

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

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Learning materials

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**CZECH
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MINISTRY OF EDUCATION,
YOUTH AND SPORTS

5 Costing systems

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5.1 Definitions used in costing

The costing system is most often understood as calculations oriented to determining costs, margins, profit or price. It is processed before or after manufacturing products or providing services that are the subject of sale to external customers. Calculation of costs of finished products, semi-finished products, activities and operations is an information tool for:

- determining the structure of the output,
- in the form of transfer prices, they allow revealing relationships between departments and influence the behaviour of department staff,
- managing direct and other variable costs,
- determining selling prices,
- planning costs, revenues and profit,
- valuation of stocks and changes in own production and other capitalised outputs.

Cost unit - the smallest unit of production for which an organisation calculates the cost. The cost might be a *single item* (e.g. table) or *parts of an item* (e.g. car wheels), or *multiple items* (e.g. 100 shirts).

Calculated quantity - the number of cost units for which total costs are traced, allocated or budgeted.

Cost object - anything for which a separate measurement of costs is desired – the cost of a product, cost of rendering services, cost of operating a particular department.

Cost centre - the section of a company in which costs are spent. For the activity of each cost centre and costs spent there one manager should be responsible. Two *main types*:

- production, and
- service.

Cost pool - the accumulation of costs which will be charged to products on the basis of a standard cost driver (grouping of individual cost items). They can range from the vast (*companywide total-cost pool for telephones*) to the very narrow (*costs of operating the car used by travelling salesperson*).

Cost driver – a factor within an organisation that causes costs. (*i.e. cost driver for machine set-up costs – number of different jobs the machine has to do*). Cost drivers need to be identified as part of *activity-based costing (ABC)*. *The cost driver of indirect costs* is used as a cost allocation base.

Cost allocation - is the process of assigning costs to cost objects that involve the use of allocation bases or cost drivers

Cost-allocation base – is a factor which is the common denominator enabling a systematic linking of indirect cost or group of indirect costs to a cost object. A cost-allocation base can be *financial* (direct labour cost, direct material cost, direct cost) or *nonfinancial* (number of machine hours, direct labour hours). The cost-allocation base has the following features:

- it should reflect the causal dependencies of overhead costs developments and the cost driver,
- the ratio between the cost driver and overheads costs should be constant,
- it should be easy to detect,
- it should be large enough so that even slight errors in the determination of the cost driver do not lead to significant errors in cost assignment,
- it should be stable to allow comparability of costs from one period to another.

5.2 Classifications of costing methods

Costing methods can be classified according to various criteria. In the literature, the following classification of costing methods can be found:

- job costing x process costing,
- actual costing x normal (standard) costing,
- costing of combined and non-combined production,
- absorption costing x variable costing,
- traditional costing x activity-based costing.

5.2.1 Job x proces costing

Within **job costing**, costs are assigned to a single unit, batch, or a lot of a product or service. Job is a task for which resources are spent to bring a single product or service to market. The product or service is often custom-made (usually by providing services, e.g. *audit by an accounting firm*). The allocation of costs in the job costing is shown in figure 1.

