Dashboard, Tool for Monitoring and Measuring the Performances of Entities within Mining Extractive

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Abstract: - This article aims to emphasis the importance of dashboard in monitoring and measuring the performances of entities within mining extractive industry of Romania. Having regard to the stage of the researches carried out in the specialty literature regarding the implementation of ABC method to the peculiarity of entities within mining extractive industry and up to the achievements made at present by various professionals, the authors of this article demonstrate the utility of dashboard in monitoring and measuring the performances of mining entities of Romania and of making decisions based on information provided by it. The main tool underlying the elaboration of dashboard was presented, namely the results account as accounting synthesis document of managerial accounting. The article ends with the conclusions of authors with a view to advantages and importance of using the dashboard of ABC method within the entities of mining extractive industry of Romania.

Key words: - Activity-Based Costing, dashboard, performances, results account, mining industry

1 Introduction

Given the present conditions of business environment, a manager must have on hand all information necessary for making an efficient decision regarding the current events and with future implications on the company that it runs. Under such conditions, the information must be collected, processed, analyzed and supplied to the end user, the manager, within a very short period of time. One of the most used tools is the dashboard. This represents a basic component of the synthesis documents of managerial accounting, together with other important instruments as: balanced dashboard, cost–volume–profit analysis etc. No set of original accounting synthesis documents which point out the internal financial statement are recorded among the Romanian entities which apply the managerial accounting. Due to this reason the main purpose of our article is to show the importance of using the dashboard as an accounting synthesis document in making decisions and measuring the performances of entities within mining industry. Our attempt is pointed out by application of principles specific to the dashboard's drawing up within entities of mining industry of Romania which apply the Activity-Based Costing method. Whereas no

consensus regarding the use of some documents considered as „synthesis documents" was reached in the international specialty literature, our objective consists of elaboration of this document for pointing out the performances designed in order to help to the creation of an overview with regard to making some concrete and relevant decisions by managers. By comparison to the synthesis documents of the financial accounting composed of: balance sheet, results account and related notes and which are intended for external users like: state, shareholders, partners, other third parties etc., the synthesis documents specific to the management accounting are intended only for the internal users (top management, department managers). Irrespective of the form that an accounting synthesis document of management accounting may take, this will always have a secret character which is not intended for accessing by the external users of entity.

2 Specialty literature

Following the researches performed by many professionals and professors within the managerial accounting field, in the domestic and international literature four patterns of results accounts were identified.

The first pattern of results account accepted especially by monism accounting practitioners is the *functional-type results account*. In the financial accounting, the classification of expenditures is carried out in relation with the entity's functions according to the structural organization and its managerial accounting. Due to the territorial independence, erroneous decisions can be made which lead to the decrease of overall level of an enterprise's profitability [6]. The second pattern is the *list-type results account* which is used by dualism accounting practitioners. The advantage of this model consists in the „added value" defined in terms of the two success key factors: the market and the customer. Judging by the accounts, the managerial accounting can be organized in two ways: either by integrated organization with the use of some distinct analytical methods of financial accounting, or by the dissociated organization with the use of accounts [7].The third pattern, *the partial-type results account* consists in separation of entity's variable and fixed expenditures; it facilitates the easy determination of specific indicators (balance point, cover factor), being an extremely useful instrument in decision-making by the entity's management, especially on short term. The forth pattern is the *activity-based results account* which corresponds mostly to the ABC method requirements, related to transversality and processes structuring in activities [13]. This pattern follows the logic for determination of activity-based results, starting with the resources consumed per activities.

Within the performance management field as well as in the dashboard's creation, implementation and development field, a very important contribution was brought by the worldwide well-known professionals like: Gary Cokins [4], Robert S. Kaplan, David P. Norton [9], Douglas T. Hicks [8], Ravignon and its team [13] as well as many other university professors. Over the years, the dashboard was extended and developed in order to meet the requirements of the end users, managers. Irrespective of its presentation form (chart, table, modular), the dashboard is one of the most useful tools that a manager has on hand in order to make correctly-substantiated and reliable decisions.

