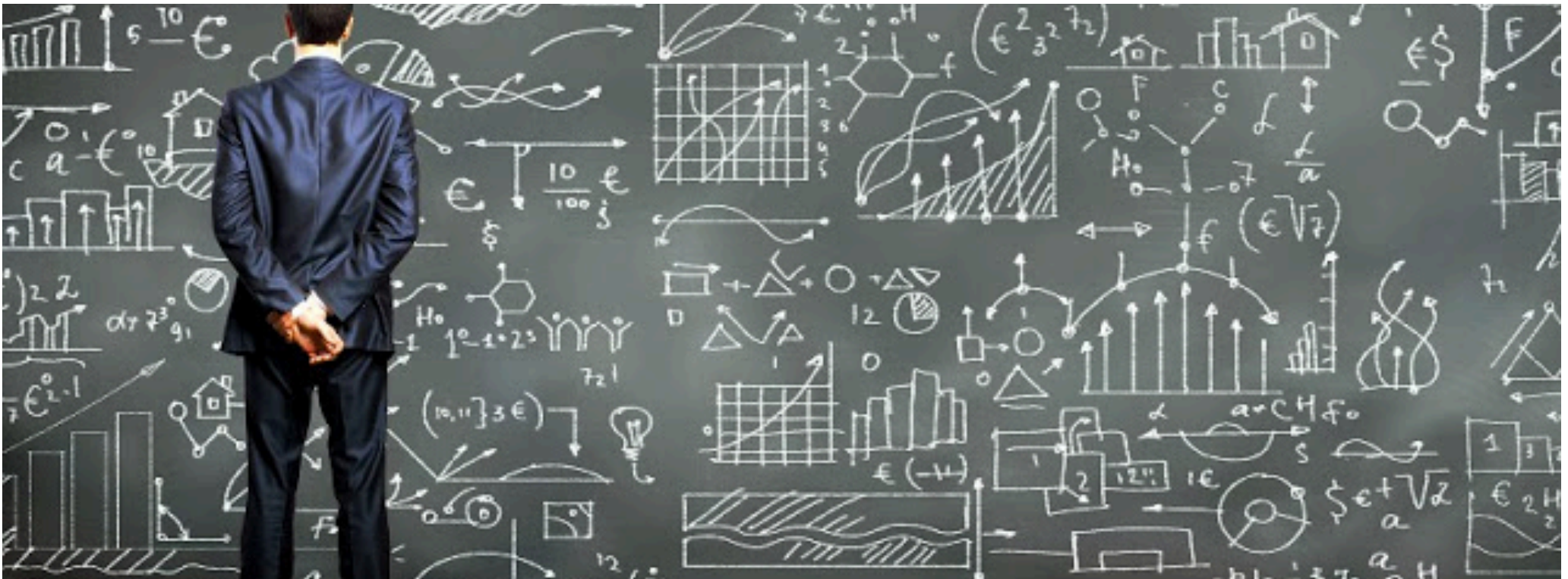


EFFICIENCY AND EFFECTIVENESS

Measuring process performance



WHAT TO MEASURE? BACK TO THE ROOTS

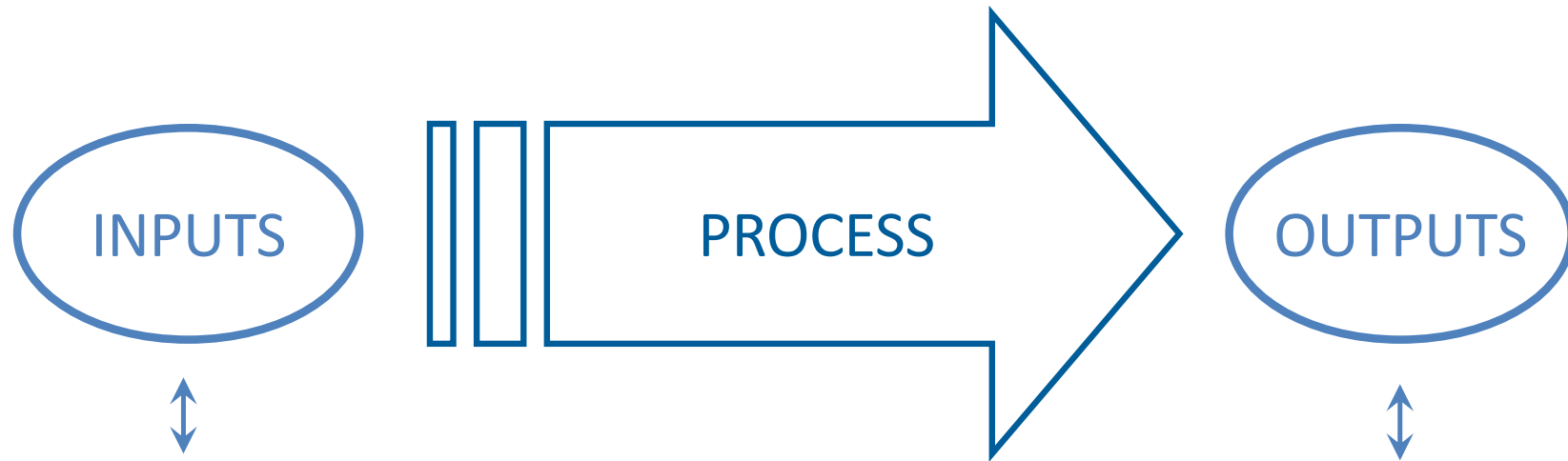
Robert Anthony initially (in 1965) defined Management Control as:

*«the process by which managers assure that **resources are obtained and used effectively and efficiently** in the accomplishment of the organization's objectives».*

Few years later (in 1988) he revised his original definition to the following:

«Management Control is the process by which managers influence other members of the organization to implement the organization's strategies».

THE LINK WITH THE OBJECTIVE OF CREATING VALUE



FACTORS OF PRODUCTION

(tangible and intangible resources needed to carry out production)
are **used, consumed.**

PRODUCTS (tangible resources) and/or
SERVICES (intangible resources)
are **made, obtained.**

EXPENSES are incurred

REVENUES are earned

DESTRUCTION OF “VALUE”

CREATION OF “VALUE”

A SIMPLE REFLECTION



Which of the two runners will make the greater effort?

Which of the two will win the race?

REAL LIFE EXAMPLE

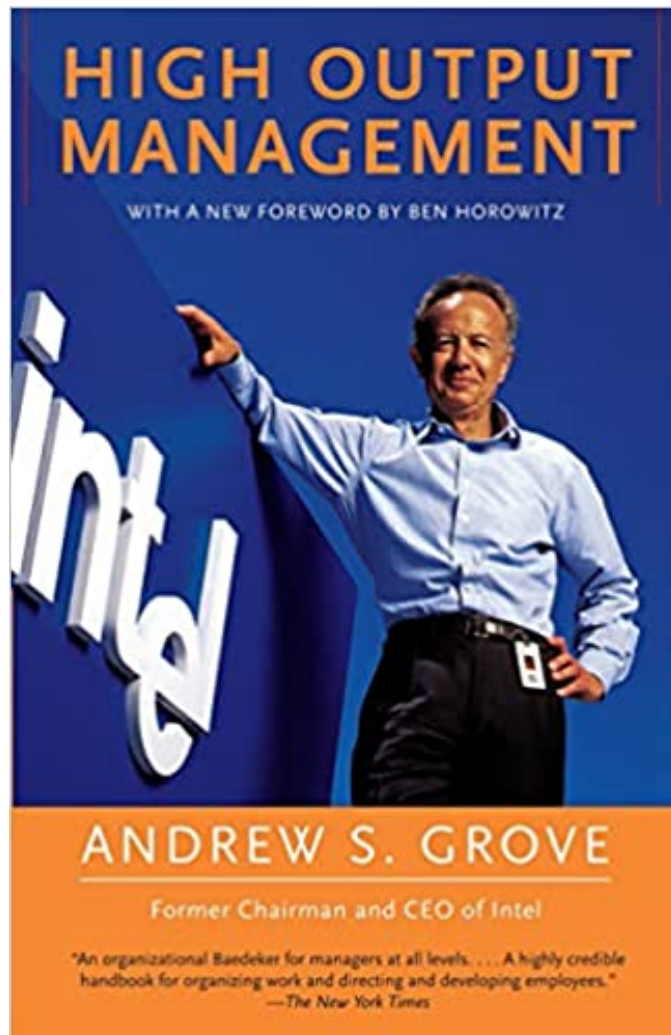


BDR: «*What grade would you assign to your exam?*»

STUDENT: «*Professor, if I consider the time it took me to study this course, I would give me an A+!*»

Please note and keep in mind: with the same result, the greater the effort produced, the worse the performance!

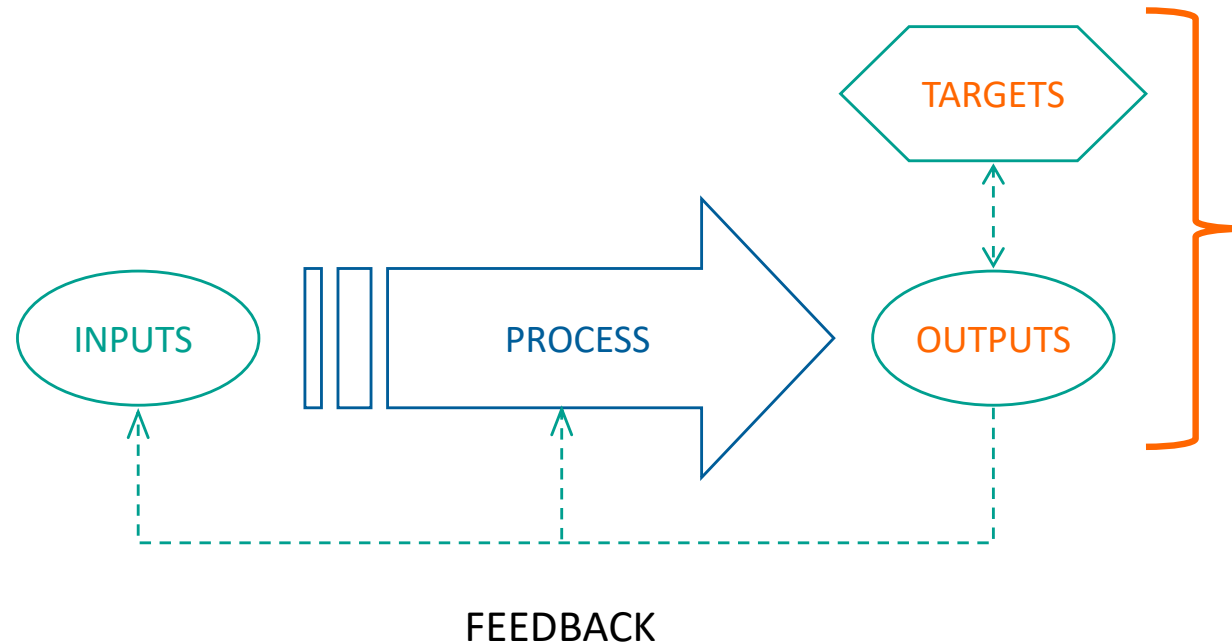
MEASURE THE OUTPUT NOT THE EFFORT



«The first rule is that a measurement—any measurement—is better than none. But a genuinely effective indicator will cover the output of the work unit and not simply the activity involved. Obviously, you measure a salesman by the orders he gets (output), not by the calls he makes (activity)».

Excerpt from: Andrew S. Grove. "High output management"

EFFECTIVENESS



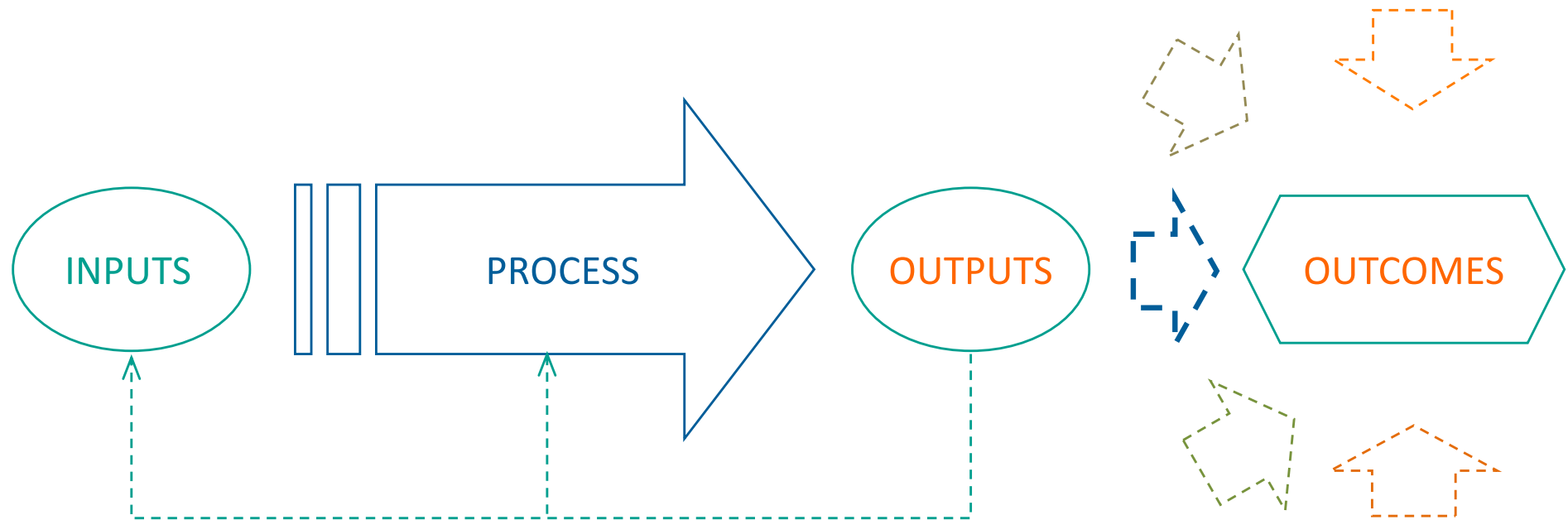
Effectiveness refers to the extent to which an activity achieves desired outcomes.

Effectiveness answers the question: Did we achieve what we set out to do?

Thus, measures of effectiveness focus on the comparison of actual results with preset expectations or standards.

Source: Robert Simons, "Strategy Execution Module 3: Evaluating Strategic Performance", HBS Publishing, 2017

OUTPUTS AND OUTCOMES



OUTPUTS VS OUTCOMES

OUTPUTS

Cause

System-oriented

Immediate effects

Descriptive

Easily measurable

OUTCOMES

Effect

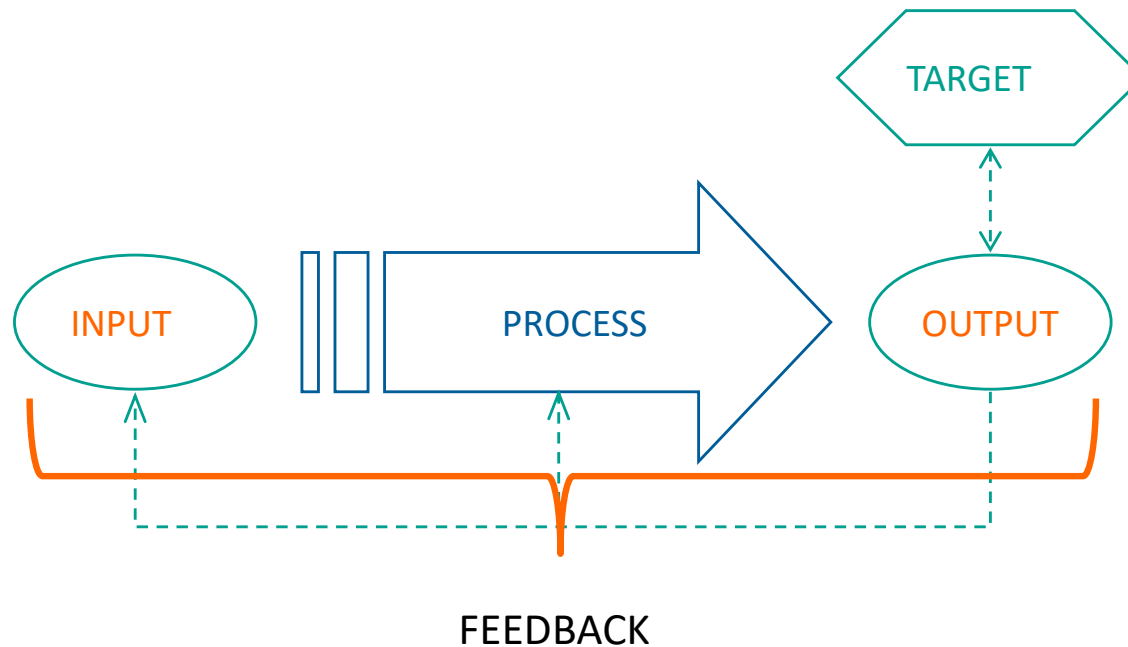
Context-oriented

Intermediate and long-term effects

Normative

Fuzzy and hard to measure

EFFICIENCY



Efficiency refers to **the level of resources that were consumed to achieve a certain level of output.**

Measures of efficiency answer the question: **How many resources were used to achieve the actual outputs?**

Thus, efficiency variances **focus on ratios of inputs to outputs.**

Source: Robert Simons, "Strategy Execution Module 3: Evaluating Strategic Performance", HBS Publishing, 2017

PRODUCTIVITY

Productivity is concerned with producing output efficiently, and it specifically addresses the relationship of output and the inputs used to produce the output.

Usually, different combinations or mixes of inputs can be used to produce a given level of output.

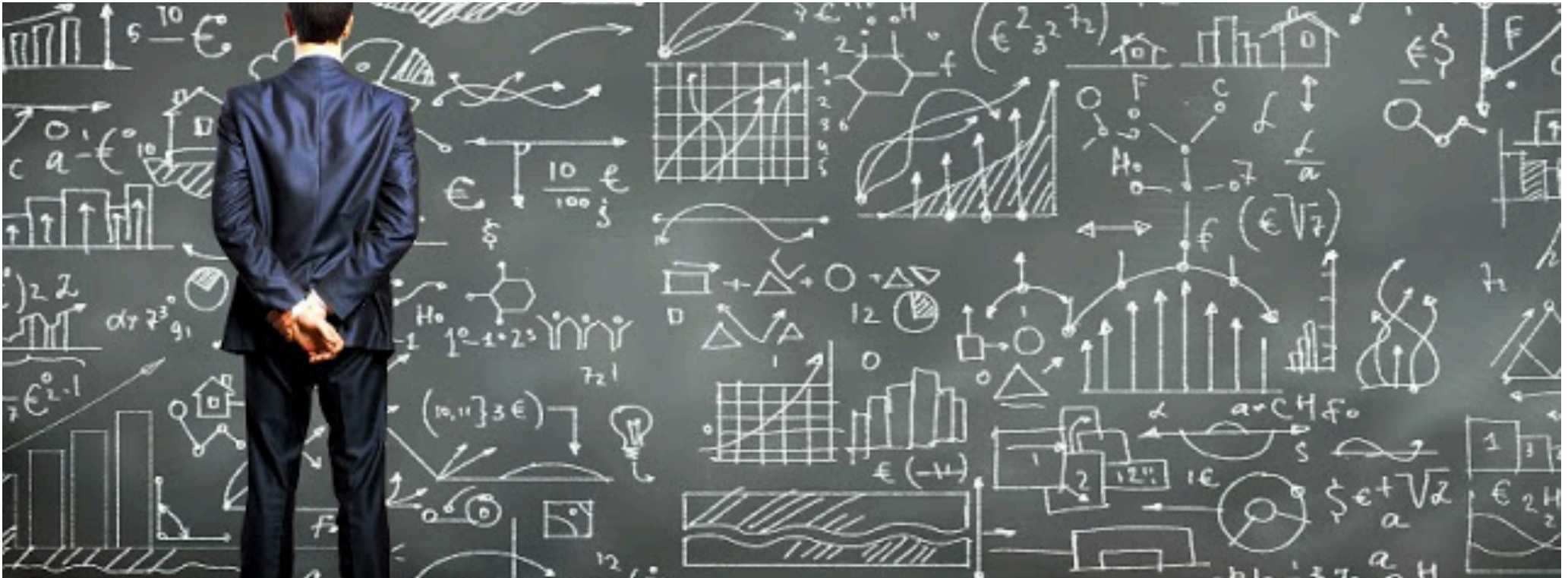
Total productive efficiency is the point at which two conditions are satisfied:

1. For any mix of inputs that will produce a given output, no more of any one input is used than necessary to produce the output (technical efficiency) and
2. given the mixes that satisfy the first condition, the least costly mix is chosen (allocative efficiency).

Source: Don R. Hansen & Maryanne M. Mowen, "Cost Management. Accounting and Control", Fifth Edition, Chapter 15
Productivity Measurement and Control, Thomson South-Western, 2006

OPERATIONAL PRODUCTIVITY MEASURES

Measuring efficiency in physical terms



PARTIAL OPERATIONAL PRODUCTIVITY



100 km

67.2 miles

3.5 liter

1 gallon

OPERATIONAL PRODUCTIVITY

$\frac{\text{\# items sold}}{\text{square meters}}$	$\frac{\text{hectoliters of wine}}{\text{hectares of vineyard}}$	$\frac{\text{1 liter of wine}}{\text{kg grapes}}$	
$\frac{\text{square meters "served"}}{\text{\# Full Time Equivalents}}$	$\frac{\text{\# salable chairs}}{\text{1 day of production}}$		
$\frac{\text{\# of products}}{\text{hours of labor}}$	$\frac{\text{\# of dossiers}}{\text{\# of clerks}}$	$\frac{\text{\# of km}}{\text{\# of day}}$	$\frac{\text{\# of km sold}}{\text{\# of km travelled}}$

HOW TO MEASURE RETAIL PERFORMANCE?



1. Number of Customers (Customer Traffic)
2. Effectivity (Retail Conversion Rate)
3. Average Sale (Average purchase value)
4. Items per purchase (Size of an average shopping cart)
5. Gross margin (Sales profit before costs)

SOURCE: <https://erply.com/how-to-measure-retail-performance-5-essential-metrics/>

HOW TO LINK THE MEASURES TOGETHER

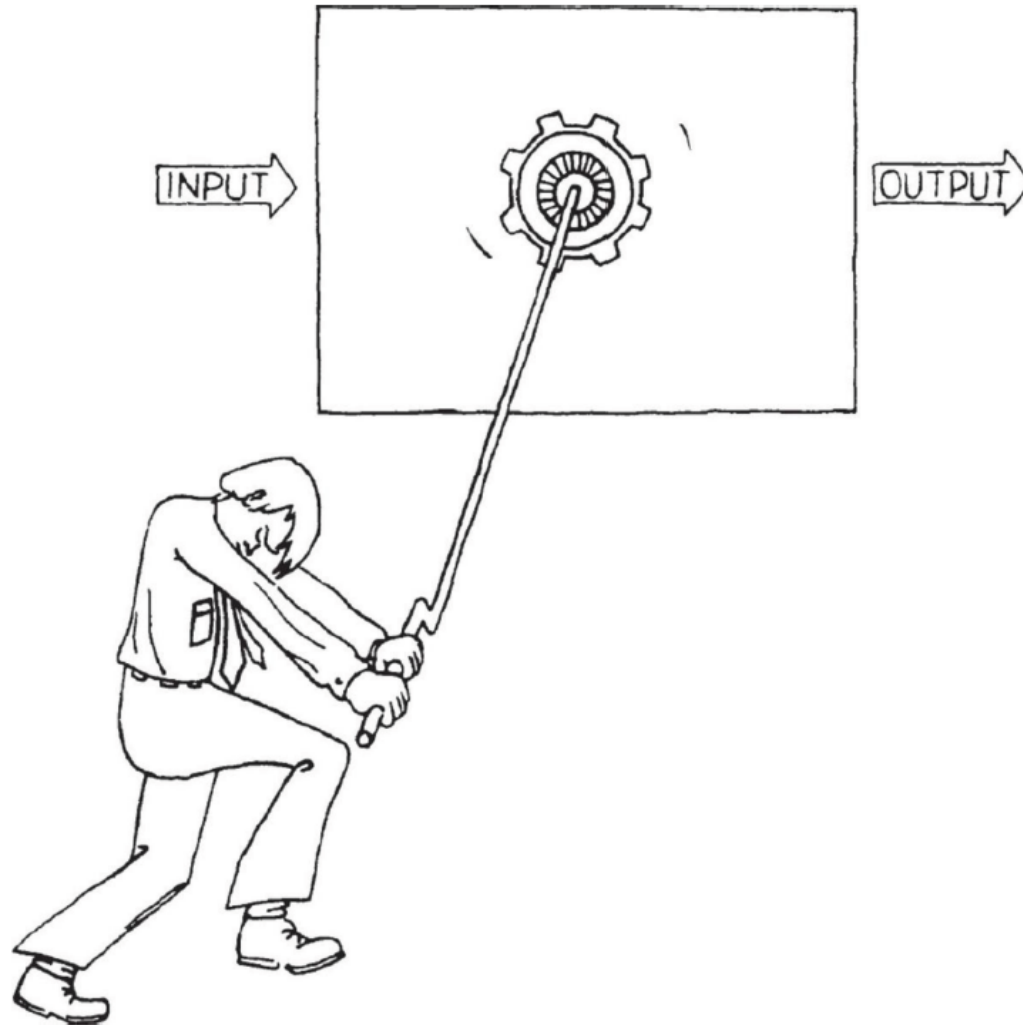


1. Number of Customers (Customer Traffic)
2. Effectivity (Retail Conversion Rate)
3. Average Sale (Average purchase value)
4. Items per purchase (Size of an average shopping cart)
5. Gross margin (Sales profit before costs)

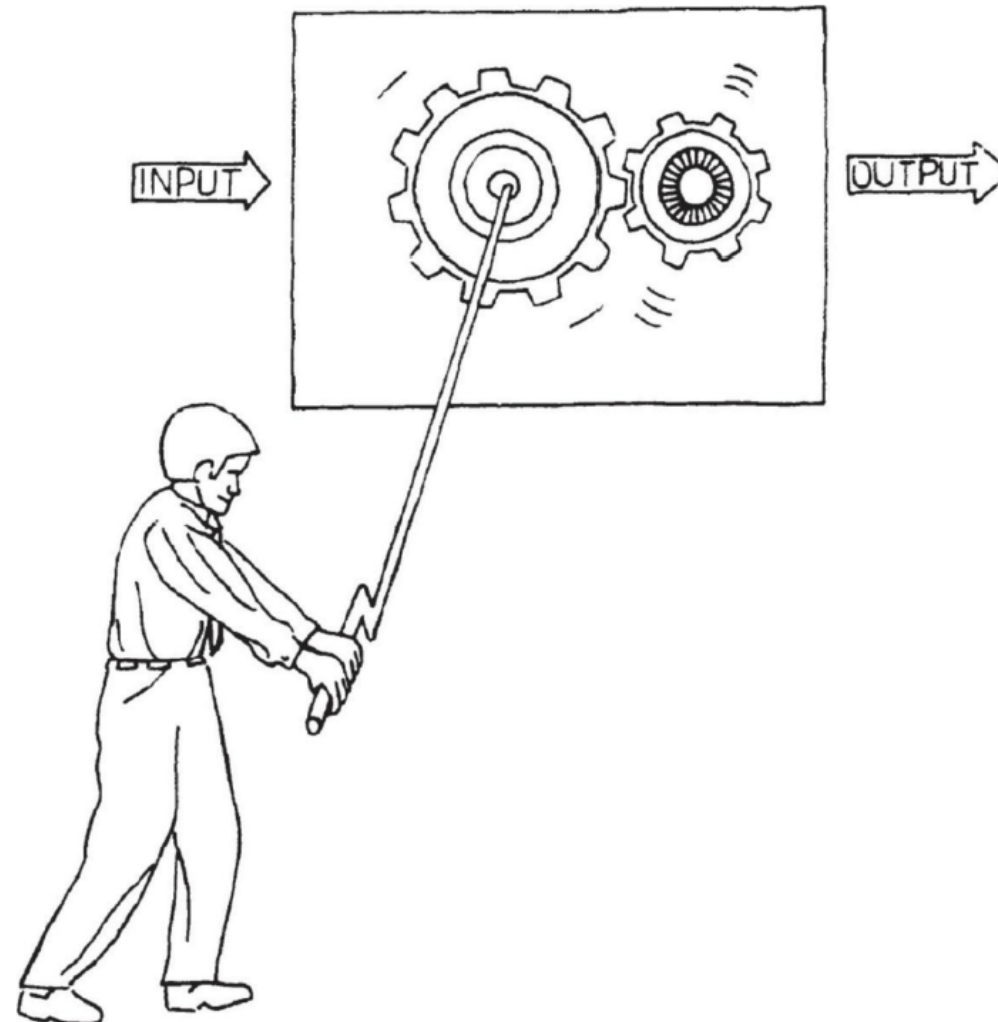
$$\underbrace{\frac{\# \text{ Visitors}}{\# \text{ Square meters}} * \frac{\# \text{ Transactions}}{\# \text{ Visitors}} * \frac{\# \text{ Items sold}}{\# \text{ Transactions}}}_{\text{Partial operational productivity measures}} * \left[\frac{\text{Sales revenue}}{\# \text{ Items sold}} - \frac{\text{COGS}}{\# \text{ Items sold}} \right]$$

Partial operational productivity measures

WORKING FASTER (HARDER ?)



WORKING SMARTER



WORKING HARDER OR SMARTER

«The workings of our black box can furnish us with the simplest and most useful definition of productivity. The productivity of any function occurring within it is the output divided by the labor required to generate the output. Thus, **one way to increase productivity is to do whatever we are now doing, but faster. This could be done by reorganizing the work area or just by working harder.** Here we've not changed what work we do, we've just instituted ways to do it faster—getting more activities per employee-hour to go on inside the black box. Because the output of the black box is proportional to the activity that occurs within it, we will get more output per hour. **There is a second way to improve productivity. We can change the nature of the work performed: what we do, not how fast we do it.** We want to increase the ratio of output to activity, thereby increasing output even if the activity per employee-hour remains the same. As the slogan has it, we want to “work smarter, not harder”».

Excerpt from: Andrew S. Grove. “High output management”

WHICH IS THE BEST?



CAB DRIVER FURIO

$$\frac{100 \text{ km travelled}}{8 \text{ liters}}$$

CAB DRIVER NEVIO

$$\frac{150 \text{ km travelled}}{12 \text{ liters}}$$

WHICH IS THE BEST?



CAB DRIVER FURIO

$$\frac{50 \text{ km sold}}{8 \text{ liters}}$$

CAB DRIVER NEVIO

$$\frac{50 \text{ km sold}}{12 \text{ liters}}$$

WHICH IS THE BEST?

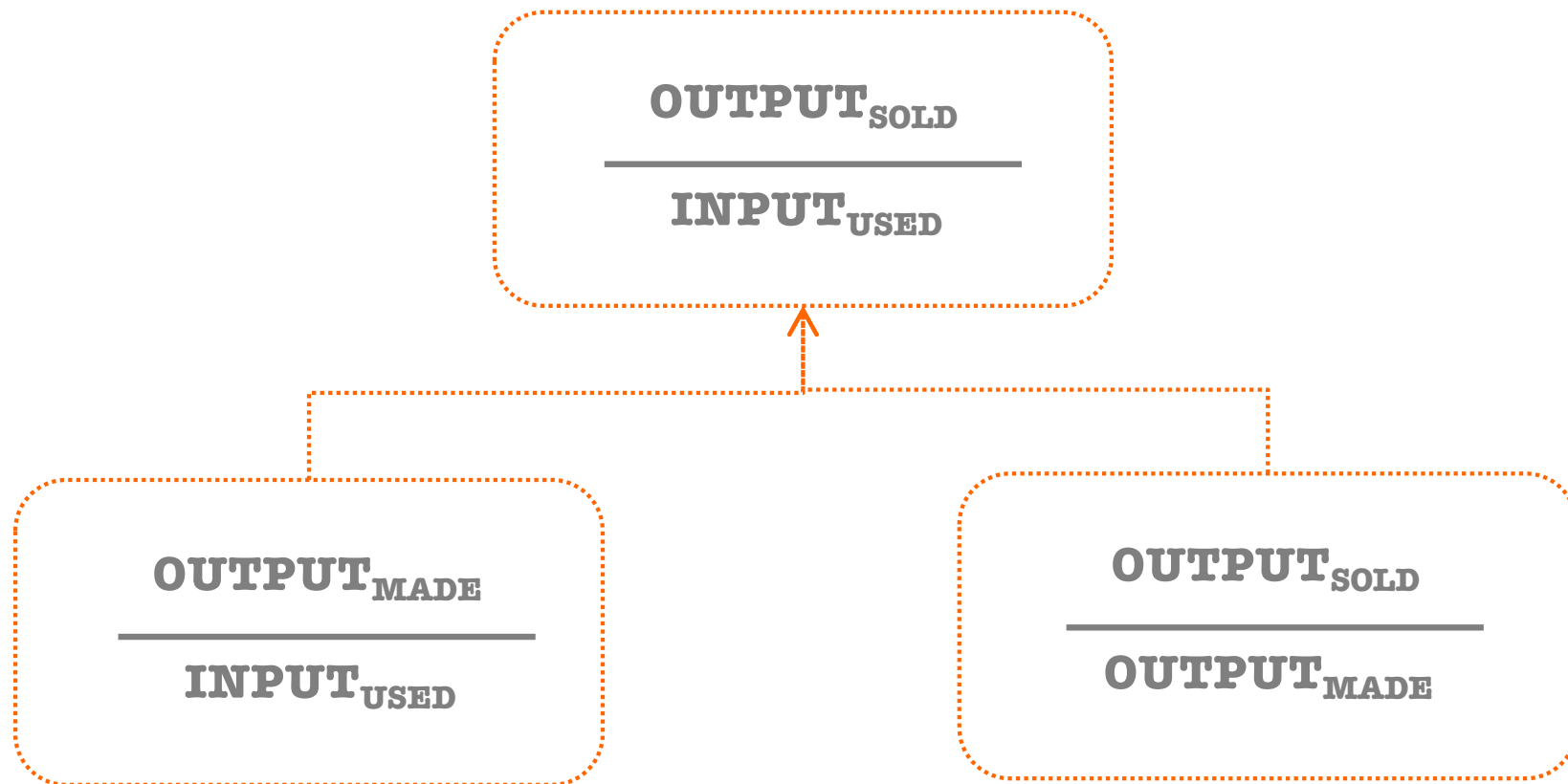
CAB DRIVER FURIO

$$\frac{50 \text{ km sold}}{8 \text{ liters}} = \frac{50 \text{ km sold}}{100 \text{ km travelled}} \times \frac{100 \text{ km travelled}}{8 \text{ liters}}$$

CAB DRIVER NEVIO

$$\frac{50 \text{ km sold}}{12 \text{ liters}} = \frac{50 \text{ km sold}}{150 \text{ km travelled}} \times \frac{150 \text{ km travelled}}{12 \text{ liters}}$$

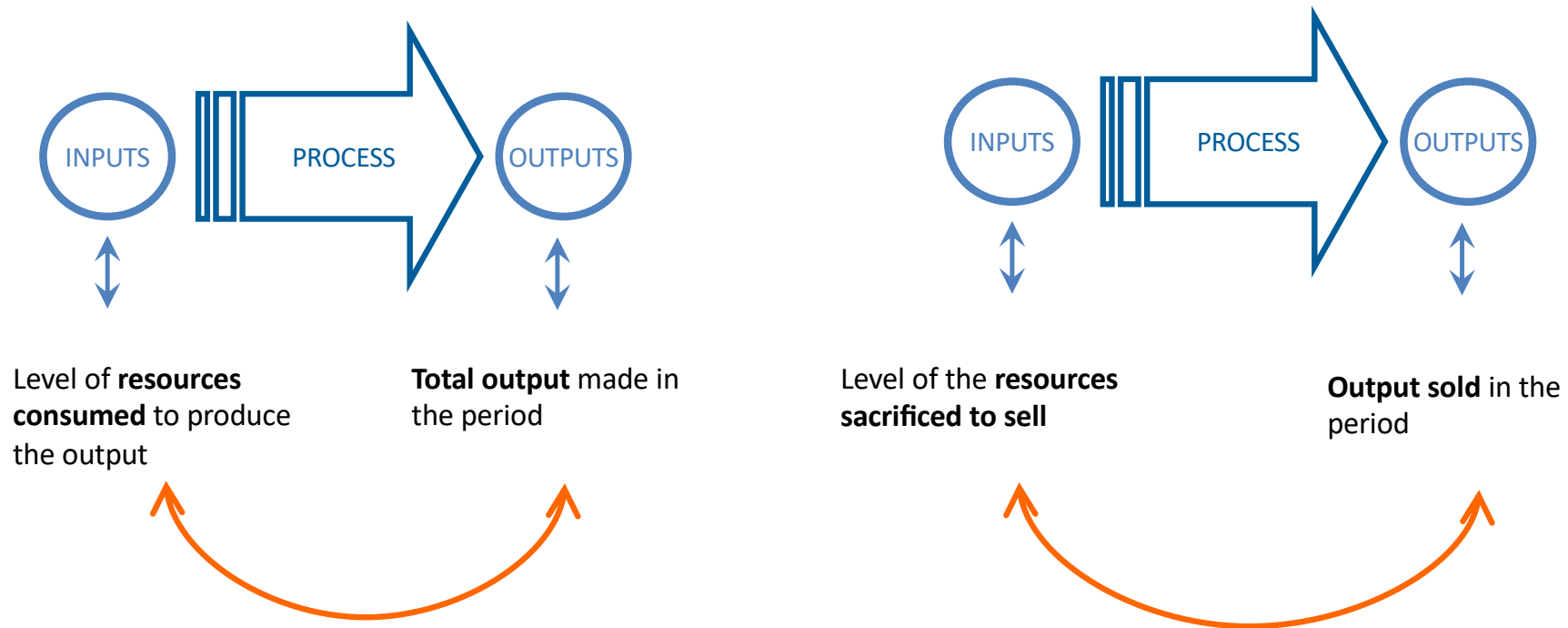
CAUSE AND EFFECT RELATIONSHIP



Efficiency in the transformation process: shows the ability to appropriately transform inputs (representing the input of the transformation process) into obtained products (constituting the output of this process)

Efficiency in the sales process: shows the ability to transform the units of product obtained (which is the input of the sales process) into sales (which is the output of this process)

TWO DIFFERENT PERSPECTIVE



In the calculation of short-term efficiency, input and output compared must be coherent, in the sense that they must refer to the same entity (outputs made or outputs sold).

