BALANCED SCORECARD FOR REPAIR SHIPYARDS

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ABSTRACT

To achieve success in the production sphere, any business entity must be able to quickly adapt to changing market conditions. Its financial and economic activities largely depend on speed of obtaining information, besides financial data, about factors influencing the results of both the daily work of the enterprise and achievement of long-term strategic goals. One of the effective methods of implementing the strategy in a form that is acceptable for a competitive environment is Balanced Score Card (BSC).

The article substantiates the need for its implementation in the practice of Russian repair shipyards, proposes a method for determining key performance indicators considering the customer focused business processes, targeted labour motivation and corporate psychology of personnel.

The suggested model was adapted to the practices of an enterprise, model KPI were proposed and discussed.

Keywords: shipbuilding industry, economy, balanced scorecard, key performance indicators, strategic goals, finance, business processes, customers, personnel, employees.

Background. *Shipbuilding is one of the most significant industrial sectors in the economy of St. Petersburg. The activities of shipbuilding and related enterprises might greatly influence the indexes of social and economic development of the region. The industry's potential in the city is unique and includes 43 enterprises, including 8 in the category «shipbuilding and ship repair», with a total employment of more than 42 thousand people, which is about 20 % of persons employed in the manufacturing industries of the northern Russian capital. The volume of products produced at shipbuilding enterprises of the city, attains about 4 % of the gross regional product, comprises up to 90 % of the local sectoral scientific capacity [1, p. 226].*

The priority importance of the shipbuilding industry is emphasized in all economic reports of the government structures of St. Petersburg and Leningrad region. Taking this into account, enterprises and organizations that ensure competitiveness of the region and are responsible for its socio-economic development deserve particular attention.

Objective. *The objective of the author is to overview and consider different aspects of implementation of Balanced Scorecard for ship repair enterprises.*

Methods. *The author uses general scientific methods, comparative analysis, economic evaluation, statistical method, statistical control, dynamical system modeling, specific BSC and KPI tools.*

Results.

BSC method: not only finance

The development of the concept of a balanced scorecard (BSC or Balanced Scorecard method), which is considered in the article, was due to the following main reasons:

- *the need to simplify and speed up the planning process;*
- *the need to fully apply the developed strategies;*
- *dissatisfaction of the management of organizations with indicator systems based on the use of financial information only;*
- *dissatisfaction of the management of organizations with the system of intra-company reporting, which is often too extensive and not tied to the accepted management scheme;*
- *the need to improve the reporting provided to the founders and potential investors of organizations by including non-financial indicators in it to confirm financial stability;*
- *the need to establish a process for coordinating the goals of the organization, structural units and individual employees;*
- *the importance of creating conditions for an earlier identification of risks [2, p. 2].*

In the 90s of the last century, American researchers Robert Kaplan and David Norton proposed their concept of a balanced scorecard. Their goal was a comprehensive assessment of an enterprise's activities, taking into account the analysis of strategic orientations and operational indicators. The scientists have published conclusions confirming the hypothesis that the most important problem in managing the activities of an organization is its focus on financial indicators without taking into account the adopted strategy. In 1990, about 50 % of the 200 largest US companies surveyed by them evaluated production activities only with the help of financial indicators [3, p. 70]. According to R. Kaplan and D. Norton, the strategy of the organization should be formed taking into account the following factors:

1. Choice of the market that the organization plans to serve.

2. Choice of the customer.

3. Highlighting key business processes required to meet customer needs.

4. Definition of individual and organizational abilities that are required to achieve goals in these areas [4, p. 67].

The meaning of the balance of the system of indicators is interrelation of operational objectives with the strategic goals of the enterprise. In addition, the internal factors of the organization's activities, such as business processes and personnel, must be balanced by external factors, for example, studying consumer preferences and competitor analysis. At the same time, target indicators (strategic goals) should be based on the available resources, that is, the internal factors of the organization and the results achieved. Also, the developed system of balanced indicators should include not only objective assessments, reasonable quantitative results of the financial and economic activities of the organization, but also qualitative indicators, which are determined by subjective evaluation.