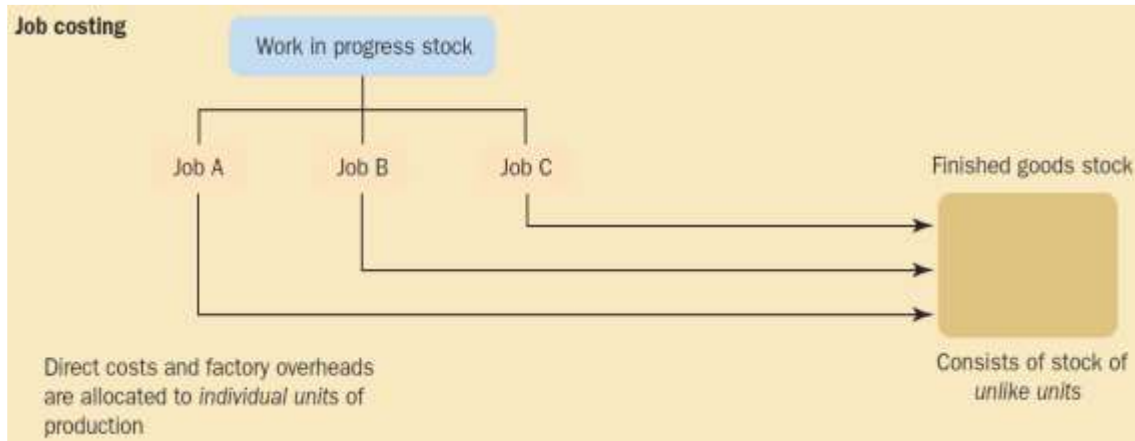


Figure 1 Job costing

Source: Colin Drury. 2018. *Management and Cost Accounting*, p. 105.

Within the **process costing** cost of a product or service is obtained by using averages to assign costs to masses of similar units. Identical items are mass-produced for general sale (e.g. Cars, clothes). The mass production of products represents a continuous flow of operations. This method is used in manufacturing (*petroleum refining, processing the chemicals*) and service organisations (*mail sorting in large post offices*). The introduction of this method requires:

- high level of standardisation,
- production of large volumes of products,
- operations have a series of processes or steps,,
- each process involves a different set of activities.

Each process is identified and organised as a **separate cost centre** (*manufacturing department, sale department, workstation, or work centre*). The total costs associated with each process are then divided by the number of units passing through to determine the cost per equivalent unit for that process. Costs of completed units of a department are transferred to the following processing department. *Direct costs* (materials and labour) are clearly linked with specific processes. *Indirect costs* are not clearly linked with a specific process. The allocation of costs in the process costing is shown in figure 2.

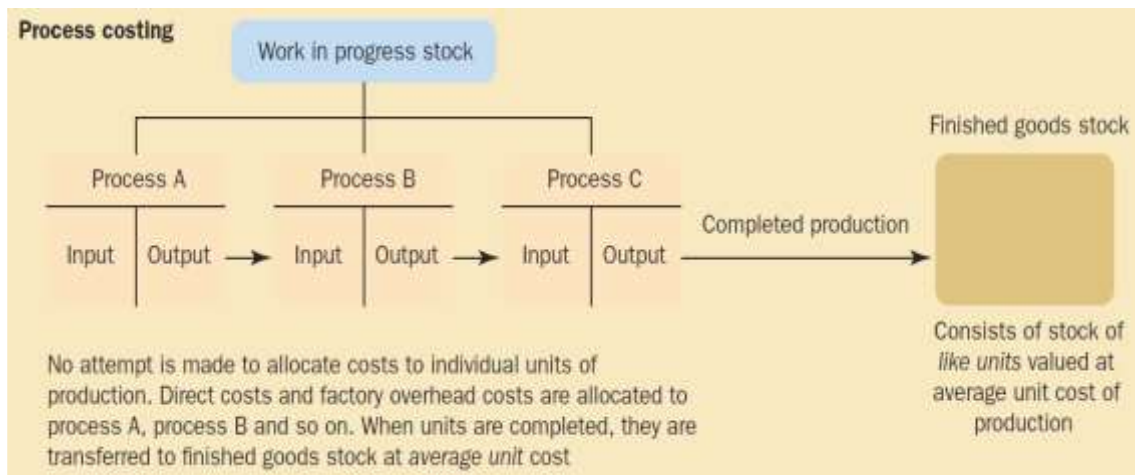


Figure 2 Process costing

Source: Colin Drury. 2018. *Management and Cost Accounting*, p. 105.

Practical examples of job and process costing applied in the service, merchandising and manufacturing sectors are shown in figure 3.

