

**Free University of Bozen**

***Master in Industrial Mechanical  
Engineering***

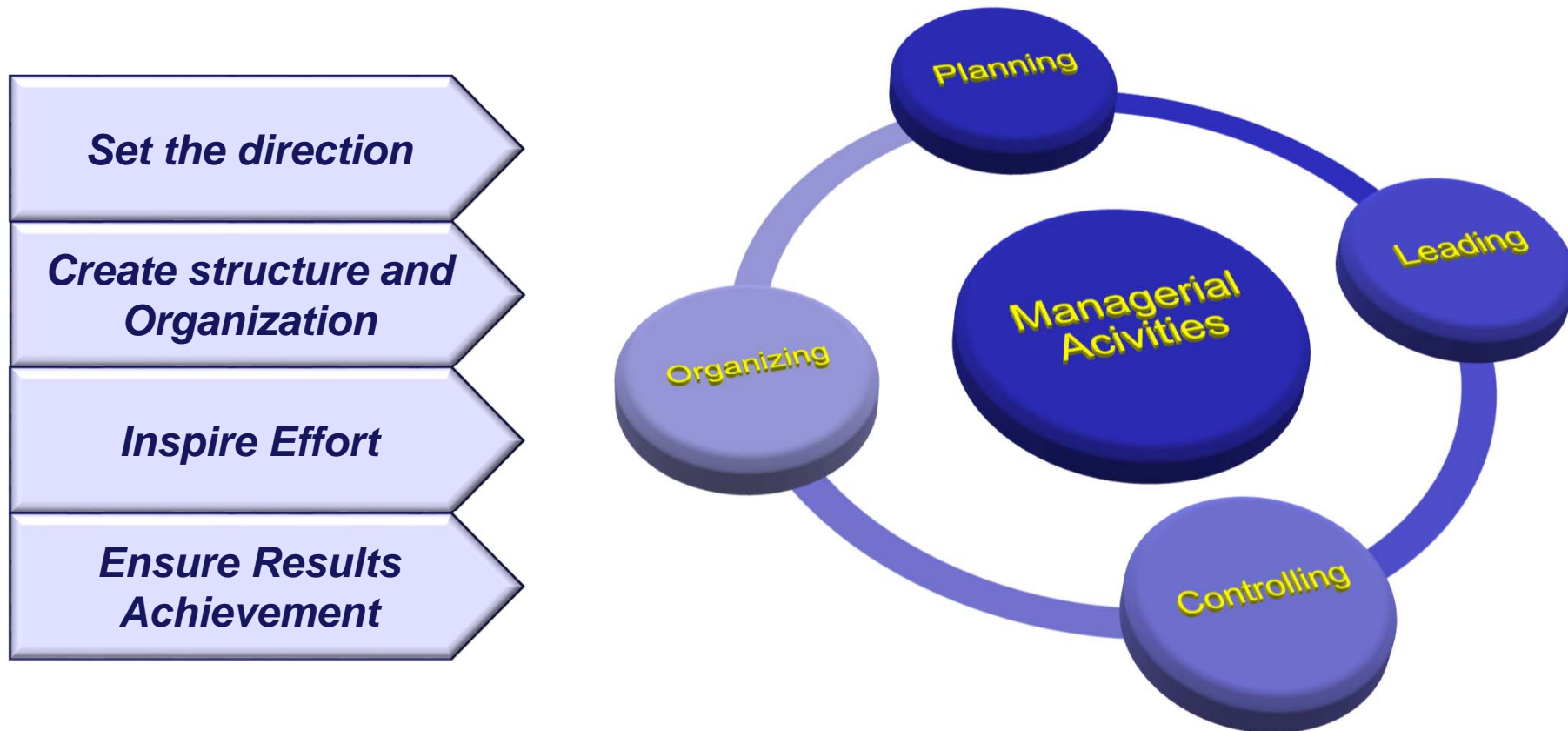
***Industrial Accounting and Management***

