

New Opportunities for the Development of Education at the Technical University of Liberec

Specific objective A2: Development in the field of distance learning, online learning
and blended learning

NPO_TUL_MSMT-16598/2022



Learning materials

Ing. Zdeněk Brabec, Ph.D.



Funded by
the European Union
NextGenerationEU



**CZECH
RECOVERY
PLAN**

MSMT
MINISTRY OF EDUCATION,
YOUTH AND SPORTS

4 Cost Management according to Activities and Methods of Strategically Oriented Cost Management

Content

4 Cost Management according to Activities and Methods of Strategically Oriented Cost Management	1
Content	1
4.1 Cost controlling	1
4.2 Pre-conditions for implementing cost control in a company	2
4.3 Variable and fixed costs	2
4.4 Short-term profit	3
4.5 The contribution margin	3
4.6 Cost-Volume-Profit analysis	5
4.6.1 Using the linear model in practice	7
4.6.2 Variable Costing	10
4.7 Creation of the organizational and economic structure of a company	12
Summary	13
Exercises	13
Literature	15

4.1 Cost controlling

In literature, many characteristics and conceptions of controlling are given, but a precise and clear definition of controlling does not exist. Controlling can be understood as a simple and inexpensive economic approach to company's management, a systematic execution of goal-oriented activities that support achieving business goals, competitiveness and a company's successful long-term existence. **Controlling** is, therefore, a subsystem oriented towards all partial management activities that ensure and coordinate planning, provide enough qualitative information to managers and enable the analysis, control and management of corrective measures needed for achieving goals set within the planning process.

Cost controlling is a method of internal company's management that with the help of value tools monitors the efficiency of all internal departments and thereby significantly contributes to improving company performance and its competitive ability. It is focused on managing the factors that influence the company's total business result, i.e., mainly on managing costs and revenues.

4.2 Pre-conditions for implementing cost control in a company

To enable the effective management of costs and revenues in a company with the help of cost controlling, the following six pre-conditions have to be fulfilled:

- A company should use **another classification of costs**. The classification of costs by their nature or according to the calculation process is normally used. In addition to these classifications, costs should be classified according to their relationship to changes in the level of business activity – **fixed and variable costs**. Such a classification is necessary for the effective management and control of a company's activities.
- A company has to regularly **calculate its short-term profit**.
- A necessary component of controlling is the **calculation of the contribution margin**.
- Also **the Break Even Point (critical point)** has to be calculated. If costs are divided into variable and fixed costs, the Break Even Point analysis is immediately applicable.
- Controlling also includes the control of achieving a complex business plan in all its parts because without a comparison between actual and planned values, successful company's management cannot occur. A key pre-condition of controlling is, therefore, **the creation of a unified set of business plans**. The difference between actual and planned values is called the **deviations from set plans**.
- The creation of a company's well-functioning organisational and economic structure, including profit centres, is also useful.

The above mentioned points create the main preconditions of the controlling management. It is also the basis to which other special controlling approaches or methods can be accompanied.

4.3 Variable and fixed costs

The classification of costs by *their nature* is based on distinguishing between individual types of costs that are connected with elementary production factors (land, labour, capital). These costs include material consumption, total wages and salaries, depreciation of property, plant and equipment, interest expenses and other financial costs, all purchased services and also shortages and damages as well as fines and penalties. In the income statement, these expenses are divided into operational, financial and extraordinary and their sum constitutes a company's total expenses.

The classification of costs into *direct* (unit) and *indirect* (overhead) is called the classification of costs according to the calculation process because it is used by the calculation of manufacturing costs attributable to a unit of production – unit product costs. The sum of these costs creates the cost of goods manufactured. (Horngren, Harrison and Oliver, 2012, p. 785 -789)

The classification of costs into *fixed* and *variable* is called the classification dependent on production capacity because an increase in output usually causes an increase in the utilization of a company's production capacity. In some cases there are also *mixed costs* that have both variable and fixed components. (Horngren, Harrison and Oliver, 2012, p. 927) The division of costs into fixed and variable can be made so that the individual costs monitored in a company are compared with the **sample list of fixed and variable costs**. The sample list can have the following structure:

- **variable costs** – direct material, direct labour, transport costs, packaging, technological energy, etc.,
- **general fixed costs** – costs connected with the administration and management of a company, costs spent of financing and accounting activities, human resources, information technology, etc.,
- **special fixed costs** – manufacturing overhead, marketing and sales expenses

The sample list should be continuously monitored and updated according to the current situation and needs of the company. Special fixed costs are used to calculate **the first type of contribution margin** (see below), which is important for selecting the product range. General fixed costs are used to calculate **the second type of contribution margin** (see below), which is necessary for creating a company's business strategy.

Using **mixed costs**, an expert estimate of the ratio of fixed and variable costs should be made. This estimate should be carried out by professionals with enough experience in this area using special methods and procedures. The division of total costs into fixed and variable parts is complicated because both types are connected to the temporal aspect and, therefore, the same costs can be considered fixed or variable in different time horizons. The costs that are considered variable over the long run can become fixed if short-term measures are taken. Therefore, this fact should be taken into account by making concrete decisions.

4.4 Short-term profit

If costs are deducted from a company's revenues **short-term profit (STP)** is obtained. The amount of costs and revenues is obtained from the income statement. To get relevant information by the cost items, the data in the calculation sheets of individual products should be taken into account. The sum of all costs embodied in the calculation sheets should be equal to the sum of costs embodied in the income statement. If there is a difference, this should be specified and clarified (some expenditures are not connected with the product directly and, therefore, they do not have to be recorded in the calculation sheet). This control is an essential basis for calculating the STP because controlling assumes that costs are monitored not only for the whole company, but also for individual products

4.5 The contribution margin

The contribution margin (CM) is one of the basic components of a controlling system. In practice, the contribution margin can be calculated as a total or per unit. (Walther and Skousen, 2009, p. 50)

Total CM = Revenues of a company– variable costs of a company

CM per unit = Revenues of a product – variable costs of a product

Logically, the sum of all individual CM per unit has to be equal to the CM of a company.

A pre-condition for using the contribution margin is the classification of costs into fixed and variable costs. The amount of the contribution margin determines the extent to which fixed costs are covered and which part contributes to the creation of a company's profit. A company creates profit only when the sum of all contribution margins is higher than its fixed costs. This calculation of the contribution margin is shown in table 7. 1.

Table 4.1 The calculation of the contribution margin of a company

Item	CZK	%
Revenues	5,000,000	100
<i>minus</i> variable costs	– 3,000,000	60
= contribution margin	2,000,000	40
<i>minus</i> fixed costs	– 1,500,000	30
Operating profit	500,000	10

Source: Own computation.

By calculating the contribution margin of individual products variable costs are assigned to individual products or product groups. The difference between revenues and variable costs is the contribution margin that was calculated for individual products (product groups) A, B, and C. On the other hand, fixed costs are recorded only as a total amount. These costs are not assigned to individual product groups because it is not necessary (these cost are not immediately connected with their production) A company's fixed costs are, therefore, deducted from the total sum of the contribution margins of individual products or product groups. The obtained result is the company's profit. This calculation of the contribution margin is shown in table 7. 2.

Table 4.2 Single stage calculation of the contribution margin of a product group

Product group	A		B		C		Total	
	thousand CZK	%	thousand CZK	%	thousand CZK	%	thousand CZK	%
Revenues								
<i>minus</i> variable costs	500	100	300	100	900	100	1,700	100
= contribution margin	– 300	– 60	– 150	– 50	– 620	– 69	1,070	– 63
	200	40	150	50	280	31	630	37
<i>minus</i> fixed costs							520	30
= profit							110	12

Source: Own computation.

