## PAPER • OPEN ACCESS

# Improving the management tools of engineering enterprises in modern conditions

To cite this article: V A Ogloblin et al 2019 J. Phys.: Conf. Ser. 1399 033060

View the article online for updates and enhancements.

## You may also like

- <u>Review—Optimized Particle Filtering</u> <u>Strategies for High-Accuracy State of</u> <u>Charge Estimation of LIBs</u> Shunli Wang, Xianyi Jia, Paul Takyi-Aninakwa et al.
- <u>Ultrasound device selection by using F-</u> <u>ANP and COPRAS</u> Humala L Napitupulu
- River fragmentation and flow alteration metrics: a review of methods and directions for future research Suman Jumani, Matthew J Deitch, David Kaplan et al.





DISCOVER how sustainability intersects with electrochemistry & solid state science research



This content was downloaded from IP address 18.223.119.17 on 07/05/2024 at 11:46

## Improving the management tools of engineering enterprises in modern conditions

V A Ogloblin<sup>1</sup>, Yu N Malanina<sup>1</sup> and M V Vikhoreva<sup>1, 2</sup>

<sup>1</sup> Irkutsk State Transport University, 15 Chernyshevsky St., 664074, Irkutsk, Russia <sup>2</sup> Baikal State University, 11 Lenin St., 664003, Irkutsk, Russia

E-mail: ogloblinva@mail.ru

Abstract. This article substantiates the relevance of improving the management tools of engineering enterprises. The historically formed management assessment system is substituted by production assessment. The article considers the model of balanced scorecard, the essence of the system, its advantages and disadvantages, discussed by both foreign and national researches. The authors propose new management improvement tools based on the use of a complex function and division of management functions according to the criterion of achieving the strategic goals of engineering enterprises.

### 1. Introduction

The problem of increasing labor productivity at the enterprises of our country has a high state status. In May 2019, President of Russia Putin V.V. signed a decree "On national goals and strategic objectives of the development of the Russian Federation for the period until 2024" [1]. He presented a plan for the development of Russia for the next 6 years. The head of state entrusted the Russian government with such important goals as ensuring the growth of labor productivity in medium and large enterprises of the basic non-primary sectors of the economy by at least 5% per year, involving at least 10 constituent entities of the Russian Federation each year to participate in the development program, and in addition involving at least 10 thousand different production enterprises in the execution of the government plan.

It should be noted that the current market conditions and the assignment of an enterprise to the goods and means of production group (category A) are obviously in a riskier position than the assignment of an enterprise to the group of consumer goods (category B). Since the enterprises of category B are forced to "only" predict changes in the needs of consumers, and the enterprises of category A have time to not only predict, but also make changes to their products, so that enterprises of category B require goods and means of labor. Engineering enterprises, in particular, are in this category.

Methods of increasing labor productivity are widely discussed in the scientific literature. Sokolova proposed an interesting approach, grouping such methods by management functions: production management, marketing, finance. In her opinion, strategic planning, methods of human resource management, methods of labor organization, productive work of equipment, quality control of products and the "just-in-time" system as methods of production management will give many effects from the implementation. They are the following effects: organization viability increase; risk reduction; improving the quality of the workforce; stimulation of labor activity; reduction of social



tension; rational use of resources; increasing the culture of production; reduction of accidents, industrial accidents, losses from malfunctions and equipment accidents; training workers who are well versed in equipment skills; decrease in the level of marriage; quality management throughout the cycle - from product development to after-sales service; reduction of failures in production. It must be pointed out that the prevailing point of view of Russian researchers is the limitation of the methods of production management of engineering enterprises by the methods of production management [2]. However, it is important not only to produce the product, but also to sell it. Therefore, we agree with the opinion of Sokolova, that production management methods should be complemented by marketing and financial management methods.

Adaptation of the engineering enterprise to the external environment is impossible without an adequate management system. At the same time, historically, the activities of domestic industrial enterprises are evaluated by production indicators but the other areas of its activities are not taken into account. This approach allows us to improve the tools of production, but not management [3].

The most widely used assessment method in practice is the target approach. Based on this assessment approach, a balanced scorecard model was developed by Robert Kaplan and David Norton, which focuses on the financial capital of an engineering enterprise, considering that its increase is the most important goal [4]. The following model, proposed by Herwig Friedag and Walter Schmidt, proposes that intellectual capital be considered the application of a balanced scorecard [5].

