"Modeling of strategic control system in the context of sustainable development of enterprise"

| AUTHORS | Marianna Stehnei https://orcid.org/0000-0002-4688-6447
Inna Irtysheva
Ksenya Khaustova https://orcid.org/0000-0002-3062-918X
Yevheniia Boiko https://orcid.org/0000-0003-1874-5433 |

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Marianna Stehnei, Doctor of
Economic Sciences, Professor of the
Department of Finance, Dean of the
Faculty of Economics, Management
and Engineering, Mukachevo State
University, Ukraine.

Inna Irtysheva, Doctor of Economic
Sciences, Professor, Head of
Management Department, National
University of Shipbuilding named
after Admiral Makarov, Ukraine.

Ksenya Khaustova, Ph.D., Assistant
Professor of the Department of
Management, Mukachevo State
University, Ukraine.

Yevheniia Boiko, Ph.D. Candidate,
Public Institution "Institute of
Environmental Economics and
Sustainable Development of the
National Academy of Sciences of
Ukraine", Ukraine.

Marianna Stehnei (Ukraine), **Inna Irtysheva** (Ukraine), **Ksenya Khaustova**
(Ukraine), **Yevheniia Boiko** (Ukraine)

MODELING OF STRATEGIC CONTROL SYSTEM IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT OF ENTERPRISE

Abstract

Sustainable development of an enterprise in the conditions of permanent changes is possible only with the presence of an effective system of external and internal control. The theoretical foundations of a creation of the strategic control's indicators to simplify the process of strategic management in the context of sustainable development of the Ukrainian companies were investigated. The classification features of the main strategic indicators have been systematized, which can be useful for the creation of strategic control system. Based on theoretical research, there has been developed a comprehensive model of strategic control, which brings together external and internal indicators and makes it possible for the top and middle levels of managers to carry out strategic surveillance of the process of sustainable development in the context of the chosen strategy.

INTRODUCTION

The objective of sustainable development is to ensure stable production, economic activity and socio-economic development of the enterprise as an integrated open economic system. In terms of dynamic changes, the effectiveness of sustainable development depends on the quality of strategic and adaptive system of controlling the implementation of strategic goals.

Strategic control is the basic tool of senior management of the organization, which is designed to monitor the effectiveness of the strategic development of the company, to determine the relevance of the chosen strategy and its compliance with external opportunities and constraints. In this context, the actual problem is the formation of the key indicators, which will allow to monitor the strategic development process, identify possible obstacles (or opportunities) that were not taken into account when developing strategies and making timely decisions.

The purpose of this article is to justify the theoretical principles of developing a model of strategic control in the context of sustainable development of the organization.

Metrics system of strategic control should be developed at the stage of the creation of strategic goals and include a system of interconnected indicators that serve as certain checkpoints of effectiveness of the strategy implementation strategies at certain defined stages. In this context, the main problems are:

- Defining areas of strategic control.
- The list of objects of control.
- Determination of a control period.
- Design of management decisions based on the results of control.

In connection with this, the main objectives of the article are the development of methodological recommendations for the formation of a model of strategic control, which will help solve these problems.

1. LITERATURE REVIEW

The analysis of scientific sources indicated that the determination of key parameters, indicators and models of management control has been the subject of research of many scholars. But the results of the research show that there is no consensus on what should be the system, process, and mechanism of strategic control.

Most scholars divide control over the organization into the internal and external and examine them separately. Among them are J. Walsh, J. Seward (1990), H. K. Chung, H. Lee Chong, H. K. Jung (1997), C. Barnabas (2011), A. M. King (2011), V. Lakis, L. Giriūnas (2012) and others. The results of their work provide an opportunity to determine the key foundations and mechanisms of control. However, in these studies, there is a weak relationship between the control system and the organization's strategy.

One of the first scientists who have identified the peculiarities of strategic control and its interrelation with the strategy at various levels of government is Kim Langfield-Smith (1997). An important requirement for strategic control, in his opinion, is the very adaptability to changes in the environment: "Control systems may focus more on problem finding than problem solving, and flexible structures and processes may assist the organization to respond rapidly to environmental change and to create such change. However, coordination may be expensive and difficult due to overlapping project teams and shared information and resources".

