significance (on a 10-point scale *)
1	Reduction in the share of coal mining enterprises in the overall structure of clientele of the plant's products	The share of sales of goods and services for coal mining enterprises in the total volume of sales of goods and services	
2	Reducing the level of receivables	Level of receivables	
3	Increasing the volume of production and sales of the company's products	Volume of production of goods and services Volume of sales of goods and services	
4	Increasing the profit of the enterprise	Financial result of the activities	
5	Increasing the work level of production capacity	Work level of production capacity	

* 0 – the indicator is absolutely not significant;

10 – the significance of the indicator in terms of assessing the degree of achievement of the strategic goals of the enterprise is maximum.

where W – the concordance coefficient;

d_j – the deviation of the sum of the ranks of the estimates received by the j -th element from the arithmetic mean of the sums of the ranks of the estimates received by all elements;

m – the number of elements to evaluate;

n – the number of experts conducting the assessment;

i – the numerical order of the expert;

j – the numerical order of the element being evaluated;

T_i – related (equal) ranks of assessments assigned by the i -th expert.

l – the index of the group of equal ranks ($l = 1, \dots, k$);

t_l – the number of equal ranks in the l -th group;

\bar{S} – the arithmetic mean of the sums of the ranks of the estimates obtained by all elements;

S_j – the sum of the ranks of the estimates obtained by the j -th element.

Despite the high concurrence of experts' opinions assessed using the concordance coefficient, we note the non-identity of their assessments, which indicates the presence of ambiguous interpretations of the degree of significance and priority of achieving certain goals. In this situation, there may be a mismatch between the actions of the managers which will lead to a general decrease in the quality of strategic management. The above serves to confirm the author's point about the need to rank goals and to determine weighting factors at the stage of formulating strategic goals.

The final weight coefficients obtained as a result of interpreting the estimates obtained by averaging expert judgments are shown in Table 2.

Table 2.

**Determination of the significance
of the target parameters of sustainable development
of YMZ through a set of weighting coefficients**

No.	Strategic goal of the enterprise	Indicator for assessing the degree of achievement of the strategic goal	Designation of the target result	Weight coefficient
1	Increasing the profit of the enterprise	Financial result of the activities	a_1	0.28
2	Reducing the level of receivables	Level of receivables	a_2	0.20
3	Reduction in the share of coal mining enterprises in the overall structure of clientele of the plant's products	The share of sales of goods and services for coal mining enterprises in the total volume of sales of goods and services	a_3	0.18
4	Increasing the volume of production and sales of the company's products	Volume of production of goods and services	a_4	0.12
		Volume of sales of goods and services	a_5	0.12
5	Increasing the work level of production capacity	Work level of production capacity	a_6	0.10

Thus, from *Table 2* we can conclude that the most significant goals are to increase the profit of the enterprise and to reduce the level of receivables. The high significance of the goal aimed at reducing the level of receivables is due to its significant value, the average annual value of which for the analyzed period fluctuated within 7.1–26.4% of the annual revenue of the enterprise. The high level of significance of the goal associated with reducing the share of coal mining enterprises in the overall structure of clientele of the plant's products is due to the desire to reduce the level of uncertainty, since according to the company's management system, the level of uncertainty in relations with stakeholders in this market is significantly higher.

Having assessed the significance of strategic goals and having a set of target indicators, an attractor can be determined. Using the data of the financial and management reporting of

the enterprise, the actual values of the parameters can be collected. Based on the indicated data, the distance to the “ideal” point was calculated for each of the target parameters in relative terms, a graphical representation of which by months for 4 years (48 months) is shown in *Fig. 1–6*.

Figures 1–6 reflect the degree of achievement of the key strategic goals of the enterprise over time. An increase in the distances between the target and the actual values of the resulting parameters indicates a distance from the strategic goal, and a reduction indicates an approach to its achievement.

