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PRACE NAUKOWE UNIWERSYTETU EKONOMICZNEGO WE WROCŁAWIU
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Finanse i rachunkowość – teoria i praktyka

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COSTING AND ITS USAGE IN PRODUCT MANAGEMENT

1. Introduction

In business environment numerous changes are taking place presently. They influence in a significant way the traditional methods applied in company management. In connection with this, there are also partial modifications in the usage of calculations in companies. The oldest task of calculations, topical even today at times of management accountancy, is to offer information on costs of individual products and services that companies are focusing on, and trying to win markets with. Full costing is still considered to be the most suitable tool for achieving this goal. The aim of this contribution is to emphasise the importance of the traditionally used absorption costing in the present-day company management. Simultaneously, the contribution will highlight the usefulness of combining various ways of calculations for some types of decision-making tasks.

2. Full costing

When managing a production process, we often need data in the form of calculations. These express the relationship of all costs to the calculation unit. The so-called *absorption costing* absorbs all the costs consumed in the production process of a given product. *Full costing* adjoins a concrete product and all *the direct and indirect costs* connected with its creation. What is not taken into account at all then is the existence of variable and fixed costs. This means that a concrete product is connected with both variable and fixed costs together without considering their different meanings. Thus full costing is a tool defining costs expressed only statistically. The value of costs expressed in this way is correct only in the case that the

volume and assortment of the given output will not change. Another problem is distributing of overhead costs to the calculation unit itself. For this task different calculation approaches are used.

In spite of all the given drawbacks mentioned above, full costing remains to be irreplaceable. Understanding all the costing is important particularly for long-term analyses of costingness of the given output, for advocating prices of individual orders, and for indicating changes in company stocks. Seen from the *long-term perspective*, the price of a product must always compensate all the costs and, moreover, it must yield some profit.

When the company managers make decisions about the line of products, then full costing, covering also the inaccurately stated share of fixed costs, may lead to mistaken decisions. Alongside, inaccurate evaluations of company economy can take place. This is due to the fact that the fixed costs included in calculations might seem to be connected with the amount of production, which is, in reality, not true.

From everyday life of companies we know that to increase the value of full costing, it is not sufficient to improve the methods of costing used alongside the overhead rates costing (like extending direct costs, focusing on correct choices of the cost-allocation base and differentiating among them, overhead charges, and overhead rates). The conditions of the liberalised market environment keep changing constantly; characteristically, the amount of overhead costs is rising in the full costing category. In such a situation various new demands arise from managers to classify individual cost items in calculations. The separation between direct and indirect costs is becoming less important, and what matters is a connection between costs linked to the amount of production, and the following relevant division of costs into variable and fixed ones. That is why in calculations another point of view is also being applied to the costing of an item rather than to its linking to output.

3. Variable costing

As a reaction to problems and drawbacks connected with the practical application of absorption costing, the variable costing method came into being. It is based on a combination of costs separated according to their connections to the changes of the amount of output. In the calculation pattern expressing this type of costing, there are clearly defined both *variable and fixed costs*. The reason for separating these two types of costs from the point of view of calculating variable costs is the fact that fixed and variable costs are totally different. The calculated output can be connected only with variable costs, where unit costs and variable overhead costs are included. In the case of these costs, one correctly presupposes that they are a function of the amount of production and thus they are caused by a unit of the concrete production. The rise (or decline) of the production amount is always accompanied by the rise (or fall) of this part of costs. The fixed costs, which are the func-

tion of time, are understood by the variable costing approach as an inseparable entirety, which is to be paid for securing the production conditions and selling of the product in the given time period. These costs are to be paid *fully* from the difference between the yields from sales and the variable costs of the sold products without considering how many pieces have been sold. The backflow of all the given fixed costs is guaranteed only by a certain amount of produced and sold products. It is impossible to state how much an individual product contributes towards settling of the given fixed costs spent. It is so as we do not know the amount of the fixed costs connected with one unit of our production (the fixed costs are common to more products). The level of fixed costs connected with how much each product will contribute towards meeting the complete given fixed costs can be expressed as a difference between the price for a piece (c_j) and the variable costs of a unit (v_j). These are the types of data that are known for each product. The difference ($c_j - v_j$) is called *the contribution towards meeting of fixed costs and towards creating a profit* (margin, marginal contribution, and gross range); in connection with its height, one can evaluate the contribution or usefulness of individual products.