This necessity arises from the need to compare similar entities with each other, but it is important to understand that (for the total output scheme) the correctness of this reasoning is tied to the assumption that what is placed in inventory will sooner or later be sold

TWO DIFFERENT PERSPECTIVE: A VERY SIMPLE EXAMPLE

Let's imagine that in order to produce one unit of Product "K" we need 0,5 units of Resource "L" and that we have the following relationships between products obtained and sold:

	20X0	20X1	20X2	20X3	20X4	20X5	Total
Made	850	730	620	670	630	600	4100
Sold	790	690	700	650	650	620	4100

Focus on outputs SOLD:

	20X0	20X1	20X2	20X3	20X4	20X5	Total
(A) Output sold	790	690	700	650	650	620	4100
(B) Input used to make the whole production	395	345	350	325	325	310	2050
(C) Operational productivity = A/B	2,00	2,00	2,00	2,00	2,00	2,00	2,00

Focus on outputs MADE:

	20X0	20X1	20X2	20X3	20X4	20X5	Total
(A) Output made	850	730	620	670	630	600	4100
(B) Input used to make the portion of product sold	425	365	310	335	315	300	2050
(C) Operational productivity = A/B	2,00	2,00	2,00	2,00	2,00	2,00	2,00

TWO DIFFERENT PERSPECTIVE: A MORE COMPLEX EXAMPLE

Let's imagine that in order to produce one unit of Product "K" we need 0,4 units of Resource "G" and that we have the following relationships between outputs obtained, sold and removed from inventory because obsolete:

	20X0	20X1	20X2	20X3	20X4	20X5	Total
Made	600	570	610	650	620	550	3600
Sold	540	595	629	614	598	584	3560
Removed					28	12	40

Focus on outputs SOLD:

	20X0	20X1	20X2	20X3	20X4	20X5	Total
(A) Outputs sold	540	595	629	614	598	584	3560
(B) Inputs used to make the outputs that have been sold	216	238	252	246	239	234	1424
(C) Inputs used to make the outputs that have been removed					11,20	4,80	16
(D) Operational productivity = $A/(B+C)$	2,50	2,50	2,50	2,50	2,39	2,45	2,47

Focus on outputs MADE:

	20X0	20X1	20X2	20X3	20X4	20X5	Total
(A) Outputs made	600	570	610	650	620	550	3600
(B) Outputs removed					28	12	40
(C) Inputs used to make the outputs	240	228	244	260	248	220	1440
(D) Operational productivity = $(A-B)/C$	2,50	2,50	2,50	2,50	2,39	2,45	2,47

IN THE LONG RUN

$$\frac{\text{OUTPUT}_{\text{SOLD}}}{\text{INPUT}_{\text{USED}}} = \frac{\text{OUTPUT}_{\text{SOLD}}}{\text{OUTPUT}_{\text{MADE}}} * \frac{\text{OUTPUT}_{\text{MADE}}}{\text{INPUT}_{\text{USED}}}$$

First example:

	20X0	20X1	20X2	20X3	20X4	20X5	Total
(A) Output made	850	730	620	670	630	600	4100
(B) Input used to make the portion of product sold	425	365	310	335	315	300	2050
(C) Operational productivity = A/B	2,00	2,00	2,00	2,00	2,00	2,00	2,00

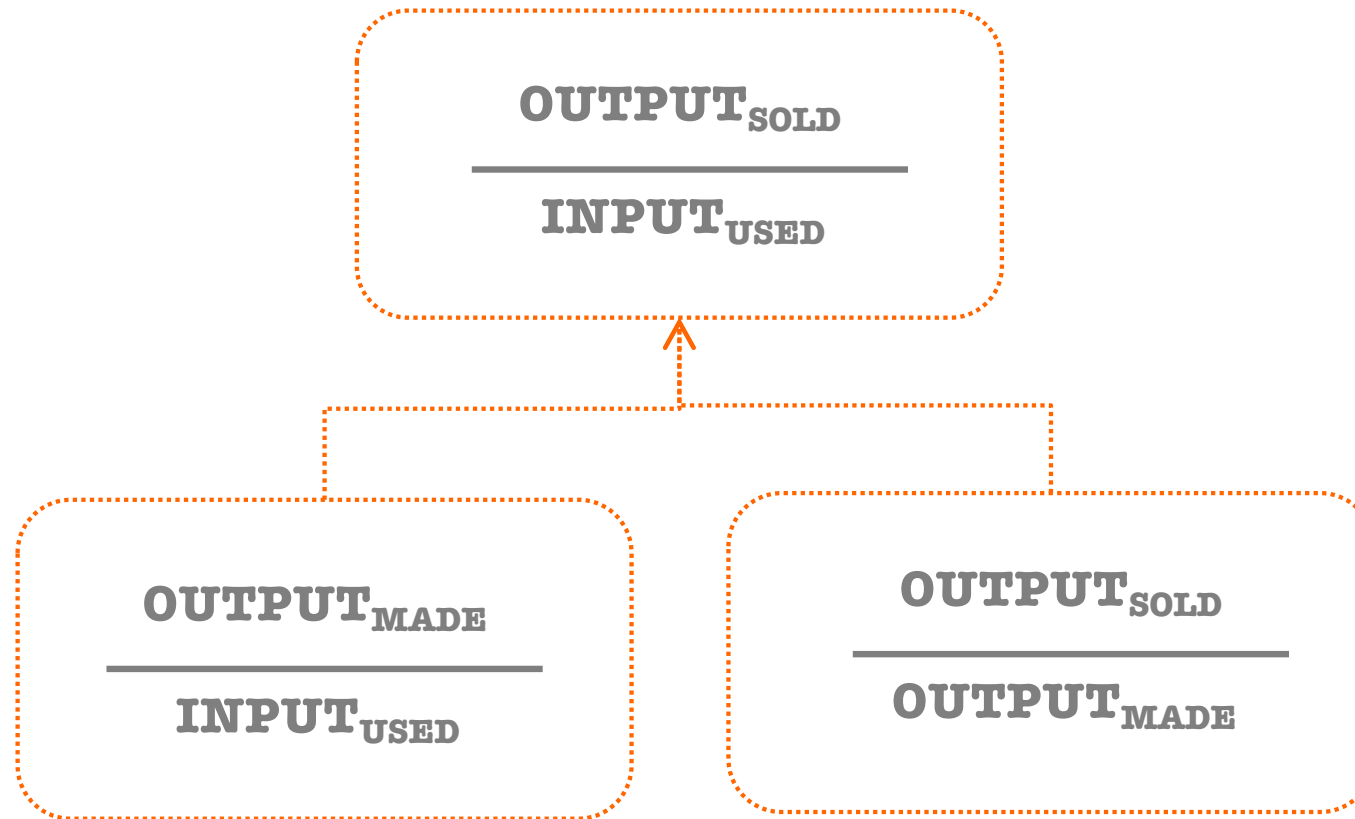
$$\frac{4,100 \text{ units}}{2,050 \text{ doses}} = \frac{4,100 \text{ units}}{4,100 \text{ units}} * \frac{4,100 \text{ units}}{2,050 \text{ doses}} = 2,00$$

Second example:

	20X0	20X1	20X2	20X3	20X4	20X5	Total
(A) Outputs made	600	570	610	650	620	550	3600
(B) Outputs removed					28	12	40
(C) Inputs used to make the outputs	240	228	244	260	248	220	1440
(D) Operational productivity = (A-B)/C	2,50	2,50	2,50	2,50	2,39	2,45	2,47

$$\frac{3,560 \text{ units}}{1,440 \text{ doses}} = \frac{3,560 \text{ units}}{3,600 \text{ units}} * \frac{3,600 \text{ units}}{1,440 \text{ doses}} = 2,47$$

CAUSE AND EFFECT RELATIONSHIP



In the long run is necessarily less than or at most equal to 1!

This component if not correctly managed **can only destroy value**

TOTAL VOLUME



30 #

10 #

20 #



20 #

30 #

10 #

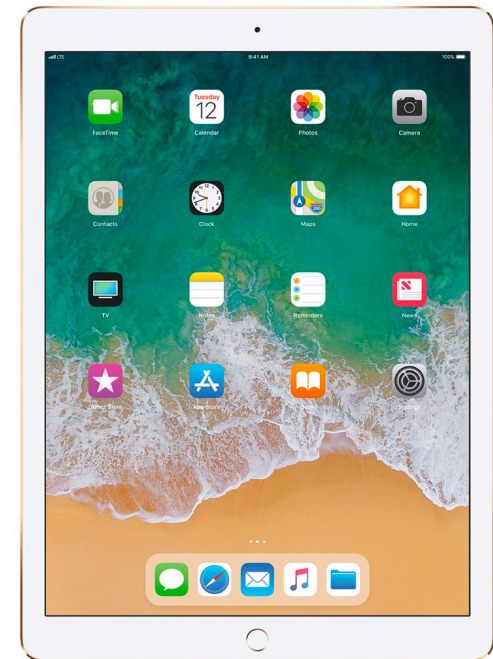


10 #

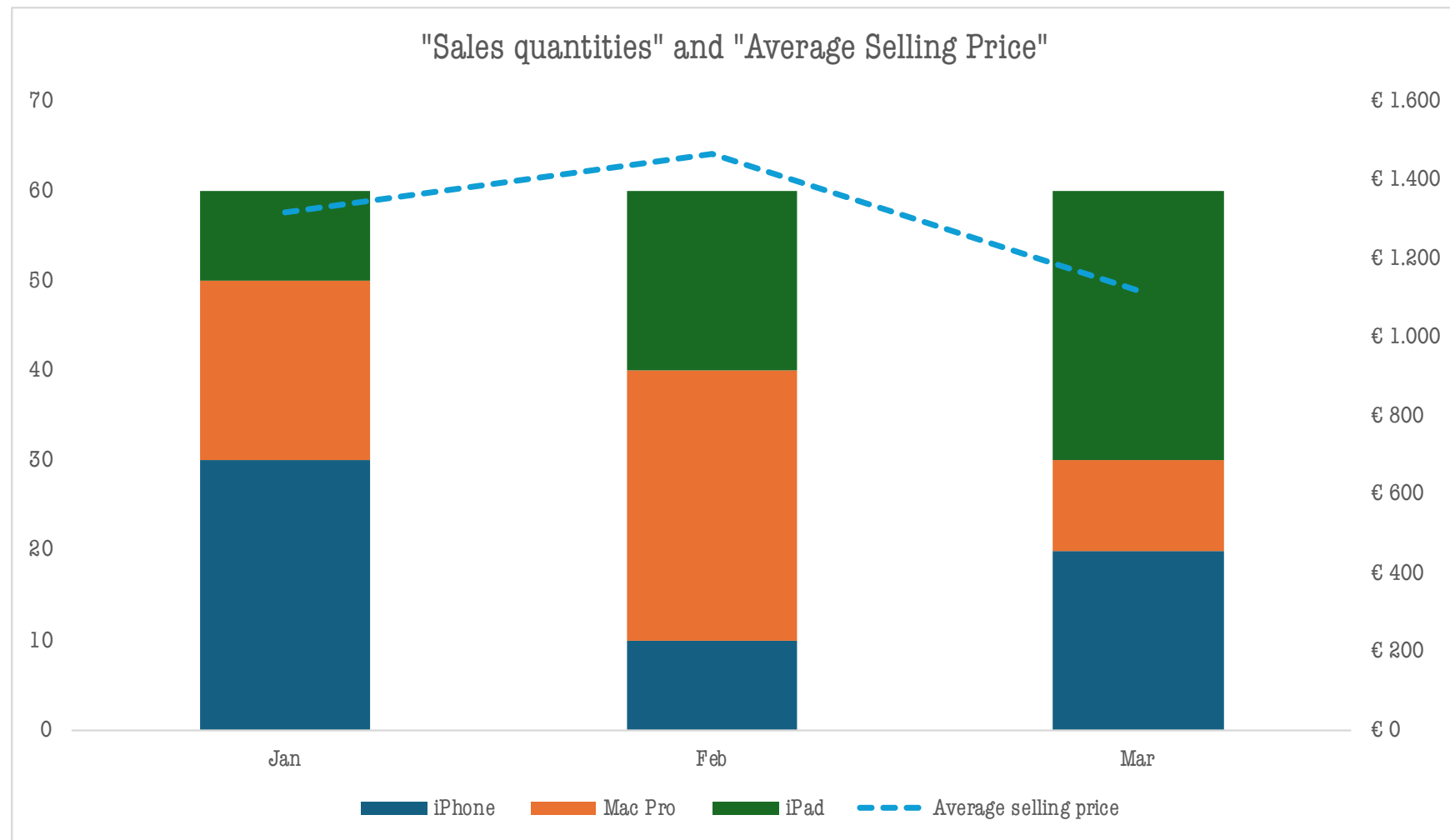
20 #

30 #

DEVICES?



ADDING UP DIFFERENT THINGS TOGETHER



Note that the volume seems to be stable and the average price seems to be changing, while the prices of the three items remained exactly the same over the three months: a phenomenon concerning “volume” sold over the three months is interpreted as a phenomenon concerning price.

PRICE AS A HOMOGENIZING FACTOR



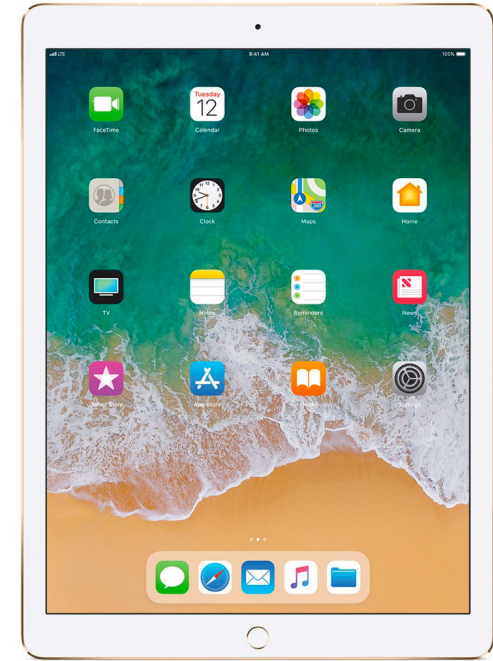
\$ 1,000

1 iPhone



\$ 2,000

2 iPhone equivalent



\$ 900

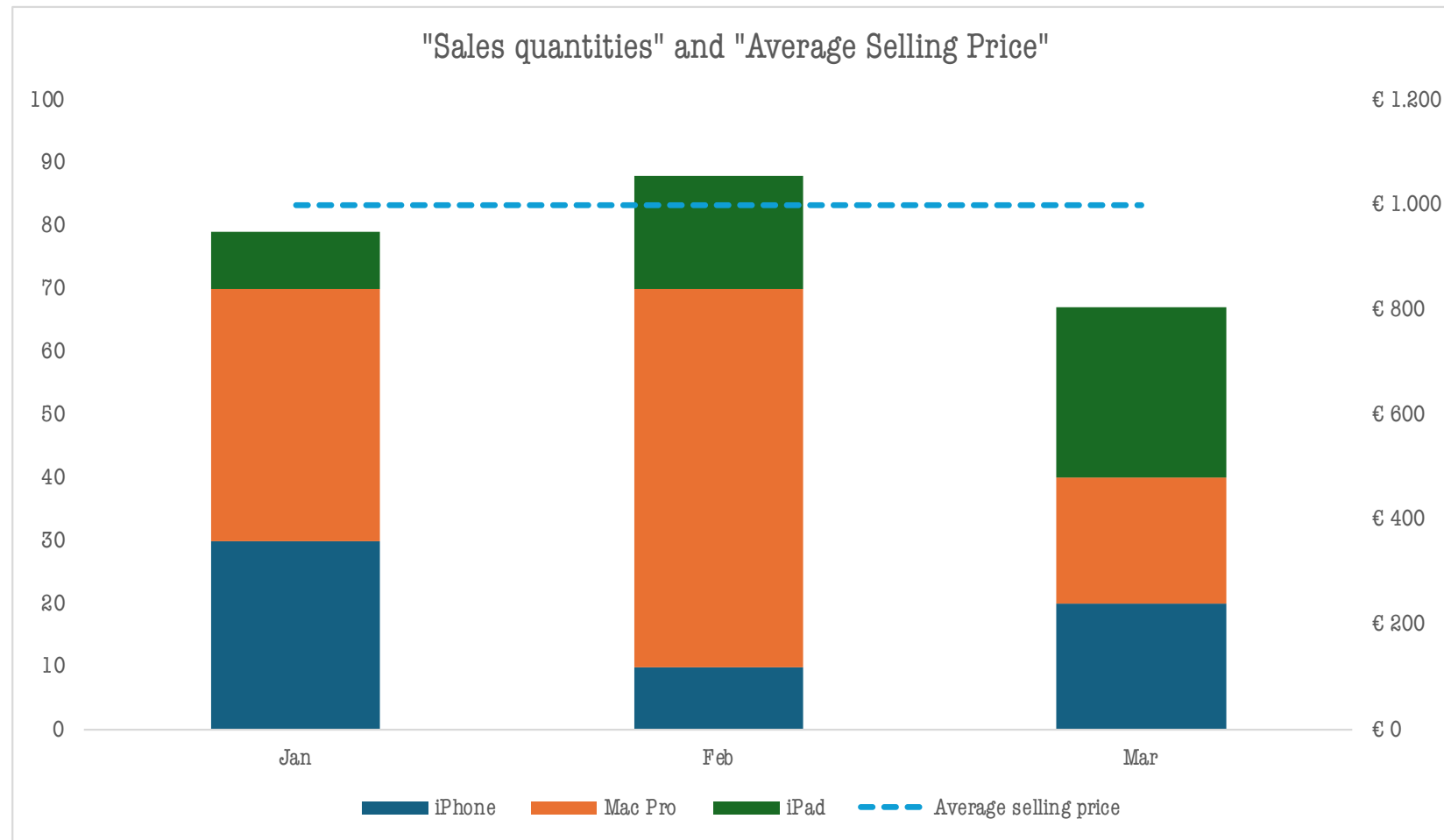
0,9 iPhone equivalent

Break even point in units



Break even point in total dollars

ANALYSIS DEVELOPED IN TERMS OF EQUIVALENT GOODS



Note that the analysis this time accounts for the fact that different things were sold in different months with clear effects on overall volume. It is no longer taken for granted that selling a Mac Pro is equivalent to selling an iPad, because the two items are different from each other not only from a technical point of view but also-and especially as far as this analysis is concerned-from an economic point of view

UNEVENNESS IN THE RESOURCES DEPLOYED



Surgeon



Nurse



Laboratory technician

CAN MINUTES OF DIFFERENT “RESOURCES” BE ADDED TOGETHER?

Hypothesis 1

Hypothesis 2

Hypothesis 3



30'

10'

20'



20'

30'

10'



10'

20'

30'

?

?

?

DIFFERENT STANDARDS

How many corks
are needed to cork
a bottle of wine?



$$\frac{1 \text{ CORK}}{1 \text{ BOTTLE}} = 1$$



$$\frac{21 \text{ CORKS}}{18 \text{ BOTTLES}} = 1.3125$$

IDEAL VS NORMAL STANDARD

Companies set standards at one of two levels: ideal or normal.

- Ideal standards represent optimum levels of performance under perfect operating conditions.
- Normal standards represent efficient levels of performance that are attainable under expected operating conditions.

Some managers believe ideal standards will stimulate workers to ever-increasing improvement. However, most managers believe that ideal standards lower the morale of the entire workforce because they are difficult, if not impossible, to meet. Very few companies use ideal standards.

Most companies that use standards set them at a normal level. Properly set, normal standards should be rigorous but attainable. Normal standards allow for rest periods, machine breakdowns, and other “normal” contingencies in the production process.

SPOILAGE, SCRAP AND REWORK



Spoilage refers to unacceptable units that are discarded or sold for disposal value.

Scrap is the material left over from the manufacture of the product; it has little or no value.

Rework units are units produced that must be reworked into good units that can be sold in regular channels.

“Level” of the problem

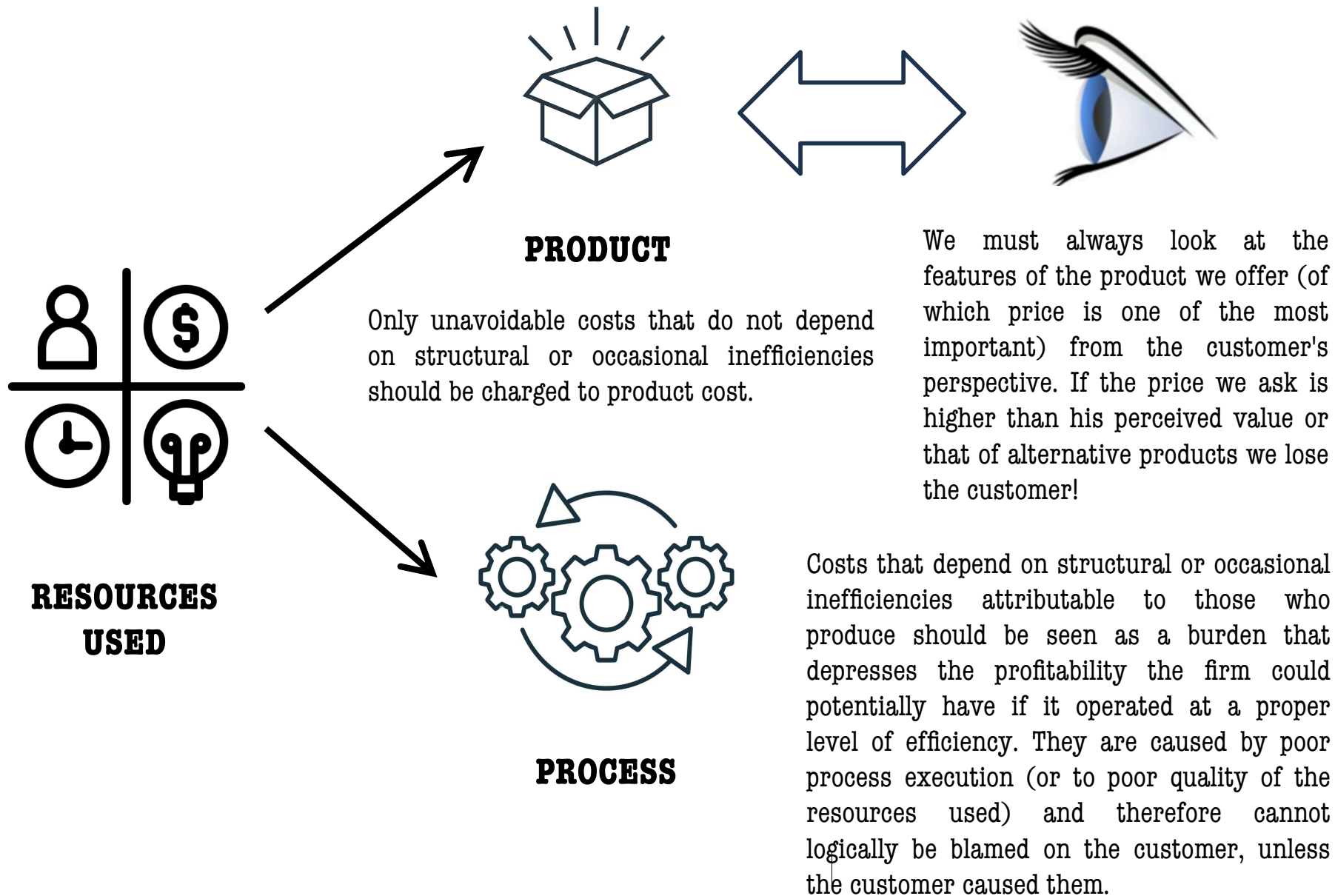
NORMAL: *occurs under normal operating conditions; it is uncontrollable in the short term and is considered a normal part of production and product cost.*

→ the cost incurred is absorbed by the cost of good units produced.

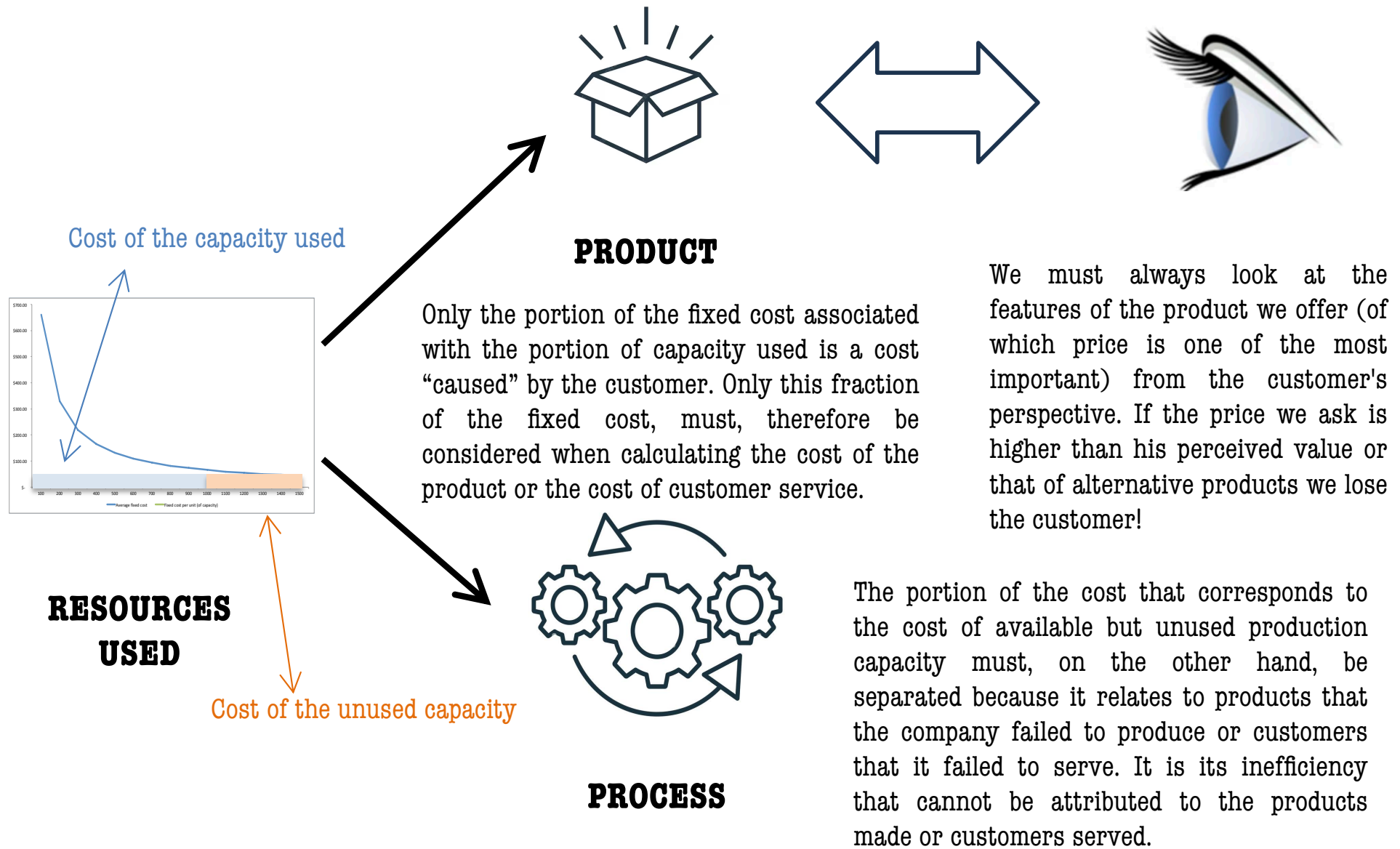
ABNORMAL: *is in excess over the amount of normal spoilage expected under normal operating conditions.*

→ the cost incurred is charged as a loss to operations in the period detected.

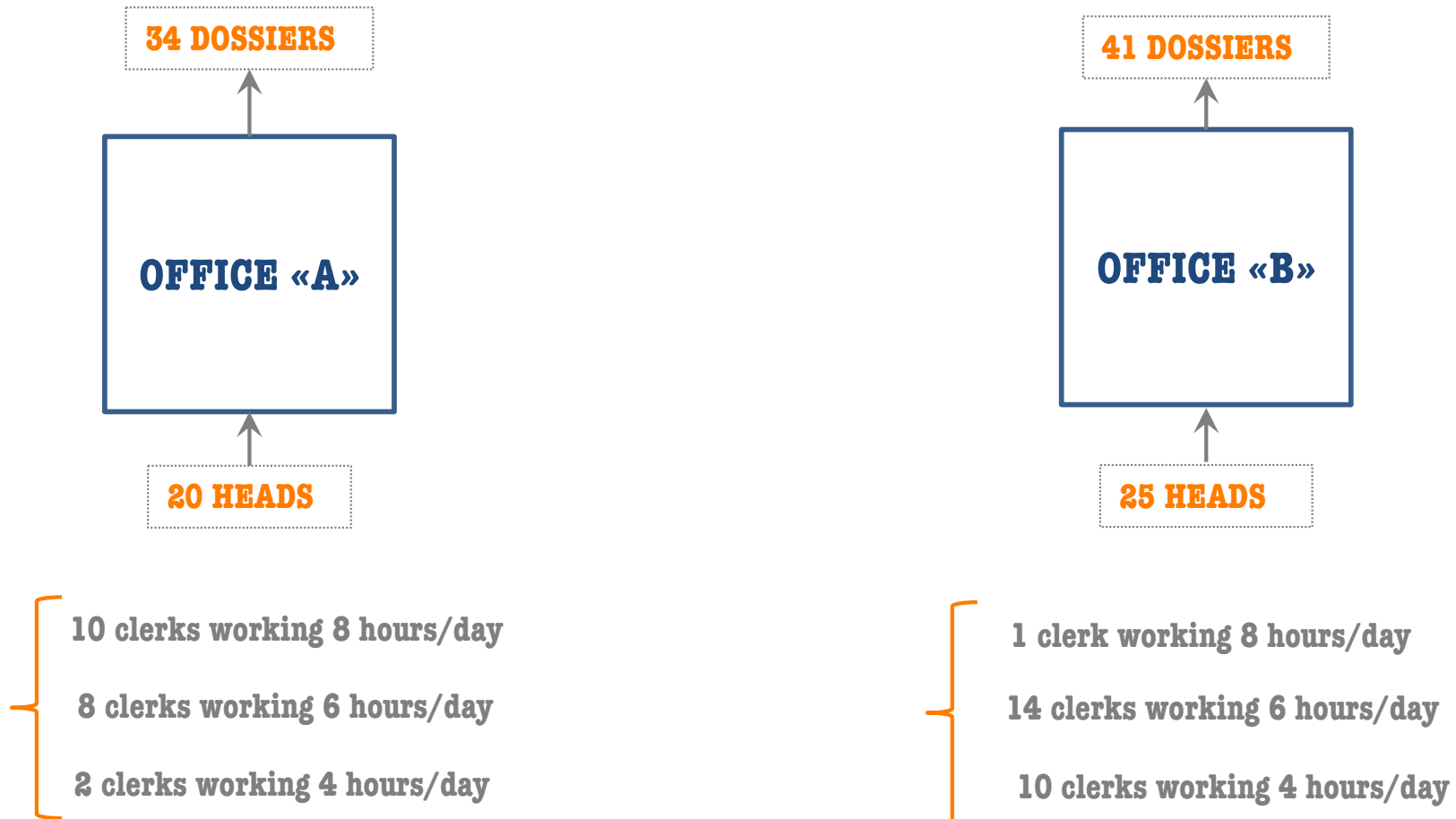
THE UNDERLYING LOGIC



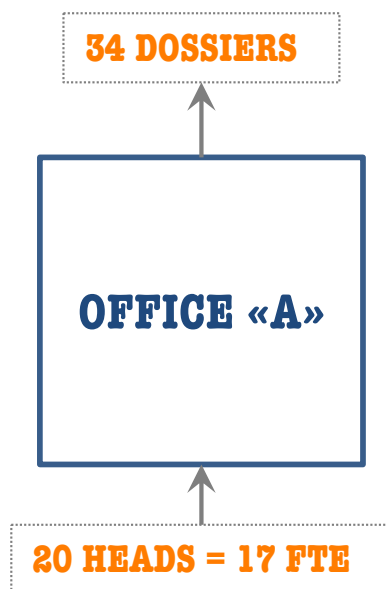
“PULL APPROACH” IN THE ASSIGNING OF FIXED COSTS



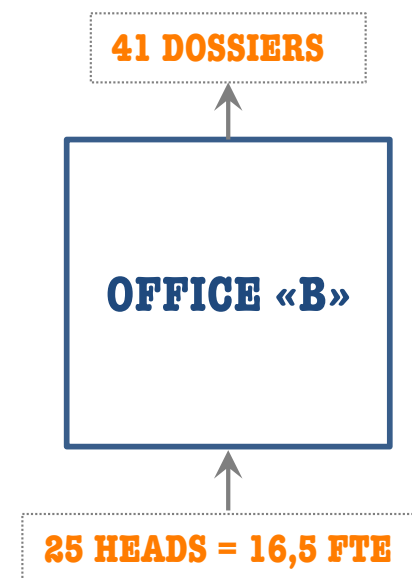
COMPARISON BETWEEN TWO OFFICES



COMPARISON BETWEEN TWO OFFICES



- 10 clerks working 8 hours/day * 8/8 = 10 FTE
- 8 clerks working 6 hours/day * 6/8 = 6 FTE
- 2 clerks working 4 hours/day * 4/8 = 1 FTE



- 1 clerk working 8 hours/day * 8/8 = 1 FTE
- 14 clerks working 6 hours/day * 6/8 = 10,5 FTE
- 10 clerks working 4 hours/day * 4/8 = 5 FTE

DIFFERENT KINDS OF OUTPUTS

8 TYPE 1

26 TYPE 2



34 DOSSIERS



20 HEADS = 17 FTE

30 TYPE 1

10 TYPE 2

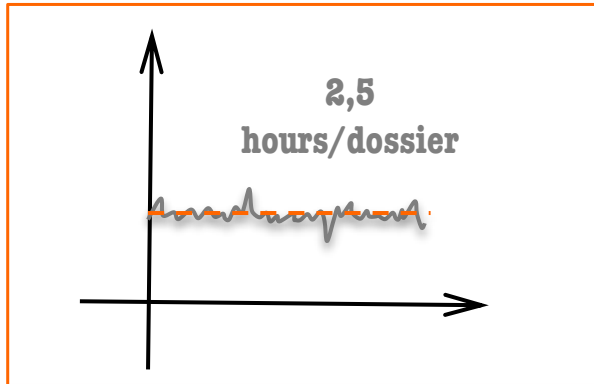


40 DOSSIERS

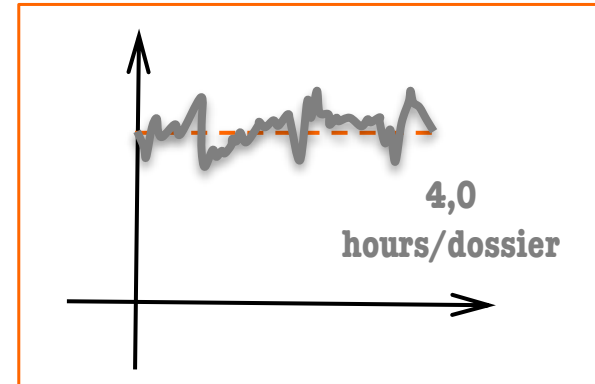


25 HEADS = 16,5 FTE

ESTABLISHING EQUIVALENCE



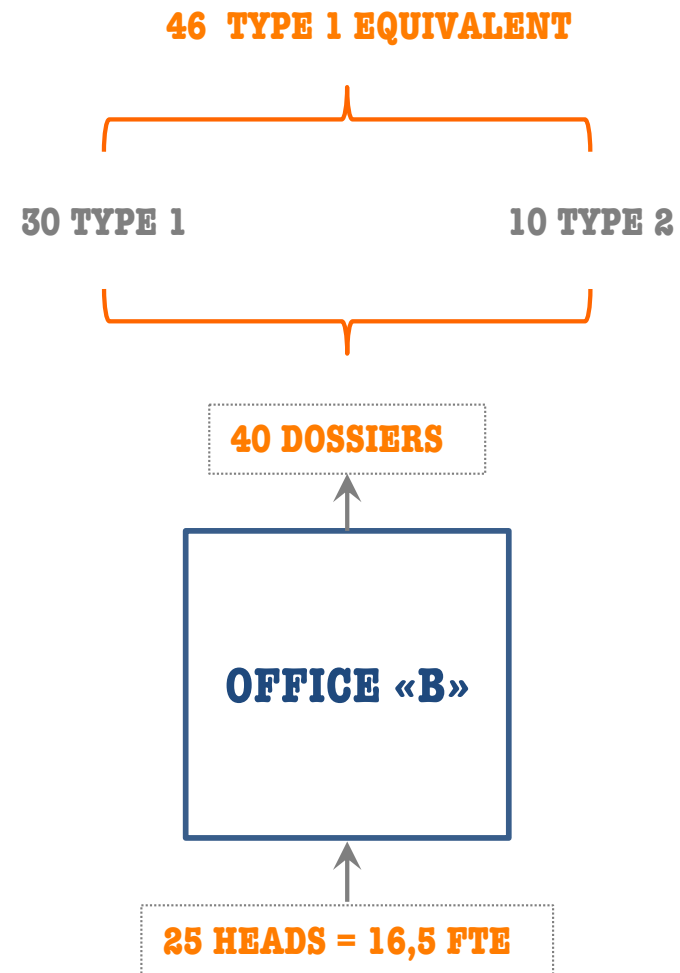
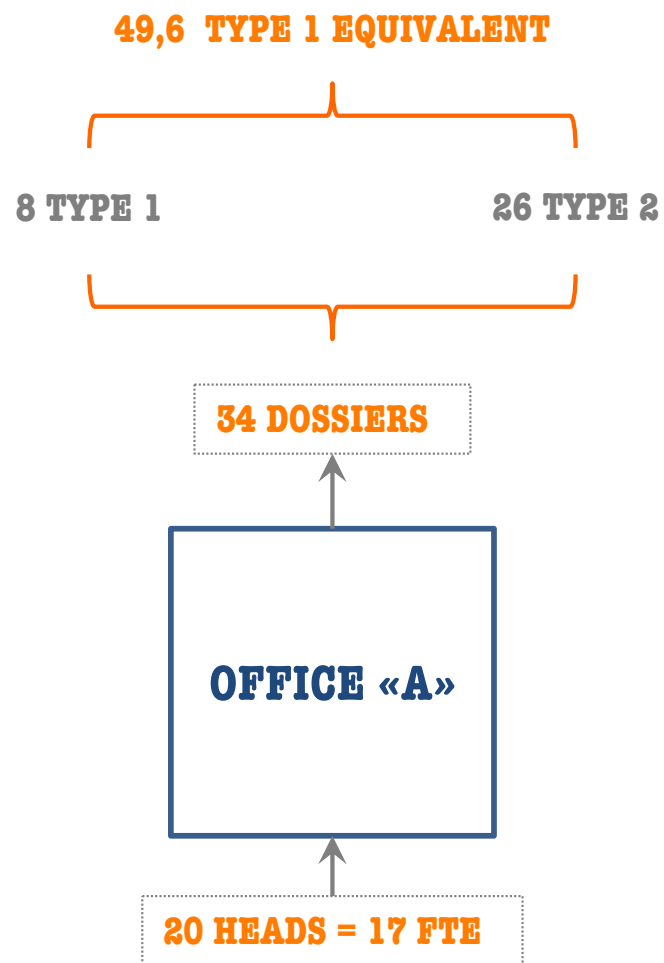
DOSSIER TYPE 1



DOSSIER TYPE 2

$$\text{DOSSIER TYPE 2} = \frac{4}{2,5} * \text{DOSSIER TYPE 1}$$

DIFFERENT KINDS OF OUTPUTS



DIFFERENT WINE BOTTLE SIZES



AVERAGE SALES PRICE “PER BOTTLE”

The owner of Birre dal Mondo S.r.l., a company that sells beer imported from abroad, wishes to calculate the average unit selling price of a particular S.K.U. (Stock Keeping Unit) for the purpose of calculating the breakeven point.

The brand in question is sold in bottles of different sizes. The sales figures for the period under consideration are as follows:

▪ 330 cl format	14,580 bottles sold	€ 10,206.00
▪ 660 cl format	39,126 bottles sold	€ 43,038,60
▪ 1000 cl format	24,168 bottles sold	€ 36,252.00

Required:

The owner asks you to calculate the average sales price “per bottle”. Can you help him out?

AVERAGE SALES PRICE “PER BOTTLE”: SOLUTION

Format	Bottles Sold	Sales Revenue	Price per bottle	Conversion Rate	Equivalent bottles	
330	14,580	€ 10,206.00	€ 0,70	0,50	7,290	
660	39,126	€ 43,038.60	€ 1,10	1,00	39,126	
1000	24,165	€ 36,252.00	€ 1,50	1,52	36,614	
		€ 89.496,60			83,030	€ 1,08

WEIGHTED AVERAGE SALES PRICE

Exercise MC_A.1 – Basic data analysis for a multiproduct company

The company “Wines from the World” sells three different product lines having completely different qualitative characteristics, to the point of being completely incomparable with each other, both in terms of enology and economics.

The first line consists of a superior Barolo, an outstanding wine that has won coveted awards. This is a wine for true connoisseurs that has a particularly high price and therefore cannot be intended for the general public. Of this line, 1,450 0.75-liter bottles were sold, achieving sales revenues of € 543,750. In addition, 300 bottles in magnum format (1.5 liters) of this line were also sold, achieving a total turnover of € 202,500

The second line, on the other hand, is dedicated to a discreet Cabernet Franc, which achieved considerable success among the distributor company's clientele due to its excellent price-quality ratio. Of this wine, 74,349 bottles (all in 0.75-liter format) were sold for total sales revenue of € 1,189,584

Finally, there is the lowest quality wine, which is sold under the joking label “Alcool da ferite,” a wine that is often used in low-level taverns and is known for its particularly advantageous price. Of this, 215,670 bottles were sold (all in 0.75-liter format) achieving total sales revenue of € 539,175.

Required:

Determine, first, the average price per equivalent bottle (in the 0.75 format) relative to the Barolo line. Then, proceed to determine the average price of the entire offer proposed by “Wines from the World”

PRICE AS “HOMOGENIZATION FACTOR”



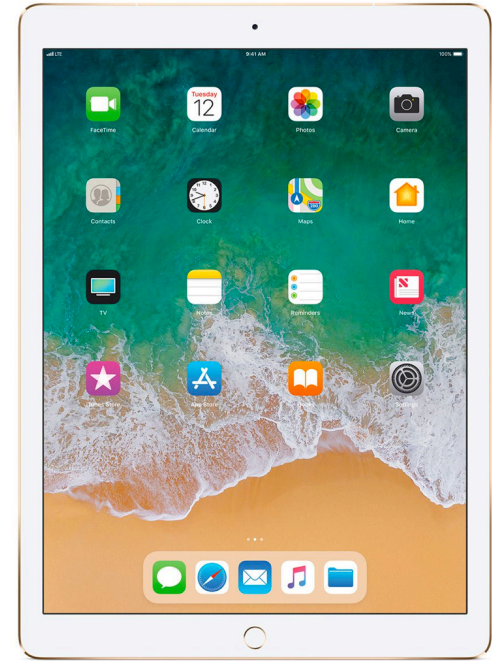
\$ 1,000

1 iPhone



\$ 2,000

2 iPhone equivalent



\$ 900

0,9 iPhone equivalent

Break even point in units

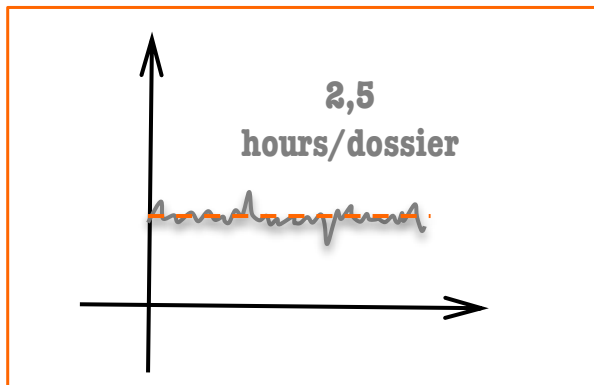


Break even point in total dollars

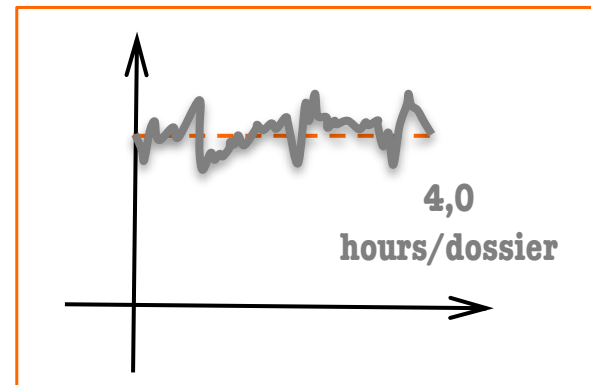
QUANTITY OF DIRECT MATERIALS USED



HOURS OF DIRECT WORK USED



DOSSIER TYPE 1



DOSSIER TYPE 2

$$\text{DOSSIER TYPE 2} = \frac{4}{2,5} * \text{DOSSIER TYPE 1}$$

WORK IN PROCESS

Direct Materials	476.905
Direct Labour	366.850
Manufacturing Overheads	660.330
Total Manufacturing Costs	1.504.085

Finished Products	3.554
WIP # 2	2.300
WIP # 1	4.500

Required:

Determine the cost of one product.

