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Performance of manufactured and sold goods by direct costing method

Teodor HADA
teohada@yahoo.com
"Bogdan Vodă" University
Nicoleta BĂRBUȚĂ-MIȘU
Nicoleta.Barbuta@ugal.ro
Dunarea de Jos" University of Galati
Teodora Maria AVRAM
avram_teodora@ymail.com
"1 Decembrie 1918" University

Abstract
The paper presents how the performance of manufactured and sold goods can be highlighted by the Direct Costing Method. The study provides an integrated approach to personalized cost calculation through a detailed empirical study, monthly detailed, for data of 2017. We consider it useful to know how to reduce company spending to increase profitability and, implicitly, performance. The current performance context of manufactured goods produces findings for the analysed company as it is found in the financial balance area and the volume of sales is greater than the safety margin of the difference between the turnover and the determined breakeven point.

Key words: fixed and variables costs, break-even point, coverage factor, dynamic safety ratio, margin of safety

JEL Code: D24,L25, G30

1. Introduction

The framework of economic development based on the economic efficiency changes directs firms - components of the national economic system - to the formation of circumstances in which the inter-human relations between investors, shareholders, state authorities, employees, the environment and other involved parties lead the economic system towards economic progress.

The term "performance", through its construction, is one that has the objective of exploring. However, its flexibility and adaptability over time determine the formation of working hypotheses, which offers vast possibilities in the study of performance methods. Also, the descriptive character captured in the research is provided by studies and information already existing in socio-economic relations. As a priority objective of this scientific approach, we identify the possibility of analysing performance based on the production of goods by a specific costing process.

The research is easy to understand because of the rigor in presentation, but limited in time and space. As a research that concentrates the financial particularities of the theoretical and practical aspects, a quantitative exploratory analysis is carried out by revising the specialized literature, followed by a qualitative analysis presented by the proposed empirical

study which, in a comprehensive manner, seeks to bring uniqueness and originality in interpreting the study.

The elements contained in the paper provide pertinent answers to the questions that raise the interests in the theoreticians identified once with the revision of the literature. For this reason, the proposed research involves a structure that is predominantly thought out on these vivid controversies for which no consensus has so far been found.

The feasibility of this research is also available for other researches, because it brings novelty elements through the integrated way of studying elements related to the novelties brought by studying the performance of manufactured products. The paper is organized as follows: Section 2 presents a literature review related to performance analysis; Section 3 develops the research methodology and Section 4 presents empirical results and discussions, followed by Section 5 with conclusions.

2. Literature review

Performance analysis demonstrates its effectiveness by knowing and establishing the strategy to be followed in firm. Just as a doctor determines the diagnosis of a patient by checking out the vital signs: pulse, blood pressure, breathing, temperature and heart rhythm, so is the diagnosis of a firm. Each user requests the information needed to evaluate the performance according to the intended purpose (Jianu, 2007).

We believe that there are multiple types of performance due to their identification in all areas of activity. At the institutional level, we show that the main types of performance are:

(i) economic performance is the level at which an industry reaches the goals or objectives pursued by companies operating on it. Performance is multi-dimensional, covering aspects of profitability, innovation, product design, quality and growth (Sava, 1999);

(ii) financial performance is a superior quality level of economic and financial activity performed by firms, which is appreciated by several indicators, such as: turnover, return on capital, labour productivity, gross and net result, rate of annual renewal of fixed capital, efficiency of using fixed assets, etc. (Bistriceanu, 2001);

(iii) performance in public institutions imply a relationship between objectives, means and outcomes (Profiroiu, 2001). From this relationship results that performance is the result of simultaneous pursuit of efficiency, effectiveness and an appropriate budget;

(iv) the performance of special operations is defined by merger, division, liquidation, insolvency and consolidation operations (Mateş, 2003) that requires the provision of special operations to managers. They have the role of taking the appropriate decisions to increase the performance of firms. By doing so, we consider that these types of operations are important for firms because they have tools to increase their decision-making performance as well. The link between special operations and performance in the decision-making process shows that firms, of different causes, have to regroup after a certain time, and the way in which they are transformed is by merger and division;

(v) banking performance in other credit institutions, which can be studied on the basis of the following indicators: return on assets, return on equity and net interest margin (Nouaili, Abaoub & Ochi, 2015);

(vi) non-financial performance, concretized by:

- social performance, that involves the mobilization of the following major dimensions (Zeller, Lapenu & Greeley, 2003): mobilizing for the poor and social exclusion, adapting the services and products to the target customers, improving the social and political capital of the clients, respectively the organizations, the social responsibility specific to the social performance of the companies;

- environmental performance, combating air emissions, water discharges, waste management, use and disposal of chemical, toxic and hazardous substances or any other form of pollution identified (International Standard ISO 26000, 2010).