**Managerial Control: Costing**

*Ing. Fabrizio Bottacin, Ph.D.*

- Introduction
- Costs: definition and classification
- Costing

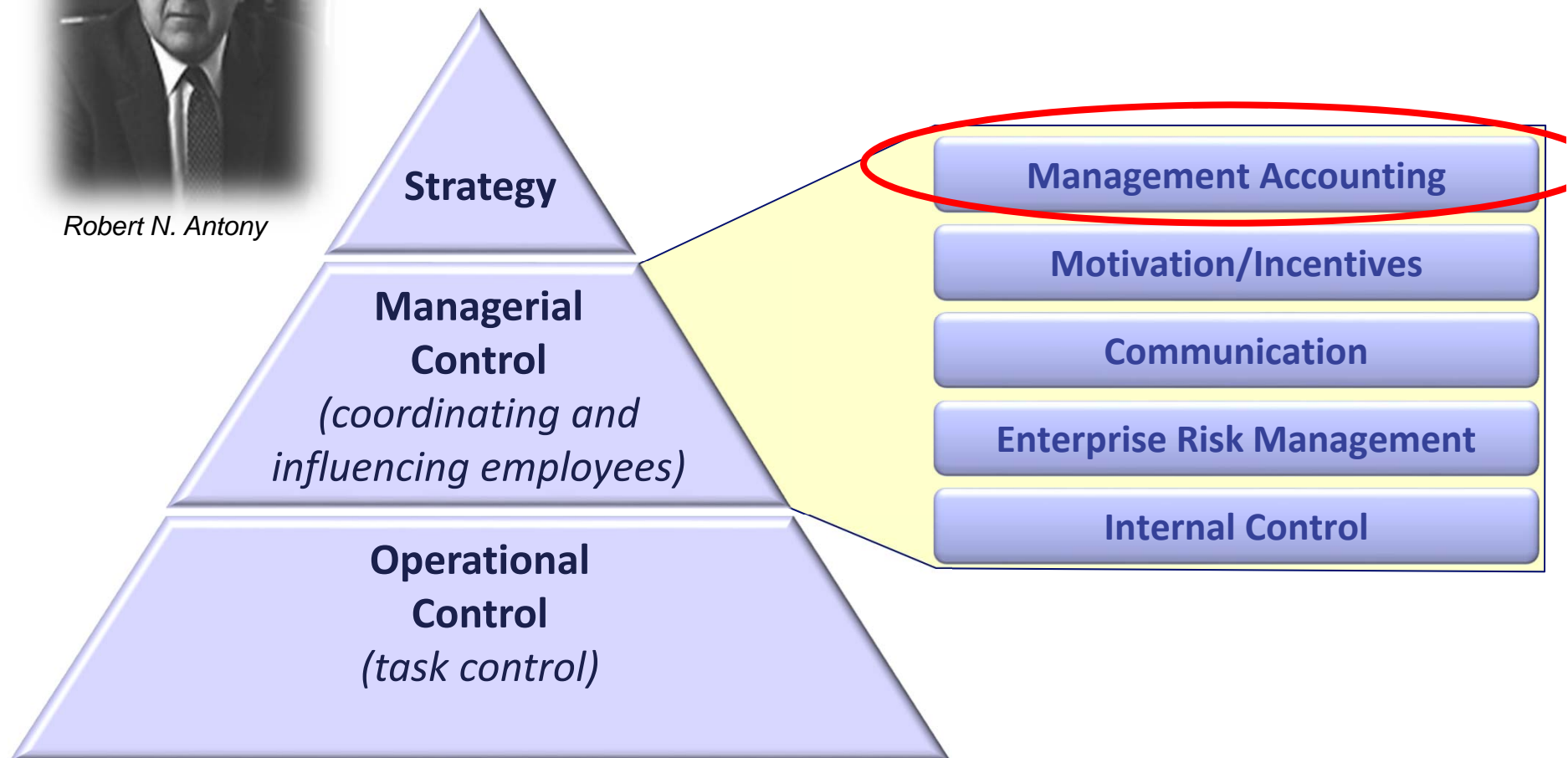
**Management** can be defined as the process of administering and controlling the affairs of the organization, irrespective of its nature, type, structure and size. It is an act of creating and maintaining such a business environment wherein the members of the organization can work together, and achieve business objectives efficiently and effectively.