For all subsystems of the company, as a rule, 20–25 indicators are assigned in accordance with the strategy. However, if the balanced scorecard would have been reduced only to calculation of these positions, it should never be so widespread. The main condition for its use in corporate governance is the causal relationship of indicators. This is the main

Table 1

Selection of indicators based on expert assessment of points

Indicators	Relationship with strategy	Quantitative expression	Availability of information	Balance of the system	Total points
Finance					
Indicator 1					
Indicator 2					
Indicator ...					
Indicator n					
Clients					
Indicator 1					
Indicator 2					
Indicator ...					
Indicator n					
Business processes					
Indicator 1					
Indicator 2					
Indicator ...					
Indicator n					
Personnel					
Indicator 1					
Indicator 2					
Indicator ...					
Indicator n					
Total assessment of indicators					

problem of developing a balanced system for the enterprise.

As a result, interrelation of indicators may look like this: an organization sets itself a goal of obtaining a certain financial result, but in order to obtain it, it must adjust business processes that are consumers' focused. In turn, this requires certain skills and competencies of employees.

The transition from analyzing the results of an enterprise's activity to integrated corporate governance, not only on the basis of reporting, but also on analyzing the environmental indicators, is the main merit of American scientists in the field of research on the Balanced Score Card method. It is advisable to use the system proposed by them for forecasting the activity of an enterprise and justifying management decisions.

Previously, activity management systems focused only on the internal environment, analyzing the company's financial indicators, and with the advent of the BSC method, external environmental factors are also analyzed, since the organization's strategy, a key element of the management system, depends on them. That is, we can state the fact of expanding the area of application of management accounting systems to analyze the results achieved by a company or an enterprise.

Having an idea of the BSC method, the balanced data system can be defined as a set of indicators characterizing the activities of an organization, taking into account the chosen strategy and other factors.

The main goal of the system is development of measures that increase the competitiveness and financial stability of the company, and the timely diagnosis of risks affecting its activities. I would also like to note the complexity of the management system, which covers all the subsystems of the organization, not just financial.

To have an effective balanced scorecard, an organization needs to determine the criteria for its assessment. The criterion of efficiency of its development is the maximum information content of the created system in accordance with the tasks (number of strategies, divisions, number of indicators, qualitative and quantitative characteristics) and the minimum resources spent on its development and maintenance.

When selecting BSC indicators it is advisable to comply with certain conditions:

- *indicators should be considered in dynamics;*
- *they should not duplicate each other;*
- *it is necessary to take into account the features of the organisation, developed because of its belonging to a certain sector of the economy;*
- *they should reflect the main risks of the activity;*
- *the indicators used offer a link to the organization's strategies;*
- *in the aggregate, the system is designed to display an assessment of effectiveness of the organization's subsystems (human capital, finance, production, marketing, and management).*

Since the purpose of BSC method is to diagnose risks in a timely manner, system indicators must take into account key factors affecting the company's operations. They are called «key performance indicators of the organization» or «key performance indicators (KPI)».

Key indicators are usually determined on the basis of an analysis of the organization's activities, for example, financial analysis and SWOT analysis.

Strategy and problems

In the conditions of reforming the country's economy, focused on creation of knowledge-intensive

industries, which are designed to ensure its competitiveness, while simultaneously renewing key industries, continuous improvement of corporate governance becomes the primary task of enterprises and organizations [5, p. 45].

For shipbuilding and ship repair enterprises, the BSC method is especially relevant due to the industry specific features of the business and the insufficient attention of management to the need to combine the methods of strategic and operational management:

- *capital intensity of projects;*
- *scope of activities (complexity of the organizational structure, number of works and services);*
- *lag in competitive advantages from world leaders;*
- *constant changes in the external environment that have a significant impact on functioning of enterprises;*
- *development of market conditions of operation, to which enterprises are not always ready;*
- *dependence on government support and legislation base;*
- *specificity of production and financial subsystems in the presence of a long operating cycle;*
- *direct dependence on industry and related enterprises (orders, components);*
- *strategic orientation of the enterprises in view of the importance of the industry in GNP and GDP;*
- *risks of increase in losses of ship repair enterprises.*

Balanced Scorecard will help ship repair companies to mitigate crisis conditions. On its basis, the management of enterprises will be able to establish targets that will be oriented towards achievement of a strategy that has been developed. Such indicators should be established both for structural divisions and for employees, which will allow to control all aspects of the activity of the ship-repair enterprise.