The performance is the consistency between the actual output and the desired output of an organization. The purpose of business performance measurement was a manager inspecting the goal attainment of the organization to judge the corporate performance (Qian, Wan, Du, Shi, Huang, 2018).

In order to determine the performance of the manufactured and sold goods, the method of separating the expenses in variables and fixed ones is used. The methods used for separating variable and fixed expenses are: the process of external points (maximum and minimum points), least squares process and analytical procedure. For the present study, we used the Direct-Costing method which consists in separating production and sales expenses in relation to their character to the change in the physical volume of production and sales, to variable and fixed costs. Also, unit costs per product are taken into account only for variable expenses, fixed expenses being deducted from the gross profit of the firm (Capusneanu, 2002).

Besides, we mention that in the entrepreneurial behaviour, the production cost plays an important role due to the importance it reflects. In the economic literature, it is defined as the total expenditure of inputs performed by the firms in the production and sale of a material good or service (Burja, 2009).

The management accounting method uses specific costing procedures to determine the cost per unit of product. The methods used to calculate the costs are: the method of determining the expenses on cost carriers and places of expense, calculation methods of the independent production, calculation procedures of the expenses in variables and fixed, methods of separating the indirect costs and calculation methods per product unit.

In the definition of Chartered Institute of Management Accountants (CIMA), managerial accounting is an integrated part of management that deals with the identification, preparation and interpretation of information used to formulate strategies, make decisions, optimize resource use, inform employees, protect assets, planning and controlling the activity, informing associations or other users of external information.

The centre of performance achievement is given by the importance of a thorough knowledge of firms that function and try to increase their activities as a living organism. In close connection with the proposed goal of firms seen from the modern perspective of profiting from sales of goods and services, there is the fierce contribution to firms to the development of global performance through the link between financial performance, social life from which the group is part of the society and of the adopted specific environment protection policy. In this way, we note the importance and necessity of studying how to analyse performance by costing method.

3. Methodology

According to the proposed cost analysis method, we present the costing indicators below. The indicators used for production performance are: breakeven point, coverage factor, dynamic safety factor and safety margin.

The ***breakeven point*** (BEP) is the point at which sales are equal to variable costs plus fixed costs, or financial results are null (Căpuşneanu, 2002), in other words sales revenues less variable and fixed costs produce zero profits (Droździel, Komsta & Krzywonos, 2012). Break-even price analysis computes the price necessary at a given level of production to cover all costs (Kampf, Majerčák & Švagr, 2016). But, in order to explain how break-even analysis works, it is necessary to define the cost items (Gutierrez & Dalsted, 2015). This is determined by the following calculation relations:

a) for homogeneous production:

$$BEP = \frac{TFC}{GC}$$

where: TFC – total fixed costs;

GC – gross contribution, that means: unit fixed costs + unit profit.

b) for heterogeneous production:

$$BEP=\frac{TFC}{\overline{GC}}$$

where:

$$\overline{GC}=\frac{GC}{\sum_{i=1}^{n} q_i}$$

q_i – production.

Coverage factor (CoF) expresses the percentage of contribution to each product of fixed costs and benefit. It directs the firm's decision on products with the highest coverage factor (Capusneanu, 2002).

$$CoF=\frac{GC}{S}\times 100$$

where: S – volume of sales.

The ***Dynamic Safety Ratio*** (DSR) expresses how much the sales can decrease to a relative way for the company to reach the breakeven point (Căpuşneanu, 2002), any decrease above this coefficient causing the entrance to the field of losses. The decisions of decreasing the sales must be taken within this coefficient (Dima, 2013). It is determined as follows:

$$DSR=\frac{Pr}{GC}\times 100$$

where: Pr = the profit.