As can be seen from *Fig. 1–6*, the trajectories of movement towards strategic goals are of a spasmodic oscillatory nature, which can be caused by the manifestation of seasonality and a violation of the rhythm of produc-

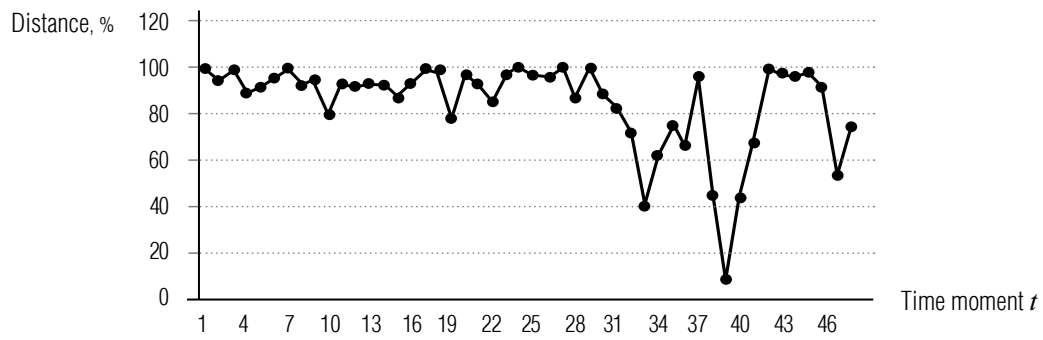


Fig. 1. Distance between the target and the actual value of the resulting parameter a_1 at the time moment t .

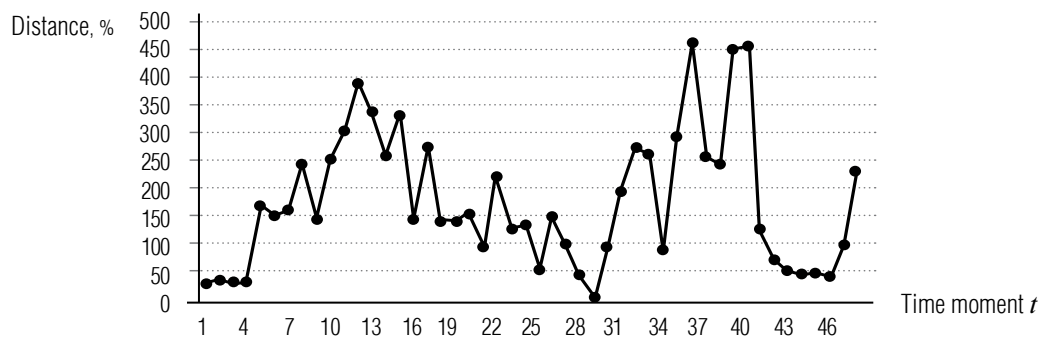


Fig. 2. Distance between the target and the actual value of the resulting parameter a_2 at the time moment t .

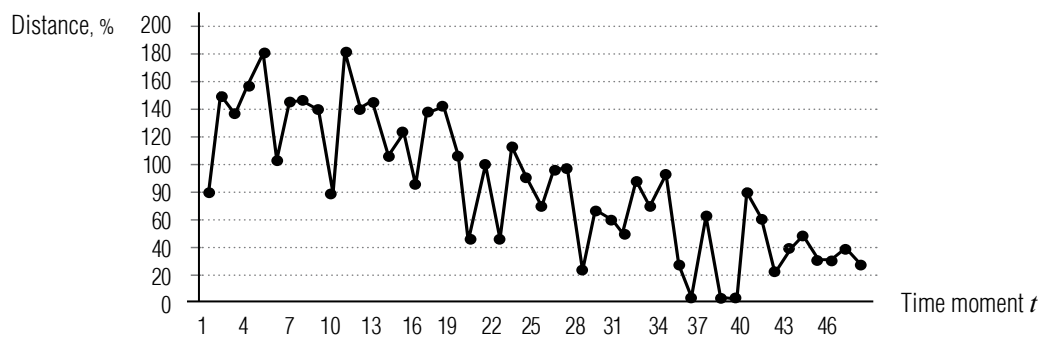


Fig. 3. Distance between the target and the actual value of the resulting parameter a_3 at the time moment t .