The BSC method covers four functional areas of activity of any enterprise: finance, clients and internal business processes, personnel [6, p. 101]. The indicators of all subsystems of the enterprise are balanced by giving each indicator a certain weight in order to reflect its contribution to achievement of the strategy goals, as well as by analyzing the actions of structural units and individual employees.

The KPI system in most cases is interconnected with the employee motivation system, in accordance with which employees receive material rewards when they achieve specific indicators.

There are many modern methods that develop a modified version of the BSC method, using alternative classifications of functional areas and their indicators. But they all have a common feature – the KPI system should be determined based on the objectives of the organization's strategic planning.

Assessing the effectiveness of the KPI system gives you the opportunity to understand how the implemented actions contribute to the strategic goals.

The KPI system involves several stages of development of balanced indicators:

1. Defining the mission, strategic goals, operational objectives and values of the company.

2. Identification of indicators based on goals and objectives.

3. Breaking up the strategic goals of the company to the level of operational tasks of the divisions, the choice of key indicators.

4. Analysis of indicators for compliance with the criteria.

5. Definition of control values of indicators.

6. Checking BSC for compliance with the strategic goals and capacity of the company.

After analyzing the activities of the enterprise, the main correlating factors are identified, a list of them is proposed by the BSC subsystems (finance, clients, business processes, personnel), a quantitative scale for evaluating each indicator characterizing the results of factorial impact is established.

The enterprise chooses performance criteria independently, depending on the objectives – for example, a connection with the strategy, a quantitative expression of assessment, availability of information, a balanced system.

The criterion «relationship with strategy» is consistency of the strategic goal of attitudes and actions of the management system.

Quantitative expression indicates the possibility of obtaining a numerical value in the analysis of data. And the need to remember that any information can be normalized.

«Availability of information» means its collection with the least amount of time, human and other resources, without significant restrictions in the mode of use.

«Balance of the system» is a priority condition in selection of indicators, since it is important to trace their causal relationships with the subsystems of the enterprise under consideration. The more the indicator affects the subsystems, the more points it will receive by this criterion (Table 1) [7, p. 78].

The assignment of points depends on availability of information, for example, the indicator «revenue growth index» can be assigned 8 points, since the revenue indicator is given in the financial results report, but not 10 points, since the indicator requires calculations.

Based on expert assessments of all survey participants, averaged values are displayed, which are filled in the final table. Thus, each indicator of the organization's subsystem (along the vertical) can be scored according to the criteria presented (horizontally).

KPI target values

The list of indicators of the system should be periodically reviewed depending on changes in the strategy of the enterprise, for which it is necessary to constantly analyze environmental factors. It is advisable to make adjustments to the system after a year, since most of the indicators are diagnosed during this particular period. The balanced scorecard is aimed at achieving long-term results, so it's worth assessing its effectiveness in a few years to see all the data over time. KPI can be partially changed when changing goals that depend on environmental conditions, that is, it can be changed situationally.

After that, for each indicator, the resulting target value is displayed (Table 2).

Target values of indicators are determined on the basis of indicators of competitors, regulations and indicators of management accounting. These values, as a rule, are set by the planning and financial service, which controls the BSC system of the enterprise.

Update frequency shows the period of analysis of the result obtained and the possible revision of the indicator: daily, weekly, monthly, quarterly, annually.