EQUIVALENT UNIT OF PRODUCTION

	WIP #1	WIP #2	Finished Products	WIP #1	WIP #2	Finished Products
Direct Materials	75,00%	20,00%	5,00%	75,00%	95,00%	100,00%
Direct Labour	0,50	1,25	0,25	0,50	1,75	2,00
Manufacturing Overheads	1,00	4,50	0,50	1,00	5,50	6,00
Total Manufacturing Costs						

	WIP #1	WIP #2	Finished Products	WIP #1	WIP #2	Finished Products
Direct Materials	€ 48,75	€ 13,00	€ 3,25	48,75	61,75	65,00
Direct Labour	€ 12,50	€ 31,25	€ 6,25	€ 12,50	€ 43,75	€ 50,00
Manufacturing Overheads	€ 15,00	€ 67,50	€ 7,50	€ 15,00	€ 82,50	€ 90,00
Total Manufacturing Costs	€ 76,25	€ 111,75	€ 17,00	€ 76,25	€ 188,00	€ 205,00
				37,20%	91,71%	100,00%

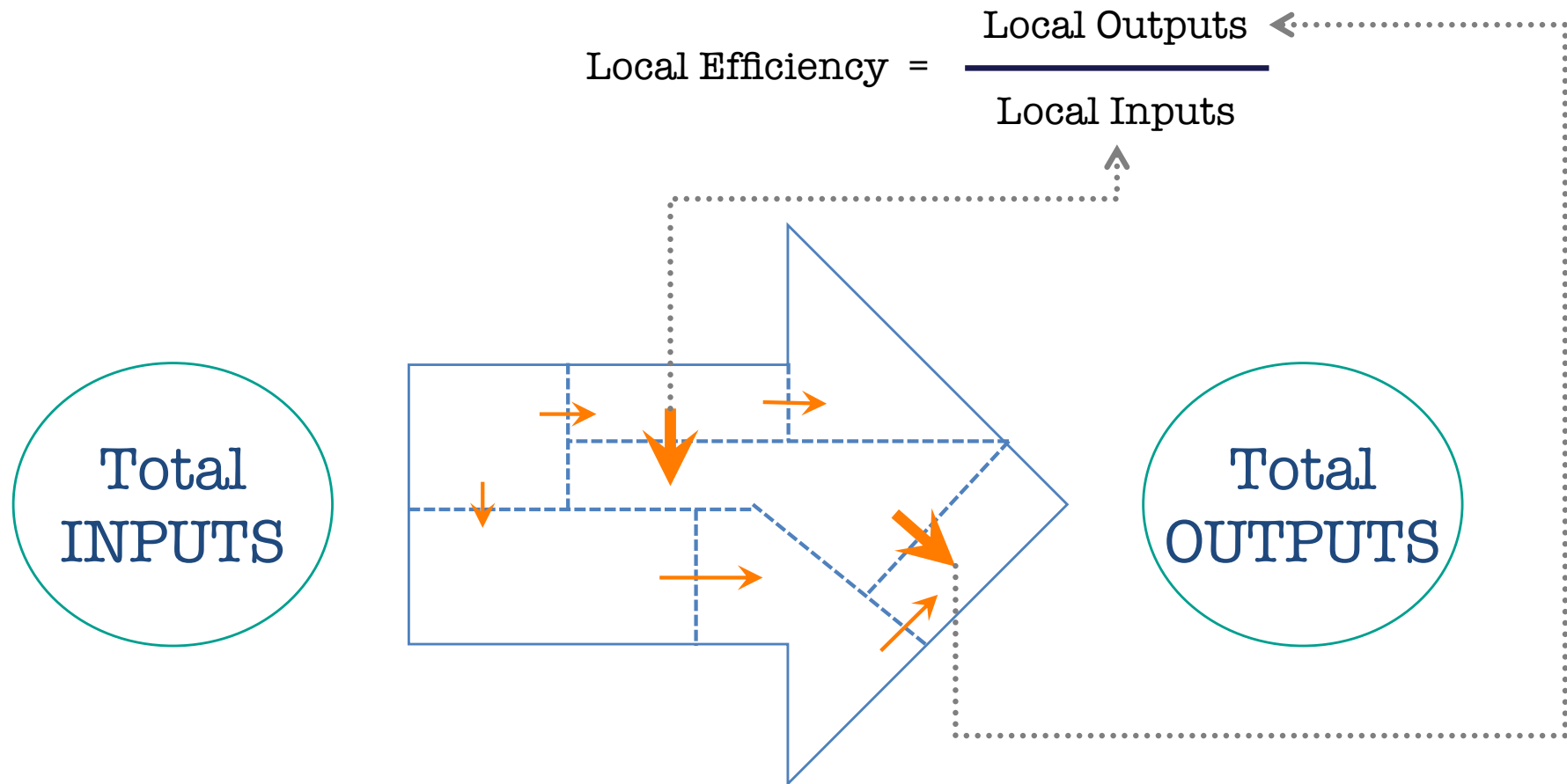
EQUIVALENT UNIT OF PRODUCTION

Direct Materials	476.905	7.337	€	65,00
Direct Labour	366.850	7.337	€	50,00
Manufacturing Overheads	660.330	7.337	€	90,00
Total Manufacturing Costs	1.504.085	7.337	€	205,00

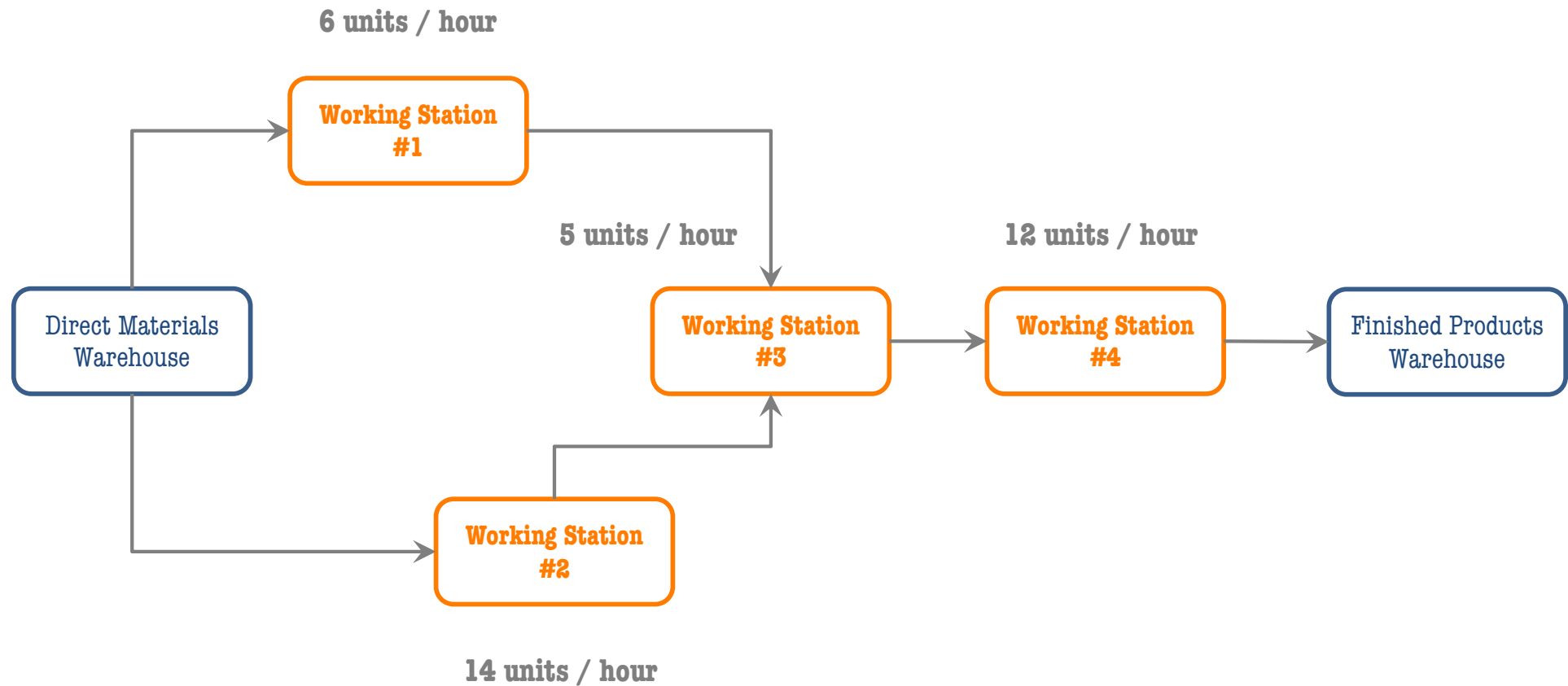
Finished Products	3.554	100,00%	3.554
WIP # 2	2.300	91,71%	2.109
WIP # 1	4.500	37,20%	1.674
			7.337

$$\text{Cost per unit} = \frac{1,504,085}{7,737} = 205$$

LOCAL EFFICIENCY



ANALYSIS OF A SIMPLE PROCESS



CAUTION IN INTERPRETING PARTIAL MEASURES



T_0

CAUTION IN INTERPRETING PARTIAL MEASURES



It should always be remembered that any measure of partial productivity cannot isolate the relationships of formally considered inputs and outputs alone.

ADVANTAGES OF PARTIAL MEASURES

«Partial measures allow managers to focus on the use of a particular input.

Operating partial measures **have the advantage of being easily interpreted by everyone** within the organization. Consequently, partial operational measures **are easy to use for assessing productivity performance of operating personnel**. Laborers, for instance, can relate to units produced per hour or units produced per pound of material. Thus, partial operational measures provide feedback that operating personnel can relate to and understand—measures that deal with the specific inputs over which they have control.

The ability of operating personnel to understand and relate to the measures increases the likelihood that the measures will be accepted.

Source: Don R. Hansen & Maryanne M. Mowen, “Cost Management. Accounting and Control”, Fifth Edition, Chapter 15
Productivity Measurement and Control, Thomson South-Western, 2006

DISADVANTAGES OF PARTIAL MEASURES

Partial measures, used in isolation, can be misleading.

A decline in the productivity of one input may be necessary to increase the productivity of another. Such a trade-off is desirable if overall costs decline, but the effect would be missed by using either partial measure.

For example, changing a process so that direct laborers take less time to assemble a product may increase scrap and waste while leaving total output unchanged. Labor productivity has increased, but productive use of materials has declined. If the increase in the cost of waste and scrap outweighs the savings of the decreased labor, then overall productivity has declined.

Source: Don R. Hansen & Maryanne M. Mowen, “Cost Management. Accounting and Control”, Fifth Edition, Chapter 15
Productivity Measurement and Control, Thomson South-Western, 2006

DIFFERENT INPUTS AND DIFFERENT OUTPUTS



SOME CONSEQUENCES

Two important conclusions can be drawn from the analysis of disadvantages of partial productivity measures.

First, the possible existence of trade-offs mandates a total measure of productivity for assessing the merits of productivity decisions. Only by looking at the total productivity effect of all inputs can managers accurately draw any conclusions about overall productivity performance.

Second, because of the possibility of trade-offs, a total measure of productivity must assess the aggregate financial consequences and, therefore, should be a financial measure.

Source: Don R. Hansen & Maryanne M. Mowen, “Cost Management. Accounting and Control”, Fifth Edition, Chapter 15 *Productivity Measurement and Control*, Thomson South-Western, 2006



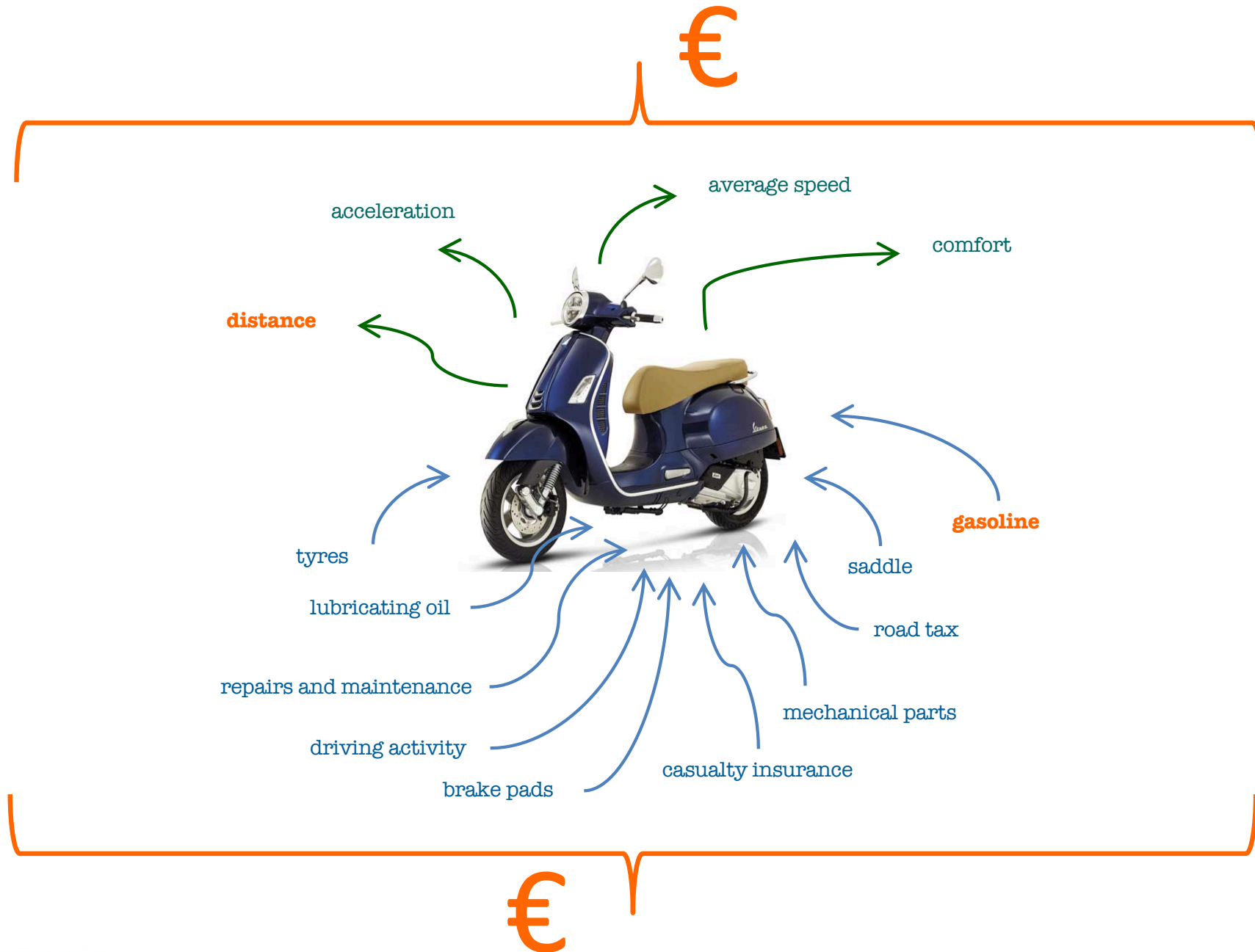
WHY IT IS DIFFICULT TO COMPUTE....

Total operational productivity measure:

$$\frac{\sum_{j=1}^n O_j^{Ph}}{\sum_{i=1}^m I_i^{Ph}}$$

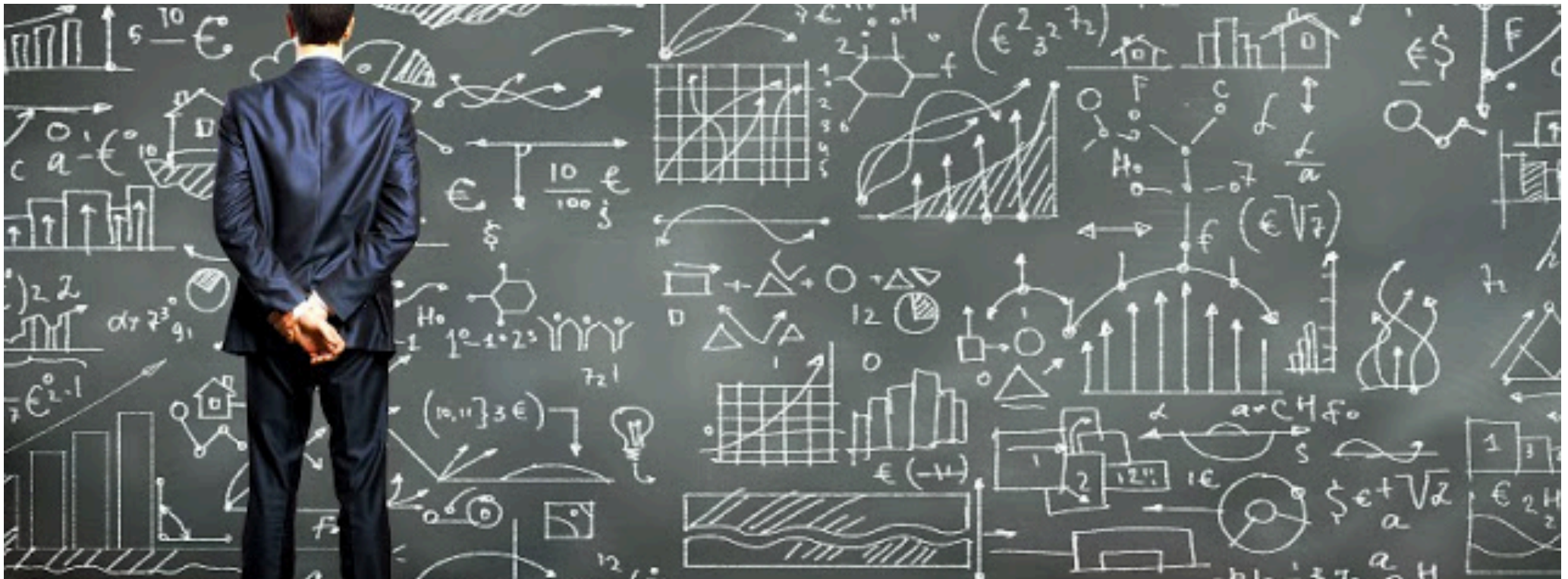
There is a problem of heterogeneity both in the components of the numerator and in those that make up the denominator.

FINACIAL PRODUCTIVITY

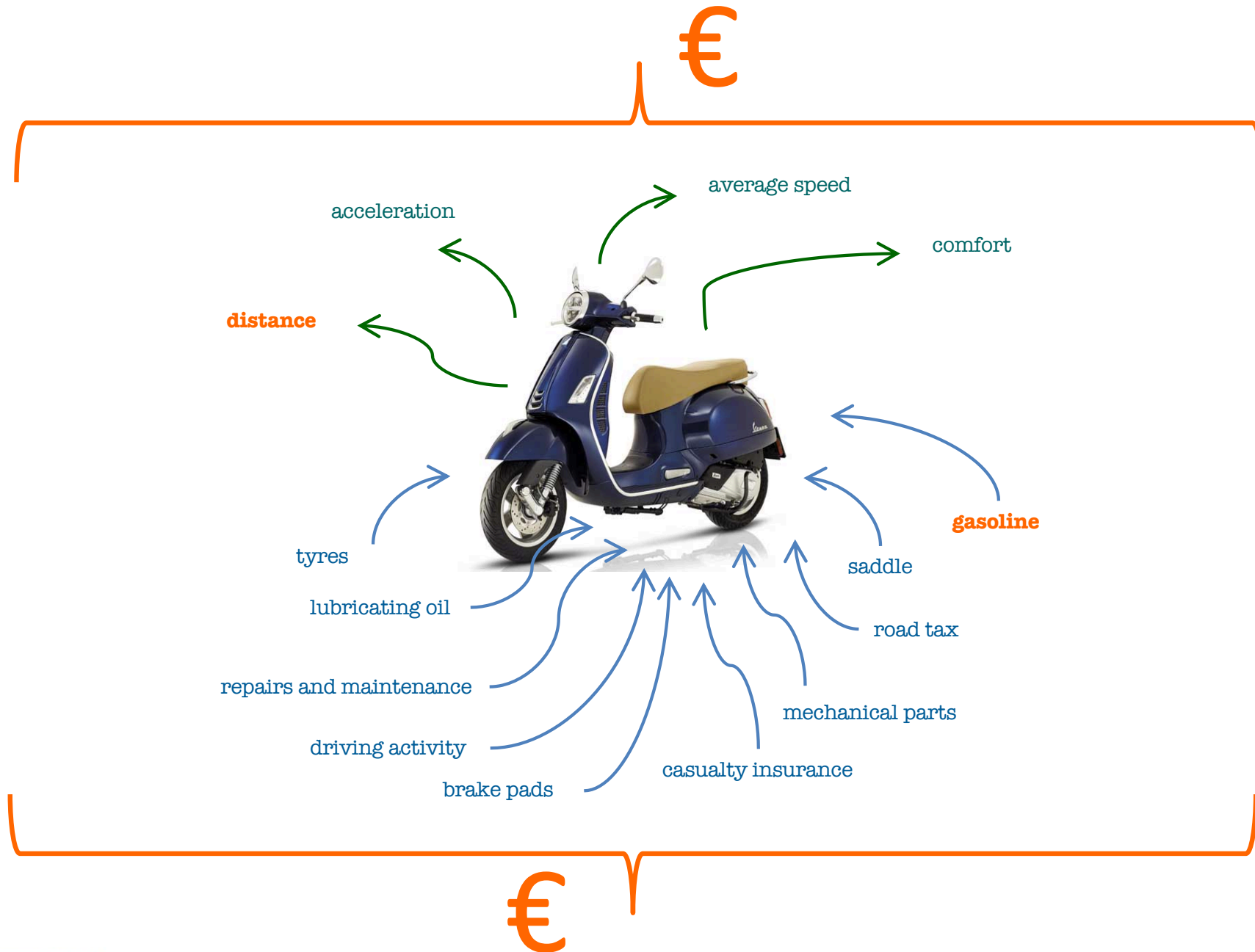


FINANCIAL MEASURES OF EFFICIENCY

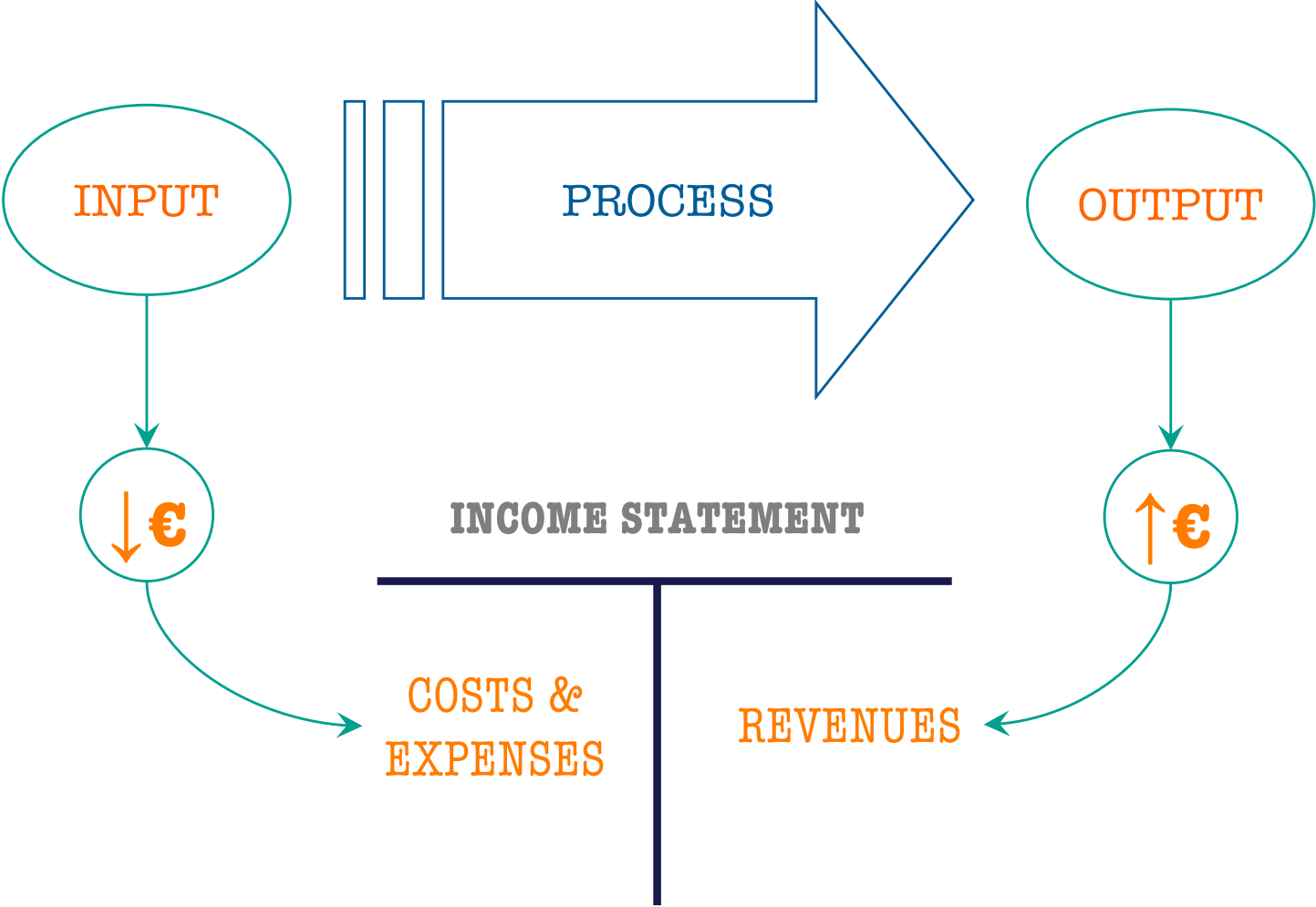
Measuring efficiency in monetary terms



FINACIAL PRODUCTIVITY



INCOME STATEMENT



EFFICIENCY

1. OPERATIONAL PRODUCTIVITY

$$\frac{O_{\text{PHYSICAL}}}{I_{\text{PHYSICAL}}}$$

2. FINANCIAL PRODUCTIVITY

$$\frac{O_{\text{REVENUES}}}{I_{\text{EXPENSES}}}$$

3. ...

4. ...



DIFFERENT TYPES OF METRICS

**OPERATIONAL
PRODUCTIVITY**

$$\frac{O_{Ph}}{I_{Ph}}$$

**FINANCIAL
PRODUCTIVITY**

$$\frac{O_{\$}}{I_{\$}}$$

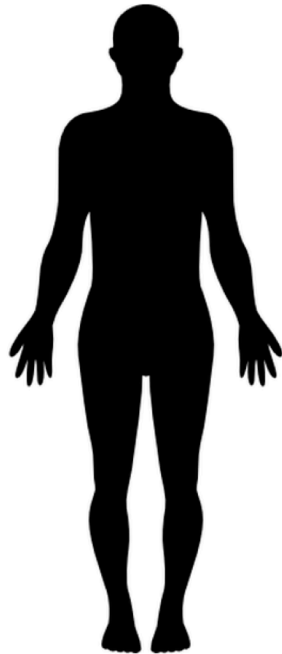
$$O_{\$} - I_{\$}$$

PROFIT: NET PROFIT AND OTHER PROFIT MARGINS

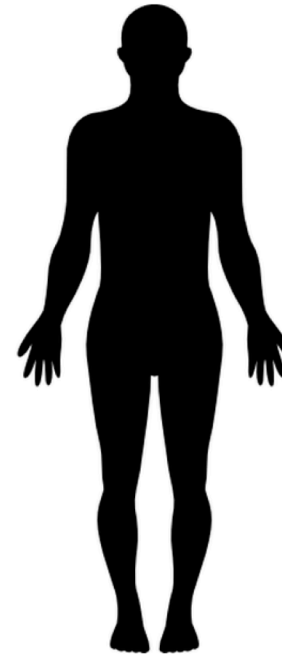
Net Profit (also called “Net Income” or “Net Earnings”) is the “bottom line” of the “Income Statement”. It is therefore computed as revenues, less cost of goods sold less, less other expenses, less taxes.

More broadly, **profit** is the difference between revenues and expenses. It can be assessed in a number of different ways because the appropriate measure depends on the specific question being asked. One can, therefore, determine different figures of profit (normally defined as “**margins**”) taking into consideration different subset of revenues and costs or expenses, earned or incurred within a defined time frame.

WHICH OF THE TWO IS IN BETTER SHAPE?

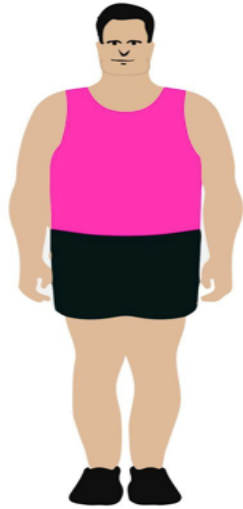


148 lbs.



204 lbs.

MAKING COMPARISONS - BODY MASS INDEX



148 lbs. – 147 cm

67 kg – 4' 10"

BM: 30.9



204 lbs. – 193 cm

93 kg – 6' 4"

BM: 24.8

PROFITABILITY

PROFITABILITY

1. the ability, attitude, potentiality of a business or an activity to yield profit or, more broadly, to offer an adequate level of return
2. a relative number (a percentage) that gauge the level of profitability (in the sense specified above) and is normally expresses as the ratio between profit and another monetary term

PROFIT AND PROFITABILITY

Profitability is a measure of profit compared to another “entity” (“sales”, “assets”, “capital employed”, etc.) and it is therefore expressed in **relative terms**. This way of computing it, enhance the level of **comparability** of the measure considered.

Profitability ratios gauge a company’s profitability—its profits as a percentage of various other numbers. They’ll help you determine whether your company’s profits are healthy or anaemic, and whether they’re moving in the right direction. Examples of profitability ratios are *return on sales*, *contribution margin ratio*, *return on assets*, *return on inventory*, *return on equity*.

DIFFERENT TYPES OF METRICS

OPERATIONAL PRODUCTIVITY

$$\frac{O_{Ph}}{I_{Ph}}$$

FINANCIAL PRODUCTIVITY

$$\frac{O_{\$}}{I_{\$}}$$

$$O_{\$} - I_{\$}$$

$$\frac{O_{\$} - I_{\$}}{I_{\$}}$$

$$\frac{O_{\$} - I_{\$}}{O_{\$}}$$

RELATIONSHIP BETWEEN MARK-UP AND ROS

$$\frac{O_{\$} - I_{\$}}{I_{\$}} = x$$

$$\frac{O_{\$} - I_{\$}}{O_{\$}} = ?$$

$$\frac{O_{\$} - I_{\$}}{O_{\$}} = y$$

$$\frac{O_{\$} - I_{\$}}{I_{\$}} = ?$$

FROM MARK-UP TO RETURN ON SALES

$$\frac{O_{\$} - I_{\$}}{I_{\$}} = x \quad \frac{O_{\$} - I_{\$}}{O_{\$}} = ? \quad \Rightarrow$$

$$O_{\$} - I_{\$} = x * I_{\$} \quad \Rightarrow \quad O_{\$} = I_{\$} + x * I_{\$} = I_{\$} * (1+x)$$

$$\frac{O_{\$} - I_{\$}}{O_{\$}} = \frac{x * I_{\$}}{I_{\$} * (1+x)} = \frac{x}{(1+x)}$$

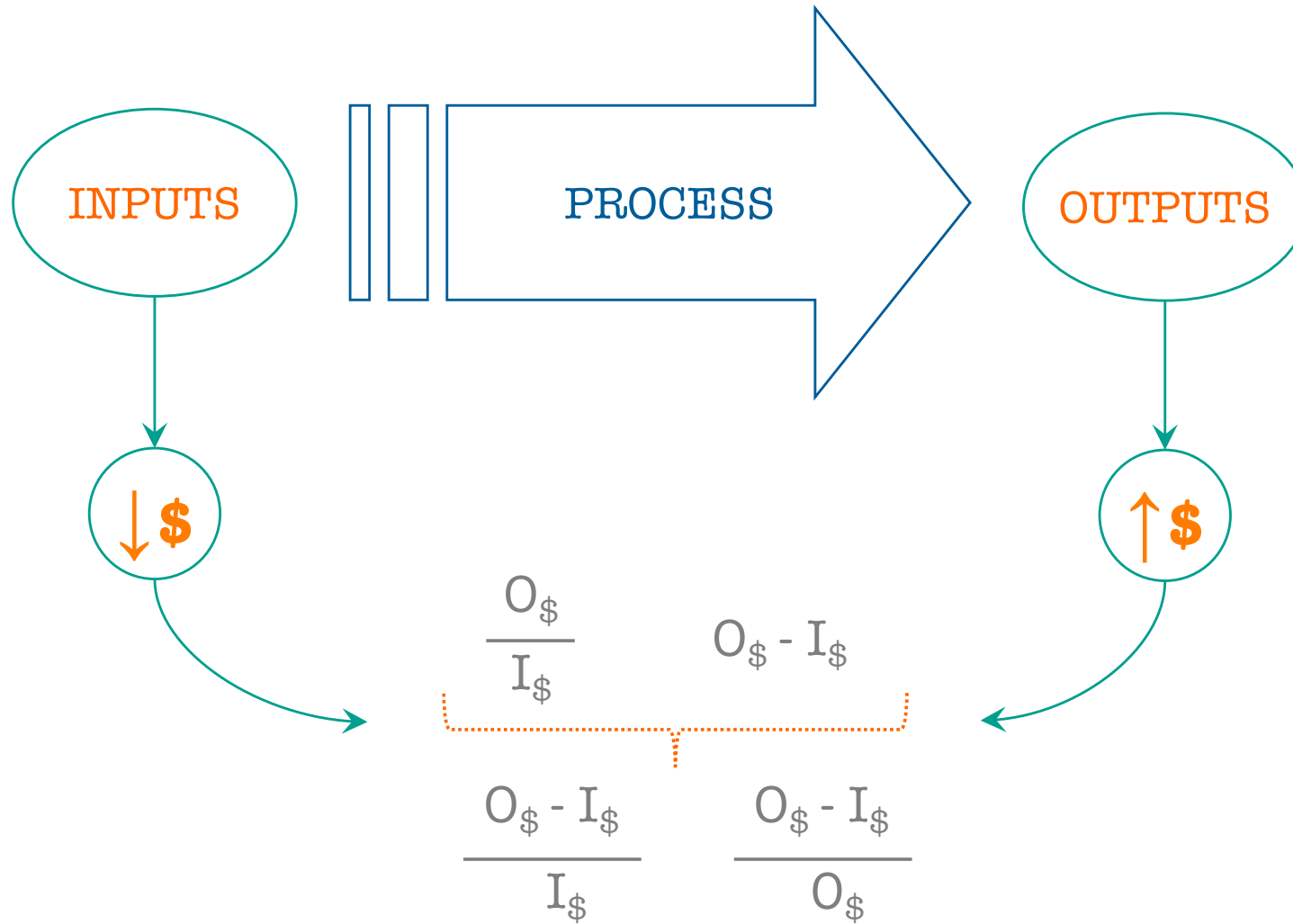
... AND VICE VERSA

$$\frac{O_{\$} - I_{\$}}{O_{\$}} = y \quad \frac{O_{\$} - I_{\$}}{I_{\$}} = ? \Rightarrow$$

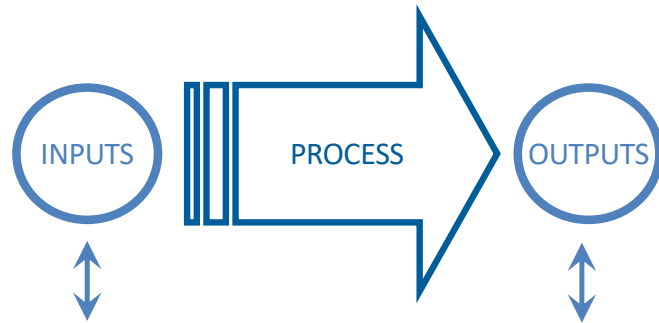
$$O_{\$} - I_{\$} = y * O_{\$} \Rightarrow I_{\$} = O_{\$} - y * O_{\$} = O_{\$} * (1-y)$$

$$\frac{O_{\$} - I_{\$}}{O_{\$}} = \frac{y * O_{\$}}{O_{\$} * (1-y)} = \frac{y}{(1-y)}$$

FINANCIAL PRODUCTIVITY



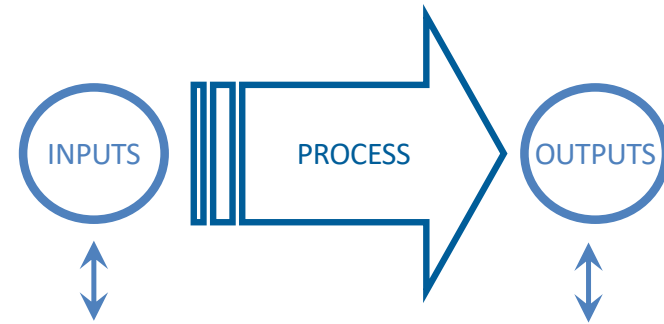
TWO DIFFERENT PERSPECTIVE



Total level of resources
(productive factors)
consumed to achieve
the entire production
(total output)

Total output made in
the period

+ Sales Revenues
+ Changes in Inventory
+ Capitalized Expenses
= Total Outputs
- Materials Expenses
- Personnel Expenses
- Expenses for External Services
- Depreciation & Amortization
= EBIT

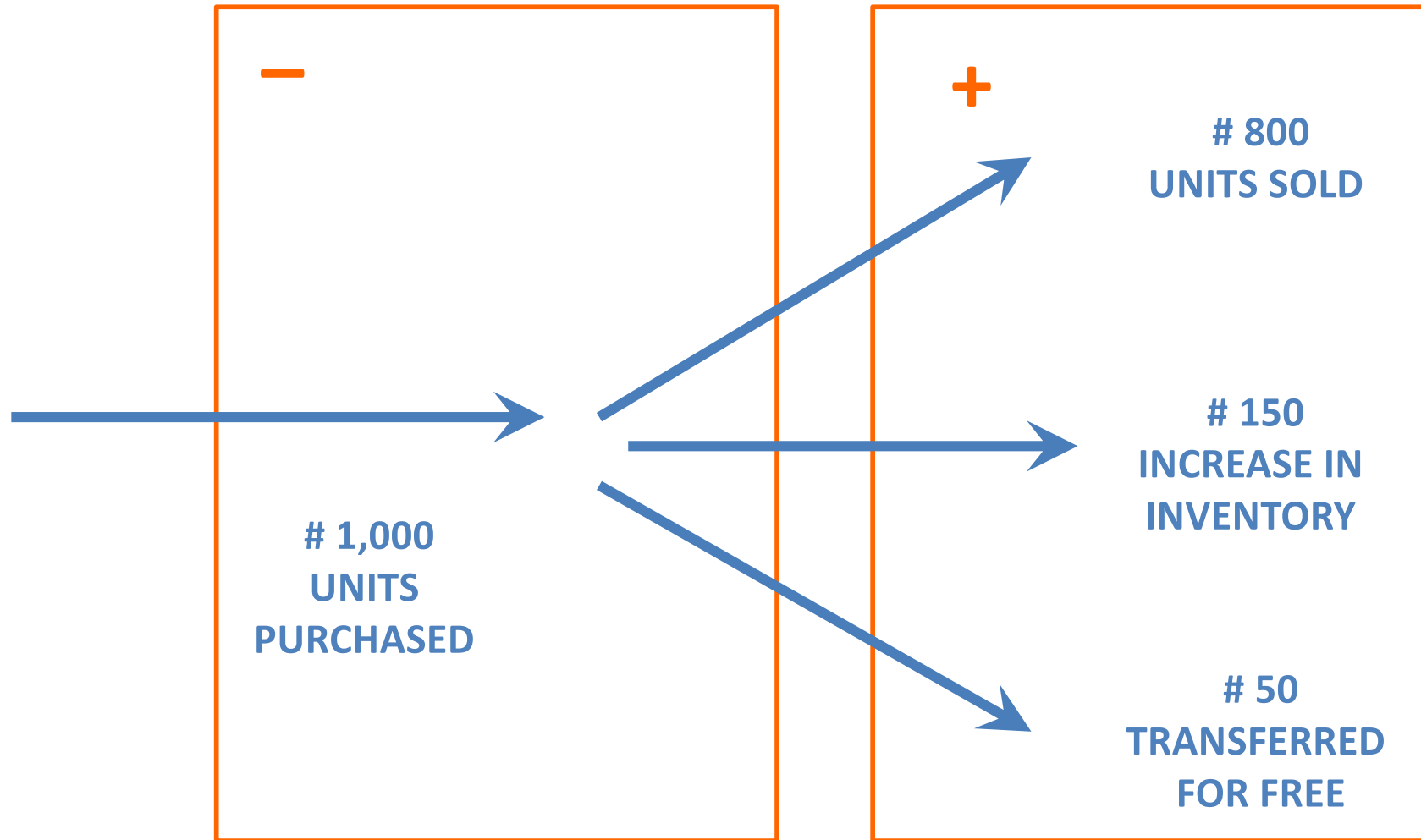


Cost of the goods sold:
portion of the resources
consumed to obtain the
fraction of production that
was sold

