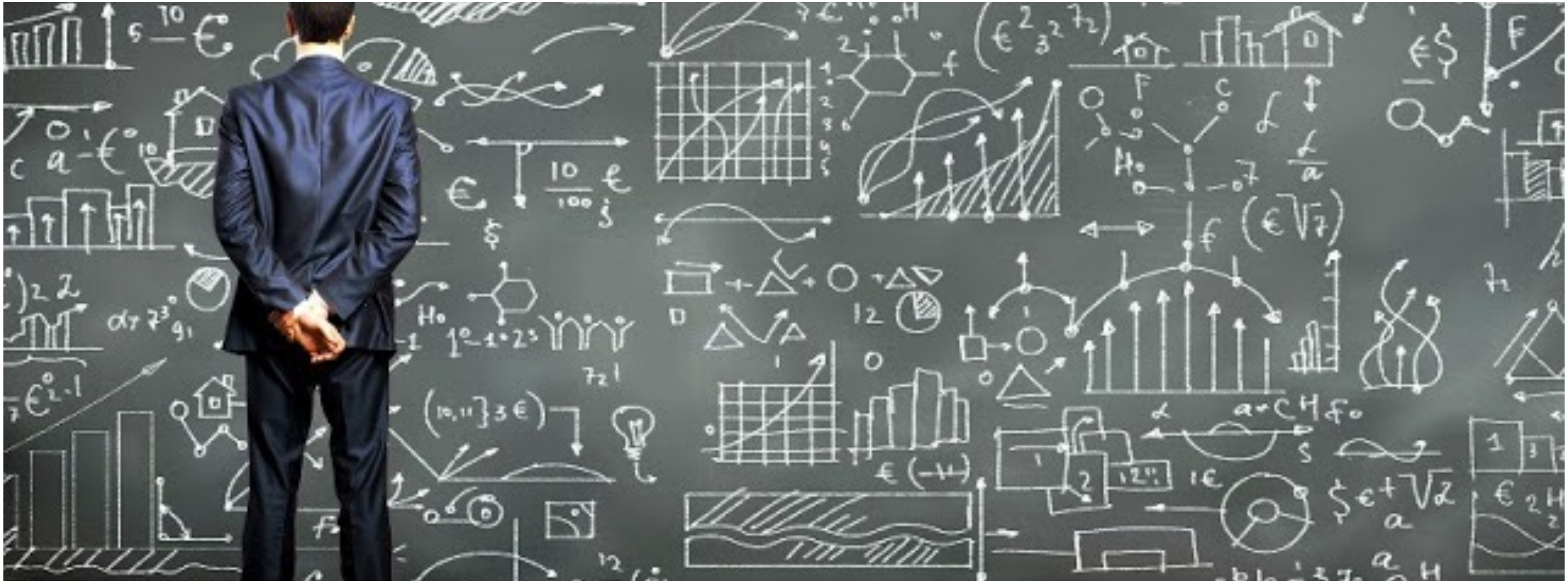
THE IMPORTANCE OF PERFORMANCE MEASURES

What is the role of measurement in management?



THE IMPORTANCE OF MEASUREMENT

One of the basic element in the work of the manager is measurement.

The manager establishes targets and yardsticks—and few factors are as important to the performance of the organization and of every person in it.

He or she sees to it that each person has measurements available that are focused on the performance of the whole organization and that, at the same time, focus on the work of the individual.

The manager analyzes, appraises, and interprets performance.

As in all other areas of this work, he or she communicates the meaning of the measurements and their findings to subordinates, superiors, and colleagues.

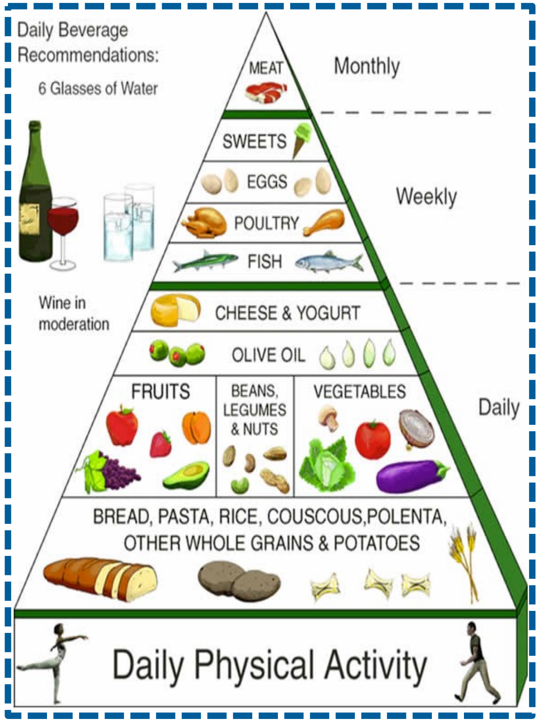
Peter F. Drucker, Management, revised edition

WHAT DOES A MANAGER DO?

1. He/She acquires information

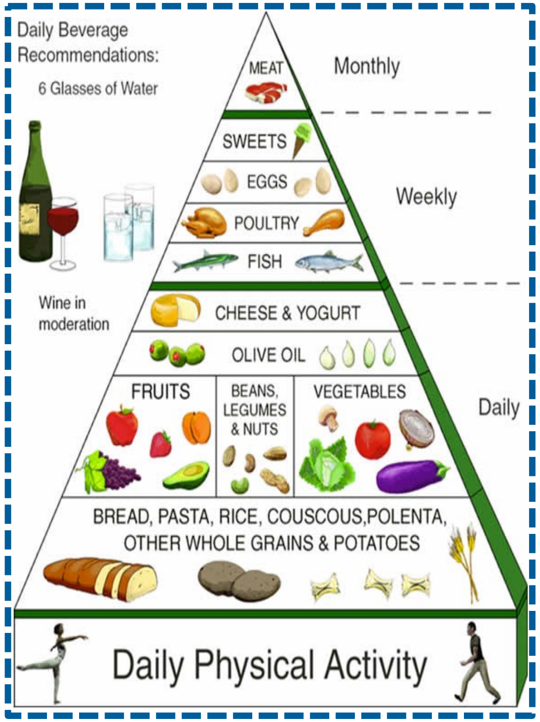
WHAT DOES A MANAGER DO?

2. He/She makes decisions

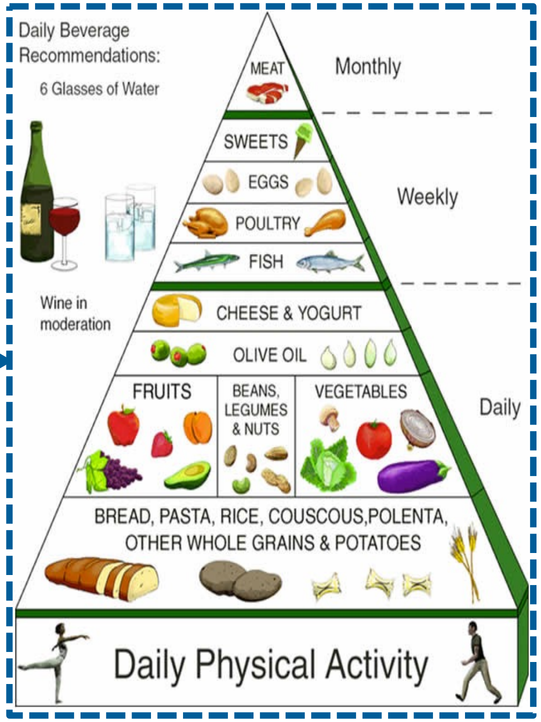


WHAT DOES A MANAGER DO?

3. He/She tries to put the decision taken in practice



COHERENCE BETWEEN INFORMATION AND DECISIONS



DECISION MODELS

The information must be **RELEVANT** for the decisions that managers, operating in a particular business environment with a particular strategy, make.

THE FIRM AS A "BLACK BOX"

MENTAL MODELS

In 1971 Jay Wright Forrester defined mental models as follows:

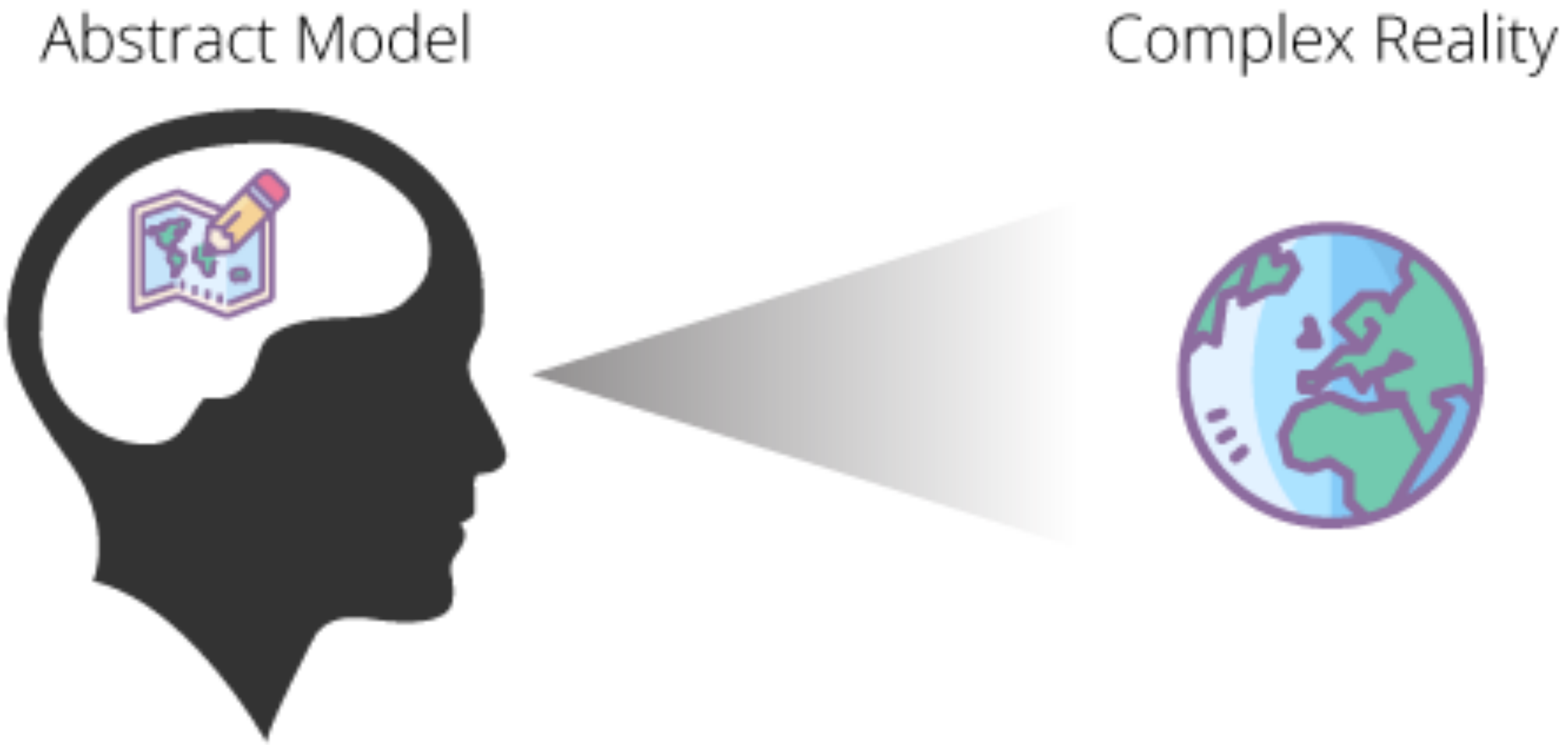
"The image of the world around us, which we carry in our head, is just a model. Nobody in his head imagines all the world, government or country. He has only **selected concepts, and relationships between them,** and uses those to represent the real system"

Mental model is an explanation of someone's thought process about how something works in the real world. It is a representation of the surrounding world, the relationships between its various parts and a person's intuitive perception about his or her own acts and their consequences. Mental models can help shape behavior and set an approach to solving problems (similar to a personal algorithm) and doing tasks.

A mental model is a kind of internal symbol or representation of external reality, hypothesized to play a major role in cognition, reasoning and decision-making. Kenneth Craik suggested in 1943 that the mind constructs "small-scale models" of reality that it uses to anticipate events.

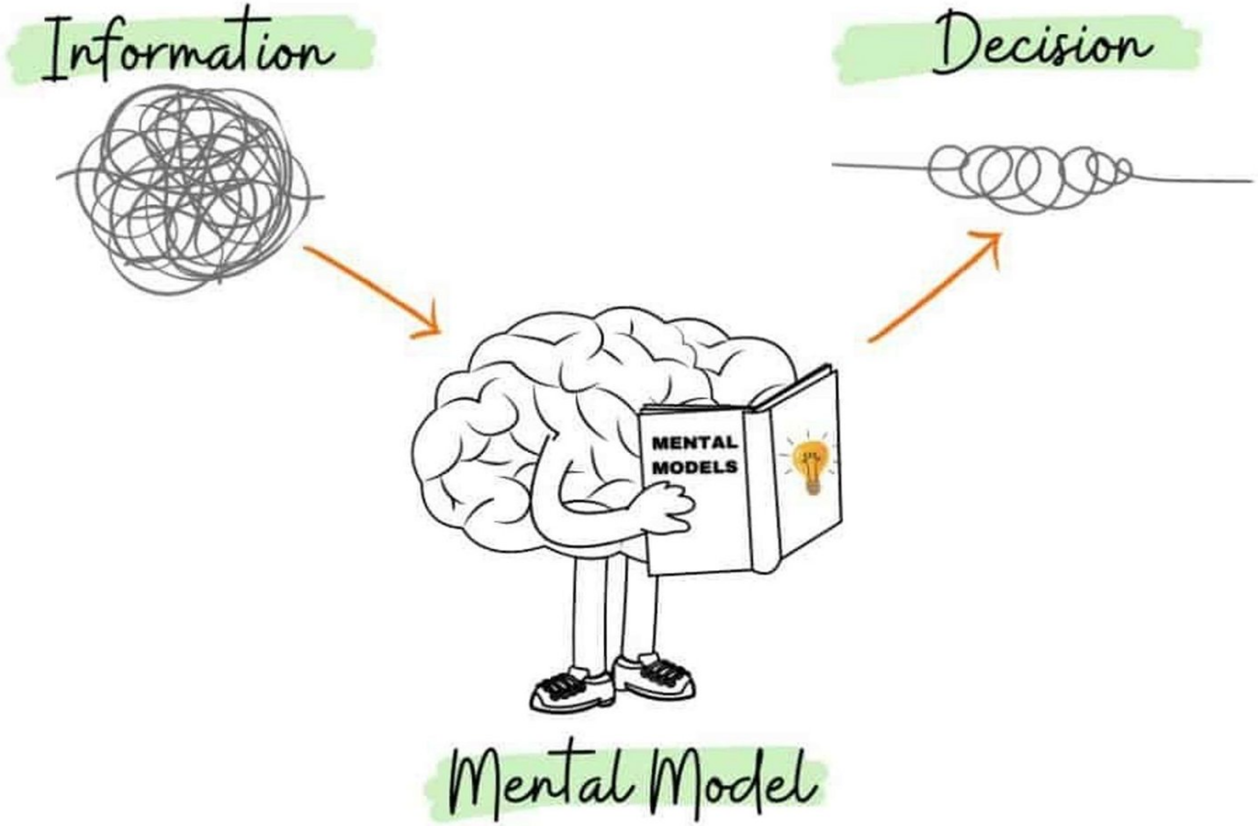
SOURCE: https://en.wikipedia.org/wiki/Mental_model

MENTAL MODELS



A mental model is a simplified observation of a certain part of reality that you can keep in your head.

MENTAL MODELS



https://thewizdomproject.com/mental-models-basics

MENTAL MODELS

"One thing all managers know is that many of the best ideas never get put into practice. Brilliant strategies fail to get translated into action. Systemic insights never find their way into operating policies. A pilot experiment may prove to everyone's satisfaction that a new approach leads to better results, but widespread adoption of the approach never occurs.

We are coming increasingly to believe that this "slip 'twixt cup and lip" stems, not from weak intentions, wavering will, or even nonsystemic understanding, but from mental models. More specifically, new insights fail to get put into practice because they conflict with deeply held internal images of how the world works, images that limit us to familiar ways of thinking and acting. That is why the discipline of managing mental models—surfacing, testing, and improving our internal pictures of how the world works— "promises to be a major breakthrough for building learning organizations. None of us can carry an organization in our minds—or a family, a community. What we carry in our heads are images, assumptions, and stories. [...]

Our "mental models" determine not only how we make sense of the world, but how we take action."

Excerpt From: Peter M Senge. "The Fifth Discipline: The Art and Practice of the Learning Organization: First Edition." iBooks.

"COGNITIVE BIAS" AND BLINKERS

ENACTED ENVIRONMENT

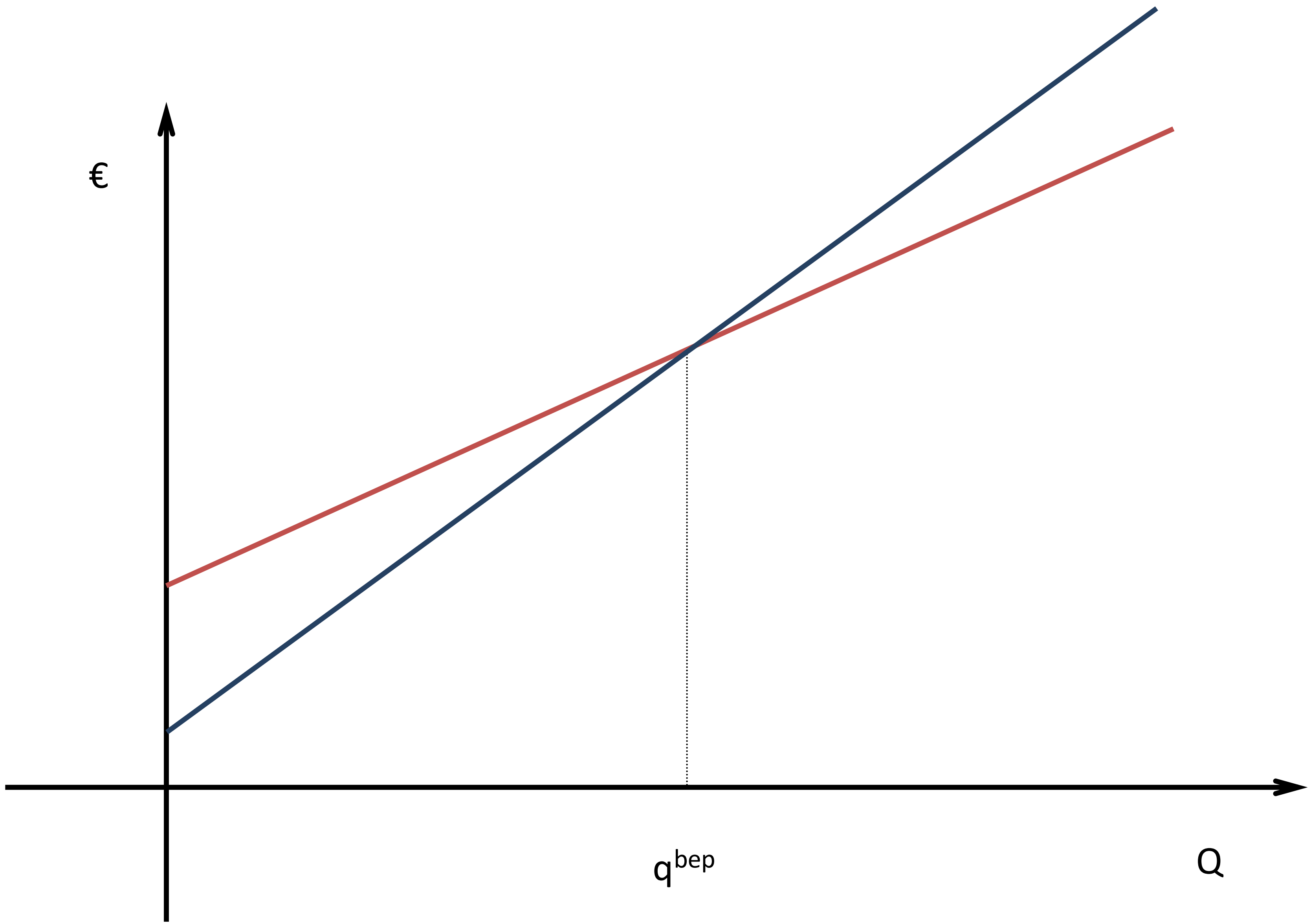
WEICK: ENACTMENT & ENACTED ENVIRONMENT

Weick (1988) describes the term enactment as representing the notion that when people act, they bring structures and events into existence and set them in action.

The process of enactment involves two steps. First, preconceptions are used to set aside portions of the field of experience for further attention, that is, perception is focused on predetermined stimuli. Second, people act within the context of these portions of experience guided by preconceptions in such a way as to reinforce these preconceptions. Hence, attention to certain stimuli will guide subsequent action so that those stimuli are confirmed as important.

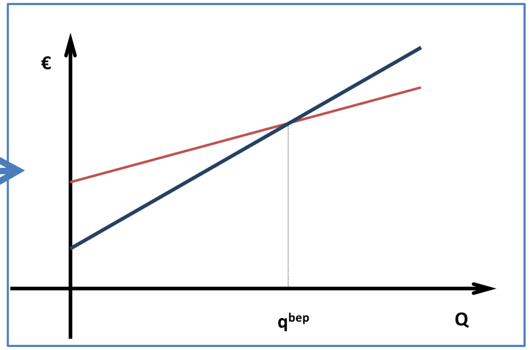
The result of the process of enactment is the enacted environment. This enacted environment comprises "real" objects but the significance, meaning and content of these objects will vary. These objects are not significant unless they are acted upon and incorporated into events, situations and explanations. In this way the enacted environment is a direct result of the preconceptions held by the social actor.

COST-VOLUME-PROFIT ANALYSIS

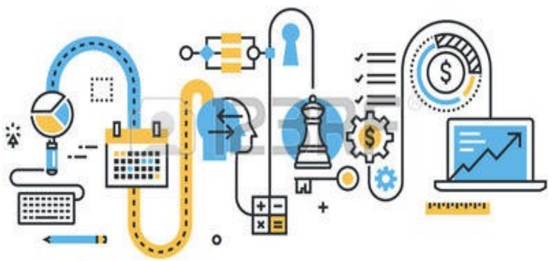


DECISION MODELS

SELECTED CONCEPTS AND SELECTED RELATIONSHIPS BETWEEN THEM

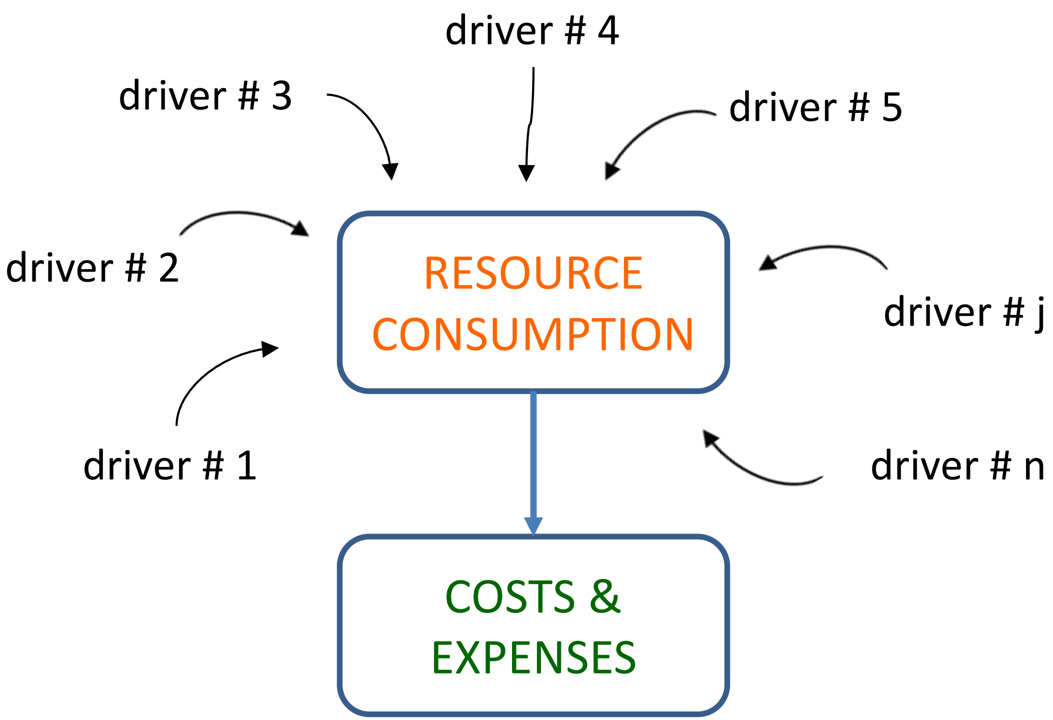


DECISION MODEL (ABSTRACTION)



BUSINESS PROCESSES (REALITY)

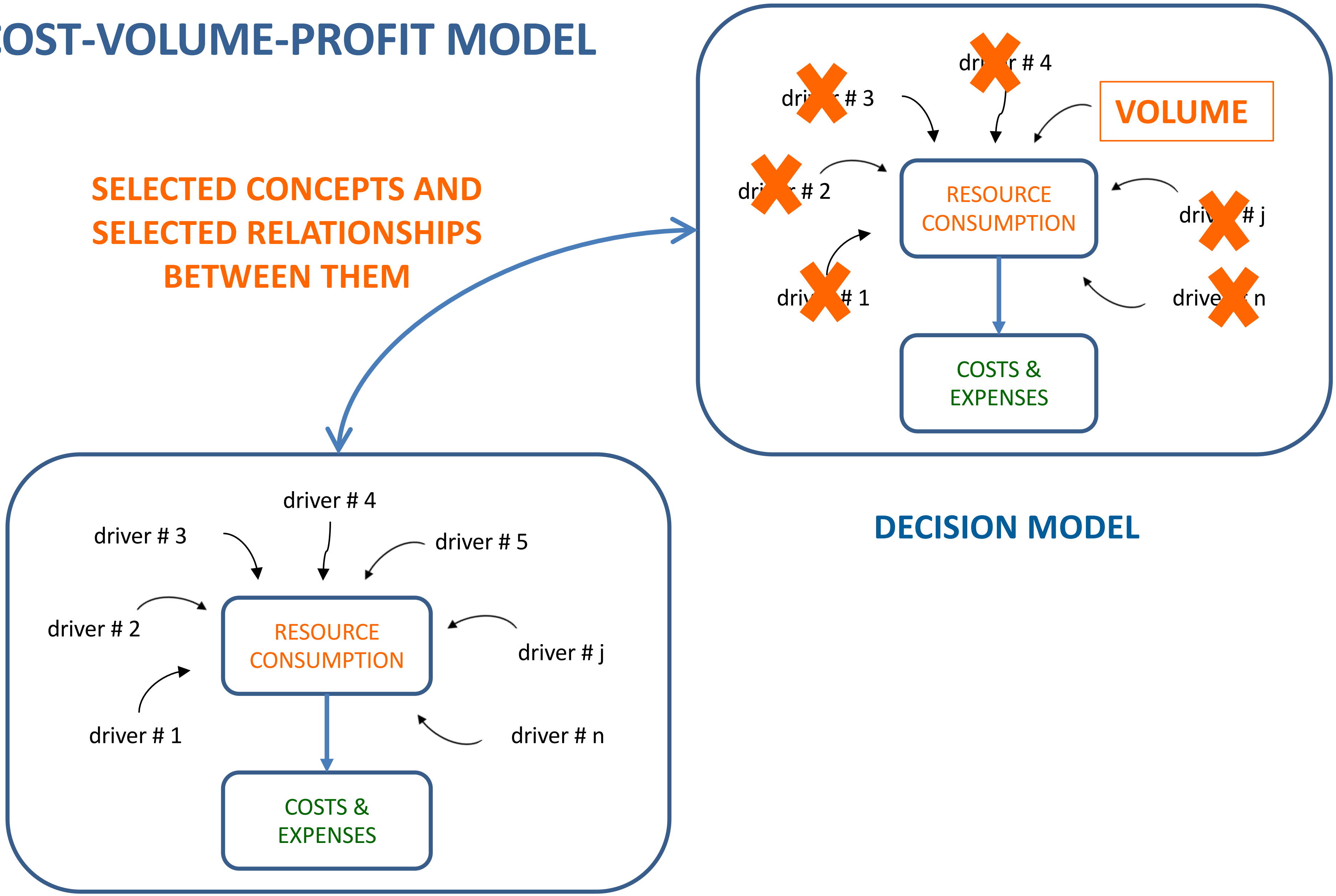
COSTS, RESOURCES AND DRIVERS



A **cost** is a sacrifice of resources. More precisely the cost (and therefore an expense) is **the monetary reflection** of the sacrifice of one or more resources that are used in order to perform business processes. The **usage** of a resource is determined by different kinds of causes (generally indicated in accounting as drivers)

«The objective of managerial **costing** is to provide a **monetary reflection** of the **utilization** of business **resources** and related cause and effect insights».