One of the fundamental points of the model of a balanced scorecard of Robert Kaplan and David Norton is the choice of market and client for which the company is going to produce products. An equally important step is the identification of key business processes in terms of customer satisfaction. And finally, it is required to develop solutions for optimizing business processes that can ensure the achievement of the goals of a machine-building enterprise related to the selected market segment and type of client. The authors of the model define the concept of a "balanced" system of indicators by the presence of a connection between accounting for: short-term and long-term goals, external and internal assessments of the organization, leading and lagging indicators, objective and subjective assessments. In total, 20-25 indicators from the following areas of the organization are taken into account: financial, client, internal business processes, innovation and training. The greatest difficulty is the determination of cause-effect relationships between indicators, although the main idea is that achieving the financial goals of the organization is possible with certain results of working with its customers, which requires restructuring their business processes due to the innovative potential of the organization and its training opportunities staff.

A number of researches positively assess the prospects for the application of these models in the practice of Russian engineering enterprises [6–9].

So Milyaeva believes that the balanced scorecard system will ensure the spread of the strategy to all levels of the enterprise and cascading goals, and due to the implementation of the developed measures, the implementation of the strategy will be accelerated and consistent [9].

Using a system of balanced indicators will allow quarterly assessing the contribution of each indicator to achieving goals, thereby assessing the degree of achievement of the chosen development strategy. Plan the implementation of the construction program by changing individual parameters and allocating key resources [7].

Mizikovsky I.E. considers the possibility of applying the model of a balanced Friedag-Schmidt index system, positively evaluating its use [8].

However, a group of researches criticizes these assessment models [10]. In their opinion, a significant part of engineering enterprises use a system of balanced indicators that is not adapted for specific conditions. First, this statement relates to non-financial indicators. In this regard, the establishment of causal relationships between calculated indicators and the goals of the organization occurs with a limited degree of reliability. In such conditions, managers have the opportunity to adjust the value of indicators to justify the bonus of their work [10]. There are researchers who consider the model of a balanced scorecard to be internally contradictory and lacking a logic of construction and

use. They believe that the fame of the balanced scorecard is based on the charisma of its authors and the reputation of the Harvard Business School [11].

Our national scientists identify the following problems in the implementation and use of a balanced scorecard [6, 12-16].

Some researchers note the lack of necessary qualifications among the staff of domestic machinebuilding enterprises, the strong dependence of the choice of indicators of a balanced scorecard on the scope of the enterprise [6].

Karalkin agrees with the problem of industry dependence for large domestic enterprises of the fuel and energy complex, offering to take into account the huge scale of production, a long production cycle, imperfect corporate culture, the lack of a developed system of business planning and strategic management, inefficient management methods and tools used by management, inconsistency of business processes, underdevelopment of management accounting, risk management, motivation systems, cost management, etc. [14].

Kyle argues that there is no connection between the strategic objectives of the enterprise and the balanced scorecard, a number of indicators are not comparable, the emphasis is only on the financial aspect of the organization, and long-term and short-term goals are not balanced [13].

Malova believes that the use of balanced scorecard without adaptation to other existing elements of the management system, leads to the lack of the desired results of the goals [15]. There are other researchers who agree with this statement [12, 14].

According to Molchanov, the problem is the formation of the innovative potential of Russian machine-building enterprises, due to the lack of a resulting indicator that allows measuring innovative potential [16]. The researcher suggests conducting such an assessment on the basis of Bukhonova's methodology for assessing and managing the sustainable development of enterprise [17], adjusted for the balanced scorecard. The essence of the proposed approach in comparison with the indicators of the average criterion scale of values of the integral innovative potential of enterprises in the industry (field of activity) based on the benchmarking approach, that is, the construction of a rating of enterprises by field of activity.

Baranov believes that the choice of indicators for the development of the innovative potential of the organization and its ability to develop is a difficult problem for managers of machine-building enterprises [18], which indirectly proves with reference to the work of Kaplan and Norton, who subsequently are forced to consider this component of a balanced scorecard [19].

We believe that the main drawback of the balanced scorecard model is that, along with setting the goals of the machine-building enterprise, there is no tool to achieve them. It is assumed that managers are sufficiently qualified to cope with the tasks. This provision does not allow to improve the management system at the engineering enterprise, to determine the quality of management, the degree of provision of competent managers, to make informed decisions on training, advanced training and rotation of managers.

Volkov and Ptuskin propose combining the use of the business value management system (VBM - Value-Based Management) and a balanced scorecard (to compare the quality of the employee's work with the results of the unit in which he works) BSC - Balanced Scorecard) [6].