Strategic control is designed to determine whether there is a possible implementation of the strategy and how this implementation helps in achieving the goals. It cannot exist without the current and final control, as well as strategic management

based on the current activity of the enterprise (I. Danylyk, N. Mikhailyshyn, 2013).

According to a study by M. A. Machkur (2003), strategic control covers the following areas:

- Control of strategy preparation: strategically focused observation (strategic monitoring, continuous scanning of the external environment) and control of the preconditions for strategic plans (testing of assumptions about external factors and own resource potential).

- Control of strategy implementation (control of deviations from strategic plans).

- Control of the development of crisis phenomena – early warning (providing information to develop solutions to eliminate strategic deviations).

So, strategic control is a system of mechanisms, tools and indicators that measure the process of implementing an organization's strategy and provide a flexible response to changes in the external environment.

The important discussion questions are about the definition of key indicators of strategic control and their classification. Research studies (Redchenko K., 2015) based on a survey of 185 top managers of Ukrainian enterprises showed that most domestic enterprises use a limited number of leading indicators for decision-making control. These include: the market share (78.9% of enterprises use), sales growth (98.4%), net income per 1 m^2 of industrial or commercial areas (84.9%), turnover ratio (87.0%), turnover of receivables and payables (62.2% and 53.0%, respectively).

The use of the limited metrics as a whole meets the basic postulates of W. Dettmer (2000) who com-

pared managers with pilots of plane and said: "the pilots sufficiently analyzed the speed, altitude, and direction in order to draw a conclusion about efficiency of the aircraft in conditions of turbulence, rather than wait for a lengthy set of data on many criteria".

B. Andersen (1999) also compares a control system with dashboard indicators: "unlike antediluvian breaker by which the finance department switches the red light, warning of a gain or a loss, a new dashboard will contain complex instrumentation, which can assess the real situation. This dashboard will indicate any emerging negative trends that will develop over time and help to define the prerequisites for specific efforts to improve".

One of the most famous models of measurement and evaluation of the strategic development of the company is the "balanced scorecard" suggested by R. S. Kaplan and D. P. Norton (1996). They identified four components of the system for evaluating the attractiveness and efficiency of the company, taking into account the interests of all stakeholders (shareholders, investors, customers and owners), namely financial, marketing component, quality and development of staff component and efficiency of business processes. The disadvantage of using such a system for the strategic oversight is the inadequate account of external factors of influence on the process of achieving the goals.

Useful for strategic control is a model "results and determinants" developed in the 90's by the team of scientists led by L. Fidzherald (1992). The feature of this model is a division of indicators in two groups: indicators of results (financial and non-financial) and determinants – the factors affecting the results. According to the model, typical financial indicators of the performance of the company (profit or loss of equity, assets, etc.) are defined as overdue indicators (lagging indicators). Using only lagging indicators in the implementation of strategic control is counterproductive, because the information they show is final and thus it is impossible to make reasonable forecasts and influence the process of achieving the goals.

In turn, K. Mc Naira, R. Lynch and K. Cross (1990) developed a model, called "Pyramid of activity". It was designed to the performance of control in re-

lation to the overall strategy of the enterprise. The basic idea of the model is to identify the relationship between the overall strategy of the company and the following factors: finance, customer satisfaction, innovation and training, productivity, quality, production cycle time of delivery. The main disadvantage of this model is a rigid adherence to the organizational structure and the virtual absence of opportunities to change the preset strategies.

The main indicators measuring achievements quantum model (Quantum Performance Measurement) are three components, namely: quality, cost and time. These indicators are called "significant signs" and intended to monitor the effectiveness of the organizational structure, personnel, and manufacturing process (Baum H.-G., Coenenberg, A. G., Günther T., 2013). However, the model does not give a full assessment of strategic development, because only identifies the level of performance by individual departments and employees.