A simplified calculation of the contribution margin summarizes all fixed costs into **one block**. This variant expresses a **single stage calculation of variable costs** where fixed costs are not analysed in detail and they are used as one indivisible amount. The table indicates the ranking of individual product groups from two points of view. According to the total contribution margin, product group C seems to be the most beneficial one

because these products cover the greater part of fixed costs and creates most of the profit. The percentage expression of the contribution margin is used for measuring **gross profitability**, in other words, **the relationship between the contribution margin and revenues**. If this expression is used, another ranking is obtained. **Gross profitability** expresses the concrete contribution of the contribution margin of a certain product group on the revenues of this product group, respectively, the revenues of the whole company. From this point of view, product group B is the most beneficial one because these products cover the greater part of fixed costs and create most of the profit. The gross profitability ratio is very important for a company's management. The production and sales plans should respect this ratio to obtain optimal income.

In practice, not all fixed costs embodied in one unified block have the same character. Therefore, the block of fixed costs should be divided into two groups – **special fixed costs** and **general fixed costs**. **Special fixed costs** are directly attributable to certain products or product groups. Special fixed costs include, for example, fixed costs connected with production and material supply, marketing and distribution. With **general fixed costs**, there is no connection between these costs and individual product groups. General fixed costs include, for example, expenses spent on a company's management, its accounting, controlling and general overhead. General fixed costs are presented only as a total sum (block). The two-stage calculation of the contribution margin is shown in table 3.

Table 4.3 Multistage calculation of the contribution margin of a product group

Product group	A		B		C		Total	
	thousand CZK	%	thousand CZK	%	thousand CZK	%	thousand CZK	%
Revenues								
minus variable costs	500	100	300	100	900	100	1,700	100
= contribution margin I	- 300	- 60	- 150	- 50	- 620	- 69	1,070	- 63
	200	40	150	50	280	31	630	37
minus special fixed costs	- 150	- 30	- 105	- 35	- 235	- 26	- 490	- 29
= contribution margin II	50	10	45	15	45	5	140	8
minus general fixed costs							- 50	- 2.9
= profit							90	5.1

Source: Own computation.

The table shows that special costs are attributable to a specific product group (product). In the next phase, contribution margin II is calculated. It expresses the margin created by individual product groups. Profit is calculated after deducting the special fixed costs. This is called a **multistage calculation of variable costs**. The application of this method provides a more precise analysis of the profit created by individual product groups (products). It shows which product group is the most profitable.

4.6 Cost-Volume-Profit analysis

The Break Even Point is an output at which a company achieves neither profit nor loss. The revenues of a company are equal to its costs. If a company systematically monitors variable and fixed costs, a calculation of the Break Even Point can be made.

Variable costs that are directly connected with every manufactured and sold product are always covered through the sale of this product (if the sale price is higher than variable costs). The sale of all products, therefore, covers total variable costs through sales that are gradually paid.

The return of **fixed costs** is different because they are not caused by the manufacturing of individual products, but by the passage of time. Fixed costs are spent at one time in unified blocks. They secure the general conditions necessary for the production and sale of products. They are not attributable to a certain unit of production, but they are common to all of the products. The proportion at which individual activities contribute to their production is dependent on the difference between their price and variable cost per unit. The return of total fixed costs incurred is, therefore, ensured by a certain amount of products being manufactured and sold. The amount that individual products contribute to covering the fixed costs incurred cannot exactly be determined because the proportion of fixed costs spent on the manufacturing of one unit is not known. Each product contributes to the covering of total fixed costs incurred at a certain amount, which can be quantified as the difference between the sale price per unit (P) and variable cost per unit (AVC). These variables are known for each product. The difference (P – AVC) is called the **contribution (gross) margin**, which covers fixed costs and profit. (Horngren, Harrison and Oliver, 2012, p. 930-936)

If enough products are manufactured and sold, the sum of all contribution margins per unit is equal to total fixed costs incurred and the **Break Even Point** is achieved. The contribution margin is used for a gradual covering of fixed costs. After total fixed costs are covered, a profit is achieved. These relationships are shown in figure 1.