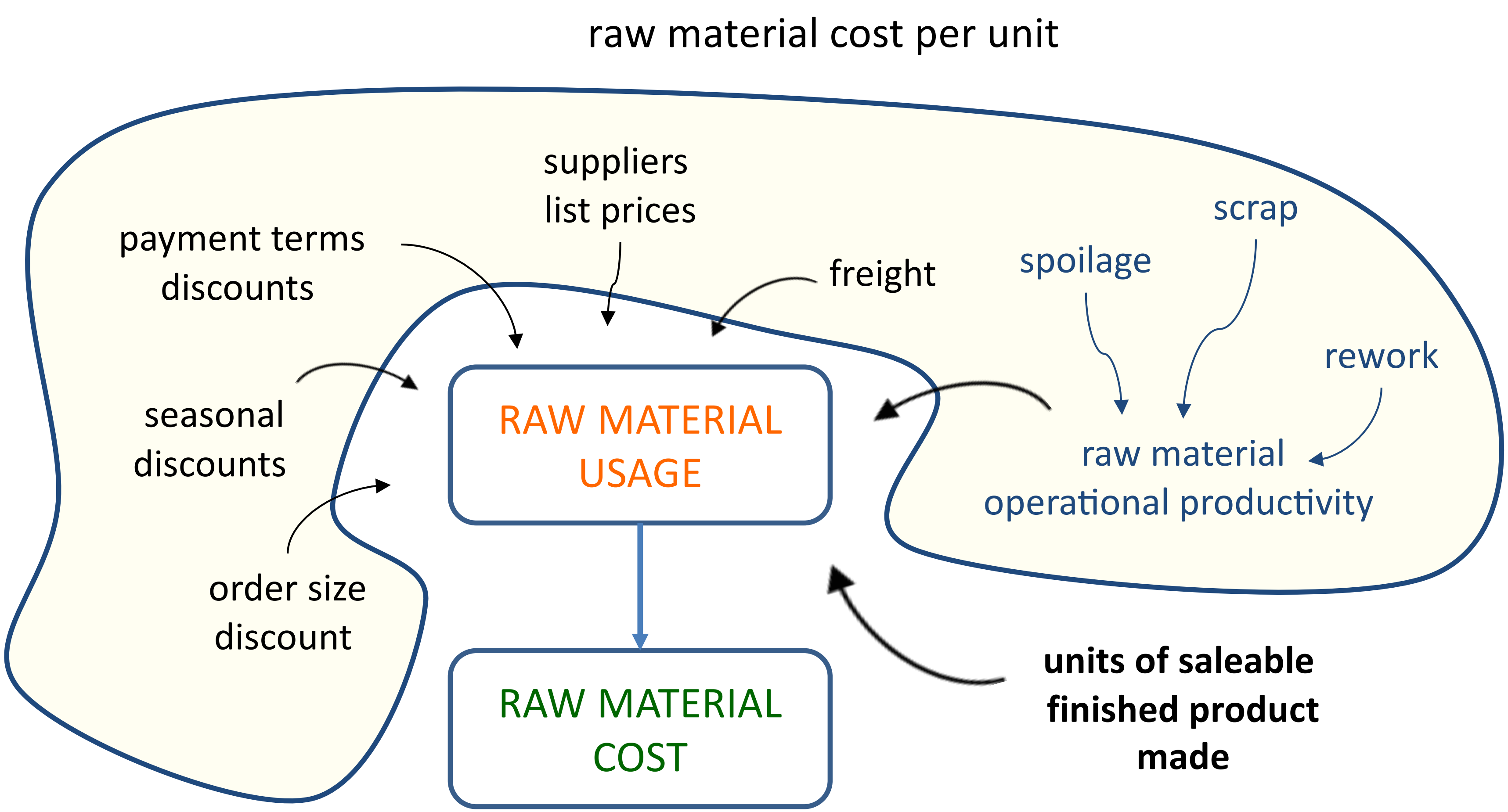
COST-VOLUME-PROFIT MODEL



DECISION MODEL

REALITY

COST OF RAW MATERIAL UTILISATION



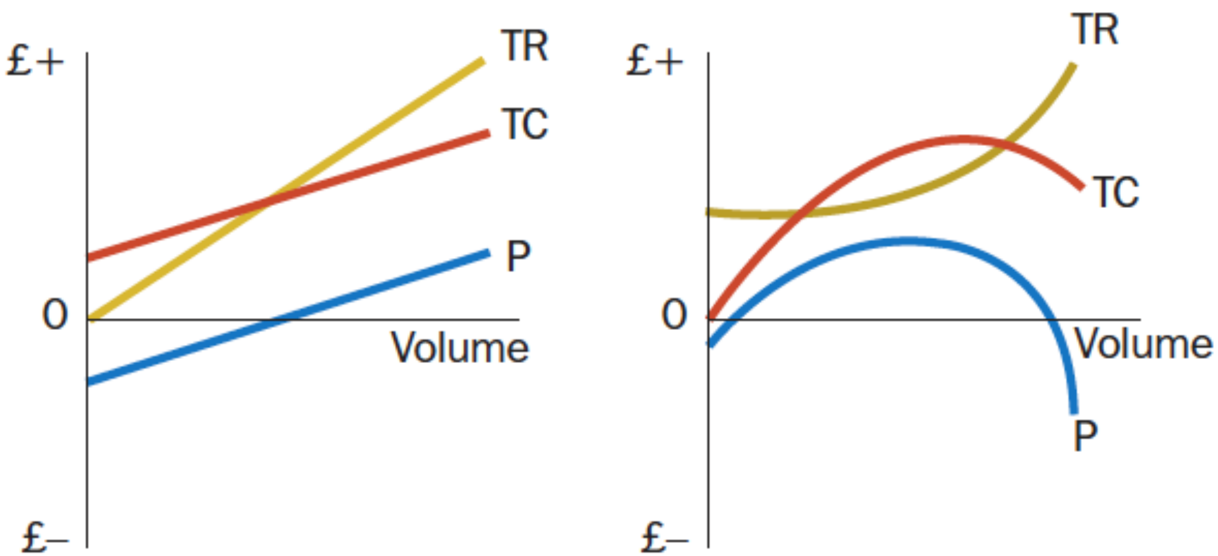
COMPARE

The graphs shown below show cost–volume– profit relationships as they are typically represented in

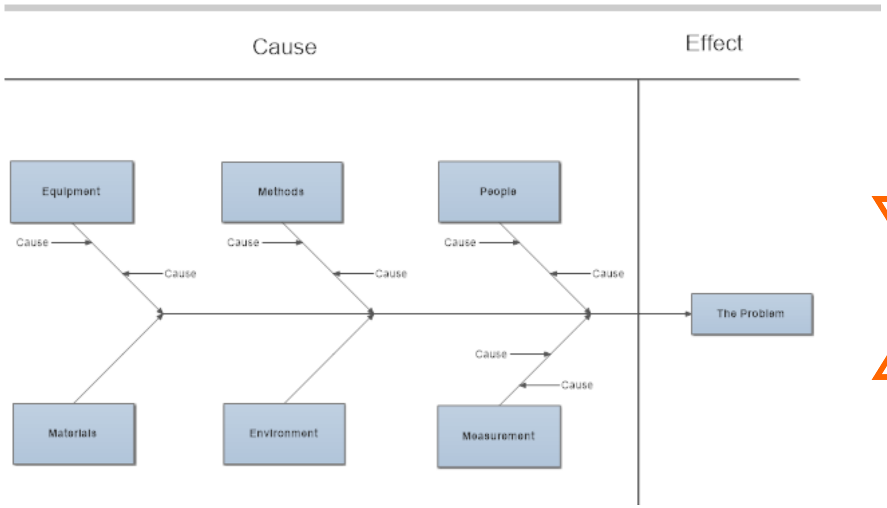
1. management accounting and
2. economic theory.

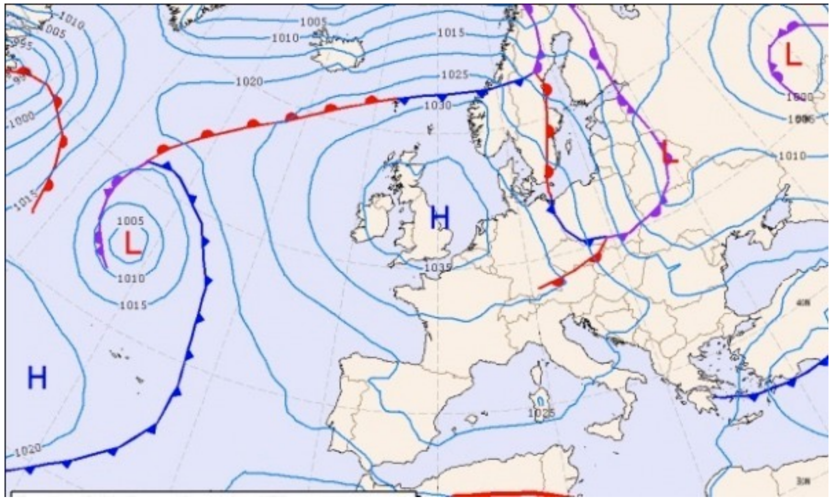
In each graph T = total revenue, TC = total cost, and P = profit.

You are required to compare these different representations of cost–volume–profit relationships, identifying, explaining and commenting on points of similarity and also differences.



A FORECAST BASED ON A CAUSE-AND-EFFECT MODEL

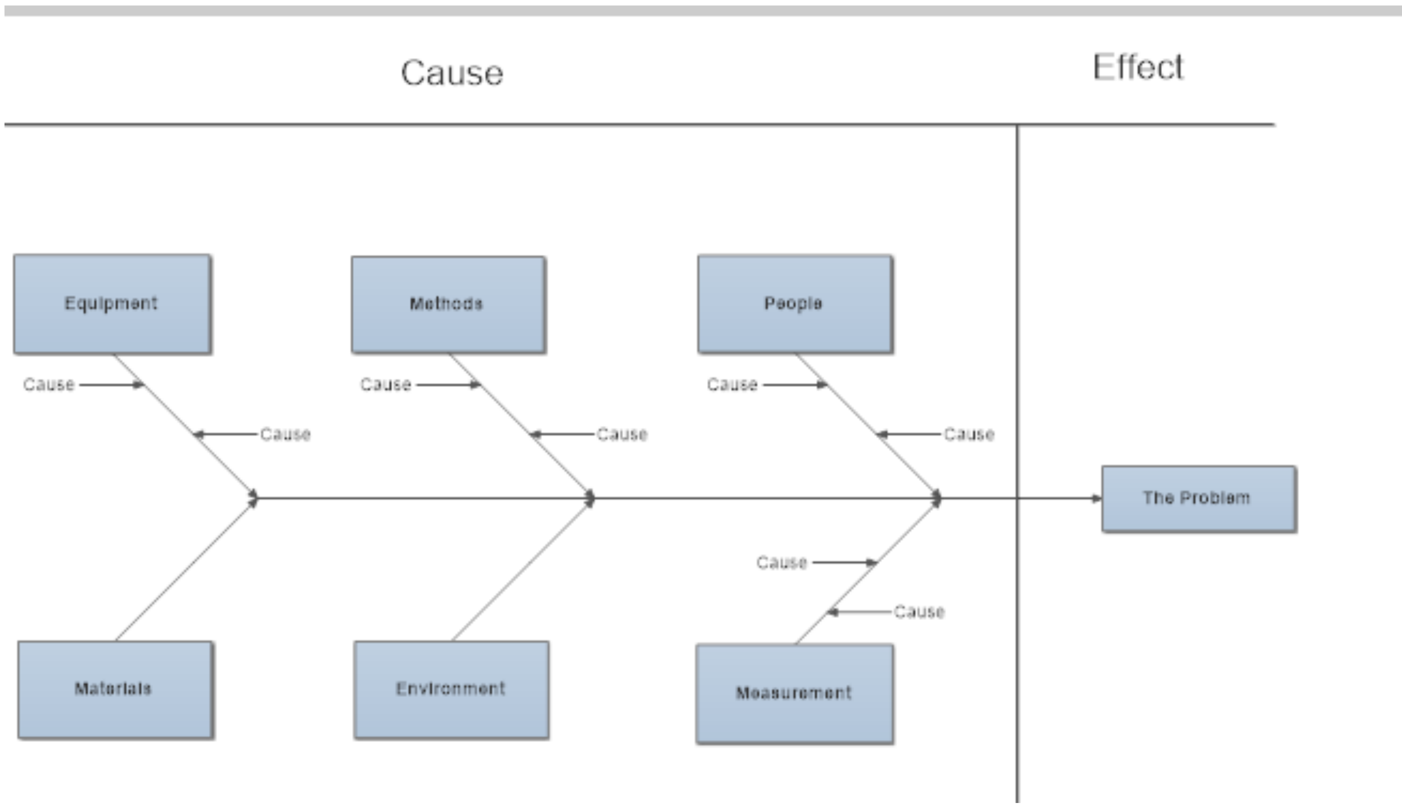




Causality
deals with **capturing and understanding quantitative cause and effect relationships.**

Analogy
could be defined as **the use of causal insights, to infer past or future causes or effects.**

CAUSES AND EFFECTS RELATIONSHIPS



If one really wants to manage a business, one must know the various cause-effect relationships that link inputs and outputs. One must make the black box transparent by reconstructing (on the basis of the measurement of analytical reasoning) which are the main relationships on which attention must be focused if the desired effects are to be produced. Managing requires a focus on causes so that effects can be produced.

CASUALITY AS THE GUIDING PRINCIPLE IN COST MODELING

Cost modeling provides a monetary representation of the organization's resources, processes, and products and services. […].

The guiding principle for operations modeling (and, hence, cost modeling) is **causality,** the ability to reflect **cause-and-effect relationships**.

A useful cost model must efficiently guide a manager

(1) from a monetary effect to the operational cause and

(2) to clear and direct insight into the probable monetary effect of a particular operational action (or cause) being considered

Causality: The relation between a managerial objective's quantitative output and the input quantities consumed if the output is to be achieved

By applying the principle of causality and its associated concepts, **we can create a model that represents an organization's operations and explains the resulting financial results.** This establishes the baseline from which managers will seek to achieve strategy in an optimal manner.

Source: IMA (Institute of Management Accountants), "The Conceptual Framework for Managerial Costing," Statement on Management Accounting

AN INPUT-PROCESS-OUTPUT MODEL OF THE FIRM

RESOURCES

- People,
- Buildings,
- Machines,
- Forklifts,
- Trucks,
- Patents,
- Brands

ACTIVITIES

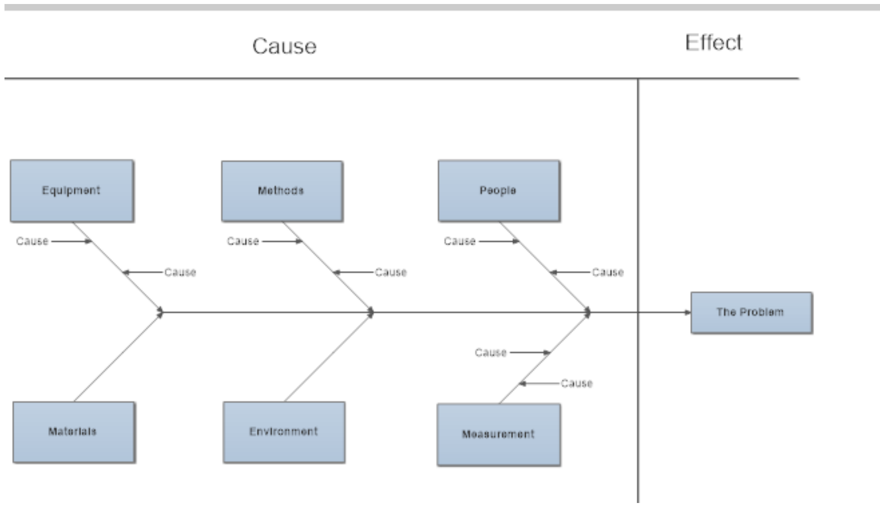
- Developing new products,
- Drilling holes,
- Moving parts,
- Expediting orders,
- Delivering products
- Sending invoices
- Recording transactions

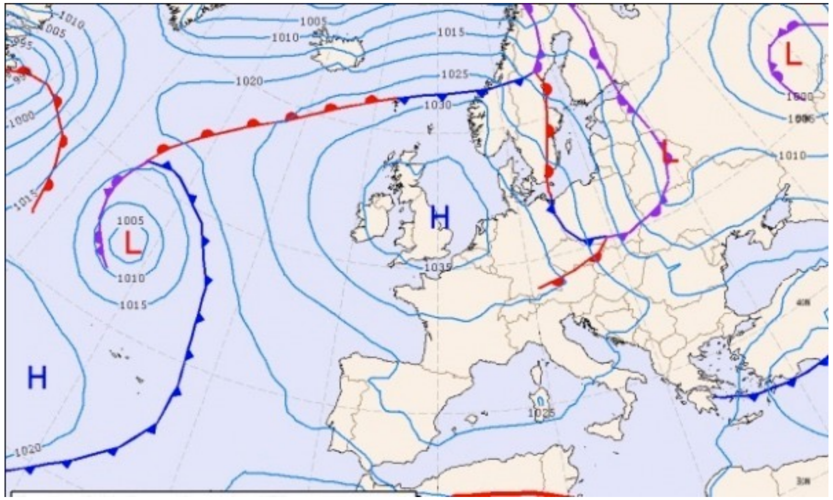
OUTPUTS

- Different product lines
- Shipments
- Warranties on products sold
- Product awareness
- Consulting services
- Financial Statements

A well-designed cost model highlights the relationships that exist between the different **resources that are used**, the specific **activities that are carried out** as a result of the use of the different resources available, and the multiple **outputs (tangible or intangible) that are obtained** as a result of carrying out the activities that constitute the business process

ANALOGY AS THE GUIDING PRINCIPLE FOR DECISION MAKING

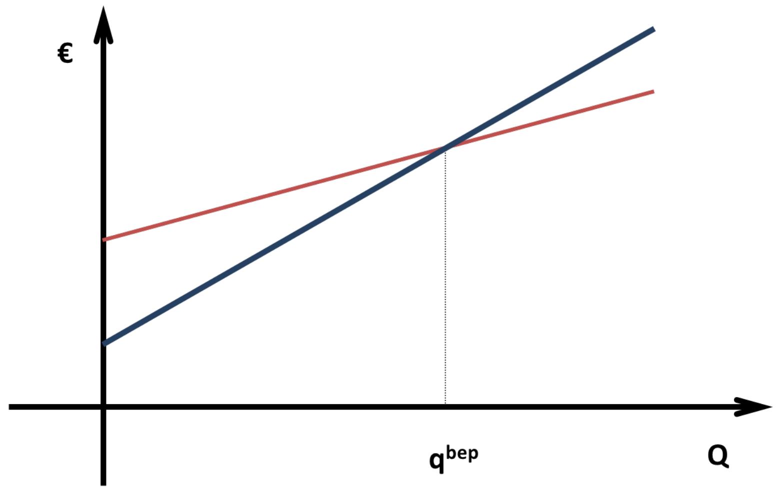




The guiding principle for decision making is **analogy**—the **use of causal insights to infer past or future causes or effects.** Managers use cost information by applying the principle of analogy to infer past or future causes or effects. This results in learning from the past, making plans for the future, and supporting resource application decisions to achieve strategic objectives.

Source: IMA (Institute of Management Accountants), "The Conceptual Framework for Managerial Costing," Statement on Management Accounting

INFERRING THE FUTURE USING THE CURRENT INFORMATION



Contribution Margin per unit:	$ 375.00
Total Fixed Costs:	$ 2,625,000
Actual level of Sales:	11,250 units

if the quantity sold were to increase by 20% and fixed costs were to rise by 10%, then the new break-even point would be 7,700 units and EBIT would rise by 36.47%.

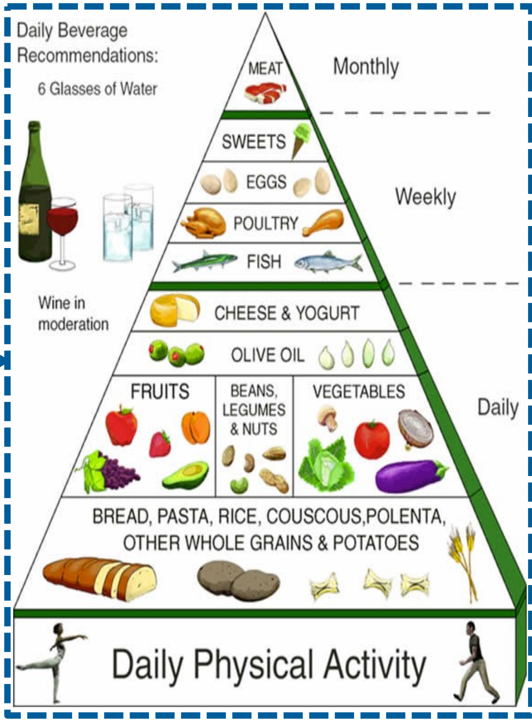
PURPOSES OF MEASUREMENT

- To understand the **real causes** of the value creation process.

Causality
deals with capturing and understanding quantitative cause and effect relationships.

Analogy
could be defined as the use of causal insights, to infer past or future causes or effects.

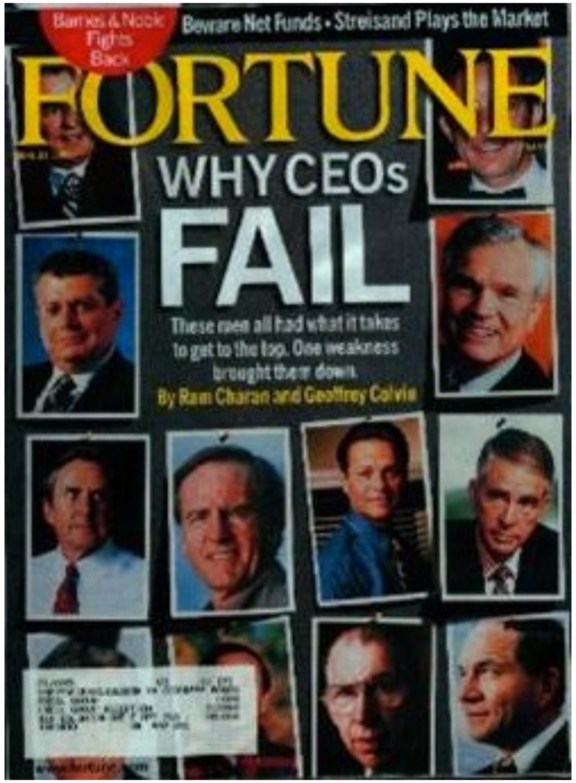
ABILITY TO INDUCE ORGANIZATIONAL BEHAVIOR



DECISION MODELS

?

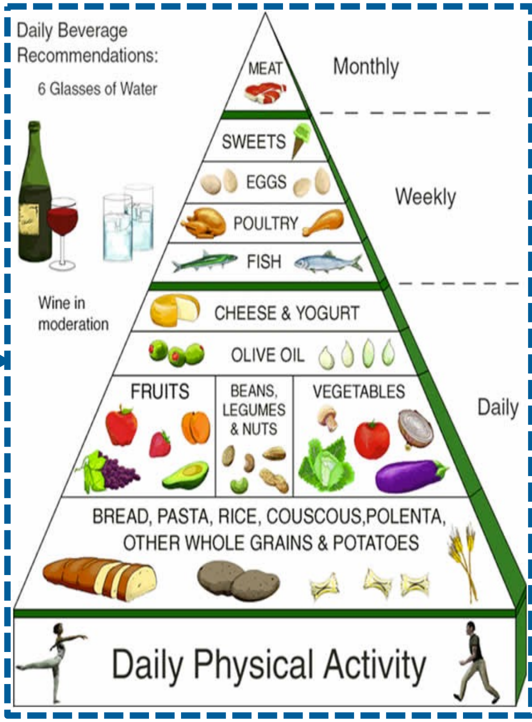
"WHY CEOs FAIL"



"It's bad execution. As simple as that: not getting things done, being indecisive, not delivering on commitments.

We base our conclusions on careful study of several dozen CEO failures we've observed over the decades--through our respective work as a consultant to major corporations and a journalist covering them. The results are beyond doubt".

ABILITY TO INDUCE ORGANIZATIONAL BEHAVIOR



MANAGEMENT CONTROL

After strategies are set and plans are made, management's primary task is to take steps to ensure that these plans are carried out, or, if conditions warrant, that the plans are modified.
This is the critical control function of management. And since management involves directing the activities of others, a major part of the control function is making sure other people do what should be done.

SOURCE: Kenneth A. Marchant, The control Function of Management, Sloan Management Review, Summer 82, pgg. 43-55

PURPOSES OF MEASUREMENT

What are the purposes of measurement applied to management?

- To understand the **real causes** of the value creation process.

Causality
deals with capturing and understanding quantitative cause and effect relationships.

Analogy
could be defined as the use of causal insights, to infer past or future causes or effects.

- To influence **behavior.**

> Human beings adjust behavior based on the metrics they're held against. Anything you measure will impel a person to optimize his score on that metric. What you measure is what you'll get. Period.
>
> Dan Ariel

TOO MANY PURPOSES FOR JUST ONE TOOL?

Source: Bjarte Bogsnes, Implementing Beyond Budgeting Unlocking the Performance Potential, Wiley, 2016.

WHAT IS A MEASURE?

WHAT IS A MEASURE?

Important advice:

In order to be able to save your life you must move yourself exactly **35,5 gnugni** northwards.

CHARACTERISTIC OF DIAGNOSTIC MEASURES

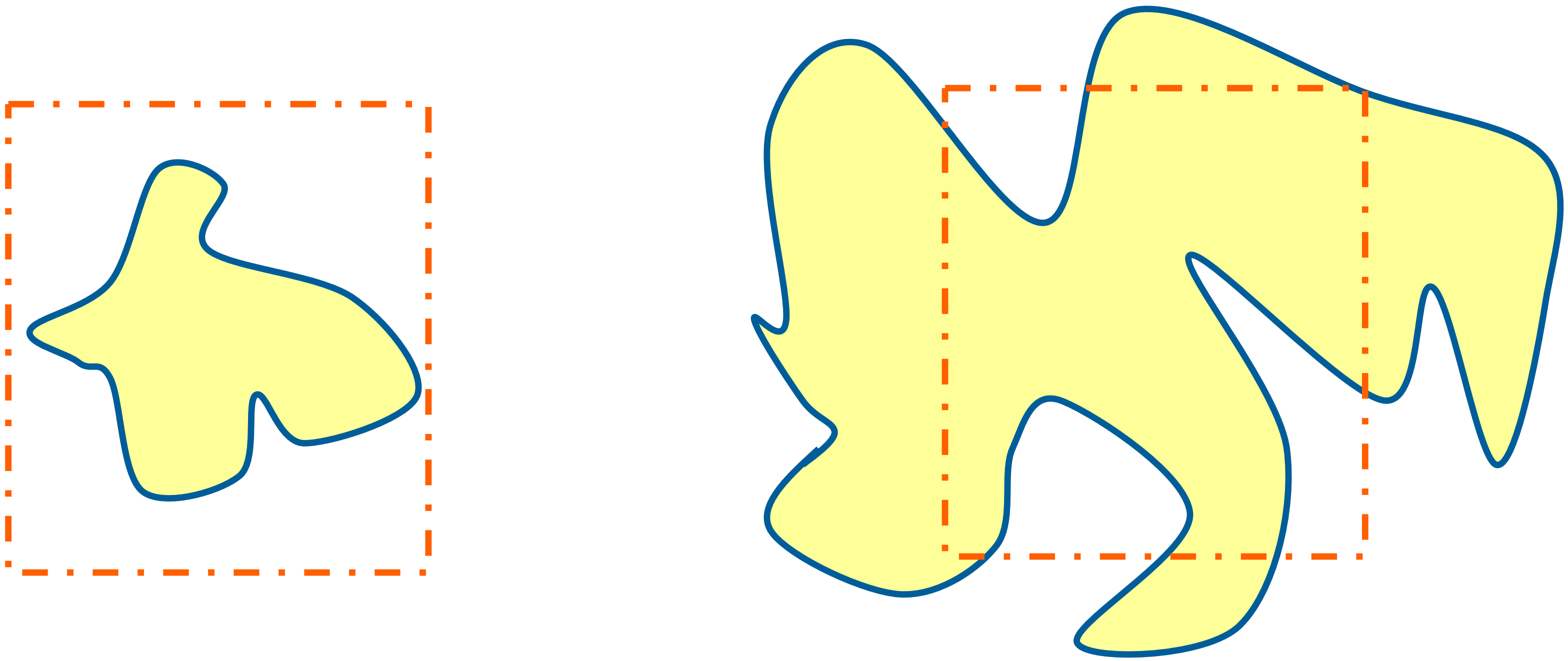
«Ideally, diagnostic control measures should be objective, complete, and responsive.

