

BENEFITS OF KPI IMPLEMENTATION IN METALLURGICAL ENTERPRISES

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Abstract

Modern metallurgical enterprises operate in conditions of strong competition. They must quickly respond to market opportunities. For this reason they need well-designed strategies to gain competitive advantage. Nowadays strategy is changed and up-dated very frequently. This leads to strong pressure for quickly strategy implementation and realization. Therefore metallurgical companies are looking for new solutions which help to introduce, constant monitor and control of regularly updated corporate strategy.

This paper proposes a comprehensive method of monitoring strategy realization through a well-designed set of Key Performance Indicators (KPI's). This solution is dedicated to metallurgical enterprises and pays particular attention to an overall assessment of the company, its strategy and future plans that help build competitive advantage. A concept of the main assumptions of the Performance Management (PM), the Balanced Scorecard (BSC) and a combination of strategic management with the implementation of operational management is presented.

The proposed solution tries to solve important problems related to the management of metallurgical enterprises. A significant importance is to quickly realize main strategic goals. The well-designed strategy reduces the risk associated with metallurgical activity. The proposed KPI's system helps to monitor and control strategy realization in metallurgical companies what allows time of strategy implementation in companies to be considerably shortened and its effectiveness to be increased. The KPI's system includes measures which can control the main areas of strategic goals in metallurgical enterprises.

Keywords: Key Performance Indicators, Performance Management, strategy, metallurgical sector

1. INTRODUCTION

Modern companies must quickly respond to market opportunities. They have to formulate business strategy much more often and implement it quickly. This leads to strong pressure for constant monitoring and introduction of new methods that allow quick evaluation of the effectiveness of a company and at the same time, frequent changes, quick deployment or regularly updated corporate strategy [1], [2].

Nowadays, a very significant challenge of Enterprise Management (EM) is the connection between strategic and operational management. Activities at the strategic level must be closely linked to performance management which is performed at the operational level to manage efficiency and effectiveness (see **Figure 1**) [3], [4].

Strong competition in the market and growing customer requirements have led to an increase in make-to-order manufacturing (MTO). This trend is also apparent in the metallurgical sector. Meeting customer needs associated with the development and production of small series of products according to customer orders is associated with problems with quick and precise planning, execution and performance of orders.

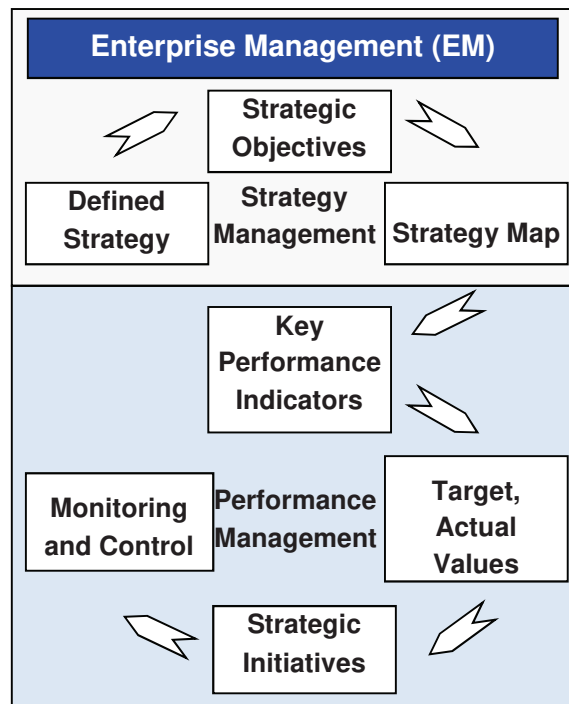


Figure 1 Connection strategic and operational management in new presented solution

Source: own work

This paper proposes a comprehensive method of monitoring strategy realization through a well-designed set of Key Performance Indicators (KPI's). This solution is dedicated to metallurgical enterprises and pays particular attention to an overall assessment of the company, its strategy and future plans that help build competitive advantage. A concept of the main assumptions of the Performance Management (PM), the Balanced Scorecard (BSC) and a combination of strategic management with the implementation of operational management is presented.

2. THE CONCEPT OF THE BALANCED SCORECARD - THEORETICAL BASIS

A paradigm of modern enterprise management is an aptly defined strategy. To gain a competitive advantage in the market and ensure the long-term development of the organization, modern companies must define strategic objectives much more widely - from different perspectives.

Traditionally used methods of assessment based solely or mainly on the financial aspects are already insufficient, because they are based only on historical data. This means that traditional methods do not take into account the future plans of the company, objectives and strategy, which are key to building competitive advantage today. Financial metrics must be extended to the many aspects that are difficult to measure the current enterprise effectiveness assessment (e.g. related to the relationship with customers, to building strategic skills, innovation of products, processes or services, etc.) [5].