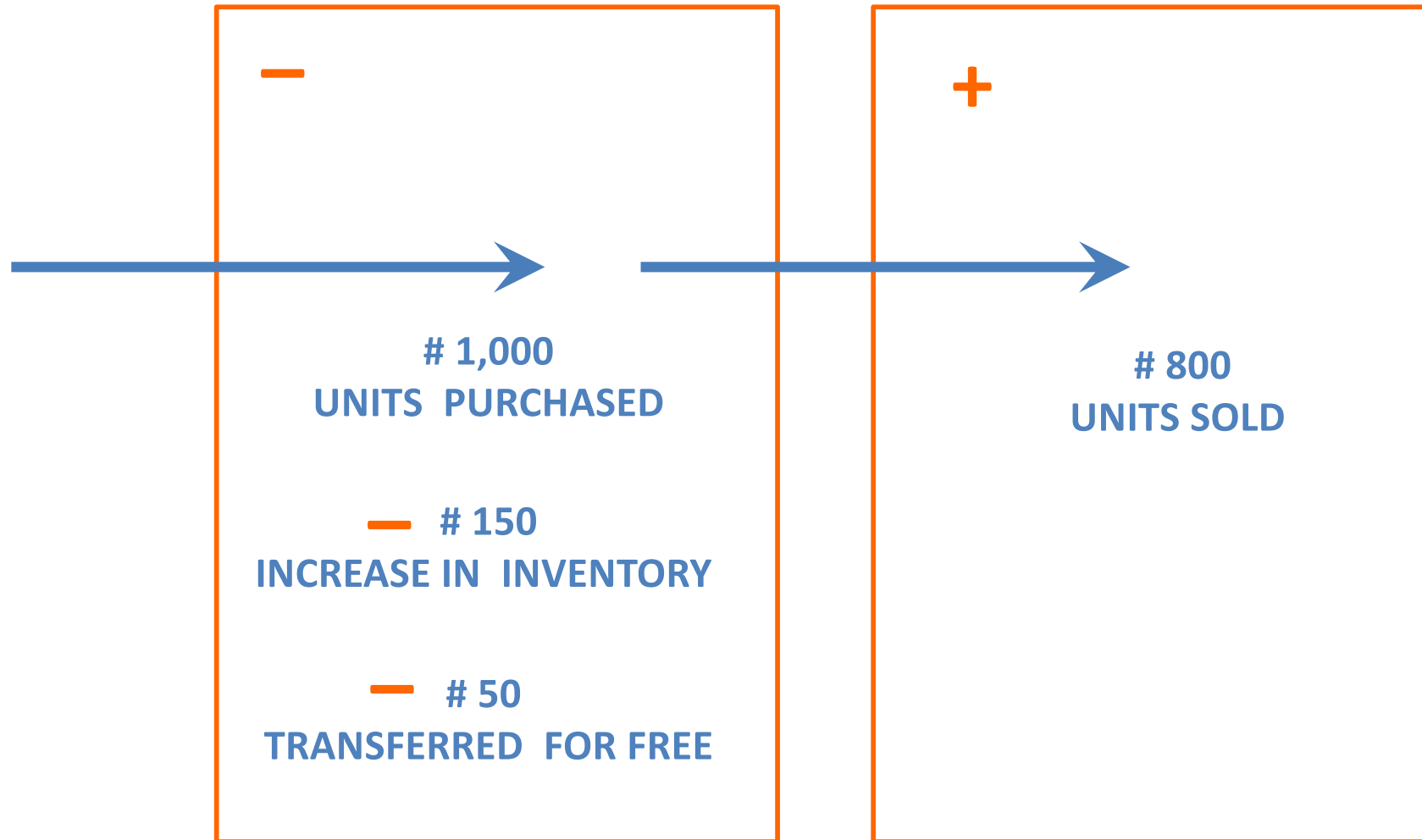
Output sold in the
period

+ Sales Revenues
- Cost of Goods Sold
= Gross Margin
- Selling, General & Administrative Expenses
= EBIT

TOTAL OUTPUT INCOME STATEMENT (MERCHANDISING)



COGS INCOME STATEMENT (MERCHANDISING)



LINDE INCOME STATEMENT 2000

Linde Group Income Statement in € '000

	Note	2000	1999
Sales	13	8,450,279	6,193,923
Changes in inventories and own work capitalised	14	418,357	65,642
Total output		8,868,636	6,259,565
Other operating income	15	274,078	187,262
Material expense	16	- 3,986,321	- 3,039,673
Personnel expense	17	- 2,222,890	- 1,657,814
Depreciation on tangible and intangible assets	18	- 676,834	- 315,128
Other operating expense	19	- 1,544,010	- 973,147
Investment income	20	7,020	6,933
Depreciation on financial assets and investment securities	18	- 111	- 1,072
Net interest income	21	- 193,518	- 26,506
Profit on ordinary activities		526,050	440,420
Taxes on profit		- 207,117	- 156,324
Other taxes		- 44,556	- 23,374
Net income	22	274,377	260,722

LINDE INCOME STATEMENT 2001

	Note	2001	2000
Sales	11	9,076,395	8,450,279
Cost of sales		- 6,168,579	- 5,617,514
Gross profit on sales		2,907,816	2,832,765
Marketing and selling expenses		- 1,283,712	- 1,270,228
Research and development costs		- 168,335	- 170,994
Administration expenses		- 683,587	- 689,465
Other operating income	12	237,438	274,078
Other operating expenses	13	- 214,652	- 201,378
Amortization of goodwill		- 107,943	- 106,675
Operating profit		687,025	668,103
Net income from investment in other companies		7,692	7,020
Net interest expense		- 187,558	- 193,518
Depreciation of financial assets and investment securities		- 1,708	- 111
Financial result	14	- 181,574	- 186,609
Earnings before taxes on income		505,451	481,494
Taxes on income		- 216,690	- 207,117
Net income		288,761	274,377

EXAMPLE ANALYZED TOGETHER

Finished Product "X" (Output)

Beginning Inventory:	100	€	2.500
Quantity Made (Inflow):	1.200	€	30.000
Quantity Sold (Outflow):	800	€	20.000
Ending Inventory:	500	€	12.500

Bill of Material for product "X"

Raw Material "A" (first component)	3 doses/unit	5 €/dose
Raw Material "B" (second component)	5 doses/unit	2 €/dose

Raw Material "A" (Input)

Beginning Inventory:	500	€	2.500
Quantity Purchased (Inflow):	4.000	€	20.000
Quantity Used (Outflow):	3.600	€	18.000
Ending Inventory:	900	€	4.500

Raw Material "B" (Input)

Beginning Inventory:	3.000	€	6.000
Quantity Purchased (Inflow):	5.000	€	10.000
Quantity Used (Outflow):	6.000	€	12.000
Ending Inventory:	2.000	€	4.000

- S.G.&A. Expenses		€	2.500
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EXAMPLE ANALYZED TOGETHER

COGS FORMAT:

+ Sales Revenue	800	*	€ 30	=	€	24.000
- Cost of Goods Sold	800	*	-€ 25	=	-€	20.000
= Gross Margin	800	*	€ 5	=	€	4.000
- S.G.&A. Expenses					-€	2.500
= Profit					€	1.500

TOTAL OUTPUT FORMAT:

+ Sales Revenue	800	*	€ 30	=	€	24.000
+ Change in Inventory (output)	400	*	€ 25	=	€	10.000
= Total output	1.200			=	€	34.000
- Purchases cost					-€	30.000
+ Change in Inventory (inputs)					€	-
= Gross Margin	1.200				€	4.000
- S.G.&A. Expenses					-€	2.500
= Profit					€	1.500

EXAMPLE ANALYZED TOGETHER

Finished Product "X" (Output)

Beginning Inventory:	500	€	12.500
Quantity Made (Inflow):	900	€	22.500
Quantity Sold (Outflow):	1.150	€	28.750
Write-off	50	€	1.250
Ending Inventory:	200	€	5.000

Bill of Material for product "X"

Raw Material "A" (first component)	3 doses/unit	5 €/dose
Raw Material "B" (second component)	5 doses/unit	2 €/dose

Raw Material "A" (Input)

Beginning Inventory:	900	€	4.500
Quantity Purchased (Inflow):	2.000	€	10.000
Quantity Used (Outflow):	2.700	€	13.500
Ending Inventory:	200	€	1.000

Raw Material "B" (Input)

Beginning Inventory:	2.000	€	4.000
Quantity Purchased (Inflow):	5.000	€	10.000
Quantity Used (Outflow):	4.500	€	9.000
Ending Inventory:	2.500	€	5.000

S.G.&A. Expenses		€	2.500
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EXAMPLE ANALYZED TOGETHER

COGS FORMAT:

+ Sales Revenue	1.150	*	€	30	=	€	34.500
- Cost of Goods Sold	1.150	*	-€	25	=	-€	28.750
= Gross Margin	1.150	*	€	5	=	€	5.750
- S.G.&A. Expenses						-€	2.500
- Write-off	50	*	-€	25	=	-€	1.250
= Profit						€	2.000

TOTAL OUTPUT FORMAT:

+ Sales Revenue	1.150	*	€	30	=	€	34.500
+ Change in Inventory (output)	- 250	*	€	25	=	-€	6.250
- Write-off	-50	*	€	25	=	-€	1.250
= Total output	900				=	€	27.000
- Purchases cost						-€	20.000
+ Change in Inventory (inputs)						-€	2.500
= Gross Margin	1.200					€	4.500
- S.G.&A. Expenses						-€	2.500
= Profit						€	2.000

BACK TO BASIC FINANCIAL ACCOUNTING

XYZ incurs the following classes of costs during fiscal year 20XO:

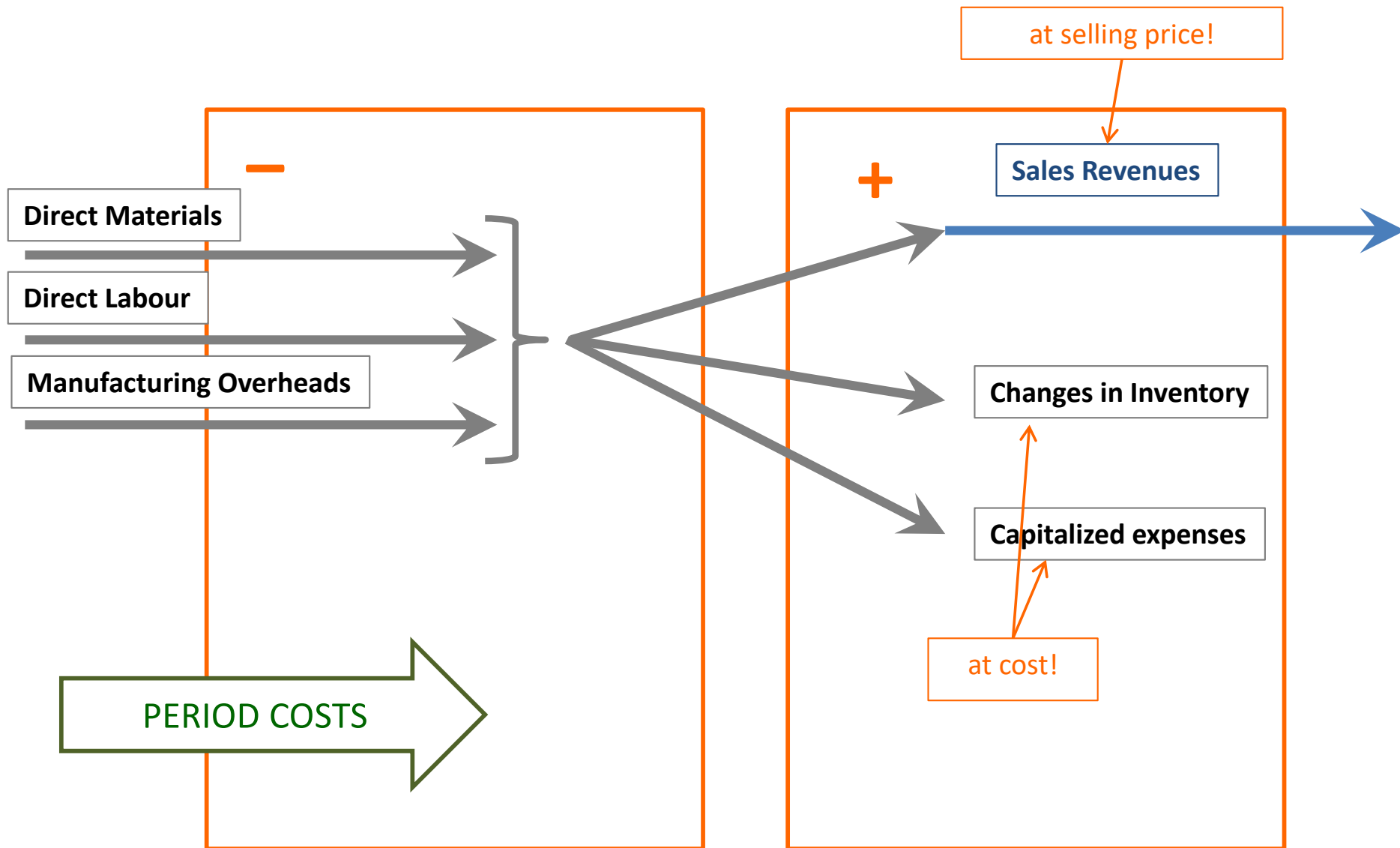
	Manufacturing	Other Phases
Materials Expenses	\$ 200,000	\$ 80,000
Personnel Expenses	\$ 350,000	\$ 420,000
Expenses for External Services	\$ 160,000	\$ 450,000
Depreciation & Amortization	\$ 290,000	\$ 550,000
Total	\$ 1,000,000	\$ 1,500,000

In addition to the typical product, a specific machine is built during the period for use in subsequent fiscal years. Its cost value (all made up of cost-line items belonging to manufacturing costs) is \$ 320,000.

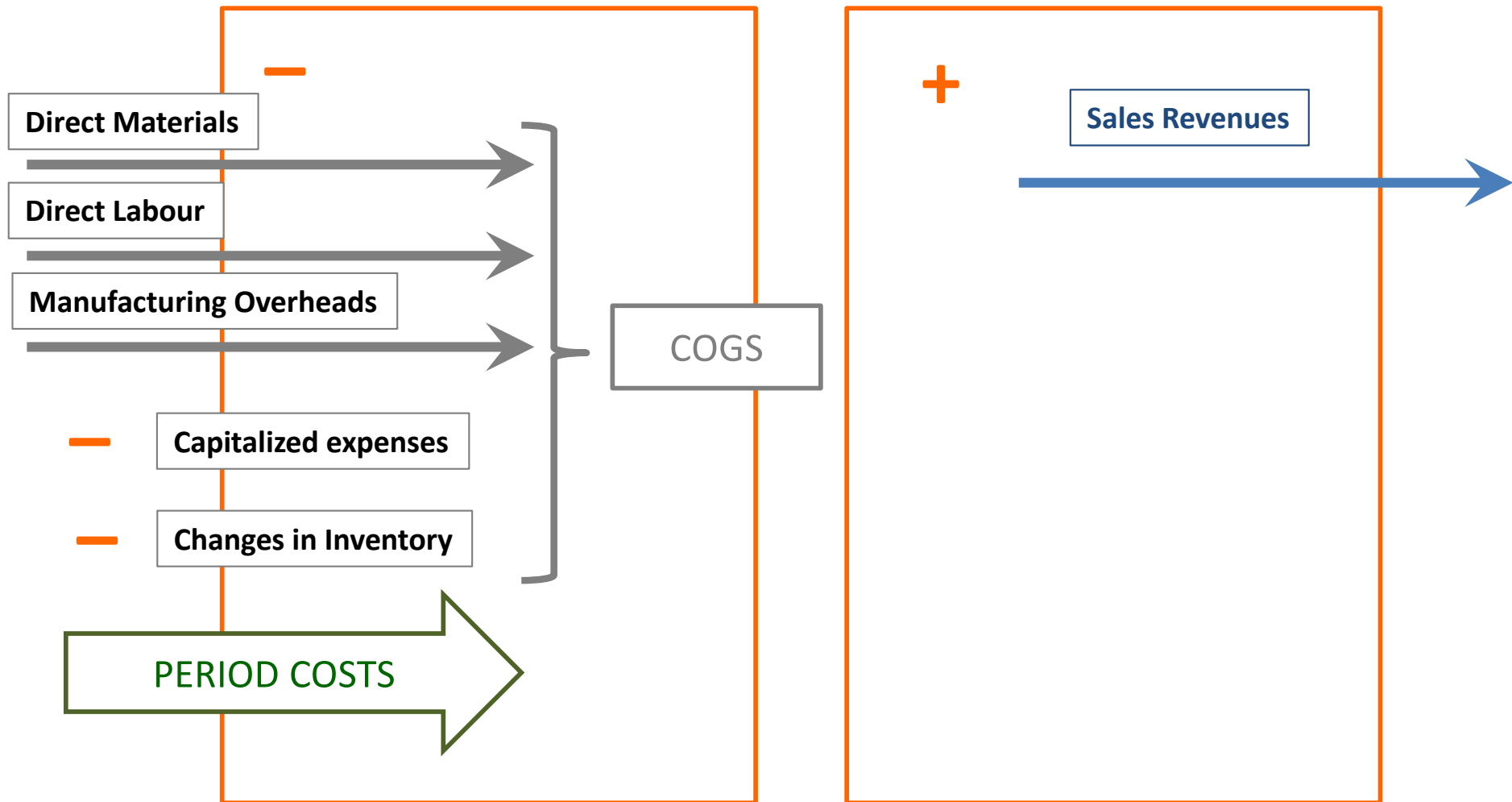
The finished products manufactured during the period are 20,000. Of these the units sold are, instead, 17,600. The average selling price was \$ 130.00.

Required: determine the EBIT of the Company

TOTAL OUTPUT INCOME STATEMENT



COGS INCOME STATEMENT



BACK TO BASIC FINANCIAL ACCOUNTING

XYZ incurs the following classes of costs during fiscal year 20X0:

	Manufacturing	Other Phases
Materials Expenses	\$ 200,000	\$ 80,000
Personnel Expenses	\$ 350,000	\$ 420,000
Expenses for External Services	\$ 160,000	\$ 450,000
Depreciation & Amortization	\$ 290,000	\$ 550,000
Total	\$ 1,000,000	\$ 1,500,000

In addition to the typical product, a specific machine is built during the period for use in subsequent fiscal years. Its cost value (all made up of cost-line items belonging to manufacturing costs) is \$ 320,000.

The finished products manufactured during the period are 20,000. Of these the units sold are, instead, 17,600. The average selling price was \$ 130.00.

Required: determine the EBIT of the Company

+ Sales Revenues	\$ 2,288,000
+ Changes in Inventory	\$ 81,600
+ Capitalized Expenses	\$ 320,000
= Total Outputs	\$ 2,689,600
- Materials Expenses	\$ 280,000
- Personnel Expenses	\$ 770,000
- Expenses for External Services	\$ 610,000
- Depreciation & Amortization	\$ 840,000
= EBIT	\$ 189,600

+ Sales Revenues	\$ 2,288,000
- Cost of Goods Sold	\$ 598,400
= Gross Margin	\$ 1,689,600
- Selling, General & Administrative Expenses	\$ 1,500,000
= EBIT	\$ 189,600

A) VALUE OF PRODUCTION

1)	net sales	3,977,201,532	3,263,797,418	713,404,114
2)	increase/(decrease) in inventory of work in progress, semi-finished and finished products	94,814,663	73,939,855	20,874,808
3)	increase/(decrease) of work in progress on a contract basis	(125,593)	457,830	(583,423)
4)	capitalised costs	189,452	253,433	(63,981)
5)	other revenues	73,446,318	54,487,636	18,958,682
TOTAL A) VALUE OF PRODUCTION		4,145,526,372	3,392,936,172	752,590,200

B) COSTS OF PRODUCTION

6)	purchase of raw materials, packaging and supplies	(2,240,546,485)	(1,751,381,169)	(489,165,316)
7)	purchase of services	(681,398,629)	(528,387,903)	(153,010,726)
8)	rentals and leases	(46,434,637)	(42,101,960)	(4,332,677)
9)	labour costs			
	a) wages and salaries	(632,079,118)	(569,482,624)	(62,596,494)
	b) social security contributions	(106,294,229)	(95,372,311)	(10,921,918)
	c) staff severance fund	(11,309,916)	(9,923,214)	(1,386,702)
	d) pension funds	(12,133,770)	(8,194,334)	(3,939,436)
	e) other costs	(48,035,012)	(40,806,762)	(7,228,250)
	Total labour costs	(809,852,045)	(723,779,245)	(86,072,800)
10)	amortisation, depreciation and write-downs			
	a) amortisation of intangible assets	(47,442,671)	(49,039,483)	1,596,812
	b) depreciation of tangible assets	(70,333,076)	(64,492,881)	(5,840,195)
	c) other write-downs of fixed assets	0	(67,149)	67,149
	d) write-down of receivables recognised as current assets and cash and cash equivalents	(6,491,445)	(6,339,759)	(151,686)
	Total amortisation, depreciation and write-downs	(124,267,192)	(119,939,272)	(4,327,920)
11)	increase/(decrease) in inventory of raw materials, packaging and supplies	90,213,168	91,794,434	(1,581,266)
12)	provisions for risks	(2,006,627)	(1,908,330)	(98,297)
13)	other provisions	(73,899)	0	(73,899)
14)	other operating costs	(60,484,991)	(49,496,978)	(10,988,013)
TOTAL B) COSTS OF PRODUCTION		(3,874,851,337)	(3,125,200,423)	(749,650,914)

DIFFERENCE BETWEEN VALUE AND COSTS OF PRODUCTION		270,675,035	267,735,749	2,939,286
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Output

Input

SOME CONSEQUENCES

Measuring productivity for all inputs at once is called total productivity measurement.

In practice, it may not be necessary to measure the effect of all inputs. Many firms measure the productivity of only those factors that are thought to be relevant indicators of organizational performance and success. Thus, in practical terms, total productivity measurement can be defined as focusing on a limited number of inputs, which, in total, indicates organizational success. In either case, total productivity measurement requires the development of a multifactor measurement approach.

Two approaches that have gained some acceptance are profile measurement and profit-linked productivity measurement.

Source: Don R. Hansen & Maryanne M. Mowen, “Cost Management. Accounting and Control”, Fifth Edition, Chapter 15 *Productivity Measurement and Control*, Thomson South-Western, 2006

PROFIT-LINKED PRODUCTIVITY MEASUREMENT

Assessing the effects of productivity changes on current profits is one way to value productivity changes. Profits change from the base period to the current period. Some of that profit change is attributable to productivity changes.

Measuring the amount of profit change attributable to productivity change is defined as profit-linked productivity measurement.

Assessing the effect of productivity changes on current-period profits will help managers understand the economic importance of productivity changes.

Source: Don R. Hansen & Maryanne M. Mowen, “Cost Management. Accounting and Control”, Fifth Edition, Chapter 15 *Productivity Measurement and Control*, Thomson South-Western, 2006



PROFIT-LINKAGE RULE

Linking productivity changes to profits is described by the following rule:

For the current period, calculate the cost of the inputs that would have been used in the absence of any productivity change and compare this cost with the cost of the inputs actually used.

The difference in costs is the amount by which profits changed because of productivity changes.

Source: Don R. Hansen & Maryanne M. Mowen, “Cost Management. Accounting and Control”, Fifth Edition, Chapter 15 *Productivity Measurement and Control*, Thomson South-Western, 2006

APPLYING THE PROFIT-LINKAGE RULE

To apply the linkage rule, the inputs that would have been used for the current period in the absence of a productivity change must be calculated. Let PQ represent this productivity-neutral quantity of input.

To determine the productivity-neutral quantity for a particular input, divide the current-period output by the input's base-period productivity ratio:

$$PQ = \frac{\text{Actual Output}}{\left(\frac{\text{Output}}{\text{Input}} \right)_{\text{Base Period}}}$$

Source: Don R. Hansen & Maryanne M. Mowen, "Cost Management. Accounting and Control", Fifth Edition, Chapter 15 *Productivity Measurement and Control*, Thomson South-Western, 2006

PRICE-RECOVERY COMPONENT

The profit-linked measure computes the amount of profit change from the base period to the current period attributable to productivity changes. Generally, this will not be equal to the total profit change between the two periods.

The difference between the total profit change and the profit-linked productivity change is called the price-recovery component. This component is the change in revenue less a change in the cost of inputs, assuming no productivity changes. It, therefore, measures the ability of revenue changes to cover changes in the cost of inputs, assuming no productivity change.

Source: Don R. Hansen & Maryanne M. Mowen, “Cost Management. Accounting and Control”, Fifth Edition, Chapter 15 *Productivity Measurement and Control*, Thomson South-Western, 2006



PROFIT-LINKAGE RULE: AN EXAMPLE

	20X0	20X1
Number of frames produced	240'000	250'000
Labor hours used	60'000	50'000
Materials used (lbs.)	1'200'000	1'300'000
Unit selling price (frames)	30.00 US\$	29.00 US\$
Wages per labor hour	15.00 US\$	15.00 US\$
Cost per pound of material	3.00 US\$	3.50 US\$
Operational productivity for labor	4.0000	5.0000
Operational productivity for materials	0.2000	0.1923
Quantity of labor that <i>would have been used</i>		62'500
Quantity of material that <i>would have been used</i>		1'250'000

PRICE RECOVERY EFFECT

Hypothetical cost of labor	62'500	15.00 US\$	937'500 US\$
Hypothetical cost of materials	1'250'000	3.50 US\$	4'375'000 US\$
Hypothetical cost of inputs			5'312'500 US\$
Actual cost of labor	50'000	15.00 US\$	750'000 US\$
Actual cost of materials	1'300'000	3.50 US\$	4'550'000 US\$
Actual cost of inputs			5'300'000 US\$
Productivity gain			187'500 US\$
Productivity loss			-175'000 US\$
Profit-linked productivity change			12'500 US\$
	20X0	20X1	- Difference -
Revenues	7'200'000 US\$	7'250'000 US\$	50'000 US\$
Cost of inputs	-4'500'000 US\$	-5'300'000 US\$	-800'000 US\$
Profit	2'700'000 US\$	1'950'000 US\$	-750'000 US\$
- Profit-linked productivity change			-12'500 US\$
Price-recovery effect			-762'500 US\$

PROFIT-LINKAGE RULE: AN EXAMPLE

20X0

Product XYZ	200	€	10,00	€	2.000,00
Resource A	490	€	2,00	€	980,00
Resource B	400	€	1,00	€	400,00
Margin				€	620,00

20X1

Product XYZ	200	€	9,75	€	1.950,00
Resource A	460	€	1,80	€	828,00
Resource B	410	€	1,20	€	492,00
Margin				€	630,00

Required:

- determine the level of the partial operational productivity measures of the two resources over the two years;
- determine the variance in margin

PROFIT-LINKAGE RULE: AN EXAMPLE

20X0

Product XYZ	200	€	10,00	€	2.000,00
Resource A	490	€	2,00	€	980,00
Resource B	400	€	1,00	€	400,00
Margin			(B)	€	620,00

Partial Operational Productivity:

Resource A	0,4082
Resource B	0,5000

20X1

Product XYZ	200	€	9,75	€	1.950,00
Resource A	460	€	1,80	€	828,00
Resource B	410	€	1,20	€	492,00
Margin			(A)	€	630,00

Partial Operational Productivity:

Resource A	0,4348
Resource B	0,4878

$$\text{Variance in margin} = (A) - (B) = € 630 - € 620 = + € 10$$

$$\text{Variance in margin} = + € 10 \left\{ \begin{array}{l} \text{Variance in revenues} = + € 1,950 - € 2,000 = - € 50 \\ \text{Variance in costs (res. A)} = - € 828 - - € 980 = + € 980 - € 828 = + € 152 \\ \text{Variance in costs (res. B)} = - € 492 - - € 400 = + € 400 - € 492 = - € 92 \end{array} \right.$$

PROFIT-LINKAGE RULE: AN EXAMPLE

20X0

Product XYZ	200	€	10,00	€	2.000,00
Resource A	490	€	2,00	€	980,00
Resource B	400	€	1,00	€	400,00
Margin			(B)	€	620,00

Partial Operational Productivity:

Resource A	0,4082
Resource B	0,5000

20X1

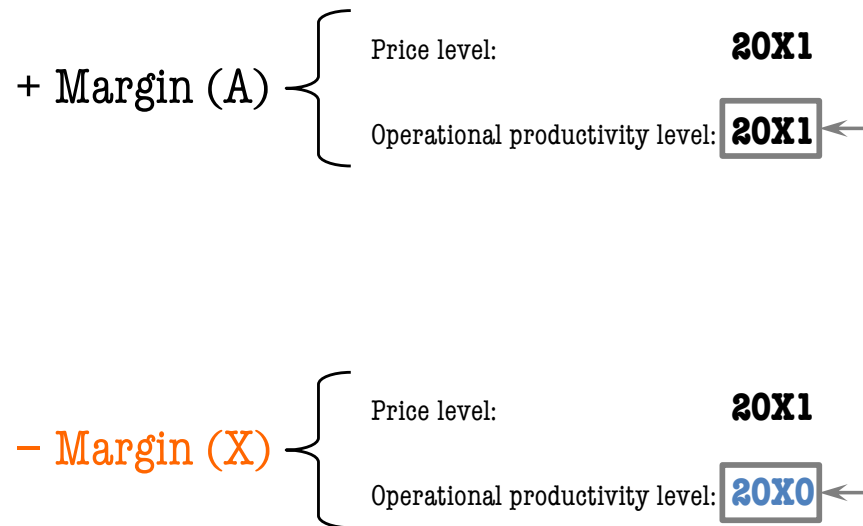
Product XYZ	200	€	9,75	€	1.950,00
Resource A	460	€	1,80	€	828,00
Resource B	410	€	1,20	€	492,00
Margin			(A)	€	630,00

Partial Operational Productivity:

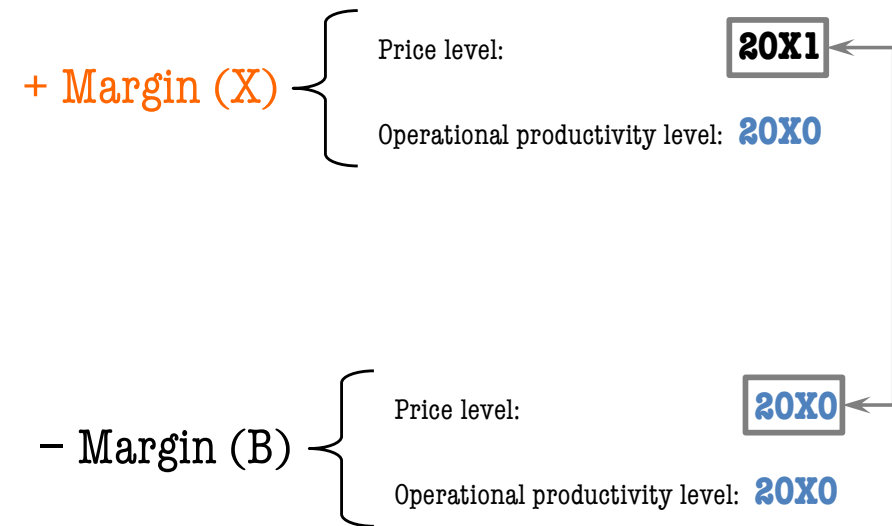
Resource A	0,4348
Resource B	0,4878

Product XYZ	200	€	9,75	€	1.950,00
Resource A	490	€	1,80	€	882,00
Resource B	400	€	1,20	€	480,00
Margin			(X)	€	588,00

TWO COMPONENTS



This component of the overall variance measures the effect of changes in the levels of utilisation of different resources (operational productivity) by valuing this information (logically expressed in physical units) on the basis of the most recent prices.



This second component, on the other hand, values the same level of resource utilisation using two distinct price levels (final and initial) and thus provides a measure of the effect produced on the margin by the change in price level (upstream and downstream of the firm)

PROFIT-LINKAGE RULE: ANOTHER EXAMPLE

20X0

Product XYZ	200	€	10,00	€	2.000,00
Resource A	490	€	2,00	€	980,00
Resource B	400	€	1,00	€	400,00
Margin			(B)	€	620,00
Resource A	2,45				
Resource B	2,00				

20X1

Product XYZ	220	€	9,75	€	2.145,00
Resource A	506	€	1,80	€	910,80
Resource B	451	€	1,20	€	541,20
Margin			(A)	€	693,00
Resource A	2,30				
Resource B	2,05				

$$\text{Variance in the margin} = (A) - (B) = [(A) - (X)] + [(X) - (Y)] + [(Y) - (B)] = + € 73$$

PROFIT-LINKAGE RULE: ANOTHER EXAMPLE

$$\text{Variance in the margin} = (A) - (B) = [(A) - (X)] + [(X) - (Y)] + [(Y) - (B)] = + \text{€ } 73$$

Product XYZ	220	€	9,75	€	2.145,00
Resource A	539	€	1,80	€	970,20
Resource B	440	€	1,20	€	528,00
Margin			(X)	€	646,80

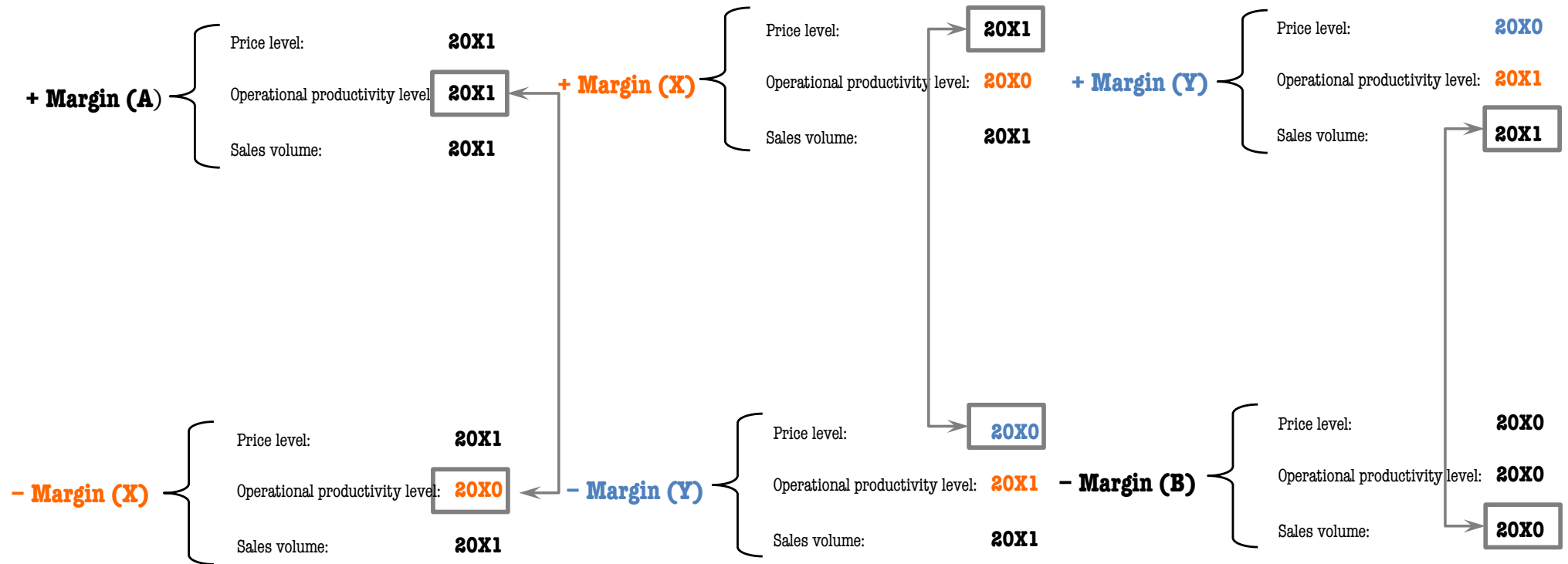
Product XYZ	220	€	10,00	€	2.200,00
Resource A	539	€	2,00	€	1.078,00
Resource B	440	€	1,00	€	440,00
Margin			(Y)	€	682,00

PROFIT-LINKAGE RULE: ANOTHER EXAMPLE

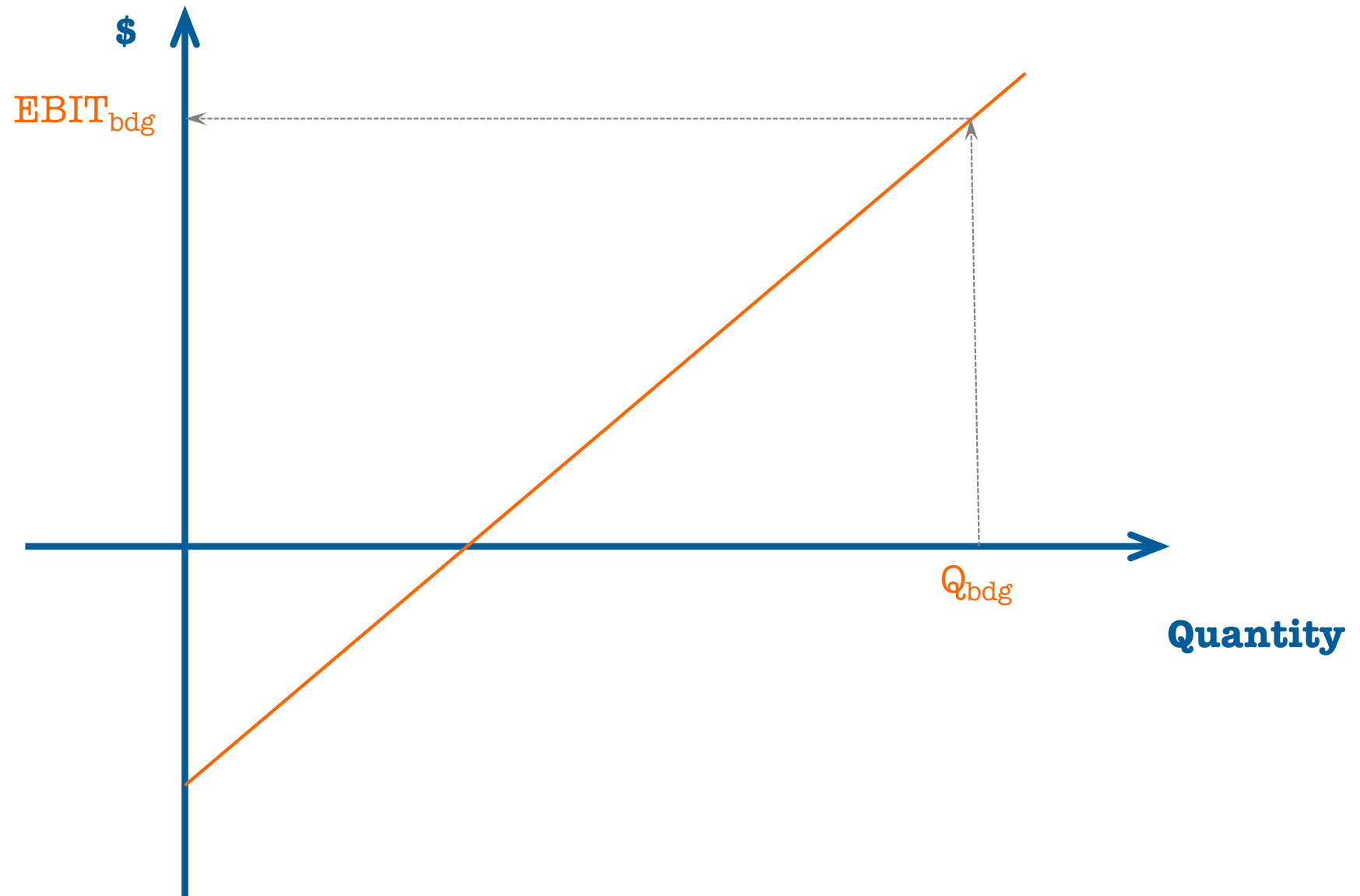
$$\text{Variance in the margin} = (A) - (B) = [(A) - (X)] + [(X) - (Y)] + [(Y) - (B)] = + \text{€ } 73$$

Product XYZ	220	€	9,75	€	2.145,00	+ (A)	€	693,00
						- (X)	-€	646,80
						Scostamento efficienza	€	46,20
Resource A	539	€	1,80	€	970,20			
Resource B	440	€	1,20	€	528,00			
						+ (X)	€	646,80
						- (Y)	-€	682,00
						Scostamento prezzi	-€	35,20
Margin			(X)	€	646,80			
						+ (Y)	€	682,00
						- (B)	-€	620,00
						Scostamento volume	€	62,00
Product XYZ	220	€	10,00	€	2.200,00			
Resource A	539	€	2,00	€	1.078,00	Scostamento efficienza	€	46,20
Resource B	440	€	1,00	€	440,00	Scostamento prezzi	-€	35,20
						Scostamento volume	€	62,00
Margin			(Y)	€	682,00	Scostamento totale	€	73,00