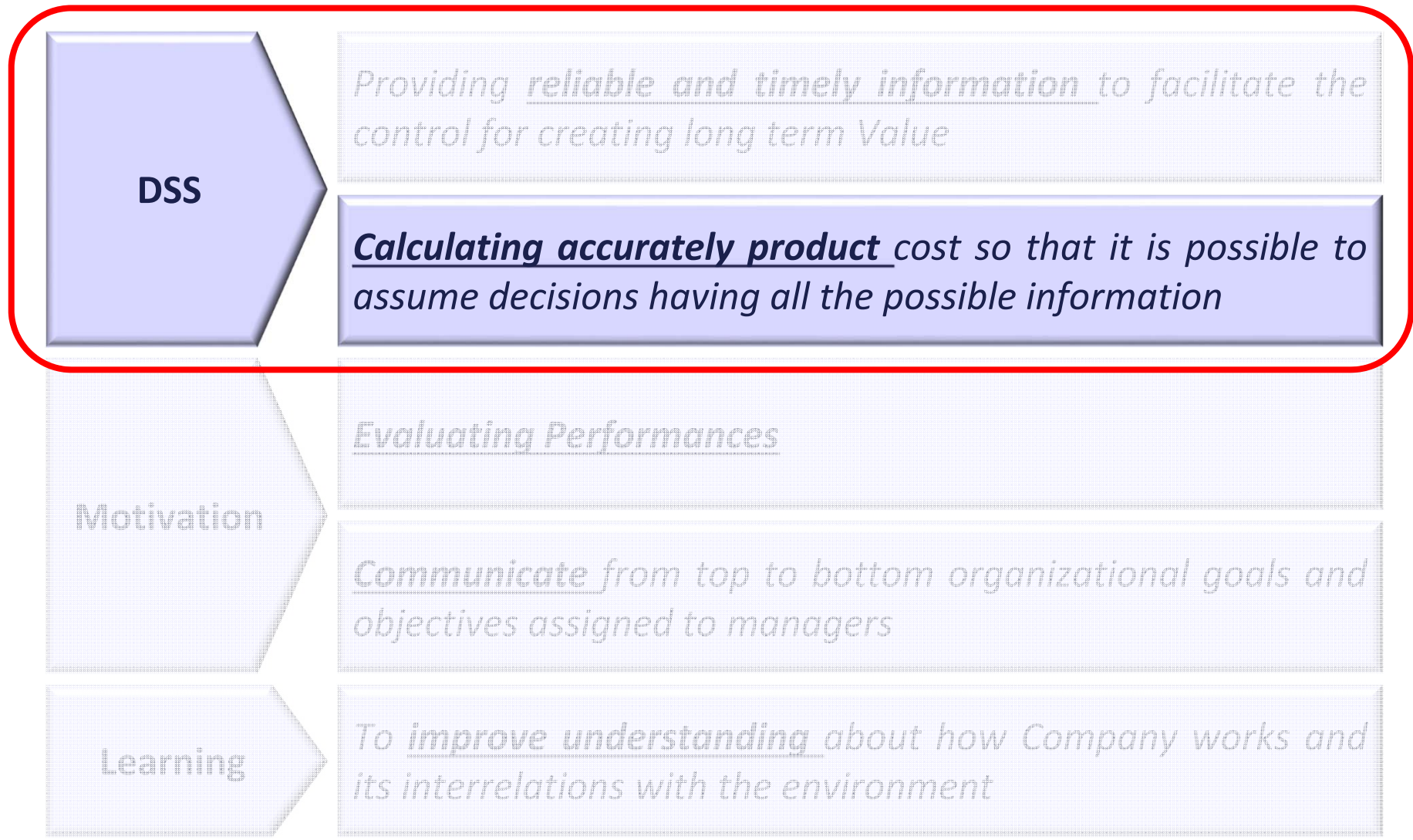


Managerial Activities could be grouped in 3 areas:



Robert N. Anthony





- Introduction
- Costs: definition and classification
- Costing

General Accounting is aimed at **providing information to external users** according to Civil Code principles (Art. 2423 bis).

- *prudence and continuity of the business;*
- *substance of the transaction or contract;*
- *you can only denote profits realized at the closing date;*
- *you must consider amounts regardless of the date of collection or payment;*
- *risks and losses must be considered even known after the closing date;*
- *single items must be valued separately;*
- *valuation criteria cannot be changed from one year to another.*

General Accounting produces a set of documents listed in Art. 2423:

- Statement of Financial Position [Art. 2424];
- Profit & Loss Statement [Art. 2425];
- Cash Flow Statement [Art. 2427];
- Notes to the Account [Art. 2427].