A measure is:

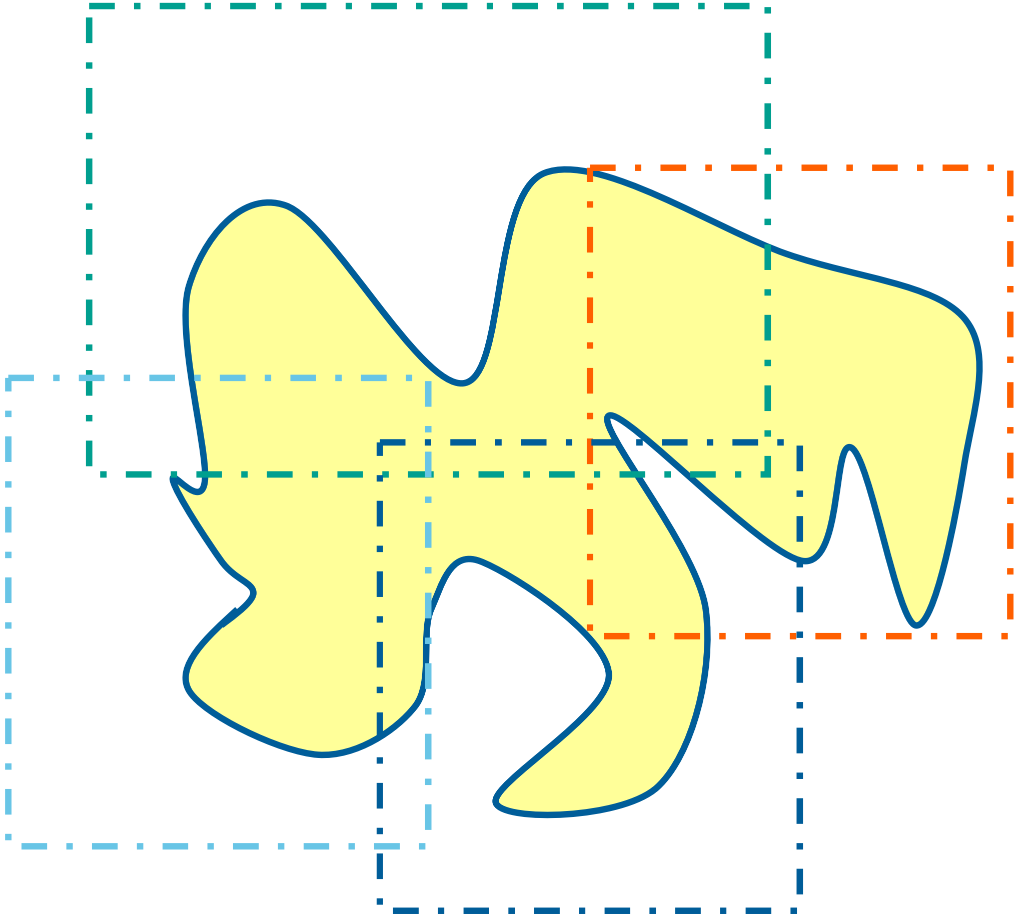
1. objective when it is independently verifiable;
2. complete when it captures all relevant actions or behaviors; and
3. responsive when it reflects the efforts or actions of the individual being measured.

These ideal attributes are seldom achieved.»

COMPLETE AND INCOMPLETE MEASURES

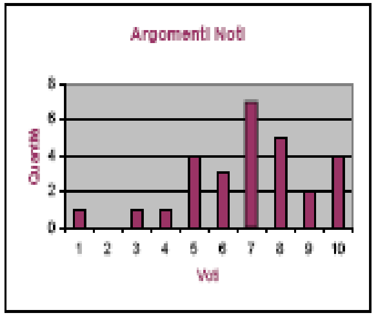


SYSTEMS OF MEASURES



SYSTEMS OF MEASURES

"Analisi di Bilancio. Metodologie, procedure e casi pratici"



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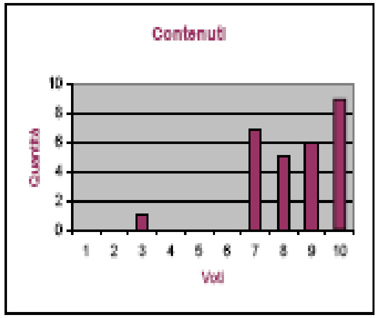

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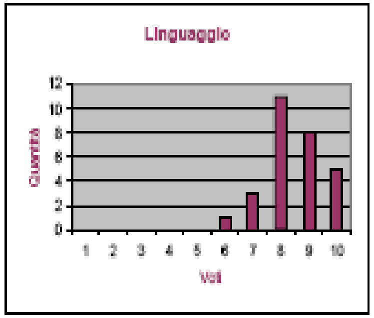

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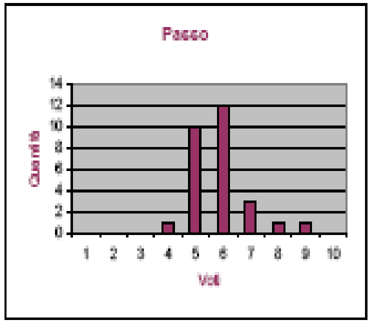

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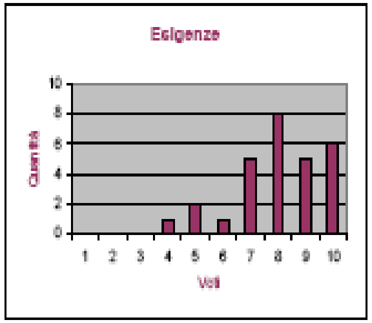

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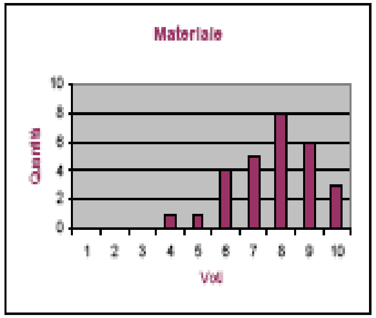

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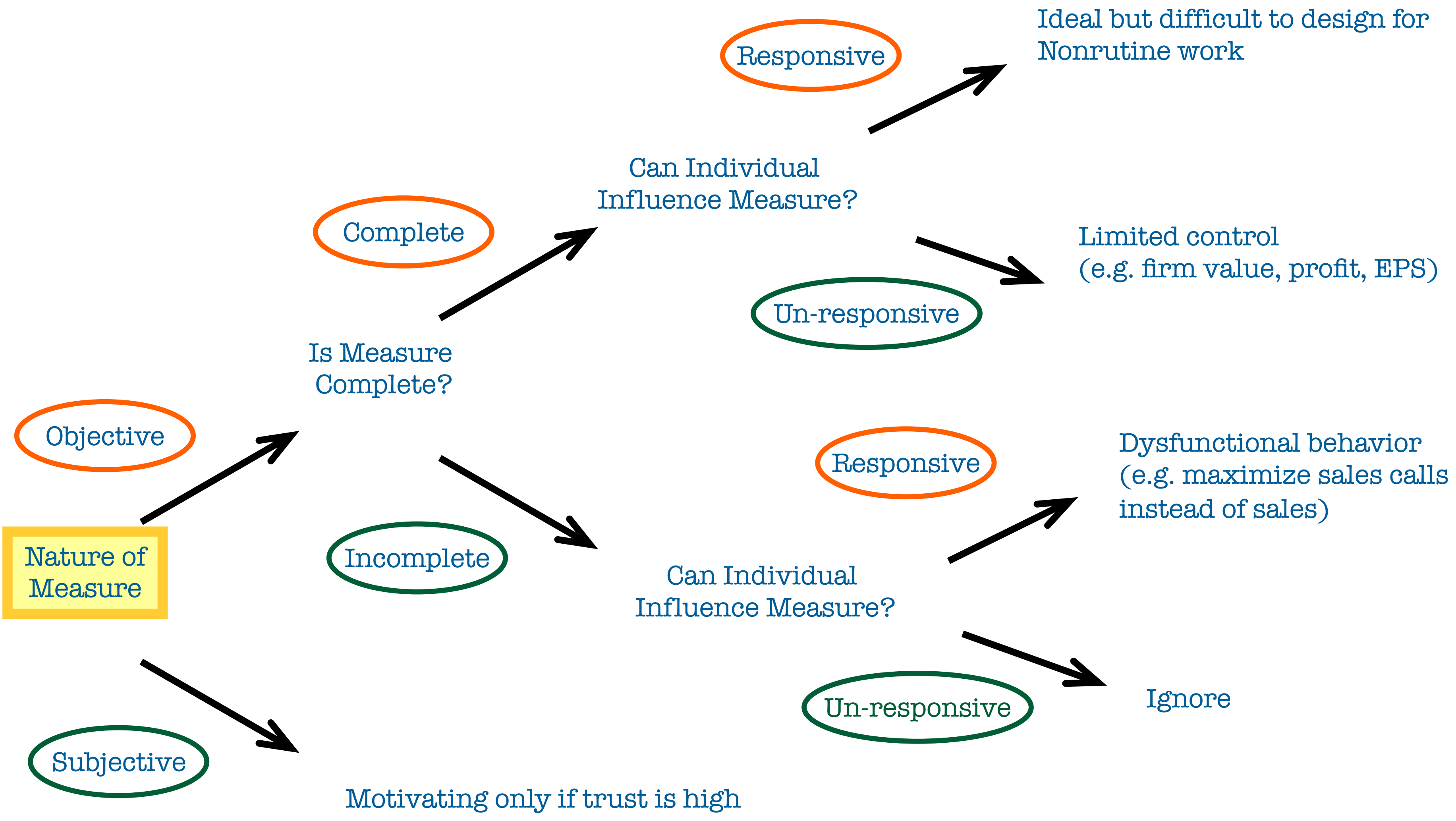
CHARACTERISTIC OF MEASURES



INDICATORS TEND TO DIRECT YOUR ATTENTION

«As manager of the factory, you have a substantial staff and a lot of automated equipment. But to run your operation well, you will need a set of good indicators, or measurements. […] Just to get a fix on your output, you need a number of indicators; to get efficiency and high output, you need even more of them. The number of possible indicators you can choose is virtually limitless, but for any set of them to be useful, you have to focus each indicator on a specific operational goal. […]

Indicators measure factors essential to running your factory. If you look at them early every day, you will often be able to do something to correct a potential problem before it becomes a real one during the course of the day.

Indicators tend to direct your attention toward what they are monitoring. It is like riding a bicycle: you will probably steer it where you are looking».

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

… THEREFORE, YOU SHOULD GUARD AGAINST OVERREACTING

«So, because indicators direct one's activities, you should guard against overreacting. This you can do by **pairing indicators**, so that together both **effect** and **counter-effect** are measured.

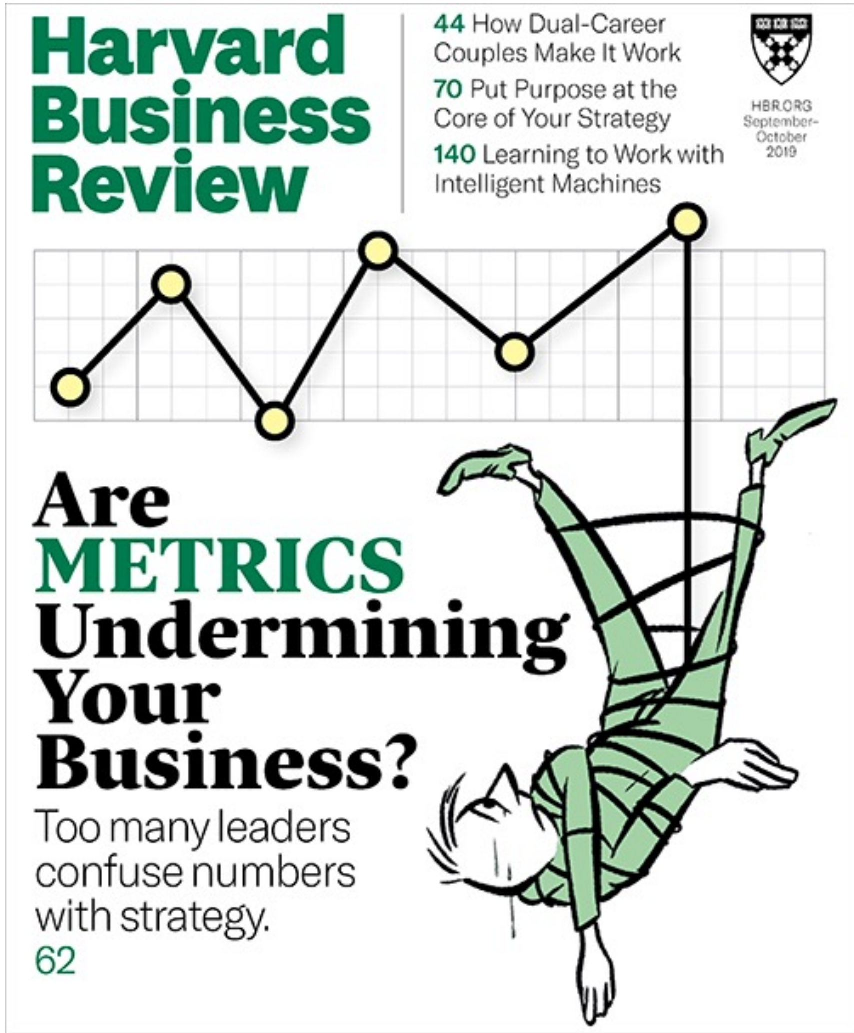
Examples of effective measures of administrative output are:

ADMINISTRATIVE FUNCTION	**WORK OUTPUT INDICATOR**
Accounts payable	# Vouchers processed
Custodial	# Square feet cleaned
Customer service	# Sales orders entered
Data entry	# Transactions processed
Employment	# People hired (by type of hire)
Inventory control	# Items managed in inventory"

Because those listed here are all quantity or output indicators, their paired counterparts should stress the quality of work. Thus, in accounts payable, the number of vouchers processed should be paired with the number of errors found either by auditing or by our suppliers. For another example, the number of square feet cleaned by a custodial group should be paired with a partially objective/partially subjective rating of the quality of work as assessed by a senior manager with an office in that building».

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

A POSSIBLE PROBLEM



THE RELATION BETWEEN STRATEGY AND METRICS

«Tying performance metrics to strategy has become an accepted best practice over the past few decades. Strategy is abstract by definition, but metrics give strategy form, allowing our minds to grasp it more readily.

If strategy is the blueprint for building an organization, metrics are the concrete, wood, drywall, and bricks.

But there's a hidden trap in this organizational architecture: A company can easily lose sight of its strategy and instead focus strictly on the metrics that are meant to represent it.

For an extreme example of this problem, look to Wells Fargo, where employees opened 3.5 million deposit and credit card accounts without customers' consent in an effort to implement its now-infamous "cross-selling" strategy.».

THE SURROGATION SNARE

«Every day, across almost every organization, strategy is being hijacked by numbers. It turns out that the tendency to mentally replace strategy with metrics —called surrogation— is quite pervasive. And it can destroy company value.

Of course, we all know that metrics are inherently imperfect at some level. In business the intent behind metrics is usually to capture some underlying intangible goal—and they almost always fail to do this as well as we would like. Your performance management system is full of metrics that are flawed proxies for what you care about.

Surrogation is especially harmful when the metric and the strategy are poorly aligned. The greater the mismatch, the larger the potential damage».

SOURCE:, Michael Harris and Bill Tayler, "Don't Let Metrics Undermine Your Business", HBR, S September–October 2019

GUARDING AGAINST SURROGATION

«To prevent surrogation, we must first understand how it happens.

Two recent studies on surrogation suggest that surrogation is a common subconscious bias: Whenever metrics are present, people tend to surrogate.

Nobel prize winner Daniel Kahneman and Yale professor Shane Frederick postulate that three conditions are necessary to produce the type of substitution we see with surrogation:

- The objective or strategy is fairly abstract.
- The metric of the strategy is concrete and conspicuous.
- The employee accepts, at least subconsciously, the substitution of the metric for the strategy».

Multiple research studies have helped demonstrate how these conditions combine to produce surrogation. Knowledge of them supplies us with the means to combat the problem ».

SOURCE:, Michael Harris and Bill Tayler, "Don't Let Metrics Undermine Your Business", HBR, S September–October 2019

HOW TO DO THAT

Get the people responsible for implementing strategy to help formulate it.

This helps reduce surrogation because those involved in executing the strategy will then be better able to grasp it, despite its abstract nature —and to avoid replacing it with metrics. It's particularly crucial to bring the executives and senior managers who are charged with communicating strategy into this process.

Loosen the link between metrics and incentives.

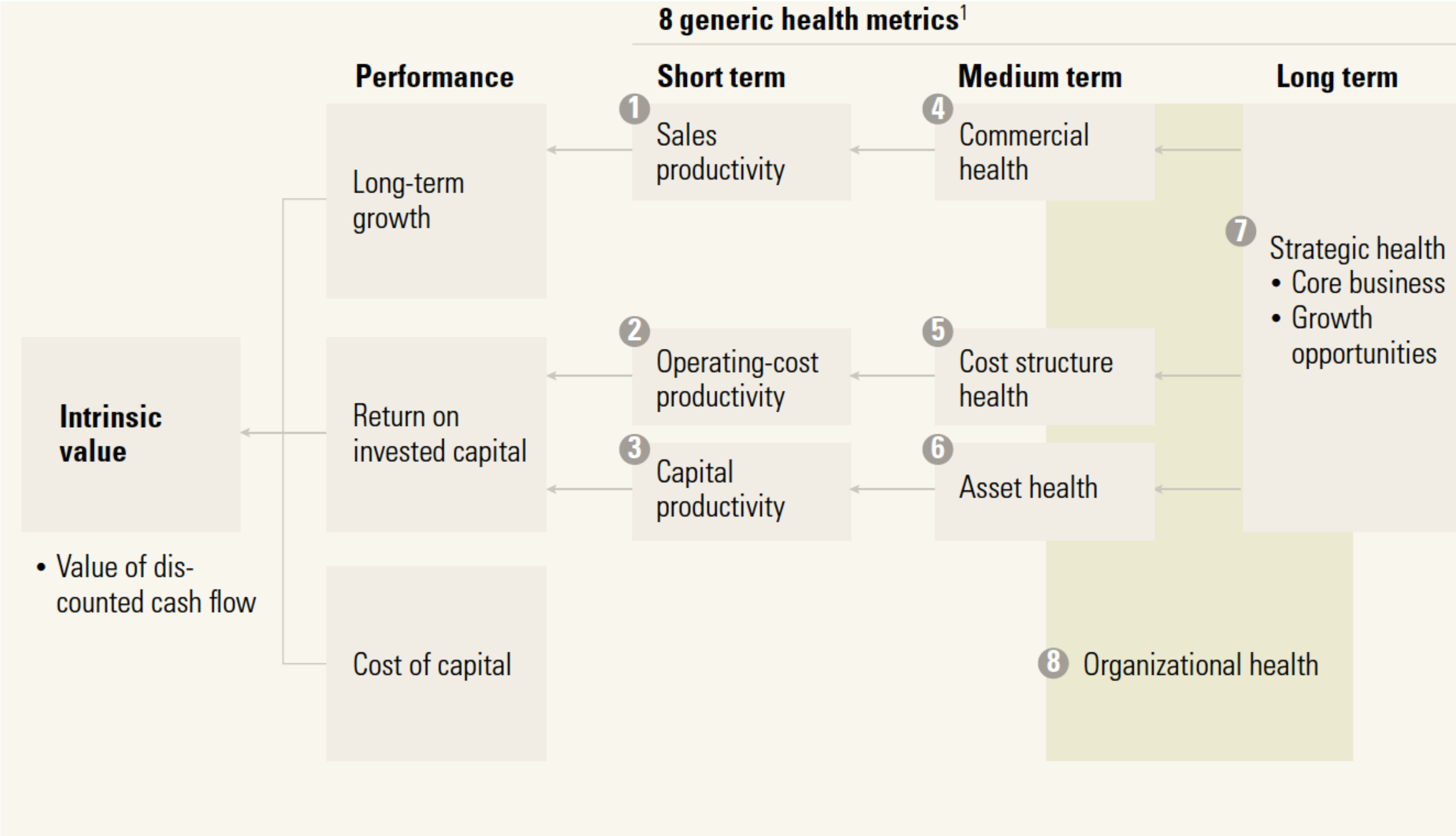
Tying compensation to a metric-based target tends to increase surrogation—an unfortunate side effect of pay for performance. Besides tapping into any monetary motivations people might have, this approach makes the metric much more visible, which means employees are more likely to focus on it at the expense of the strategy.

Use multiple metrics.

Another study shows that people surrogate less when they're compensated for meeting targets on multiple metrics of a strategy rather than just one. This approach highlights the fact that no single metric completely captures the strategy, which makes people more likely to consciously reject substituting it for the strategy.

SOURCE:, Michael Harris and Bill Tayler, "Don't Let Metrics Undermine Your Business", HBR, S September–October 2019

"PERFORMACE 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

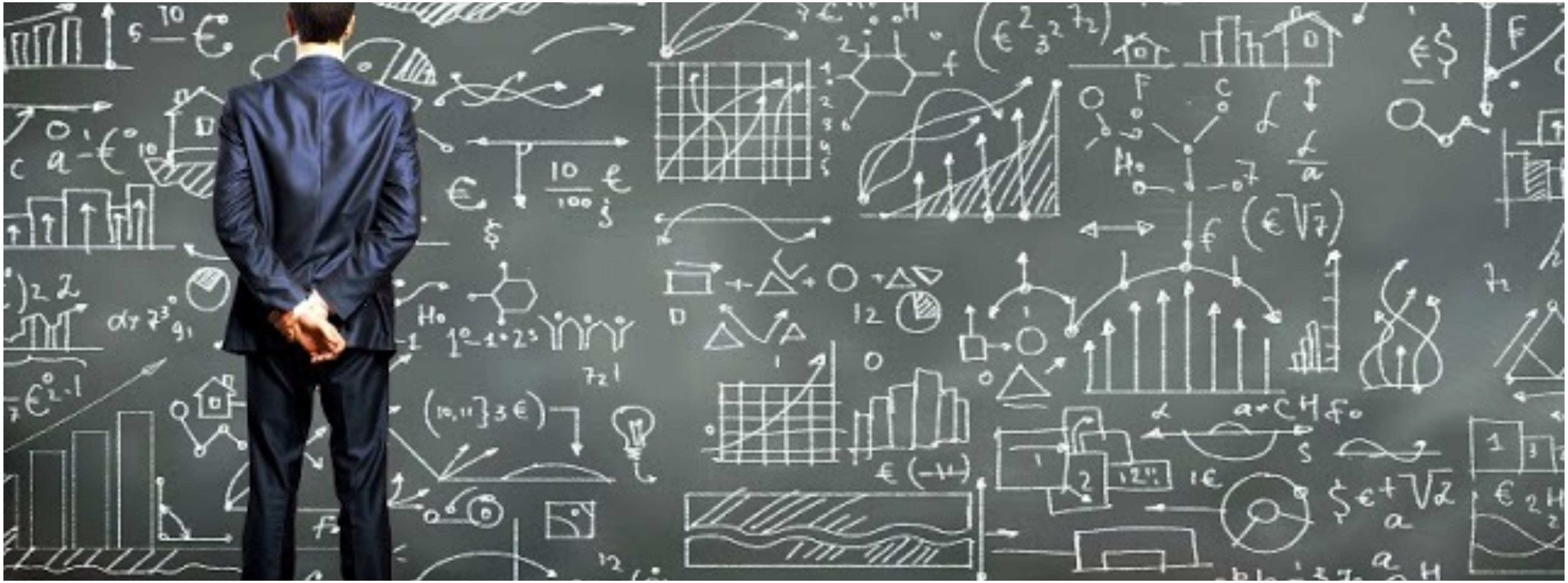
- Metrics of long-term strategic health show the ability of an enterprise to sustain its current operating activities and to identify and exploit new areas of growth. A company must periodically assess and measure the threats—including new technologies, changes in public opinion and in the preferences 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.

EFFICIENCY AND EFFECTIVENESS

Measuring process performance



WHAT TO MEASURE? BACK TO THE ROOTS

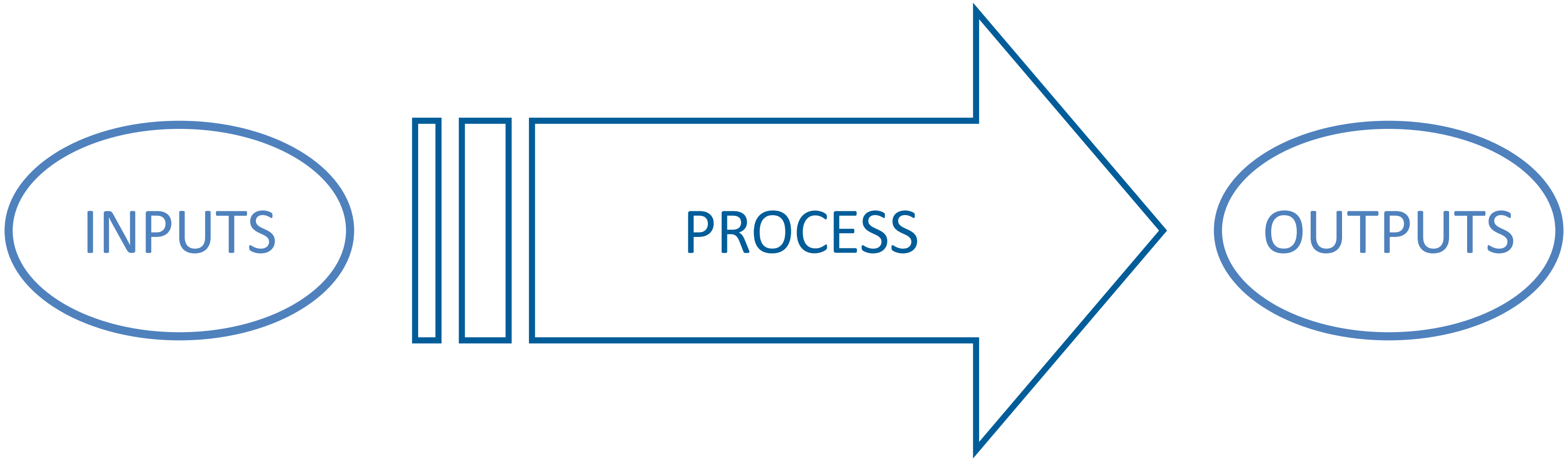
Robert Anthony initially (in 1965) defined Management Control as:

«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».

