

UDC 657:663.5
DOI 10.12737/1565

A METHODOLOGY FOR IMPLEMENTING A CURRENT COST MANAGEMENT SYSTEM AT PROCESSING COMPANIES OF THE DISTILLING INDUSTRY: THE CASE OF THE MARIINSK DISTILLING PLANT

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(Received August 01, 2013; Accepted in revised form August 20, 2013)

Abstract: Methods of controlling current costs in the processing industry are discussed. A description is given of cost and profit management techniques based on the concept of financial responsibility centers. An algorithm is provided to consistently develop financial responsibility centers, determine the scope of their competence, and thus achieve an effective functioning of the system. A method is described which is based on direct costing and is used to determine the financial safety margin of a processing company. The implementation of advanced direct costing in the context of financial responsibility centers allows one to analyze the structure of fixed and variable costs, marginal income, and profits for the whole company and, thus, improve the cost management and financial performance.

Keywords: current cost management, financial responsibility centers, direct costing.

INTRODUCTION

Important elements in the analysis of a company's activities and financial performance are (a) product cost analysis and (b) cost-effectiveness analysis in terms of identifying products with a low value of this indicator. There should be a methodology enabling a cost management system based on the analysis of the structure of fixed and variable costs and the marginal income, determination of responsibility centers, and development of indicators for each center. The methodology aims to identify responsibility centers and analyze and control costs for each center and, as a consequence, for the whole company.

SUBJECT AND METHODS OF RESEARCH

OOO Mariinskii Spirtovyi Kombinat (Mariinsk Distilling Plant; hereinafter referred to as the distilling plant), the largest company in the alcohol market of Kemerovo oblast, is the longest-standing enterprise in the industry in Siberia and the Far East. The plant was put into operation in 1937 and occupies a land plot of 38.1 ha.

In August 1993 the company was incorporated. The authorized share capital is 252 978 rubles; the controlling stake is owned by the state and is part of the federal state unitary enterprise FGUP Rosspirtprom.

The distilling plant is a diversified enterprise employing 830 people. The main products are ethyl alcohol, dried fodder yeast, food additive carbon dioxide, etc.

The company's first priority is the production and

supply of ethyl alcohol of the following varieties: highly refined, "Extra", "De Luxe", "Alpha", and "Denatured".

The production capacity of the distilling plant is 3 558 355 dal of alcohol, 9882 t of carbon dioxide, and 7875.1 t of fodder yeast per year.

The company was ranked first among the leading Russian alcohol producers in 2009 and 2010 in the rating of the National Alcohol Association of Russia.

The financial and economic activities of the distilling plant in the last three years include current, investment, and financial operations. The analysis is based on comparing the distilling plant with peer companies and leading businesses in the industry. It is complicated to conduct an objective analysis of business activities due to a high level of privacy and the lack of analytical information on the activities of the competitors.

The annual alcohol production capacity was used to 67.3% in 2008, 96.1% in 2009, and 100% in 2010. There is a tendency for the production of the main product – food-grade ethyl alcohol – to grow: 2 262 000 dal in 2008, 3 421 000 dal in 2009, and 4 607 000 dal in 2010.

In 2010 the shipping volume increased by 167.9% compared to 2008 and by 82.5 % compared to 2009 and was 2997 million rubles with the excise duty and VAT and 1394 million rubles without the excise duty and VAT [1].

The plant's production capacity is used to 96.1%. The costs of production and sales were 1361 million rubles in 2010 to exceed the 2009 level by 747 million

rubles.

The higher costs resulted from the increased production and higher prices for raw materials and services, which in turn leads to an increase in costs per unit of output.

RESULTS AND DISCUSSION

Business management issues arising from the operation of a company can be summarized in three groups:

- Implementation of cost management processes.
- Development of an effective product range policy.
- Managerial decision-making.