One of the most effective models of control that can be used for businesses of any type is the "Performance Wheel", suggested by T. Watts and C. J. McNair-Connolly (2012). This integrated model combines traditional and modern perspectives on control, both top-down and bottom-up metrics, the internal versus external stakeholder perspective, and finally, the relationship of locus of control (organizational role) with the types of incentives that companies have found to be most useful in creating sustainable performance improvements. It incorporates and remedies the identified weaknesses of each model and provides a comprehensive model of performance management that can be adapted to meet the needs of most organization (C. J. Watts & McNair-Connolly, 2012).

There is a difference between strategic indicators and performance indicators. Strategic indicators show the ways of strategic process and their concentration points are different in the timeline. D. Parmenter (2010) explains that result indicators show what has happened until now and that result indicators (RI) signal how is the performance at this moment. On the other hand, performance indicators concentrate on improving the performance in the future and show what aspect is leading to a result.

Having examined the main approaches, we can conclude that at present, there is no single universally accepted model of strategic control. However, based on a synthesis of the research, there were established the basic requirements for its formation:

- adherence to a single methodological approach for providing a clear definition of indicators calculation algorithms and understanding their economic substance and interpretation by professionals at various levels;

- compliance of the system of control of organization of the enterprise with circumscription of "centers of responsibility" for certain aspects of the strategy;

- coverage of all the major characteristics of the management system;

- the optimal number of indicators that shape key indicators of strategic supervision;

- the possibility of modeling the process of implementing the strategy based on the actual performance measurement system and reconfiguring in the case of changes made to the strategy, tactics or individual goals;

- balancing of indicators together towards the formation of a single vector. Thus, the total number of indicators at each level should be sufficient for the formation and interpretation of indicators of higher level;

- quality information provision that takes into account the business enterprise, its internal capacity and external market environment.

2. METHODOLOGY

Modeling of strategic control indicators involves research organization in terms of three basic approaches: system, process, and situation.

From positions of strategic management, the organization is considered as an open system, which has integrated to the external environment. Thus, we assume that the main areas of strategic control are the environment, "input data", "output data" and the internal environment of the organization.

According to the systematic approach the following areas of strategic control can be outlined:

1. The external environment of the company. The main task of strategic control is to monitor environmental changes that have not been addressed in the development of strategies and create additional opportunities or threats to its implementation.

2. The internal environment encompasses a system of indicators that characterize the internal processes of achieving the goals of the company. As indicators of internal strategic control are based on current and operational control, it is necessary to organize them so that certain groups of indicators of current control formed the generalized indicators for strategic oversight.

3. The outputs of the organization. The main parameters of efficacy in this component are the satisfaction of customers, customer retention, attracting new customers, market share in target segments and so on. Indicators of strategic control in this area are the indicators of the actual implementation of the strategy. However, they can serve as impulses to review strategic or tactical goals for the next cycle.

The effectiveness of the strategic control depends on the management structure and appropriate implementation process goals. One of the most effective management and control systems, which proved its relevance to the practice of most successful corporations, is reengineering business processes of the organization. The advantage of this model is the possibility of establishing for each business process clearly defined objectives and key performance indicators.

The founders of the concept of reengineering are considered by American specialists in management M. Hamer and Dzh. Champy (1993). In their view, business process reengineering (BPR) "is a fundamental rethinking and radical redesign of business processes to achieve rapid, spasmodic improvements in critical contemporary figures such as cost, quality, service and rates".

During the studies, it was found that different scientists offered different sets of control parameters and different approaches to their classification. Given the characteristics of strategic control, in Figure 1, we systematized the main classification criteria of the metric system.

So, by ambits of control, the indicators are divided into:

- External, which reflect the state of the relevant factors of external environment in relation to the environment of the enterprise (market conditions, competition, tax policy, etc.).

- Input – a set of indicators describing the qualitative and quantitative aspects of the incoming resources.

- Internal – indicators, which reflect productivity and efficiency of internal processes in the enterprise.