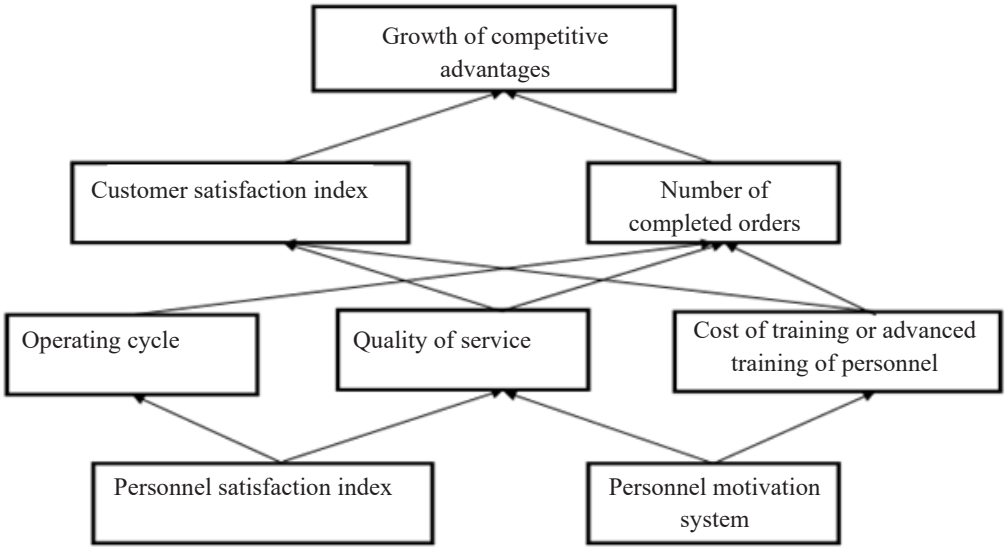
The degree of reliability of indicators is determined through three evaluation options: high, medium and low. The level can be set on the basis of the questionnaire of interviewed experts, if there is such a criterion as availability of information.

When the obtained values for degree of reliability have low expert assessment, it is necessary to pay

Table 2

An example of determining the resulting characteristics of each indicator by the enterprise's strategic subsystems

Subsystem	Indicator	Target value	Update frequency	Degree of reliability	Possibility of calculation
Finance	Indicator 1				
	Indicator 2				
	Indicator ...				
	Indicator n				
Clients	Indicator 1				
	Indicator 2				
	Indicator ...				
	Indicator n				
Business processes	Indicator 1				
	Indicator 2				
	Indicator ...				
	Indicator n				
Personnel	Indicator 1				
	Indicator 2				
	Indicator ...				
	Indicator n				



Pic. 1. Part of the BSC strategic map for Kanonersky Ship Repair Plant.

special attention to them and propose measures to increase the value of the indicator for management analysis of the company.

The criterion «possibility of calculation» is assessed in terms of the likelihood and conditions of the given action, «yes» or «no» is written.

The strategic stage of development of BSC ends with establishment of a target value, that is, an indicator evaluation parameter.

Using the example of a field study of data of CJSC Kanonersky Repair Shipyard, table 3 was compiled. The balanced scorecard system was developed taking into account the following strategic goal: increasing competitive advantages through to the growth of orders for all types of ship repair and other services, while ensuring maximum utilization of production assets [8].

The choice of key performance indicators of the enterprise takes into account main risks identified in SWOT-analysis: decrease in the volume of orders, a decrease in qualifications of the workforce and a high turnover of personnel, an increase in duration of the operating cycle, the lack of effective methods of managing costs and capital.

The emphasis in the field of financial indicators is proposed to be made on the dynamics of their change,

Table 3

KPI target values at Kanonersky Repair Shipyard

Indicators	Target value	Update frequency	Degree of reliability	Possibility of calculation
Subsystem «Finance»				
Revenue growth index	more than unit	Year	High	yes
Growth rate of cost of sales	less than unit	Year	High	yes
Net profit growth index per employee	more than unit	Year	High	yes
Index of growth in efficiency of the enterprise	more than unit	Year	High	yes
Ratio of own and borrowed funds (financial leverage)	Up to 3; annually reduce by 0,1, in the perspective up to 2	Year	High	yes
Return on equity (an indicator is extremely important for owners)	not less than 10 %	Quarter	High	yes
Subsystem «Customers (clients)»				
Market share by product and geographical segments	not less than 30 % by region, not less than 1 % by country	Year	Low	yes
Number of orders	increase by 10 %	Month	High	yes
Customer satisfaction index	not lower than the current level	Week	Average	yes
Subsystem «Business processes»				
Duration of the production cycle	not more than 80 days	Quarter	High	yes
Financial cycle duration	not more than 20 days	Quarter	High	yes
Operating cycle duration	not more than 80 days	Quarter	High	yes
Subsystem «Personnel»				
Personnel satisfaction index	more than 1	Quarter	Average	yes
Personnel turnover	not more than 10 %	Month	High	yes
Expenses for training or advanced training	increase by 10 %	Year	High	yes

that is, it is proposed to use indices characterizing the ratio of actual indicators to basic ones (of the previous period).