Addressing the first group of issues requires a large amount of time and data to implement the cost management processes. The data obtained from the analysis of this group of issues provide an information base to address the other tasks.

Cost management is necessarily a continuous process; therefore, the key to addressing the cost management issues is to tie costs to their place of origin, i.e., cost centers. The need to control costs and final financial results on the basis of estimated figures is dictated by the isolation of financial responsibility centers that are to be subordinate to the heads of structural subdivisions of the company.

Responsibility center management is one of the subsystems ensuring the in-house management. This subsystem helps evaluate the contribution of each unit to the final results of the company, decentralize the cost management system, and monitor the formation of costs at all levels of management. All this significantly increases the cost-effectiveness of management.

In the context of the distilling plant, the financial responsibility center is a main shop or a structural unit that is engaged in operations with the ultimate aim to optimize profits and is responsible to senior management for the implementation of the set objectives and keeping the costs within the established limits.

The aim of a management system based on financial responsibility centers is to increase the efficiency of management of company units by summarizing data on the costs and performance of each responsibility center so that a deviation can be attributed to a particular manager. The main principle of this type of management is that each responsibility center is only responsible for those costs and (or) revenues and, in a broader sense, only for those indicators that must and can be controlled by its managers during a certain period [2].

The distribution of revenues and expenses, as well as control over costs or financial performance only, between the company's structural units that are objects of managerial accounting ensures a correctly arranged financial structure, which would allow one to see how and where profits are generated, reported, and distributed and ensure the monitoring of expenses and revenues.

We propose a procedure to develop an effective management system based on financial responsibility centers at the distilling plant. The procedure is based on a stepwise implementation of the system. When forming

the financial responsibility centers, for the system to function effectively, we need to define the scope of competence and demarcate the areas of responsibility of the centers. This will help collect more reliable information about the company's revenues and expenses. Defining the main areas of economic activity, such as the company's organizational structure, is the first, decisive step in building a management system.

Studying the company's production activity to define technological accountability centers is a necessary step in collecting information on incurred costs. It includes the distribution of the main areas of economic activity by business unit and identification of auxiliary units that do not manufacture the key products. The analysis of the accountability of costs, revenues, profits, and investment by business unit and the identification of controllable items determine the borderline between financial responsibility centers and define their status.

An important step is to define the rules of interaction (including the list of reporting and planning documents and the range of indicators characterizing the performance and regulating the rights and responsibilities) between the various financial responsibility centers within the company and between individual centers and the senior management.

Setting a cost limit (with respect to material, financial, and labor costs) for the company for a specific output in each financial responsibility center is a key point in the company's cost management system. The final stage of any well-functioning system should be a motivation system focused on compliance with the approved cost limit to establish a direct dependence between spending, performance, and the outcome.

Table 1 presents a classification of financial responsibility centers by a number of criteria.

Table 1. Classification of financial responsibility centers

Classification criteria	Types of responsibility centers
In-house management objectives	Operational / Strategic
Management level	Company / Company departments and services / Individual business units/ Workshop / Team
Scope of competence and responsibilities	Cost centers Revenue centers Profit centers Investment centers Management and control centers
Tasks and functions of the center	Primary / Auxiliary
Degree of resemblance to the place of origin of costs	Resembling / Nonresembling
Place in the responsibility center hierarchy	One-type horizontal / Many-type horizontal / Pyramidal
Relations with the in-house management system	Analytical / Self-supporting

Financial responsibility centers are accountable for the costs and results that are directly dependent on their scope of competence. The centers' activities should be reflected and presented in the accounts by means of double-entry to ensure the comparability of costs and results for each center.

Figure 1 shows a cost management procedure for a manufacturing company.