- Output – a system of indicators that measure the compliance of products, services, and information produced by the enterprise to the requirements and expectations of state holders.

- Summarizing – indicators that are based on previous aggregation of groups signal the efficiency (inefficiency) of the company in implementing the chosen strategy. Deviations in this group of indicators favor a push for more granular control specified areas.

Classification of indicators for strategic directions is based on a balanced scorecard of the company (R. S. Kaplan & D. P. Norton, 1992) and control indicator system that was proposed by a team of scholars (M. O. Kizim, A. A. Pylypenko, V. A. Zinchenko, 2007). However, in the context of strategic control model, these figures were modified by taking into account the strategic dimension. According TO the areas, the following classification of strategic indicators has been suggested:

- Financial indicators, which characterize the financial conditions of the enterprise and financial results that should be targeted at definite stages of reaching the aim. Financial indicators tend to feature prominently in the processes of strategic control, as they assess cost-benefit ratio of each tactical event and process.
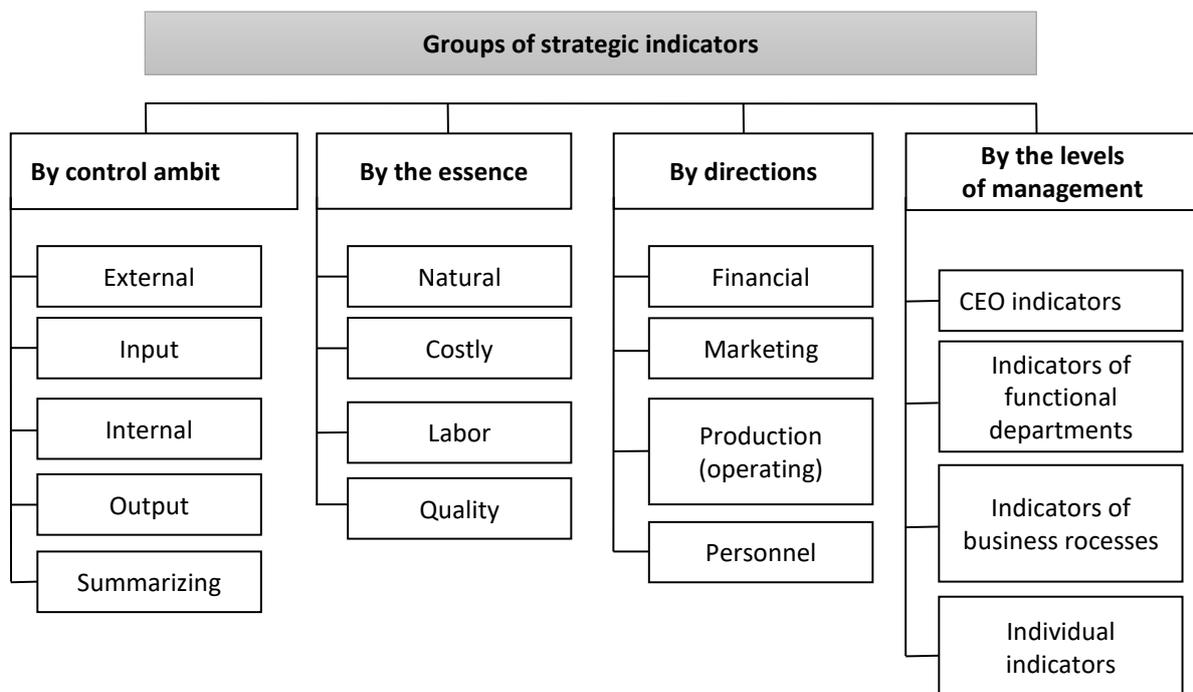
Source: developed by authors.

Figure 1. Classification of indicators of strategic control

- Marketing indicators are intended to determine the effect of internal efforts on the behavior of ready-made product users. Usually marketing indicators are market share by product, price level, number of customers, distribution channels, etc.

- Production (operational) indicators reflecting the planned course of production of goods or services.