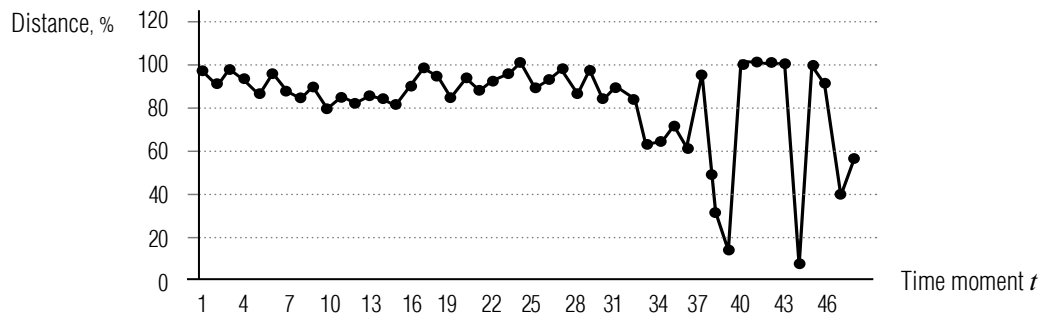


Fig. 4. Distance between the target and the actual value of the resulting parameter a_4 at the time moment t .

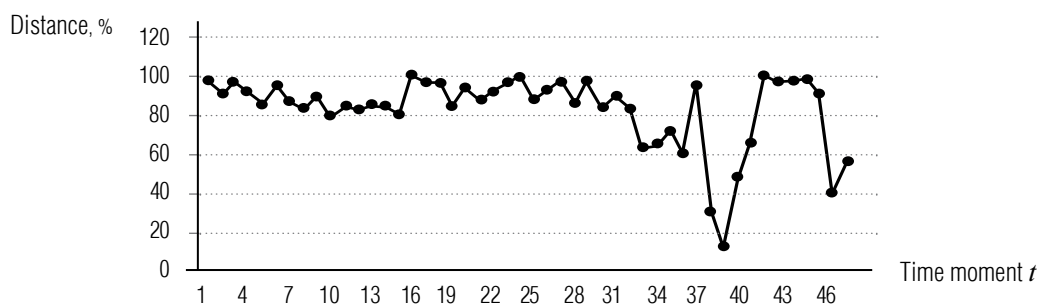


Fig. 5. Distance between the target and the actual value of the resulting parameter a_5 at the time moment t .

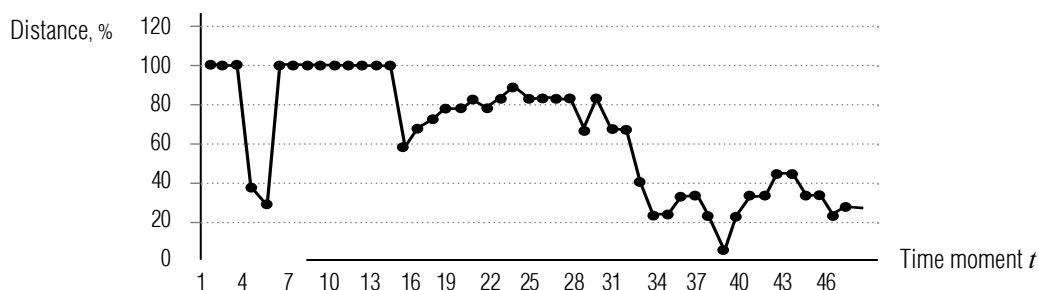


Fig. 6. Distance between the target and the actual value of the resulting parameter a_6 at the time moment t .

tion. In this regard, it is interesting to follow the analysis of the trajectory of movement to the attractor in the context of the dynamics over the years.