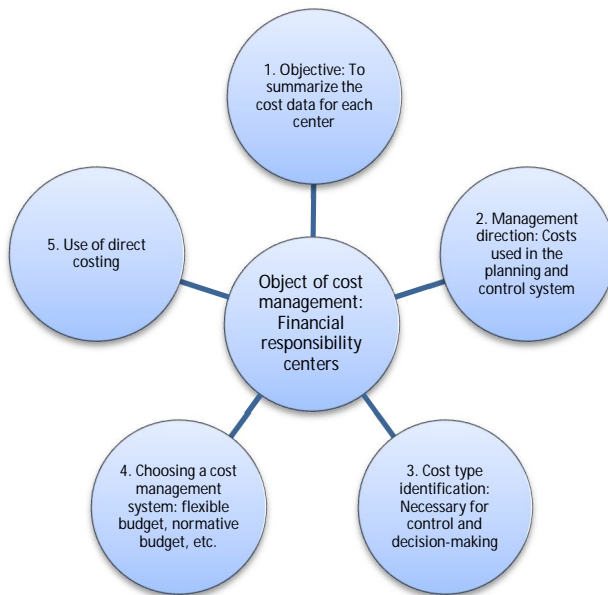


Fig. 1. Cost management procedure based on financial responsibility centers.

At the distilling plant, financial responsibility centers are identified on the basis of their tasks and functions:

(1) The main responsibility centers are involved in the direct manufacture of goods, performance of works, and provision of services to consumers. Their costs are included directly in the product costs. These centers comprise an alcohol shop, fodder yeast shop, enzyme shop, and carbon dioxide shop.

(2) The auxiliary responsibility centers exist to serve the main ones. Their costs are first spread over the main responsibility centers and then included (as part of the main centers' total costs) in the product costs.

An analysis of the existing financial responsibility centers at the distilling plant shows that they are singled out using the widespread criterion of the scope of competence and responsibility:

(1) Main and auxiliary shops, the foremen of which are responsible for costs only.

(2) The commercial service, which is responsible for the revenues from sales of products and services and for the cost of sales.

Currently, there are no profit-, investment-, or management/control-based responsibility centers at the distilling plant. As a result, it is impossible to evaluate the performance of these centers, and they bear no responsibility for the financial results of their activities.

The principle whereby individual costs are included in the product costs by means of distribution between product items may not allow for their monitoring and

control because the production cycle may consist of several different processing steps, with a specific person being responsible for each step. Therefore, the data on product costs is insufficient to determine exactly how costs are distributed between individual production units (responsibility centers). This problem is solved by tying costs and revenues to the actions of specific individuals who are responsible for spending the respective funds. This approach to cost management is only possible when cost planning is based on financial responsibility centers (FRCs).

The underlying idea of FRC-based cost management is the separation of competences, i.e., employees' responsibilities for costs and revenues.

FRC-based cost management aims at maintaining the cost allocation and marginal income determination scheme for each FRC. To this end, costs and sales revenues need to be accounted to the corresponding FRCs, and those costs that can be directly attributed to a given FRC should be accounted to this center without using indirect distribution methods. As a rule, a number of marginal incomes (full and partial) are specified in the course of variable and direct fixed cost accounting. In Table 2 we consider the determination of the full and partial marginal incomes, depending on whether variable and direct fixed costs are included in the product costs.

Table 2. Scheme for the inclusion of variable and direct fixed costs in the product costs and determination of full and partial marginal incomes for individual financial responsibility centers (FRCs) in advanced direct costing

Cost centers	Costs included in the product costs at each level	Marginal income
Team	Variable costs	Full
Shop	Variable costs plus specific direct fixed costs included in the product	Partial (1)
Individual production units (FRCs)	Variable costs plus specific direct fixed costs included in the product range	Partial (2)
Company	All costs	Profit

To illustrate the above, we discuss the organization of FRC-based cost management at the distilling plant as of May 2011 (Table 3). To this end, we single out three FRCs and determine the corresponding proportions of variable costs and the marginal income from variable costs in sales revenues.