- HR indicators determine the quantitative and qualitative characteristics of labor and personnel, which are necessary to achieve the goals.

Depending on the particular configuration of economic activities and strategies of enterprises, some other groups of indicators can be incorporated into the control system. For example, the environmental, innovational, investment, foreign trade indicators and others.

Since the system of strategic indicators is derived from the structure of the company and the corresponding allocation purposes, the process of finding a balance between different indicators is related to the achievement of close relationship between personal and organizational goals. Clarity and unity of personal goals and overall objectives of the enterprise required the active involvement of employees in the enterprise in the context of the strategy. In this regard, there has been suggested a hierarchical division of indicators into the following groups:

- CEO indicators. They are tools for strategic oversight of senior management in the process of implementing the strategy and monitoring important changes in the environment that can affect a change in strategy, tactics or purposes.

- Indicators of functional departments or services have combined the most important indicators of control of the following areas of responsibility.

- Indicators of business processes. They are key indicators covering the implementation of business processes within the operating strategy.

- Individual indicators are indicators that are oriented at individual performers or groups in order to determine the role of their actions in achieving the goals.

Consequently, the suggested classification can be used for organizing strategic control indicators of the system of the formation of strategic management for businesses of any type.

In an uncertain environment, it is necessary to develop a system of indicators of the company, which would be characterized by the high level of universality. When we say "universality", it should be understood that measurement characteristics of objects of external environment and internal environment must be adequate and comparable in time and space (L. Malyarets, A. Shtevereverya, 2008).

One of the methods, which help to achieve flexibility in the process of measurement, is a method of standardizing of indicators.

This method is used for calculating conditional (standardized) parameters, which allows to convert the indexes that are non-comparable with each other into a single measurement system. As strategic control system is based on indicators of strategic planning, the strategic control indicators are benchmark rates of reference value targets that must be achieved in the most efficient process of strategy implementation. In this case, it has been suggested to standardize of indicators by the formulae:

- for the indices, whose growth is positive for the company:

$$\overline{I}_{gi} = \frac{g_{if}}{g_{is}};\qquad(1)$$

- for the indices, whose growth is negative for the company:

$$\overline{I}_{gi} = \frac{g_{is}}{g_{if}},\qquad(2)$$

where: $\overline{I}_{gi}$ – standardized value of the i-th indi-

Table 1. Evaluation of standardized indicators

Indexes	Faster growth	Very high		High	Average (within acceptable)	Low	Very low	Critical		
A range of indicators, $\overline{I}_{gi}$	> 1	0.90-1.0	0.80-0.89	0.70-0.79	0.60-0.59	0.50-0.59	0.40-0.49	0.30-0.39	0.20-0.29	0.1-0.09	0.08-0
Points, P_{gi}	> 10	9	8	7	6	5	4	3	2	1	0

cator of strategic control; g_{is} – reference (target) value of statistic indicator; g_{if} – actual value of the index at the time of monitoring.

In this paper, in order to facilitate interpretation of measurement results of various content indicators, it was suggested to transfer them to a 10-point system, which is shown in Table 1. In the suggested scale, there was used a scoring system with an interval from 0 to 10.

Using a point system will form an interactive model of a strategic control that should signal about the efficiency of the progress of the strategy at all levels of management, separate and functional areas and within specific business processes.

Strategic control model is developed by taking into account the suggestions of scientists such us R. S. Kaplan and D. P. Norton (1992), M. Hammer and J. Champy (1993), C. J. T. Watts and McNair-Connolly (2012).

The main components of this model are:

T – term of strategy implementation, which is divided into periods (t_i) of implementing the objectives of tactical indicators (g_i), expressed in points (P_{gi});

SG_i (summation goals) – internal control benchmarks at certain stages of strategy implementation. They are defined as integral indicators of strategy implementation in certain areas by the formula:

$$SG_i = \sum_{i=1}^{n} P_{gi} w_i, \qquad (3)$$

where: SG_i – indicator of strategic control process in a certain period of time under certain di-

rection (e.g., performance process, product quality, financial performance, etc.); w_i – weight of single index in a group.