Based on the features of the proposed approach to assessing the quality of strategic management within the framework of an enterprise's achieving sustainable development, which involves calculating the distance to the "ideal" point for each of the target parameters, strategic goals can be represented as a reduction in such a distance, i.e. minimizing the gap between the target values of the parameters and the actual ones. In this case, we can say that the attractor of the m -dimensional phase space illustrating the smallest distance between the target values of the parameters and the actual values, is located at the origin (Fig. 7).

For YMZ, the assessment of the quality of strategic management of which is carried out according to six resulting parameters, the

attractor of the six-dimensional phase space has coordinates (0; 0; 0; 0; 0; 0).

As can be seen in Fig. 7, the general trend for the five resulting parameters is to reduce the distance to the attractor, and the trend for the resulting parameter a_2 does not carry a steady movement in the direction of the attractor. Thus, without additional calculations of the integral assessment of the degree of achievement of sustainable development, an unambiguous answer regarding the direction of the trajectory at this stage cannot be given.

In this regard, calculation of the integral assessment of the degree of achievement of sustainable development of YMZ acquires interest and practical value. A graphical illustration of the dynamics of such an assessment is shown in Fig. 8.

Thus, as can be seen from Fig. 8, in 2017, compared to 2016, there was an increase in the integral estimate, which indicates an increase

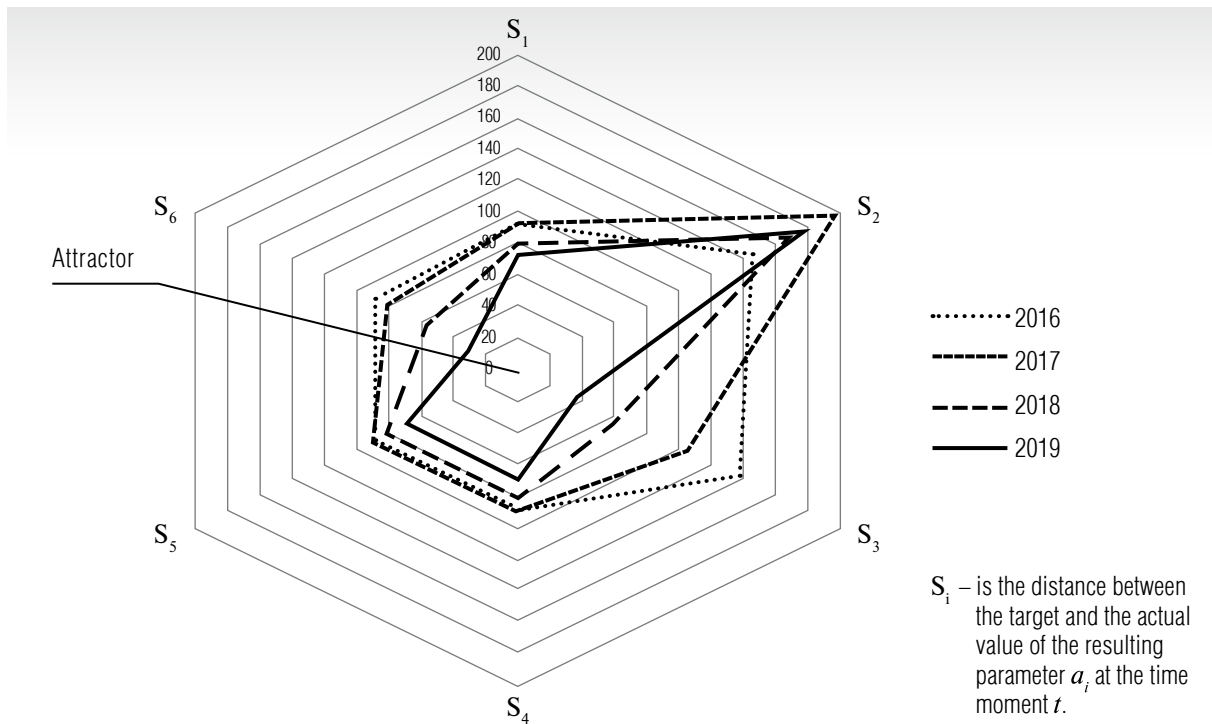


Fig. 7. The attractor and the trajectories for achieving strategic goals by YMZ in six-dimensional phase space.