The marginal loss of the main production processes is 3.046 million rubles, and the marginal loss of the FRCs is 4.367 million rubles. The development of a methodology for FRC-based cost management, classification of costs, and selection of planning and control methods for managerial decision-making is the key to the effective management of the company's profits.

Profit management through the organization of FRCs affects the functioning of in-house services and business units that ensure the development and implementation of managerial decisions on certain aspects of profit generation, distribution, and use and are responsible for the results of these decisions.

Table 3. Organization of cost management based on advanced direct costing at the distilling plant

Indicator	FRC total		Financial responsibility centers					
			Alcohol shop		Fodder yeast shop		Carbon dioxide shop	
	Total, thousand rubles	%	Total, thousand rubles	%	Total, thousand rubles	%	Total, thousand rubles	%
Sales revenues	102 100	100.00	92 100	100.00	8 500	100.00	1 500	100.00
Cost of basic materials, raw materials, and components	52 022.5		46 260		5 700		62.5	
Direct labor costs	1 317.5		720		490		107.5	
Fringe benefit expenses	354.1		208.8		142.1		3.1	
Cost of fuel and electric power	15 056		13 800		1 100		156	
Cost of maintenance and repair of machinery and equipment	1 291		1 050		207.9		33.1	
Total variable costs	70 041.3	68.60	62 039	67.36	7 640.0	89.88	362.2	24.15
Marginal income from variable costs	32 058.7	31.40	30 061	32.64	860.0	10.12	1 137.8	75.85
Direct fixed costs of main production processes	35 105	34.38	33 750	36.64	1 200	14.12	155	10.33
Marginal income of main production processes	-3 046.3	-2.98	-3 689	-4.00	-340.0	-4.00	982.8	65.52
Direct costs of FRCs	1 320.6	1.00		0.00		0.00		
Total fixed costs	36 425.6	35.68		0.00		0.00		
Marginal income of FRCs	-4 366.9	-4.28		0.00		0.00		

system and financial performance.

The reason for the application of FRC-based profit management technologies is that the company is interested in forecasting and achieving an optimal return, performance, and profitability both of FRCs and the enterprise as a whole.

It is recommended to identify the following stages in FRC-based profit management:

(1) Analysis of the functioning of business units and their impact on the generation and use of profit.

(2) Identification of the main types of FRCs among the company's business units.

(3) Development of a system of rights, responsibilities, and liabilities of the heads of the units identified as FRCs.

(4) Development of operating and capital budgets to communicate them to the FRCs.

(5) Monitoring of the FRCs' performance on their tasks through the analysis of reports to determine the causes of deviations.

The key points of profit management within a FRC are considered in Table 4.

The calculation of profit and breakeven point is preceded by an analysis of marginal income using advanced direct costing, which is conducted for each FRC.

Advanced direct costing allows one to infer about the profitability and sustainability of production and predict the changes in the company's revenues and profitability, depending on the volume of production and sales, prices, and variable and fixed costs. The implementation of this method in the context of FRCs allows one to analyze the structure of fixed and variable costs, marginal income, and profits for the whole company and, therefore, improve the cost management

Table 4. Features of the FRC-based profit management technology

Feature	Content
Profit management objective	Ensuring profit maximization in the current and future periods
Methodological tools of profit management	Marginal analysis based on advanced direct costing Marginal income Relative income Production leverage Breakeven point Financial safety zone
Development of a flexible budget	Provision of forecast data for different output levels within activities
Control and analysis of deviations	For materials For labor For overheads For gross profit

Table 5 presents the estimates of economic indicators made by direct costing, which help determine the breakeven point in volume and value terms, the level of sustainability, and the financial performance of FRCs.

The analysis of deviations is aimed at comparing the total actual costs to the total normative costs for each operation of a FRC for a period in order to control costs. The deviations for each FRC are determined for each element and must be analyzed in accordance with the prices and resource amounts. The results are used to develop an optimal production program taking into account the features of the industry.