ORGANIZATIONAL PROCESS MODEL

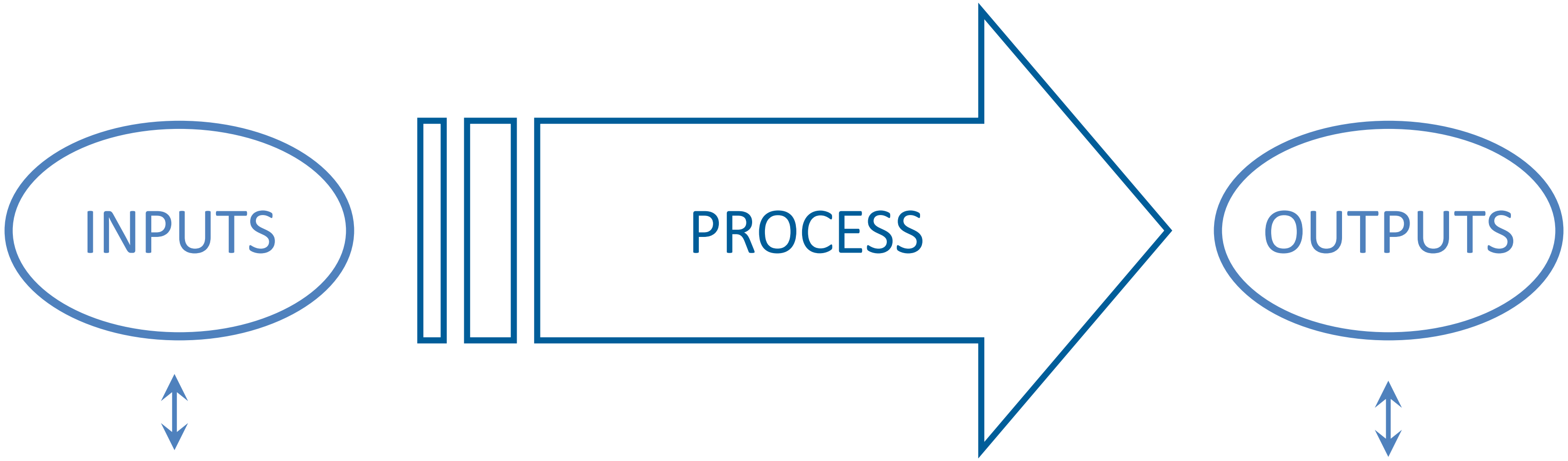


The input-process-output model is generic, so we can easily refer it to different entities: a machine, a factory, an individual worker, a team or the entire business. The principles are the same: <u>absorb inputs, transform them through productive processes, and create outputs of value</u>.

Managers are responsible for ensuring that:

- Inputs are appropriate to the task at hand and are adequate in quality and quantity,
- The transformation process is efficient, and
- The outputs meet specification.

THE LINK WITH THE OBJECTIVE OF CREATING VALUE



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

EXPENSES are incurred

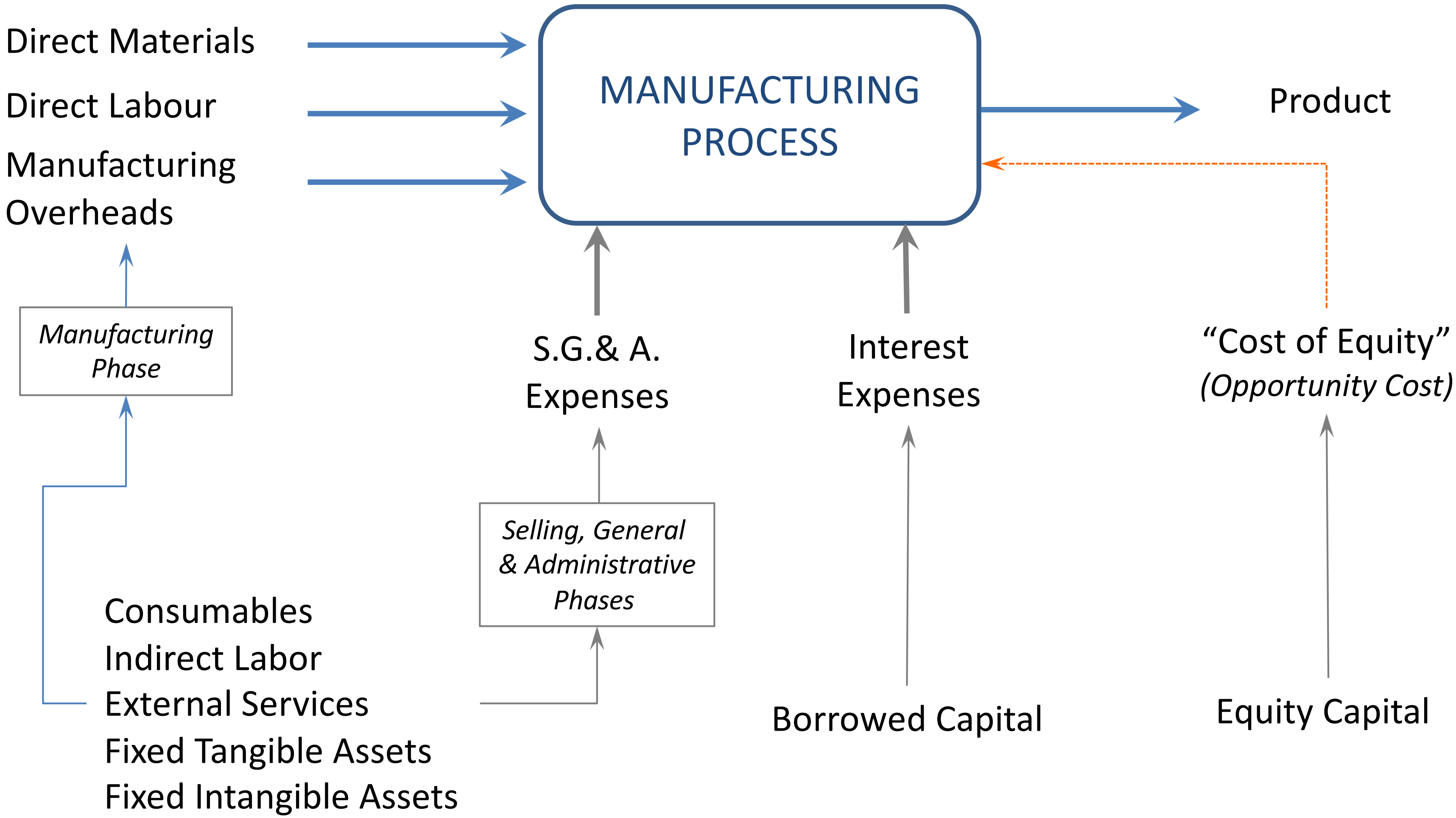
DESTRUCTION OF "VALUE"

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

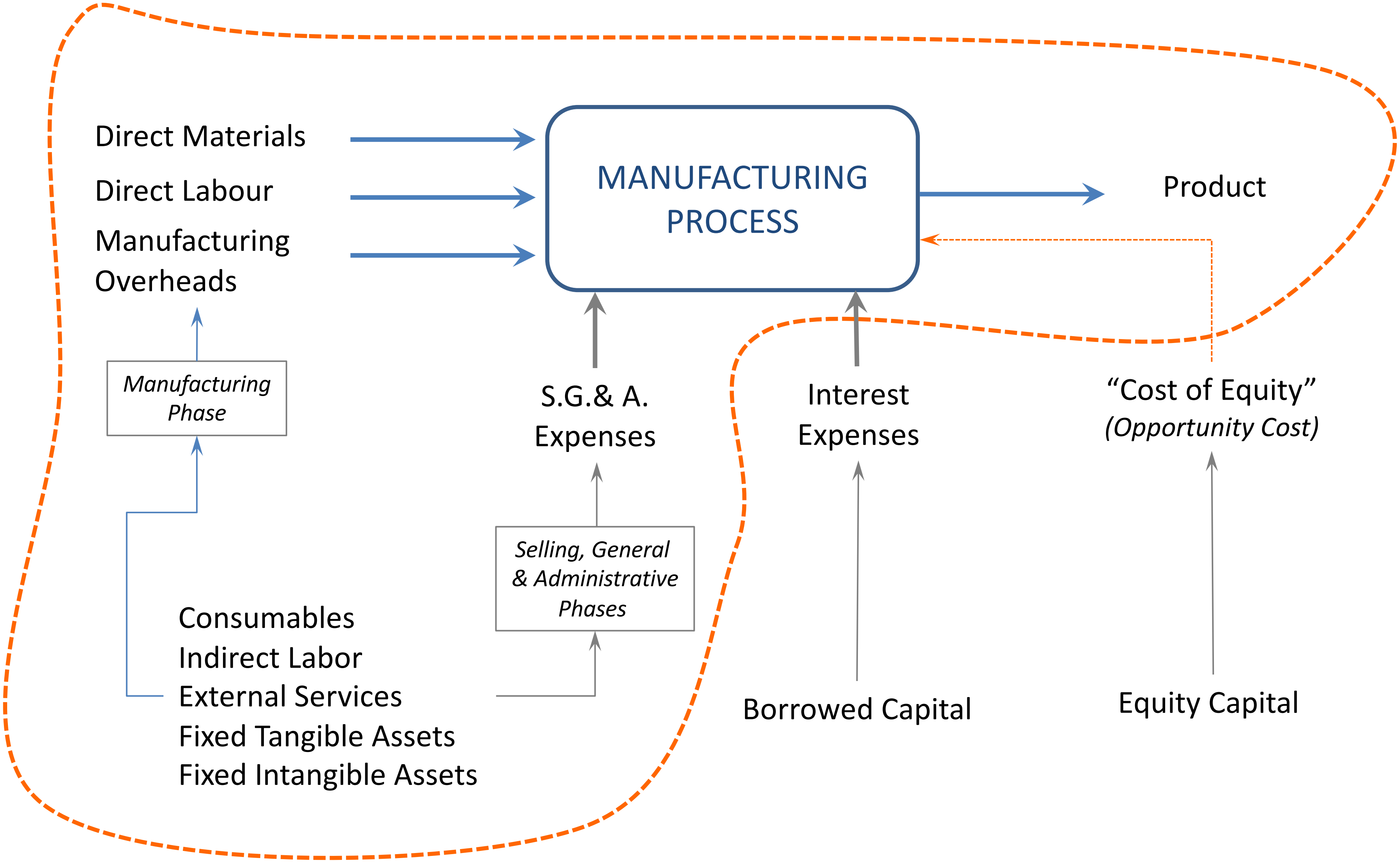
REVENUES are earned

CREATION OF "VALUE"

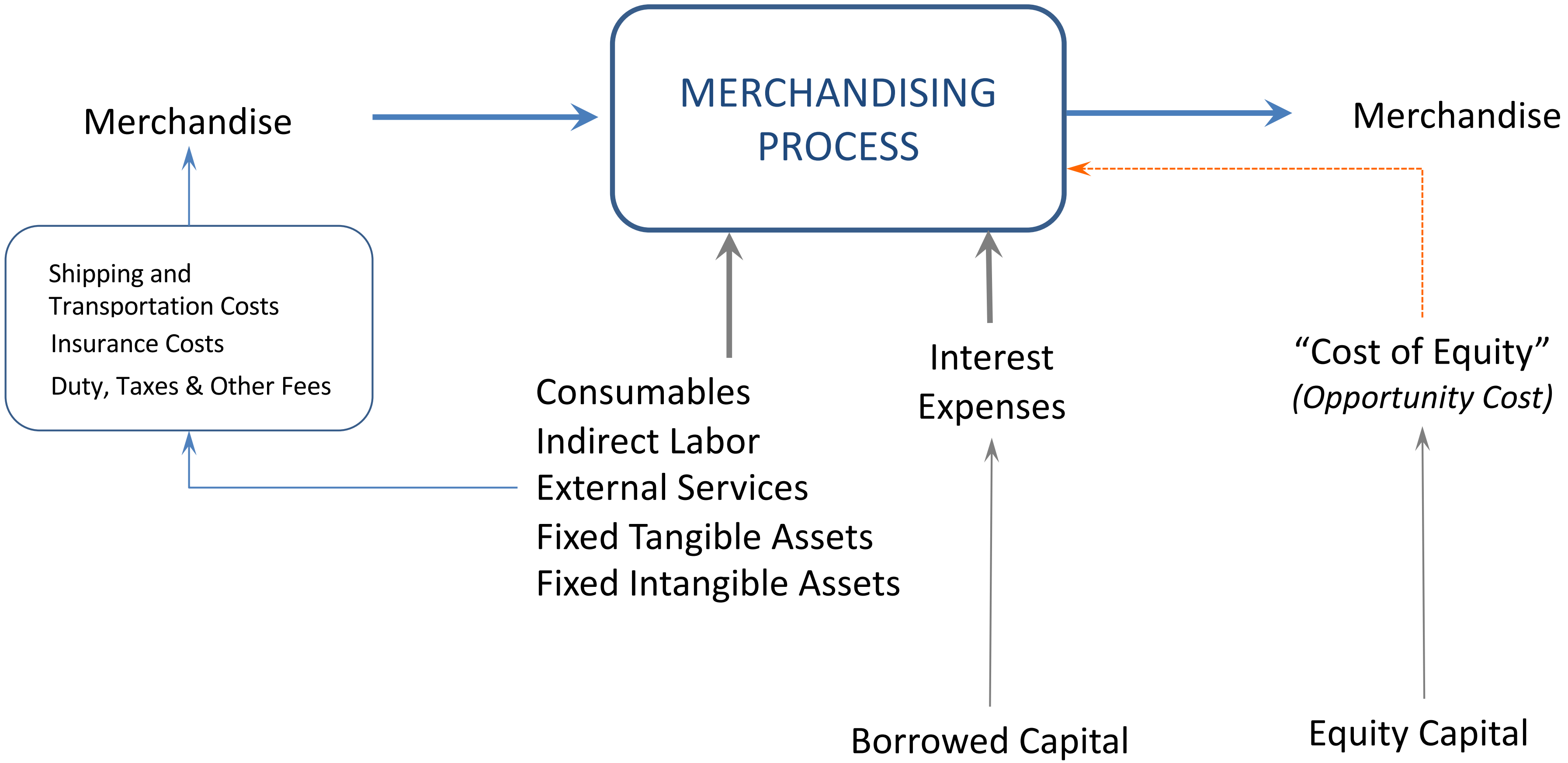
MANUFACTURING COMPANIES



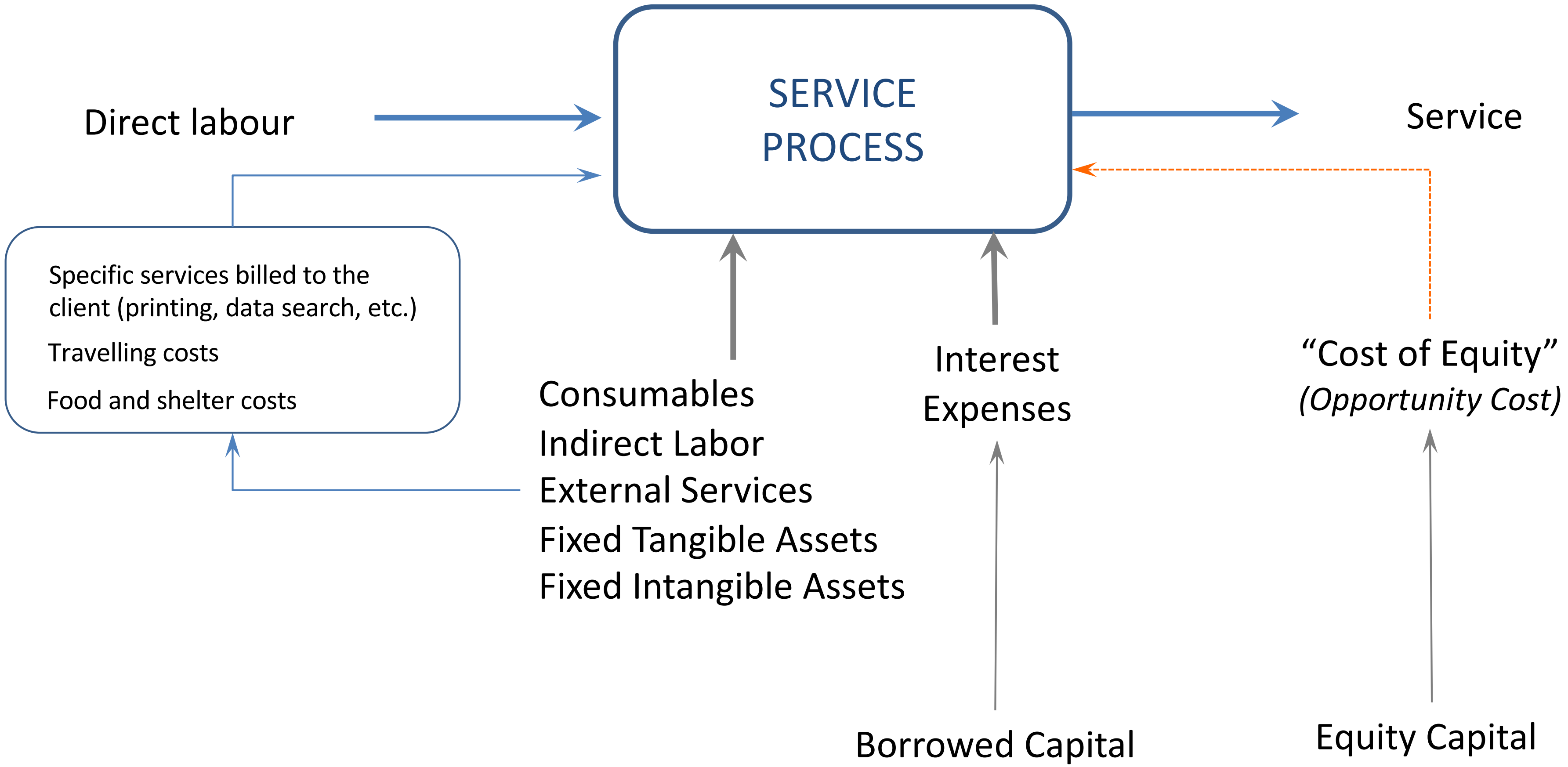
OPERATING ACTIVITIES



RETAIL & WHOLESALE ORGANIZATIONS



SERVICE ORGANIZATIONS



A SIMPLE REFLECTION

Which of the two runners will make the greater effort?

Which of the two will win the race?

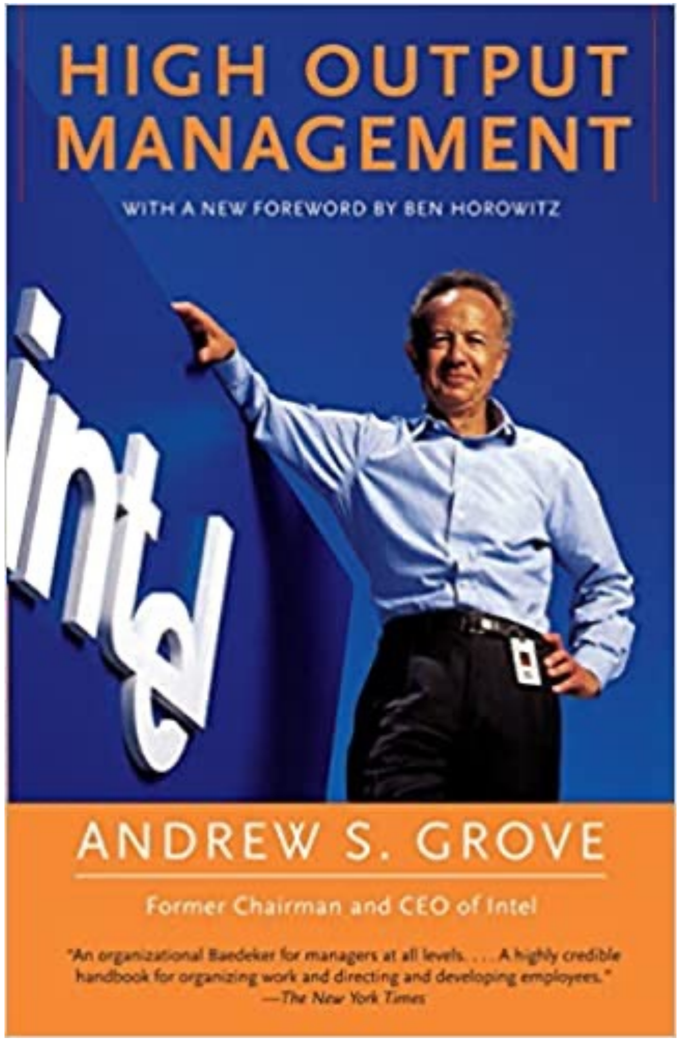
REAL LIFE EXAMPLE

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: <u>with the same result, the greater the effort produced, the worse the performance!</u>

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"

INDICATORS TEND TO DIRECT YOUR ATTENTION

«As manager of the factory, you have a substantial staff and a lot of automated equipment. But to run your operation well, you will need a set of good indicators, or measurements. […] Just to get a fix on your output, you need a number of indicators; to get efficiency and high output, you need even more of them. The number of possible indicators you can choose is virtually limitless, but for any set of them to be useful, you have to focus each indicator on a specific operational goal. […]

Indicators measure factors essential to running your factory. If you look at them early every day, you will often be able to do something to correct a potential problem before it becomes a real one during the course of the day.

Indicators tend to direct your attention toward what they are monitoring. It is like riding a bicycle: you will probably steer it where you are looking».

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

… THEREFORE, YOU SHOULD GUARD AGAINST OVERREACTING

«So, because indicators direct one's activities, you should guard against overreacting. This you can do by **pairing indicators**, so that together both **effect** and **counter-effect** are measured.

Examples of effective measures of administrative output are:

ADMINISTRATIVE FUNCTION	WORK OUTPUT INDICATOR
Accounts payable	# Vouchers processed
Custodial	# Square feet cleaned
Customer service	# Sales orders entered
Data entry	# Transactions processed
Employment	# People hired (by type of hire)
Inventory control	# Items managed in inventory"

Because those listed here are all quantity or output indicators, their paired counterparts should stress the quality of work. Thus, in accounts payable, the number of vouchers processed should be paired with the number of errors found either by auditing or by our suppliers. For another example, the number of square feet cleaned by a custodial group should be paired with a partially objective/partially subjective rating of the quality of work as assessed by a senior manager with an office in that building».

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

	INPUT MEASURES	PROCESS MEASURES	OUTPUT MEASURES
Non-Financial Measures for:			
(a) New Products	# of engineering hours	# of product delivery milestones achieved	# of new products introduced
(b) Order Processing	# of telephone answering staff	Order completion time	# of orders processed
(c) Parts Manufacture	# of components rejected	Set-up time	% of units meeting standard
Financial Measures for:			
(a) New Products	Labor and material $	$ cost of prototyping	% of sales $ from new products
(b) Order processing	Clerical labor $	$ cost of backorder handling	$ cost per order processed
(c) Parts Manufacture	$ cost of defective components	Set-up $ cost, cost of rework	$ cost per unit

DIFFERENT TYPES OF CONTROLS FOR DIFFERENT REASONS

Type of control: **motivating,** pushes to act

Reinforcement tools: **incentives** (monetary and non-monetary) like rewards, promotions to a better job. etc.

LEVEL OF PERFORMANCE

+

Above and beyond the average

Average

Below the level of "duty"

–

Type of control: **blocking,** prevents wrong or dangerous actions from being carried out

Reinforcing tools: **disincentives** (monetary and non-monetary) like sanctions, punishments, warning letters, dismissals, complaints, etc.

MANAGEMENT INVOLVES DIRECTING THE ACTIVITIES OF OTHERS

A dual sets of
control mechanisms
Is needed

LIMITS AGAINST UNDESIRABLE BEHAVIOR

The "Administration" responsibility centre may not, in the coming year, exceed the following values for any single cost item

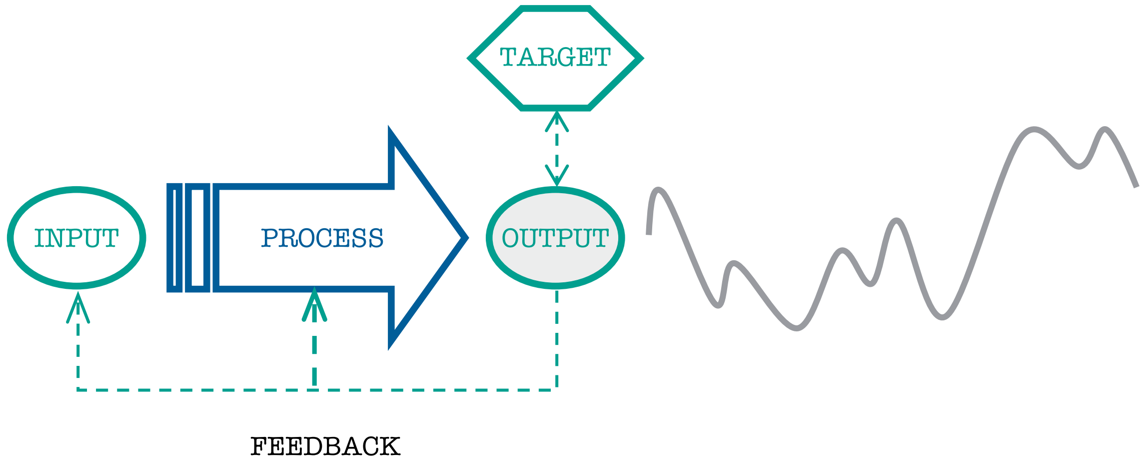
- consultancy costs $250,000
- training expenses $120,000
- travel and transfers $80,000

INCENTIVE TO CARRY OUT DESIRED ACTIONS

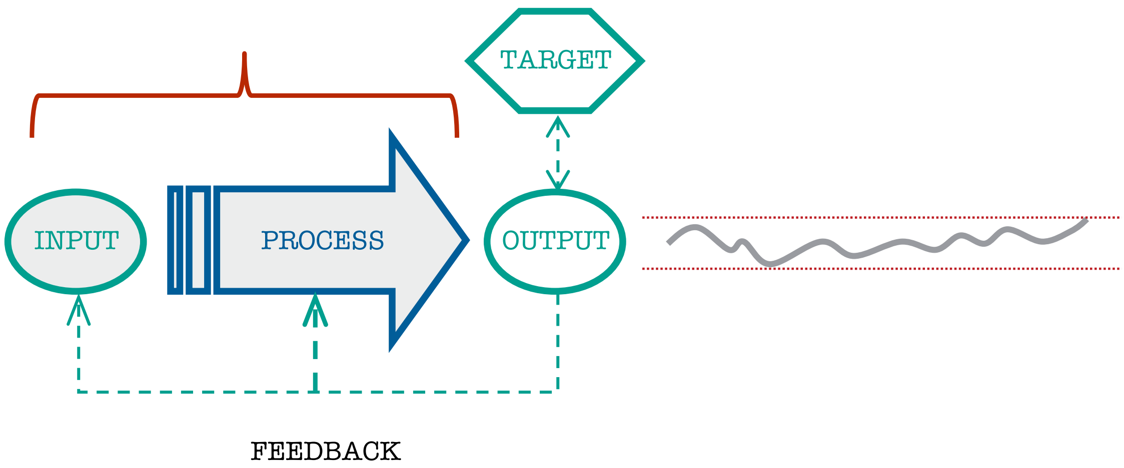
The manager of the "Painting" centre will receive a bonus if the average cost per square centimetre painted is less than $ 2.15

DIFFERENT TYPES OF CONTROLS WITH DIFFERENT EFFECTS

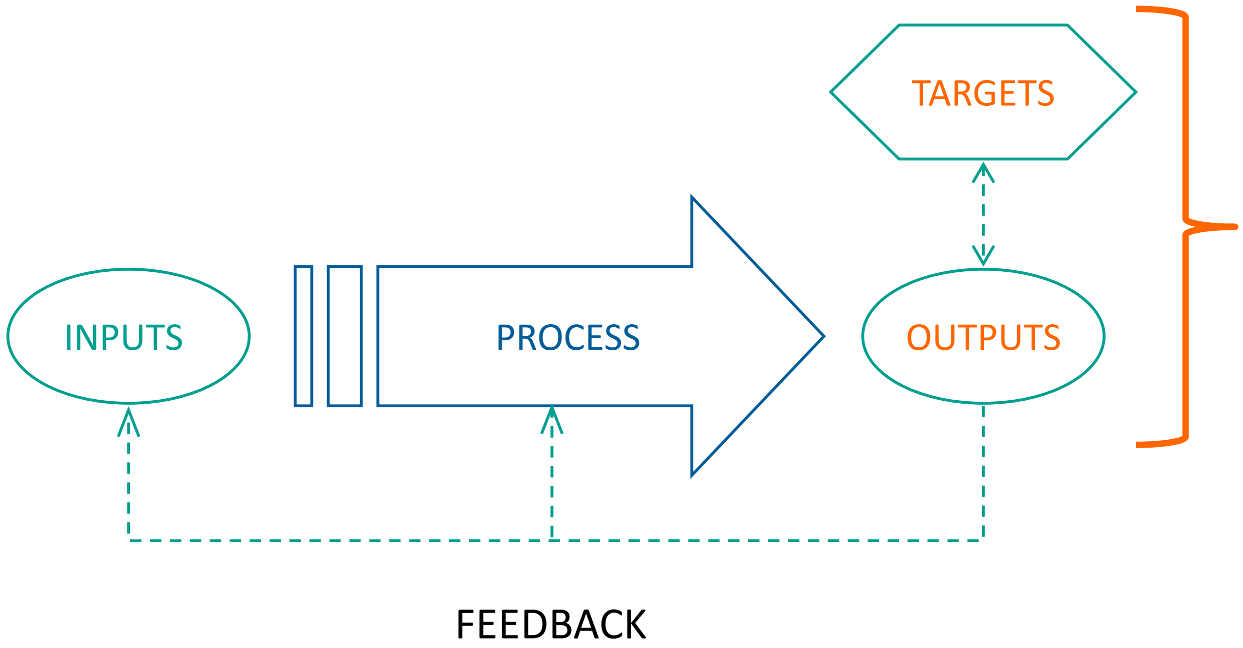
ACCOUNTABILITY



STANDARDIZATION



EFFECTIVENESS



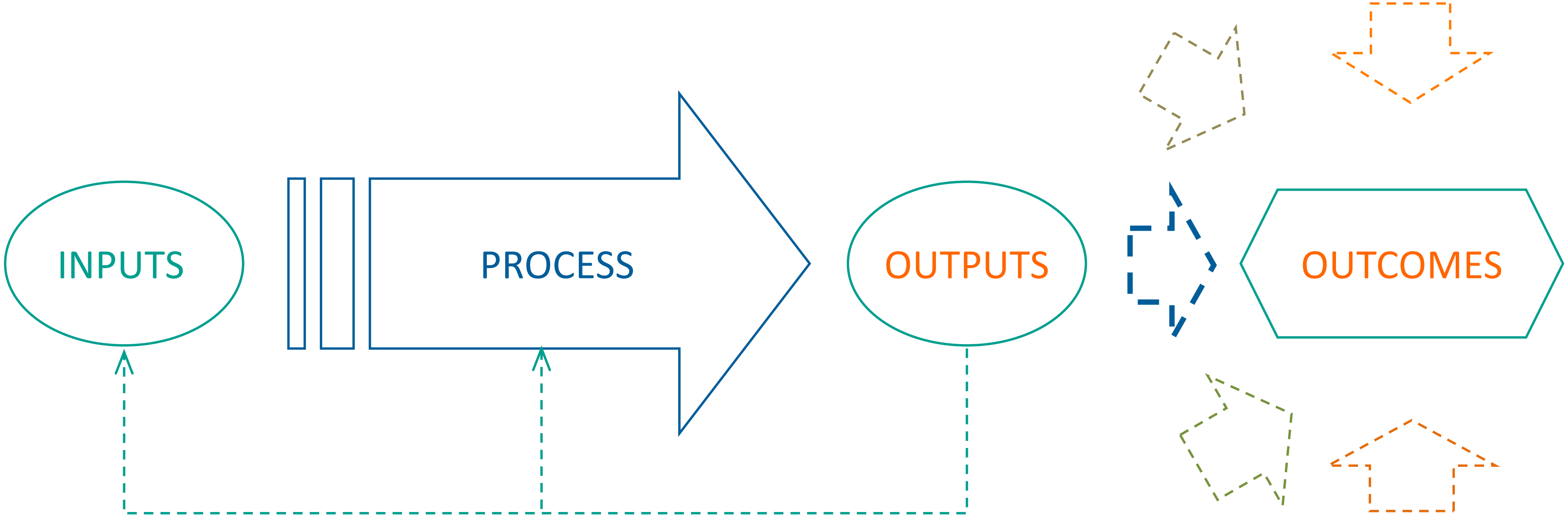
Effectiveness refers to the extent to which an activity achieves desired outcomes.