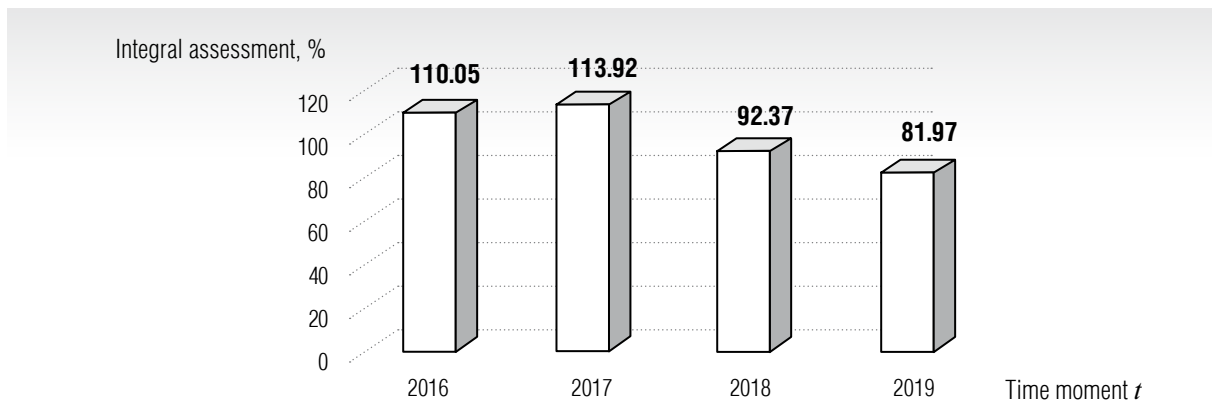


Fig. 8. Integral assessment of the degree of achievement of sustainable development by YMZ under uncertainty at the time moment t .

in the distance (i.e., remoteness) from the “ideal” point. In the next years of 2018–2019 YMZ reduced the distance to the attractor by more than 30%.

Having assessed the degree and having analyzed the trajectory of movement within the framework of achieving sustainable develop-

ment by YMZ, it is of interest to conduct similar assessments and analyzes for other industrial enterprises in the region operating in conditions of uncertainty.

A graphical illustration of the results of the assessment and an analysis of the degree of achievement of sustainable development of

“Milk River” in a four-dimensional phase space, presented in the form of a petal diagram, is shown in *Fig. 9*.

As can be seen from *Fig. 9*, which illustrates the attractor and the trajectories for achieving strategic goals, over the period from 2015 to 2020 there was both a reduction in the distance to achieve the target values of the parameters by “Milk River” and an increase in this distance for all estimated resulting parameters.

A graphical illustration of the results of the assessment and an analysis of the degree of achievement of sustainable development of the Skochinsky Coal Mine in a four-dimensional phase space, presented in the form of a petal diagram, is shown in *Fig. 10*.

As can be seen from *Fig. 10*, the dynamics of actual performance results in the period from 2016 to 2018 did not undergo significant changes. In 2019–2020, the actual values

of the resulting indicators have significantly moved away from the target values, increasing the distance to the attractor. In 2021, there was a qualitative change in the trajectory, as a result of which the distance to the attractor decreased.

The trends that are reflected in the dynamics of individual resulting parameters, naturally, are also reflected in the dynamics of the integral assessment of the degree of achievement of sustainable development of “Milk River” and the Skochinsky Coal Mine (*Fig. 11–12*).