The weights $(w)_i$ were defined within the selected indicators together with a certain level of aggregation. The weighting factor of each level has been justified by an expert in accordance with the purposes of the analysis at the discretion of prioritization of management between individual factors for analysis.

According to this model, the process of implementation of the strategy within the defined business process is considered optimal when weighted index $SG_i = 10$ points in the specified period of control. In the process of implementing the strategy, there may appear deviations as towards a positive (> 10 points) and a negative (< 6 points) direction.

Major cases of such deviations should be foreseen and alternative solutions should be developed to help to adapt the process of implementing the strategy to new conditions (if the deviation was caused by changes of objective factors) or to eliminate the deviations if they are caused by internal problems.

EK (external environment control) – group of relevant factors of strategy implementation at the level of departments or business processes. The structure of external control indicators includes factors that critically affect the achievement of intermediate targets implementing the strategy within the business process.

Finding these factors can be carried out at the stage of strategic analysis by an expert or based on correlation dependencies.

For example, based on studies, it was found that the successful achievement of strategic goals (G) consisting of a set of the tactical objectives (g) is affected by environmental factors k and d. However, tactical goals are interrelated and environmental factors are independent.

In this case, to determine the relationships between independent factors of external and internal environment, it was suggested to use the canonical system of equations.

One of the main tasks solved in the analysis of canonical correlation is to find such a pair of values of canonical variables, which corresponds to the maximum value of the canonical coefficient of correlation.

The main purpose of the use of canonical correlations to measure links is, first of all, to find maximum correlation-regression relationships between groups of initial variables: dependent and explanatory. In addition, the method of canonical correlations makes it possible to reduce the amount of source information by removing minor factors that have little effect on dependent variables, that is, using canonical correlations, it is possible to avoid errors in the specification of the econometric model (T. A. Tereshchenko, 2012).

Then, the influence of individual factors on achieving certain goals can be written as the canonical correlation between new component variables:

$$\begin{aligned} g_1 &= \alpha_0 + \alpha_1 k_1 + \alpha_2 k_2 + \ldots + \alpha_q k_q, \\ g_2 &= b_0 + b_1 d_1 + b_2 d_2 + \ldots + b_m d_m, \end{aligned} \qquad (4)$$

where g_1, g_2 – tactical goals of the enterprise; k, d – most important environmental factors affecting the achievement of tactical objectives; α, b – regression parameters.

Thus, the density of communication between the canonical variables can be determined by using canonical correlation coefficient (r) of the formula:

$$r = \frac{cov(g_1, g_2)}{\sqrt{var(g_1) \cdot var(g_2)}}. \qquad (5)$$

Depending on the values acquired by coefficients α_i and $b_j (i = 1, q; j = 1, m)$, the value of canonical variables g_i and canonical correlation coefficient will change.

For easier measurement and interpretation of indicators of external environment control, we must convert the coefficients of canonical equations into the percent by the formula of elasticity, for example:

$$E_{k_1} = \alpha_1 \frac{k_1}{g_1}. \qquad (6)$$

The coefficient of elasticity E_{k_1} shows that increasing signs of k_1 factor by 1% leads to increases (decreases) of the resultant index in average by ....%.

It is necessary to standardize the elasticity index for using it in the system of strategic control. To do this, we suggest to use the formula:

$$SK_{k_1} = \frac{E_{k_1}}{100} \cdot \frac{\left(\left(\frac{k_1 N}{k_1 F} \right) \cdot 100 - 100 \right)}{100}, \qquad (7)$$

where SK_{k_1} – standardized value of k_1 factor; $k_1 N$ – standard value factor (appropriate for the purposes); $k_1 F$ – actual value factor at the time of measurement.