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	OUTCOMES
Cause	Effect
System-oriented	Context-oriented
Immediate effects	Intermediate and long-term effects
Descriptive	Normative
Easily measurable	Fuzzy and hard to measure

SOME EXAMPLES

$$\frac{\text{Actual Quantity of Product Made}}{\text{Budgeted Quantity}}$$

$$\frac{\text{\# of Tasks completed}}{\text{\# of Tasks attempted}}$$

$$\frac{\text{Actual Sales Revenues}}{\text{Budgeted Sales}}$$

$$\frac{\text{Desired Delivery Time}}{\text{Actual Delivery Time}}$$

$$\frac{\text{\# of products without defects}}{\text{\# of products made}}$$

$$\frac{\text{\# of products delivered}}{\text{\# of order}}$$

DRILL DOWN ANALYSIS

Company Level

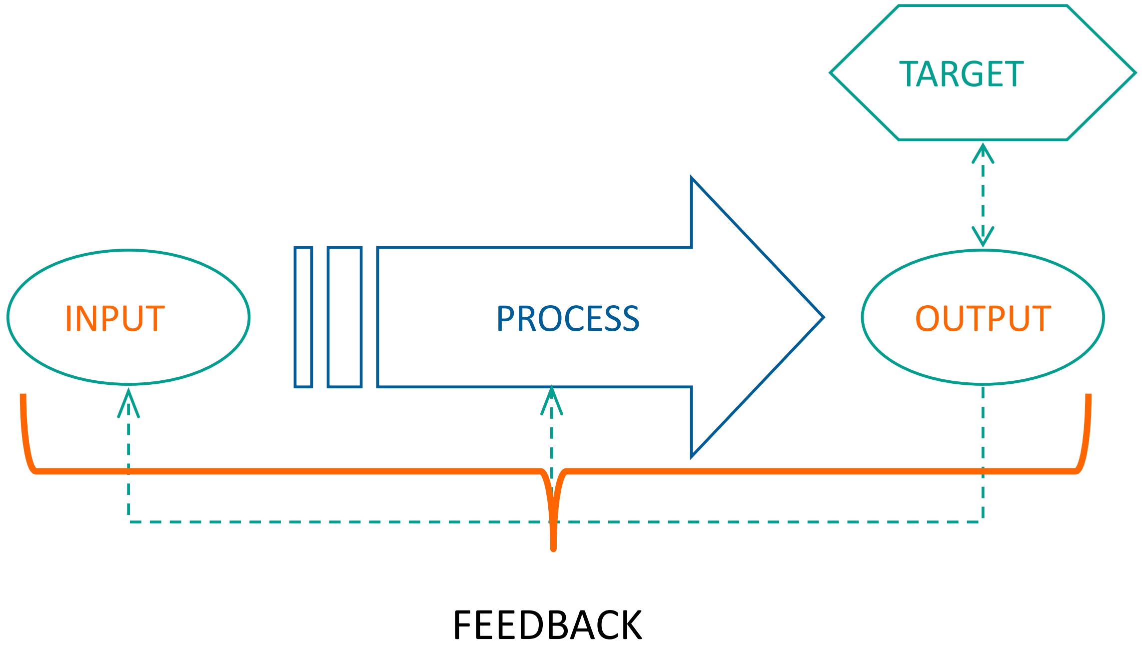
Division Level

Department Level

DIFFERENT KINDS OF MEASURES

TARGET	ACTUAL RESULT	KIND OF MESSURE
To decrease delivery time	Yes, delivery time has been reduced (but we don't know by how much)	Dichotomous
To finish the project by 12/31/2020	Failed	Dichotomous
To be one of the first 5 players in the market	# 2	Ordinal
To sell 20.000 liters of Chardonnay	22.650 liters sold	Cardinal
To decrease average delivery time below 8 days	Average delivery time equal to 7 day and 1/2	Cardinal

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 Performence", 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

TOTAL PRODUCTIVE EFFICIENCY: AN EXAMPLE

Resource “A“

Resource “B“

Product “X“

1 dose of "A” = $ 18.00

1 dose of "A” = $ 10.00

2 doses of "A"	2 doses of "A"	1 dose of "A"	1 dose of "A"
1 dose of ”B"	1,5 doses of ”B"	3 doses of ”B"	2,5 doses of ”B"

TOTAL PRODUCTIVE EFFICIENCY: AN EXAMPLE

Resource “A“
Resource “B“

Product “X“

1 dose of "A” = $ 18.00

1 dose of "A” = $ 10.00

2 doses of "A"
1 dose of ”B"

~~2 doses of "A"~~
~~1,5 doses of ”B"~~

~~1 dose of "A"~~
~~3 doses of ”B"~~

1 dose of "A"
2,5 doses of ”B"

TOTAL PRODUCTIVE EFFICIENCY: AN EXAMPLE

Resource “A“

Resource “B“

Product “X“

1 dose of "A” = $ 18.00

1 dose of "A” = $ 10.00

2 doses of "A"

1 dose of ”B"

~~2 doses of "A"~~

~~1,5 doses of ”B"~~

~~1 dose of "A"~~

~~3 doses of ”B"~~

1 dose of "A"

2,5 doses of ”B"

~~$ 46.00~~

$ 43.00

PRODUCTIVITY MEASUREMENT

Productivity measurement is simply a quantitative assessment of productivity changes. The objective is to assess whether productive efficiency has increased or decreased.

Productivity measurement can be actual or prospective.

Actual productivity measurement allows managers to assess, monitor, and control changes.

Prospective measurement is forward-looking, and it serves as input for strategic decision making.

Specifically, prospective measurement allows managers to compare relative benefits of different input combinations, choosing the inputs and input mix that provide the greatest benefit.

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

PARTIAL PRODUCTIVITY MEASURES

Productivity measures can be developed for each input separately or for all inputs jointly. Measuring productivity for one input at a time is called partial productivity measurement.

Productivity of a single input is typically measured by calculating the ratio of the output to the input as follows:

Productivity = Output/Input

Because the productivity of only one input is being measured, the measure is called a partial productivity measure.

If both output and input are measured in physical quantities, then we have an operational productivity measure. If output or input is expressed in dollars, then we have a financial productivity 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

PARTIAL OPERATIONAL PRODUCTIVITY

$$\frac{100\text{ km}}{3.5\text{ liter}} \qquad \frac{67.2\text{ miles}}{1\text{ gallon}}$$

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)

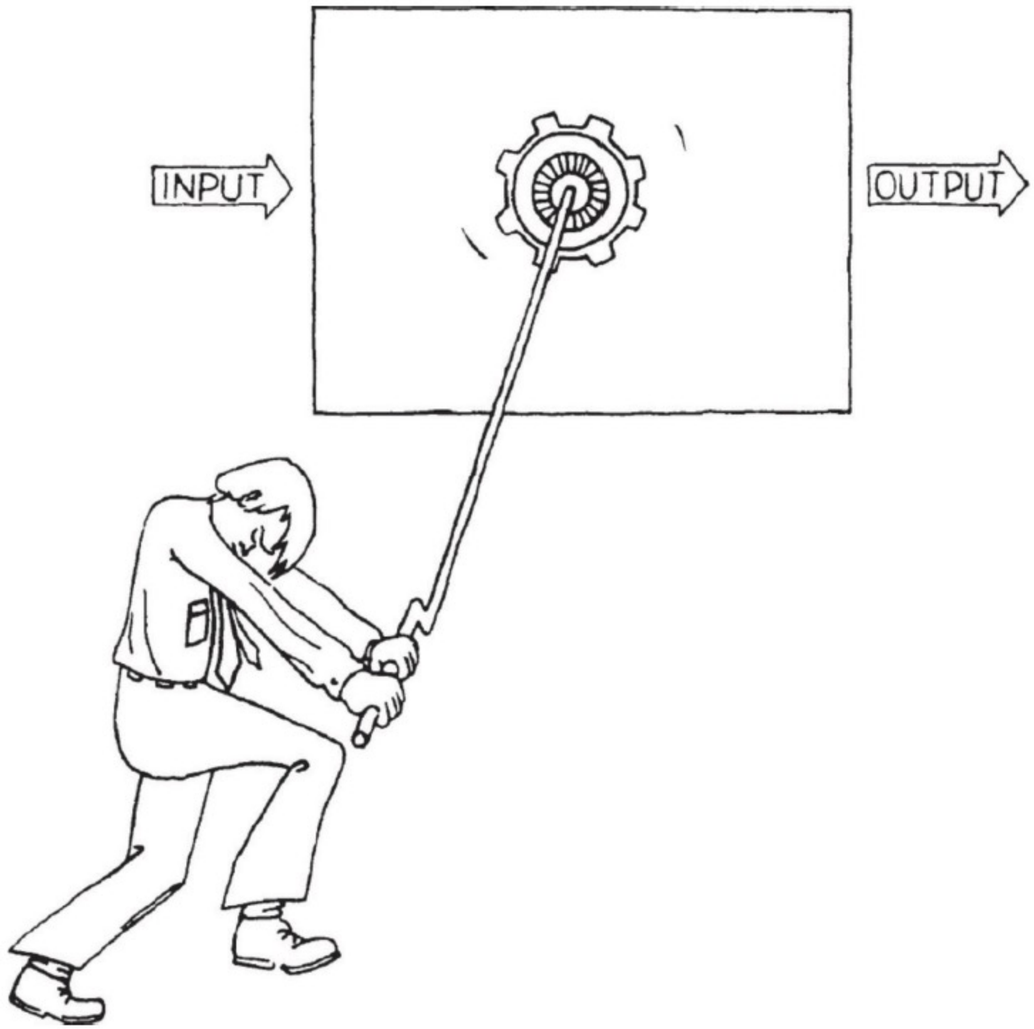
SOURCE: https://erply.com/how-to-measure-retail-performance-5-essential-metrics/

HOW TO LINK THE MEASURES TOGETHER

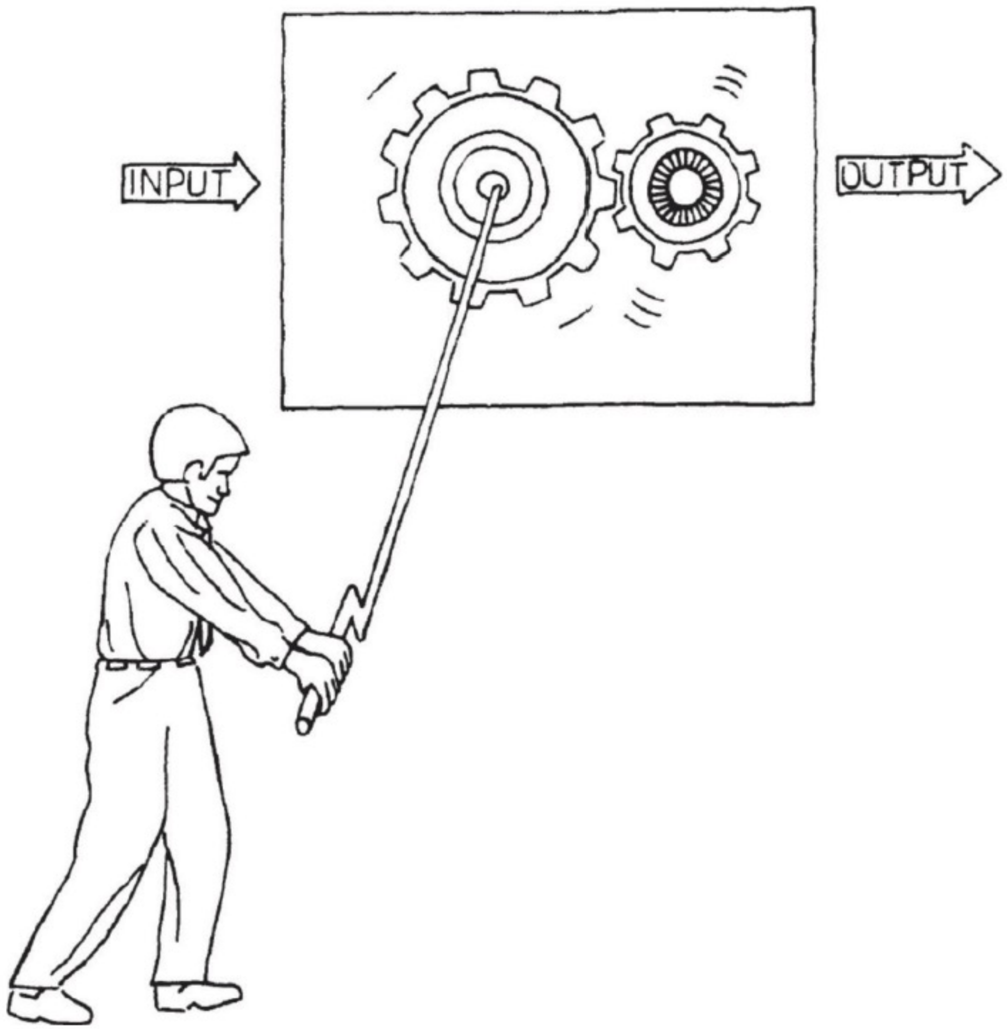
1. Number of Customers (Customer Traffic)
2. Effectivity (Retail Conversion Rate)
3. Average Sale (Average purchase value)
4. Items per purchase (Size of an average shopping cart)
5. Gross margin (Sales profit before costs)

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

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

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

TWO DIFFERENT PERSPECTIVE

Level of **resources consumed** to produce the output

Total output made in the period

Level of the **resources sacrificed to sell**

Output sold in the period

input and output compared must be coherent, in the sense that they must refer to the same entity (outputs made or outputs 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

$$\frac{OUTPUT_{SOLD}}{INPUT_{USED}} = \frac{OUTPUT_{SOLD}}{OUTPUT_{MADE}} * \frac{OUTPUT_{MADE}}{INPUT_{USED}}$$

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**

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

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**

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

CAUSE AND EFFECT RELATIOSHIP

$$\frac{OUTPUT_{SOLD}}{INPUT_{USED}}$$

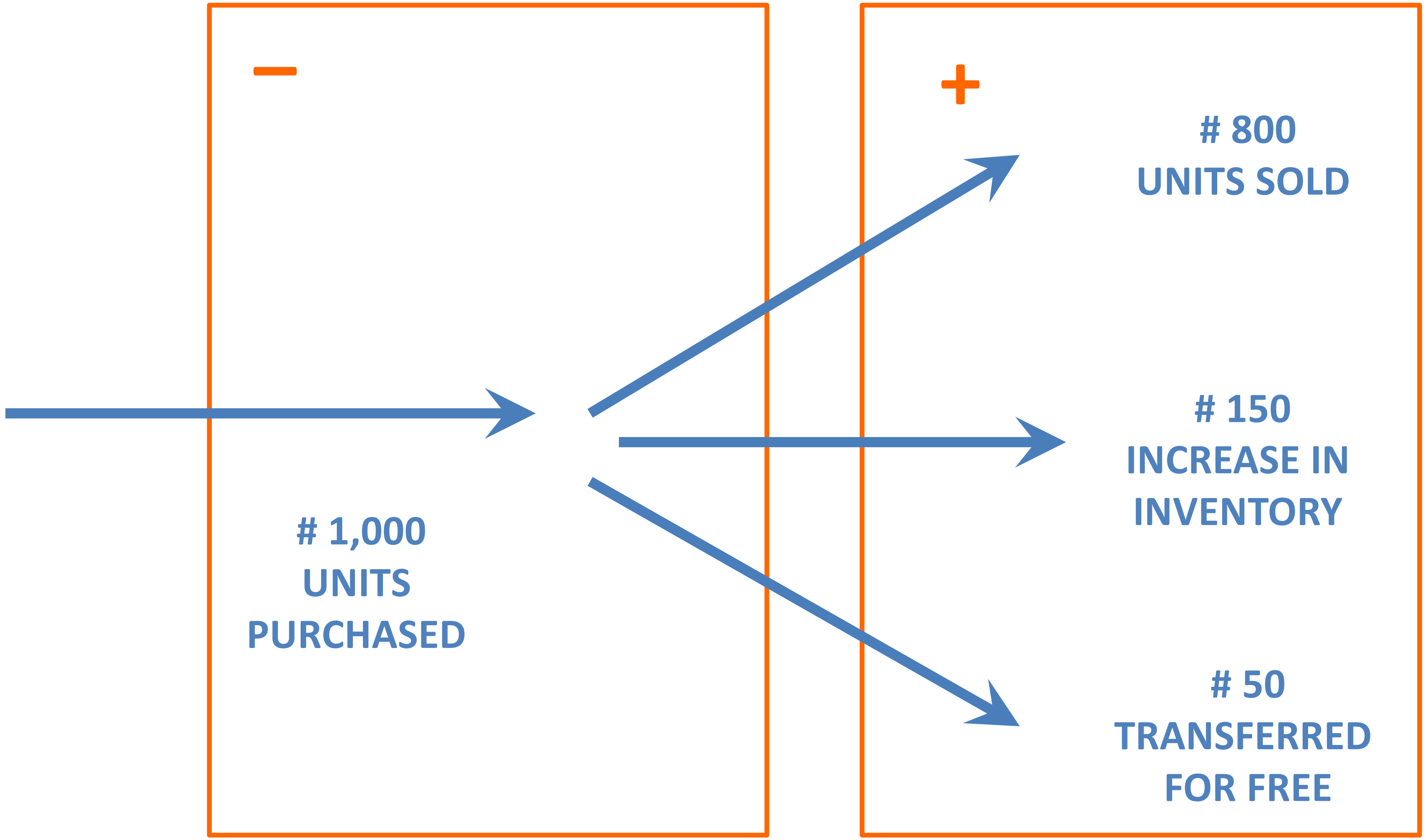
$$\frac{OUTPUT_{MADE}}{INPUT_{USED}}$$

$$\frac{OUTPUT_{SOLD}}{OUTPUT_{MADE}}$$

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 OUTPUT INCOME STATEMENT (MERCHANDISING)



COGS INCOME STATEMENT (MERCHANDISING)

−

\# 1,000
UNITS PURCHASED

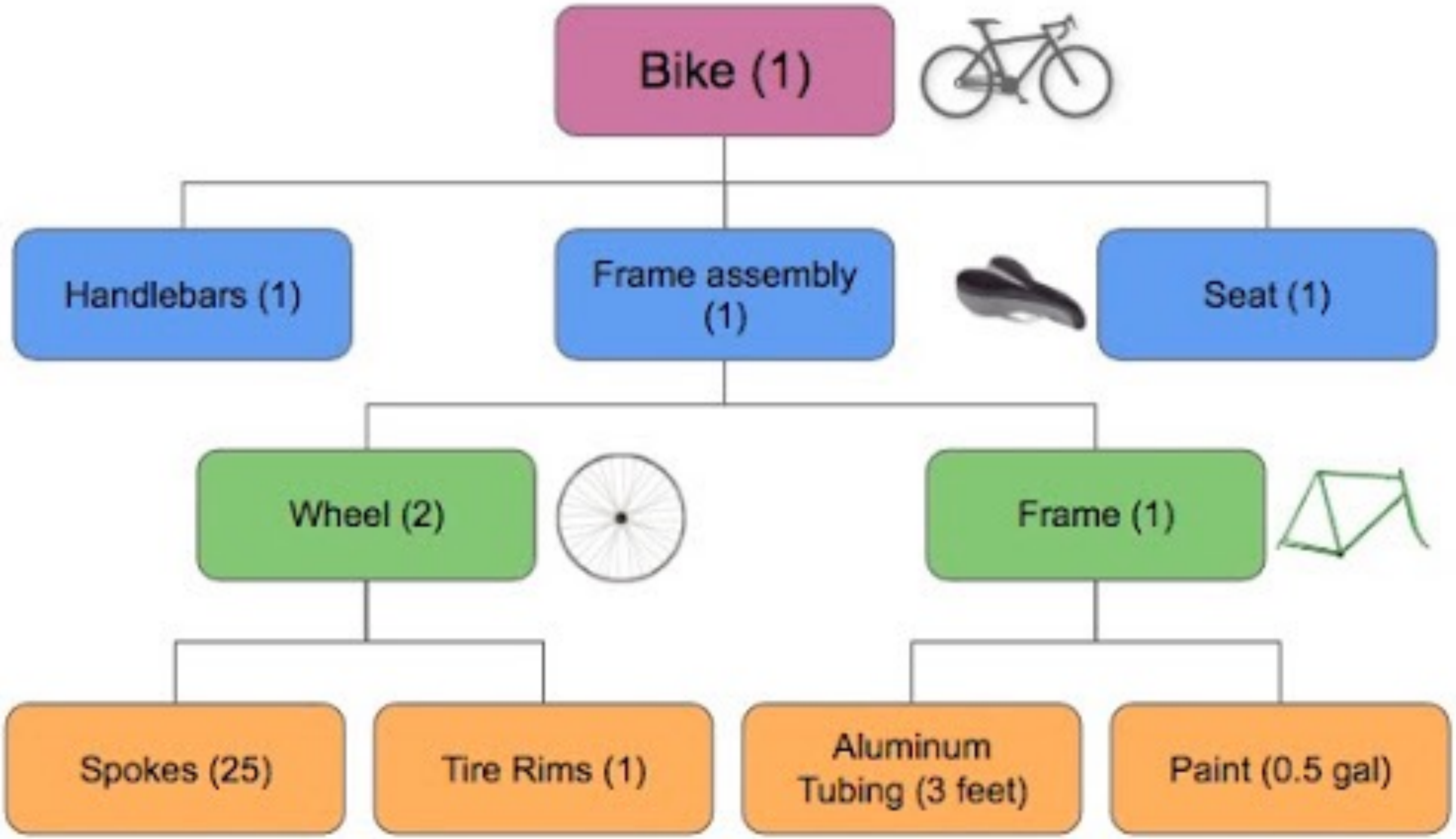
− # 150
INCREASE IN INVENTORY

− # 50
TRANSFERRED FOR FREE

\+

\# 800
UNITS SOLD

BILL OF MATERIALS



DIFFERENT STANDARDS

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

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

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

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.