	Service sector	Merchandising sector	Manufacturing sector
Job costing used	<ul style="list-style-type: none"> Accounting firm audits Advertising agency campaigns 	<ul style="list-style-type: none"> Sending a catalogue to a mailing list Special promotion of a new store product 	<ul style="list-style-type: none"> Aircraft assembly House construction
Process costing	<ul style="list-style-type: none"> Deposit processing Postal delivery (standard items) 	<ul style="list-style-type: none"> Grain dealing Processing new magazine subscriptions 	<ul style="list-style-type: none"> Oil refining Beverages production

Figure 3 Examples of job and process costing

Source: Horngren, Charles T., Srikant M. Datar, Madhav V. Rajan. 2012. *Cost accounting: a managerial emphasis*. p. 101.

5.2.2 Actual x standard costing

Actual costing records actual product costs (e.g. cost of materials, the actual cost of labour, and the actual overhead costs incurred). Overhead costs are allocated using the actual quantity of the allocation base experienced during the reporting period. This approach leads to a more significant fluctuation in overhead cost allocations because it monitors short-term costs.

Standard (normal) costing uses a budgeted amount of overhead. The advantage of applying this approach is less fluctuation in overhead costs allocations. This is because of using long-term expectations for overhead costs instead of short-term costs.

5.2.3 Costing in combined and non-combined production

A production process may result in more than one product being produced simultaneously (for example production of joint products or the production of the main product and a by-product). **Joint products** have significant relative sales values. On the contrary, **by-products** are products with insignificant sales value. Joint products are essential to the commercial success of an organisation, whereas by-products are incidental. The cost allocation during the production of joint and by-products is shown in figure 4.

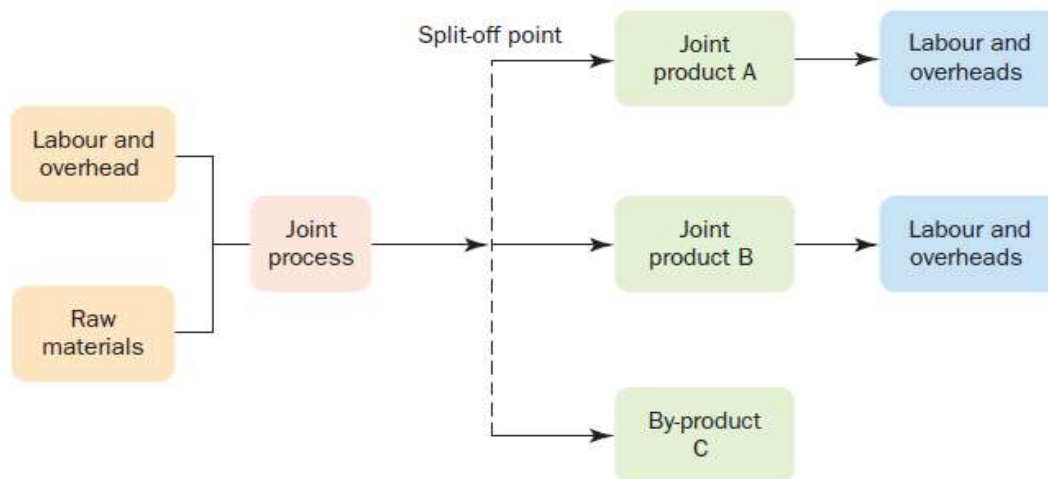


Figure 4 Production process for joint and by-products

Source: Colin Drury. 2018. *Management and Cost Accounting*, p. 134.

When each product's conversion costs are not separately identifiable, they are allocated between the products on a rational and consistent basis. The allocation may be based, for example, on the relative sales value of each product at the production stage when the products become separately identifiable or at the completion of production.

Most by-products are often measured at net realisable value, which is deducted from the cost of the main product. This approach enables the carrying amount of the main product is not materially different from its cost.