3 Research methodology

By reference to the researches performed by the professionals within the managerial accounting field regarding the elaboration of dashboard, we aimed to draw up a dashboard specific to the entities within mining industry of Romania based on the information provided by ABC method. Consequently we tried to find answers to the following questions: (1) *Is the results account the main information provider for drawing up the dashboard of entities within mining industry?* (2) *Is the information included in the results account and in the dashboard relevant for the entities` management within mining industry and for complex managerial decision-making?*

The research design is focused on the theoretical and practical approach of the implications determined by the development in the issues described by means of questions raised. For the relevance of the study, questionnaires were used, and two major categories of respondents to the questions raised were taken into account. The first category is composed of professionals within the managerial accounting field (management accountants) and company managers (heads of departments, heads of top management). The study sample was elaborated on 307 persons within 2 companies of mining extractive industry of Romania, according to the categories mentioned below (table 1). Following the collection of questionnaires and carrying out the data consolidation, the situation was as follows:

Table 1. Situation of respondent categories

Questions	Respondent category			
	Professionals		Company managers	
	For	Against	For	Against
(1)	272	26	7	2
(2)	245	53	6	3

As can be seen, 272 professionals (88.60%) and 7 companies` managers (77.77%) consider that the results account is the main provider of information for the dashboard and 281 professionals (82.21%) and 6 companies` managers (66.67%) agree with the fact that the information contained in the results account and in the dashboard are relevant for the companies` management and for making well substantiated decisions.

4 Tools for monitoring and measuring the performances of entities within mining industry

4.1. Results account of ABC method, main source of information for dashboard

The activity-based results account (ABC) represents that synthesis document of managerial accounting which allows the viewing of gains and /or losses that best matches the requirements of ABC method, related to transversality and processes structuring in activities [5]. For correct determination of expenditures which can be found in the activity-based results account, we must carry out a classification or a reclassification of expenditures (according to the principles of ABC method) and to establish the list of specific cost drivers which help to the allocation of expenditures on the cost bearers.

Classification of production expenditures according to the apportionment method in the cost of production creates, for economic entities within coal extractive industry, the premises for delimitation of expenditures on the cost centers that incurred them, as well as on calculation objects, underlying the calculation of production unit cost. Drawing on to the application of principles specific to ABC methodology, the expenditures are reclassified as follows [11]:

1. Direct expenditures: Costs on raw materials, explosives, fittings, clamps, braiding, sand, ballast, consumables, miscellaneous, fuel, spare parts, electricity, water, amortization, inventory items, packaging, transport of materials, wages and wage increases etc.

2. Expenditures on activities: preparation of coal, preparation of mine tailing, mining maintenance, complexly mechanized, assembled, dismantled longwall, complex mechanized service, flow control, batchers operation and maintenance, maintenance, servicing of hoppers openings, sorting (belt flow), cableway station for transport and stockpiling, cabinet for safety lamps, pressure gauges, drillings, underground blasting, etc.

According to ABC method, the cost drivers [3] represent the measurement units used for causal assignment and following-up the indirect activity-related expenditures (production, administration, sale etc.) on the cost items (products, works performed, services etc.). The proceedings for costs` allocation are used for calculation of cost for expenditure resources which are consumed and which must comply with the principle of costs causality. After studying the main activities related to mining industry, the following list of cost drivers was identified (table 2):

Table 2. List of cost drivers specific to mining extractive entity

Cost driver
Number of delivery bills (kg, pcs.)
Number of material delivery bills (liters)
Number of spare parts
Number of kwh consumed
Number of Gcal consumed
Normal period of operation
Number of material delivery bills (liters)
Number of repairs performed
Number of invoices to third parties
Consumption of liters
Number of hours of work in relation to the number of employees
Number of insurance contracts
Number of bank commissions
Number of postage / fiscal stamps
Number of charges paid
Number of disabled persons
Number of persons in travels, transfers
Additional amounts assigned
Additional amounts related to power consumption
Number of employed persons
Number of protective outfits
Number of trained employees
Number of employees subject to medical care
Number of employees who need help
Value of telephone subscriptions
Number of companies which provide guard and security services

On the basis of drawing the results account of ABC method (figure no. 1) is the accounting journal, whose informational sources gather data of activity catalogue, list of cost drivers etc.

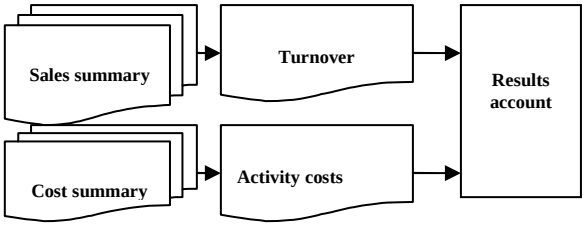

Figure no. 1. Scheme for formation and drawing up the results account of ABC method

The architecture of results account of ABC method is very simple. Thus two types of results` accounts were identified: at company's level (table no. 3) and product level (table no. 4).