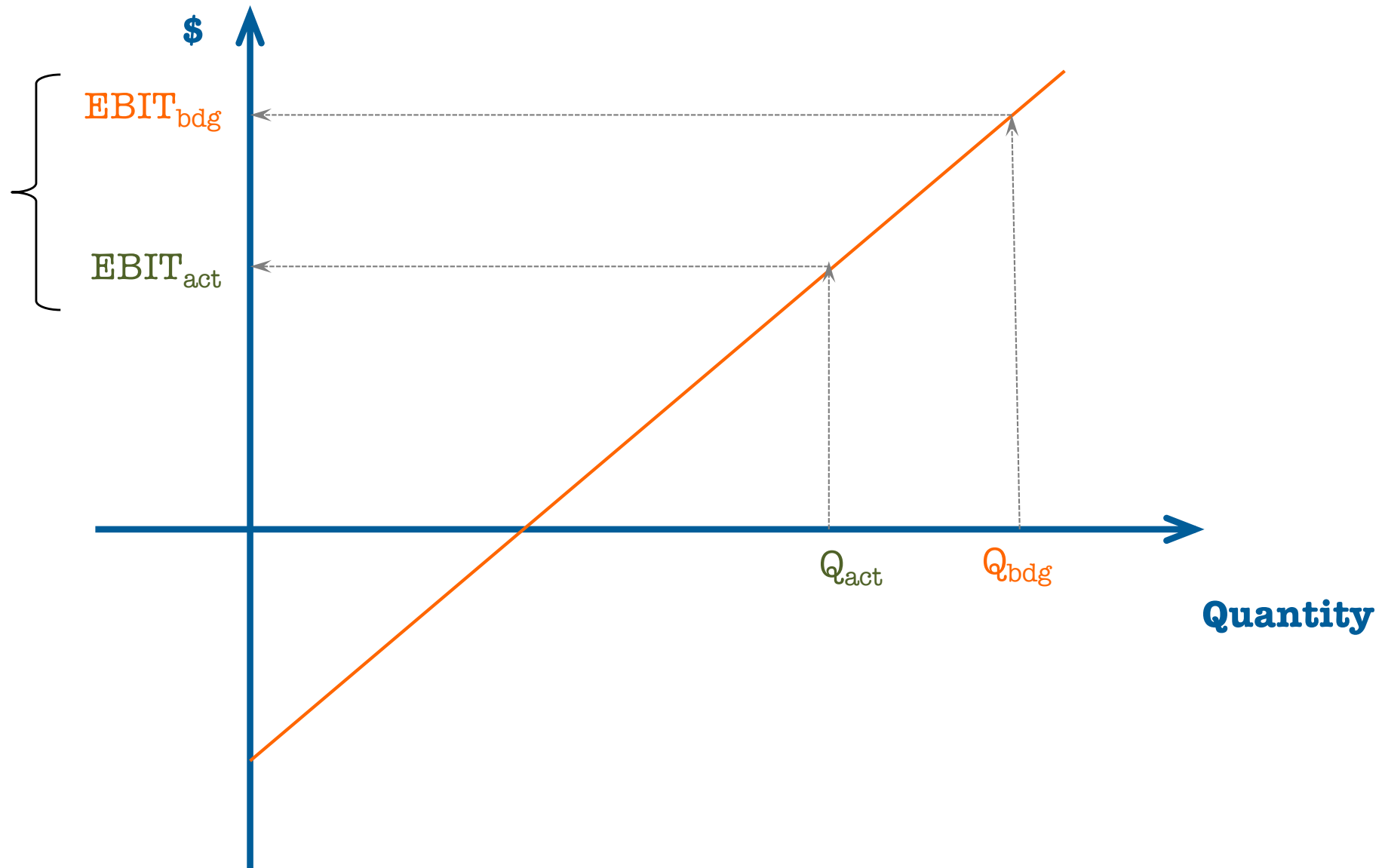
THREE COMPONENTS



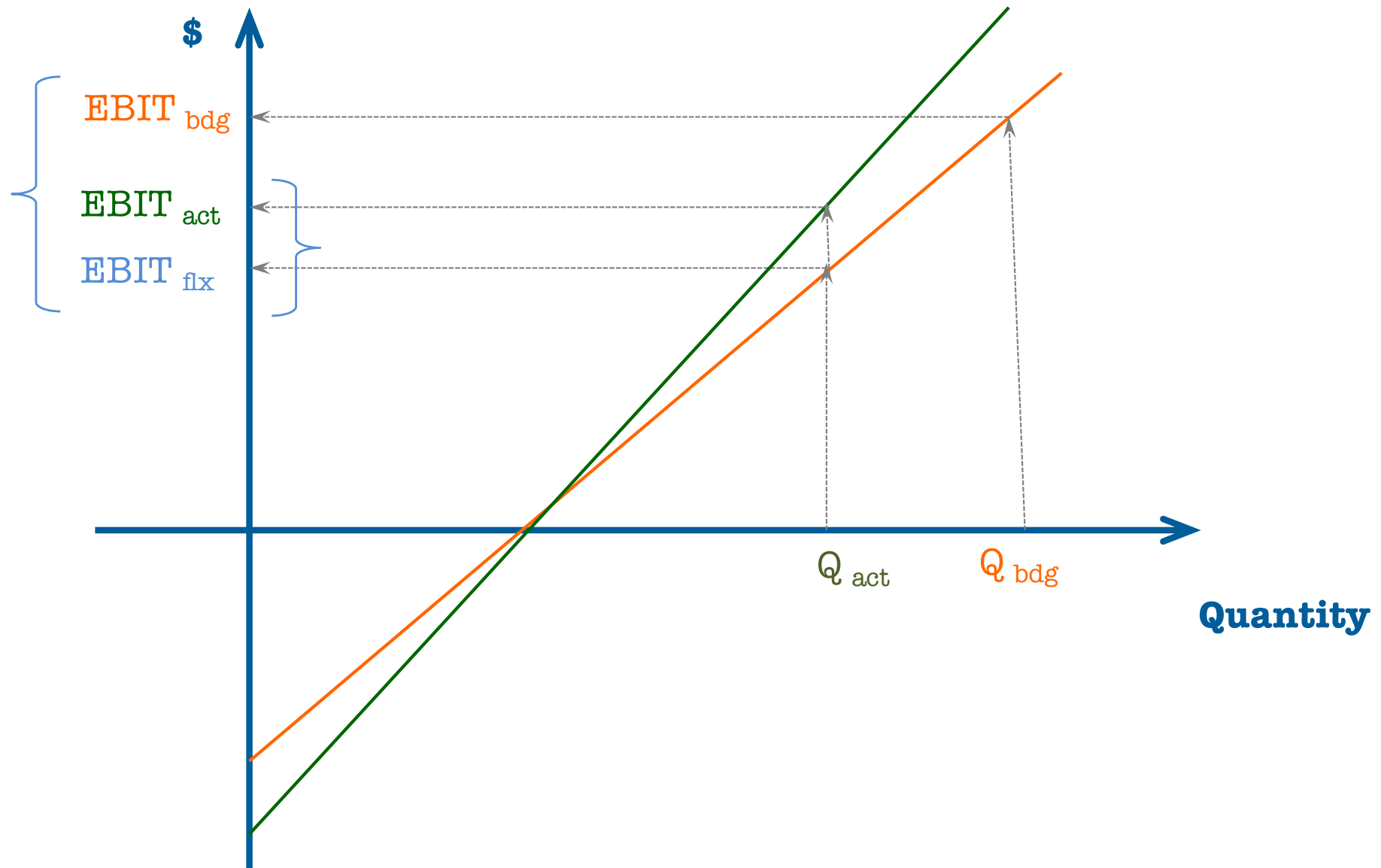
BUDEGT



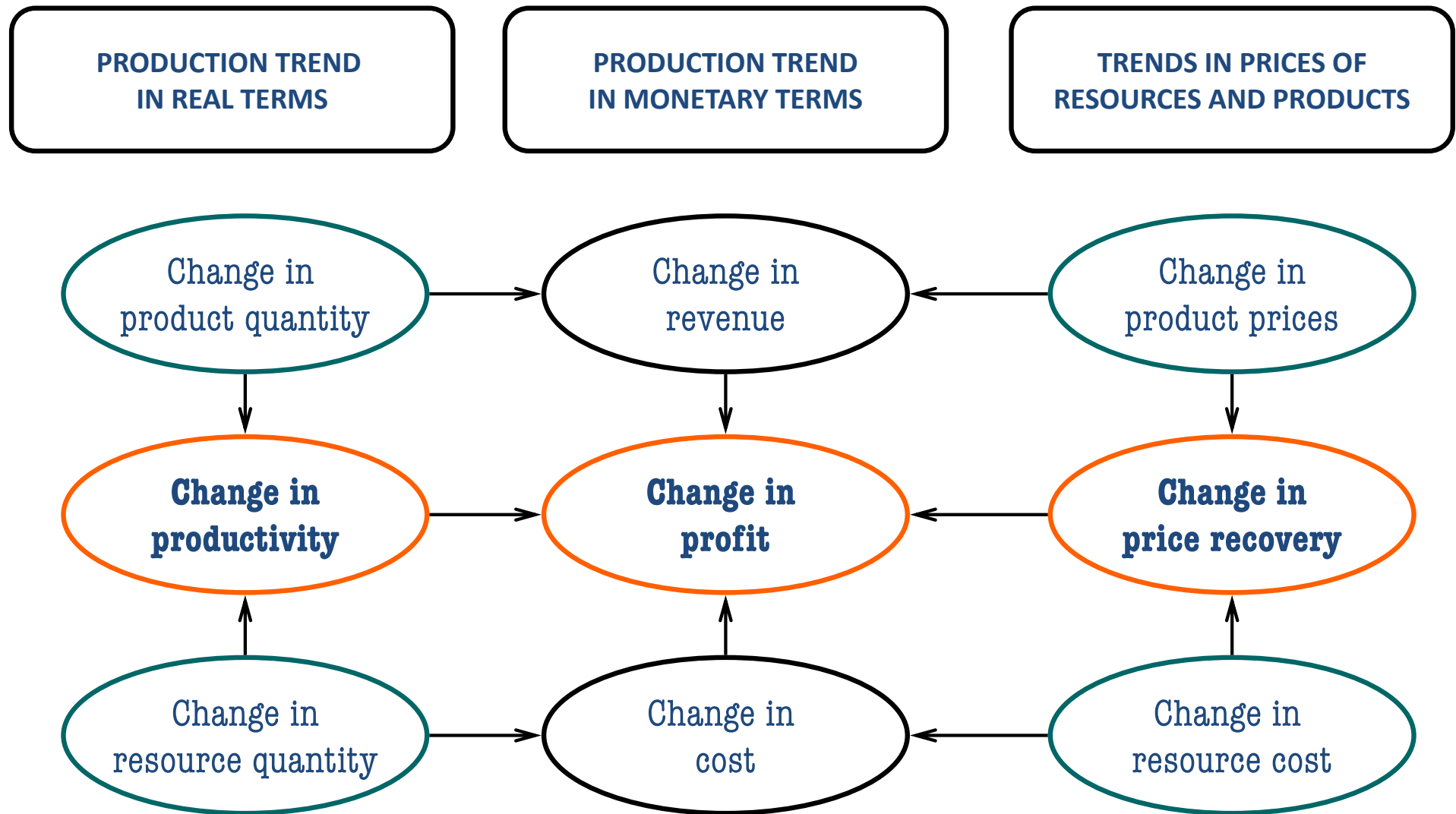
FLEXING THE BUDEGT



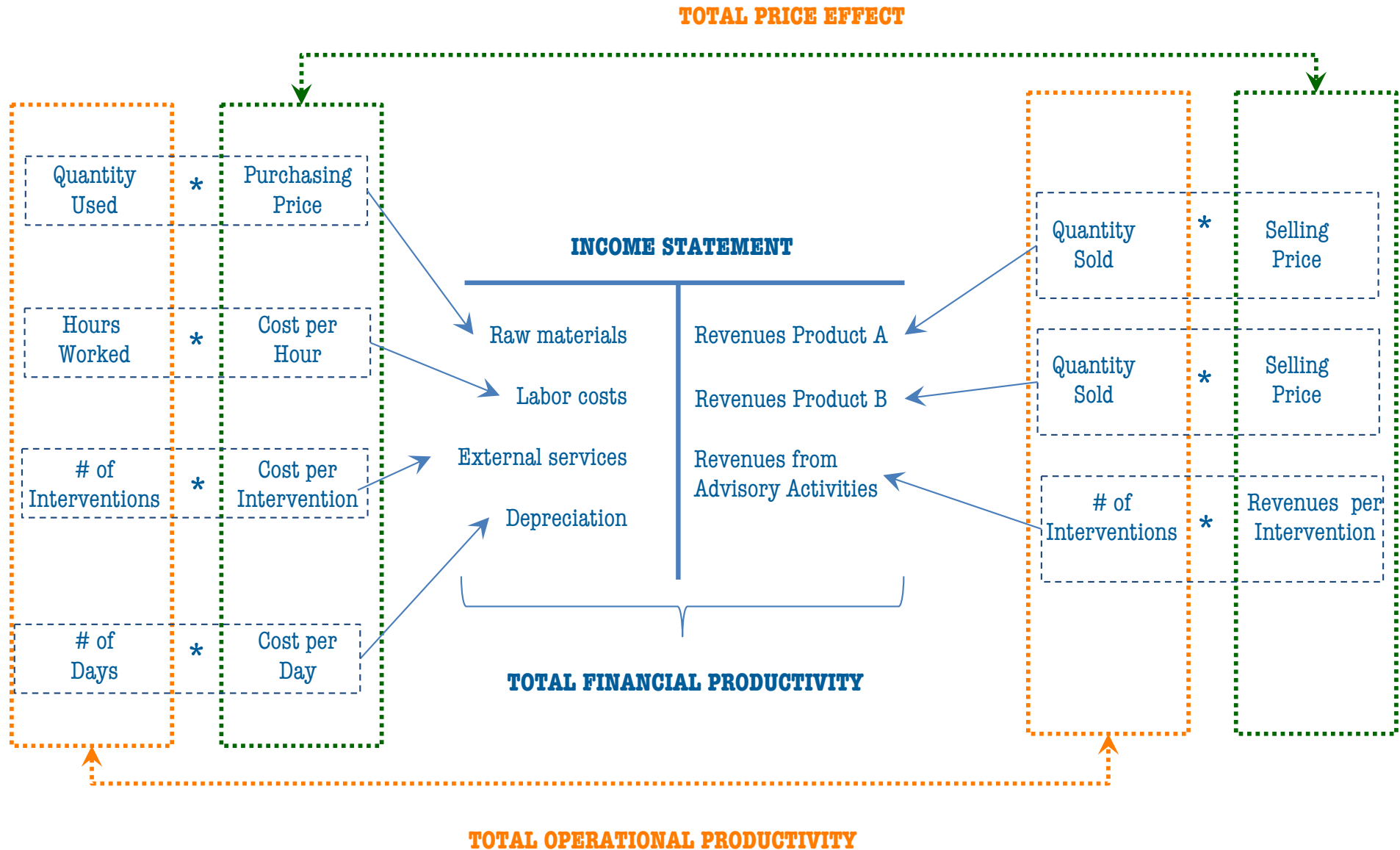
AGAIN: TWO COMPONENTS



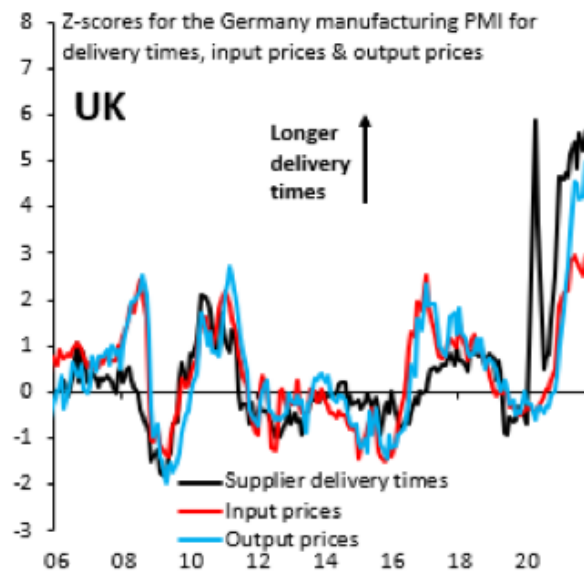
PROFITABILITY = PRODUCTIVITY + PRICE RECOVERY



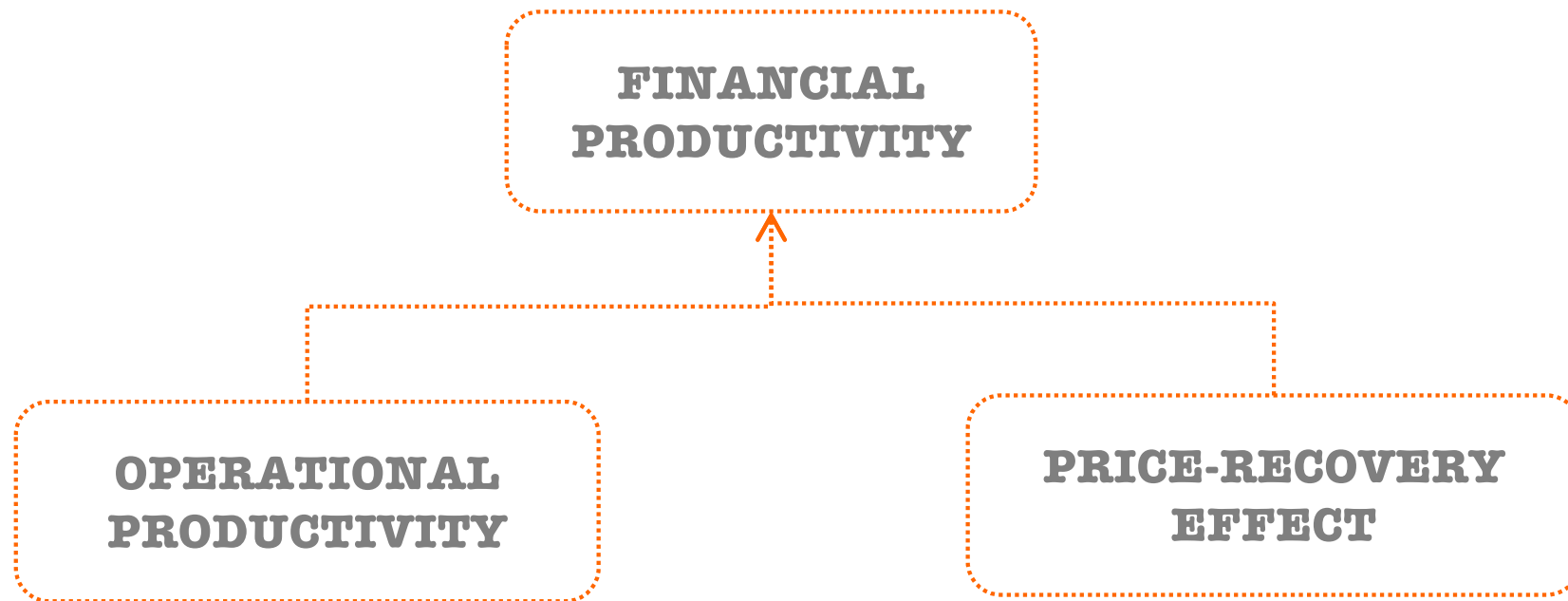
SOME IMPORTANT RELATIONSHIPS



A GLIMPSE AT REAL DATA



CAUSES AND EFFECT



PORTER'S 5 FORCES



DIFFERENT POSSIBLE PROFIT MARGINS

+ Sales revenues	€ 265.780	100,00%
- Cost of goods sold (@manufacturing variable cost)	-€ 85.330	-32,11%
= Manufacturing variable margin	€ 180.450	67,89%
- Sales variable costs	-€ 24.550	-9,24%
= Contribution margin	€ 155.900	58,66%
- Fixed costs (excluding depreciation and amortization costs)	-€ 83.009	-31,23%
= EBITDA	€ 72.891	27,43%
- Depreciation and amortization costs	-€ 38.126	-14,34%
= EBIT	€ 34.765	13,08%
- Interest expenses	-€ 12.500	-4,70%
= EBT	€ 22.265	8,38%
- Income taxes	-€ 6.680	-2,51%
= EAT	€ 15.586	5,86%

DIFFERENT PRIORITIES?

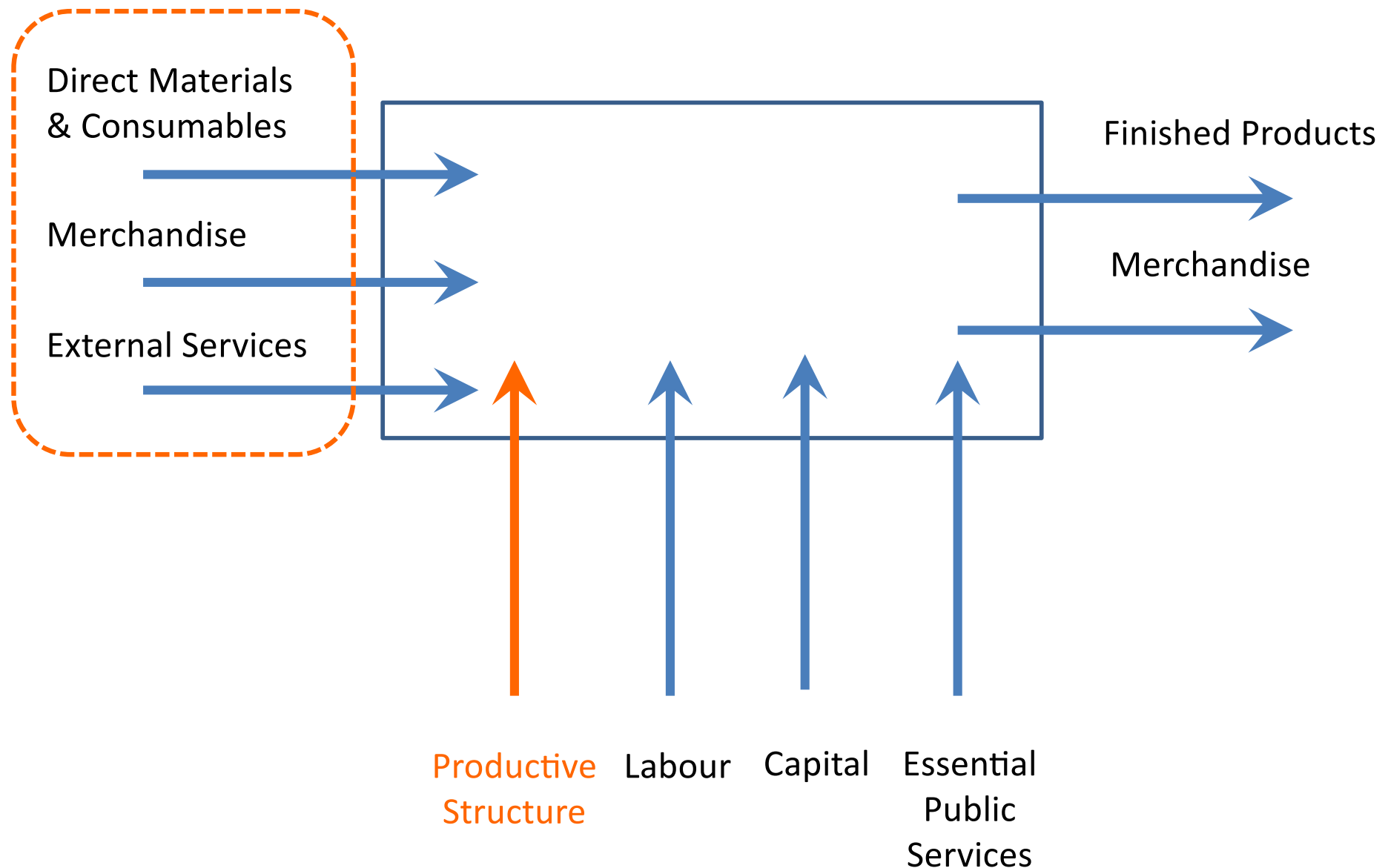
	COMPANY "A"	COMPANY "B"
+ TOTAL OUTPUT	100 €	100 €
- INTERMEDIATE CONSUMPTION	(10 €)	(60 €)
<hr/>	<hr/>	<hr/>
= ADDED VALUE	90 €	40 €
- OTHER OPERATING COSTS	(85 €)	(35 €)
<hr/>	<hr/>	<hr/>
= EBIT	5 €	5 €

ADDED VALUE

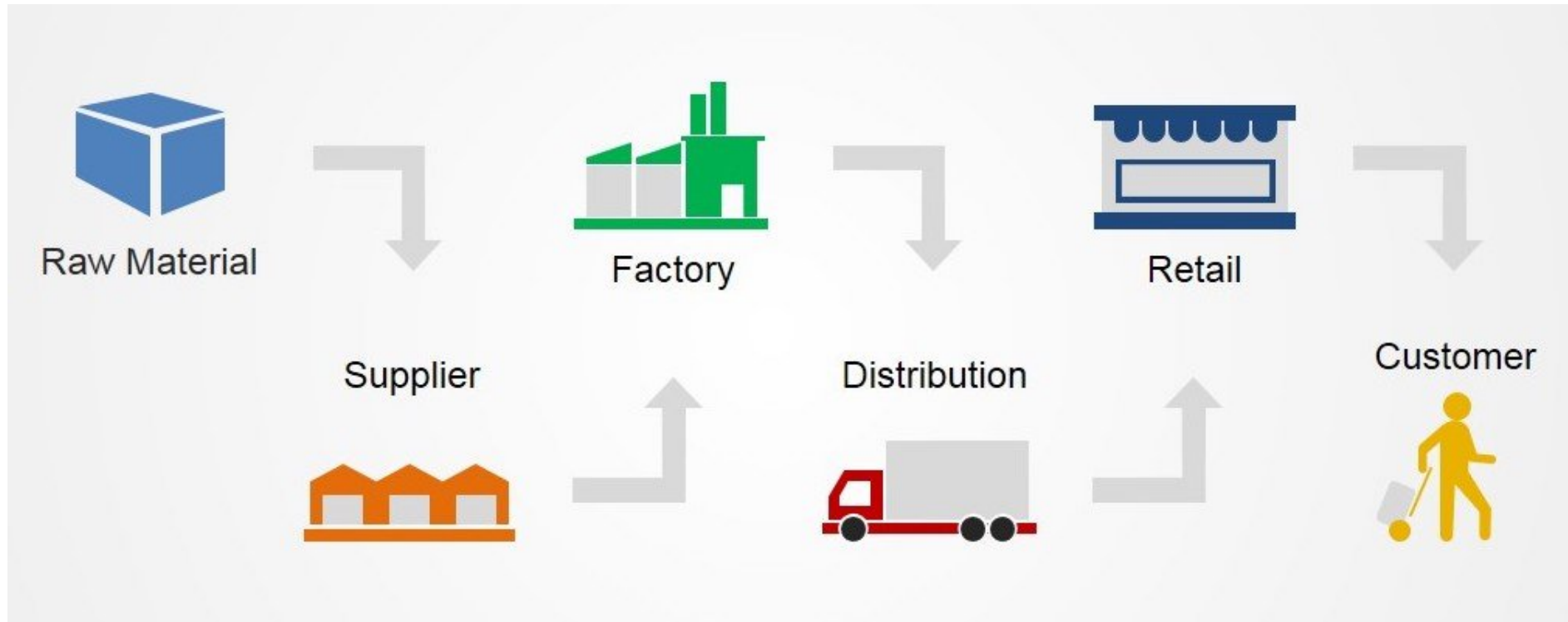
The term **value added** refers to the **contribution** of the **factors of production that are considered “internal”** to a specific entity – i.e. fixed assets (both tangible and intangible), internal labour (work performed by employees), financial capital (both borrowed or obtained as equity capital) and essential public services available to the firm – **to raise the value of goods and services acquired outside** the entity.

The value thus added is **ideally used to sequentially remunerate all the internal factors of production considered**, in a cascading process in which equity contributors are only rewarded in residual terms (with the possibility that instead of gaining value, they lose it to other parties)

ADDED VALUE

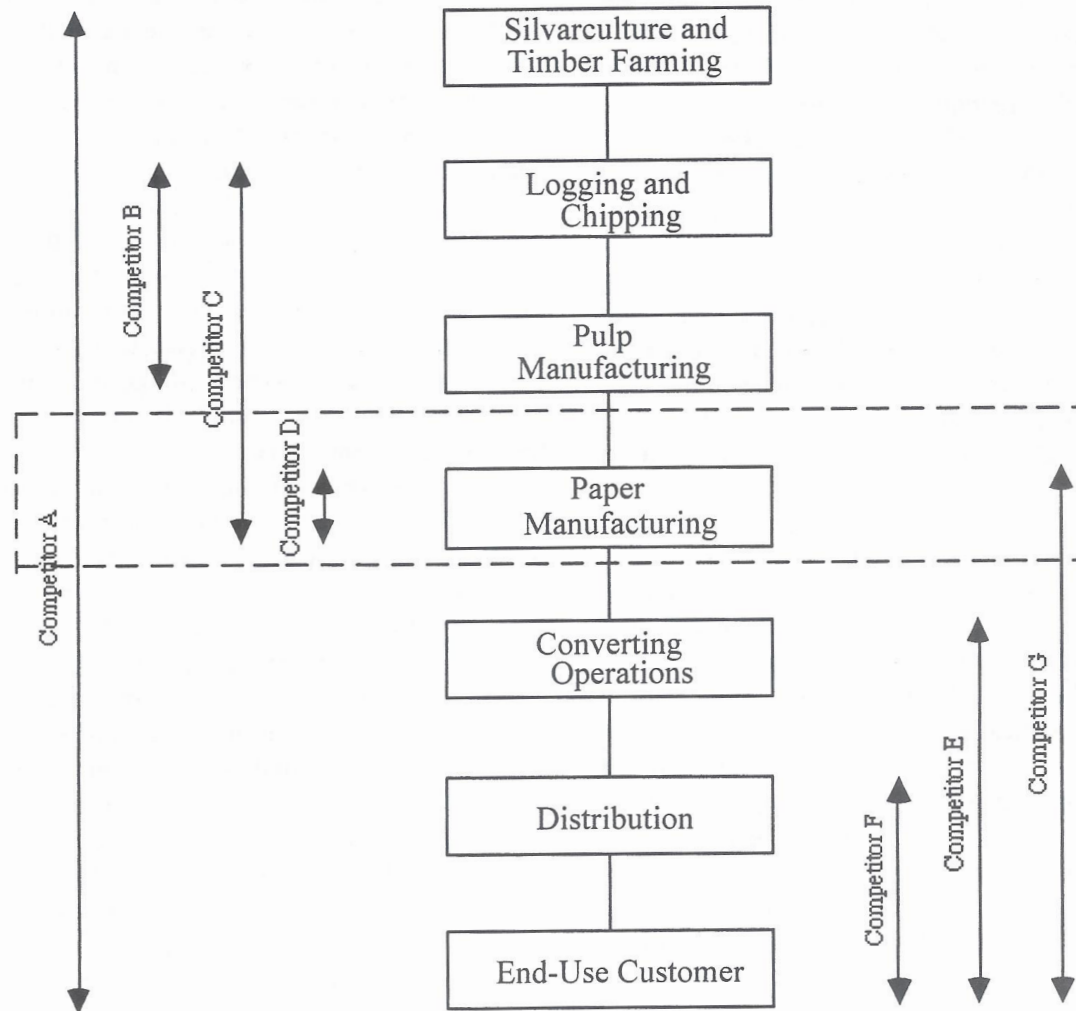


SUPPLY CHAIN



In commerce, a supply chain is a network of facilities that procure raw materials, transform them into intermediate goods and then final products to customers through a distribution system. It refers to the network of organizations, people, activities, information, and resources involved in delivering a product or service to a consumer. Supply chain activities involve the transformation of natural resources, raw materials, and components into a finished product and delivering the same to the end customer.

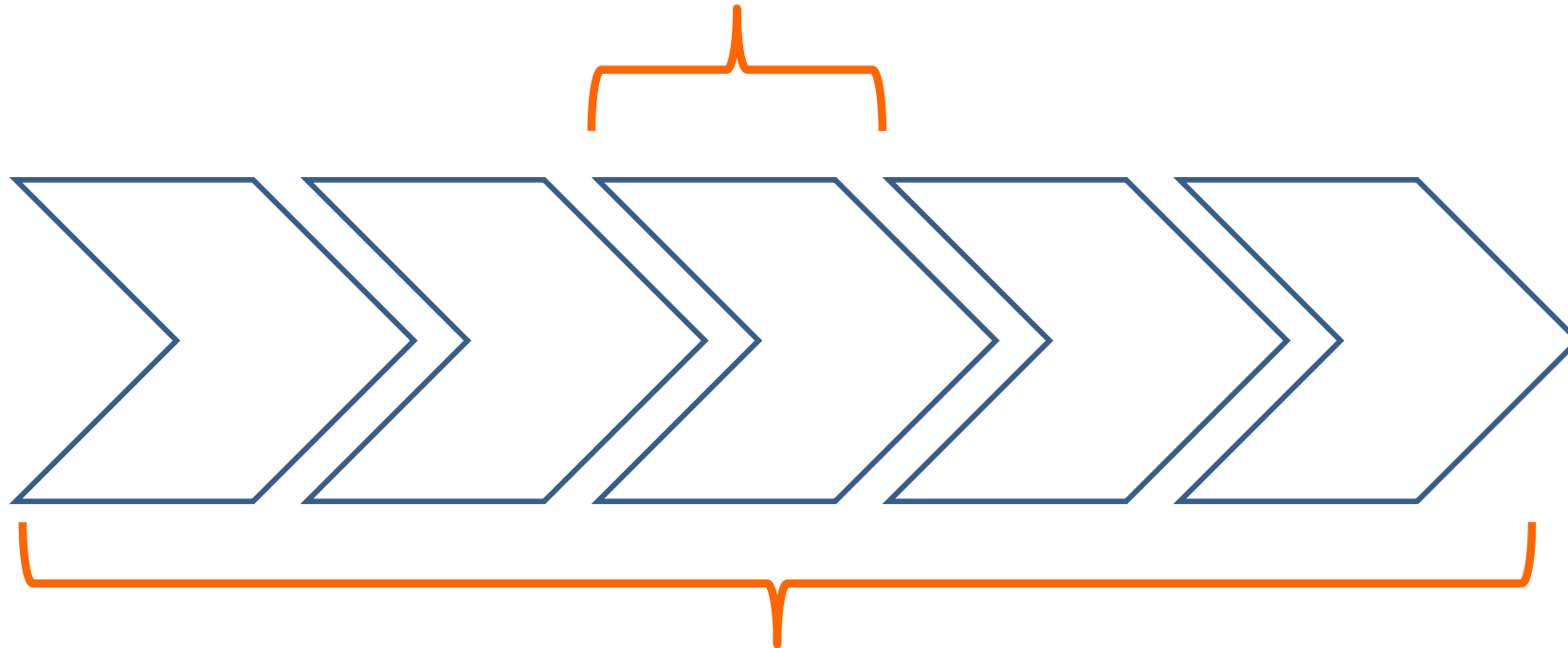
SUPPLY CHAIN IN THE PAPER PRODUCTS INDUSTRY



Source: John K. Shank, "Cases in Cost Management. A Strategic Emphasis", Third Edition, Thompson, 2006

DIFFERENT STRATEGIES

Outsourcing is the business practice of hiring a party outside a company to perform services or create goods that were traditionally performed in-house by the company's own employees and staff. Outsourcing is a practice usually undertaken by companies as a cost-cutting measure



A vertical integration is when a **firm extends its operations within its supply chain**. It means that a **vertically integrated company will bring in previously outsourced operations in-house**. The direction of vertical integration can either be upstream (backward) or downstream (forward). This can be achieved either by internally developing an extended production line or by acquiring vertically.

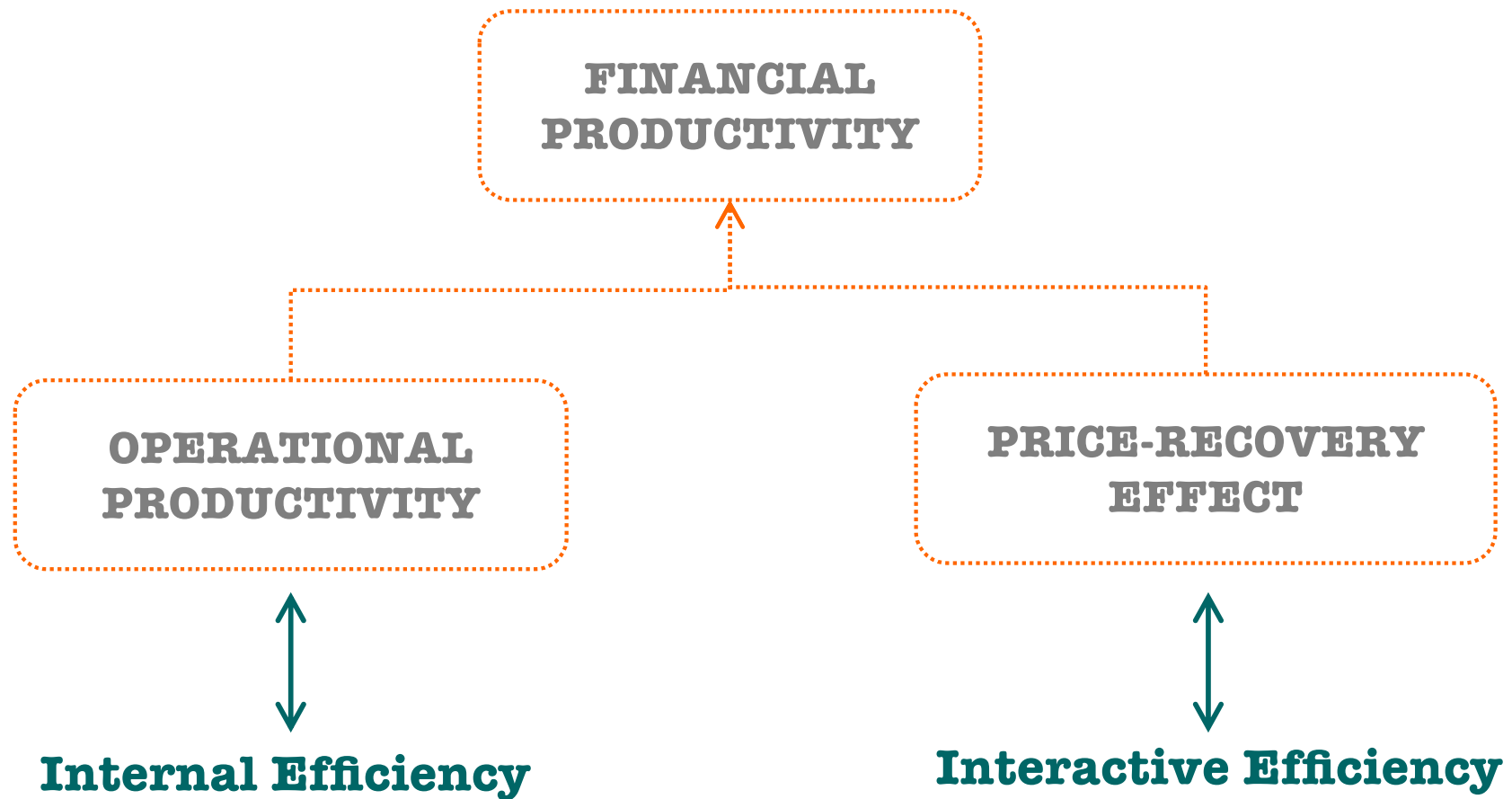
ANY CONNECTION?

	COMPANY "A"	COMPANY "B"
+ TOTAL OUTPUT	100 €	100 €
- INTERMEDIATE CONSUMPTION	(10 €)	(60 €)
<hr/>	<hr/>	<hr/>
= ADDED VALUE	90 €	40 €
- OTHER OPERATING COSTS	(85 €)	(35 €)
<hr/>	<hr/>	<hr/>
= EBIT	5 €	5 €
STRATEGY FOLLOWED:	VERTICAL INTEGRATION	OUTSOURCING

DIFFERENT PRIORITIES?

	COMPANY "A"	COMPANY "B"
+ TOTAL OUTPUT	100 €	100 €
- INTERMEDIATE CONSUMPTION	(10 €)	(60 €)
<hr/>	<hr/>	<hr/>
= ADDED VALUE	90 €	40 €
- OTHER OPERATING COSTS	(85 €)	(35 €)
<hr/>	<hr/>	<hr/>
= EBIT	5 €	5 €
 PROBABLE PRIORITY OF CONTROL SYSTEM:	PRODUCTIVITY	PRICE RECOVERY

CAUSES AND EFFECT



EFFICIENCY

1. OPERATIONAL PRODUCTIVITY

$$\frac{O_{\text{PHYSICAL}}}{I_{\text{PHYSICAL}}}$$

a) Partial ✓

b) Total ✗

2. FINANCIAL PRODUCTIVITY

$$\frac{O_{\text{REVENUES}}}{I_{\text{EXPENSES}}}$$

a) Partial ✗

b) Total ✓

EFFICIENCY

1. OPERATIONAL PRODUCTIVITY

a) Partial ✓

b) Total ✗

2. FINANCIAL PRODUCTIVITY

a) Partial ✗

b) Total ✓



DIFFERENT TYPES OF METRICS

**OPERATIONAL
PRODUCTIVITY**

$$\frac{O_{Ph}}{I_{Ph}}$$

**FINANCIAL
PRODUCTIVITY**

$$\frac{O_{\$}}{I_{\$}}$$

$$O_{\$} - I_{\$}$$

DIFFERENT TYPES OF METRICS

OPERATIONAL PRODUCTIVITY

$$\frac{O_{Ph}}{I_{Ph}}$$

FINANCIAL PRODUCTIVITY

$$\frac{O_{\$}}{I_{\$}}$$

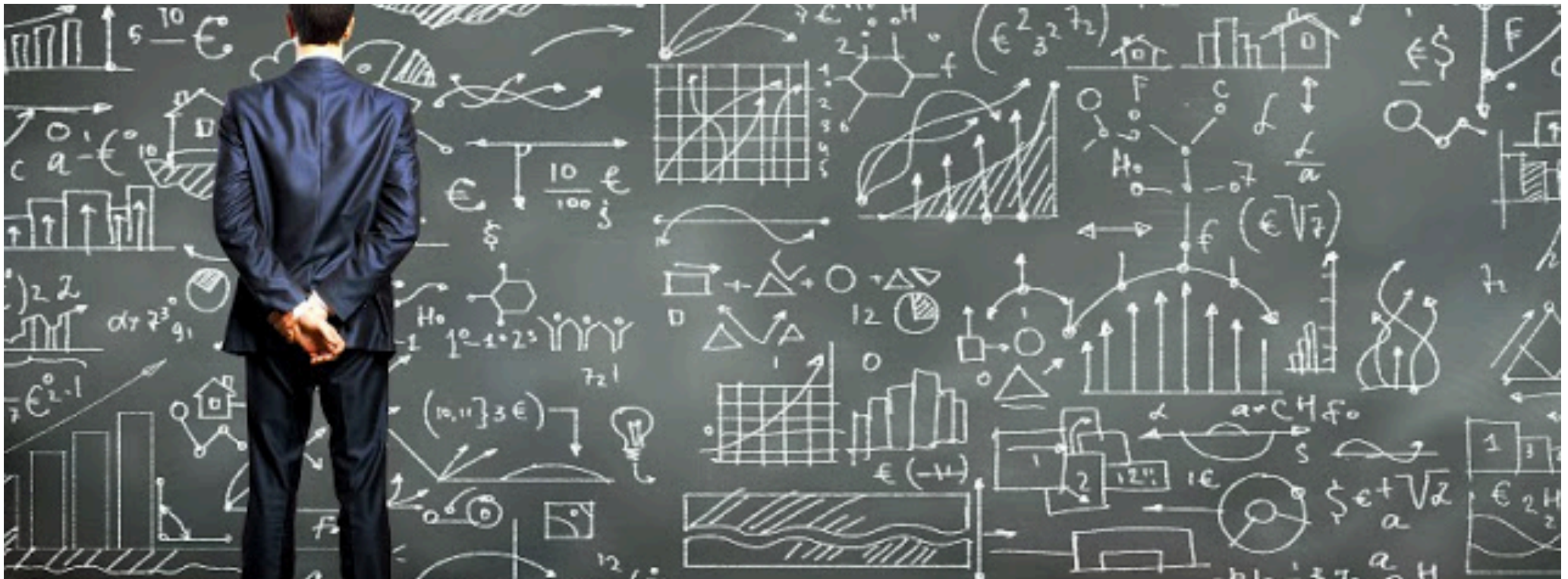
$$O_{\$} - I_{\$}$$

$$\frac{O_{\$} - I_{\$}}{I_{\$}}$$

$$\frac{O_{\$} - I_{\$}}{O_{\$}}$$

ASSET TURNOVER RATIOS & PROFITABILITY

Efficiency in the “deployment” of economic resources



EFFICIENCY

1. OPERATIONAL PRODUCTIVITY

$$\frac{O_{\text{PHYSICAL}}}{I_{\text{PHYSICAL}}}$$

a) Partial

b) Total

2. FINANCIAL PRODUCTIVITY

$$\frac{O_{\text{REVENUES}}}{I_{\text{EXPENSES}}}$$

a) Partial

b) Total



WHICH IS THE BEST?