5.2.4 Absorption x variable costing

The costing methods are compiled concerning the decision-making task for the solution for which they are used. A different approach to include different costs (direct, indirect) in the costing scheme leads to choosing a different costing method.

The **full cost method**, which includes direct and indirect costs in the calculation, is called **absorption costing**. It is historically the oldest costing system, developed in the early 1900s and still widely used today, mainly because of its relatively easy usage. It allocates all the costs to cost objects as they were spent for its creation. Costs are classified according to the method of their assignment into **direct costs** (directly assigned) and **overhead costs** (numerical and technical procedures for assignment). The process of absorption costing is shown in figure 5.

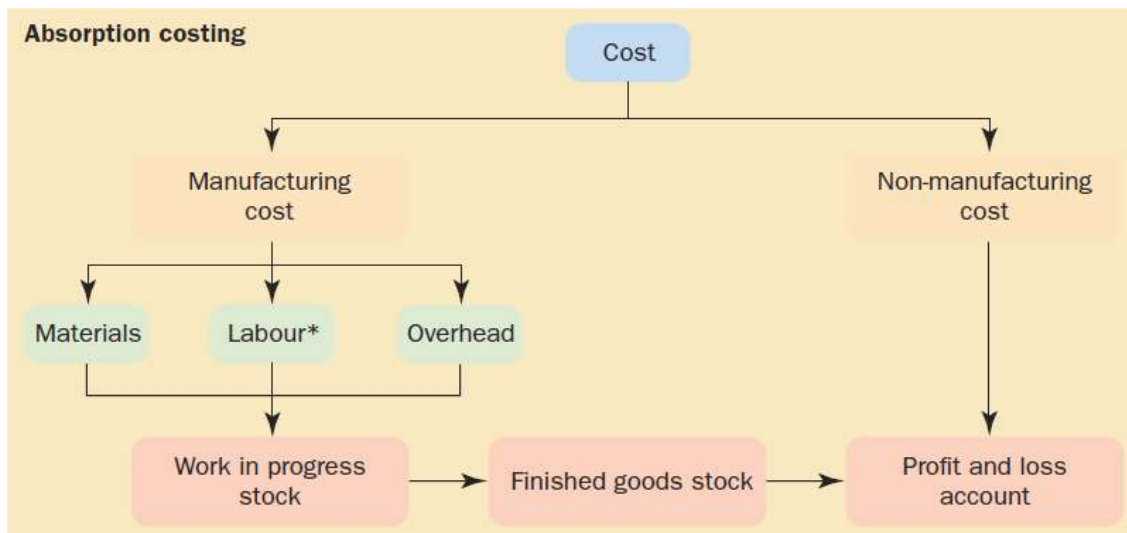
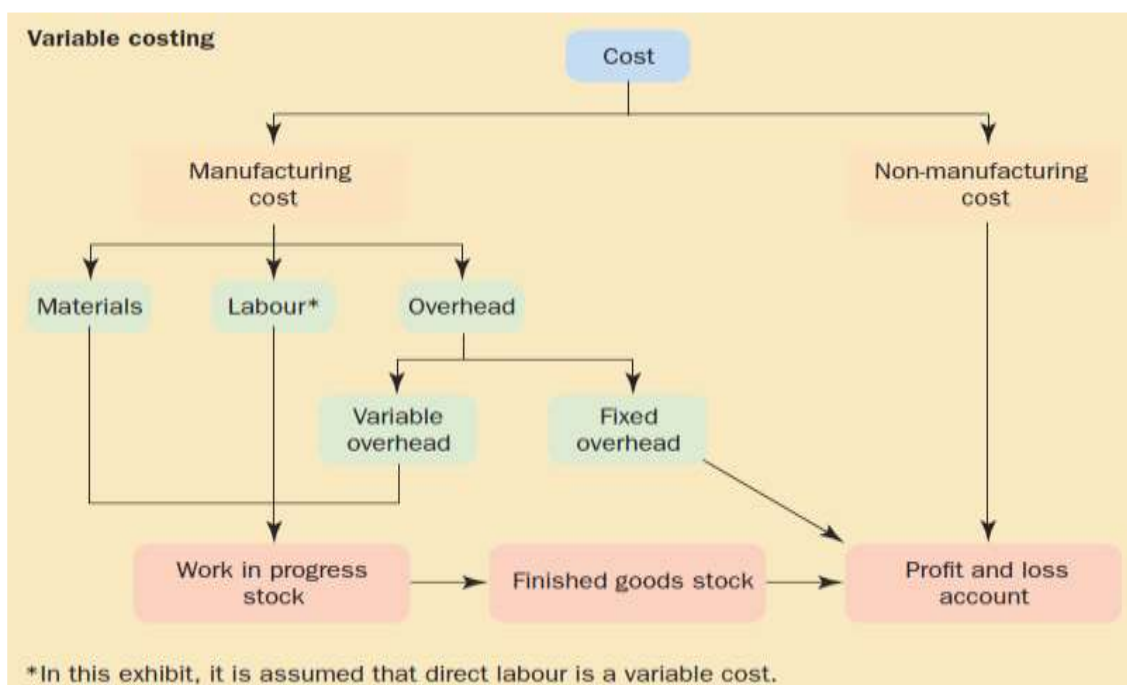