**Jacopo de' Barbari - Fra' Luca Bartolomeo de Pacioli** (Sansepolcro, c. 1445 - 1514 o 1517)

The **profit and loss statement** is a statement that summarizes **revenues, costs** and **expenses** incurred during a specified period, usually a fiscal quarter or a year.

Profit and loss statement provides information about a company's ability or inability to generate profit by increasing revenue, reducing costs, or both.

Synonyms are also *statement of profit and loss, income statement, statement of operations, statement of financial results or income, earnings statement or expense statement.*





<b>Vendite nette</b>	<b>Net Sales</b>
Altri ricavi e proventi	Other revenue and income
Variaz. rim.ze prodotti finiti e lavori in corso	Change in inventory of finished products and wip
<b>Valore della produzione</b>	<b>Value of production</b>
Acquisto di materiali	Purchase of materials
Variazioni del magazzino materie prime	Change in inventory of raw materials
Prestazioni di servizi	Services
Altri costi	Other costs
<b>Valore aggiunto</b>	<b>Added Value</b>
Costo del lavoro	Labour costs
<b>Margine Operativo Lordo (EBITDA)</b>	<b>Gross Operating Profit (EBITDA)</b>
Ammortamenti	Amortisation & Depreciation
Altri accantonamenti	Other provisions/accruals
<b>Risultato operativo (EBIT)</b>	<b>Operating Profit (EBIT)</b>
Proventi e oneri finanziari netti	Net financial income and losses
Utili e perdite su cambi netti	Net exchange rate gain/(losses)
Svalutazione/Rivalutazione partecipazioni	Profits/(losses) of equity-accounted investees
<b>Risultato prima delle imposte</b>	<b>Profit before taxation</b>
Imposte sul reddito: Correnti	Current Income taxes for the period
Imposte sul reddito: Differite	Deferred Income taxes for the period
<b>Risultato del periodo</b>	<b>Profit for the period</b>



Distortions can be explained by the specificity of **General Accounting**:

- has external information recipients;
- has tax purposes;

so it is **heavily influenced by the rules and regulations**;

But Managers need **other data** for:

- **supporting** the development of **general accounting** data (inventory valuation);
- analyzing which products, rather than organizational units are actually **responsible** for the firm's results.

Such information:

- are **cost per unit** of product/service or **cost of organizational units** (cost centers; expense centers);
- are **useful** for **decision-making** and **performance management system** and **can't be inferred** by general accounting information system.



Using Internal Accounting, Management analyzes both the short and long term, aimed at the planning and control. They use Internal Accounting for:

- supporting the elaboration of the business budget;
- developing profitability analysis;
- Introduction/elimination of products;
- Making production or service centers more efficient ;
- Outsourcing decisions (make or buy);
- Tactical Decisions (mix, pricing, ...);
- Performance evaluation;



The term “**cost**” means the aggregate of values that measure, in **monetary terms**, the **consumption of resources** used for certain activities aimed at achieving a predetermined **goal** (such as the realization of a product or provision of a service).

The concept of cost is **ambiguous** and must be characterized by a qualifying adjective:

- **Direct;**
- **Full;**
- **Opportunity;**
- **Differential**

It must be, also, related to an **object of cost** and it is characterized **in time**, in a range of **relevance** and in a **specific context**.

We must consider **different classifications**:

- Fixed VS Variable;
- Direct VS Indirect;
- Product VS Period;
- Avoidable costs VS Unavoidable;



Following the way of varying of the cost level in relation to the variation of the activity volume, we can divide costs in:

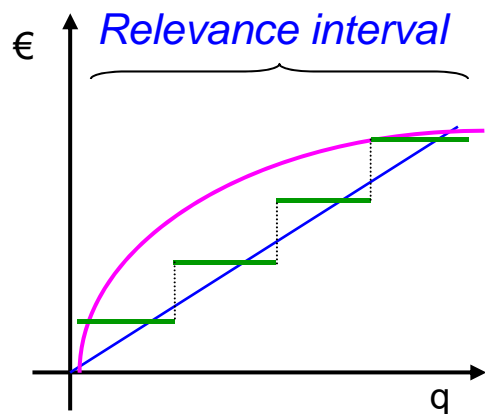
- Variable Costs;
- Fixed Costs;
- SemiFixed Costs;

The relative proportion of each type of cost in a Company is defined “**cost structure**”

Cost Structure allows to **foresee the economic effects of changes in the level of activities** that generate the costs itself and make correct strategic decisions

**Variable cost** = cost amount varies, depending on the volume of activity ("cost object").

The relation is not only direct proportionality.



