

Investigation of factors determining costs of production

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Abstract:

Aim: This paper is devoted to a study of the company's external and internal factors determining the cost of production. The object of the study is a large industrial enterprise in Russia, Moskoks JSC. The aim of the paper is to analyse the existing cost accounting system of this company, in particular to identify weaknesses of the current system and to provide recommendations for its improvement.

Design/research methods: The paper presents classification of costs and cost accounting systems based on the literature study. Then, factors determining the costs of production are analysed within the case study of the cost accounting system based on cost-creating factors in the Moskoks JSC. This allows providing recommendations for such a system. The discussion of results sets them in the wider business context.

Conclusions/findings: The analysis of the cost accounting system in operation in the analysed company is performed on the basis of an analysis of cost-creating factors related to the internal company operations and external relations. This analysis revealed the drawbacks of the implemented cost accounting system and led to the formulation of the recommendations regarding the system of accounting and cost planning.

Originality/value of the paper: The proposed system based on differential cost accounting meets the need for accurate information about costs of resources necessary to manufacture specific types of products in the analysed company. This approach to cost management can be recommended for similar businesses.

Keywords: production costs, classification of costs, cost accounting system, the cost of resources
JEL: D24, L11, L23, L6, M11, N65, P23

1. Introduction

The cost of production is a monetary expression of the costs of production factors necessary for the enterprise to carry out production and commercial activities related to the production and sale of products and the provision of services. This cost incorporates all that the enterprise has to do to produce and sell products.

The cost value is one of the most important quality indicators of the enterprise, which characterizes the success of its work, the degree of use of production factors and resources and it is one of the most important criteria for assessing the efficiency of the production process. The indicators of the level and dynamics of cost are used to assess the rationality of the use of available industrial resources (Ejkova 2008).

The aim of the paper is to analyse the existing cost accounting system of the chosen company operating in Russia, in particular to identify weaknesses of the current system and to provide recommendations for its improvement.

In the following chapters the classification of production costs and cost management systems are presented. Then the case study of Moskoks JSC is described, followed by the results featuring the system of accounting and cost planning on the basis of an analysis of cost-creating factors.

2. Classifications of production costs and cost management systems

In management accounting, the classification of costs is determined based on the goals and objectives of management. During the personal contacts the managers of various types of companies very often express the concern that for the management, there is always insufficient data about costs in the organization as a whole. Therefore, the companies are applying

management accounting that allows them to extract information about the costs from the various data sources in the company and to further analyse them in various layouts and structures. Thus, providing information for financial planning of a company (Dubel 2001).

Generalized classification of enterprise costs for management accounting is presented in Table 1, based on Nikolaeva (1993).

Table 1. Classification of costs in management accounting

Classification features with regard to management functions	Cost Types
The process of making managerial decisions	Explicit and alternative; relevant and irrelevant; effective and inefficient
The forecasting process	Short-term and long-term
The planning process	Planned and non-planned
The normalization process	Standards, norms and standards, deviation from them
Organization process	In places and areas of origin, functions of activities and responsibility centres
Accounting Process	Single-element and complex; by costing and economic elements; constant and variable; basic and overhead; direct and indirect; current and one-time
Control Process	Controlled and uncontrolled
The process of regulation	Adjustable and unregulated
Incentive process	Mandatory and encouraging
Process of analysis	Actual; predictive; planned; estimated; standard; general and structural; complete and private

Source: Authors' own elaboration based on Nikolaeva 1993.

All existing accounting and costs systems are based on known classifications. In this way financial planning can be done efficiently, transparently and various external comparisons can be effectively conducted.

The existing cost classifications are the basis for making timely effective management decisions. However, in the conditions of a dynamically developing market economy, there is a need for the constant improvement of these classifications.

To date, in theory and practice of cost management worldwide, such methods and approaches to their management as absorption-costing, direct-costing, standard-bone, etc., have

been extended and developed (Efremova 2006). Classifications of the modern cost management systems are presented in Table 2.

Table 2. Modern cost management systems

Methods of management accounting related to costs		
In relation to business processes	By the degree of absorption of fixed costs	By the level of cost control
<ul style="list-style-type: none"> • Cost Centre Responsibility • Processor method • The Peripheral Method • Custom method 	<ul style="list-style-type: none"> • Absorption-costing • Direct-costing • Calculation of the reduced (production) cost price 	<ul style="list-style-type: none"> • Calculation of the actual cost price • Calculation of regulatory costs • Standard-costing
Integrated cost management systems		
Market-oriented systems	Cost methods	Management Methods for Life Cycle Stages
<ul style="list-style-type: none"> • Just in time • Target-costing • Kaizen Costing • Benchmarking • Total Quality Management 	<ul style="list-style-type: none"> • Strategic Cost Management • Functional and Cost Analysis 	<ul style="list-style-type: none"> • Life Cycle Costing • Activity Based Costing

Source: Authors' own elaboration based on Efremova 2006.