Thus, within the framework of this study, an assessment was made of the quality of strategic management of industrial enterprises in the Donetsk region in the context of their achievement of sustainable development based on the author’s approach to such an assessment. As a result, it was established that the integral indicator for assessing the degree of achievement of

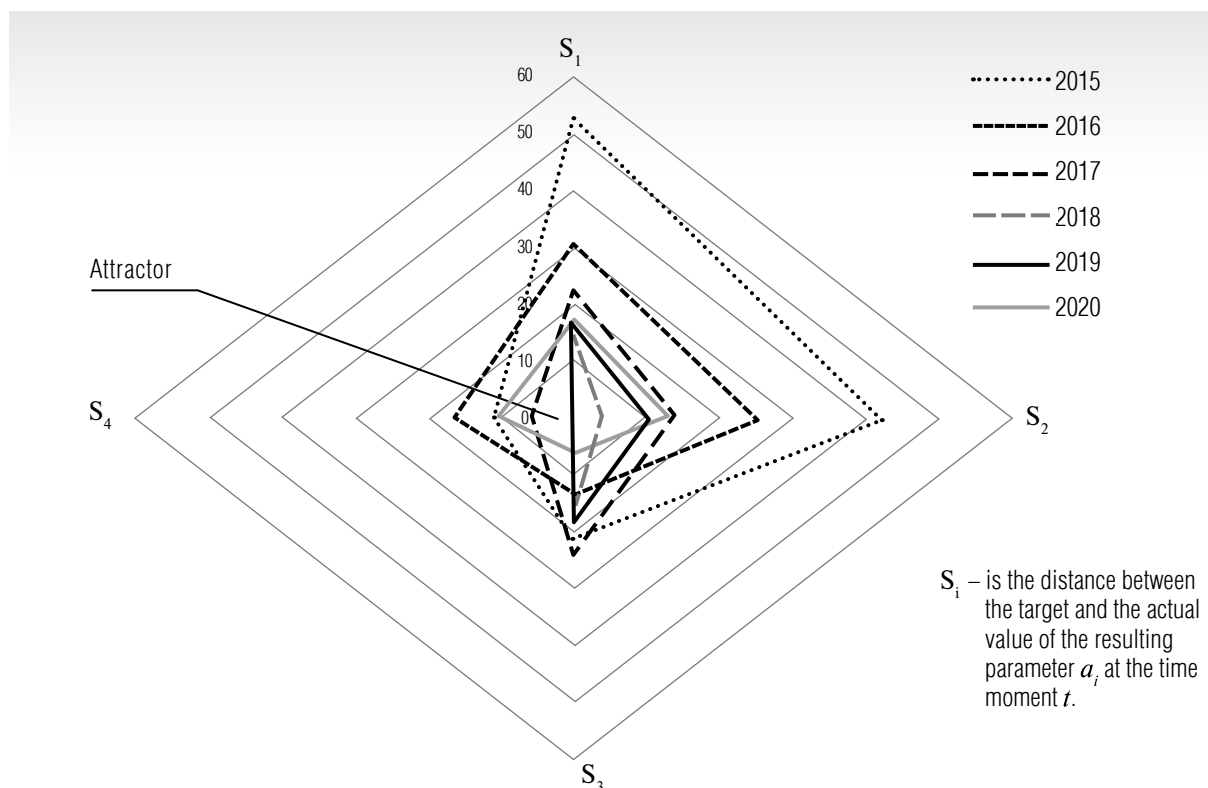


Fig. 9. The attractor and the trajectories for achieving strategic goals by “Milk River” in four-dimensional phase space.