Sales Revenues	1,000 \$	5,000 \$
Operating costs	- 600 \$	- 4,000 \$
EBIT	400 \$	1,000 \$

RETURN ON SALES

Sales Revenues	1,000 \$	5,000 \$
Operating costs	- 600 \$	- 4,000 \$
EBIT	400 \$	1,000 \$
r.o.s.	40%	20%

EFFICIENCY IN THE SHORT TERM

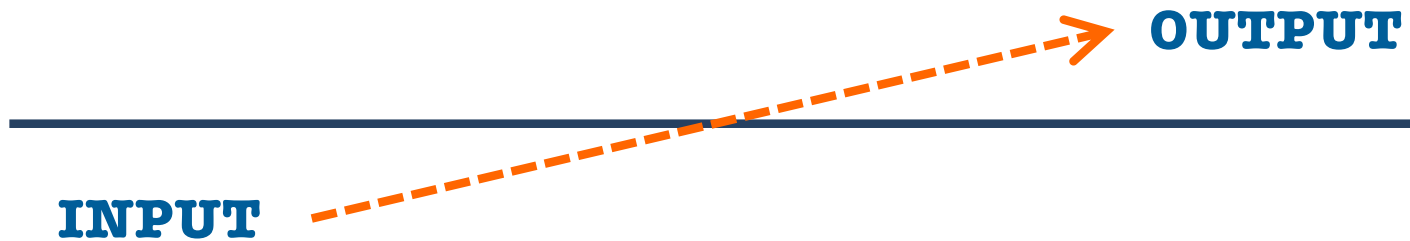


Efficiency in the **use** of economic resources.

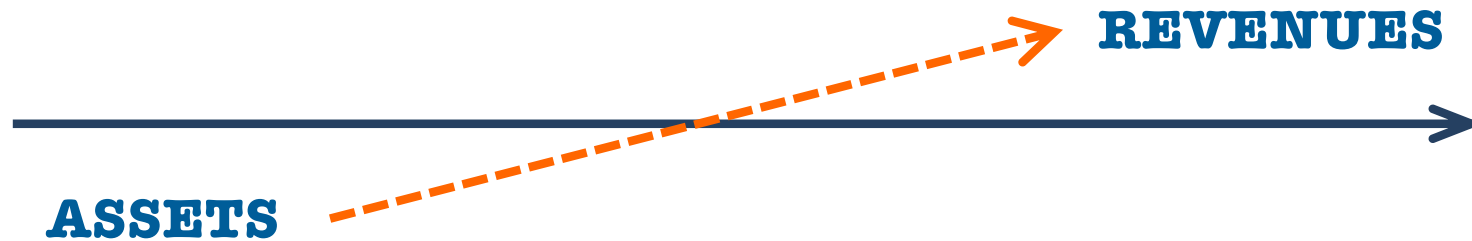
The “sacrifice” of economic resources is made in this period in order to be able to achieve an economic “benefit” in the same time frame. From an economic point of view this normally determines the incurrence of **one or more costs** and the attainment of **one or more revenues**.

This situation is normally portraits inside the **income statement**.

TWO DIFFERENT INSTANCES



EFFICIENCY IN THE SHORT TERM



Efficiency in the **deployment** of economic resources (broader view: it encompasses the utilization (investment) of “capital” (wealth) obtained from both external and internal sources.

The “sacrifice” of economic resources has been made in this period or in the past in order to be able to achieve an economic “benefits” in the future.

An asset is a **resource** controlled by the entity as a result of past events and from which **future economic benefits are expected to flow** to the entity. The residual value is stated in the **balance sheet**.



How many resources (ambulances) do I have at my disposal?



What overall volume of activity do I do with those resources (how many interventions do I make)?



How efficient am I in using those resources (what is the ratio of patients saved to interventions performed)?

CAPITAL EMPLOYED

Sales Revenues	1,000 \$	5,000 \$
Operating costs	- 600 \$	- 4,000 \$
EBIT	400 \$	1,000 \$
r.o.s.	40%	20%
Capital Employed (Investment)	2,000 \$	2,500 \$

BALANCE SHEET

SOLVENCY-AND-LIQUIDITY ANALYSIS OF THE BALANCE SHEET

+ Short-term Assets	+ Short-term Liabilities
	+ Long-term Liabilities
+ Long-term Assets	+ Stockholder Equity

Debit side

Credit side

CAPITAL-EMPLOYED ANALYSIS OF THE BALANCE SHEET

+ Inventory + Operating Debtors – Operating Creditors	+ Financial Liabilities – Financial Assets
+ Fixed Assets	+ Stockholder Equity

Debit side

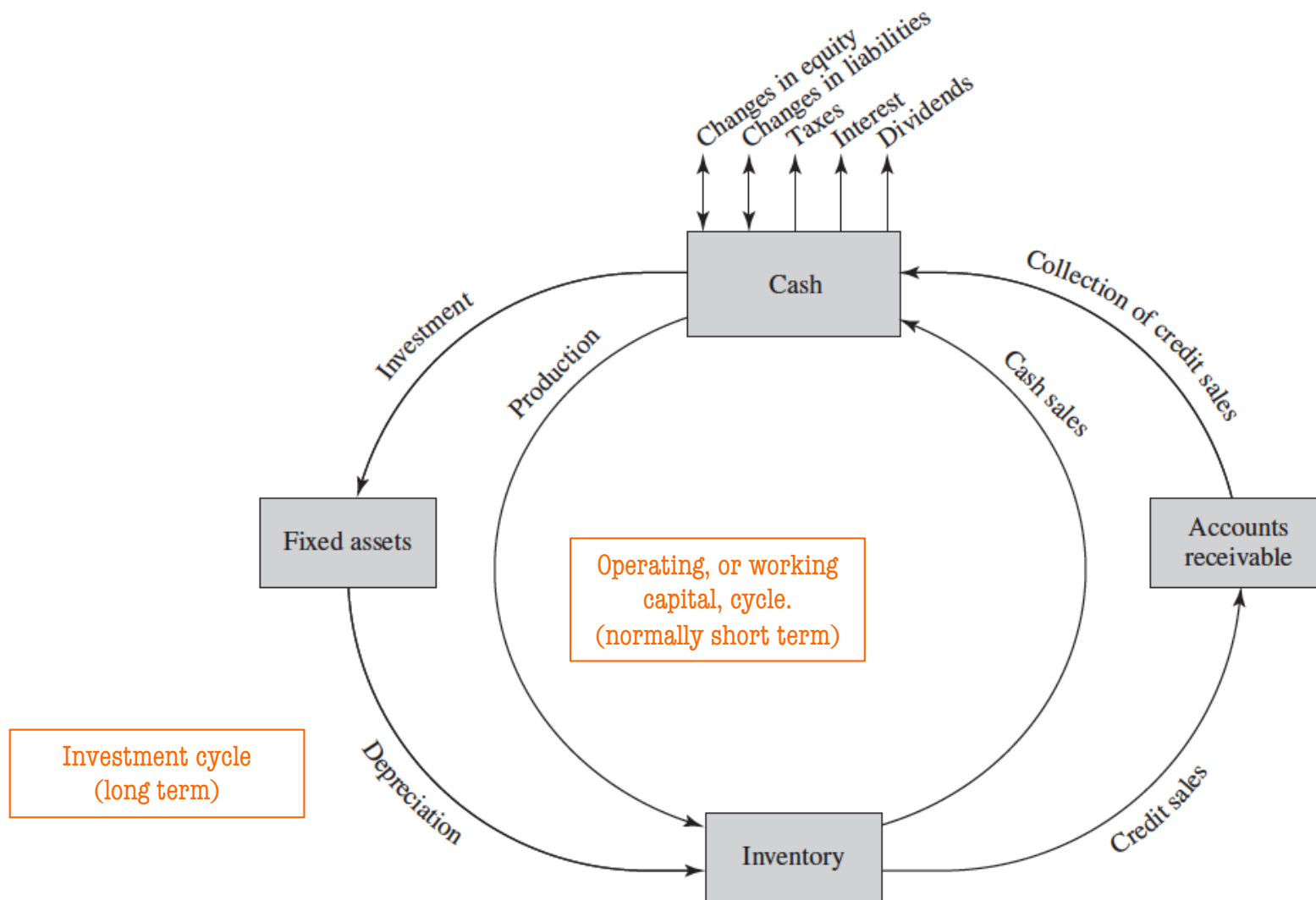
Credit side

RETURN ON CAPITAL EMPLOYED

Sales Revenues	1,000 \$	5,000 \$
Operating costs	- 600 \$	- 4,000 \$
EBIT	400 \$	1,000 \$
r.o.s.	40%	20%
Capital Employed (Investment)	2,000 \$	2,500 \$
r.o.i.	20%	40%

also Return On Capital Employed (ROCE) o Return on Assets (ROA) o Return on Net Assets (RONA)

A SIMPLIFIED ANALYSIS OF WEALTH FLOWS



OPEX VS CAPEX

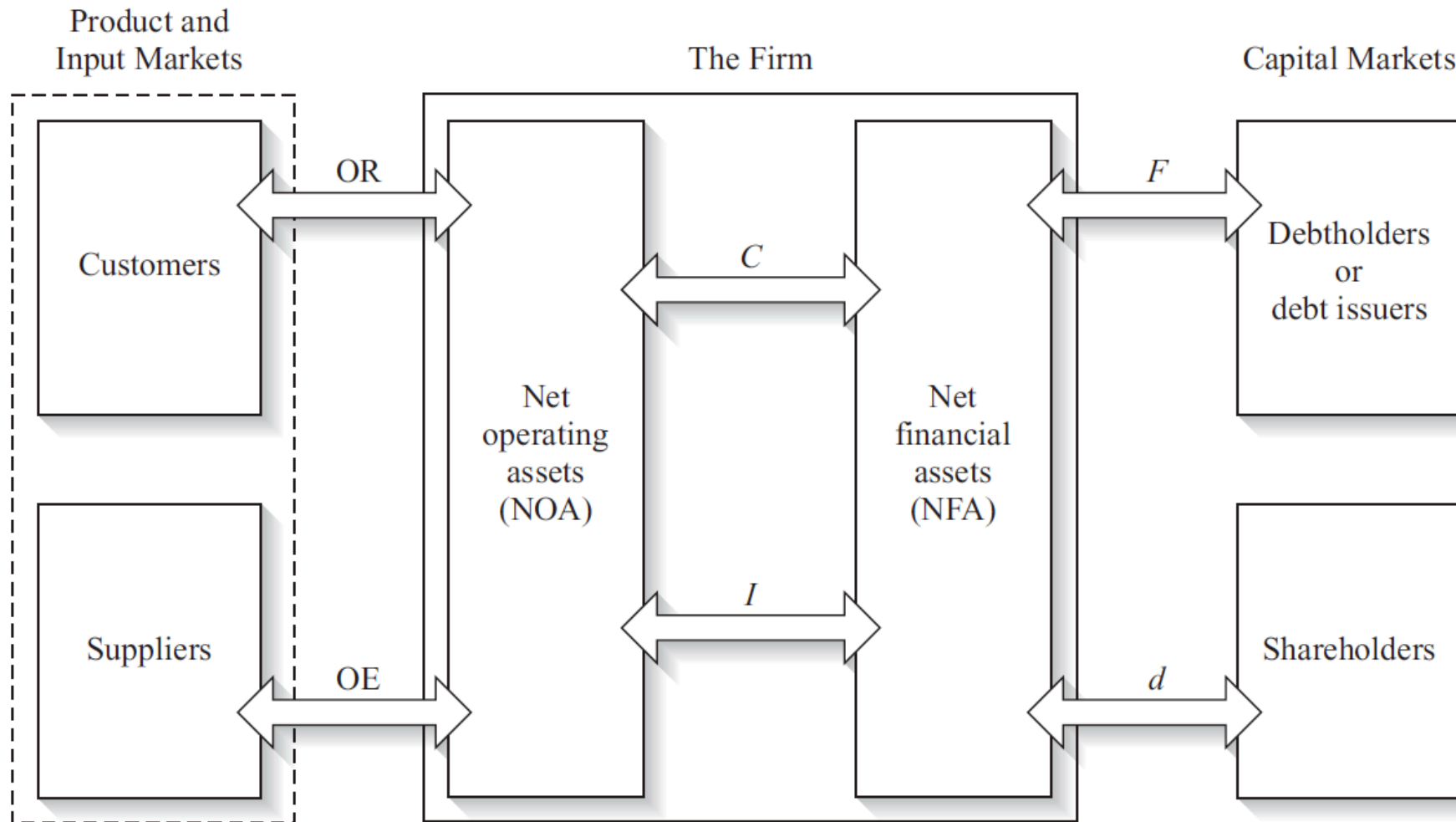
Operating Expenses

Operating expenses are the costs required to keep the business going from day to day. They include salaries, benefits, and insurance costs, among a host of other items. Operating expenses are listed on the income statement and are subtracted from revenue to determine profit.

Capital Expenditures

A capital expenditure is the purchase of an item that's considered a long-term investment, (more precisely: fixed asset) such as computer systems and equipment. Most companies follow the rule that any purchase over a certain dollar amount counts as a capital expenditure, while anything less is an operating expense. Operating expenses show up on the income statement, and thus reduce profit. Capital expenditures show up on the balance sheet; only the depreciation of a piece of capital equipment appears on the income statement.

OPERATING AND FINANCING ASSETS AND LIABILITIES



Operating assets and liabilities are simply the assets and liabilities used in the business of selling to customers. **Financing assets are assets and liabilities** used in the financing of the business. The former are involved in trading with customers and suppliers, the latter in trading in capital markets.

SOURCE: Stephen H. Penman "Financial Statement Analysis and Security Valuation", Fourth Edition, McGraw-Hill/Irwin

FINANCIAL ASSETS AND LIABILITIES

Generally, the simplest way to break these components apart is first to identify financial assets and liabilities that you are confident you can match to the revenues and expenses associated with them. **Financial assets (FA)** generate investment revenues for the firm. Examples of financial assets include investments in marketable securities because these assets generate interest and dividend revenues. More significant equity stakes of between 20–50 percent are also financial assets because these assets generate financial income via capital gains. Other financial assets can include notes receivables with explicit interest rates and noncurrent investments in debt and equity securities. At the most basic level, if the asset generates interest, dividend, or capital gains income for the firm, and these income streams can be identified, the asset can be considered an FA.

Ironically, as simple as cash is to value as an asset, it presents thorny issues with respect to classifying it as an operating or financial asset. Every firm requires some cash to operate, but how much of a firm's cash should be considered operating and how much should be considered financial? The most common classification is to consider 100 percent of a firm's cash balance to be a financial asset. Unless a firm's cash is sitting in a register or under the CEO's mattress, it is likely held in an interest-bearing account that generates interest income for the firm (making it a financial asset).

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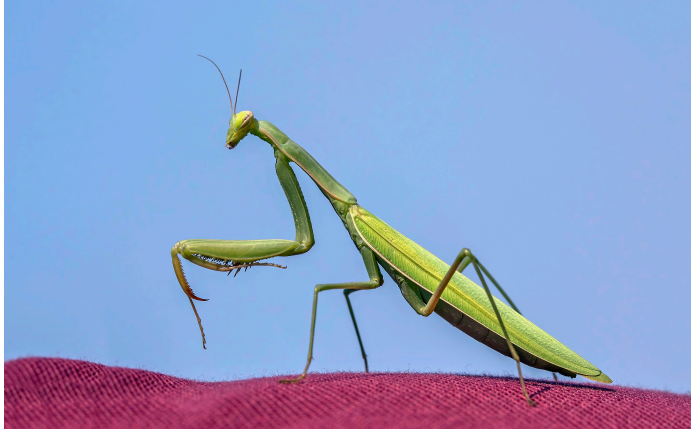
An alternative view is to estimate the minimum cash a firm requires to fund its operations and consider excess cash holdings above this minimum level to be a financial asset. For example, in a study spanning years 1993 to 2000, **McKinsey & Company** found firms with the lowest cash balances were those whose cash levels equaled approximately 2 percent of annual sales. Accordingly, McKinsey & Company suggest defining operating cash as equal to 2 percent of annual sales and excess cash above this level to be a financial asset.³

Financial liabilities (FL) include all forms of interest-bearing debt obligations. Debt obligations are almost universally discussed in the notes to the financial statements as are interest- and other financing-related expenses. For example, firms often have revolving credit facilities. These credit facilities, known as *revolvers* or *lines of credit*, give firms access to short-term financing, and their balances usually fluctuate throughout the fiscal year due to seasonality in financing needs. Associated with these credit facilities are interest expenses assessed on borrowed funds and financing charges assessed on *unborrowed* funds. Both types of expenses related to the revolving credit facility should be considered as financial expenses.

SOURCE: Bruno De Rosa, Giorgio Valentinuz, "Issues in Financial and management Accounting", McGraw-Hill CREATE pg. 172, 173



WORKING CAPITAL VS FIXED ASSETS



WORKING CAPITAL provides its utility in a **single productive act**, it is therefore productive factors having simple fruitfulness



FIXED ASSETS provide their utility in **multiple acts of production**, they are therefore factors of production having repeated fruitfulness

BALANCE SHEET

SOLVENCY-AND-LIQUIDITY ANALYSIS OF THE BALANCE SHEET

+ Short-term Assets	+ Short-term Liabilities
	+ Long-term Liabilities
+ Long-term Assets	+ Stockholder Equity

Debit side

Credit side

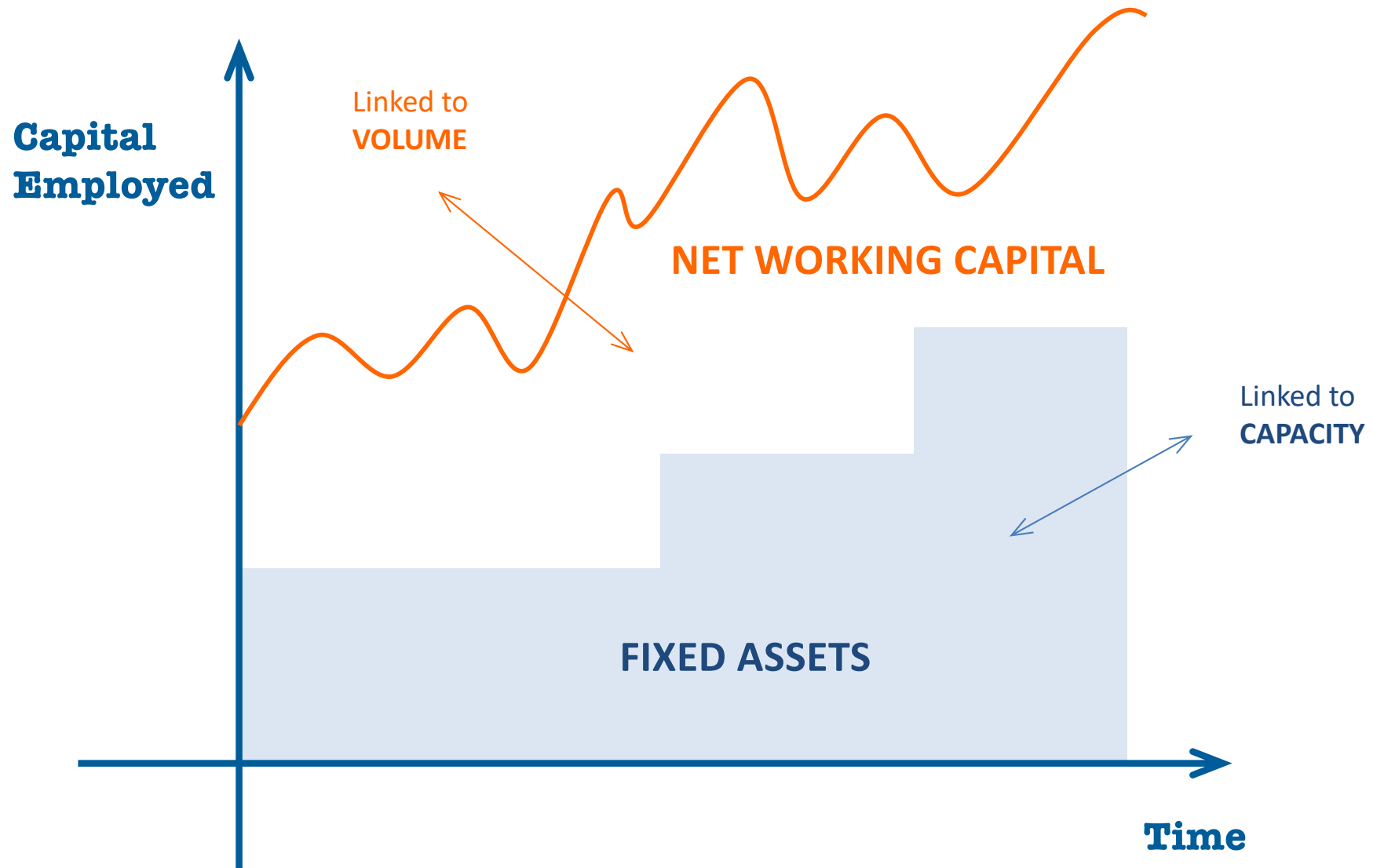
CAPITAL-EMPLOYED ANALYSIS OF THE BALANCE SHEET

+ Inventory + Operating Debtors – Operating Creditors	+ Financial Liabilities – Financial Assets
+ Fixed Assets	+ Stockholder Equity

Debit side

Credit side

CAPITAL-EMPLOYED ANALYSIS



BALANCE SHEET

SOLVENCY-AND-LIQUIDITY ANALYSIS OF THE BALANCE SHEET

+ Short-term Assets	+ Short-term Liabilities
	+ Long-term Liabilities
+ Long-term Assets	+ Stockholder Equity

Debit side

Credit side

CAPITAL-EMPLOYED ANALYSIS OF THE BALANCE SHEET

+ Inventory + Operating Debtors – Operating Creditors	+ Financial Liabilities – Financial Assets
+ Fixed Assets	+ Stockholder Equity

Debit side

Credit side

SOLVENCY-AND-LIQUIDITY ANALYSIS

What the company **owns**

What the company **owes**

BSE Company					
Assets	Cash	300	Short Term Loans	1.200	Liabilities
	Accounts Receivable	1.950	Accounts Payable	1.500	
	Accruals and Prepaid expenses	230	Accrued Expenses	180	
	Other Operating Receivables (short term)	470	Deferred Revenues	220	
	Inventory (short term)	2.900	Other Operating Payables	400	
	Financial Receivables (short term)	700	Financial Payables (short term)	2.420	
	Marketable securities	1.450	Current Liabilities	5.920	
	Current Assets	8.000			
	Inventory (slow moving)	320	Tax and Social Security Liabilities	2.280	
	Property, Plant & Equipment	9.050	Long Term Loans	18.500	
	Intellectual Property & Patents	1.300	Long Term Liabilities	20.780	Net Equity
	Goodwill	4.630	Share capital	2.000	
	Financial Receivables (long term)	1.400	Paid in capital in excess of par	6.000	
	Equity in associated companies	3.200	Retained Earnings	3.550	
	Long-term investments	12.100	Net Income for the year	1.750	
	Long Term Assets	32.000	Owners' Equity	13.300	
	Total Assets	40.000	Total Liabilities + Shareholders' Equity	40.000	

TWO DIFFERENT NATURES

BSE Company

Cash	300	Short Term Loans	1.200
Accounts Receivable	1.950	Accounts Payable	1.500
Accruals and Prepaid expenses	230	Accrued Expenses	180
Other Operating Receivables (short term)	470	Deferred Revenues	220
Inventory (short term)	2.900	Other Operating Payables	400
Financial Receivables (short term)	700	Financial Payables (short term)	2.420
Marketable securities	1.450	Current Liabilities	5.920
Current Assets	8.000	Tax and Social Security Liabilities	2.280
Inventory (slow moving)	320	Long Term Loans	18.500
Property, Plant & Equipment	9.050	Long Term Liabilities	20.780
Intellectual Property & Patents	1.300	Share capital	2.000
Goodwill	4.630	Paid in capital in excess of par	6.000
Financial Receivables (long term)	1.400	Retained Earnings	3.550
Equity in associated companies	3.200	Net Income for the year	1.750
Long-term investments	12.100	Owners' Equity	13.300
Long Term Assets	32.000	Total Liabilities + Shareholders' Equity	40.000
Total Assets	40.000		

TWO DIFFERENT NATURES

DEBIT SIDE

– CREDIT SIDE

BSE Company

Cash	300	Short Term Loans	1.200
Accounts Receivable	1.950	Accounts Payable	1.500
Accruals and Prepaid expenses	230	Accrued Expenses	180
Other Operating Receivables (short term)	470	Deferred Revenues	220
Inventory (short term)	2.900	Other Operating Payables	400
Financial Receivables (short term)	700	Financial Payables (short term)	2.420
Marketable securities	1.450	Current Liabilities	5.920
Current Assets	8.000	Tax and Social Security Liabilities	2.280
Inventory (slow moving)	320	Long Term Loans	18.500
Property, Plant & Equipment	9.050	Long Term Liabilities	20.780
Intellectual Property & Patents	1.300	Share capital	2.000
Goodwill	4.630	Paid in capital in excess of par	6.000
Financial Receivables (long term)	1.400	Retained Earnings	3.550
Equity in associated companies	3.200	Net Income for the year	1.750
Long-term investments	12.100	Owners' Equity	13.300
Long Term Assets	32.000	Total Liabilities + Shareholders' Equity	40.000
Total Assets	40.000		



TWO DIFFERENT NATURES

- DEBIT SIDE



CREDIT SIDE

BSE Company

Cash	300	Short Term Loans	1.200
Accounts Receivable	1.950	Accounts Payable	1.500
Accruals and Prepaid expenses	230	Accrued Expenses	180
Other Operating Receivables (short term)	470	Deferred Revenues	220
Inventory (short term)	2.900	Other Operating Payables	400
Financial Receivables (short term)	700	Financial Payables (short term)	2.420
Marketable securities	1.450	Current Liabilities	5.920
Current Assets	8.000	Tax and Social Security Liabilities	2.280
Inventory (slow moving)	320	Long Term Loans	18.500
Property, Plant & Equipment	9.050	Long Term Liabilities	20.780
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Long-term investments	12.100	Owners' Equity	13.300
Long Term Assets	32.000	Total Liabilities + Shareholders' Equity	40.000
Total Assets	40.000		



CAPITAL-EMPLOYED ANALYSIS

Also called to
NET FINANCIAL OBLIGATIONS (NFO)

<i>BSE Company</i>			
+ Accounts Receivable	1.950	+ Short Term Loans	1.200
+ Accruals and Prepaid expenses	230	+ Long Term Loans	18.500
+ Other Operating Receivables (short term)	470	+ Financial Payables (short term)	2.420
+ Inventory (short term)	2.900	- Financial Receivables (long term)	- 1.400
+ Inventory (slow moving)	320	- Financial Receivables (short term)	- 700
- Accounts Payable	- 1.500	- Marketable securities	- 1.450
- Accrued Expenses	- 180	- Cash	- 300
- Deferred Revenues	- 220	Net Financial Debt	18.270
- Other Operating Payables	- 400	Share capital	2.000
- Tax and Social Security Liabilities	- 2.280	Paid in capital in excess of par	6.000
Net Working Capital	1.290	Retained Earnings	3.550
Property, Plant & Equipment	9.050	Net Income for the year	1.750
Intellectual Property & Patents	1.300	Owners' Equity	13.300
Goodwill	4.630		
Equity in associated companies	3.200		
Long-term investments	12.100		
Fixed Assets	30.280		
<i>Net Capital Employed</i>	<i>31.570</i>	<i>Sources of Net Capital Employed</i>	<i>31.570</i>

Also called to
NET OPERATING ASSETS



CAPITAL-EMPLOYED ANALYSIS

What is the level and what are the components of **invested capital** required by the carrying out of operating activities (net of the portion financed by operating suppliers)?

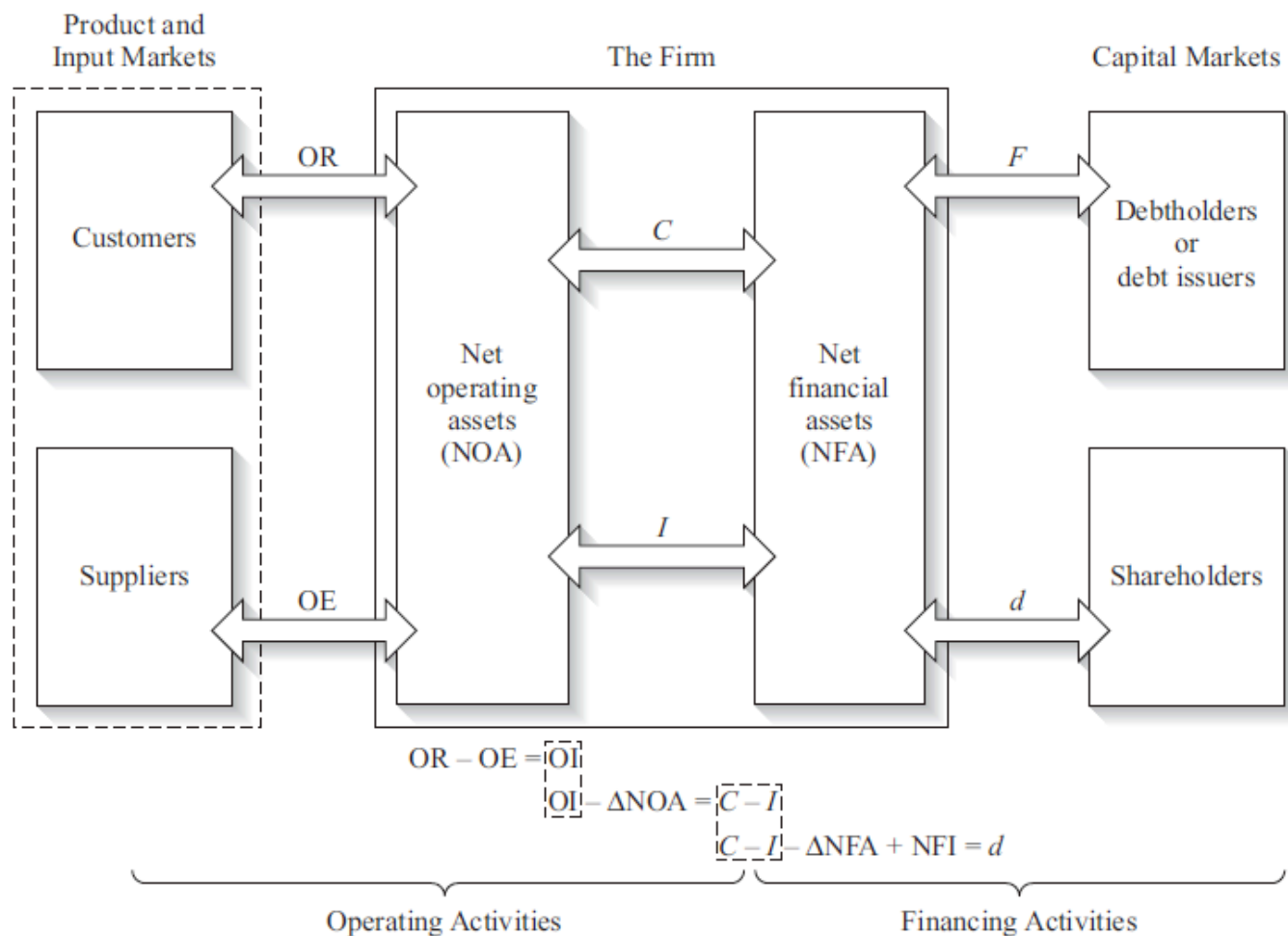
Who provided the **funds** required to finance the net operating investment recorded in the debit section?

BSE Company					
Net Capital Employed	+ Accounts Receivable	1.950	+ Short Term Loans	1.200	Net Financial Obligations
	+ Accruals and Prepaid expenses	230	+ Long Term Loans	18.500	
	+ Other Operating Receivables (short terr	470	+ Financial Payables (short term)	2.420	
	+ Inventory (short term)	2.900	- Financial Receivables (long term)	- 1.400	
	+ Inventory (slow moving)	320	- Financial Receivables (short term)	- 700	
	- Accounts Payable	- 1.500	- Marketable securities	- 1.450	
	- Accrued Expenses	- 180	- Cash	- 300	
	- Deferred Revenues	- 220	Net Financial Debt	18.270	
	- Other Operating Payables	- 400			
	-Tax and Social Security Liabilities	- 2.280			
	Net Working Capital	1.290	Share capital	2.000	Net Equity
			Paid in capital in excess of par	6.000	
	Property, Plant & Equipment	9.050	Retained Earnings	3.550	
	Intellectual Property & Patents	1.300	Net Income for the year	1.750	
	Goodwill	4.630	Owners' Equity	13.300	
	Equity in associated companies	3.200			
Long-term investments	12.100				
Fixed Assets	30.280				
Net Capital Employed	31.570	Sources of Net Capital Employed	31.570		

**Net
Financial
Obligations**

**Net
Equity**

ALL STOCKS AND FLOWS FOR A FIRM



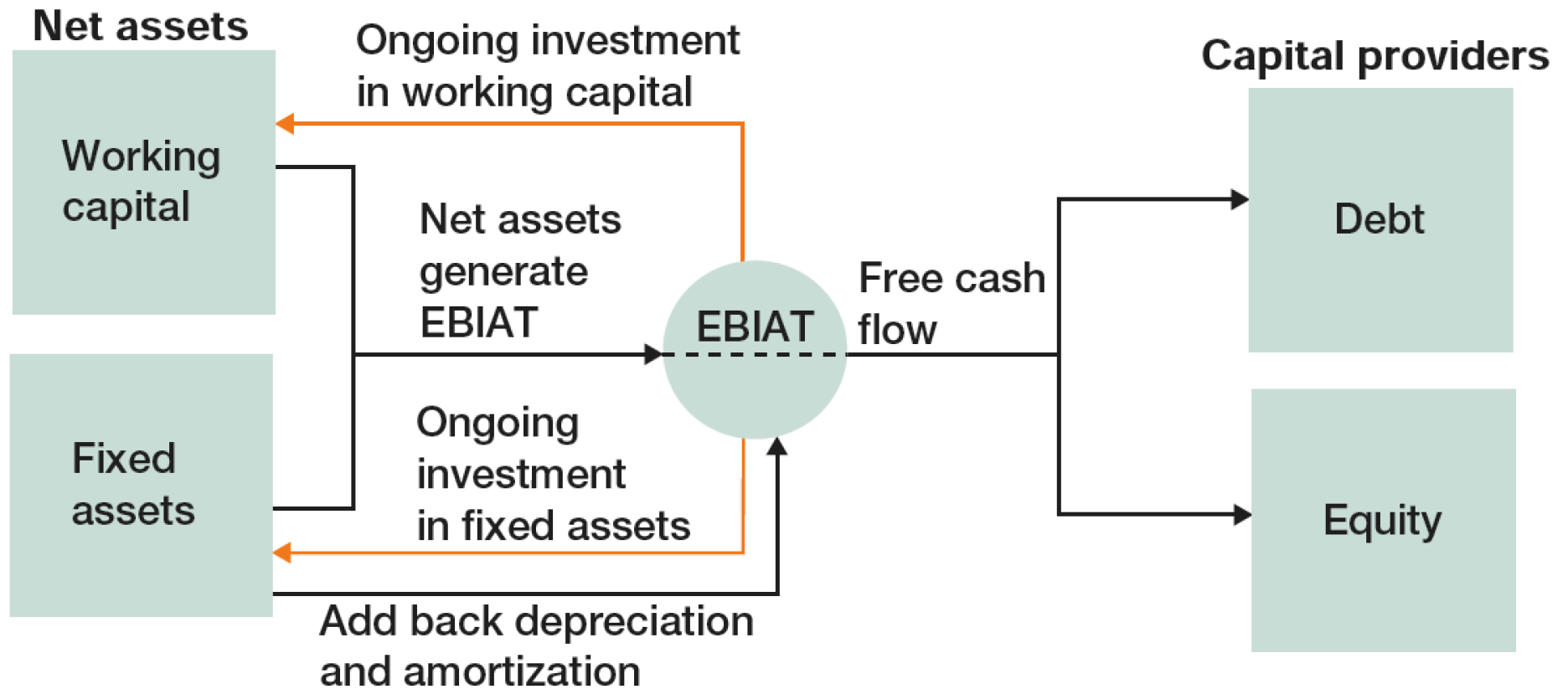
Key:

- F = Net cash flow to debtholders and issuers
- d = Net cash flow to shareholders
- C = Cash flow from operations
- I = Cash investment
- NFA = Net financial assets

- NOA = Net operating assets
- OR = Operating revenue
- OE = Operating expense
- OI = Operating income
- NFI = Net financial income

SOURCE: Stephen H. Penman "Financial Statement Analysis and Security Valuation", Fourth Edition, McGraw-Hill/Irwin

THE LINKAGES WITH FREE CASH FLOW



CAPITAL-EMPLOYED ANALYSIS

What is the level and what are the components of of invested capital required by the carrying out of operating activities (net of the portion financed by operating suppliers)?

Who provided the funds required to finance the net operating investment recorded in the debit section?

BSE Company						
Net Capital Employed	+ Accounts Receivable		1.950	+ Short Term Loans		1.200
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	Equity in associated companies		3.200			
	Long-term investments		12.100			
Fixed Assets		30.280				
Net Capital Employed		31.570	Sources of Net Capital Employed		31.570	

**Net
Financial
Obligations**

**Net
Equity**

PORTER ON PERFORMANCE

“Performance, Porter argues, must be defined in terms that reflect the economic purpose every organization shares: to produce goods or services whose value exceeds the sum of the costs of all the inputs. In other words, organizations are supposed to use resources effectively.

The financial measure that best captures this idea is return on invested capital (ROIC). ROIC weighs the profits a company generates versus all the funds invested in it, operating expenses and capital. Long-term ROIC tells you how well a company is using its resources.

It is also, Porter points out, the only measure that matches the multidimensional nature of competition: creating value for customers, dealing with rivals, and using resources productively. ROIC integrates all three dimensions. Only if a company earns a good return can it satisfy customers in a sustainable way. Only if it uses resources effectively can it deal with rivals in a sustainable way.”

Excerpt From: Magretta, Joan. “Understanding Michael Porter.” iBooks.



FLAWED GOALS

“When Porter questions why so few companies are able to maintain successful strategies, he often points to flawed goals as the culprit:

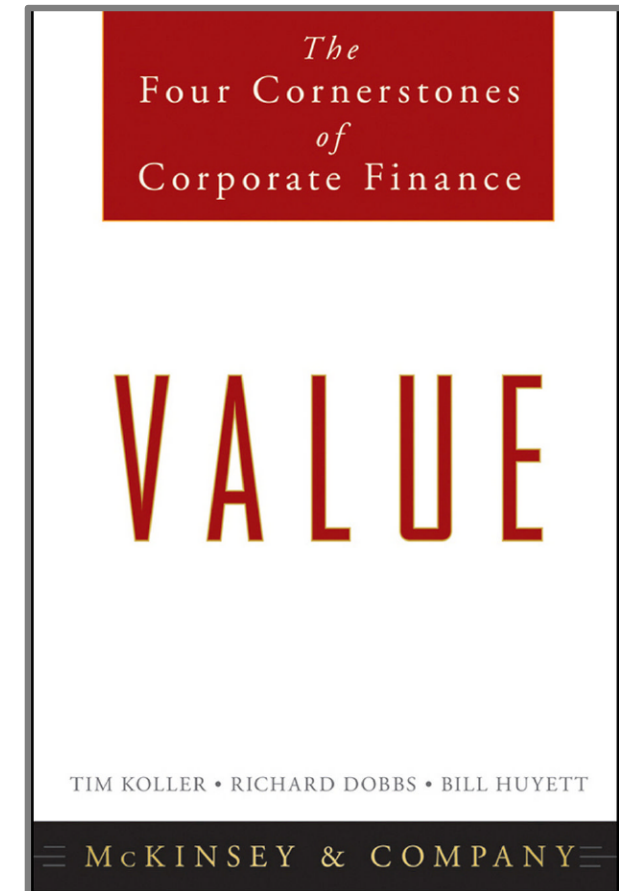
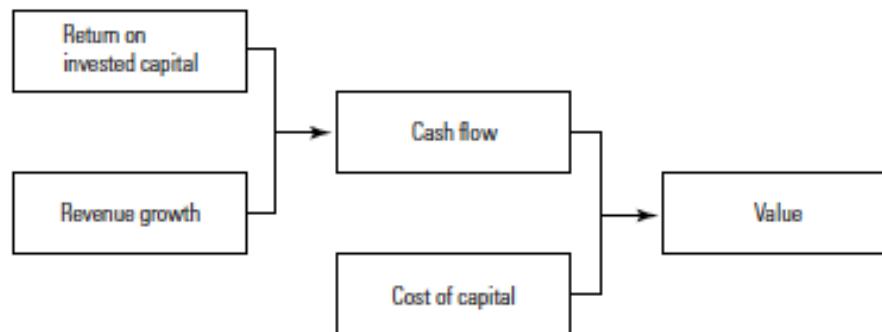
- Return on sales (ROS) is used widely, although it ignores the capital invested in the business and therefore is a poor measure of how well resources have been used.
- Growth is another widely embraced goal, along with its sister goal, market share. Like ROS, these fail to account for the capital required to compete in the industry. Too often companies pursue unprofitable growth that never leads to superior return on capital. As Porter notes wryly when he talks to managers, most companies could instantly achieve rapid growth simply by cutting their prices in half.
- Shareholder value, measured by stock price, has proven to be a spectacularly unreliable goal, yet it remains a powerful driver of executive behavior. Stock price, Porter warns, is a meaningful measure of economic value only over the long run.”

Excerpt From: Magretta, Joan. “Understanding Michael Porter.” iBooks.

FIRST CORNERSTONE OF VALUE

«The first and guiding cornerstone is that *companies create value by investing capital from investors to generate future cash flows at rates of return exceeding the cost of that capital* (that is, the rate investors require to be paid for the use of their capital). *The faster companies can grow their revenues and deploy more capital at attractive rates of return, the more value they create.* In short, the combination of growth and return on invested capital (ROIC) drives value and value creation. [...] This first cornerstone, the core of value, is illustrated by Exhibit 2.1».