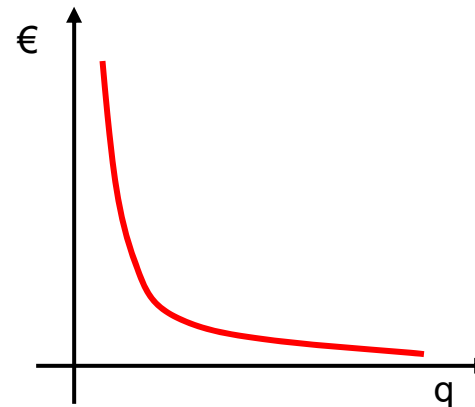
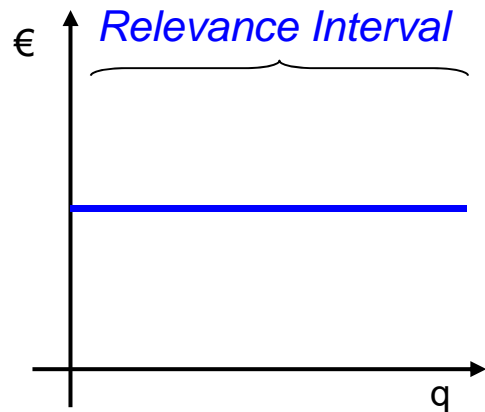
**Activity Base = basic unit of activity that generates a variable cost (cost drivers) as:**

- direct labor hours / hours machine
- units produced / sold
- number of kilometers traveled by sellers
- ...

Variable costs are not necessarily linked to the units produced or sold. They can be originated from the production side activities. A cost will be **variable** if it is caused by **volume** of activity.

**fixed cost** = its total amount is not influenced by the volume of activity within the relevant range

The impact of fixed costs on the single unit produced decreases as the level of activity increases (inverse proportionality)



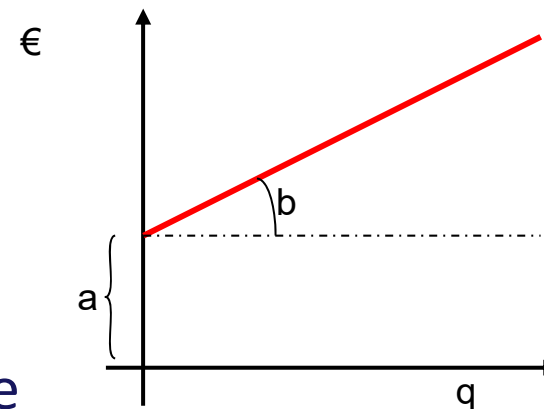
For decision-making, Companies should not express their fixed costs in unitary terms in order to **avoid strategic mistakes**

Regarding changes in the level of activity, their behavior has elements similar to fixed cost and, at same time, variable cost elements. Law that describes its course is described by a law as the following:

$$Y = a + bq$$

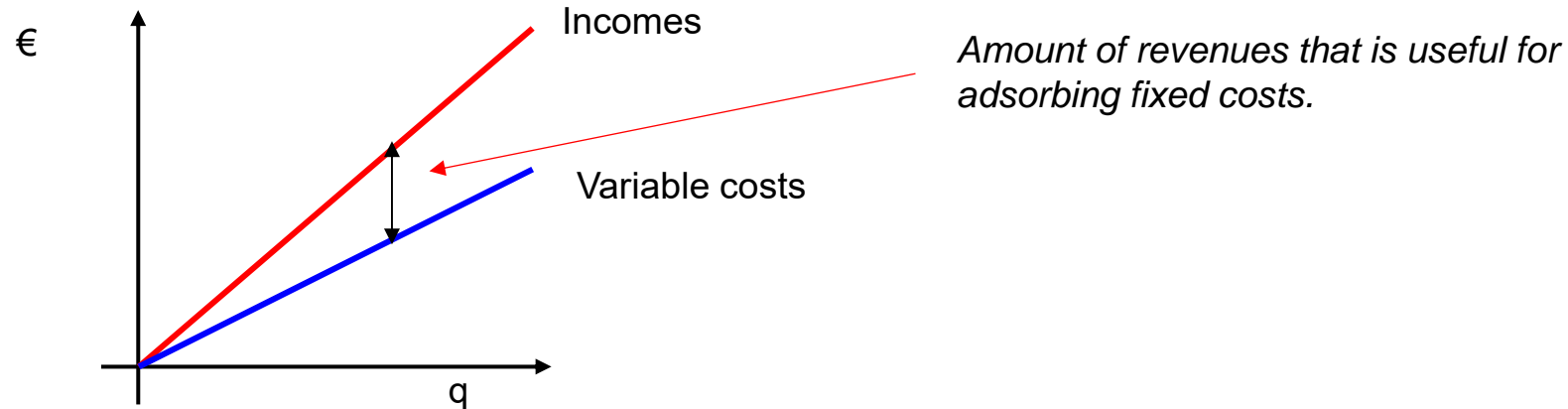
**a** = fixed component (expresses the cost of the availability of the resource)

**b** = coefficient of proportionality (expresses the cost of resource consumption)





**contribution margin** = (Revenues) – (Variable costs)



**“Contribution Margin” Income Statement**

Traditional Approach

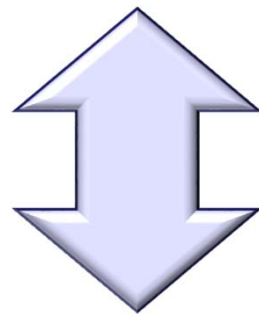
Contribution Margin Approach

Revenues	12.000
Sold goods Cost	- 6.000
<b>First Margin</b>	<b>6.000</b>
Selling Expenses	- 3.100
G&A Expenses	- 1.900
<b>Operational Margin</b>	<b>1.000</b>

Revenues	12.000
Variable Production costs	- 2.000
Variable Selling costs	- 600
Variable costs of managing	- 400
<b>Contribution margin</b>	<b>9.000</b>
Fixed Production costs	- 4.000
Fixed Selling costs	- 2.500
Fixed costs of managing	- 1.500
<b>Operational Margin</b>	<b>1.000</b>

If a cost can be attributed unambiguously and unequivocally to a given cost object, it can be defined **direct cost**.

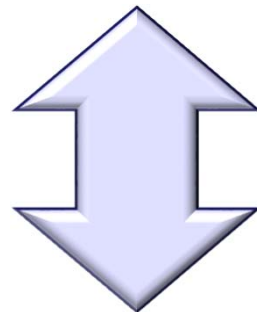
*Example: the cost of the raw materials used to produce a given product*



The presence of **indirect costs** determines the problem of their **allocation**, in case you wish to assign to the products to determine their full cost, after having allocated direct costs.



**Product costs:** value of resources associated directly or indirectly to the realization of a given product or service;



**Period costs:** value of resources used in activities **not associated with the production of a good or realization of a service**, according to a causal link (*i.e. not directly related to the physical transformation of input into output operations*);



Product costs can be further classified into:

- **direct material costs** (Raw materials, components, semi-finished directly associated to the production of a certain product/service);
- **direct work costs** related to employees that operate physical transformation and assembling;
- **indirect costs of production** (or production **overhead**) costs not directly attributable to individual products, although associated productive activity as a whole;



**Period Costs** can be:

- **Administration costs** (personnel + other administrative costs);
- **General Expenses** (salaries of executives and employees central offices, depreciation of machinery/equipment/non-industrial buildings, overhead office - phone, missions, etc. - offices of employees insurance and non-industrial buildings, ...);
- **Selling expenses** (salaries and the domestic sales agents travel expenses, amortization + insurance + operating expenses / maintenance sellers-distributors vehicles, etc.);
- **Discretionary spending** (advertising, promotion, participation in trade fairs, training courses and updating, legal, cultural and leisure activities, etc.);
- **R & D expenses** (research and development of new products, new processes, ...);