The ***Safety Margin*** (SM) shows in absolute terms how much sales can decrease so the company does not enter in the loss area (Capusneanu, 2002).

$$SM=S-S_{BEP}$$

where: S_{BEP} – sales at the breakeven point.

Other way to express the breakeven point indicators is (Hada, 1999):

$$BEP=\frac{TFC}{1-a}$$

where: a - share of variable costs in sales.

In the literature, the following formula is used to determine the financial risk:

$$BEP=\frac{TFC+I}{1-a}$$

where: I - interest as a fixed expense.

4. Results and discussions

In order to determine the indicators of performance analysis, a documentation to a company was realized. We mention that the data have been taken from the company's accounting records from the year 2017 (in lei), based on the primary records drawn up, but we have not received the agreement to disclose its name. Thus, in Table 1 we presented the structure of production of goods in variable costs, fixed costs, profit and gross contribution.

Table 1. Structure of production of goods

Month	Production of goods	Variable costs	%	Fixed costs	%	Total expenses	%	Profit	%	Gross contribution
January	4.834.762	2.391.652	49,47	2.429.316	50,24	4.820.968	99,71	13.794	0,29	2.443.110
February	6.193.265	3.330.977	53,78	2.421.161	39,09	5.752.138	92,87	441.127	7,13	2.862.288
March	8.393.317	5.013.854	59,74	2.431.981	28,97	7.445.835	88,71	947.482	11,29	3.379.463
April	7.240.036	3.832.109	52,93	2.428.339	33,54	6.260.448	86,47	979,588	13,53	3.407.927
May	8.524.701	4.384.897	51,44	2.447.663	28,71	6.832.560	80,15	1.692.141	19,84	4.139.804
June	8.650.410	5.280.280	61,04	2.448.042	28,30	7.728.322	89,34	922.088	10,66	3.370.130

Month	Production of goods	Variable costs	%	Fixed costs	%	Total expenses	%	Profit	%	Gross contribution
July	9.284.903	5.088.820	54,81	2.449.216	26,38	7.538.036	81,19	1.746.867	18,81	4.196.083
August	4.332.220	3.027.180	69,88	2.462.770	56,84	5.489.950	126,72	-1.157.730	-26,72	1.305.040
September	8.291.790	4.832.681	52,28	2.460.947	29,68	7.293.628	87,96	998.162	12,04	3.459.109
October	9.353.950	5.922.386	63,31	2.456.463	26,26	8.378.849	89,57	975.101	10,43	3.431.564
November	9.203.894	6.503.144	70,66	2.467.820	26,81	8.970.964	97,47	232.930	2,53	2.700.750
December	5.488.402	4.630.885	84,38	2.646.347	48,21	7.277.232	132,59	-1.788.830	-32,59	857.517
Total 2017	89.791.650	54.238.865	60,41	29.550.065	32,91	83.788.930	93,32	6.002.720	6,68	35.552.785

Source: Own processing based on the accounting records

Production of goods recorded lower values in January, August and December due to holidays granted within the company, meaning that a great part of employees are leaving on vacation, and production is reduced. Variable expenses are determined based on direct materials and labour costs, which varies from one month to another and per total in 2017, they hold a proportion of 60.41% in total expenditure.

The profit realized in 2017 is 6.68% of the volume of goods production. In the months of August and December, the company recorded losses due to reducing of production and sales. The gross contribution, consisting of profit and fixed expenses was in 2017 in the amount of 35,552,785 lei, registering minimal values in the months of August and December due to rest leave.

In the following, we determine in Table 2, the structure of turnover by variable costs, fixed costs, profit and gross contribution according to the structure of the production of goods by applying the percentages in Table 1.