Table 5. System of economic indicators used in advanced direct costing at the distilling plant

Indicators	Formula	FRC	Financial responsibility centers		
			Alcohol shop	Fodder yeast shop	Carbon dioxide shop
Revenues (R), thousand rubles		102 100	92 100	8 500	1 500
Variable costs (VC), thousand rubles		70 041.3	62 038.8	7 640.0	362.5
Marginal income (MI), thousand rubles	$MI=R-VC$	32 058.7	30 061.2	860.0	1 137.5
Relative income (RI), %	$RI = MI/R \times 100$	31.40	32.64	10.12	75.83
Fixed costs (FC), thousand rubles		36 425.6	33 750.0	1 200.0	0
Profit per shop (P), thousand rubles	$P = MI-FC$	-4 366.9	-3 688.8	-340.0	982.5
Leverage (L)	$L = MI / P$	-7.34	-8.15	-2.53	1.16
Sustainability level (SL)	$SL =FC / MI$	1.14	1.12	1.40	0.14
Breakeven point (BEP), thousand rubles	$BEP =FC / RI$	1 160.0	1 034.0	118.6	2.0
Marginal income per unit (MI_{unit}), rubles	$MI_{unit} = MI / Output$		66.80	860.00	4 550.00
Breakeven point (BEP), units	$BEP = FC / MI_{unit}$		505 239.52	1 395.35	34.07

The development of an optimal production program is an essential part of cost management since this production plan determines the costs. If a company produces several types of products, it is important to pay attention to planning the product range.

The breakeven point depends on the size of the fixed and variable costs per unit of output, which suggests a reasonable selection of the best selling price and managerial decision.

The proposed key points of the cost management system used at processing companies of the distilling industry are based on the principles of advanced direct costing, a popular accounting method in the world. The main feature of this method is that direct fixed costs of production and sales are included, as well as variable costs, into the product costs [3].

An important advantage of the system is the possibility of a detailed and qualitative study of the relationship between the output, costs, and marginal

income and the profit as a result of economic activity.

The analysis of the relationship of the output, costs, and profits is the most important feature of advanced direct costing because one can analyze not only profit but also marginal income, the values of which are derived from those of revenues and expenses. Direct costing helps understand the relationship between the product price, output, direct costs per unit of output, total fixed costs, and mixed costs.

The analysis based on direct costing helps trace the relationship between such important characteristics as costs, output, and profit; it is a key factor in much of the decisions-making process, including on the determination of output and product range.

In Table 6 we consider the performance indicators of the distilling plant, which were calculated from the major indicators such as the output in physical terms and the costs grouped into fixed and variable costs by type of alcohol produced.

Table 6. Performance indicators of the distilling plant calculated by advanced direct costing

Calculated performance indicators	Alcohol			
	De Luxe	Raw	Highly refined	Total
Actual output, thousand dal (q)	100 000	300 000	50 000	450 000
Selling price per one dal, rubles (P)	260.00	180.00	242.00	205.00
Actual revenue, thousand rubles (Q)	26 000	54 000	12 100	92 100
Variable costs, thousand rubles (V)	14 386.4	40 459.2	7 193.2	62 038.8
Fixed costs, thousand rubles (Z)	7 500	22 500	3 750	33 750
Total costs, thousand rubles (F)	21 886.4	62 959.2	10 943.2	95 788.8
Marginal income, thousand rubles ($X = Q-V$)	11 613.6	13 540.8	4 906.8	30 061.2
Profit, thousand rubles (Q-F)	4 113.6	-8 959.2	1 156.8	-3 688.8

If the managers of the distilling plant made decisions within a management system based on total cost, the company would have to exclude all its products from the product range because the loss from alcohol production would be 3 688 800 rubles.

If we use advanced direct costing, the company would have only one unprofitable product – raw alcohol (the amount of loss is 8 959 200 rubles) and the other types of alcohol would have a positive financial result.