EXHIBIT 2.1 Growth and ROIC Drive Value



Excerpt From: T. Koller, R. Dobbs, B. Huyett, "Value. The Four Cornerstones Of Corporate Finance McKinsey & Company, John Wiley & Sons, 2011.

ASSET TURNOVER RATIO

$$\text{ROCE} = \frac{\text{EBIT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Capital Employed}}$$

The asset turnover ratio measures the value of a company's sales or revenues generated relative to the value of its assets. It can often be used as an indicator of the efficiency with which a company is deploying its assets in generating revenue.

Capital employed refers to the assets within a manager's direct span of control. Some companies define capital employed as total assets controlled by a manager minus noninterest-bearing liabilities (for example, accounts payable). These assets typically include accounts receivable, inventory, and plant and equipment.

In other cases, some corporate-level assets, such as goodwill, are also allocated to profit centers to be included in the “capital” that is employed to generate revenue and profit.

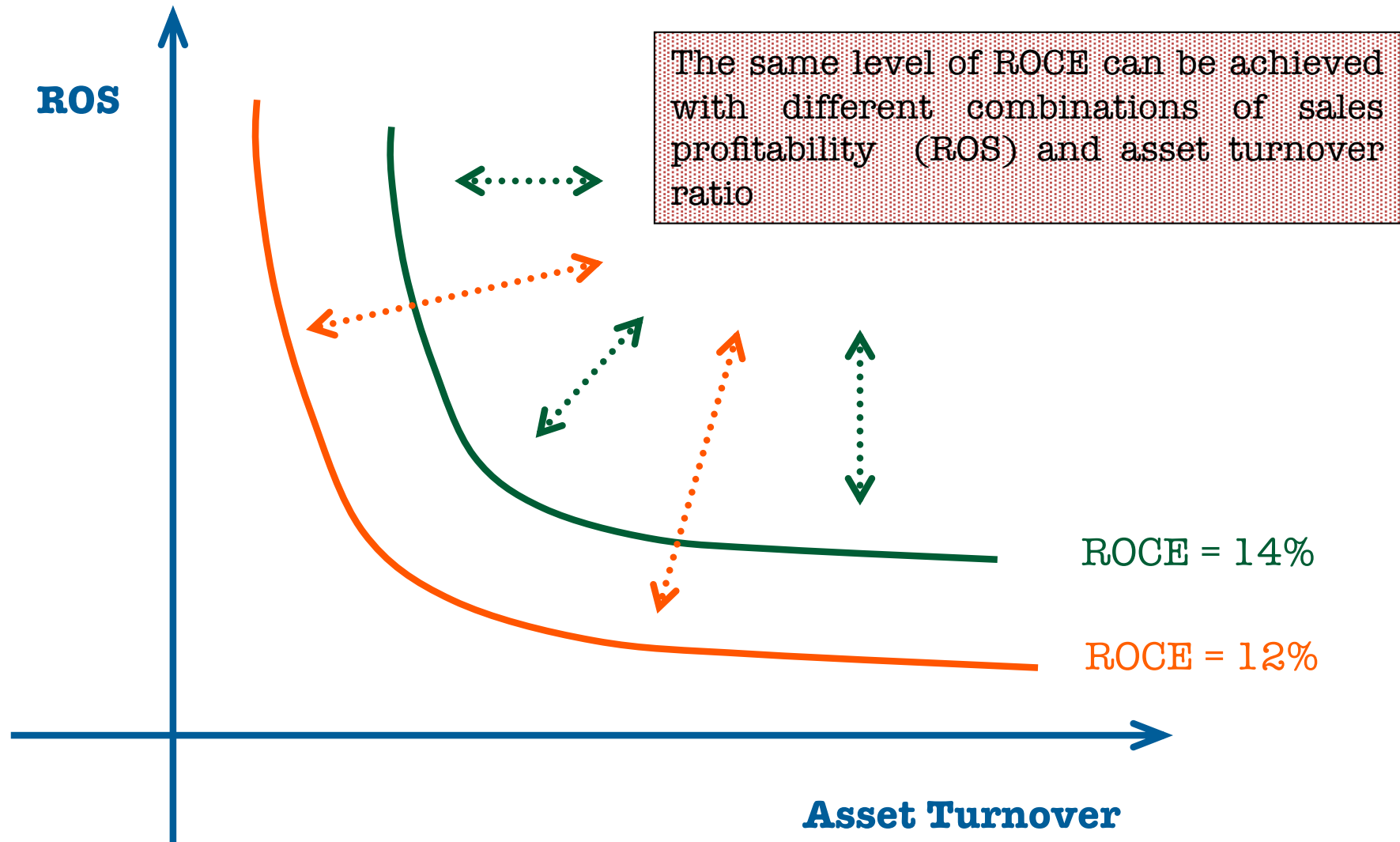
TURNOVER RATIOS

In accounting, turnover ratios are the financial ratios in which an annual **income statement amount** is divided by the average balance of an asset (or group of assets) throughout the year.

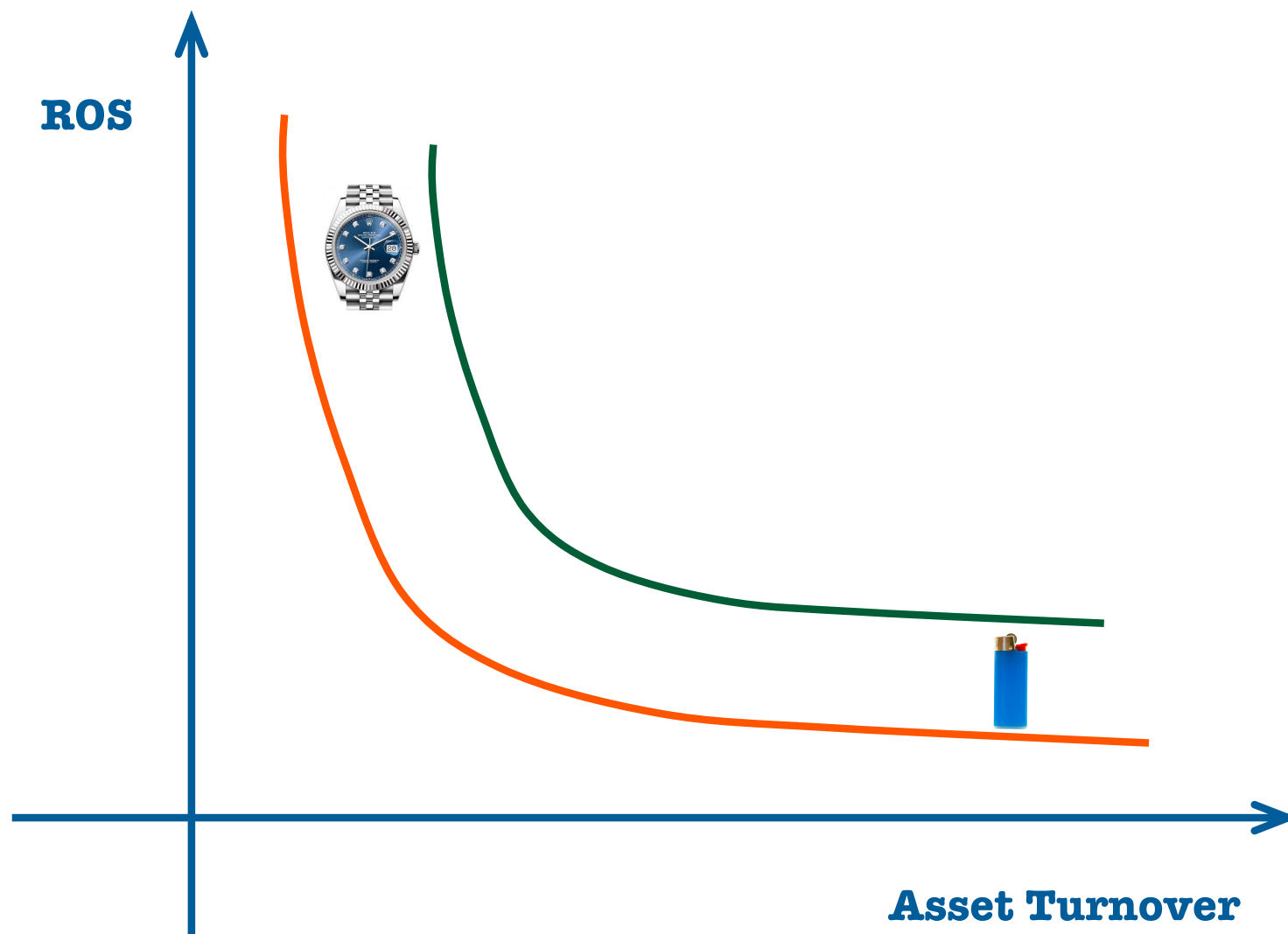
Turnover ratios include:

- Capital employed turnover ratio
- Total assets turnover ratio
- Accounts receivable turnover ratio
- Inventory turnover ratio
- Working capital turnover ratio
- Fixed assets turnover ratio

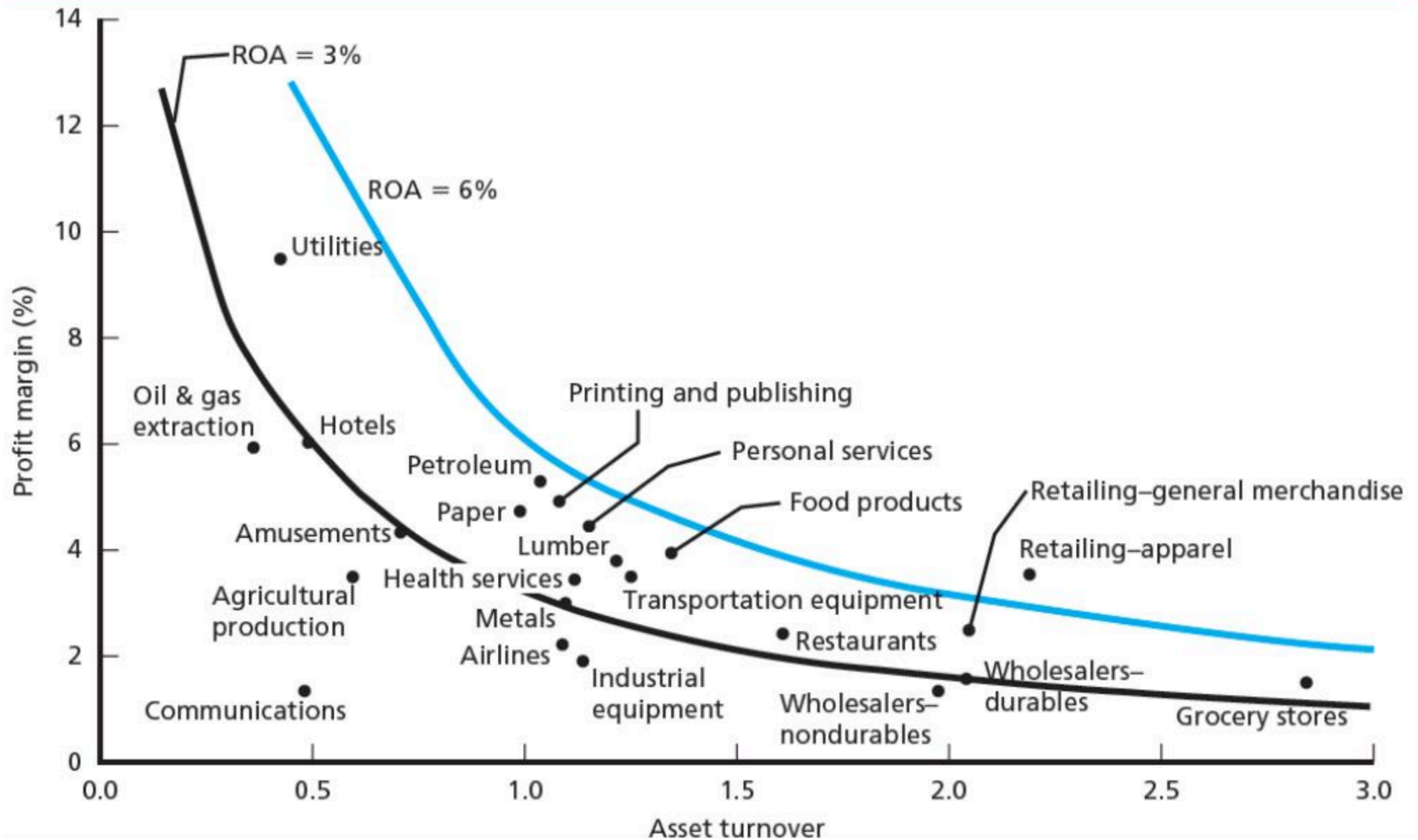
DISAGGREGATION OF ROCE



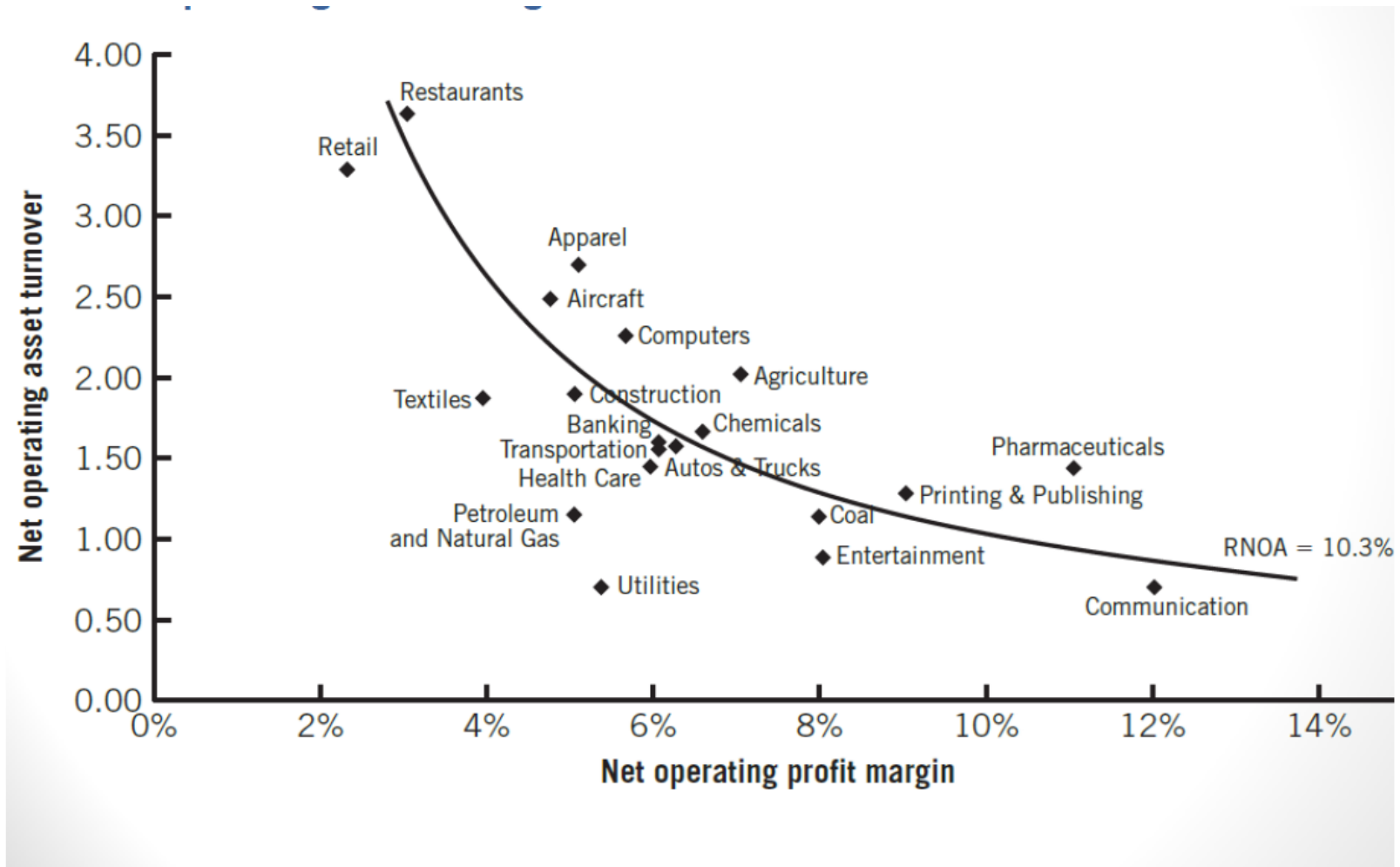
DISAGGREGATION OF ROCE



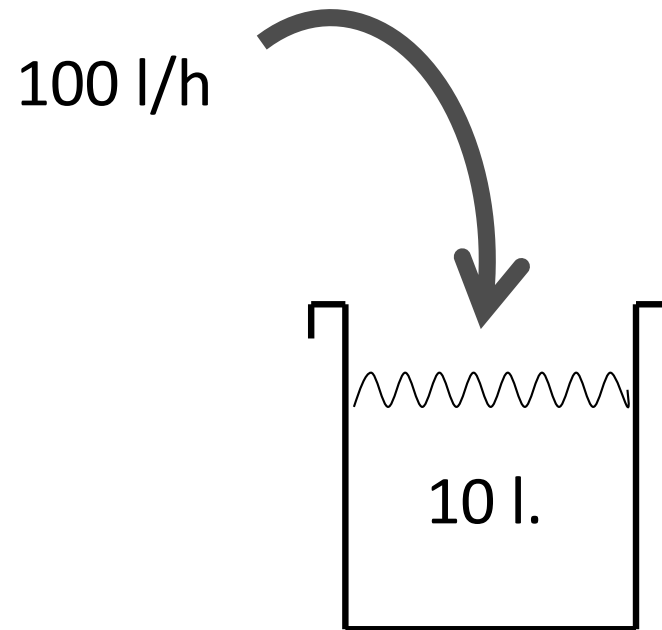
DISAGGREGATION OF ROCE (ROA) IN REAL LIFE



DISAGGREGATION AT A DIFFERENT LEVEL



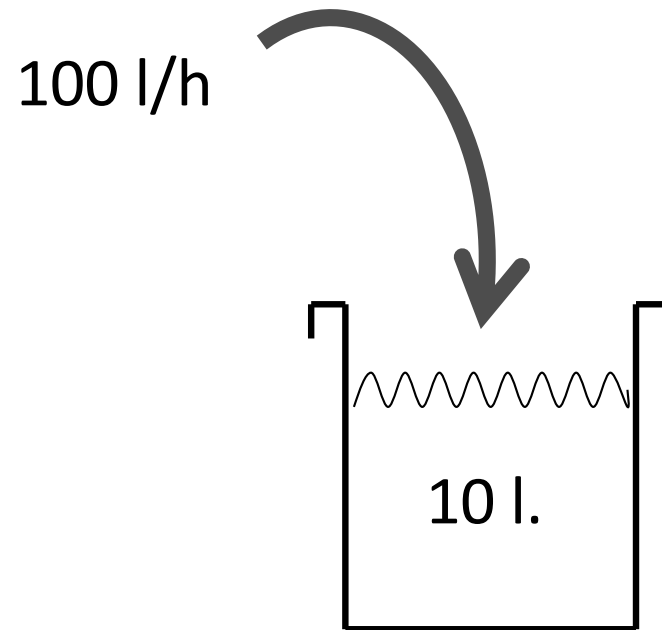
BACK TO ELEMENTARY SCHOOL



A tap leaks 100 litres of water every hours into a 10 litres container.

- A. How many times does the container fill over the course of an hour (imagining that once the container is loaded it is drained immediately, with no loss of time)?
- B. How long does it take to completely fill the container?

BACK TO ELEMENTARY SCHOOL



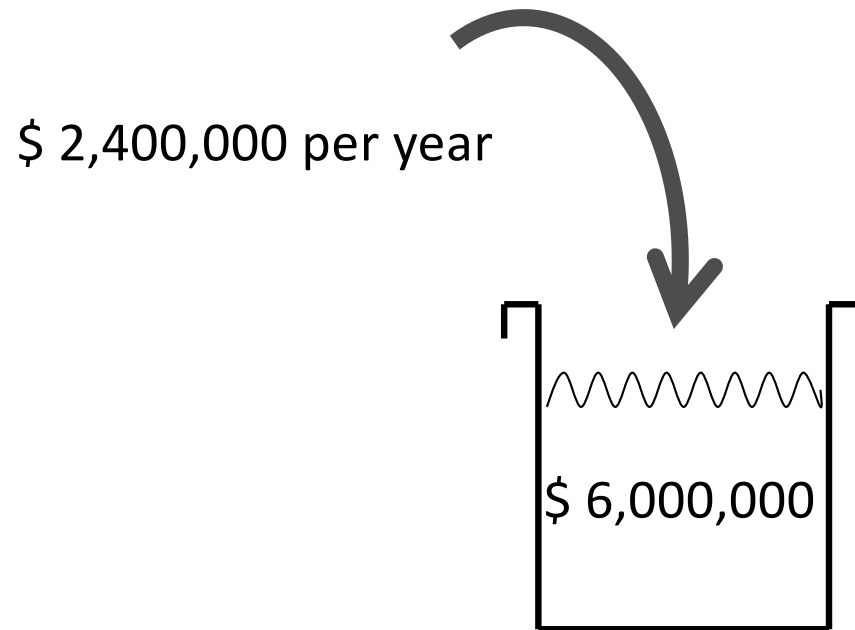
Turnover ratio:

$$\frac{100 \text{ l/h}}{10 \text{ l.}} = 10 \text{ times/hour}$$

Time required :

$$\frac{10 \text{ l}}{100 \text{ l/h}} = 1/10 \text{ hour}$$

BACK TO ELEMENTARY SCHOOL

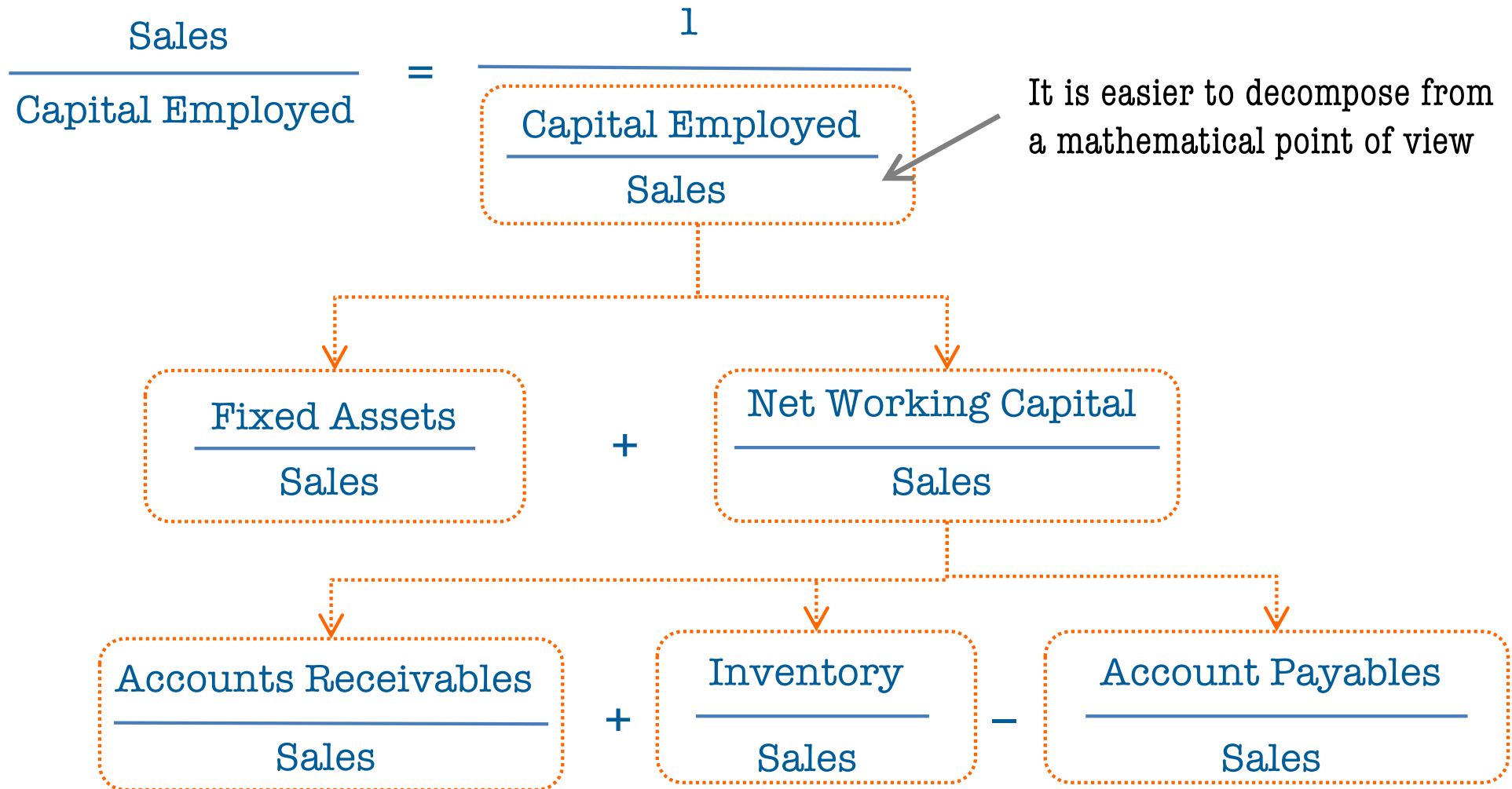


Capital Employed Turnover Ratio:

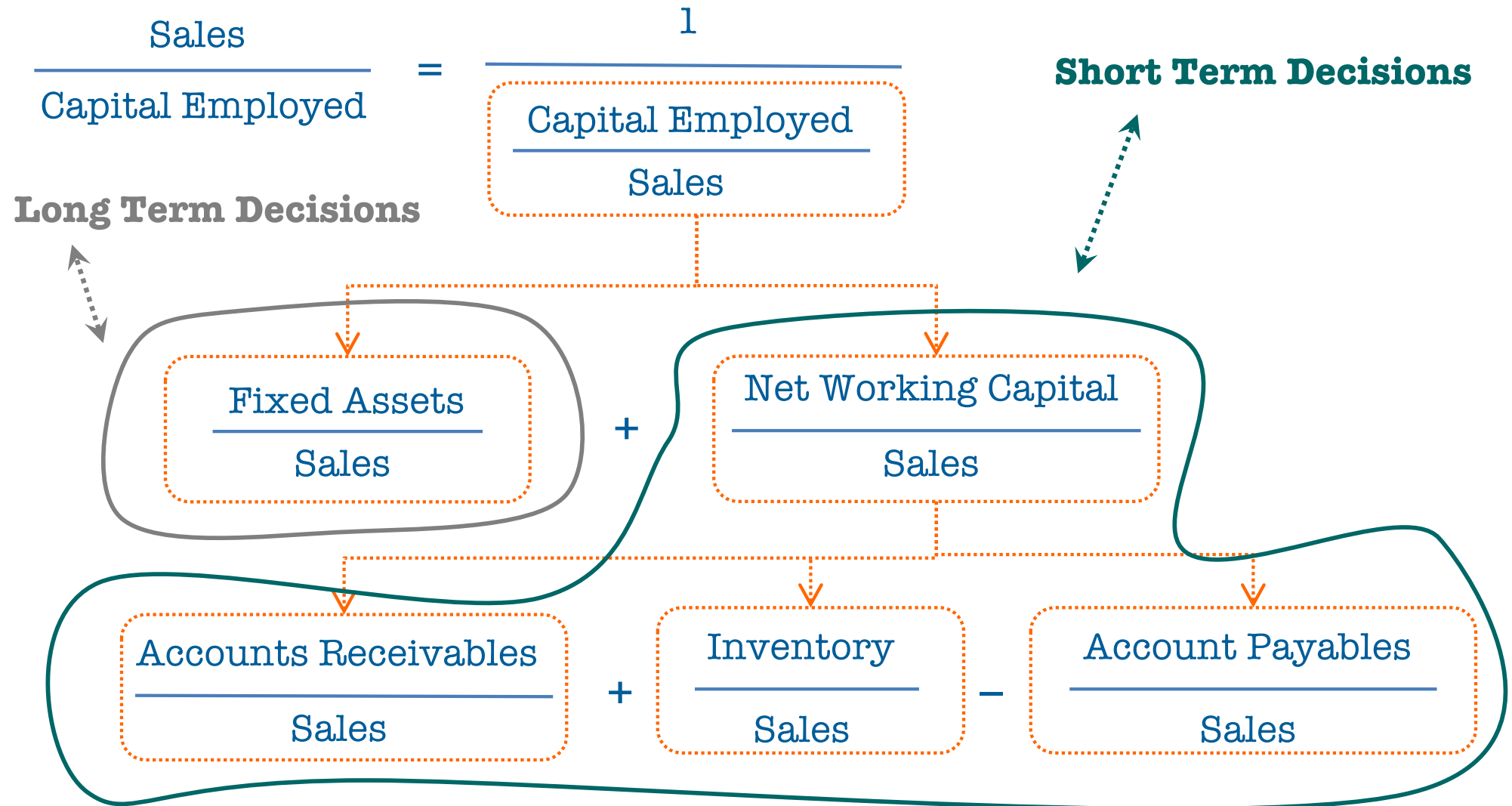
$$\frac{\$ 2,400,000}{\$ 6,000,000} = 0.4 \text{ times/year}$$

$$\frac{\$ 6,000,000}{\$ 2,400,000} = 2.5 \text{ years}$$

MANAGING ASSET TURNOVER



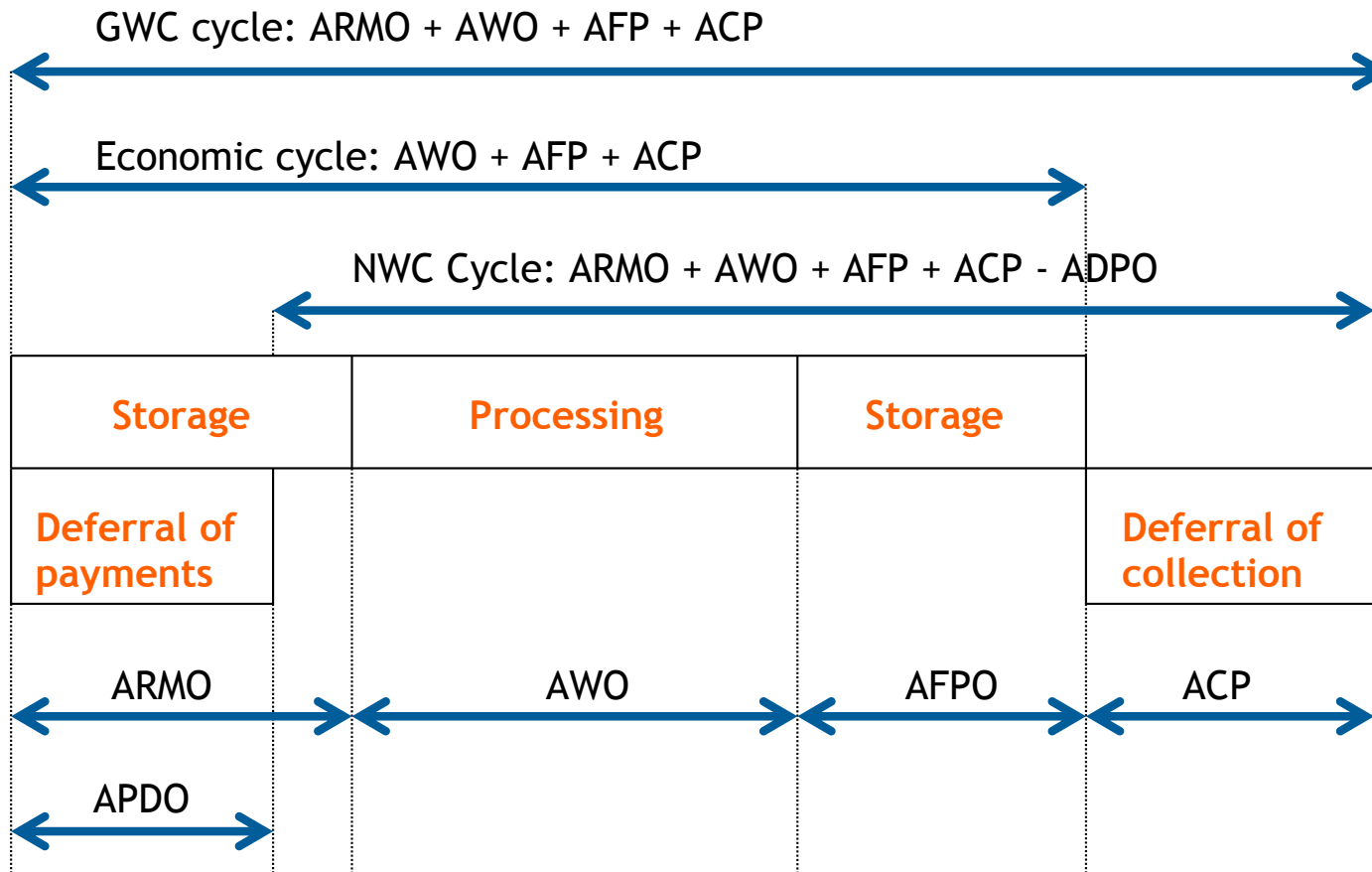
MANAGING ASSET TURNOVER



NET WORKING CAPITAL CYCLE



NET WORKING CAPITAL CYCLE



ARMO = Average Raw Materials Outstanding
 AWO = Average W.I.P. Outstanding
 AFPO = Average Finished Goods Outstanding
 ACP = Average Collection Period
 APD= = Average Payable Days Outstanding

FINISHED PRODUCTS INVENTORY

"PianoSolo" is an industrial company that manufactures and sells only one model of digital piano. During financial year 20X0 it sold 2,400 units of the product at an average price of € 1,800. The average stock in the warehouse dedicated to finished products is 800 units. The average unit cost of production is € 1,100.

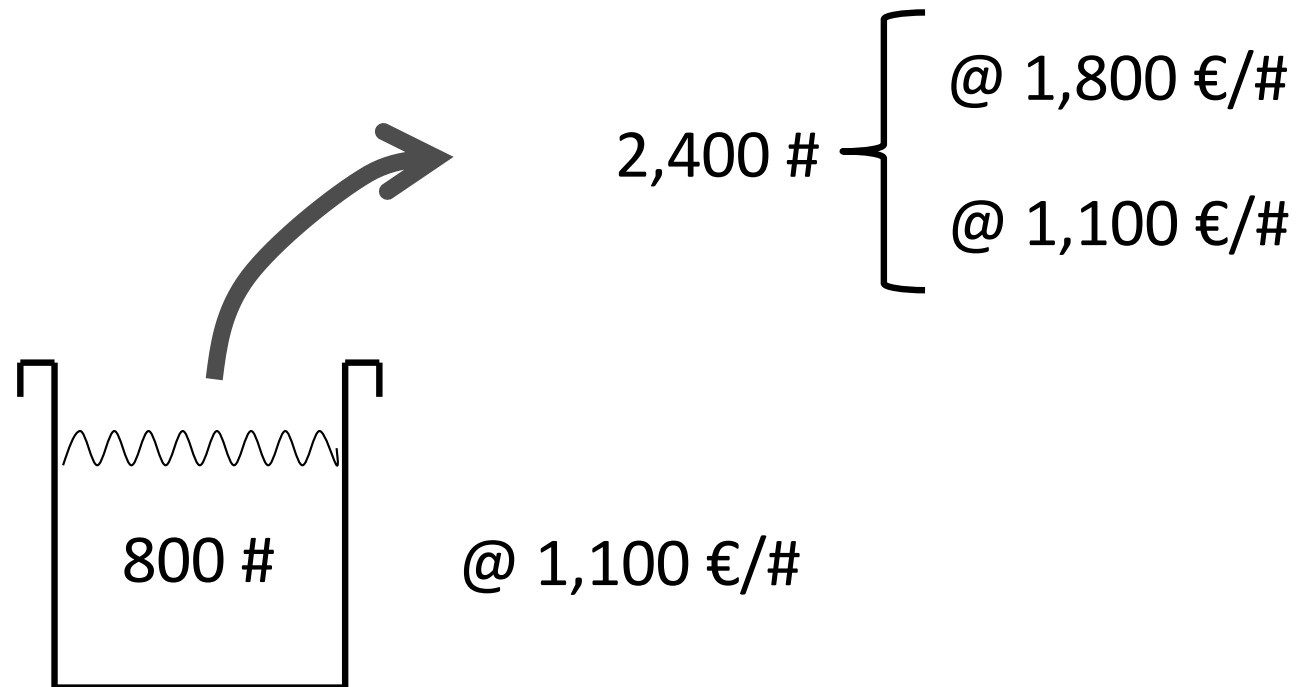
Required:

Determine the finished products turnover rate and average finished products days outstanding using first the data in pieces and then the data in euros.

FINISH PRODUCT INVENTORY

$$\text{Finished product turnover rate} = \frac{\text{Sales}}{\text{Inventory}}$$

$$\text{Finished product days outstanding} = \frac{\text{Inventory}}{\text{Sales}} * 360$$



FINISH PRODUCT INVENTORY

$$\begin{aligned} \text{Finished product turnover rate} &= \frac{\text{Sales}}{\text{Inventory}} \\ &= \frac{\text{COGS}}{\text{Inventory}} * \frac{\text{Sales}}{\text{COGS}} \end{aligned}$$

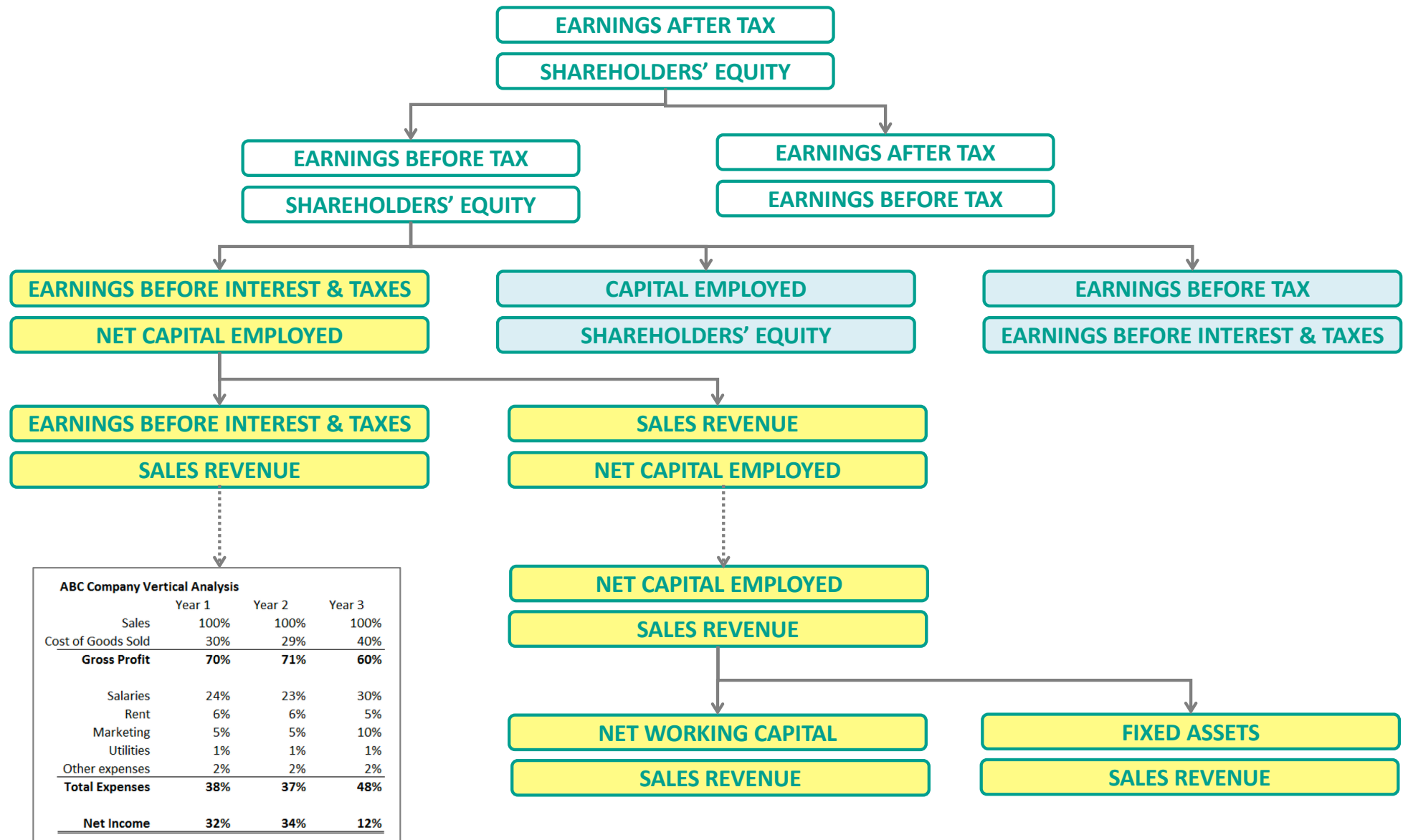
$$\begin{aligned} \text{Finished product days outstanding} &= \frac{\text{Inventory}}{\text{Sales}} * 360 \\ &= \frac{\text{Inventory}}{\text{COGS}} * 360 * \frac{\text{COGS}}{\text{Sales}} \end{aligned}$$

RAW MATERIALS INVENTORY

$$\begin{aligned} \text{Raw materials turnover rate} &= \frac{\text{Sales}}{\text{Inventory}} \\ &= \frac{\text{Consumption}}{\text{Inventory}} * \frac{\text{COGS}}{\text{Consumption}} * \frac{\text{Sales}}{\text{COGS}} \end{aligned}$$

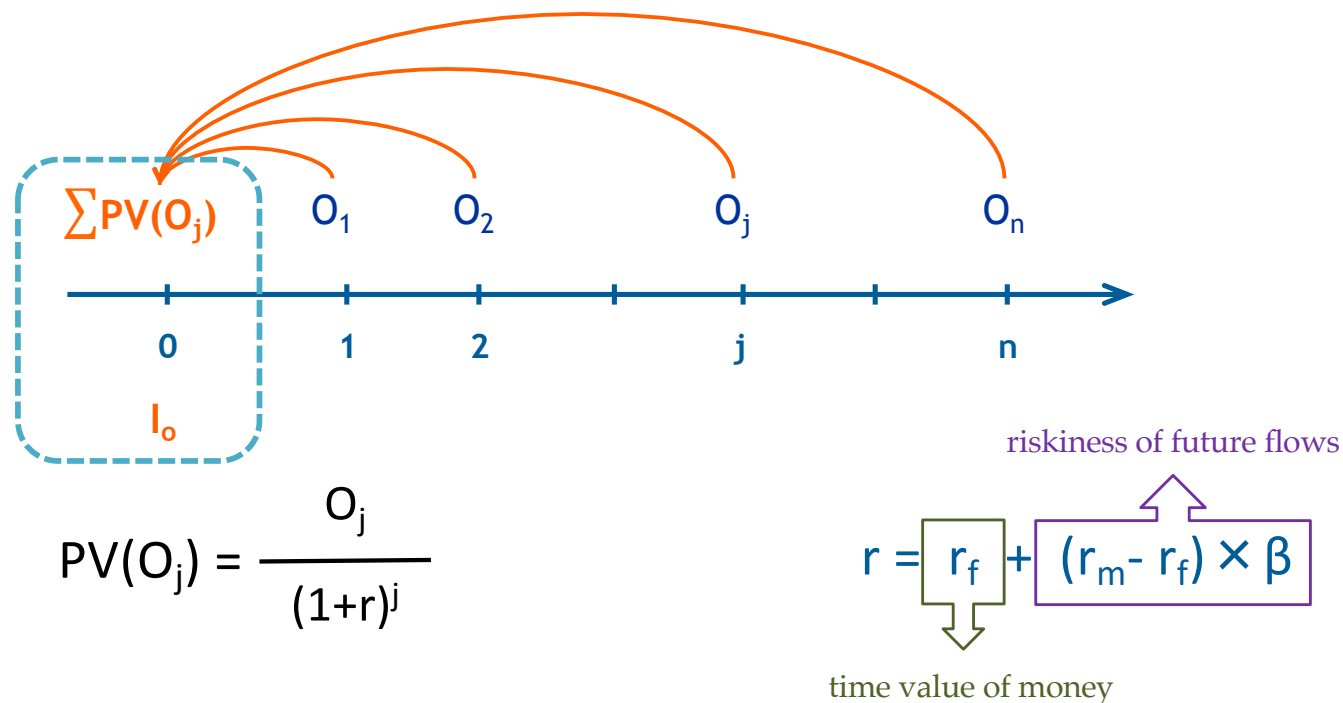
$$\begin{aligned} \text{Raw materials days outstanding} &= \frac{\text{Inventory}}{\text{Sales}} * 360 \\ &= \frac{\text{Inventory}}{\text{Consumption}} * 360 * \frac{\text{Consumption}}{\text{COGS}} * \frac{\text{COGS}}{\text{Sales}} \end{aligned}$$

OPERATING DECISIONS



CAPITAL INVESTMENTS

«Companies create value for their owners by **investing cash now to generate more cash in the future**. The amount of value created is the difference between investments made and cash inflows—adjusted for the fact that tomorrow’s cash flows are worth less than today’s, due to the **time value of money** and **riskiness of future flows**. [...] a company’s return on invested capital (ROIC), and its revenue growth, determine how revenues get converted into cash flows. Therefore, value creation is ultimately driven by ROIC, revenue growth and, of course, the ability to sustain both over time».