Table 2. Structure of turnover

Month	Net turnover	Variable expenses	Fixed expenses	Total expenses	Profit	Gross contribution
January	4.834.344	2.391.550	2.428.774	4.820.324	14.020	2.442.794
February	6.268.411	3.371.151	2.450.322	5.821.473	446.938	2.897.260
March	8.624.104	5.152.040	2.498.403	7.650.443	973.661	3.472.064
April	7.519.618	3.980.134	2.522.080	6.502.214	1.017.404	3.539.484
May	8.724.404	4.487.833	2.504.776	6.992.609	1.731.795	4.236.571
June	8.515.637	5.197.945	2.409.925	7.607.870	907.767	3.317.692
July	9.453.354	5.181.383	2.493.795	7.675.178	1.778.176	4.271.971
August	4.001.193	2.796.034	2.274.278	5.070.312	-1.069.119	1.205.159
September	9.059.754	5.280.025	2.688.935	7.968.960	1.090.794	3.779.729
October	9.351.702	5.920.563	2.455.757	8.376.320	975.382	3.431.139
November	9.172.527	6.481.308	2.619.182	7.203.429	-1.770.569	848.613
December	5.432.860	4.584.247	2.619.182	7.203.429	-1.770.569	848.613
Total 2017	90.957.908	54.947.672	29.934.248	84.881.920	6.075.988	36.010.236

Source: Own processing based on the accounting records

From the data of Table 2 results that the structure of the turnover of the company in 2017 is 60.41% for variable costs, 32.91% for fixed expenses and 6.68% for the profit.

The calculation of the cost performance analysis indicators (breakeven point for homogeneous and heterogeneous production, the coverage factor, the dynamic safety ratio and the safety margin) for the company with the net turnover is determined in Table 3.

Table 3. Determination of cost performance analysis indicators

Month	Breakeven point for homogeneous production	Breakeven point for heterogeneous production	Coverage factor	Dynamic safety ratio	Safety margin
U.M.	lei	lei	%	%	lei
January	0,9943	4.806.788	50,53	0,5	27.556
February	0,8457	5.301.195	46,22	15,43	967.216
March	0,7196	6.205.905	40,26	28,04	2.481.199
April	0,7126	5.358.480	47,07	52,94	2.161.138
May	0,5912	5.157.868	48,56	40,88	3.566.536
June	0,7264	6.185.759	38,96	27,36	2.329.878
July	0,5838	5.518.868	45,19	41,62	3.934.486
August	1,8871	7.550.651	30,12	-88,71	-3.549.458
September	0,7114	6.445.109	41,72	28,86	2.614.645
October	0,7157	6.693.013	36,69	28,43	2.658689
November	0,9138	8.481.855	29,34	8,62	790.672
December	3,0864	16.767.979	15,62	-208,64	-11.335.119
Total 2017	0,83137	75.610.580	39,59	16,87	15.344.599

Source: Own processing based on Table 2

For 2017, based on the data presented in Table 2 results the following:

- the breakeven point shows roughly equal values by determining it by the two calculation formulas. The breakeven point for heterogeneous production, according to Table 3 is equal to 75,610,580 lei, and by determining it based on the formula proposed by Hada (1999) this is 75,610,438 lei $\left(\frac{29.934.248}{1-0,604099}\right)$. So the results by both methods of calculation are roughly the same;
- the coverage factor shows the percentage of coverage of fixed costs and the profit obtained. That is, the share of fixed expenses in net turnover is 32.91% and the share of the profit in net turnover is 6.68%;
- the dynamic safety ratio shows that net turnover may decrease by 16.87% to reach the breakeven point;
- the safety margin shows that net turnover can fall by an absolute amount of 15,344,599 lei so that the company does not enter the area of losses.

For the purpose of assessing financial incomes and expenses at the level of a company, we calculate the performance indicators, taking into account the financial income and expenses in the structure of the Profit and Loss Accounts. For the case study, we present in Table 4 the structure of financial incomes and expenditures.