Figure 5 Absorption costing

Source: Colin Drury. 2018. *Management and Cost Accounting*, p. 160.

On the other hand, the method reflecting only variable costs is called **variable costing**. The changes in the structure of production costs in the second half of the 20th century caused the need to introduce a new method for monitoring production costs. In this period, the share of direct material and, significantly, direct labour costs decreased substantially, whereas the share of indirect (overhead) costs rose rapidly. Within **variable (retrograde) costing**, costs are classified into variable and fixed, and the contribution margin at different levels is calculated. This approach is used, for example, by managing short-term profit. The process of variable costing is shown in figure 6.



5.3. Cost assignments

The cost assignment methods are used to allocate costs to individual cost units. The whole process of cost assignment is influenced by:

- the determination of unit cost (direct and indirect)
- the volume of output (fixed and variable)
- the result of a specific decision on the subject of the calculation:
 - relevant – affected by the decision
 - irrelevant – not affected by the decision

Different methods of assigning costs to cost objects are used in practice (see figure 7).

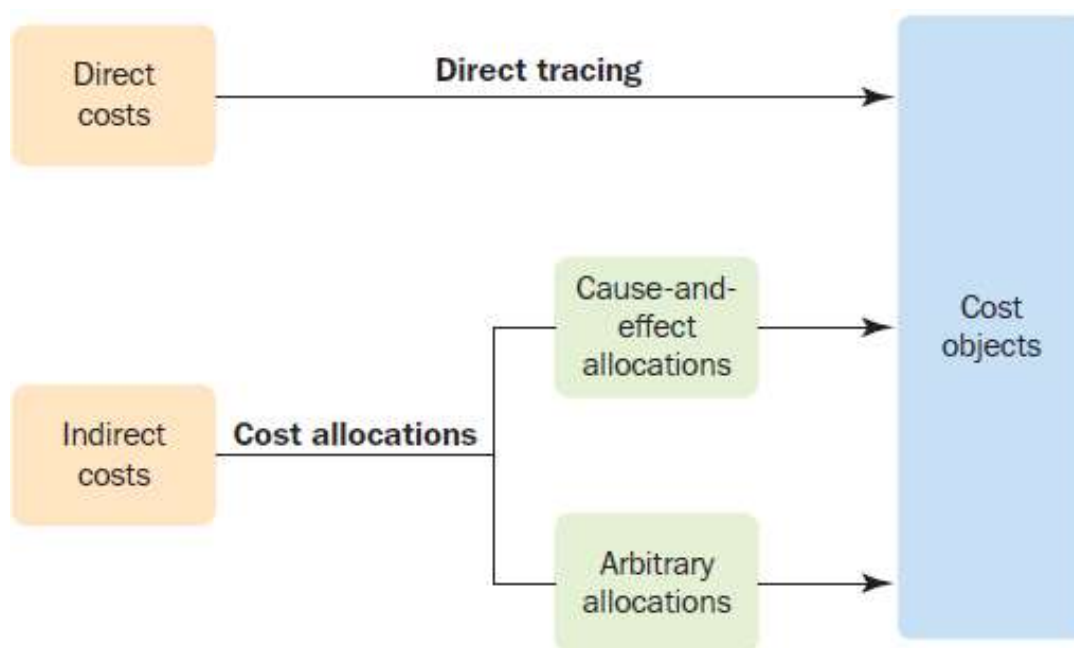


Figure 7 Cost assignment methods

Source: Colin Drury. 2018. *Management and Cost Accounting*, p. 46.

Direct costs can be precisely and exclusively identified with a given cost object, supposing they can be accurately traced to cost objects. Timesheets or job cards (direct labour) or material requisition (direct materials) can be used to monitor direct costs. Direct costs can be determined on the cost unit quite accurately:

- by dividing (for the actual calculation),
- on the basis of standards (for preliminary calculation).

Indirect costs cannot be directly traced to a cost object, and, therefore, they are assigned to cost objects using cost allocations. Indirect costs are incurred in connection with ensuring the production of a broader range of products, or they ensure the operation of the entire enterprise. The volume does usually not influence the amount and structure output, and only a part is affected by the degree of capacity utilisation. However, there may be cases where the amount is also influenced by the output volume

(lubricant consumption, ordering costs, etc.) In this case, the term **variable overhead** is used.

5.3.1 The two-stage allocation process

A **two-stage allocation process** is required to establish departmental or cost centre overhead rates. The process consists of the following two stages:

Stage 1 – Assign overheads initially to cost centres.

Stage 2 – Allocate cost centre overheads to cost objects (e.g. products) using second-stage allocation bases/cost drivers.

The structure of the two-stage process used within the traditional costing method can be shown in figure 8.