Excerpt from: T. Koller, R. Dobbs, B. Huyett, "Value. The Four Cornerstones Of Corporate Finance McKinsey & Company, John Wiley & Sons, 2011.

ASSET ACQUISITION SYSTEM

«An asset allocation system is the set of formal routines and procedures designed to process and evaluate requests to acquire new assets.

It is sometimes known as a capital budget or capital investment plan.

These systems, like the profit plans to which they are linked, typically work on a calendar cycle—that is, formal proposals for asset acquisitions are created once a year. The timing of this process is designed to ensure that proposals are formally evaluated and approved prior to actually committing to spend any money».

SOURCE: SIMONS, Designing Asset Allocation Systems

ASSET ACQUISITION SYSTEM

«In the most basic sense, virtually all asset acquisition systems specify a minimum rate of return or discount rate that should be used by individuals when proposing asset acquisitions. Because senior management cannot foresee all the opportunities available to the firm, senior managers reviewing asset acquisition proposals set a lower limit on acceptable proposals and motivate organizational participants to search for the best possible asset utilization opportunities within the boundary conditions. The effect is to say, "I will not tell you what opportunities to sponsor. Find the best opportunities out there and present them to us, but do not consider proposals with an ROI less than 15 percent." The hurdle rate sets minimum boundaries.»

SOURCE: SIMONS, LEVERS OF CONTROL



BENEFITS OF ASSET ACQUISITION SYSTEM

«Asset allocation systems provide a number of benefits.

- First, they provide a framework and set of categories into which asset proposals can be grouped. [...] Sorting asset acquisition proposals into different buckets forces managers to be explicit about the type of value that they expect the asset to provide and the economic viability of the proposal.
- Second, asset allocation systems include analytic tools that can be tailored to different types of assets. [...] With proposals sorted into the correct bucket, decision makers can apply different decision tools to each category.
- Finally, and most importantly, asset allocation systems provide guidelines that help managers throughout the organization understand how their proposals relate to the strategy of the business. Acquiring assets often involves the analysis and judgment of several, if not many, people. These systems can be used to communicate what types of assets are needed (and not needed) to support new and ongoing strategic initiatives».

SOURCE: SIMONS, Designing Asset Allocation Systems

LIMITS ON THE DISCRETION

«Acquiring assets involves choice, and future options may become more limited after choices are made.

Because of the sometimes large sums of money involved, and the often irrevocable commitments, there are few other decisions in organizations in which decision making authority is so carefully prescribed.

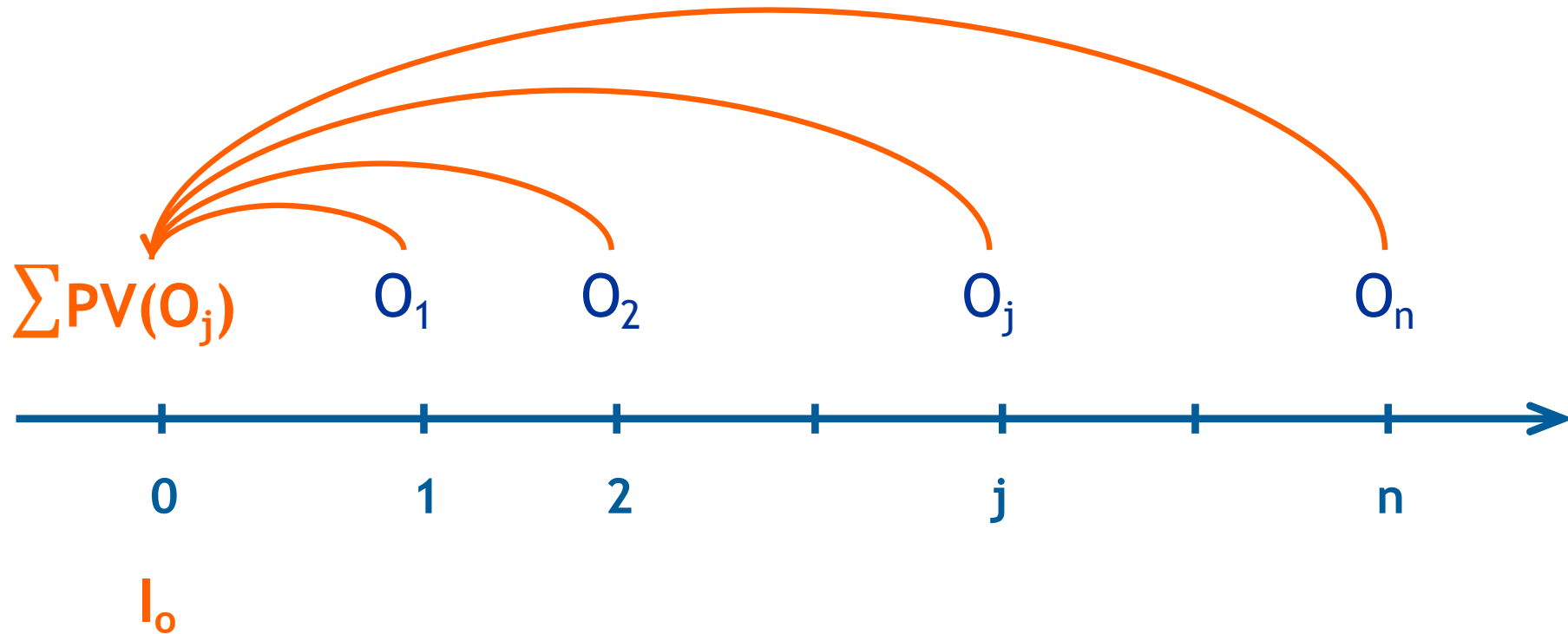
Businesses invariably impose limits on the discretion of any individual manager to authorize or commit to the acquisition of assets. These limits are a function of span of control and position in the organizational hierarchy. The former affects the type of assets for which the manager has authority to commit; the latter affects the amount of money that a manager can commit».

SOURCE: SIMONS, Designing Asset Allocation Systems

ASSET ACQUISITION SYSTEM

- ❑ Payback Period (PBP)
- ❑ Discounted Payback Period (DPBP)
- ❑ Internal rate of return (IRR)
- ❑ Net present value (NPV)
- ❑ Modified Internal Rate of Return (MIRR)

CAPITAL INVESTMENTS



$$\frac{\sum PV(O_j)}{I_o} > 1$$

$$\underbrace{\sum PV(O_j) - I_o}_{\text{NPV}} > 0$$

NPV

SIMPLE EXAMPLE

CASH FLOW STATEMENT

	20X0	20X1	20X2	20X3	20X4	20X5
Sales revenues		€ 1.000,00	€ 1.000,00	€ 2.000,00	€ 2.000,00	€ -
- Operating costs (other than depreciation & amortization)		-€ 750,00	-€ 750,00	-€ 1.500,00	-€ 1.500,00	€ -
= EBITDA		€ 250,00	€ 250,00	€ 500,00	€ 500,00	€ -
- Change in Net working capital		-€ 166,67	€ -	-€ 166,67	€ -	€ 333,33
= Free cash flow to the firm		€ 83,33	€ 250,00	€ 333,33	€ 500,00	€ 333,33
Net working capital	€ -	€ 166,67	€ 166,67	€ 333,33	€ 333,33	€ -
Change in net working capital		€ 166,67	€ -	€ 166,67	€ -	-€ 333,33

CAPITAL INVESTMENT PLAN

		1	2	3	4	5
Discount rate	8%					
	€	77,16	€ 214,33	€ 264,61	€ 367,51	€ 226,86
Present Value of future cash inflows	€ 1.150,48					
Actual cash outflow	-€ 1.000,00					
Net present value	€ 150,48					

VALUE BASED MANAGEMENT

«The thinking behind VBM is simple. The value of a company is determined by its discounted future cash flows. Value is created only when companies invest capital at returns that exceed the cost of that capital. VBM extends these concepts by focusing on how companies use them to make both major strategic and everyday operating decisions. Properly executed, it is an approach to management that aligns a company's overall aspirations, analytical techniques, and management processes to focus management decision making on the key drivers of value.

VBM calls on managers to use value-based performance metrics for making better decisions. It entails managing the balance sheet as well as the income statement, and balancing long- and short-term perspectives».

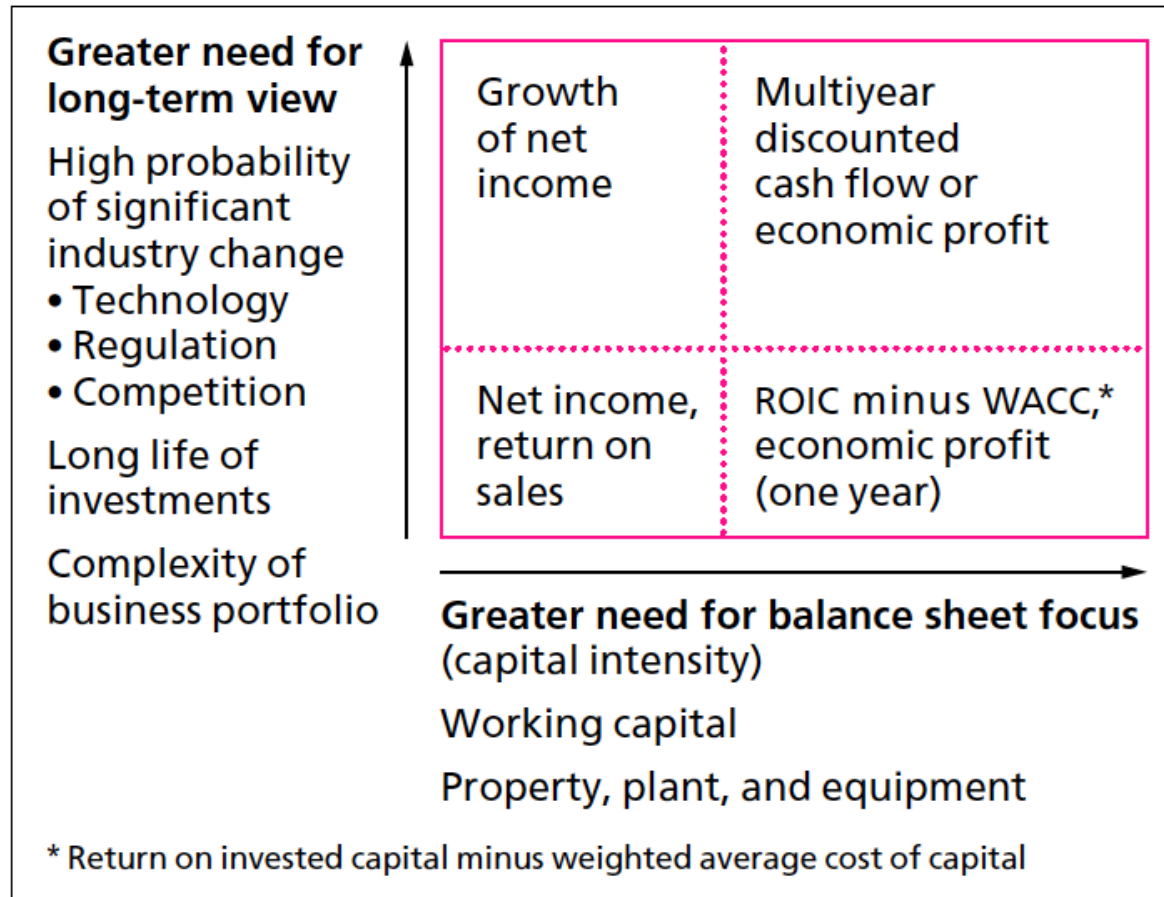
Excerpt from: T. Koller, "What is value-based management?", The McKinsey Quarterly, 1994, Number 3



VALUE BASED MANAGEMENT

Exhibit 2

Measuring corporate performance



Excerpt from: T. Koller, "What is value-based management?", The McKinsey Quarterly, 1994, Number 3

VALUE DRIVERS

«An important part of VBM is a deep understanding of the performance variables that will actually create the value of the business – the key value drivers. Such an understanding is essential because an organization cannot act directly on value. It has to act on things it can influence – customer satisfaction, cost, capital expenditures, and so on. Moreover, it is through these drivers of value that senior management learns to understand the rest of the organization and to establish a dialogue about what it expects to be accomplished.

A value driver is any variable that affects the value of the company. To be useful, however, value drivers need to be organized so that managers can identify which have the greatest impact on value and assign responsibility for them to individuals who can help the organization meet its targets».

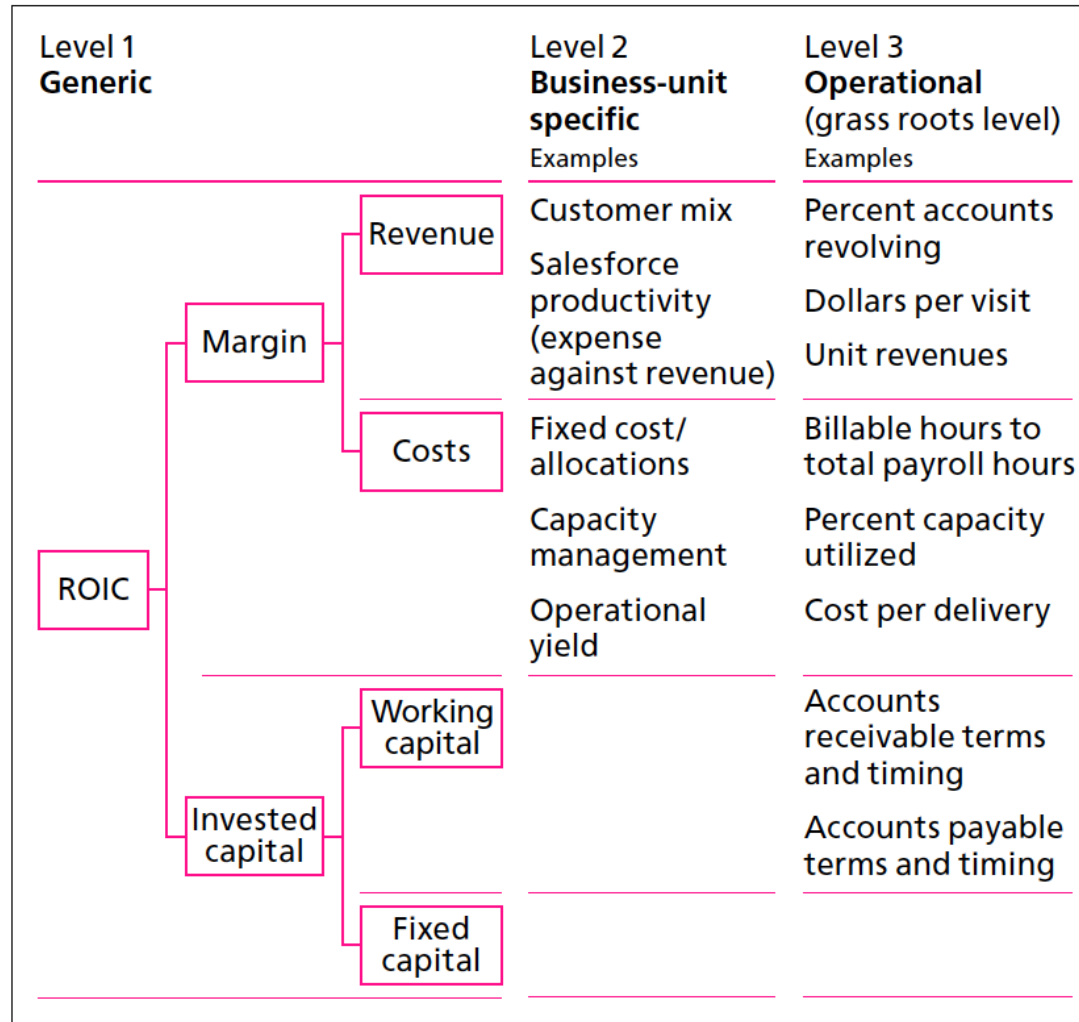
Excerpt from: T. Koller, “What is value-based management?”, The McKinsey Quarterly, 1994, Number 3



MANAGING VALUE DRIVERS

Exhibit 3

Levels of value drivers



Excerpt from: T. Koller, "What is value-based management?", The McKinsey Quarterly, 1994, Number 3

FOUR SETS OF METRICS

EFFICIENCY

1. OPERATIONAL PRODUCTIVITY

$$\frac{O_{\text{PHYSICAL}}}{I_{\text{PHYSICAL}}}$$

2. FINANCIAL PRODUCTIVITY

$$\frac{O_{\text{REVENUES}}}{I_{\text{EXPENSES}}}$$

3. ASSET TURNOVER

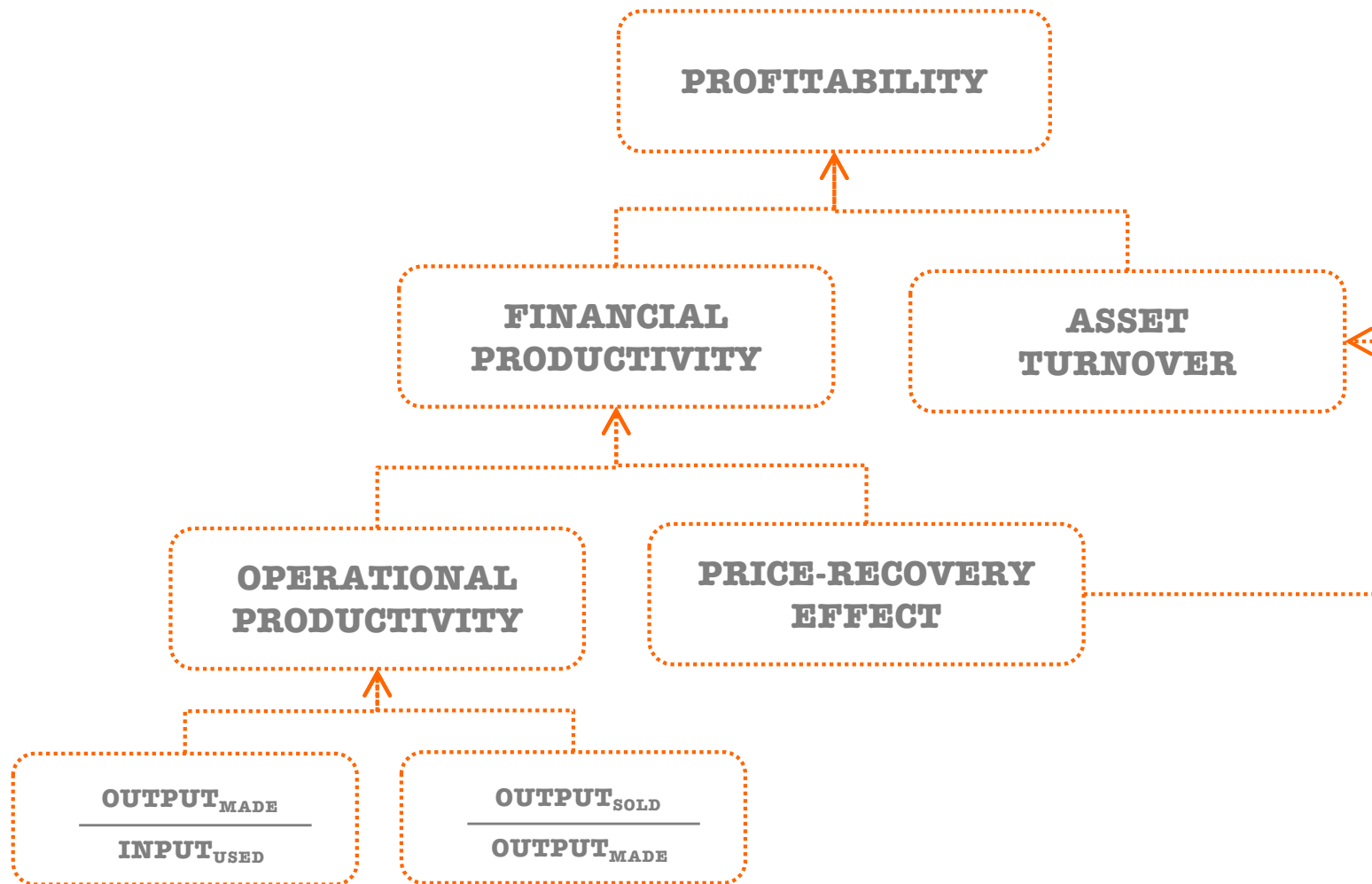
$$\frac{O_{\text{REVENUE}}}{I_{\text{ASSETS}}}$$

4. PROFITABILITY

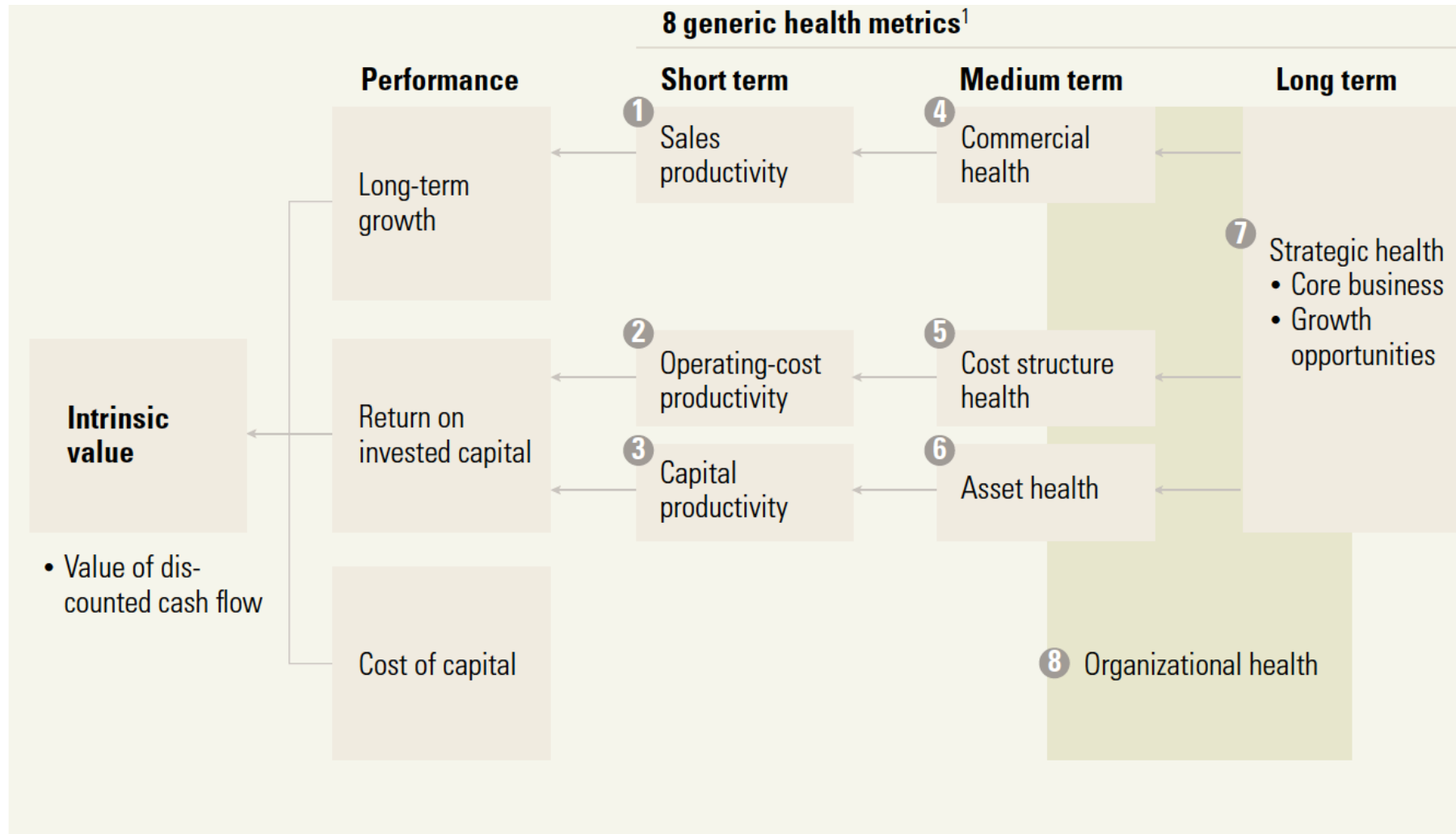
$$\frac{O_{\text{PROFIT}}}{I_{\text{INVESTMENT}}}$$



CAUSES AND EFFECT



“PERFORMANCE VERSUS HEALTH”



SHORT-TERM HEALTH METRICS

- Sales productivity metrics explore the factors underlying recent sales growth. For retailers, these metrics include market share, a retailer's ability to charge higher prices than its peers, the pace of store openings, and same-store sales increases.
- Operating-cost productivity metrics explore the factors underlying unit costs, such as the cost of building a car or delivering a package.
- Capital productivity metrics show how well a company uses its working capital (inventories, receivables, and payables) and its property, plant, and equipment. Dell revolutionized the personal-computer business by building products to order and thus minimizing inventories. Because the company keeps the so low and has few receivables to boot, it can operate with negative working capital.

MEDIUM-TERM HEALTH METRICS

- Commercial-health metrics, indicating whether a company can sustain or improve its current revenue growth, include the metrics for its product pipeline (the talent and technology to market new products over the medium term), brand strength (investments in brand building), regulatory risk, and customer satisfaction. Metrics for medium-term commercial health vary widely by industry.
- Cost structure health metrics gauge a company's ability, as compared with that of its competitors, to manage its costs over three to five years. These metrics might include assessments of programs like Six Sigma, which companies such as General Electric use to reduce their costs continually and to maintain a cost advantage relative to their competitors across most of their businesses.
- Asset health metrics show how well a company maintains and develops its assets. For a hotel or restaurant chain, to give one example, the average time between remodelings may be an important driver of health.

LONG-TERM HEALTH METRICS

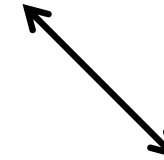
- Metrics of long-term strategic health show the ability of an enterprise to sustain its current operating activities and to identify and exploit new areas of growth. A company must periodically assess and measure the threats—including new technologies, changes in public opinion and in the preferences of customers, and new ways of serving them—that could make its current business less attractive. In assessing a company's long-term strategic health, specific metrics are sometimes hard to identify, so more qualitative milestones, such as progress in selecting partners for mergers or for entering a market, are needed.
- Metrics are also needed to determine whether a company has the people, the skills, and the culture to sustain and improve its performance. Diagnostics of organizational health typically measure the skills and capabilities of a company, its ability to retain its employees and keep them satisfied, its culture and values, and the depth of its management talent. Again, what's important varies by industry.

PERSPECTIVES ON THE LONG-TERM

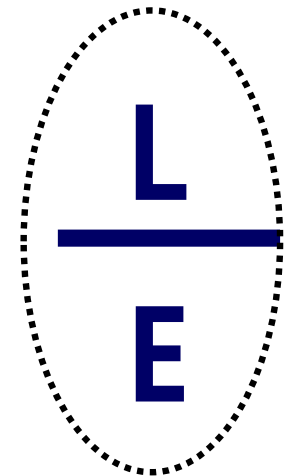
In a speech delivered back in 1969, when the Net was in its infancy, the social scientist and future Nobel laureate Herbert Simon posited that a glut of information would produce a dearth of attention. Since then, psychologists and neuroscientists have learned a great deal about how our brains respond to distractions, interruptions, and incessant multitasking. What they've discovered proves how right Simon was—and underscores why we should be worried about the new digital environment we've created for ourselves. When it comes to thinking, we're trading depth for breadth. We're so focused on the immediate that we're losing the ability to think more deeply about the long-term implications of complex problems.

FINANCIAL LEVERAGE

fulcrum of leverage

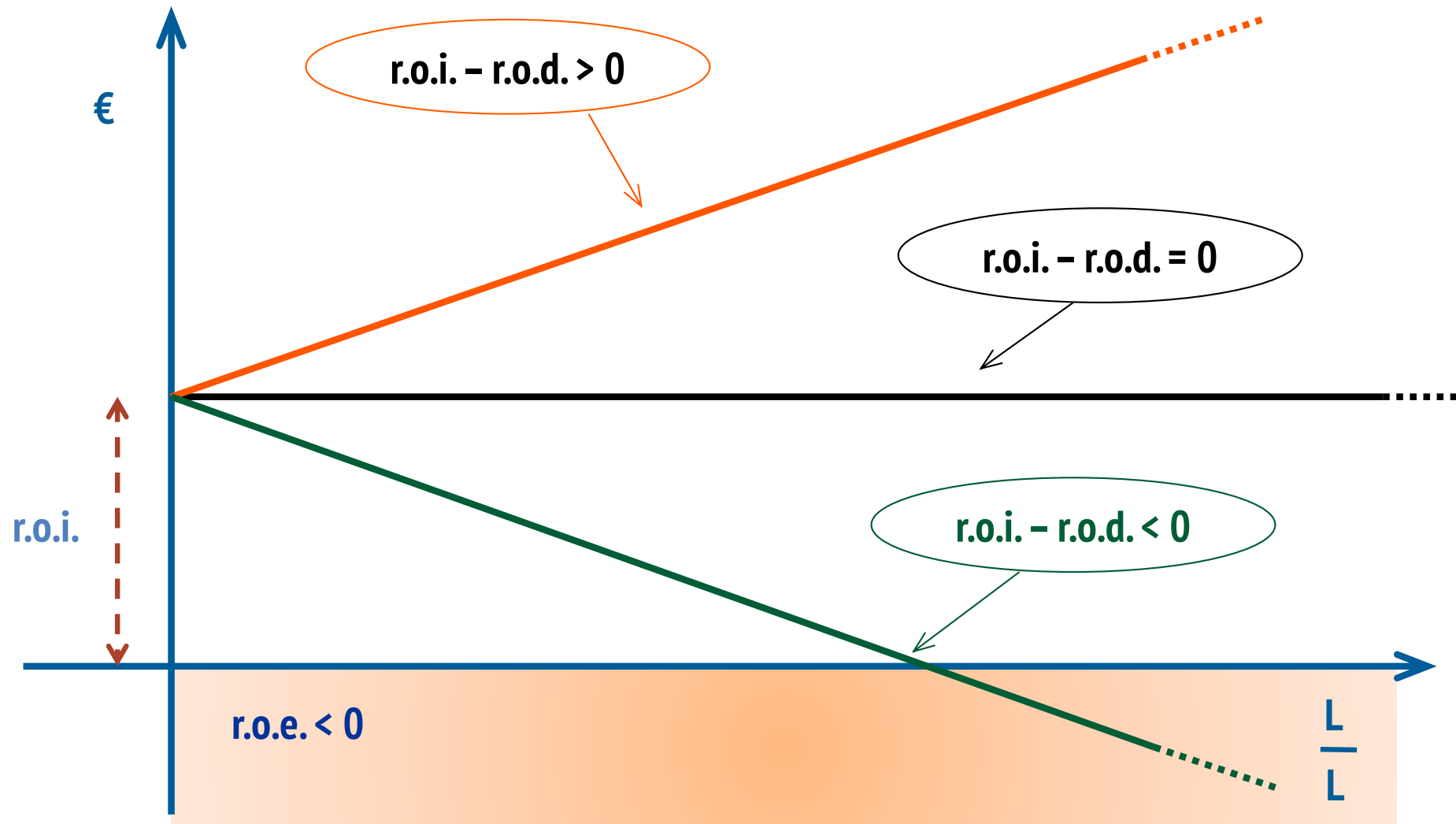


$$\text{r.o.e.} = \text{r.o.i.} + \underbrace{(\text{r.o.i.} - \text{r.o.d.})}_{\text{algebraic sign of leverage}} *$$

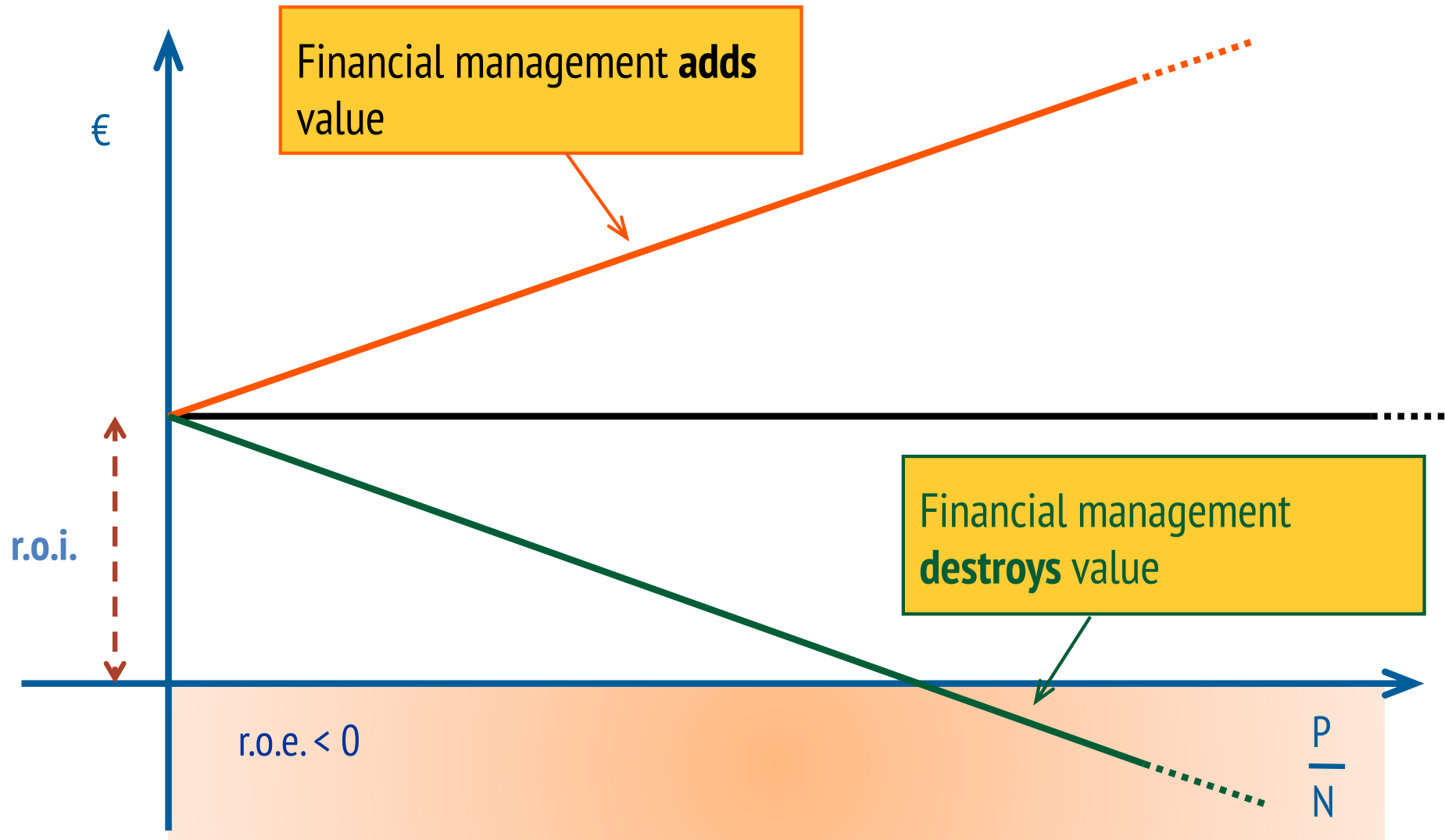


algebraic sign of leverage

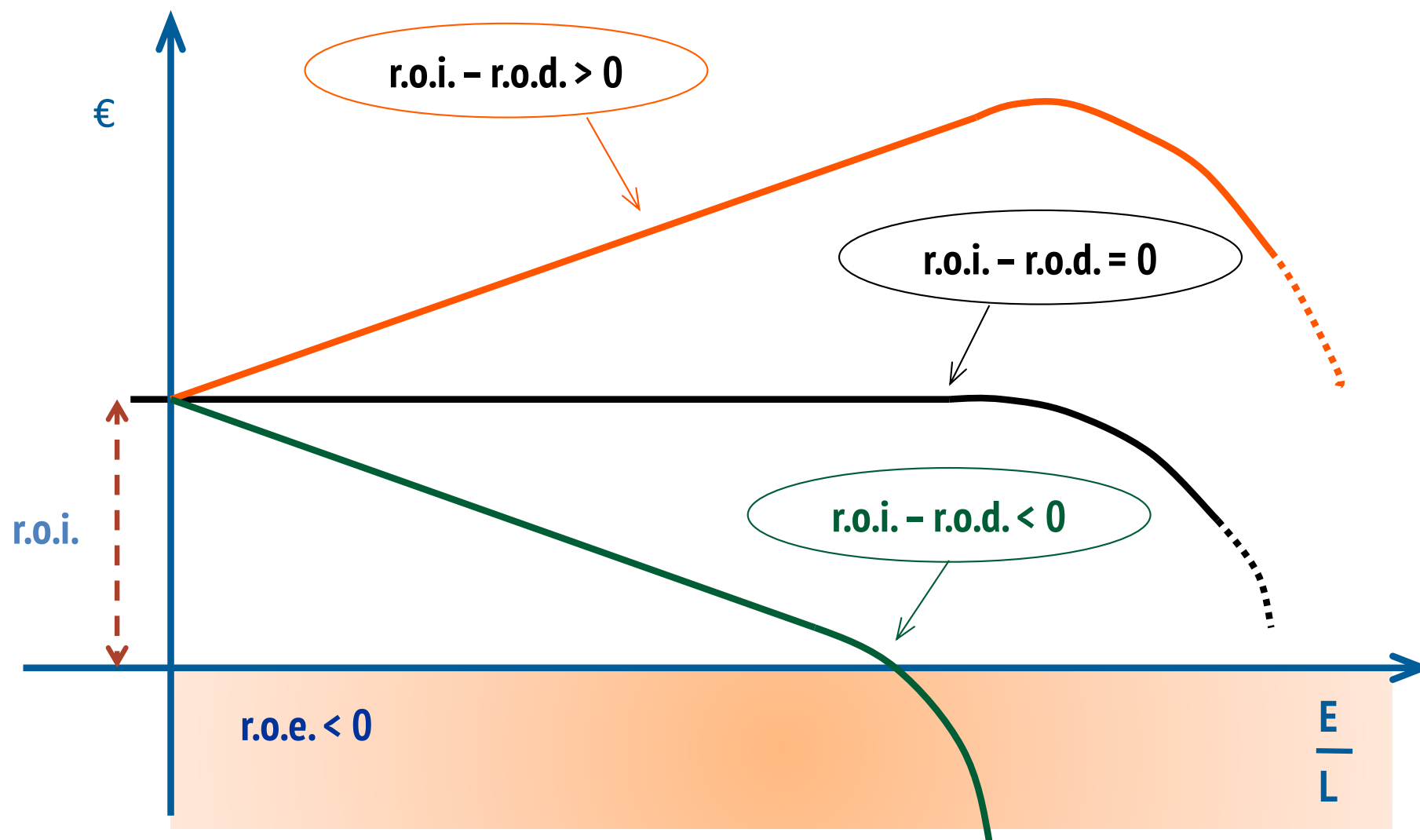
FINANCIAL LEVERAGE



FINANCIAL LEVERAGE



EFFECT ON R.O.E. ASSOCIATED WITH INCREASED FINANCIAL RISK



VARIABILITY OF ROI AND ROD