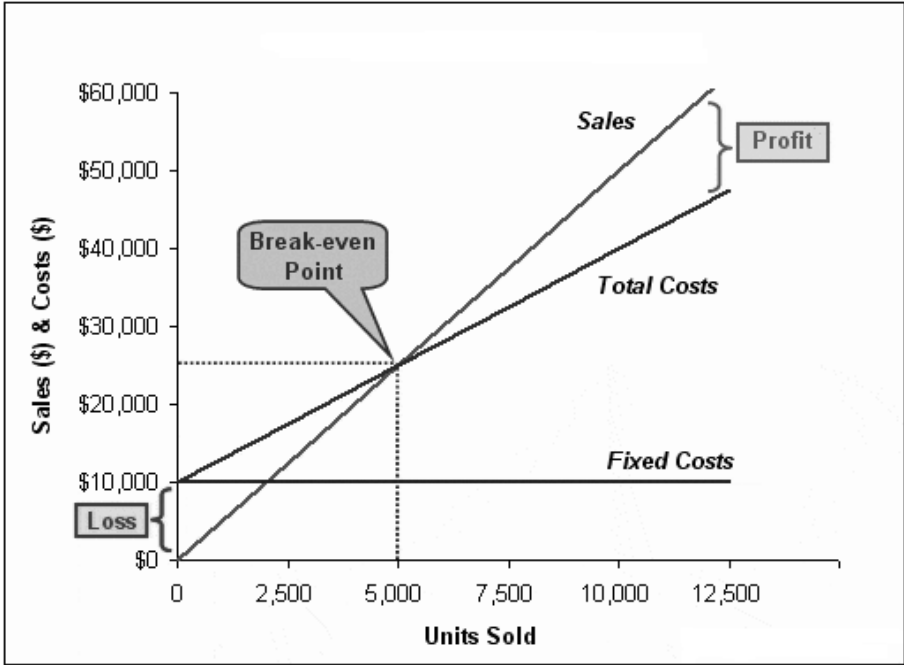


Figure 4.1 The cost-volume-profit chart

Source: Modified by HORNGREN, C. T., W. T. HARRISON and M. OLIVER, Accounting, p. 934.

If the output is lower than the Break Even Point, the total contribution margin does not cover total fixed costs incurred and a company achieves a loss. If the output is higher

than the Break Even Point, the total contribution margin does cover total fixed costs incurred and the company achieves a profit. The relationships between these basic economic phenomena (costs, revenues, profit and output) are shown in figure 2.

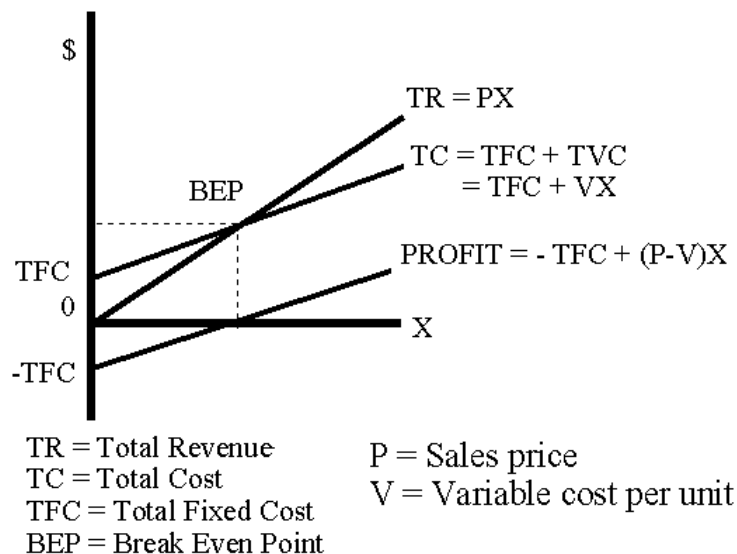


Figure 4.2 Linear model of costs, revenues and profit.

Source: Modified by SYNEK, M. et al., *Manažerská ekonomika*, p.132.

If output is zero, revenues are equal to zero and, therefore the TR line begins at the coordinate origin. The TC line crosses the y axis at the amount of total fixed costs incurred. If output is zero, there is a loss that is equal to total fixed costs incurred. As output rises, this loss decreases and after the Break Even Point is reached, a company achieves a profit. The Break Even Point is reached when the price is equal to average costs (the sum of average fixed costs and average variable costs). In other words, the Break Even Point is reached when the contribution margin of every product is equal to average fixed costs. The total contribution margin (in contrast to profit) grows proportionally to the amount of sold products.