(a) Traditional costing systems

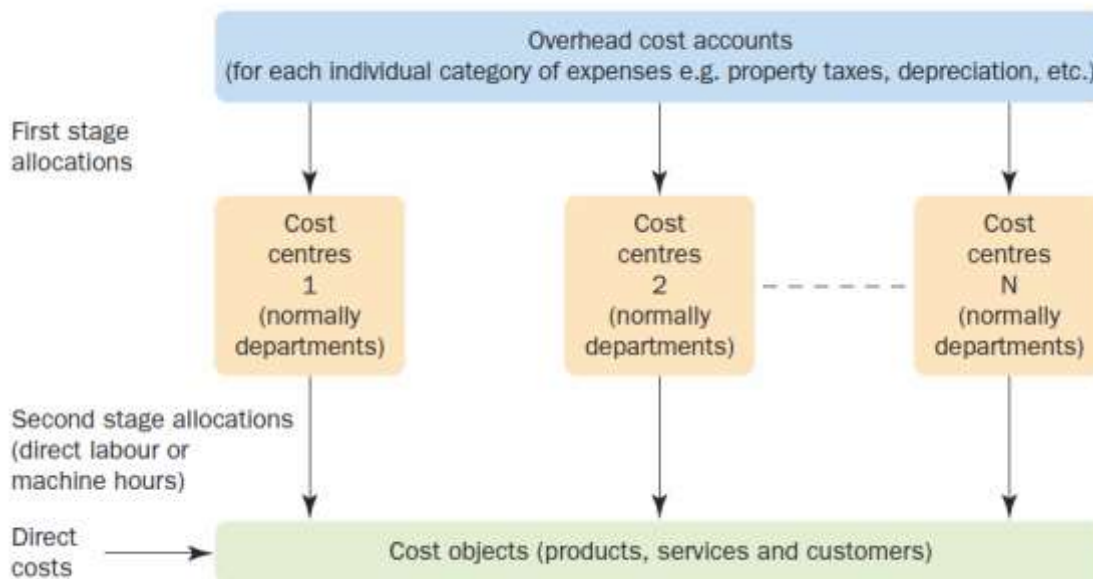


Figure 8 Two-stage allocation process

Source: Colin Drury. 2018. *Management and Cost Accounting*, p. 258.

Within the traditional costing system, the application of the two-stage allocation process requires the following four steps:

1. Assigning all manufacturing overheads to production and service cost centres.
2. Reallocating the costs assigned to service cost centres to production cost centres.
3. Computing separate overhead rates for each production cost centre.
4. Assigning cost centre overheads to products or other chosen cost objects.

For calculating the **overhead rates**, two alternatives can be used. Either the overhead rate is *expressed as a percentage*. This approach is used when the **allocation base** is expressed in monetary units (€, £). For example, direct material costs or direct labour

costs are used as the allocation base. The overhead rate is then calculated using formula 1.

$$\text{Overhead rate} = \frac{\text{indirect costs}}{\text{allocation base}} * 100 \quad (1)$$

The other alternative expresses the overhead rate in monetary units per one physical unit. This approach is used when the **allocation base** is expressed in physical units (pieces, kg, labour hours, and machine hours). The overhead rate is then calculated using formula 2.

$$\text{Overhead rate} = \frac{\text{indirect costs}}{\text{allocation base}} \quad (2)$$

5.3.2 Cost formula

The structure in which output costs are determined is expressed individually in each company in the so-called **cost formula**. A feature of the cost formula is variability with respect to the user and the decision task. There are several types of cost formulas used around the world. In the Czech Republic, for example, the traditional costing system uses the costing formula shown in figure 9.

- 1) Direct materials
- 2) Direct wages (labour)
- 3) Other direct costs
- 4) Manufacturing (production) overheads
Costs of production (operation)
- 5) Administrative overhead
Costs of output
- 6) Selling costs (direct and indirect)
Full costs of output
- 7) Profit (loss)
Production price
- 8) Sales discounts
Selling price