The concept of the Balanced Scorecard (BSC) is one of the methods which is the answer to the above described needs of modern metallurgical enterprises. BSC is mainly a strategic system that serves to clarify the strategy and translate it into operational activities, which enables the measurement and control of the implementation of the strategy [6]. It is an innovative system which provides feedback on the effects measured in both financial and non-financial measures. The BSC concept aims to ensure that the measures of a single, integrated report are characterized by: a customer-oriented company, shortening the time of order, optimizing processes in the enterprise, improves product quality, increase business agility, improved adaptability and

long-term growth of the company [7]. The BSC suggests integration of the measurements regarding the past business performance with the measurements regarding the elements that will bring future performance [8], [9].

Various aspects of the company are measured in some different perspectives in the BSC method. There are four fundamental, most frequently used perspectives in the BSC concept, which are presented in **Figure 2**. These perspectives are connected with the basic needs of the contemporary enterprise, but can be extended by other ones which play a key role in enterprise such social perspective, environmental perspective, etc.

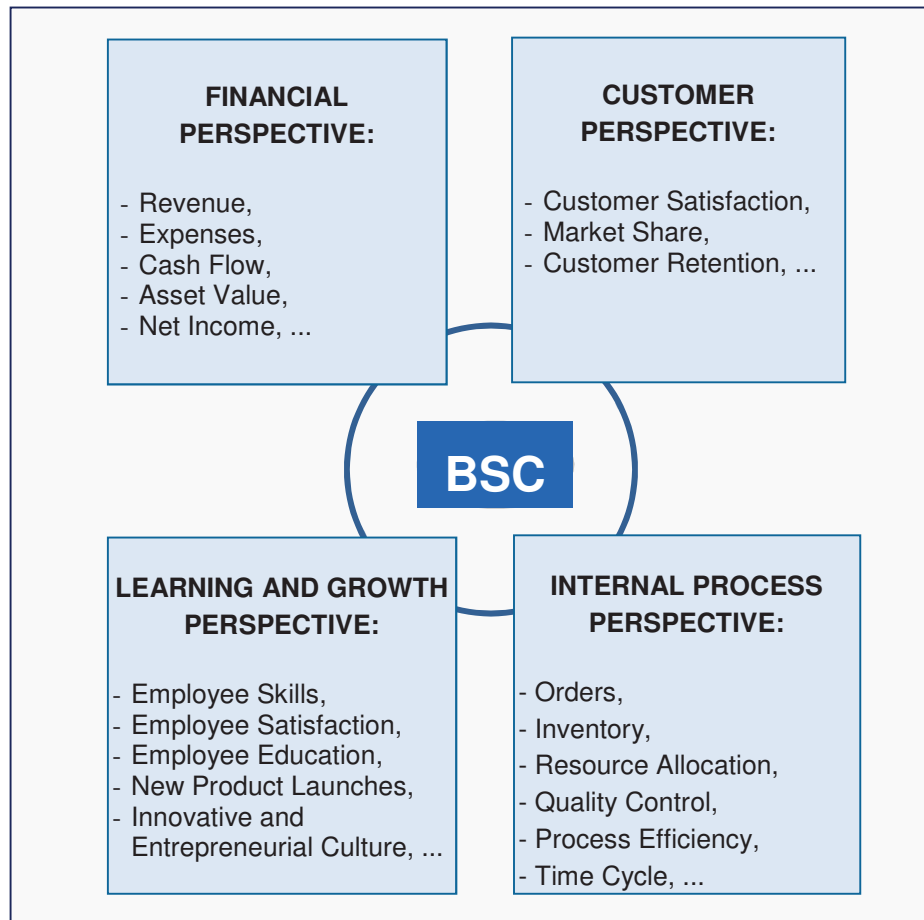


Figure 2 Basic perspectives in BSC [11]

A Balanced Scorecard typically contains between 16 and 28 different measures grouped into four-to-six categories. There are both financial (e.g. sales growth, debt ratios, etc.) and non-financial measures (e.g. customer satisfaction, cycle time, etc.) [10]. The experiences of BSC implementation in enterprises reported in literature shows that the number of strategic objectives should remain within the limits of 10-25 [11]. The analysis of a lot of measurements can be too time-consuming and leads to a lack of possibility to use it correctly [12].