Promising measures for «cannoners»

While summarizing research conclusions it is advisable for the management of Kanonersky Repair Shipyard to establish customer feedback in order to continuously monitor the quality of services provided, for this purpose it is advisable to monitor customer satisfaction with ship repairs according to the criteria of the «clients» subsystem.

Analysis of duration of production cycles allows to take into account the time factor, which is currently of paramount importance. Since the activity of the ship repair enterprise is diversified, business processes within it have different operating cycles. A feature of the ship repair industry is duration of any of them [9, p. 9]. The proposed indicators characterize the efficiency of the enterprise both in finance and in production processes.

Indicators of the «personnel» subsystem provide an assessment of its work and motivation for it. The driving force here is the personnel responsible for making management decisions and their implementation.

In analyzing the activities of the enterprise, it was found that motivation of the personnel is not sufficiently high (though it is the main task of «personnel» subsystem). This is due to lower wages than in the whole industry; young specialists' turnover; deficiency in on-job training.

From table 3 it can be seen that the indicator «market share by products and geographical segments» has a low degree of reliability; compensation measures are needed in accordance with the proposed methodology.

In the same way as in the above case, it is recommended to develop measures within each established indicator that will increase the effectiveness of achieving the target values. For each position time frame and budget should be determined.

In this vein, on the basis of the company's strategic goals and analysis of its activities, KPI system was developed for CJSC Kanonersky Repair Shipyard. There is a causal relationship between the indicators of the BSC subsystems, it can be seen on the presented part of the strategic map of the ship-repair enterprise (Pic. 1).

A fragment of the strategic map confirms the dependence of the development strategy of the ship-repair enterprise on the tasks of the lower level, on the results of personnel motivation. In turn, the effectiveness of the motivation system depends on its budget and development. The budget of the proposed measures is related to the financial results of the company, that depend on an increase in the number of orders, on the expansion of customers' base.

From a scientific point of view, the position of professor Yu. I. Rastova is of interest. She proposes to consider the system of balanced indicators of an industrial enterprise using dynamic system modeling. In this case, ship repair enterprises will be able to assess sensitivity of targets to changes in one or more parameters of the system, to establish controlled limits for KPI variation, to identify the causes of variation, to make rational management decisions. Statistical control in strategic management

solves the tasks of checking and measuring the possible consequences of an alternative solution by simulating processes of a stochastic nature, increasing reliability of dynamic system models and, as a result, improving an enterprise strategy [10, p. 89].

The use of BSC at repair shipyards will allow solving the following tasks:

• to ensure the unity of strategic objectives of management and employees;

• to establish good communication between the units;

• to develop the relationship between strategic goals of the company and current objectives;

• to allow an objective assessment of effectiveness of the enterprise and its contribution to the achievement of the strategic goals of individual departments and employees based on the analysis of established targets;

• to increase efficiency of staff motivation system development;

• to provide a full factor analysis of the results of activities [11, p. 79; 12 p. 135].

It is assumed that competent implementation of the balanced scorecard system in the economic activity of CJSC Kanonersky Repair Shipyard will increase its efficiency, reduce the risks of owners and employees of the enterprise. The competent introduction means the use of modern software products and design methods for introduction of new technologies into the activities of the ship repair company, as this is an expensive solution for large businesses.

Conclusion. *From the point of view of developing a balanced scorecard system for a particular ship repair or shipbuilding enterprise, it is important to initially analyze its activities and identify the main risks. Then on the basis of identifieed risks it is possible to formulate the tasks for the subsystems of the enterprise so that they ensure achievement of the strategic goal, which currently must meet the market conditions of development of the industry. In accordance with the goals set by the enterprise subsystems, it is necessary to develop measures for their achievement and assessment indicators (KPI), as well as to set the criteria of optimality for each indicator. To check the consistency, it is recommended to use the BSC strategic maps method, which reflects the causal relationship between the proposed measures and the criteria for their evaluation with the objectives set for the subsystems and the strategic goal of the enterprise.*

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