Table 4. The structure of financial income and expenses

Month	Financial expenses, of which:			Financial income, of which:				Balance
	TOTAL	Interests	Exchange rate differences	TOTAL	Interests	Exchange rate differences	Other financial expenses	
January	123.215	7.965	115.250	30.293	4	30.289	-	-92.922
February	62.050	7.362	54.688	33.903	3	33.900	-	-28.147
March	71.758	6.474	65.284	162.646	118	162.528	-	90.888
April	67.540	7.019	60.521	10.920	4	10.916	-	-56.620
May	43.493	6.585	36.908	75.994	7	70.433	5.554	32.501

Month	Financial expenses, of which:			Financial income, of which:				Balance
	TOTAL	Interests	Exchange rate differences	TOTAL	Interests	Exchange rate differences	Other financial expenses	
June	81.947	6.664	75.283	52.642	147	52.495	-	-29.305
July	57.893	6.243	51.650	41.607	2	41.605	-	-16.286
August	33.013	6.260	26.753	68.547	10	68.537	-	35.534
September	43.934	6.117	37.817	154.125	125	154.000	-	110.191
October	59.647	5.735	53.912	7.851	4	7.847	-	-51.796
November	48.519	5.732	42.787	97.431	17	97.414	-	48.912
December	71.994	5.408	66.586	271.412	106	271.306	-	199.418
Total 2017	765.003	77.564	687.439	1.007.371	547	1.001.270	5.554	242.368

Source: Own processing based on the Annual Financial Statements

From the data of Table 4, it follows that the structure of the financial expenses for 2017 is given by the exchange rate differences (89,86%) and the interest expenses (10,14%), and the financial revenues are structured as follows: interest earned (0,05%), exchange rate difference (99,39%) and other financial income (0,56%).

In the following, in Table 5, we calculate the breakeven point, the coverage factor, the dynamic safety ratio and the safety margin in 2017, with the influence of expenditure and financial income.

Table 5. Determination of cost performance analysis indicators with the impact of spending and financial income

Month	Breakeven point for homogeneous production	Breakeven point for heterogeneous production	Coverage factor	Safety coefficient	Safety interval
U.M.	lei	lei	%	%	lei
January	1,0323	4.990.493	50,53	-3,23	-156.149
February	0,8554	5.361.999	46,22	14,46	906.412
March	0,6934	5.979.953	40,26	30,66	2.644.151
April	0,7286	5.478.794	47,07	27,13	2.040.824
May	0,0580	506.015	48,56	94,20	8.218.384
June	0,7352	6.260.696	38,96	26,48	2.254.941
July	0,5876	5.554.791	45,19	41,24	3.898.563
August	1,8576	7.432.616	30,12	-85,76	-3.431.423
September	0,6823	6.181.470	41,72	31,77	2.878.284
October	0,7308	6.834.224	36,69	26,92	2.517.478
November	0,0896	821.858	29,34	91,04	8.350.669
December	2,8514	15.491.257	15,62	-185,14	-10.058.397
Total 2017	0,8245	74.994.795	39,59	17,55	15.963.113

Source: Own processing based on Table 4

Interpreting data of the Table 5, following calculations of performance indicators with the influence of expenditure and financial income:

- the breakeven point shows that the volume of sales equal to 74.994.795 lei must be made so as to cover the entire volume of the fixed and variable expenses;
- the coverage factor shows that the percentage of coverage of the fixed expenses and the profit obtained is of 39,59;

- the dynamic safety ratio shows the volume of turnover, which can decrease by 17,55% to reach the breakeven point;

- the safety margin shows by the total of 2017 (15,963,133 lei) the minimum necessary to reach by the turnover so that the company does not enter in the area of financial loss.

The calculation of these performance indicators, which takes into account the expenses and financial revenues, has the role of determining the performance indicators influenced by the financial activity of the company.

5. Conclusions

We believe that being successful is a success in everyday life, to which all entities must tend. That is why we believe that the value of the paper is of great importance and bring added value to the literature by approaching performance based on production costs. The impact of knowledge of this type of performance reveals the need to develop the management of firms.

In this context, production performance indicators, calculated on a variable and fixed cost basis, provide information to the managers through this study, information on the breakeven point, coverage factor, dynamic safety ratio and safety margin; thus the companies plan their production of goods and the volume of sales to cover their income, expenses and not to lose.

In the second part of the study was determined the performance indicators by taking into account financial activity (financial income and expense) on the basis that all the activities of the company participate in their performance.

The reflection of this research brings novelties in the economic literature by addressing the issues chosen in the study, expressing the usefulness and openness of both theoreticians, practitioners, management accounting specialists, and companies that intend to introduce management accounting to identify new measures through desire the growth the performance of the manufactured products.

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