The listed methods are different with regard to their content and also they cover different aspects of cost management. A cost management system is essentially designed not only to accumulate information about the costs to determine their value, but also to obtain the necessary data to control the production costs, i.e. act as the main cost management tool. However, for the effective management of an enterprise, it is not sufficient to use only one method of cost accounting and management. For the purpose of successful development in a highly competitive market environment, it is necessary to build a cost accounting and management system that combines the attributes of the above methods.

3. The case study of Moskoks JSC

As an object of research, “Moscow coke-gas works” Joint Stock Company (Moskoks JSC) was selected, working in the field of coal processing to produce coke, the main fuel for the metallurgical industry. The production of 1 tone of coke consumed an average of 1,3 tone of the batch. The share of the raw material costs in the total cost of coke is about 90%. The main consumer of coke class called “large”, which particles are bigger than 25 mm is the ferrous metallurgy. This type of coke constitutes more than 80% of all coke produced. The “large” coke is also used in nonferrous metallurgy for the smelting of copper, lead and nickel. It is also utilized in the chemical industry as a reducing agent to obtain sodium sulfide, zinc oxide, carbon dioxide, dry ice. Moreover, it is desired for limestone burning and it is valued as high-energy and smokeless fuel by municipal and industrial consumers. The coke class called “average”, which particles’ size is between 5 and 25 mm, is used in the electro-thermal production to produce various ferro-alloys, calcium carbide, zinc, yellow phosphorus, etc. The “small” coke (up to 5 mm) is used as fuel¹.

The Moskoks JSC is one of the best enterprises in the Moscow region. It focuses its operations on established markets. One of the important geographical advantages of the plant is its proximity to sea ports.

The company produces coke, benzene and coal tar. Coke products are produced at four coke batteries. The company was established primarily to serve the Russian metallurgical industry and it was successfully implemented at the domestic and foreign markets, including near and far abroad. The total production capacity today is 1,1 million tons of “large” coke per year with a moisture content of 6%.²

The enterprise applies a cross-sectional semi-finished method of costs accounting and it is calculating the cost of production using elements of the regulatory method, which involves the systematic identification of deviations of actual costs from current rates (planned cost) and accounting for changes in these norms. This approach allows to control the cost of production, to analyze the causes of deviations from the norms and to identify the reserves needed for reducing

¹ Based on <http://www.mining-enc.ru/k/koks/> [9.09.2017].

² Based on <http://www.mechel.ru/sector/mining/mkz/> [9.09.2017].

the production costs. However, the current system does not allow to determine the exact cost of producing specific types of products.

4. Recommendations for the new cost accounting and management system

In the enterprise under study we propose to introduce the system of accounting and cost planning on the basis of an analysis of cost-creating factors. This system will be based on differential accounting of costs and will allow to meet the need for accurate information on the cost of resources necessary for the manufacturing of certain types of products, for the provision of services, customer service and trade channels.

Differential accounting is process-oriented, that is, it assumes that cost objects consume functions, not resources. All costs that can not be attributed directly to the product or service (indirect costs) are traced according to the functions with which the occurrence of these costs is due. The factor that causes the appearance of costs is called the cost carrier. Through the cost object, a cause-effect relationship is established and a quantitative relationship between the function, costs incurred, and cost objects. The cost object reflects the absorption of costs by functions that are in turn absorbed by other functions or types of products (services).

Consequently, in order to implement a comprehensive cost management mechanism, it is first of all necessary to investigate the cost-creating factors, the structure of which is largely determined by the industry specificity of the enterprise.

As the main cost-creating factors, we can distinguish the following:

- change in the volume of production,
- assortment,
- raw material consumption rates,
- the level of labour remuneration,
- the technical level of production, and so on.

The investigated factors can be classified according to various characteristics, which allows to more accurately assess the place and role of each factor in the formation of the magnitude of the performance indicators.