Then, variable costing works with the margin ($c_j - v_j$). The values of the unit price (c_j) and the variable costs of a unit (v_j) do not change when the amount of output is different. This means that the margin per piece will be the same. As long as the assortment produced is stable, only the total margin will be changed in connection with the changes of the amount of the line of production. It can be expressed as the total sum reached after multiplying the number of produced pieces (n) by the margin connected with one product ($c_j - v_j$). The total margin $\underline{n} \times (c_j - v_j)$ then changes proportionately, in contrast to the economic result with the amount of production. *Margins are thus considered to be a more appropriate and suitable criterion used in the process of optimalization of the production programme.*

Marginal contribution represents a very flexible tool for decision-making and modelling of the assortment policy and planning the optimum usage of capacity of production. It is due to the fact that individual variations of produced and sold quantities of the given products can be given by a simple calculation. These variations then enable selecting an optimum production and marketing strategy of a company for achieving the best results. As a springboard, we use the assumption that the higher the margin of a product, the higher the contribution towards the fixed costs and towards the creation of a company profit, which means the product is more beneficial for a company.

3.1. Using variable costing in the product decision-making process

Variable costing is a suitable tool recommended for managing companies while the production capacity is not fully used. It creates a basis for decision-making about identifying correct levels of the assortment of production and for optimaliza-

tion of profit. Yet, it cannot guarantee the height of production costs. Entrepreneurial subjects do not usually face an alternative of selecting either full costing or variable costing. One can answer a whole range of questions correctly only if *both of the above mentioned approaches are used simultaneously*. When one uses full costing, his or her decisions whether to prolong the production of a product, which is not a profitable one at the first sight, might be wrong. Nevertheless, if the variable costing approach is used in this case too, company management can utilize and compare both of these approaches, and thus avoid potentially wrong decisions. This fact can be seen from the following numerical illustration.

Example:

A company produces three types of products, A, B, C. Profit of individual products is defined through using full costing, as shown in table 1.

Table 1. Calculation of profit based on the lines of full costing calculations

Products	Earnings (in Czech crowns)	Variable costs (in Czech crowns)	Fixed costs (in Czech crowns)	Total costs (in Czech crowns)	Profit (in Czech crowns)
A	720,000	430,000	135,832.27	565,832.27	154,167.73
B	540,000	390,000	123,196.71	513,196.71	26,803.29
C	360,000	288,000	90,967.03	378,976.03	– 18,976.03
Total	1,620,000	1,108,000	350,005	1,458,005	161,995.99

Note: Minor inaccuracies in aggregate sums are caused by rounding.

Source: Consulting Partners team: Systém ekonomického řízení společnosti pro podnik Ateso, a. s. Praha 1998, and our my own processing.

Aggregate fixed costs of all three products (in Czech crowns) are divided among the individual products with the aid of the overhead charge, where:

Total costs	1,458,005
– Variable costs	1,108,000
= Fixed costs	350,005

$$\text{Coefficient of fixed costs} = \frac{350\,005}{1108\,000} \times 100 = 31.5888989\%$$

(Fixed costs of a product represent approximately 31.5889% of its variable costs.)

As given in table 1, the economic result of the product C, identified on the basis of the full costing calculation by comparing all of its earnings and total costs,

manifests a negative value → a loss levelling up to 18,976.03 Czech crowns. From the full costing perspective, the product C represents one that is not profitable for the company. That is why the best solution for the management seems to be to withdraw this product from their production. Yet, this conclusion would not be well-considered. It would be correct only if the relevant participatory fixed costs, so far connected with the product C, were diffused among the remaining products A and B. Simultaneously, the capacity of production released after the elimination of the product C would have to be levelled up by the rise of sales of the two remaining products (A, B). If there is no rise in the sales of the products A and B, the fixed costs of 90,976.03 Czech crowns of the eliminated product C will be dissolved between the two remaining products. Yet, simultaneously it will lead to deterioration of the total economic result, as shown in table 2.