Figure 9 Cost formula used within the traditional costing system

Source: Own elaboration.

Summary



The costing system is most often understood as calculations oriented to determining costs, margins, profit or price. In practice, there are used different costing methods. They include, for example, job costing x process costing, actual costing x normal (standard) costing, costing of combined and non-combined production, absorption costing x variable costing, and traditional costing x activity-based costing.

Within **job costing**, costs are assigned to a single unit, batch, or a lot of a product or service. On the other hand, within the **process costing** cost of a product or service is obtained using averages to assign costs to masses of similar units.

Actual costing records actual product costs (e.g. cost of materials, the actual cost of labour, and the actual overhead costs incurred). **Standard (normal) costing** uses a budgeted amount of overhead.

Joint products have significant relative sales values. On the contrary, **by-products** are products with a minor sales value. Joint products are essential to the commercial success of an organisation, whereas by-products are incidental.

The full cost method, which includes direct and indirect costs in the calculation, is called absorption costing. On the other hand, the method reflecting only variable costs is called **variable costing**.

The cost assignment methods are used to allocate costs to individual cost units. **Direct costs** can be precisely and exclusively identified with a given cost object, supposing they can be accurately traced to cost objects. **Indirect costs** cannot be directly traced to a cost object; therefore, they are assigned to cost objects using cost allocations. A **two-stage allocation process** is required to establish departmental or cost centre overhead rates. The process consists of the following two stages. In stage one, overheads are initially assigned to cost centres, and in stage two, cost centre overheads are allocated to cost objects (e.g. products) using second-stage allocation bases/cost drivers

Literature



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