4.6.1 Using the linear model in practice

Total costs can be calculated as follows:

$$\underline{TC = VC + FC \rightarrow TC = (AVC \times X) + FC}$$

Total profit can be expressed in various forms:

$$TP = TR - VC - FC$$

$$\underline{TP = (P \times X) - (AVC \times X) - FC}$$

$$TP = (CM \times X) - FC$$

where: TC..... total costs
 TR..... total revenues
 VC total variable costs
 FC..... total fixed costs
 TP total profit
 X..... output
 AVC average variable costs (variable costs per unit)
 P individual sale price
 CM contribution margin per unit

The linear model is mainly used for **planning profit** and for **choosing optimal variations of company's activities** with homogenous production.¹ The basic formula of total profit development $TR = (P \times X) - (AVC \times X) - FC$ can be used not only for the quantification of total profit, but for calculating of other variables embodied in this formula. These variables include:

1. the Break Even Point and requested amount of profit,
2. the maximum amount of total fixed costs corresponding to a given output,
3. the minimum sale price of products,
4. the maximum amount of average variable costs.

1) Calculating Break Even Point

The Break Even Point analysis provides a calculation of the minimum output that is necessary to **cover total costs**. It can also be used to calculate the minimum output that is necessary to **achieve the required level of profit**. Calculating of the Break Even Point can be derived from its basic definition. (it is the output X at which total costs are equal to total revenues.

$$TC = TR$$

$$AVC \times X + FC = P \times X$$

$$FC = (P \times X) - (AVC \times X)$$

$$X = \frac{FC}{P - AVC}$$

To reach **required profit (RP)**, the achieved contribution margin should cover not only total fixed costs, but also the required level of profit. This can be expressed by the following formula:

¹ A company with homogenous production is a theoretical abstraction that allows a simple demonstration of the basic relationships between costs, revenues and profit with the help of the linear model. In practice, homogenous production mostly exists in processors of raw materials or in companies supplying other manufacturers (for example, the automotive industry). By expressing the relationships between costs, revenues and profit by inhomogenous (heterogenous) production, the linear model expresses average variable costs as costs per one monetary unit and not as per one unit of output as in homogenous production.

$$TC + RP = TR$$

$$AVC \times X + FC + RP = P \times X$$

$$FC + RP = X \times (P - AVC)$$

$$X = \frac{FC + RP}{P - AVC}$$

2) Calculating the maximum amount of total fixed costs

The linear model can be used to calculate those fixed costs that can be influenced by a company. In this context, the following question should be solved: “What is the maximum amount of total fixed costs that ensures achieving the required profit (RP) by a certain amount of expected output (EX)?” To solve this problem total fixed costs have to be divided into fixed costs that can be influenced (controllable fixed costs - CFC) and fixed costs that cannot be influenced (uncontrollable fixed costs - UFC).² For the above-mentioned calculation, only those fixed costs that can be influenced are taken into account. The amount of controllable fixed costs that can be incurred can be calculated in the following way:

$$RP = EX \times (P - AVC) - CFC - UFC$$

$$CFC = EX \times (P - AVC) - UFC - RP$$

3) Calculating of the minimum sale price of products

The linear model is also used to calculate the minimum limit of sales price of products. To achieve a positive contribution margin, the sales price should not drop under average variable costs in the short run. This reasoning should also be taken into account when calculating the minimum sales price of products. This should secure achieving the required profit by a certain amount of expected output. The lower limit of the sales price of products can be calculated in the following way:

$$RP = EX \times (P - AVC) - FC$$

$$RP = (P \times EX) - (AVC \times EX) - FC$$

$$P \times EX = RP + (AVC \times EX) + FC$$

$$P = \frac{RP + AVC \times EX + FC}{EX}$$

$$P = AVC + \frac{FC + RP}{EX}$$

² Management can influence some fixed costs such as expenses spent on promotion or R&D. Other fixed costs, such as time depreciation or leasing payments, result from using assets. These costs can hardly be influenced unless a company wants to sell its assets. The consumption of others costs is dependent on the season of the year (lighting, heating of production areas).