Table 2. Calculation of profit based on the lines of full costing calculations after shelving a loss-making product

Products	Earnings (in Czech crowns)	Variable costs (in Czech crowns)	Fixed costs (in Czech crowns)	Total costs (in Czech crowns)	Profit (in Czech crowns)
A	720,000	430,000	183,539.05	613,539.05	106,460.95
B	540,000	390,000	166,465.65	556,465.65	– 16 465,65
Total	1,260,000	820,000	350,005	1,170,005	89,995.00

Note: Minor inaccuracies in aggregate sums are caused by rounding.

Source: Consulting Partners team: Systém ekonomického řízení společnosti pro podnik Ateso, a. s. Praha 1998, and our own processing.

Aggregate fixed costs (in Czech crowns) of the two products are divided among the individual products with the aid of the overhead charge, where:

Total costs	1,170,005
– Variable costs	820,000
= Fixed costs	350,005

$$\text{Coefficient of fixed costs} = \frac{350\,005}{820\,000} \times 100 = 42.6835365\%$$

(Fixed costs of the product represent approximately 42.6835% of its variable costs.)

As shown in table 2, due to eliminating the loss-making product C from the production assortment, the total economic result (profit) decreased from Czech crowns 161,99.99 to 89,995. It was caused by the fact that the fixed costs of the

eliminated product got included in the total fixed costs. Alongside, there was a decrease of the total variable costs, which contained only the variable costs of the still-manufactured products A and B. In this situation, it was not possible to increase their turnover, and thus the total earnings declined. The overhead charge used for setting out the common fixed costs increased from 31.5889% to 42.6835%. It was caused by a lower base (total variable costs).

In contrast, in table 3, we show working-out of variable costs where a calculation of the marginal contribution is done.

Table 3. Calculation of the marginal contribution

Products	Earnings (in Czech crowns)	Variable costs (in Czech crowns)	Marginal contributions (in Czech crowns)
A	720,000	430,000	290,000
B	540,000	390,000	150,000
C	360,000	288,000	72,000
Total	1,620,000	1,108,000	512,000

Source: Consulting Partners team: Systém ekonomického řízení společnosti pro podnik Ateso, a. s. Praha 1998, and our own processing.

The above-demonstrated calculation of the marginal contribution shows clearly that even the loss-making product C achieves the positive levels of margin, namely 72,000 Czech crowns. Also, the product C, which is from the point of view of absorbing calculation loss-making, and thus its inclusion in the company programme is undesirable, contributes towards the total fixed costs. Thus, this product is then a contribution for the company management and it would be a mistake to refrain from its production.

On the basis of comparing the two calculation approaches demonstrated in the above mentioned example, we can formulate a very significant conclusion for companies: *If a company is unable to utilize capacities fixed to the production of loss-making products in another way, it is not appropriate to terminate manufacturing an unprofitable product (C) under the given conditions. The consequence of such a step would be a significant decrease of the economic result.*

4. Conclusion

High-quality company management needs specific approaches for taking different types of decisions. They are heterogeneous, and thus there is no universal correct or wrong way of connecting costs to the calculated item, or of dealing with a problem in general. There are advantages and drawbacks to every approach. The traditionally used pattern for costing (calculation of total costs) does not always provide an adequate and sufficient foundation for management and decision taking.

That is why the structure of costs in calculations derives presently from different principles. These are expressed mainly in costing patterns separating variable and fixed costs (calculation of variable costs). Applying them at present economic conditions is vital, yet it is advisable to utilize both approaches.

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KALKULACJA KOSZTÓW I JEJ WYKORZYSTANIE W ZARZĄDZANIU PRODUKTEM

Streszczenie

W związku ze zmianami zachodzącymi w otoczeniu ekonomicznym wykorzystanie kalkulacji ulega ciągłym modyfikacjom. Poza tradycyjnymi strategiami kosztowymi kładzie się nacisk na metody bazujące na odrębnych obserwacjach kosztów zmiennych i stałych. Obie metody są jednakowo efektywne w rozwiązywaniu różnych rodzajów zadań i celów wewnątrz organizacji.