Table no. 3. Results account at company's level

Explanations	Calculation method
1. Turnover	…
2. Direct costs	2.1.+ 2.2.
2.1. Consumption of raw materials	…
2.2. Cost of direct wages + direct wage increases	…
3. Activity cost	Σ 3.1. + 3.2 + ...3.*n*
…	…
…	…
4. Total costs	2 + 3
5. Result (profit or loss)	1 – 4

The last pattern of the results account drawn up on product (coal) at an extractive unit of mining industry is shown as follows:

Table no. 4. Results account broken down on activities for „N" products

Explanations			Sum (RON)
Turnover		*01*	*14500000.00*
Direct costs	Costs on raw materials	02	51624.30
	Costs on explosives	03	64449.00
	Costs on fittings, clamps	04	32970.00
	Costs with braided	05	221764
	Costs on voussoirs	06	3299.67
	Costs on sand ballast	07	562.96
	Costs on consumables	08	10127.00
	Costs on miscellaneous	09	364974.00
	Costs on Fuel	10	11797.07
	Costs on spare parts	11	99710.00
	Costs on electricity	12	110726.00
	Costs on water	13	2639.57
	Depreciation and amortization	14	733000.00
	Costs on inventory items	15	4178.45
	GFR Expenses	16	536200.00
	Packaging costs	17	253.01
	Materials Transport Costs	18	38146.85
	Salaries Costs	19	2290308.00
	Salary expenses enhancements	20	1124838.00
Total direct costs (02+20)		*21*	*5701567.88*
Expenses allocated to activities	Expenditure on miscellaneous	22	3874.00
	Fuel costs	23	3465.00
	Spare parts costs	24	19584.26
	Electricity costs	25	939404.85
	Heating costs	26	29060.00
	Depreciation and amortization	27	76789.24
	Material transport costs	28	405.00
	Machinery repair expenses	29	29491.76
	Expenditure on services provided by third parties	30	551189.88
	Expenses with antidote liquid	31	175.38
	Salaries expenses	32	2185500.00
	Salary enhancements expenses	33	881286.00
	Depreciation of fixed interest	34	154266.38
	Expenditure on insurance premiums	35	986.14
	Expenditure on fees for the issue of copyright	36	7251.50
	Expenses on stamp duty	37	63.00
	Operation Tax	38	136600.00
	Bank commission expenses	39	1208.78
	Costs with maintenance material, building cleaning	40	148.00
	Costs on electricity and motive power	41	5458.00
	Postal expenses	42	708.97
	Travel, secondments and transfers in the country	43	2913.02
	Expenditure on security and civil defense	44	110960.64
	Coal allowances	45	33557.41
	Electricity price difference	46	269933.89
	Meal expenses	47	235507.06
	Protective equipment expenses	48	25306.78
	Personnel training	49	3921.65
	Expenditure on medical health centers	50	27055.97
	Transport costs to and from work	51	73910.97
	Sickness benefit	52	1200.00
	Death support	53	7108.00
Total costs allocated to activities (22+53)		*54*	*5818291.53*
Total costs (21+54)		*55*	*11519859.41*
Result (profit or loss) (01 - 55)		*56*	*2980140,59*

4.2. Dashboard, tool for monitoring and measuring the performances of entities within mining industry

The ABC dashboard represents a modality for classification, selection, arrangement and presentation of some indicators obtained by costs calculation according to ABC method, which allows the viewing of an ensemble tendency in the evolution followed-up by the company's management by the objectives set [5]. The objectives of a dashboard may aim either the elaboration of analyses useful for company's strategies or the optimization of each company's function, by optimization of each component service. The ABC dashboard comprises that system of indicators expressed in absolute and relative values, used for the assessment, control and operative adjustment of company's activity.

The activities within entities of mining industries are assessed by means of ABC (Activity-Based Costing) method by some indicators as: activity level, cost level, efficiency, effectiveness, non-quality etc. These are established and followed-up monthly by the Indicator notebook. According to the professionals` opinion, more categories of indicators that may be used for emphasizing the performances were identified, like [13], [1]:

1. Volume-related indicators that express an activity volume obtained during a defined period of time or a provisional objective of the same kind. The general form that the indicators may take is the following:

$$\frac{\text{Cost driver}}{\text{N}} \quad (1)$$

Where: N = number of management periods.

2. Efficacy indicators which reflect the variations of the turnover to the changes of the cost drivers used by an entity. The general form that the indicators may take is the following:

$$I_{\text{Efficacy}} = \frac{\overline{CA}_{N+1} - \overline{CA}_N}{\overline{CA}_N} \quad (2)$$

Where:

$$\overline{CA_N} = \frac{CA_N}{\text{Cost driver}} \quad (3)$$

Where: $\overline{CA}$ = Average turnover per order;
N = management period.

3. Efficiency indicators which reflect the hourly variations to the changes of cost drivers used by an enterprise. The general form that the indicators may take is the following:

$$I_{\text{Efficiency}} : \frac{\overline{Vh_{N+1}} - \overline{Vh_N}}{\overline{Vh_N}} x100 \quad (4)$$

Where:

$$\overline{Vh} = \frac{Vh_N}{\text{Number of orders}} \quad (5)$$

Where: $\overline{Vh}$ = average volume of hours per order;
N = management period.