4) Calculating the maximum amount of average variable costs

The linear model is also used to calculate the maximum amount of average variable costs that can be incurred to achieve the required profit by a certain amount of expected output and total fixed costs incurred. The maximum amount of average variable costs can be calculated in the following way:

$$RP = (P \times EX) - (AVC \times EX) - FC$$

$$AVC \times EX = (P \times EX) - FC - RP$$

$$AVC = \frac{P \times EX - FC - RP}{EX} = \frac{P \times EX}{EX} - \frac{FC + RP}{EX}$$

$$AVC = P - \frac{FC + RP}{EX}$$

4.6.2 Variable Costing

The Break Even Point analysis is closely connected with variable costing. This calculation was developed as a reaction to the weaknesses of the full cost calculation. It is based on the principle that fixed costs that are not related to a unit of output should not be attributed to a unit of output. It is more accurate to attribute only variable costs to a unit of output. Therefore, their profitability of individual products should be evaluated according to the contribution towards margin per unit.

The second reason for using variable costing is the fact that there, currently, is a fluctuation in the utilization of production capacity in many companies. Companies spend vast amounts of fixed costs on creating their production capacity, but they are not able to utilize this capacity efficiently (to have enough customers who will buy their products → they request only small-scale or seasonal production and frequent product changes → it causes problems for their suppliers). In the context of these factors, **the influence of separating fixed and variable costs is increasing, as well is the need for the rational management of free production capacity, which should help to maximize the company's profit.** Variable costing is performed in the following three phases:

- first, **contribution margins** of individual products are calculated,
- secondly, the total contribution margin is calculated as the sum of contribution the margins of individual products,
- thirdly, total fixed cost (not yet calculated anywhere) are deducted from the total contribution margin so that the company's total profit is calculated.

Fixed costs are not attributed to individual products and, therefore, any profit attributed to individual products cannot be expressed. The profitability of individual products is evaluated according to their contribution toward the margin per unit. This contribution margin is **constant** regardless of the utilization of production capacity. The greater the contribution margin per unit, the greater a certain product contributes to covering fixed costs and creating profit.

Another term connected with variable costing is **gross profitability** (a relative contribution margin). It is a very important criterion used for planning and controlling a company's profit. It is calculated as the proportion between the contribution margin and output (expressed per unit or companywide). It expresses the proportion of individual products on corporate sales.

The gross profitability of a company = $\frac{CM}{Sales}$ (total companywide values should be used)

The gross profitability of a product = $\frac{CM \text{ per unit}}{P}$

Variable costing divides traditional fixed costs into variable and fixed portions. The variable portion of overhead is, together with direct costs, attributed to variable costs and fixed overhead is part of a company's fixed costs. The structure of costs according to variable costing is shown in figure 3.

Product price			
Direct costs	Overhead costs		Profit
	Gross margin		

Direct costs	Variable overhead	Fixed overhead	Profit
Variable costs		Contribution margin	

Figure 4.3: Structure of costs in the calculation of variable costs
Source: Self-created.

Using variable costing in practice

Variable costing allows for improving cost management. The management of variable costs is based on the calculation of unit costs and it enables management to minimize these costs or eliminate deviations between the planned and actual average variable costs. On the other hand, the monitoring of fixed costs enables management to measure the utilization of production capacity and, thereby contributing to its optimal utilization.

The separation of variable and fixed costs and their monitoring is important only **in the short run**. Only in the short run are certain costs of a company limited by the existing production capacity, and they are constant within this capacity. (over the long run, these costs are not constant) Variable costing can also be used within operational management for making short-term decisions that are based on the existing production capacity. It is used for **determining the optimal product range** (the products with the highest contribution margin per unit should be preferred) and for **determining the short-term minimal sales price** (the sales price can be below the average variable costs in the short term because any positive contribution margin contributes to covering fixed costs).

Variable costing – summary

Variable costing brings the following positive effects:

- It provides information necessary for solving various problematic tasks through constant production capacity – a faster orientation in the product range, setting the sales price.
- It eliminates the greatest weakness of full cost calculation – the inaccurate attributing of fixed (overhead) costs to a unit of production with the help of the calculation of overhead rates.