COMPARISON BETWEEN TWO OFFICES

34 DOSSIERS

OFFICE «A»

20 HEADS

- 10 clerks working 8 hours/day
- 8 clerks working 6 hours/day
- 2 clerks working 4 hours/day

41 DOSSIERS

OFFICE «B»

25 HEADS

- 1 clerk working 8 hours/day
- 14 clerks working 6 hours/day
- 10 clerks working 4 hours/day

COMPARISON BETWEEN TWO OFFICES

34 DOSSIERS

OFFICE «A»

20 HEADS = 17 FTE

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

41 DOSSIERS

OFFICE «B»

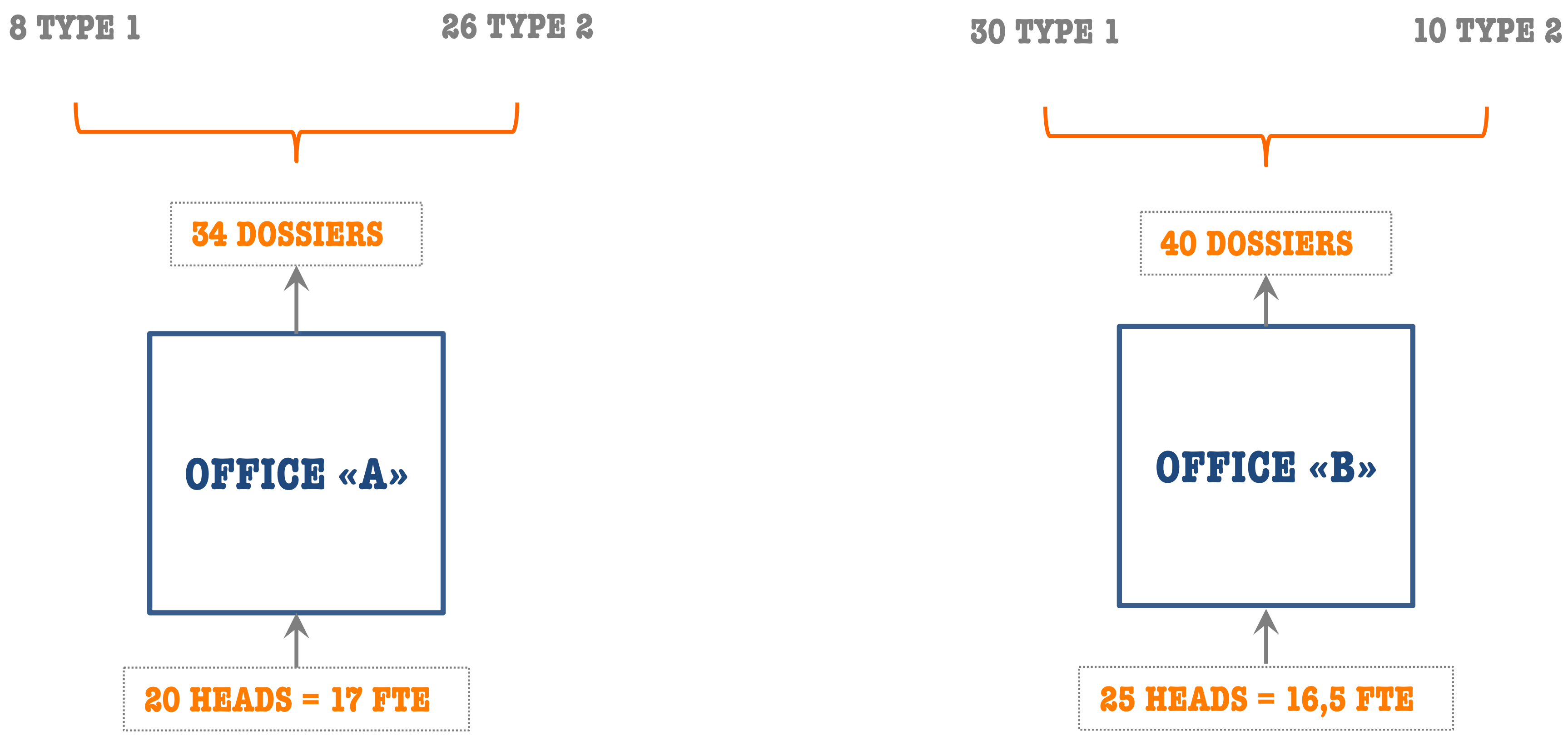
25 HEADS = 16,5 FTE

1 clerk working 8 hours/day * 8/8 = 1 FTE

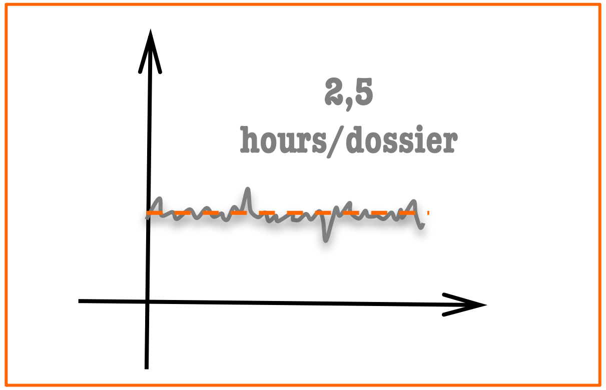
14 clerks working 6 hours/day * 6/8 = 10,5 FTE

10 clerks working 4 hours/day * 4/8 = 5 FTE

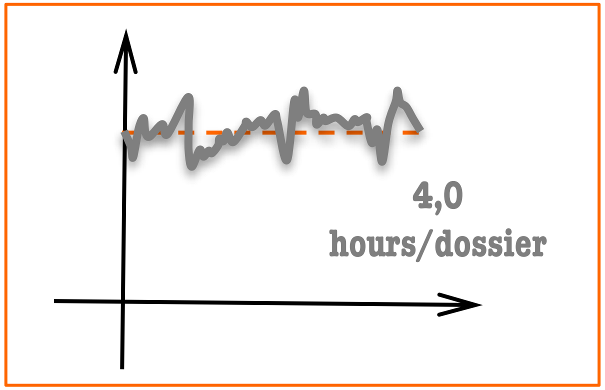
DIFFERENT KINDS OF OUTPUTS



ESTABLISHING EQUIVALENCE



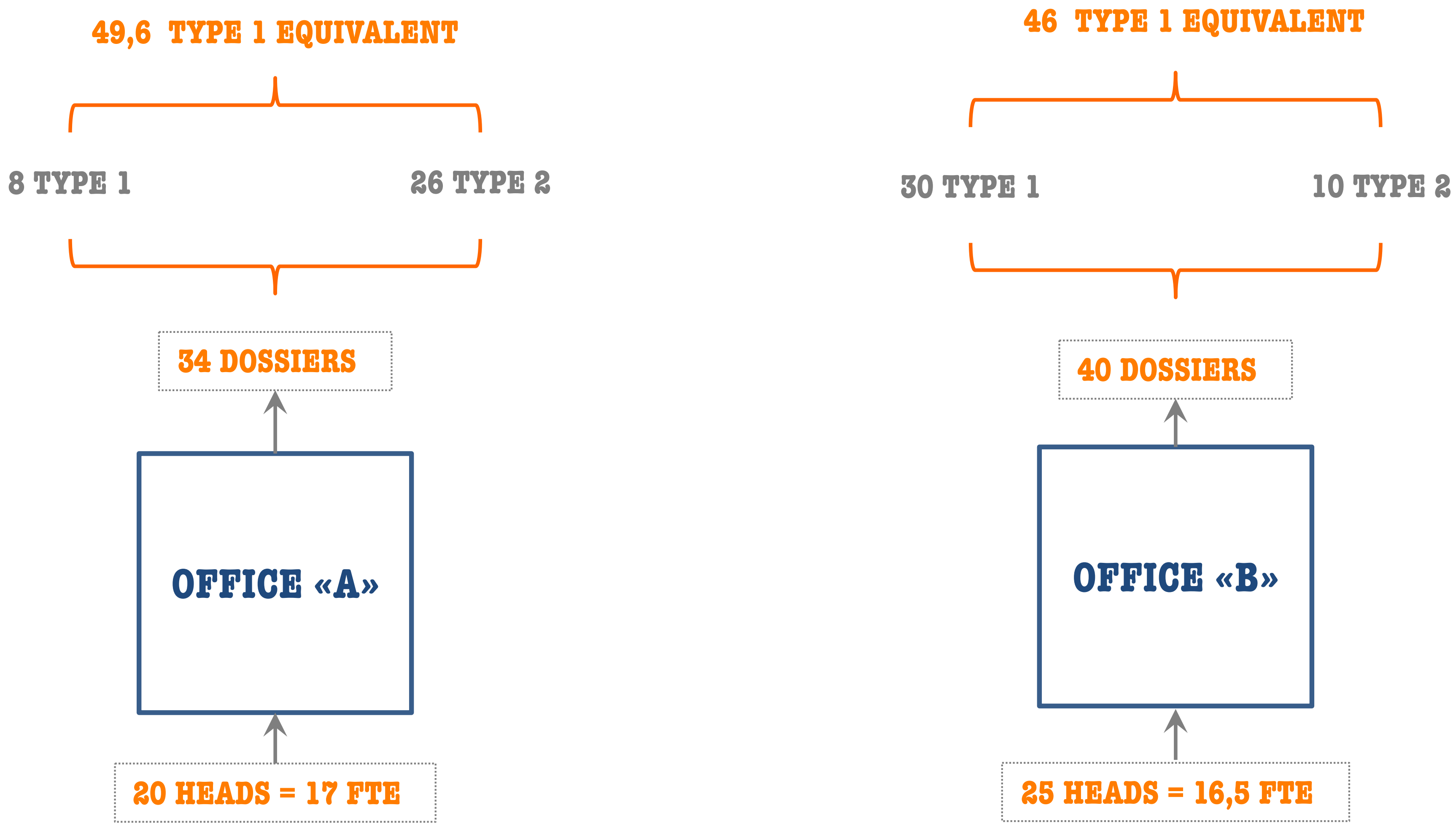
DOSSIER TYPE 1



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**

PRICE AS “HOMOGENIZATION FACTOR”

$ 1,000

1 iPhone

$ 2,000

2 iPhone equivalent

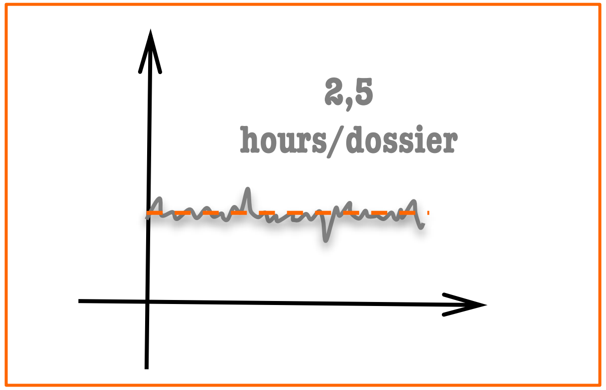
$ 900

0,9 iPhone equivalent

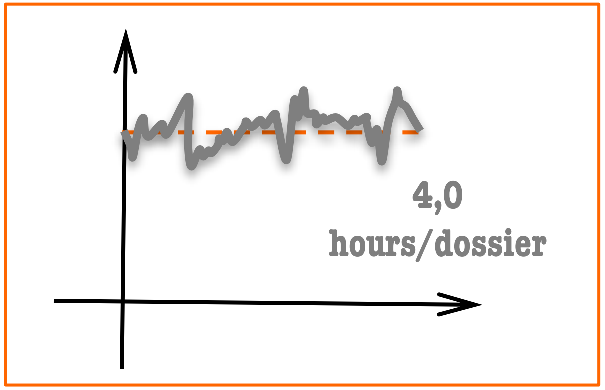
Break even point in units → Break even point in total dollars

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

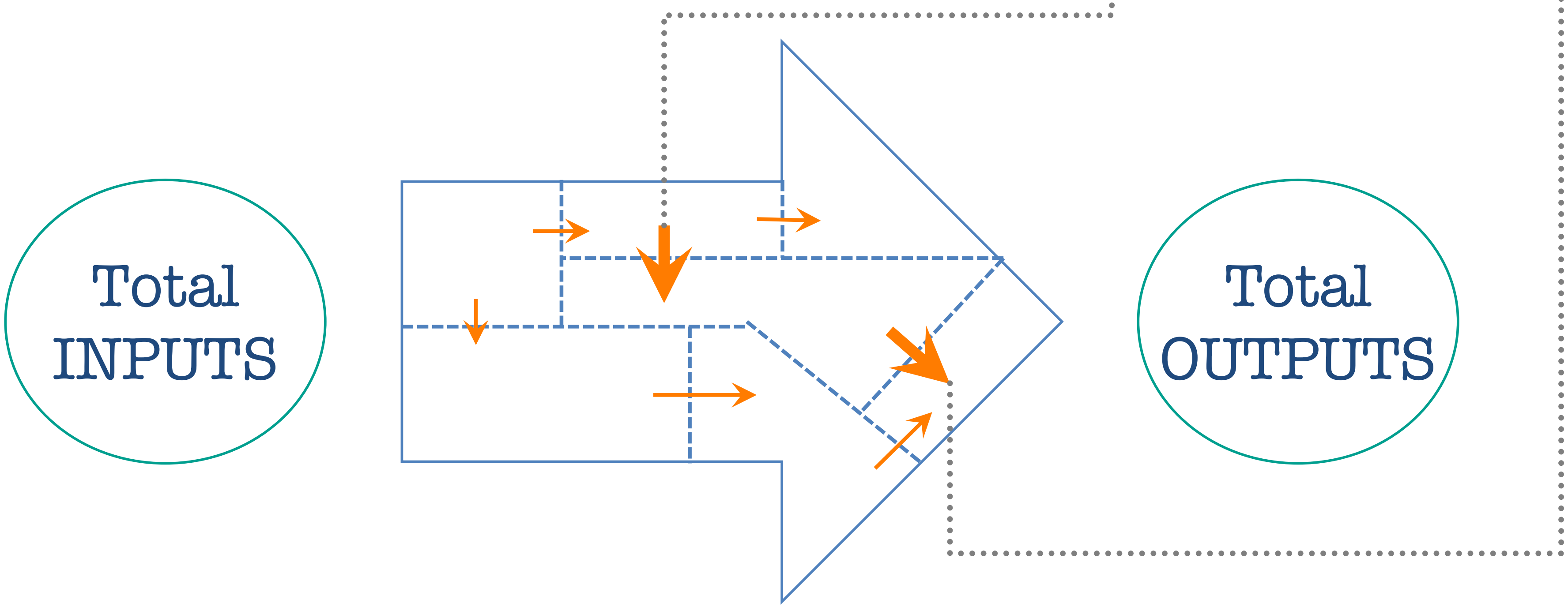
Direct Materials	476.905	7.337	€	65,00
Direct Labour	366.850	7.337	€	50,00
Manufacturing Overheads	660.330	7.337	€	90,00
Total Manufacturing Costs	**1.504.085**	7.337	€	205,00

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

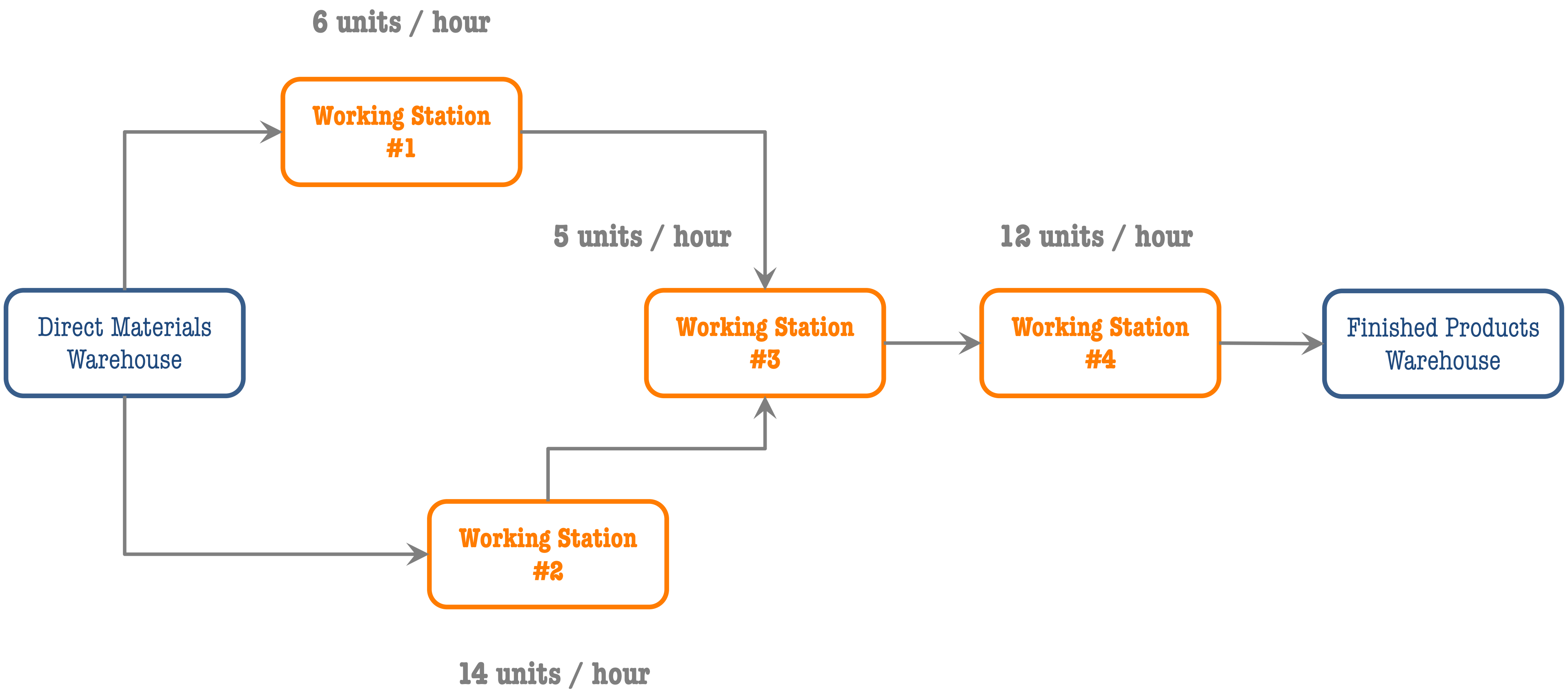
$$\text{Cost per unit} = \frac{1{,}504{,}085}{7{,}737} = 205$$

LOCAL EFFICIENCY

$$\text{Local Efficiency} = \frac{\text{Local Outputs}}{\text{Local Inputs}}$$



ANALYSIS OF A SIMPLE PROCESS



CAUTION IN INTERPRETING PARTIAL MEASURES

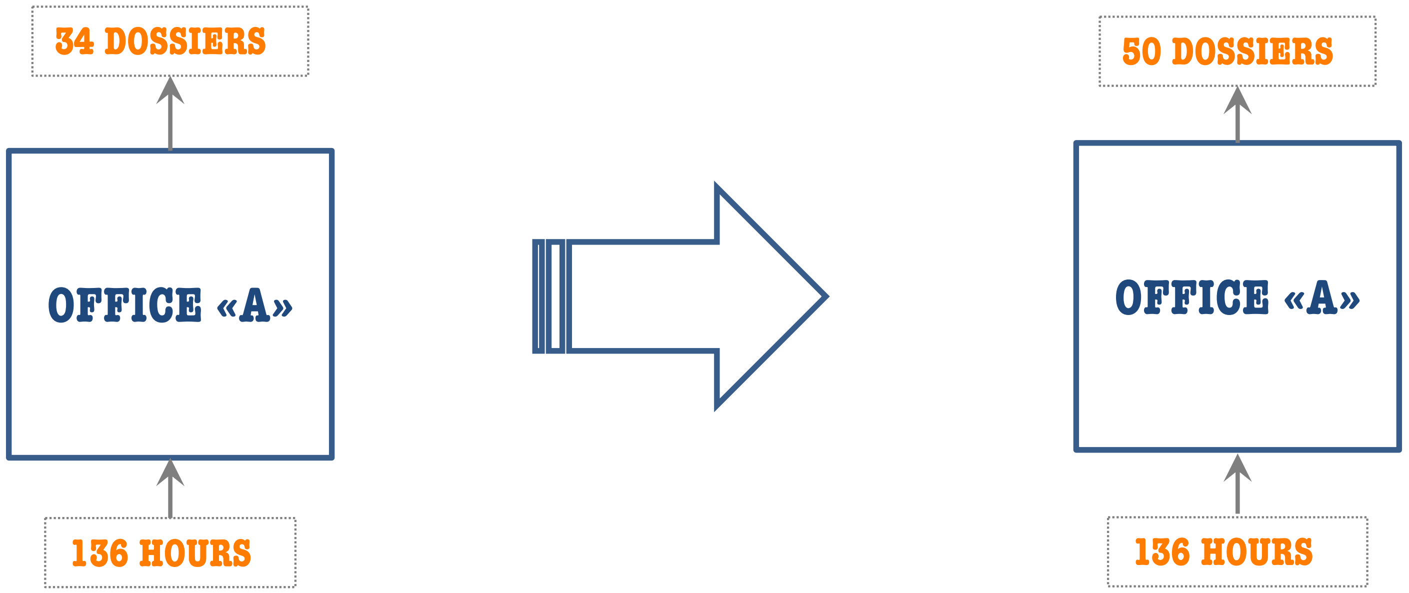
34 DOSSIERS

OFFICE «A»

136 HOURS

T_0

CAUTION IN INTERPRETING PARTIAL MEASURES



T_0

INVESTMENT IN TECHNOLOGY

workers are equipped with a new information system

T_1

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

MEASURING CHANGES IN PRODUCTIVITY

«Actual productivity ratios by themselves convey little information about productive efficiency or whether the company has improving or declining productivity.

It is possible, however, to make a statement about increasing or decreasing productivity efficiency by measuring changes in productivity. To do so, the actual current productivity measures are compared with the productivity measures of a prior period.

This prior period is referred to as the base period **and** serves to set the benchmark or standard for measuring changes in productive efficiency. The prior period can be any period desired.

For strategic evaluations, the base period is usually chosen as an earlier year. For operational control, the base period tends to be close to the current period—such as the preceding batch of products or the preceding week».

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

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

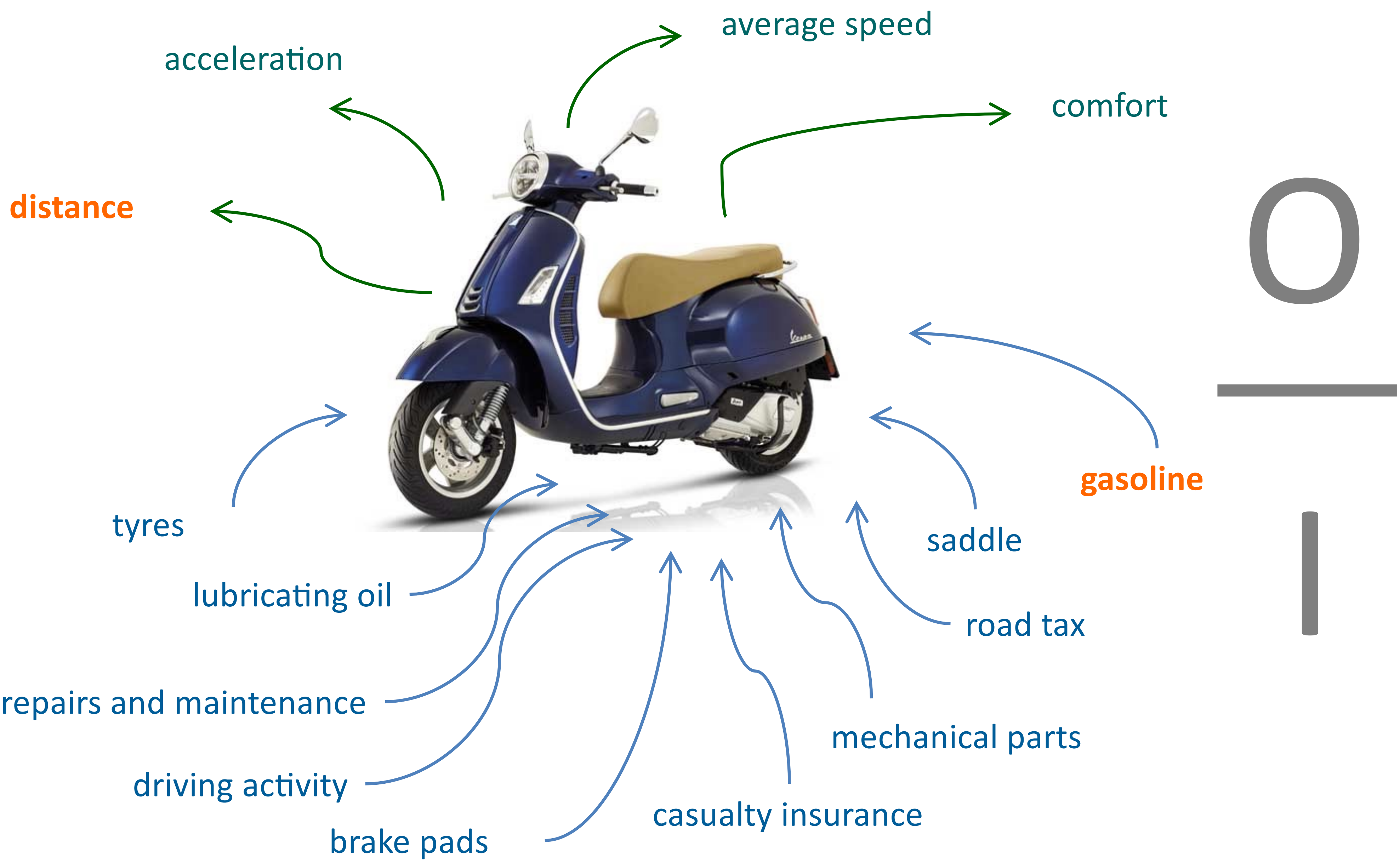
Partial measures, used in isolation, can be misleading.

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

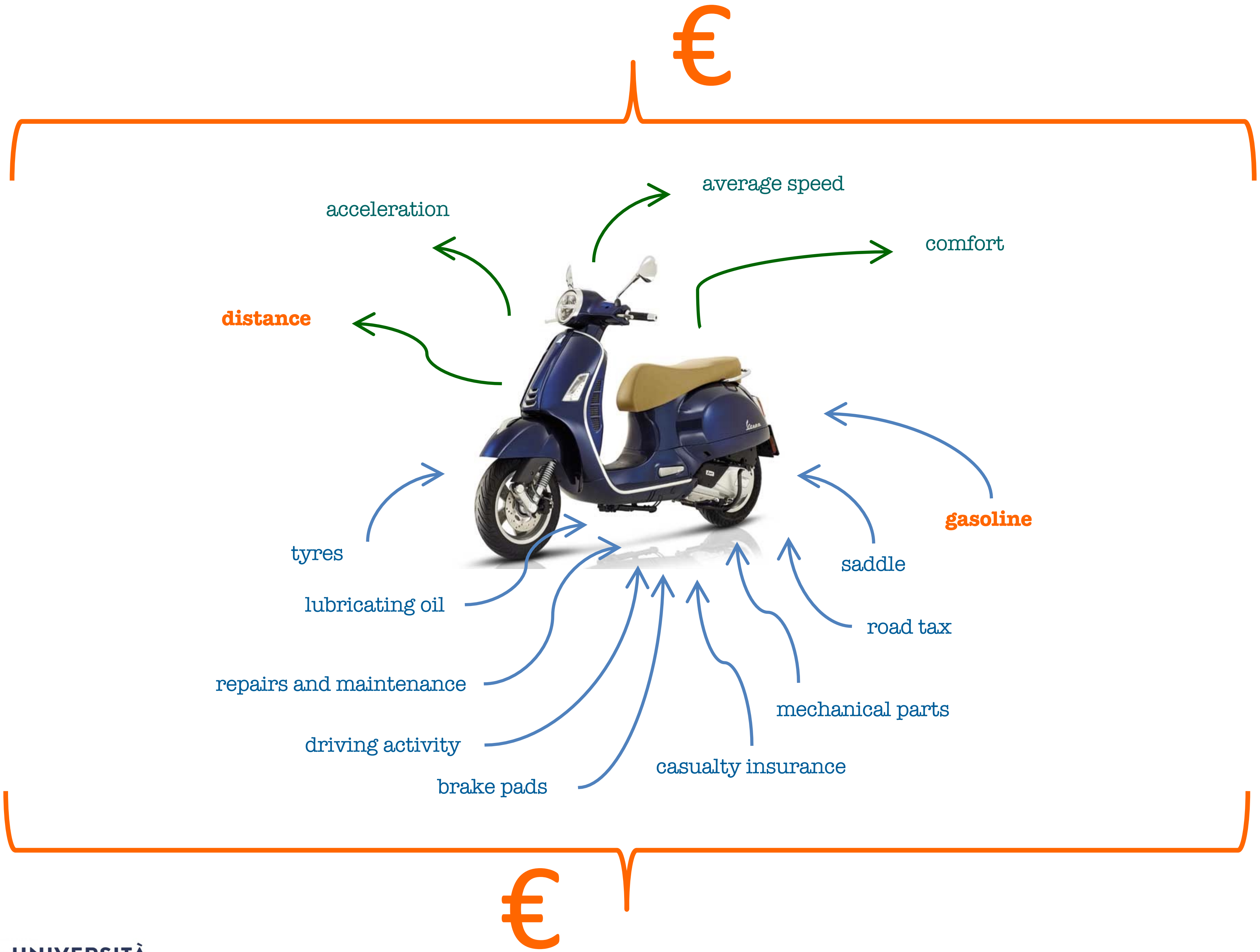
WHY IT IS DIFFICULT TO COMPUTE....