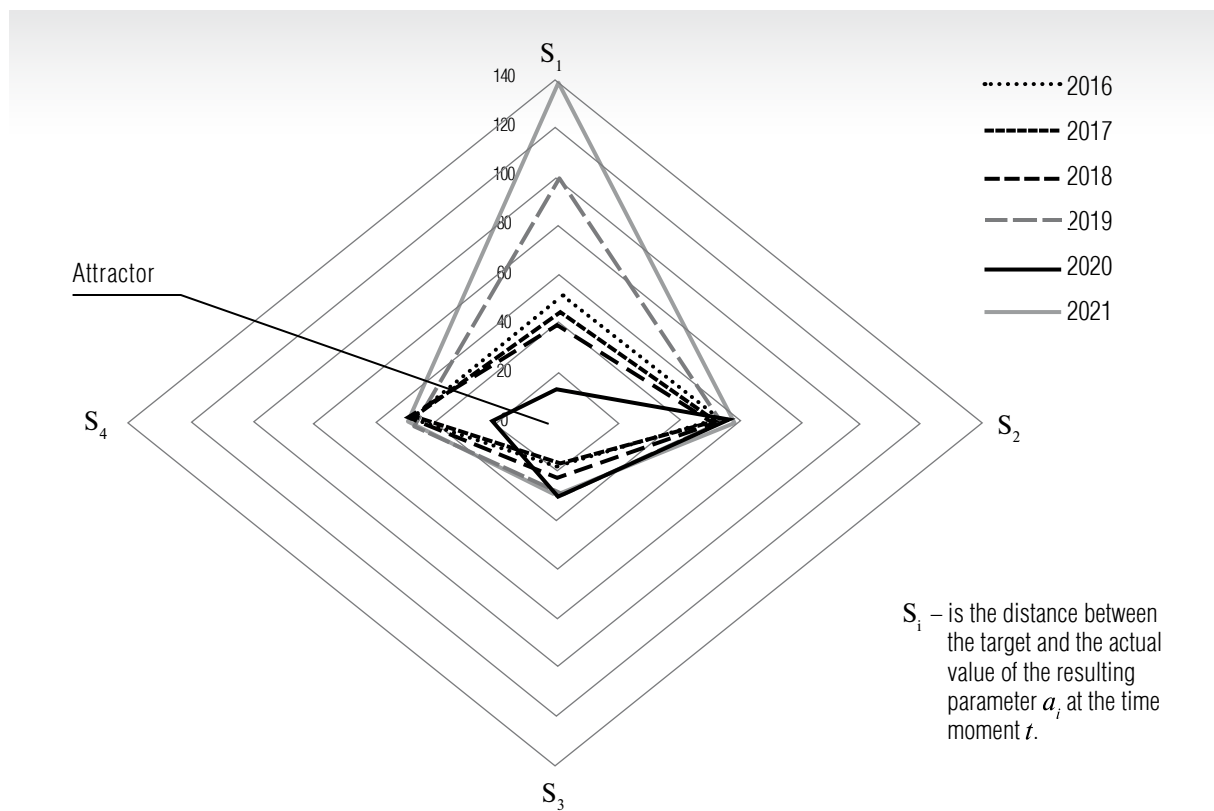


Fig. 10. The attractor and the trajectories for achieving strategic goals by Skochinsky Coal Mine in four-dimensional phase space.