Variable costing was constructed for **another purpose** than calculating product costs needed within a company's complex cost management. It is a tool for the short-term management of the production structure and it also enables management to calculate the minimum sales price that is needed to have efficient manufacturing. The "weakness" of this method is that it does not allow for the calculation of total product costs. It also does not analyse the internal structure of fixed costs, so it does not attribute them to individual products. This type of calculation cannot be used isolated, but must always be used as a supporting management tool together with full cost calculation or other methods.

Under current business conditions the proportion of fixed and overhead costs in total costs is increasing and managers do not need to analyse the internal structure of fixed costs attribute them to a concrete product. Their primary objective is to create a sufficient contribution margin that will cover the fixed costs incurred. To monitor the reasons for spending fixed costs and their efficiency, other calculation techniques should be used.

4.7 Creation of the organizational and economic structure of a company

This topic was discussed in more detail in one of the previous topics of this course. Nonetheless, the introduction and application of cost controlling in a company requires dividing the company into the following centres:

- the production centre,
- the supply centre,
- the administration centre,
- the sales centre,
- the neutral centre – it records extraordinary costs and revenues which are not recorded in other centres.

In a large company, more production, supply and other centres can exist, but the neutral centre is only one. Each centre has its own plan (or budget). If these centres are created as **cost centres**, profit is created only in sales centres that come into contact with customers. Other centres operate with costs of entry (actual costs) and with costs of exit (planned or budgeted costs) and they achieve "only" cost savings or overruns (not a real

profit or loss) even if these centres also create value. This **concept of cost centres is considered obsolete and cost controlling requires a transition to the concept of profit centres**. The concept of profit centres monitors the division of a company's total profit into all deliveries between centres as well as into the company's costs. Profit is reported by all centres and not only sales centres. The monitoring of profit in individual centres is important not only for the control process, but also for employees of the given centre and their motivation.

Summary

This chapter describes cost controlling as a method of internal management. For the full use of controlling principles in a company the necessary pre-conditions must be fulfilled. First, a company's costs should be divided into fixed and variable costs. This creates the basis for the application of other tools of internal management and control. These tools include, for example, the Break Even Point analysis, calculating the contribution margin (a useful tool for modelling the product range policy and for determining optimal utilization of production capacity), variable costing and the linear modelling of costs, revenues and profit. Other conditions on which the effective and efficient implementation of controlling in a company are based, are having a functional set of plans and the activity of its internal profit centres created within its economic structure.



Exercises

Model examples

A company produces five types of products – A, B, C, D and E. These products have the following costs and prices:



Table 4.4 The contribution of individual products to total revenues at the Break Even Point

Product	Product price (CZK)	Average variable costs (CZK)	Sales (pc)	Total revenues (CZK)	Total variable costs (CZK)
A	1,200	620	4,000	4,800,000	2,480,000
B	5,230	3,150	6,000	31,380,000	18,900,000
C	3,100	1,500	1,000	3,100,000	1,500,000
D	2,300	1,050	2,000	4,600,000	2,100,000
E	10,250	5,600	3,000	30,750,000	16,800,000
Total				74,630,000	41,780,000

Source: Own computation.

Fixed costs are 30,000,000 CZK.

Tasks:

1. Calculate the total revenues by which a company achieves the Break Even Point (assuming no changes in the output structure).
2. Calculate the contribution of individual products to the total revenues at the Break Even Point.

3. Assuming the constant output structure calculate the total revenues and revenues attributed to individual products by which a company will achieve the profit in the amount of 5,000,000 CZK.

Solution:

1) The calculation of the Break Even Point by the inhomogeneous production is based on variable costs per 1 CZK of sales and the contribution margin to sales by a set structure.

$$VC_{pU} = \frac{VC}{TR} = \frac{41,780,000}{74,630,000} = 0.56 \quad (\text{variable costs per 1 CZK})$$

Variable costs per 1,- CZK of sales are 0.56 CZK and the contribution margin to sales is 0.44 CZK (= 1 – 0,56).

$$TR_{BEP} = \frac{FC}{1 - VC_{pU}} = \frac{30,000,000}{1 - 0.56} = \frac{30,000,000}{0.44} = \underline{68,182,000 \text{ CZK}}$$

A company achieves the Break Even Point by revenues in the amount of 68,182,000 CZK.