Total operational productivity measure:

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

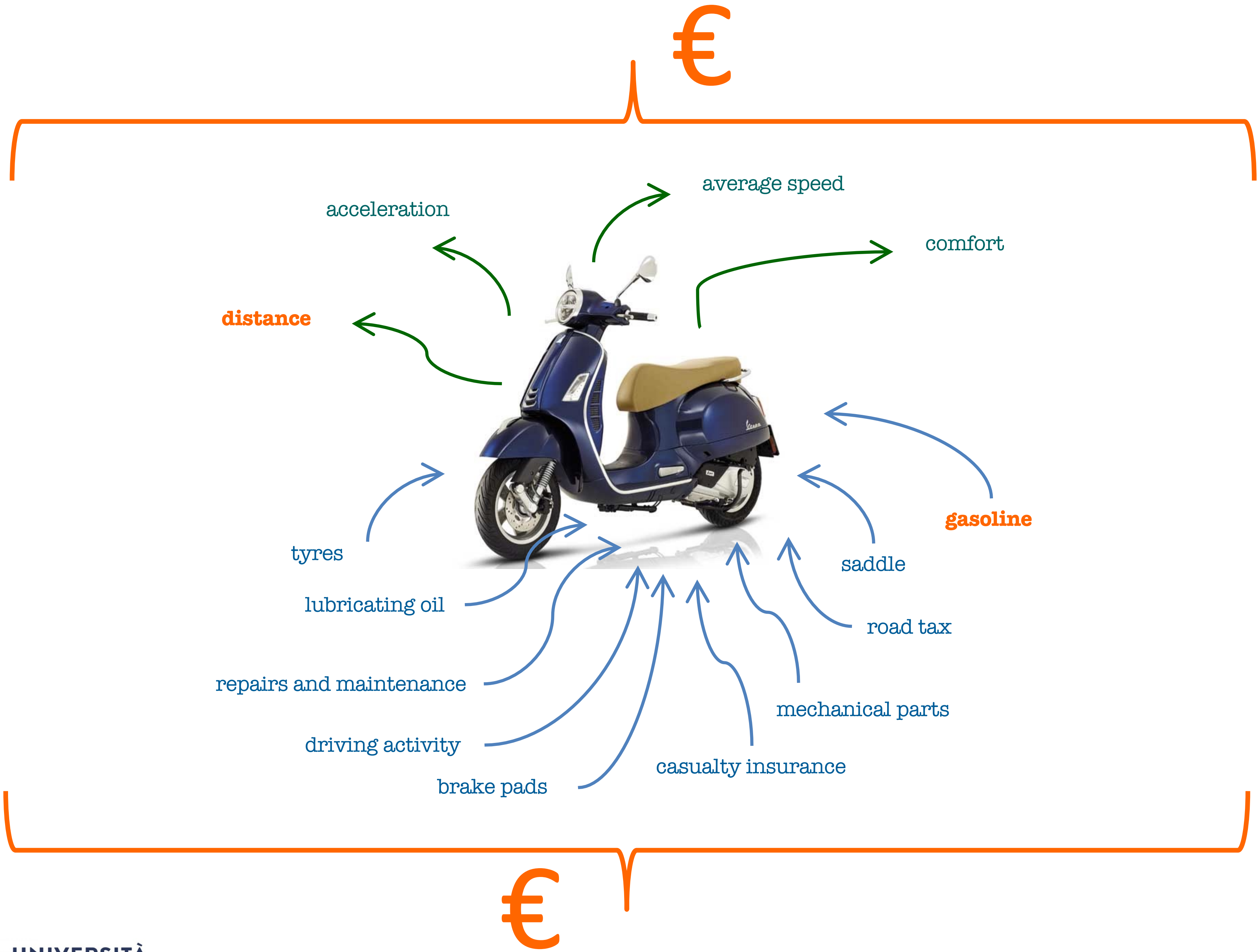
There is a problem of heterogeneity both in the components of the numerator and in those that make up the denominator.

FINACIAL PRODUCTIVITY

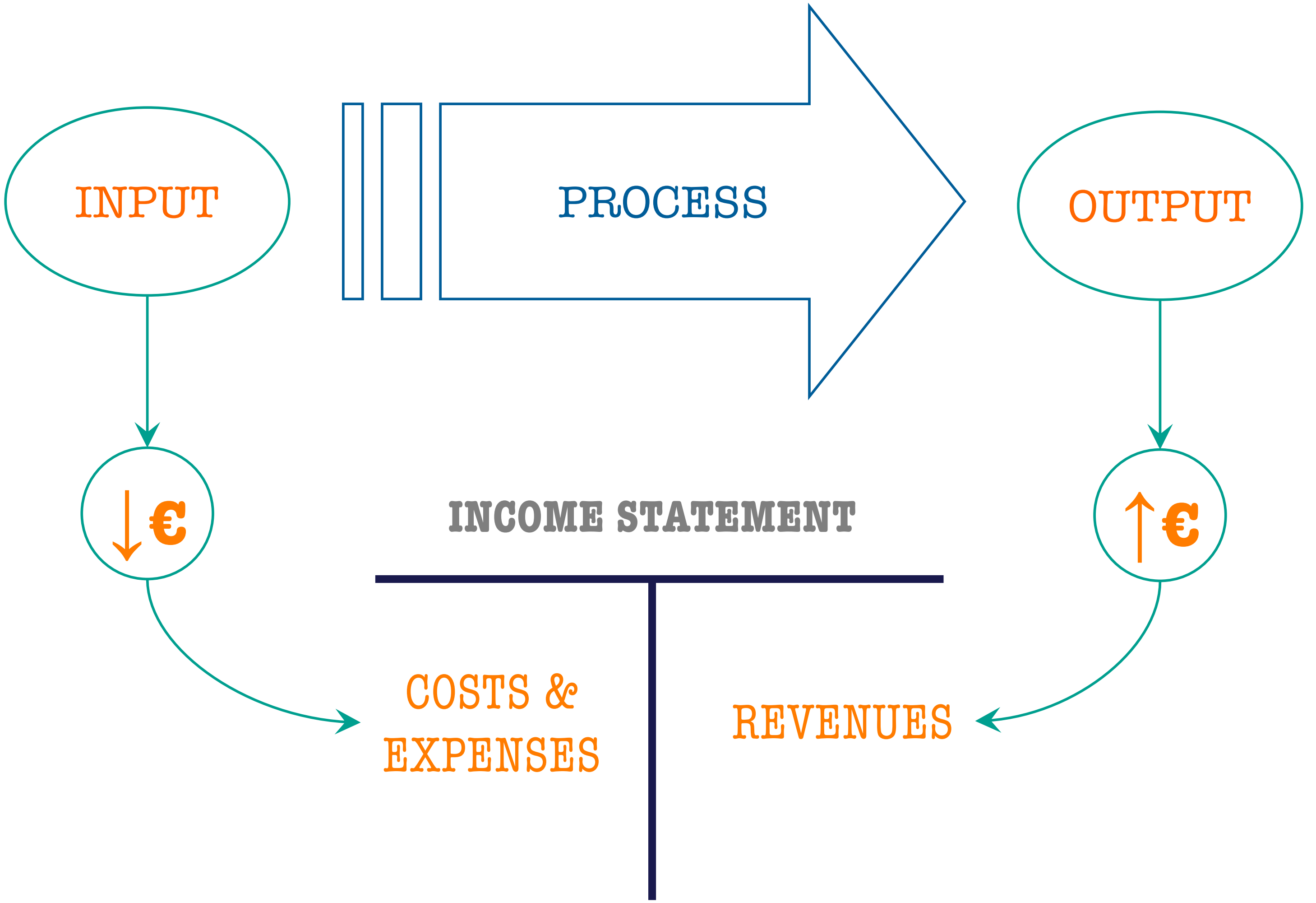


UNIVERSITÀ DEGLI STUDI DI TRIESTE

FINACIAL PRODUCTIVITY



INCOME STATEMENT



EFFICIENCY

1. **OPERATIONAL PRODUCTIVITY**

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

2. **FINANCIAL PRODUCTIVITY**

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

3. **...**

4. **...**

DIFFERENT TYPES OF METRICS

OPERATIONAL PRODUCTIVITY

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

FINANCIAL PRODUCTIVITY

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

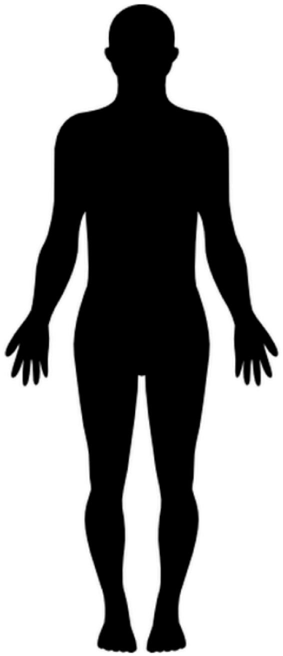
$$O_{\$} - I_{\$}$$

PROFIT: NET PROFIT AND OTHER PROFIT MARGINS

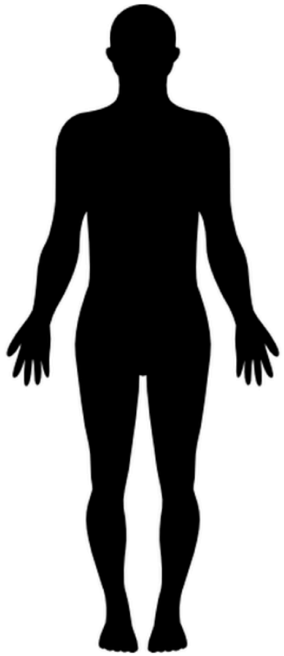
Net Profit (also called "Net Income" or "Net Earnings) is the "bottom line" of the "Income Statement". It is therefore computed as revenues, less cost of goods sold less, less other expenses, less taxes.

More broadly, **profit** is the difference between revenues and expenses. It can be assesses 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?

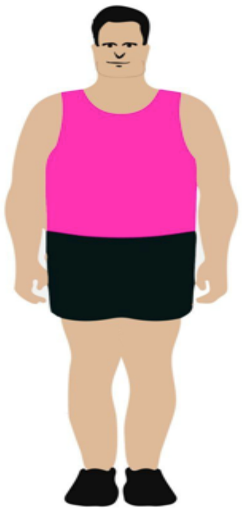


148 lbs.



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 ADD ROS

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

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

FROM MARK-UP TO RETURN ON SALES

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

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

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

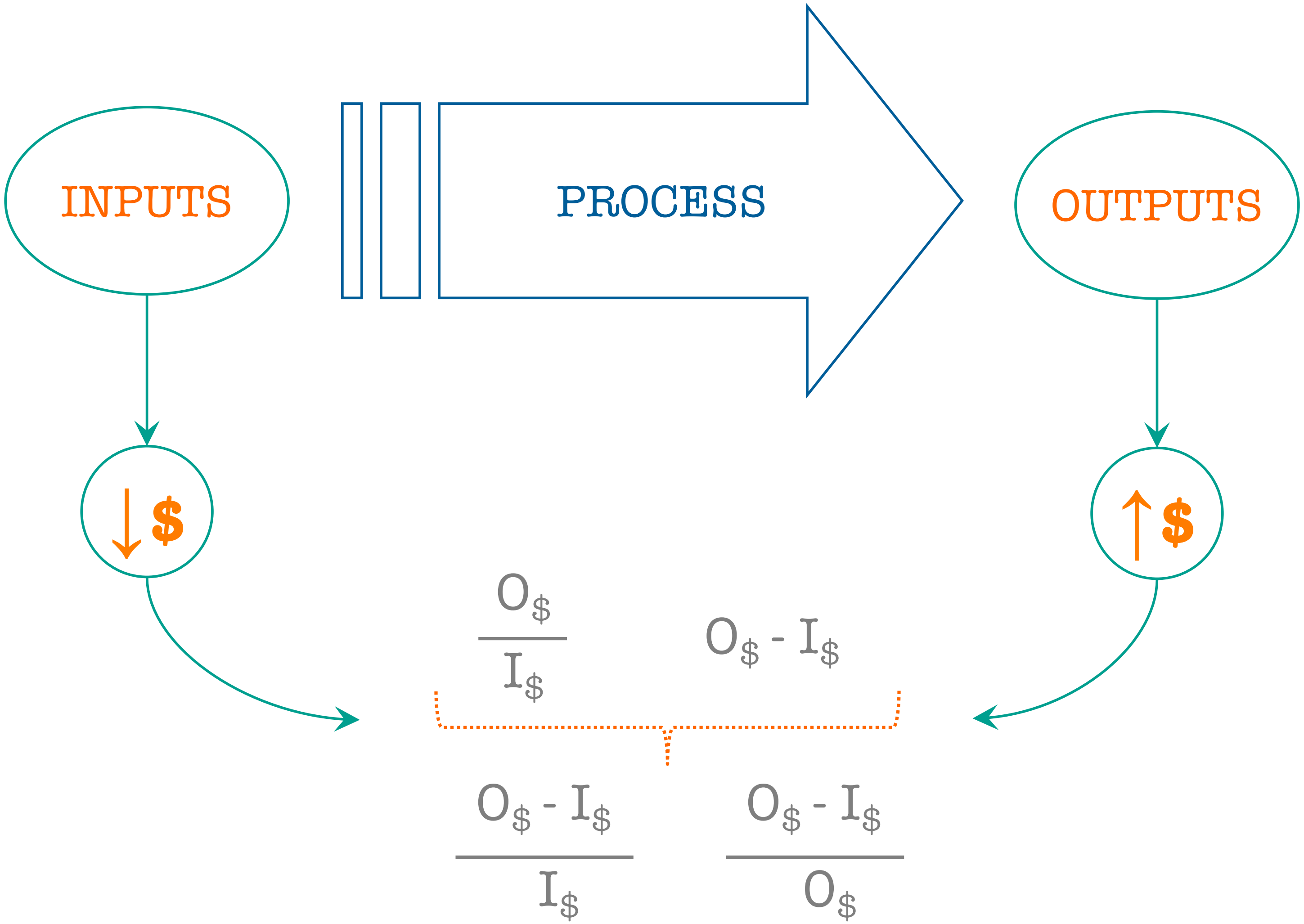
… AND VICE VERSA

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

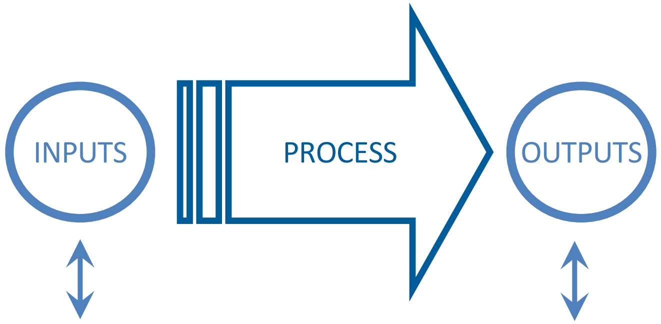
$$O_\$ - I_\$ = y * O_\$ \Rightarrow I_\$ = O_\$ - y * O_\$ = O_\$ * (1-y)$$

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

FINANCIAL PRODUCTIVITY

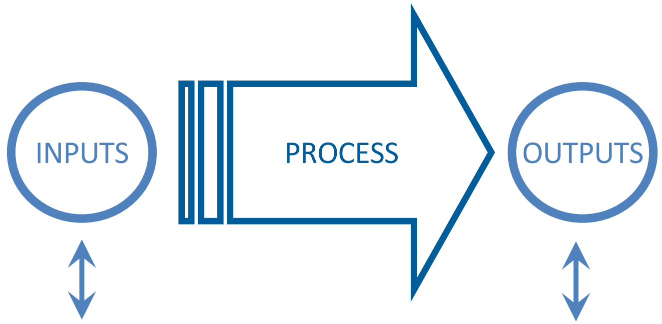


TWO DIFFERENT PERSPECTIVE



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

Total output made in the period



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

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

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**

BACK TO BASIC FINANCIAL ACCOUNTING

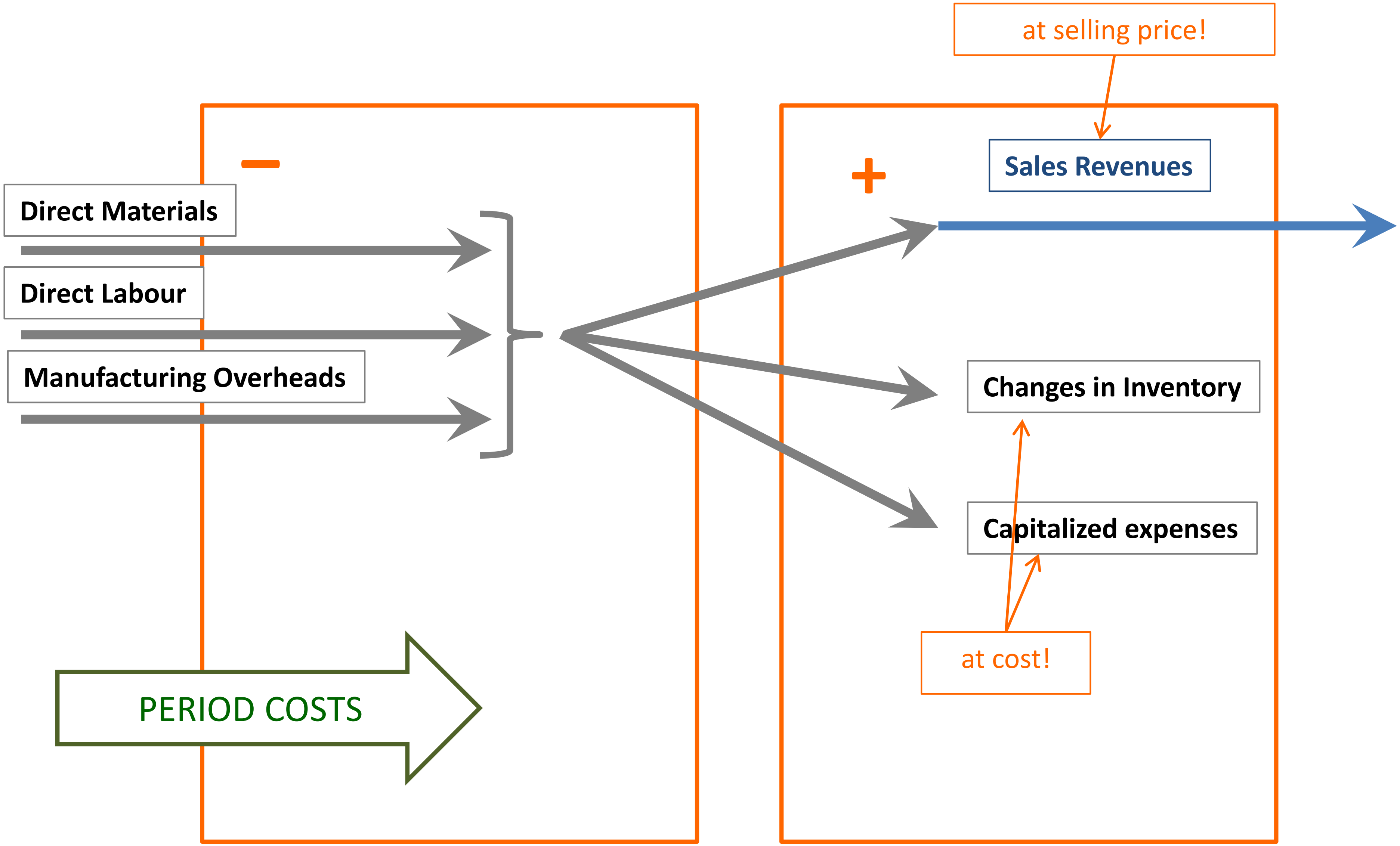
XYZ incurs the following classes of costs during fiscal year 20XO:

	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**

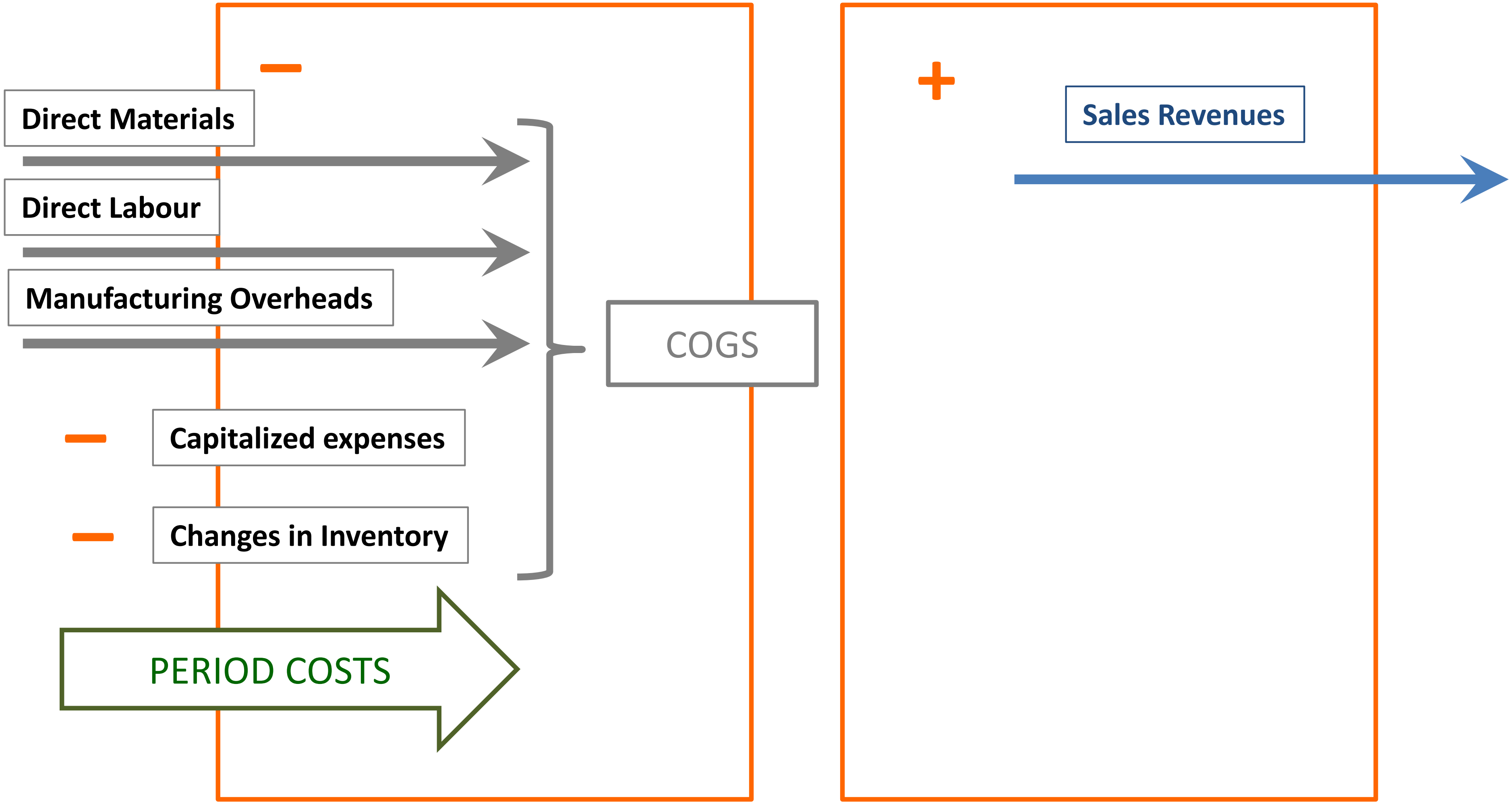
In addition to the typical product, a specific machine is built during the period for use in subsequent fiscal years. Its cost value (all made up of cost-line items belonging to manufacturing costs) is $ 320,000.
The finished products manufactured during the period are 20,000. Of these the units sold 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

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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**

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:

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

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 *would have been used*		62'500
Quantity of material that *would have been used*		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

Variance in margin = (A) – (B) = € 630 - € 620 = **+ € 10**

Variance in margin = **+ € 10**

- Variance in revenues = + € 1,950 – € 2,000 = **– € 50**
- Variance in costs (res. A) = – € 828 –– € 980 = + € 980 – € 828 = **+ € 152**
- Variance in costs (res. B) = – € 492 –– € 400 = + € 400 – € 492 = **– € 92**

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

+ Margin (A)
- Price level: 20X1
- Operational productivity level: 20X1

− Margin (X)
- Price level: 20X1
- Operational productivity level: 20X0

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.

+ Margin (X)
- Price level: 20X1
- Operational productivity level: 20X0

− Margin (B)
- Price level: 20X0
- Operational productivity level: 20X0

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				

Variance in the margin = (A) – (B) = [(A) – (X)] + [(X) – (Y)] + [(Y) – (B)] = + € 73

PROFIT-LINKAGE RULE: ANOTHER EXAMPLE

Variance in the margin = (A) – (B) = [(A) – (X)] + [(X) – (Y)] + [(Y) – (B)] = + € 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

Variance in the margin = (A) – (B) = [(A) – (X)] + [(X) – (Y)] + [(Y) – (B)] = + € 73

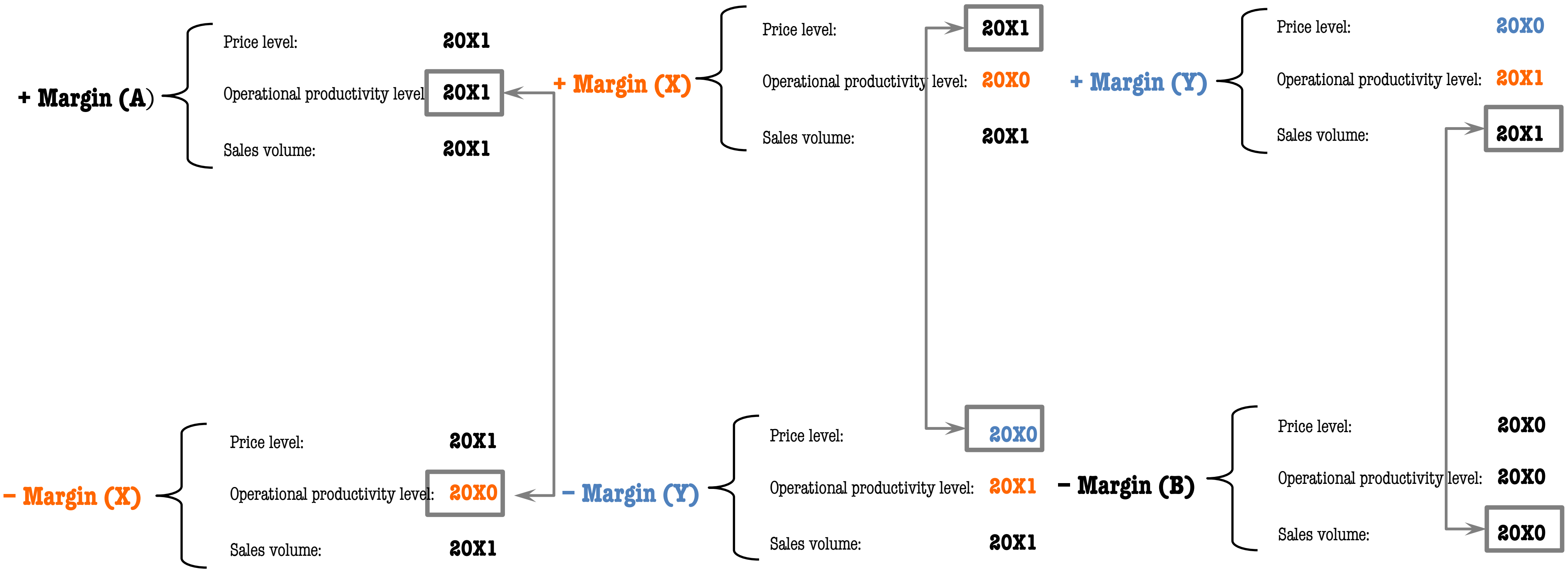
Product XYZ	220	€	9,75	€	2.145,00
Resource A	539	€	1,80	€	970,20
Resource B	440	€	1,20	€	528,00
Margin			(X)	€	646,80

