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CALCULATION OF COMPANY COSTS THROUGH THE DIRECT-COSTING CALCULATION METHOD

**Case
study**

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Abstract

The cost of production has as its starting point the purchase cost of raw materials and consumables, as well as their processing cost and the calculation of the production cost involves complex aspects. This article is based on the two major concepts of costs calculation, namely the concept of full costs and the concept of partial costs, and it analyses the direct-costing calculation method. Necessity of the Development of calculation methods to ensure rapid determination of the cost of production, and the establishment of indicators broad spectrum of information necessary for making decisions to streamline a business activity conducted by direct-costing method. Direct-costing method appeared in the U.S. for the first time in 1934 (applied by Jonathan Harris and G. Charter Harrison). Subsequently, this method was applied to European countries (England, France, Germany etc.). We stopped on this method because it is considered a modern method of costing. Therefore, we analyzed both advantages and limitations of the method in question.

1. INTRODUCTION:

The essence of the direct-costing method consists in separating the production costs in relation to their character towards the variation of the physical volume of production into variable costs and fixed costs. The method takes into consideration, in the calculation of the unit cost, only the variable costs, while the fixed costs are deducted entirely from the gross result of the company.

Variable expenses are identified and collected directly on cost carriers, considering that only they depend on their production, increasing / decreasing in relation to the increase / decrease in the production volume.

Fixed (structure) expenses regard the company's overall capacity to produce, pursuing it globally or in relation to a limited number of places of expenses or cost centres. As a result they are not included in the cost of production but they are deducted directly from the gross result.

2. LITERATURE

While delimiting the cost of production, the cost calculation theory has adopted two major concepts: the concept of complete or full costs and the concept of partial or proportionate costs.

The full costs are obtained by incorporating all operating expenses. There are two types of costs:

- traditional full costs or consumed costs when the expenses of financial accounting are integrated as such without restatement;
- full economic costs or consumed costs when the expenses are subject to restatement in order to achieve a better economic expression of the costs.

In the accounting practice, as well as in theory, there is often a distinction between the accounting cost and the economic cost [1].

The full cost concept requires that the unit cost of the product covers the total costs of obtaining it, that of the direct and indirect ones [2]. Direct costs are defined as those that are directly attributable to the different products that determined them from the very moment of performing them, and indirect costs are defined as those that cannot be identified and assigned directly to each product, they regard the whole production of a section [3].

Partial costs fall into two categories [4]:

- variables costs include only the costs that vary depending on the workload of the company without the necessity of having proportionality between the variation of costs and that of the volume of the products obtained. In this case, the "structure" costs are excluded from the calculation, costs which are considered fixed for the period considered;
- direct costs: they include expenses that can be directly identified on the cost carrier (usually operating or variable costs) and expenses which, even if they identify at the level of an analysis centre, they refer, unambiguously, to the respective cost carrier (variable and fixed costs).

The concept of partial costs underlies the direct costing method, also known as the variable costs method, according to which the cost of production takes into account only those costs that vary together with the output. This concept is based on the classification of costs according to their behaviour criterion, a criterion that refers to how costs react to the changes in the volume of production or of the entity's activity [5]. According to this criterion, the costs are divided into variable costs and fixed costs.

Variable costs are those which vary in proportion to the change of the production or activity volume [6]. They include, typically, the direct materials, the direct manual labour and the variable part of the production costs.

Fixed costs are those whose absolute value remains relatively unchanged or changes in case of increase or decrease of the output, but in insignificant proportions. This group includes: depreciation of fixed assets, rents paid for them, salaries of the personnel from the management, technical, economic or other specialisation, administrative and servicing departments, paid in directing, the social contributions payable, the consumption of materials for the maintenance and cleaning of the departments etc. [7].

3. RESEARCH METHODOLOGY

This article starts from the fundamental differences that exist in the production cost structure between the two concepts: the concept of complete or full costs and the concept of partial or proportionate costs. From the range of

methods of calculation the partial or proportionate costs the direct-costing method is analysed.

We started from the aim of the direct-costing method and the following indicators specific to the method are analysed:

- the breakeven point, both in the case of the homogeneous production and in that of the heterogeneous production;
- the coverage factor;
- the dynamic factor of safety;
- safety margin

4. OBJECTIVE OF THE DIRECT-COSTING METHOD

Given the delineation of the production costs between variable and fixed ones, the formula for calculating the unit cost specific to the direct-costing method is:

$$\text{Unit cost } (c_u) = \frac{\text{Total variable costs } (Ch_v)}{\text{Output produced } (Q_f)}$$

The objective of the direct-costing method, however, is not just to determine the unit cost but also to analyse the overall profitability for the whole enterprise. The gross contribution (Cb) for the profit is thus calculated for each product, also called the gross margin or the margin on the variable costs. This indicator is an analysis tool because it shows how much the variable expenses were covered by the sale price in each product made, so what the enterprise gains by manufacturing and selling one product (the actual return on the operating activity):

$$Cb_u = pv_u - c_u$$

in which:

Cb_u – unit gross contribution for profit

pv_u – unit selling price

With the help of the unit gross profit contribution we manage to determine the gross result (Rb) of the company. If the products A, B, C, ..., are manufactured, the unit gross contribution for each product is multiplied with the quantity sold (Qv) and the fixed costs are subtracted from the amount obtained (Chf), leading to the gross result:

$$Rb = (Cb_{u/A} \times Q_{v/A} + Cb_{u/B} \times Q_{v/B} + Cb_{u/C} \times Q_{v/C} + \dots) - Ch_f$$

total gross profit contribution(Cb)

Making the connection with the turnover (CA), the total gross profit contribution is the difference between the turnover and the total variable costs:

$$Cb = CA - Ch_v,$$

and the gross result, in its turn, the difference between the total gross profit contribution and the total fixed costs:

$$Rb = Cb - Ch_f$$

The result is not calculated on each object of calculation, but for the entire activity, a fact required by the nature of the fixed costs to be charged on the total gross profit contribution and not on each product. In terms of profitability, it aims to maximise the contribution to the profit that bears the structure costs.

5. CALCULATION OF THE INDICATORS SPECIFIC TO THE DIRECT-COSTING METHOD

The management of the modern enterprise is able to take rational decisions that will produce the best results only if it takes into account the fact that the fixed and variable costs can be found in constant contact with the volume of activity, respectively with the degree of use of the capacity and the sales price of the production. This correlation is found in the literature and in the economic practice as “price-cost-volume analysis” and it is expressed by means of some indicators such as: breakeven point, coverage factor, dynamic safety coefficient and safety margin.

5.1. THE BREAKEVEN POINT

The breakeven point (the equilibrium point) (q_e) is the point at which the company begins to make a profit, respectively the point where the total costs equal the total revenue. The calculation of the breakeven point differs

depending on the type of production achieved: homogeneous or heterogeneous.

Determining the breakeven point for the homogeneous production:

Based on the turnover calculation relationship, there is the condition that the profit is null (at this level the breakeven point is reached):

$$Q_v \times pv_u = Q_v \times c_u + Ch_f + R$$

in which:

pv_u – unit selling price

c_u – unit variable cost

Q_v – the amount of products sold

Ch_f – total fixed costs

R – result (profit or loss)

If marked with “ q_e ” the physical quantity of products that the company must produce and sell for the proceeds to cover the variable and fixed costs (the physical breakeven point) and if you take into account the fact that at the breakeven point the result is null ($R = 0$), the calculation of the quantitative breakeven point shall be done in the following way:

$$\begin{aligned} q_e \times pv_u &= q_e \times c_u + Ch_f + 0 \\ (pv_u - c_u) \times q_e &= Ch_f \\ \underbrace{\hspace{10em}}_{Cb_u} \\ \Rightarrow q_e &= \frac{Ch_f}{Cb_u} \end{aligned}$$

in which:

q_e – physical production at breakeven point level

Furthermore, a value-related breakeven point (CA_e) can be expressed, which expresses the turnover in the equilibrium point (the critical turnover) sufficient to cover the costs:

$$CA_e = q_e \times pv_u$$

In order to illustrate the calculation method we shall consider the case of S.C. Alfa S.R.L. which provides a homogeneous production of 10,000 units of product A under the following conditions: unit selling price = 200 lei, unit variable expense = 120 lei, total fixed costs = 280,000 lei.

$$q_e = \frac{Ch_f}{Cb_u} = \frac{280,000 \text{ lei}}{200 \text{ lei/pcs.} - 120 \text{ lei/pcs.}} = 3,500 \text{ pcs.}$$

It results that if the unit will sell 3,500 pieces of product A, it will cover the expenses and the result will be null (that is to say it neither gets profit, nor loss).

$$CA_e = q_e \times pv_u = 3,500 \text{ pcs.} \times 120 \text{ lei/pcs.} = 420,000 \text{ lei}$$

Determining the breakeven point for the heterogeneous production

The calculation method of the breakeven point is similar, except that in the case of the heterogeneous production (when we get two or more products), there will be used average dimensions (the average gross profit contribution, the average selling price, and so on). We determine the average unit gross profit contribution by relating the total gross profit contribution to the sum of the quantities sold from each type of product:

$$\overline{Cb_u} = \frac{\sum (Cb_{u_i} \times Q_{v_i})}{\sum Q_{v_i}}$$

in which:

Q_{v_i} – quantity sold of product i

Cb_u – average unit gross profit contribution

The physical breakeven point is determined by reporting the value of the fixed costs to the average gross unit contribution for profit:

$$q_e = \frac{Ch_f}{\overline{Cb_u}}$$

It should be noted that determining and analysing the breakeven point can give useful information as long as the combination of the assumptions underlying it does not change. In those businesses in which structure data change frequently, the breakeven point calculation is relevant when it is performed on very short periods.