We now calculate the rate of variable costs per 1 dal alcohol produced by type and write equations for the total costs that include fixed costs, output in physical

terms, and the variable cost rate per unit of output by type (q is the output):

$$\text{De Luxe alcohol: } 7\,500\,000 + 143.86 q;$$

$$\text{raw alcohol: } 22\,500\,000 + 134.86 q;$$

$$\text{and highly refined alcohol: } 3\,750\,000 + 143.86 q.$$

These formulas are used to calculate the breakeven points for each type of alcohol, which will allow us to evaluate the financial safety margin for each product type and for all the products taken together

The critical (threshold) volume of sales of De Luxe alcohol is:

$$Q_{cr \text{ De Luxe}} = (7\,500\,000 \times 26\,000\,000) / 11\,613\,600 =$$

1 679 0659.2 rubles.

The critical volume of production of the said type of alcohol ($q_{cr De Luxe}$) is:

$$q_{cr De Luxe} = 16\,790\,659.2 / 260 = 64\,579.5 \text{ dal.}$$

Similar calculations for the other types of alcohol are given in Table 7.

Table 7. Threshold revenues, threshold volume of sales, and financial safety margin of alcohol production

Product type	Financial sustainability indicators		
	Threshold revenues, rubles	Threshold volume of sales, thousand dal	Financial safety margin, rubles
De Luxe alcohol	16 790 659.2	64 579.5	9 209 340.8
Raw alcohol	89 728 819.6	498 493.4	-35 728 819.6
Highly refined alcohol	9 247 371.0	38 212.3	2 852 629.0

Not all of the above types of alcohol have sufficiently high profit margins and improve the company's financial sustainability. Thus, it would be recommended to exclude raw alcohol from the company's production plan, or the sales department should consider increasing its selling price.

The total financial safety margin for the three types of alcohol is: $9\,209\,340.8 + (-35\,728\,819.6) + 2\,852\,629.0 = -23\,666\,849.8$ rubles.

Effective organization of cost management bears a considerable potential to improve the company's financial sustainability. Isolating individual elements of variable and fixed costs in the total cost can help identify the key areas to reduce the costs [4].

We believe that the division of the company into self-standing cost centers brings the following benefits:

(1) Collecting high-quality real information on product costs.

(2) Collecting real data to draw the company's budget.

(3) Evaluating the activities of each cost center from in terms of efficiency and in connection to specific processes and individuals who are in charge of these centers.

In our view, a cost management system based on the organization of cost centers allows one to implement the following principles:

– Knowledge: at what cost center (responsibility center) and in what amounts the company's resources are spent.

– Prediction: at what cost center and in what amounts additional funding may be required given a change in the sales forecast.

– Competence: to ensure the maximum return on the use of all types of resources.

The use of the proposed method, i.e., FRC-based cost management, as well as advanced direct costing based on the system of marginal income, allows one to collect detailed information about the costs and revenues for each responsibility center. Moreover, the analysis helps identify the areas where deviations occur most frequently and the types of products with low profit margins. The core of this approach is the analysis of the structure of fixed and variable costs, marginal income, and profit for the whole company. In turn, the forecasting of performance and profitability in response to changes in the output, product prices, and variable or fixed costs makes it possible to strengthen the financial condition of the company, take more effective business development decisions, and improve the production processes of Russian companies [5].

To ensure the controllability of costs, it is highly important to attribute (in planning and accounting) to individual centers only the costs that are largely under control of the head of the corresponding responsibility center.

If the management of the distilling plant used the total-cost system in their decision-making, all the company's products should be excluded from the product range as unprofitable. However, the use of advanced direct costing leads us to conclude that there is only one loss-making product.

Therefore, the results of our study, which is based on the case of a processing plant of the distilling industry, suggest the need to improve the system of current cost management. All the processes taking place in the company should be evaluated in terms of the costs associated with them.

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