Turenko believes that there are two approaches to the HR assessment: focused on the result of the work done and on the development of the organization [20]. The author connects the latter approach with the process of formation of management personnel by the following performance indicators.

- The integral indicator is the coefficient of efficiency of the process of formation of HR management.
- Key indicators: social development factors of the team, organizational, technical and economic development of the enterprise; profit and profitability of management training system; promotion and training rates.
- Additional indicators are the coefficients of logical construction of the curriculum, the uniform distribution of the pedagogical load of teachers, exams and tests, theoretical and

practical training, satisfaction with the learning process, the effectiveness of the use of educational material base.

Turenko is sure that his assessment methodology "is a means of identifying reserves, determining the main directions of development of the process of formation of management personnel to achieve the best results of the enterprise, to increase its efficiency" [20].

The proposed approaches to solving the problems of the balanced scorecard system do not allow to reveal a direct connection between the formation of management personnel, the quality of the employee's work, the motivation system and the development of an industrial enterprise. Tools for supporting the implementation and use of a balanced scorecard are not described, the procedure for redesigning indicators in case of changes in the environment is extremely laborious and, finally, there are no criteria for improving the balanced scorecard for management of engineering enterprises.

To overcome these difficulties, we offer a classification with the separation of the management functions performed into two groups (providing a solution to the strategic tasks of the organization and providing methodological support for the functioning of the management system), which will provide conditions that affect the process of achieving the strategic goals of the enterprise [21]. Since the improvement of management is impossible without assessing this activity from the point of view of the impact on the implementation of the organization's strategy, it is important to apply modern methods for determining the effectiveness and efficiency of its functioning.

When assessing management activities, it is advisable to supplement with new types of assessment (assessment of consequences and assessment of the implementation process) as a result of which the target approach can be expanded by elements of the approach in the context of systems theory. This allows you to establish a direct relationship between strategic goals and the implementation of the management system of engineering enterprises [22].

Changes in approaches to the assessment of management entail the use of new criteria for the functioning of the modern management system of engineering enterprises, in the form of effectiveness, economic, social and integral coefficient [22].

For functions that provide a solution to the strategic tasks of the organization, an algorithm has been developed that allows them to be designed, organized and executed [23]. It should be noted that we propose to combine such functions with those for the best achievement of the strategic goals of the enterprise. These complex functions are not used for general management functions, but for functions of management types. Therefore, in this article we will present an algorithm using HR management functions as an example. The complex function of the type of management is a list of interrelated traditional functions. This set of standard functions will allow you to take into account changes in the external environment and quickly respond to the enterprise to them. The progress of such functions will be monitored by deviating from the ideal course of performing the complex function, which will enable surgical intervention to correct the performance of the multifunctional type of management. As a result, the activities of managers will be focused only on those functions that will allow achieving the strategic goals set for the enterprise. Such a management tool will provide a "feedback" between the professional actions of managers and the degree to which the strategic goals of the enterprise are achieved. In the definitions of management there are points of view that suggest it to be considered art. However, the opportunity to improve the type of management will provide managers to consider it a professional activity, which must be learned and acquired the necessary skills. The criteria for assessing the activities of employees of the type of management service were selected after a thorough study of the essence of effectiveness and efficiency. The algorithm for the formation of a complex function is built on the principle of emphasizing the main elements of the "input-process-output" in HR management system and establishing values for indicators of assessing the effectiveness and efficiency. The algorithm for the formation of the complex function of HR management will be presented in the form of a list of interrelated activities:

Stage 1. Strategic goal setting.

- Setting the strategic goals of the enterprise for the type of management.
- Assignment of criteria and performance indicators of the strategic objectives of the enterprise for the type of management.
- Definition of factors affecting the achievement of the strategic goals of the enterprise for the type of management.

Stage 2. Preparation of the complex function of the type of management

- Definition of factors depending on the type of management of an engineering enterprise.
- Description of the ideal result of performing the functions of the type of management.
- Designing a complex function of the type of management and planning for its implementation.
- Coordination of parameters of the complex function of the type of management with all interested parties.

Stage 3. Implementation of the complex function of the type of management

- Performance of the implementation plan for the integrated functions of the type of management.
- Signaling a deviation from the normal course of the complex function.
- Dealing with deviations from the ideal result of performing functions of the type of management.

Stage 4. Evaluation of the effectiveness and efficiency of the type of management

- Summing up (calculation of an integrated indicator).
- Coordination of results and adjustment of complex functions for their improvement.