3. KEY PERFORMANCE INDICATORS PROPOSITION

The main goal of the conducted research was to prepare the new method of strategy realization assessment in metallurgical enterprises. This challenge required to answer the following key questions:

(1) Which areas of metallurgical enterprises are significant enough to select them for the monitoring and control in strategy realization?

(2) How to measure the level of implementation and realization of the strategy?

In the paper a concept of a new method of the assessment of the level of strategy realization in metallurgical enterprises is proposed. This method includes the well-designed system of Key Performance Indicators which measure the main aspects of the strategy.

The system is dedicated to small and medium enterprises of the metallurgical sector which use make-to-order manufacturing. The concept of the KPI's system arose based on the long-term observation and analysis of data and results of surveys conducted in small and medium enterprises from central Europe in metallurgical sector. Surveys were conducted among metallurgical companies, which were selected on the basis of a meticulous verification. Metallurgical enterprises were divided into groups. For each group identified the most common priorities in determining strategy. The proposed solution is a pattern and in practice should be matched to the needs of a particular metallurgical enterprise. As a result, the survey research highlights the following five key areas which should be included in strategy of metallurgical enterprises and should be monitored in metallurgical sector have been selected: 1) energy saving; 2) customer satisfaction; 3) enterprise flexibility; 4) increased efficiency and 5) costs connected with ecological improvement (see more [13], [14]). The system of Key Performance Indicators for each area is presented in **Table 1-5**.

Table 1 The proposition of Key Performance Indicator system for metallurgical enterprises for the area of energy saving

Strategic objective	Key Performance Indicator
Reduction of energy consumption	KPI ₁ - electricity consumption
	KPI ₂ - fuel consumption
	KPI ₃ - gas consumption
	KPI ₄ - amount of expenditure for energy saving machines per unit of time
	KPI ₅ - amount of expenditure for energy saving solutions per unit of time

Source: own work

Table 2 The proposition of Key Performance Indicator system for metallurgical enterprise for the area of customer satisfaction

Strategic objective	Key Performance Indicator
Reduction of incompatibilities with customer requirements	KPI ₆ - percentage of products manufactured correctly due to customer requirements
	KPI ₇ - percentage of measured products
Shorten time of order realization	KPI ₈ - percentage of time of order preparation to manufacture and expectations
Improvement of reliable due date	KPI ₉ - percentage of orders with the same planned and actual due date
Improvement of reliable cost estimation	KPI ₁₀ - percentage of orders with the same planned and actual cost
Shorten duration of decision-making process	KPI ₁₁ - percentage of planning time of an order

Source: own work

Table 3 The proposition of Key Performance Indicator system for metallurgical enterprises for the area of enterprise flexibility

Strategic objective	Key Performance Indicator
Increasing the ability to change the order of the processes	KPI ₁₂ - percentage of orders for which an order can be changed
Increasing the flexibility of employees	KPI ₁₃ - percentage of employees who can operate more than one workstation

Source: own work

Table 4 The proposition of Key Performance Indicator system for metallurgical enterprises for the area of efficiency increasing

Strategic objective	Key Performance Indicator
Increase of efficiency	KPI ₁₄ - profitability of products
	KPI ₁₅ - efficiency of processes
	KPI ₁₆ - efficiency of employees
	KPI ₁₇ - efficiency of machines

Source: own work

Table 5 The proposition of Key Performance Indicator system for metallurgical enterprise for the area of costs connected with ecology reduction

Strategic objective	Key Performance Indicator
Shorten costs connected with ecology	KPI ₁₈ - cost of the introduction of gases or dust into the air
	KPI ₁₉ - cost of sewage into waters or land
	KPI ₂₀ - cost of waste storage
	KPI ₂₁ - amount of expenditure for machines and solutions which reduce gas emission per unit of time
	KPI ₂₂ - amount of expenditure for machines and solutions which reduce sewage per unit of time
	KPI ₂₃ - amount of expenditure for machines and solutions which use and/or reduce waste per unit of time

Source: own work

4. CONCLUSIONS

The proposed solution tries to solve important problems related to the management of make-to-order metallurgical enterprises. To achieve a competitive advantage, companies must change and up-date strategy very often. For this reason, of significant importance is to quickly realize main strategic goals. The well-designed strategy reduces the risk associated with metallurgical activity. The proposed Key Performance Indicators' system helps to monitor and control strategy realization in metallurgical companies what allows time of strategy implementation in companies to be considerably shortened and its effectiveness to be increased. The KPI's system includes measures which can control the main areas of strategic goals in metallurgical enterprises. There is a simple solution which gives an overall view of the significant areas for concern in business growth and development. The analysis of target and current values of KPI's allows quickly and constantly a strategy realization to be controlled and also is easy to understand for all employees of company.

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