The most significant is the classification of cost-creating factors in terms of the degree of impact on the results of economic activity. So, factors can be divided into two categories: basic

(first order) and secondary (second order). The first order factors include categories that directly affect the performance indicator, whereas the second order factors consider the categories that determine the resultant indicator indirectly, with the help of the first-order factors. This classification allows to systematize the influence of factors in the hierarchical structure, to disclose in detail the interdependence of the basic factors with the secondary ones, thereby providing the opportunity to correlate the value of various elements of costs with the causes of their occurrence. This can be performed to the second and the subsequent levels of detail.

In order to increase the objectivity of calculating the cost of individual products obtained during coal coking, it is expedient to organize the cost accounting not as a whole in the coking process, but at its stages:

- loading and coking of the charge;
- extrusion, quenching and sorting of coke;
- evacuation of coke oven gas from coke ovens.

With this detail, a portion of the costs that appear to be indirect in relation to the process as a whole will be treated as direct in relation to a particular stage.

This allows the managers to take into account the different money-, labour- and energy-intensity of individual stages separately and not allow to include the cost of issuing, quenching and sorting coke to the cost of chemical products of coking.

That is, in order to improve the effectiveness of management decisions, it is necessary to introduce an accounting system that involves separate cost accounting, whereby mixed items of cost are broken down into elements that can be correlated with a specific production operation, which in turn will allow to study in detail the causes of costs at each stage of the production process, and hence it will be possible to correlate the cost with the factors that are determining them. This represents an information base for making decisions on expanding the range of products, increasing market share, refusing to produce unprofitable products, and so on.

Thus, the main proposal to increase the effectiveness of cost accounting in the enterprise is associated with the operational management of costs, the consideration and analysis of their current deviations, studying them from the process perspective.

The most complex issue of this approach is to develop a desired degree of detail for the analyzed cost elements. As an example, the details of the fuel costs are discussed. The first level of detail is related to the separation of the costs of fuel into a constant and a variable part. The

second level of detail concerning the variable part of the fuel costs is related to its adequate allocation based on the percentage of furnace load and the part associated with the supply mode. In this case, the time-consuming factor will be the operating time of the furnace in the particular mode.

To implement these activities, it is necessary to develop a scheme for estimating the cost-creating factors that would take into account their current changes, the reasons for these changes, and the ability to manage them.

5. Discussion of results

The literature on costs management systems, which are classified in Table 2, is vast. The indicated methods are studied within multiple case study applications in various sectors worldwide, thus adding to the continues improvement of the methods. The case study of the Moskoks JSC adds to this pool of research. However, most importantly the recommended system of accounting and cost planning based on cost-creating factors should be useful for the company. An interesting study regarding the effectiveness of the cost system design and management accounting practices was developed by Uyar and Kuzey (2016). They found out that cost system design alone does not impact firm performance. However, it affects performance via management accounting practices. In particular the study indicated that incurring high costs for the establishment of a functional cost system might be justifiable, on the condition that the firm will utilize the obtained cost data through various decision-making tools, because otherwise there is no point in bearing the cost of building such a system.

Some studies (Ponisciakova et al. 2015) argue also that a structured approach to cost accounting is very useful for investors and especially helpful when one wants to attract foreign investors, who are accustomed to receiving more detailed and structured in the particular way information about the companies and their performance indicators. Such information for investors is available for instance in the form of yearly financial statements, whereas managerial accounting reports are not distributed outside of the company, because these reports often contain confidential information (Majercak et al. 2013). Nevertheless they help managers to take better decisions, which impact the released and publically available financial statements.

6. Conclusions

In order to increase objectivity of the calculation of the cost of individual products produced during the coking of coal, appropriate organization of accounting of costs in the whole process of coking, and in stages, is necessary. This allows to take into account various factors of individual stages separately, such as labour and energy, and not to include costs results, suppression and sorting of coke to the cost of chemical products of coking.

That is, with the purpose of increase of efficiency of managerial decisions it is necessary to enter the accounting system, involving separate accounting of expenses, in which mixed articles are broken down into cost elements that can be correlated with the specific production operation, which in turn will allow to study in detail the causes of cost at each stage of the production process. Therefore it will be possible to relate the magnitude of costs to their defining factors. This constitutes the information base for decision-makers in the company. The decisions regarding expansion of the range of products, to increase market share or the abandonment of the production of unprofitable products, etc., can be better informed.

As a result, the basic proposal for improving the effectiveness of cost accounting in the enterprise is associated with operational cost management and includes tracking and analysing the current variations of the costs as well as studying them in the context of the performed processes.

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