An example is the complex function of HR management (providing personnel, consisting of individual personnel functions: selection, hiring and adaptation of personnel).

To increase the degree of adaptation to the external environment, it is supposed to change the organizational structure to perform this type of management function [24], and organize the implementation of functions that provide methodological support for the functioning of the management system within a common service center to reduce the cost of their implementation [25].

The selected indicators will make it possible to build a rating by field of activity, assess the quality of management and the degree of provision of qualified managers to decide on rotation of training and advanced training of management specialists. It is envisaged to determine the personal contribution of each Manager to the implementation of a complex function based on the integral coefficient, which is a direct product of social, economic efficiency and effectiveness.

### References

- [1] Decree of the President of the Russian Federation "On national goals and strategic objectives of the development of the Russian Federation for the period until 2024". Access mode http://www.kremlin.ru/events/president/news/57425 (access date 09/15/19)
- [2] Sokolova L G 2000 Productivity: theory, measurement, growth problems *Irkutsk* 241
- [3] Ogloblin V A, Malanina Yu N, Vikhorev V G and Vikhoreva M V 2019 Prospects for development of small innovative mechanical engineering enterprises on the territories of advanced development *IOP Conf. Series: Materials Science and Engineering* 537 042071
- [4] Kaplan R and Norton D 2007 Strategic maps. Transformation of intangible assets into tangible results *Moscow* 512

- [5] Friedag H R and Schmidt V 2011 Balanced scorecard Moscow 144
- [6] Volkov A I and Ptuskin A S 2013 Problems and prospects of business value management based on a balanced scorecard *Russian entrepreneurship* 14(24) 41-7
- [7] Kiselev A V 2012 Development and application of a balanced scorecard for construction enterprises *Russian entrepreneurship* **13(10)** 81-6
- [8] Mizikovsky I E 2015 Application of the model of the balanced scorecard Friedag-Schmidt Bulletin of the Nizhny Novgorod University named after N. I. Lobachevsky 1(37) 39-44
- [9] Milyaeva E S 2019 Advantages of integration of the balanced scorecard and the company's value management system
- [10] Ittner C D and Larcker D F 2003 Coming up short on nonfinancial performance measurement Harvard Business Review 81(11) 88–95
- [11] Norreklit H 2003 The balanced scorecard: What is the score? A rhetorical analysis of the balanced scorecard *Accounting, Organizations and Society* **28(6)** 591–619
- [12] Golod V V 2000 Problems of management of fuel and energy enterprises: the main trends in the oil business *Oil Industry*
- [13] Kail V V 2013 Problems of introduction of the balanced system of indicators at the Russian enterprises *Russian entrepreneurship* 14(1) 68-72
- [14] Karalkin M V 2011 Methods of strategic management of fuel and energy sector on the basis of balanced scorecard *Russian entrepreneurship* 12(5) 108-13
- [15] Malova I I 2010 Integration of the balanced scorecard into the in-house planning at the chemical enterprise *Moscow*
- [16] Molchanov A B 2010 Approaches to the assessment of innovative potential of the enterprise *Creative Economy* **4**(7) 3-8
- [17] Bukhonova S M 2009 Assessment and management of sustainable development of enterprises Saint Petersburg 202
- [18] Baranov I N 2004 Evaluation of organizations: the approach of R. Kaplan and D. Norton *Russian journal of management* **3** 63-70
- [19] Kaplan R S and Norton D P 2004 Measuring the strategic readiness of intangible assets Harvard Business Review 82(2) 52–63
- [20] Turenko B G 2006 Formation of personnel managers and management specialists abstract Irkutsk 38
- [21] Ogloblin V A 2015 Aapproach to the classification of the processes of human resource management from the point of view of increase of competitiveness of the organization *Intern. Scie. and Pract. Conf. in Kazan* 200-3
- [22] Sokolova L G and Ogloblin V A 2016 Evaluation of the results of personnel management in the onditions of functioning of the personnel management system *Baikal Research Journal* **7(3)**
- [23] Ogloblin V A 2017 Algorithm of formation of complex function of personnel management Management of Economic Systems 4
- [24] Ogloblin V A 2017 Organizational approach to the formation of complex functions of personnel management Scientific dialogue: Economics and management VI Intern. Scie. and Pract. Conf. 60
- [25] Ogloblin V A 2015 Prospects of development of corporate General centers of service of personnel accounting and office work *Intern. Scie. and Pract. Conf. Ekaterinburg* 98-101