4. Quality indicators which measure the reliability level of an activity in relation to the total quality objective. The form that the indicators may take is the following:

$$\frac{\text{Cost driver(activity 1 ...n)}}{\text{Cost driver(objective)}} \quad (6)$$

Where: 1 ... n = activity number of the list (activity catalogue; objective = total quality (100%).

5. The cost indicators which measure the cost and evolution of resources consumed by an activity. The general form that these indicators may take is the following:

$$\frac{\text{Cost}}{\text{Cost driver}} \quad (7)$$

Where: cost = cost of an activity;
Cost driver = specific to activity (product).
An example of the indicators, calculated on the basis of cost objectives at activity level (table no. 5), is shown as follows:

Table no. 5. Cost related indicators

Expenses per activity	Cost driver	Total	Total cost per activity	Calculation (3:2)
0	1	2	3	4
01. Sundry material expenditures	Number of delivery bills (kg, pcs.)	24.00	3,874.00	161.41
02. Fuel expenditures	Number of delivery bills (liters)	2,105.00	3,465.00	1.64
03. Spare parts expenditures	Number of spare parts	48.00	19,584.26	408.00
04. Thermal power expenditures	Number of Gcal consumed	111.00	29060.00	261.80
05. Machinery repair expenditures	Number of repairs carried out	140.00	29,491.76	210.65
06. Telephone expenditures	Amount of telephone subscriptions	8.00	708.,97	88.62
07. Protection equipment expenditures	Number of protection equipment	1,674.00	25,306.78	15.11
08. Staff training	Number of trained staff	117.00	3,921.65	33.51

5 Results

On the basis of the data collected and presented in the results account of entity within mining industry the dashboard was drawn up (table no. 6) focused on a series of three indicators: activity volume, cost volume, effectiveness. The indicators presented in the dashboard are characterized by: findings carried out, emphasizing the identified causes (positive or negative) and actions which follow to be undertaken as a result of them.
The permanent knowledge on the status and evolution of indicators provided for in the dashboards and oriented on objectives established allows the management to contribute to the improvement of performance of entities within mining extractive industry.

Table no. 6. Part of dashboard of an entity within mining extractive industry

Indicators	Chosen indicator	Findings carried out	Tendency	Actions considered
Volume of activity	Average value of deliveries per (RON)	Objective: 172,500.00 Real: 181,250.00	Increase	Analysis of requests: - higher compared to the objective - delivered to the same reliable clients (amounting 80)
Effectiveness	Average value of deliveries per client compared with the objective (RON)	Objective: 20,500 Real: 18,600 -9.26%	Decrease	Analysis of requests: - lower with 9.26% - delivered to more clients during the same stage
Cost	Average cost of a delivery upon order per coal tone (RON/pcs.)	Objective: 328,57 Real: 325,09	Decrease	Analysis of costs: - Lower compared to the objective - the difference is favorable to the entity

As can be seen, the actions considered as a result of the indicators chosen and analyzed point out the conclusions necessary for some well-substantiated decisions and which will have a major impact on the present but especially on entity's future. The manager is that who has the final word regarding the entity's future, the destine of the entity and of all who by a joint effort contributed in a greater or smaller extent to collection, analysis and construing of information underlying his decision-making.

6 Conclusions

The results account of ABC method is the main source of information which contributes to the elaboration of synthesis accounting documents. This information helps to create provisional situations and future tendencies underlying the substantiation of managers` decisions. The results account is just the emphasizing base of an entity's performances which can be detailed and analyzed according to the entity and contemporaneous competitive environment's strategic objectives and requirements. The information provided by SWOT analysis helps in the process of formulation and selection of entity's strategy in order to reach the objectives set, thus identifying by it the factors which might impact the entity's results. Although is seen as an alternative information source in the decision-making process, the success key of a SWOT analysis is represented by the transparency of concentrated information and its carrying out with periodicity.

In a piloting step by means of dashboard each correctly identified indicator drives a good reactivity among the managers involved in the quick viewing and detection of actions and decisions that must be made.

The advantages offered by ABC method constitute the strength for the reflection of professionals in order to practice a performing management taking into account the possibilities for determination of some real costs, especially given the present conditions of the competitive business environment. That is to say, the dashboard contains attentively selected information derived from the results account, SWOT analysis or piloting indicators specific to objectives set by the entity. Thus, the process related to decisions made by the managers on the basis of the provided and correctly-substantiated information is visibly reduced helping to the shortening of reaction against the market and competition challenges.

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