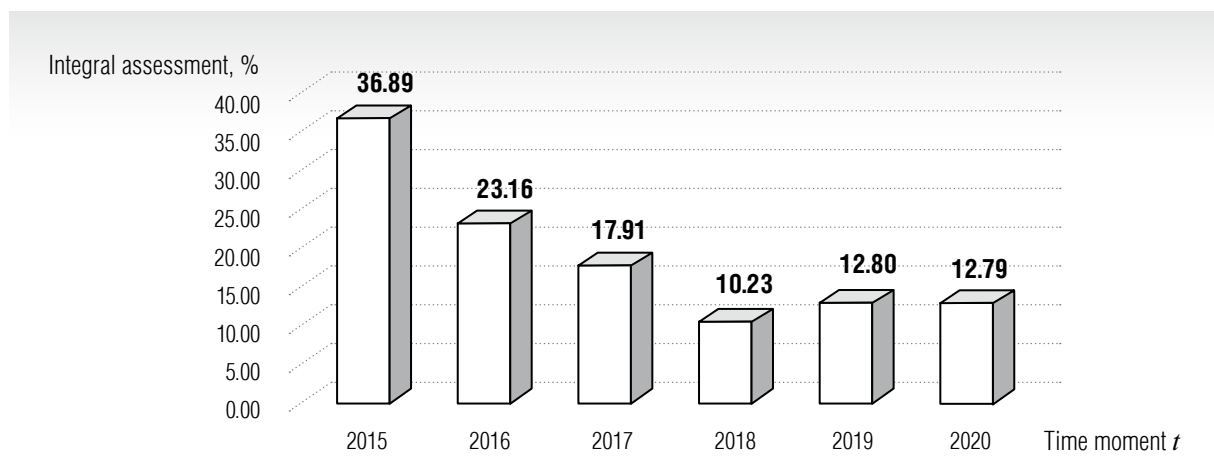


Fig. 11. Integral assessment of the degree of achievement of sustainable development by "Milk River" under uncertainty at the time moment t .

sustainable development of all analyzed enterprises did not have an unambiguous and unidirectional downward trend, i.e. there is no way

to conclude that there is a stable trend towards the attractor for the entire analyzed period for any of the analyzed enterprises.

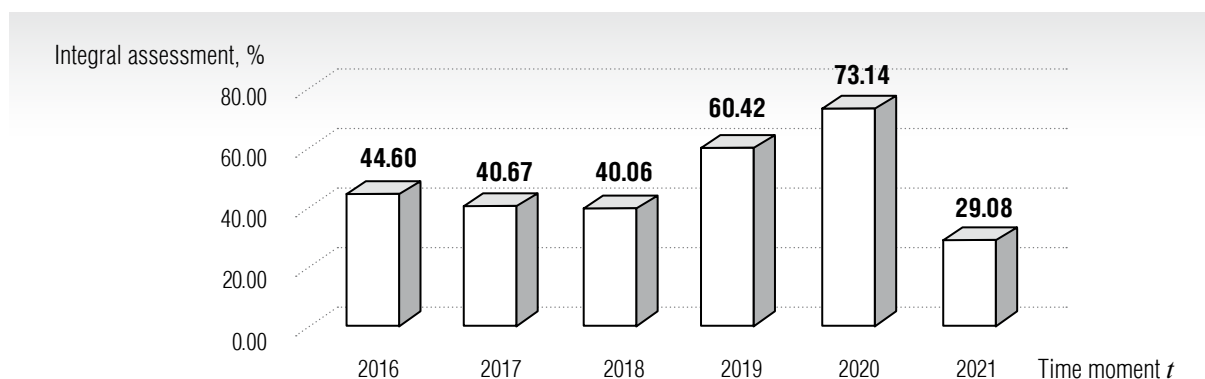


Fig. 12. Integral assessment of the degree of achievement of sustainable development by the Skochinsky Coal Mine under uncertainty at the time moment t .

Conclusion

In the course of the study, a vital task was set and solved, which is to improve the quality of strategic management of industrial enterprises operating in conditions of uncertainty through the development and testing on the example of individual enterprises of the Donetsk region of tools for assessing the quality of strategic management within the framework of an enterprise achieving a sustainable development trajectory, namely:

- ◆ a conceptualization of notions was carried out and author's approaches to the interpretation of the notions of "strategic management," "sustainable development" and "strategic uncertainty" were offered;
- ◆ a scientific and methodological approach to assessing the quality of strategic management within the framework of an enterprise's achieving sustainable development

under uncertainty aimed at conducting a retrospective assessment was offered;

- ◆ an approbation of the assessment of the quality of strategic management within the framework of achieving sustainable development of an enterprise under uncertainty was carried out on the example of industrial enterprises of the Donetsk region.

As directions for further research, one can point to the formation of a system for supporting the adoption of strategic decisions and mathematical tools that make up its model basis. Noting that the issues of improving the quality of strategic management by forming an instrumental and model basis for supporting management decisions are reflected in the scientific literature (for example, [27–30]), we point out that they do not correspond to the author's approach to assessing the quality of strategic management, which actualizes their further development. ■

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