2) The revenues of individual products by achieving the Break Even Point is shown in table 4.5. Revenues by achieving the BEP in CZK (Product A) = 68,182,900 * 6.4317 / 100 = 4,385,262 CZK.

Table 4.5 The contribution of individual products to the total revenues at the Break Even Point

Product	Share on total revenues (%)	Revenues achieving by the BEP (CZK)	Price per piece	Number of products by BEP in pcs
A	6.4317	4,385,282	1,200	3,654
B	42.0474	28,668,781	5,230	5,482
C	4.1538	2,832,161	3,100	9,134
D	6.1637	42,025,612	2,300	1,827
E	41.2033	28,093,213	10,250	2,741
Total	100	68,182,000		

Source: Own computation.

3)

$$TR_p = \frac{FC + P}{1 - VC_{pU}} = \frac{30,000,000 + 5,000,000}{1 - 0.56} = \frac{35,000,000}{0.44} = \underline{79,545,000 \text{ CZK}}$$

A company achieves the profit in the amount of 5,000,000 CZK by the total revenues of 79,545,000 CZK.

The revenues of individual products by achieving the profit in the amount of 5,000,000 CZK is shown in table 4.6. The revenues of individual products by achieving the profit in the amount of 5,000,000 CZK (product A) = $79,545,000 * 6.43 = 5,116,120$ CZK.

Table 4.6 The contribution of individual products by the profit of 5,000,000 CZK

Product	Share on total revenues (%)	Revenues achieving by the BEP (CZK)	Price per piece	Number of products by BEP in pcs
A	6.4317	5,116,120	1,200	4,263
B	42.0474	33,446,631	5,230	6,395
C	4.1538	3,304,161	3,100	1,066
D	6.1637	4,902,948	2,300	2,132
E	41.2033	32,775,141	10,250	3,198
Total	100	79,545,000		

Source: Own computation.

Literature

ESCHENBACH, R. *Controlling*. 2. vydání. Praha: Aspi, 2004. 816 s. ISBN 80-7357-035-1.

FIBÍROVÁ, J., L. ŠOLJAKOVÁ a J. WAGNER. *Manažerské účetnictví – nástroje a metody*. Praha: Wolters Kluwer ČR, 2011. 392 s. ISBN 978-80-7357-712-4.

FIBÍROVÁ, J., L. ŠOLJAKOVÁ, a J. WAGNER. *Nákladové a manažerské účetnictví*. Praha: Aspi, 2007. 171 s. ISBN 978-80-7357-299-0.

HORNGREN, C. T., W. T. HARRISON and M. OLIVER. *Accounting*. 3rd ed. Upper Saddle River, N.J.: Pearson Prentice Hall, c2012. ISBN 978-013-2497-923.

KONEČNÝ, M. *Controlling*. 4. přepracované vydání. Brno: Vysoké učení technické v Brně, 2007. ISBN 978-80-214-3346-5.

KRÁL, B., et al. *Manažerské účetnictví*. 3. doplněné a aktualizované vyd. Praha: Management Press, 2010. 660 s. ISBN 978-80-7261-217-8.

KRÁL, B., et al. *Nákladové a manažerské účetnictví*. 1. vyd. Praha: Prospektrum, 1997. 407 s. ISBN 80-7175-060-3.

MACÍK, K. *Kalkulace nákladů – základ podnikového controllingu*. Ostrava: Montanex, 1999. 241 s. ISBN 80-7225-002-7.

POPESKO, B. *Moderní metody řízení nákladů*. 1. vyd. Praha: Grada Publishing, 2009. 233 s. ISBN 978-80-247-2974-9.

WALTHER, L. M. and CH. J. SKOUSEN. *Managerial and cost accounting*. London: Ventus Publishing, 2009. 130 s. ISBN 978-87-7681-491-5.