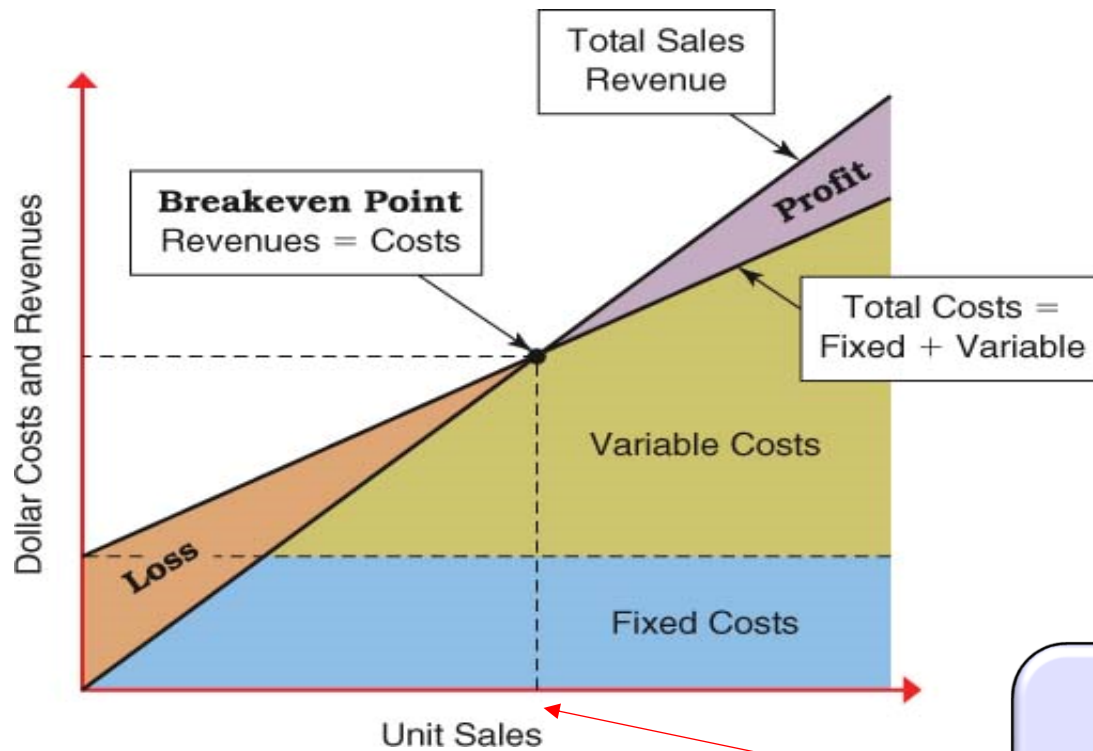


Distinguishing costs in **avoidable** costs vs **unavoidable** costs (sunk costs) is connected to their importance in **decision-making**: in a specific decision some costs are affected by the decision (avoidable) others not (unavoidable) and will be incurred regardless of the decision.

**In decision-making, you must consider only avoidable costs.**



What is the minimum amount of production that allows to cover costs?



$$X_{BE} = \frac{CF}{p - c} = \frac{CF}{m}$$

# Exercise 1 – Monoproduct Company



*A food company has a business unit dedicated to the production of anchovy paste.*

*Fixed costs amounted to € 150.000 and variable costs are 70% of the sale price (10 € / kg).*

***How many** 100 g tubes of anchovy paste must a Company sell to reach the breakeven point?*

Solution



When I consider a Company with two or more products, the previous expression has to change. I can't consider quantity but I have to consider revenues. The correct question is:

**What is the minimum revenue that allows me to cover my costs?**

$$V_{BE} = \frac{CF}{\sum \gamma_i m_{i\%}}$$

$\gamma_i$  is the revenue share of the  $i$ -th product compared to the total turnover

$m_{i\%}$  is the ratio made by contribution margin ( $m$ ) over price ( $p$ ) of the  $i$ -th product

## Exercise 2: Break Even in a Multiproduct Company



*A company produces furniture components: 40% of the turnover is made by chairs (average price = € 50) and 60% by tables (average price = 100 €).*

***What turnover** has to realize a company that produces chairs and tables, knowing that fixed costs are € 1.200.000 and that the average variable costs of chairs and tables, are 70% and 80% respectively ?*

Solution