In order to illustrate the calculation method we start from the case of S.C. Beta S.R.L. which carries out a heterogeneous production, as follows:

Table 1. Heterogeneous production indicators

No.	Explanations	A	B	C
1.	Quantity sold (pcs)	100	200	300
2.	Unit selling price (lei/pcs.)	200	300	400
3.	Variable expense per unit (lei/pcs.)	20	50	100
4.	Total fixed expenses (lei)	40,000		

In order to determine the breakeven point we start from the calculation of the unit gross profit contribution (Cb_u) for each product, as difference between the unit selling price and the

unit cost. The calculations were carried out in the following table.

Table 2. Determining the unit gross profit contribution

No.	Explanations	A	B	C
1.	Quantity sold (pcs.)	100	200	300
2.	Unit selling price (lei/pcs.)	200	300	400
3.	Variable expense per unit (lei/ pcs.)	20	50	100
4.	Total fixed expenses (lei)	40,000		
5.	Unit gross profit contribution (lei/pcs.) (2-3)	180	250	300

We determine the average unit gross profit contribution:

$$\overline{Cb_u} = \frac{(180 \times 100) + (250 \times 200) + (300 \times 300)}{100 + 200 + 300} = 263,33 \text{ lei/pcs.}$$

We determine the physical breakeven point:

$$q_e = \frac{40,000 \text{ lei}}{263,33 \text{ lei/pcs.}} = 152 \text{ pcs.}$$

In order to calculate the physical breakeven point for each type of product, we calculate the specific weight of each product in the total quantity of goods sold:

- for product A: $g_A = 100 \text{ pcs.} / 600 \text{ pcs.} = 16\%$
- for product B: $g_B = 200 \text{ pcs.} / 600 \text{ pcs.} = 34\%$

- for product C: $g_C = 300 \text{ pcs.} / 600 \text{ pcs.} = 50\%$
- total 350 pcs - 100%

The breakeven point for each type of product is determined by multiplying the total breakeven point with the weight specific to each product:

- for product A: $152 \text{ pcs.} \times 16\% = 24 \text{ pcs.}$
 - for product B: $152 \text{ pcs.} \times 34\% = 52 \text{ pcs.}$
 - for product C: $152 \text{ pcs.} \times 50\% = 76 \text{ pcs.}$
- total 152 pcs.

5.2. THE COVERAGE FACTOR

The coverage factor (F_a) expresses the percentage of the contribution of each product to covering the fixed costs and to obtaining the benefit. The indicator directs the company's decision towards the products with the highest coverage factor. It is calculated as a percentage in two ways:

- either by relating the profit contribution to the total volume of the sales at the selling price (turnover) and then multiplying by 100:

$$F_a = \frac{C_b}{CA} \times 100$$

- or by relating the fixed costs to the volume of the sales at the selling price at the level of the equilibrium point (critical turnover) and multiplying by 100:

$$F_a = \frac{Ch_f}{CA_e} \times 100$$

In the case of S.C. Beta S.R.L. the indicator is presented as follows:

$$F_a = \frac{C_b}{CA} \times 100 = \frac{158,000}{200,000} \times 100 = 79\%$$

5.3. THE DYNAMIC COEFFICIENT OF SAFETY

The dynamic coefficient of safety (K_s) shows how much sales may decrease before the enterprise reaches the equilibrium point, 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. We calculate the percentage as follows:

$$K_s = \frac{CA - CA_e}{CA} \times 100$$

In the case of S.C. Alfa S.R.L. the indicator is presented as follows:

$$K_s = \frac{CA - CA_e}{CA} \times 100 = \frac{2,000,00 - 420,000}{2,000,000} \times 100 = 79\%$$

5.4. SAFETY MARGIN

The safety margin (I_s) is the expression in absolute figures of the dynamic coefficient of safety. It is calculated as the difference between the total turnover and the turnover in the equilibrium point:

$$I_s = CA - CA_e$$

In the case of S.C. Alfa S.R.L. the indicator is presented as follows:

$$I_s = 2,000,000 - 420,000 = 1,580,000 \text{ lei}$$

5.5. CONCLUSIONS

Treating the fixed costs as a "block" within the direct-costing method represents a simplification of the calculation, which only allows the development of certain decisions on short periods by the assumption of certain given capacities and production processes.

A calculation of the coverage contributions that allows a gradual coverage of the fixed costs (for long periods all the fixed costs must be regarded as changeable) comes to cover this gap and makes the method suitable for decisions that consider long periods of time. In addition to the presentation of this research a more complex paper that can be done based on the price-cost-volume analysis. This approach takes into account the optimisation of the result of the economic activity, optimum obtained by recording the highest profit. This is achieved by determining the influences that the change of those factors underlying its establishment has on the profit: the selling price, the production and sale volume, the variable costs, the fixed costs, the production structure.

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