Then, indicators of external control can describe the function the in following form:

$$EK_{gi} = f \begin{cases} SK_{k_i}, & \overline{(q = 1, q)} \\ SD_{d_j}, & \overline{(j = 1, m)} \end{cases}. \qquad (8)$$

OK (output control) – a system of indicators, which define performance of indicators of strategy implementation within the defined business process. In general, indicators of outputs depending on the values, which have been achieved by functional indicators in the implementation of the strategy. Therefore, it can be written as a function:

$$OK = f(G_1, G_2, \ldots, G_n). \qquad (9)$$

According to the model (Figure 1), some results of output control with external factors became indicators of the input control of the business process in the value chain.

SK (surveillance control) – indicators of strategic oversight. These are aggregate indexes, which allow to summarize information on the implementation of strategic plans at the enterprise as a whole or departments, and are determined by the formula:

$$SK = \sum_{i=1}^{n} G_i w_i, \qquad (10)$$

where n – number of functional indicators within the business process; w_i – weight ratio of the G_i^{th} indicator.

If the indicators of strategic oversight do not record significant variations (taking values ranging from 7 to 10), it is considered that the strategic process is moving according to the plan.

3. RESULTS

Implementation of the developed model of strategic control was carried out according to the data of Numinator Ltd. The main activity of the enterprise

is the production of wood products. The range of products includes the boards of trimming, plywood, wooden parquet and parquet board, windows, doors, wooden thresholds, etc. Numinator Ltd. implements a strategy for sustainable development for the period 2014–2019. This strategy defines the main goals, tasks, directions of activity and the expected indicators, which the enterprise seeks to achieve. At the same time, effective implementation of the strategy requires the development of a strategic control model, which will include external and internal indicators.

The article shows the fragment of the developed model of strategic control on the example of the business process "production of boards". In the structure of proceeds from the sale of products, this process is about 40%. That is, it has a significant impact on the realization of the strategy.

The target indicator, which has defined in the strategy for this process is the volume of production (G_1). This indicator is an integral part of the "business process efficiency" indicator at the level of development departments.

The target indicators (internal control indicators) for the aggregate indicator G_1 were determined on the basis of the multifactor regression equation. The analysis covered indicators for 10 calendar months of the work of department. The resulting

Table 2. Indicators of strategic control of the business process "production of boards" of Numinator Ltd.

Source: calculated by authors.

Indexes	Symbols	Weighted coefficient	Planned and actual values of indicators						Standardized value (Points), $\bar{I}_{g_i}(P_i)$		
			2014		2015		2016		2014	2015	2016
			g_{is}	g_{if}	g_{is}	g_{if}	g_{is}	g_{if}			
The coefficient of material support of production, %	g_1	0.3	100	97	100	85	100	88	0.97 (9)	0.85 (8)	0.88 (8)
The number of employees involved in the process, units	g_2	0.3	30	28	30	28	32	27	0.93 (9)	0.93 (9)	0.84 (8)
The coefficient of using of production capacity, %	g_3	0.15	98	87	98	83	98	82	0.89 (8)	0.85 (8)	0.84 (8)
The coefficient of the rhythm of the production process, %	g_4	0.25	98	89	98	87	98	83	0.91 (9)	0.89 (8)	0.85 (8)
Summation goals (SG_1)	–	–	–	–	–	–	–	–	8.9	8.3	8

regression equation has the following form:

$$G_1 = -89.9 + 12.3g_1 + 8.5g_2 - 0.21g_3 + 5.17g_4, \quad (11)$$

where g_1 – the coefficient of material support of production; g_2 – the number of employees involved in the process; g_3 – the coefficient of using of production capacity; g_4 – the coefficient of the rhythm of the production process.

The multiple regression coefficient $(R = 0.98)$ indicates a solid correlation between the performance indicator and the factor values. The determination coefficient $R^2 = 0.95$ of the obtained correlation regression model shows that the dependence of the volume of sales on 95% is due to the selected factor values. The scores were given and the values of the aggregate index SG_1 were calculated on the basis of formulae 3-4 and data in Table 1. So, the selected indicators can be used as strategic indicators of control model within the framework of this business process (Table 2).

Consequently, we can conclude that the process of implementing the strategy within the studied business process was within the range of 8.85-8 points during the study period. This indicates a slight deviation from the strategic goal.

In addition, it has been investigated that effective implementation of the strategic goal (G_1) depends by the following groups of environmental factors:

- raw material and material supply factors (S), which include stability of supply of raw materials s_1, wood price indices s_2, energy price indices s_3.

- market factors (M), the main of which are the price index for finished products m_1, the volume of demand m_1, the volume of export of goods in this group m_3.

The system of canonical equations (formulae 4-5) was used to determine the relationship between external factors and the indexes of the internal control. The following models based on the results of calculation of canonical equations are obtained (only the equations of the relationship of new features were selected, for which the canonical correlation coefficient was significantly less than 0.05):

$$\begin{cases} g_1 = 96.74s_1 - 12.76s_2 - 0.65s_3, \\ g_4 = 7.21m_1 + 20.47m_2 - 0.01m_3. \end{cases} \quad (12)$$

The canonical correlation coefficient is 0.93, which indicates a close relationship between the individual targets of the enterprise and the factors of the environment.

Table 3. Standardized indicators of external strategic control

Source: calculated by the authors.

Indexes	The coefficient of elasticity, E	Standardized value of factors, SK		
		2014	2015	2016
Material supply factors (S)				
Stability of supply of raw materials, S_1	1.08	1	1	0.98
Wood price indices, S_2	−0.14	1.2	1	1
Energy price indices, S_3	−0.01	1	1,1	1.3
Market factors (M)				
Price index for finished products, m_1	0.07	1.1	1	1.3
Volume of demand, m_2	2.69	0.98	0.93	0.9
Volume of export of goods in this group, m_3	−0.001	1.2	1	0.7

In order to determine the degree and direction of influence of external control factors on the performance of internal business process indicators, the elasticity coefficient (formula 6) and standardized indicators of external factors control have been determined (according to the formula 7). The results of the calculations are shown in Table 3.

Thus, the biggest influence on the effectiveness of the implementation of the business process is the stability of the supply of raw materials. That is, with the improvement of this indicator by 1%, the coefficient of material supply of production is improved by 8 points. Estimation of the standardized value of this indicator in dynamics shows that during 2014–2016, the indicator was within the normative value. It has positively affected the

achievement of strategic goals within the business process. Demand has a high level of influence on the volume of production too. We have calculated that with an increase in demand by 1%, the rate of rhythm increases by 2.69 points $\left(k = 2.69 \right)$.

Consequently, according to the results of the analysis, a list of the most significant indicators, which should be included in the system of strategic control of Numinator Ltd. within the chosen business process, has been determined. At the same time, the effectiveness of strategic control depends on the development of a comprehensive model, which includes all business processes and management levels of the enterprise and takes into account the peculiarities of their interrelation in the process of developing and implementing the strategy.

CONCLUSIONS

Sustainable development of enterprises depends on effective strategies and ensures control over their implementation. It is necessary to identify areas of indicators and time frames of strategic control, which contributes to the objectives in the context of the chosen strategic vector of development.

Strategic control is a system of mechanisms, tools, and indicators that measure the process of implementing an organization's strategy and provide a flexible response to changes in the external environment.

It is proved that an important condition for the formation of a strategic control model is the identification of key indicators and the establishment of relationships between them. For this purpose, we have systematized classification indicators of strategic control, which makes it possible to determine individual indicators that are consistent with the features of functional, operational and market activities of individual enterprises.

The unified model of strategic control, which is based on the system, process and situational approaches, will enable to monitor the implementation of strategic objectives to determine the effectiveness of all actions of the enterprise in the internal and external environment and make operational decisions. The model proposed in the article can be adapted for the formation of strategic control of enterprises regardless of the type of activity, size or ownership.

Implementation of the model into practical activities of Numinator Ltd. has made it possible to identify the main bottlenecks in the control system and improve the effectiveness of strategic management. The high efficiency of a model can be achieved by developing the appropriate software.

Further research will be carried out in the direction of implementation of this model of control into the practical activities of Ukrainian enterprises.

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