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

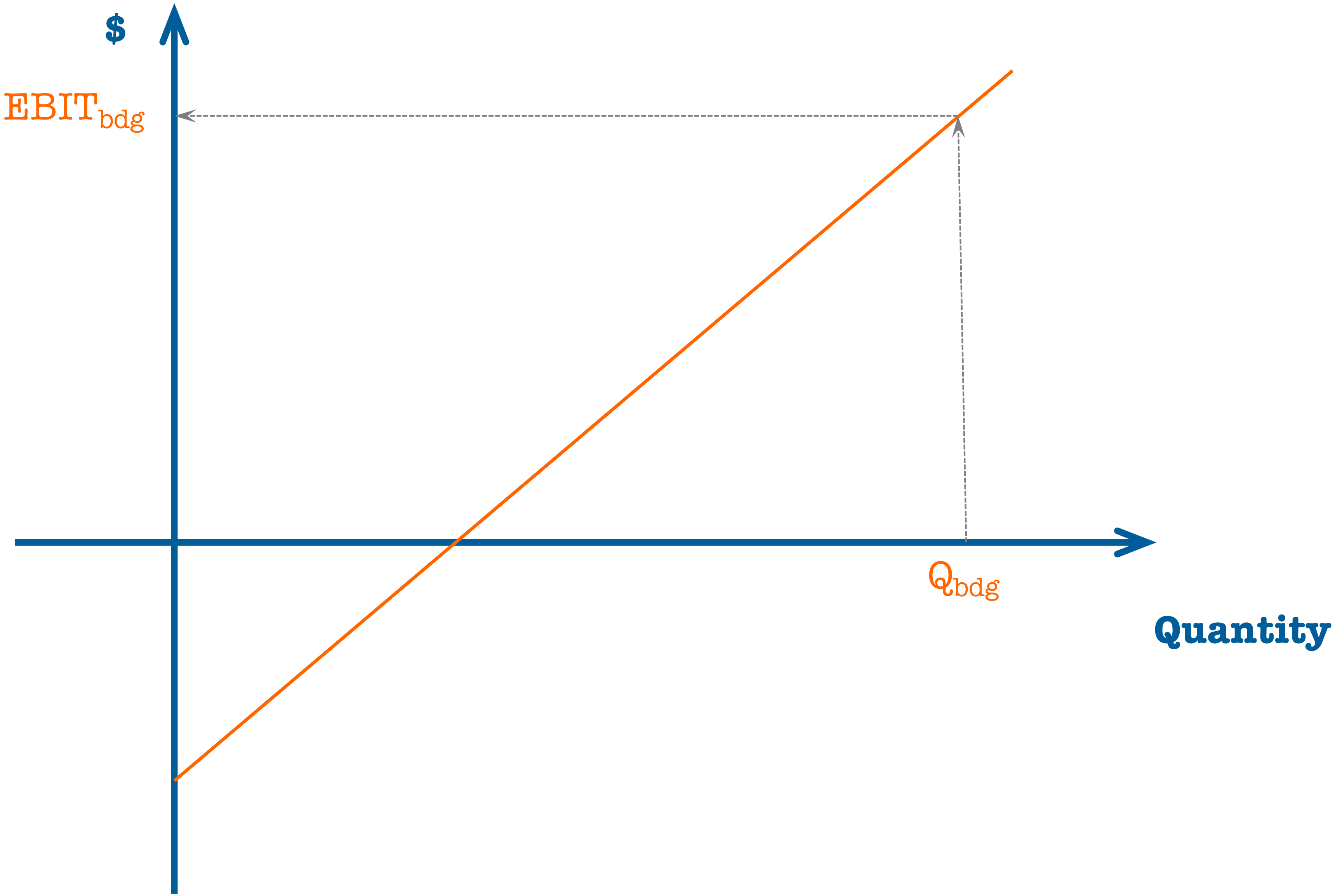
+ (A)	€	693,00
- (X)	-€	646,80
Scostamento efficienza	**€**	**46,20**
+ (X)	€	646,80
- (Y)	-€	682,00
Scostamento prezzi	**-€**	**35,20**
+ (Y)	€	682,00
- (B)	-€	620,00
Scostamento volume	**€**	**62,00**

Scostamento efficienza	€	46,20
Scostamento prezzi	-€	35,20
Scostamento volume	€	62,00
Scostamento totale	**€**	**73,00**

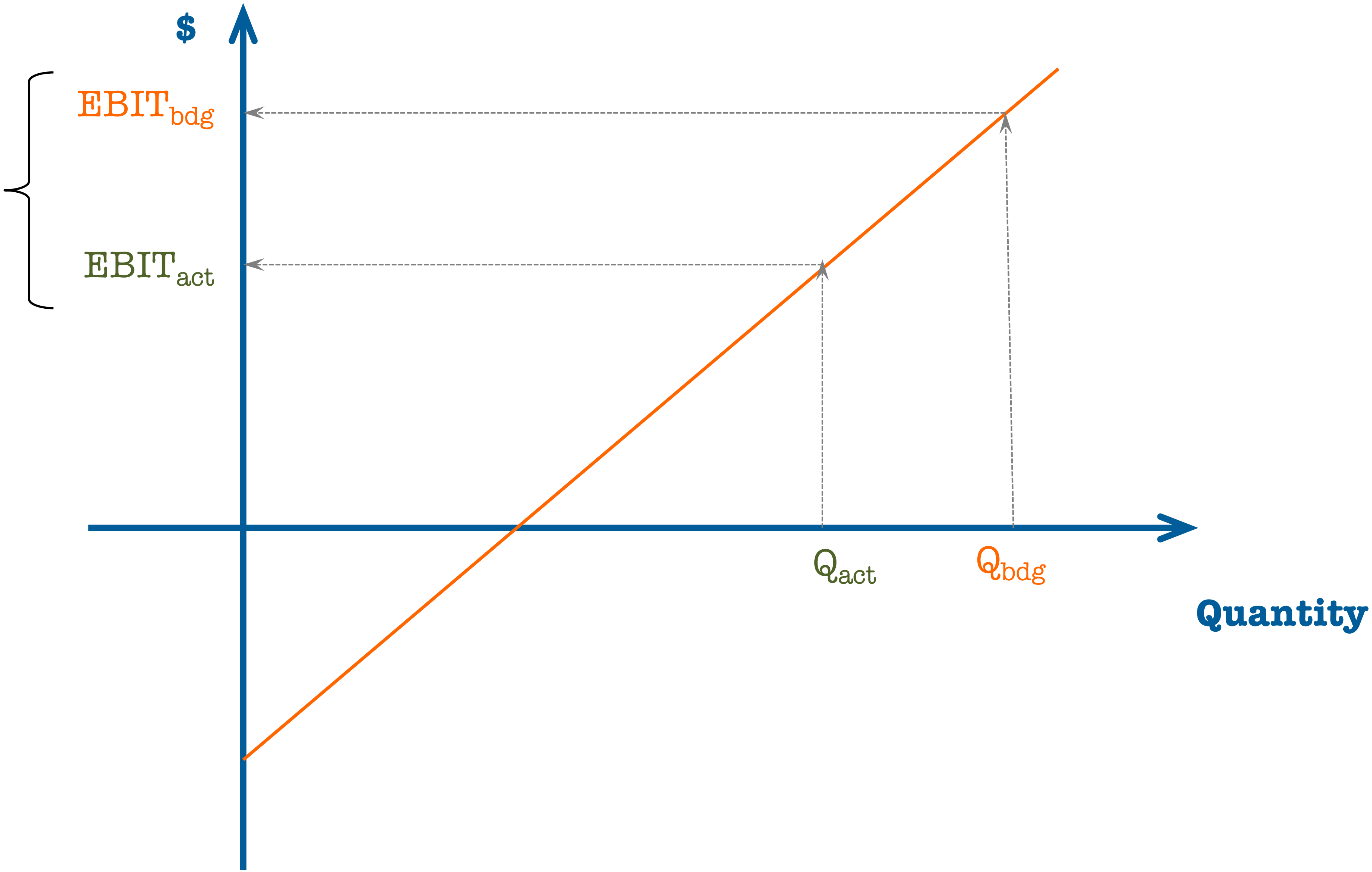
THREE COMPONENTS



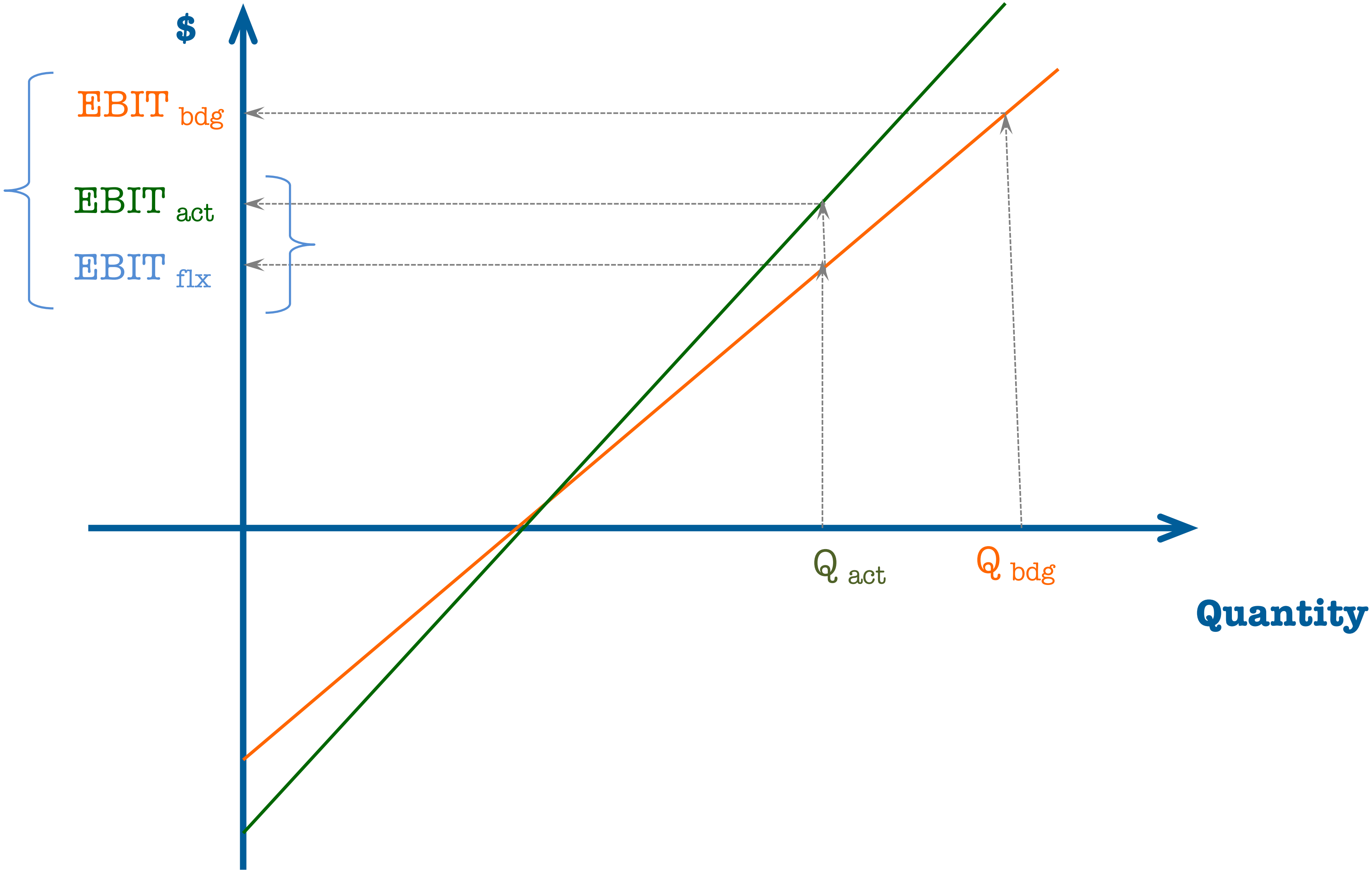
BUDEGT



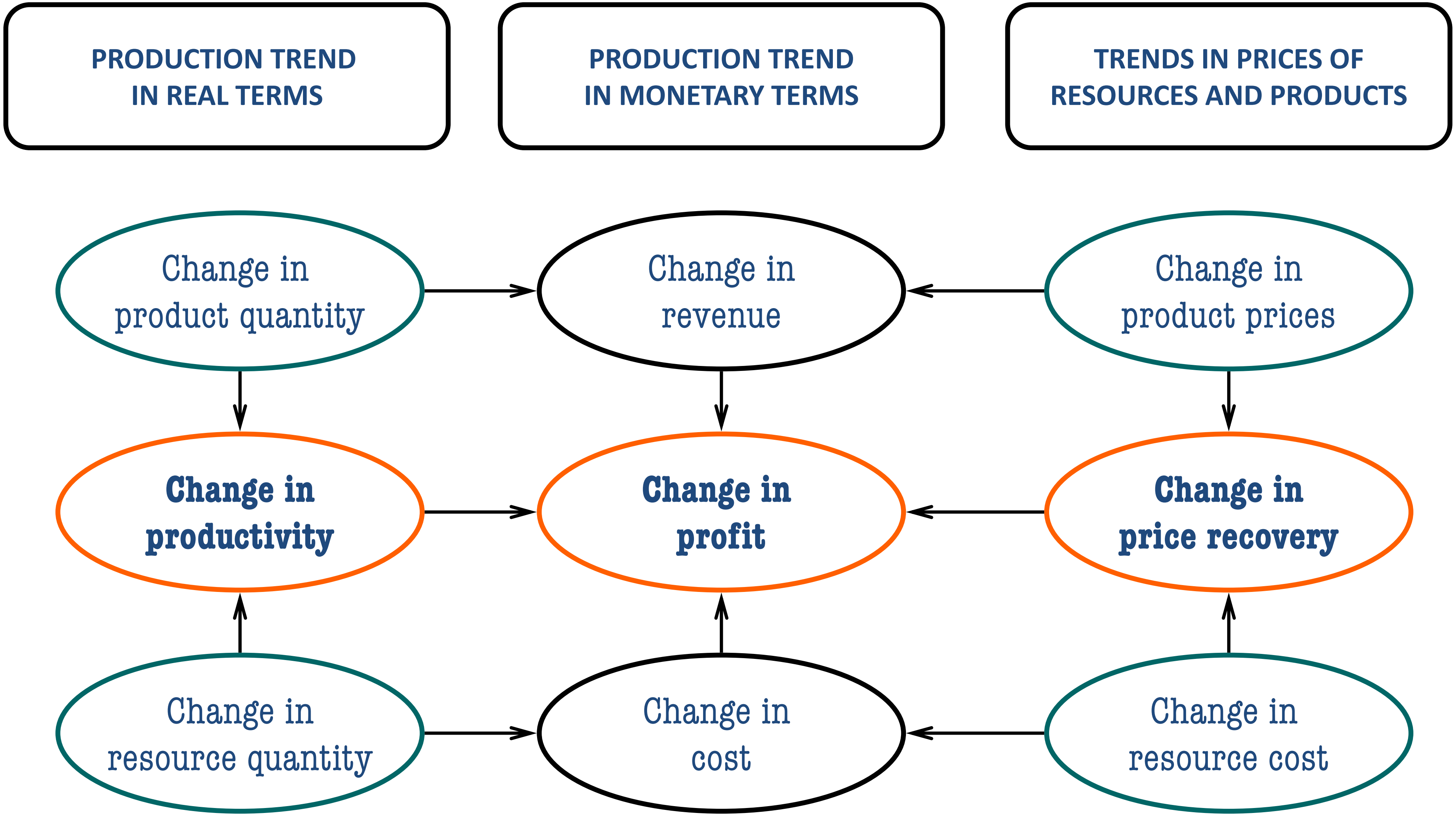
FLEXING THE BUDEGT



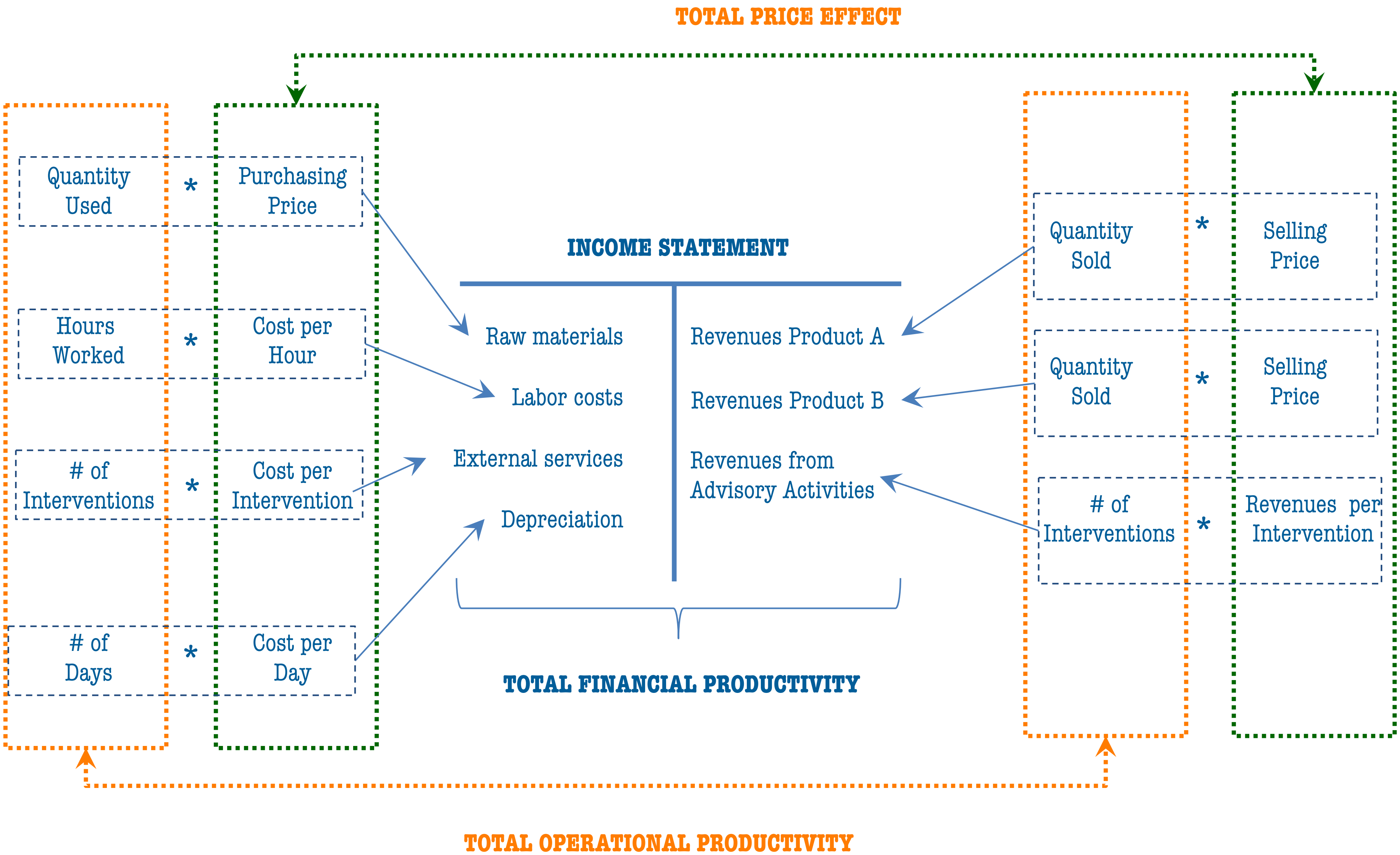
AGAIN: TWO COMPONENTS



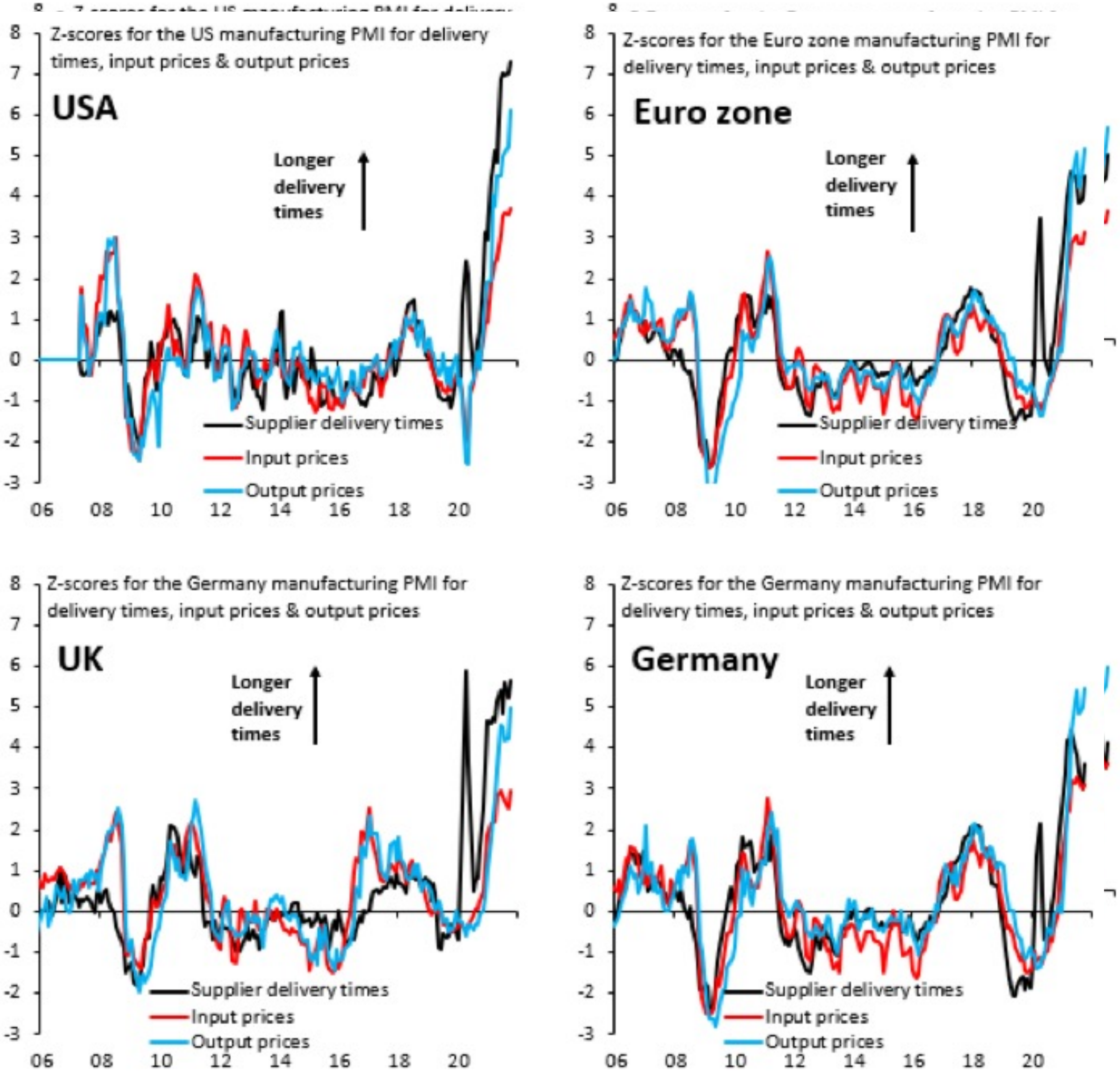
PROFITABILITY = PRODUCTIVITY + PRICE RECOVERY



SOME IMPORTANT RELATIONSHIPS



A GLIMPSE AT REAL DATA



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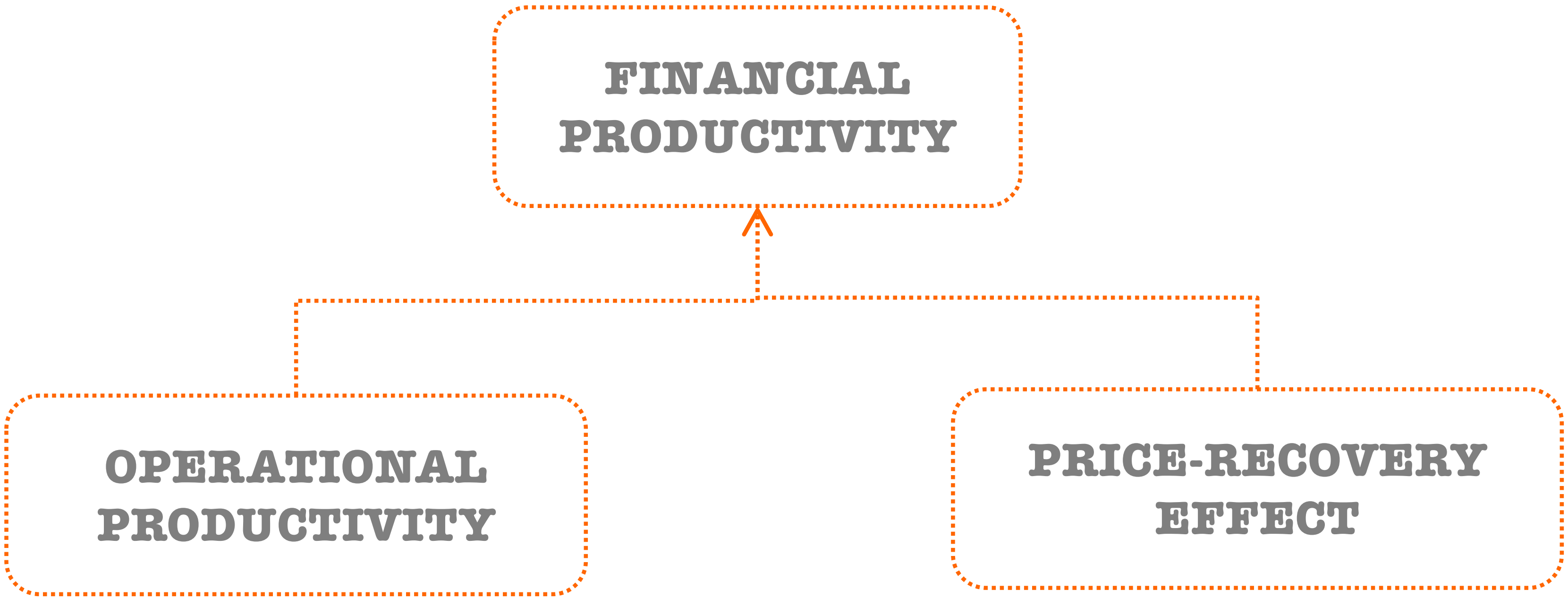
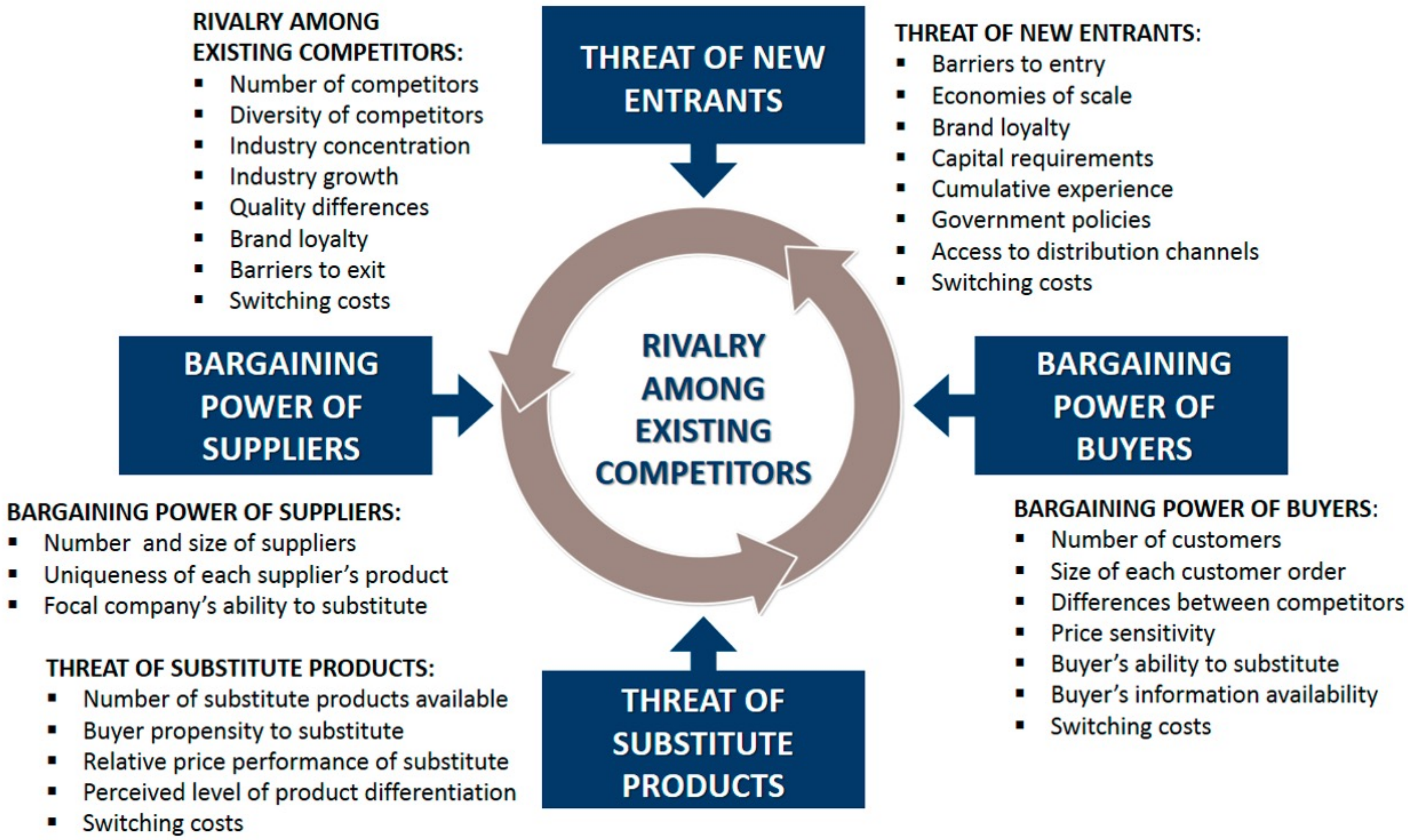
CAUSES AND EFFECT



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%**
- Interst expenses	-€	12.500	-4,70%
= EBT	**€**	**22.265**	**8,38%**
- Income taxes	-€	6.680	-2,51%
= EAT	**€**	**15.586**	**5,86%**

DIFFERENT PRIORITIES?

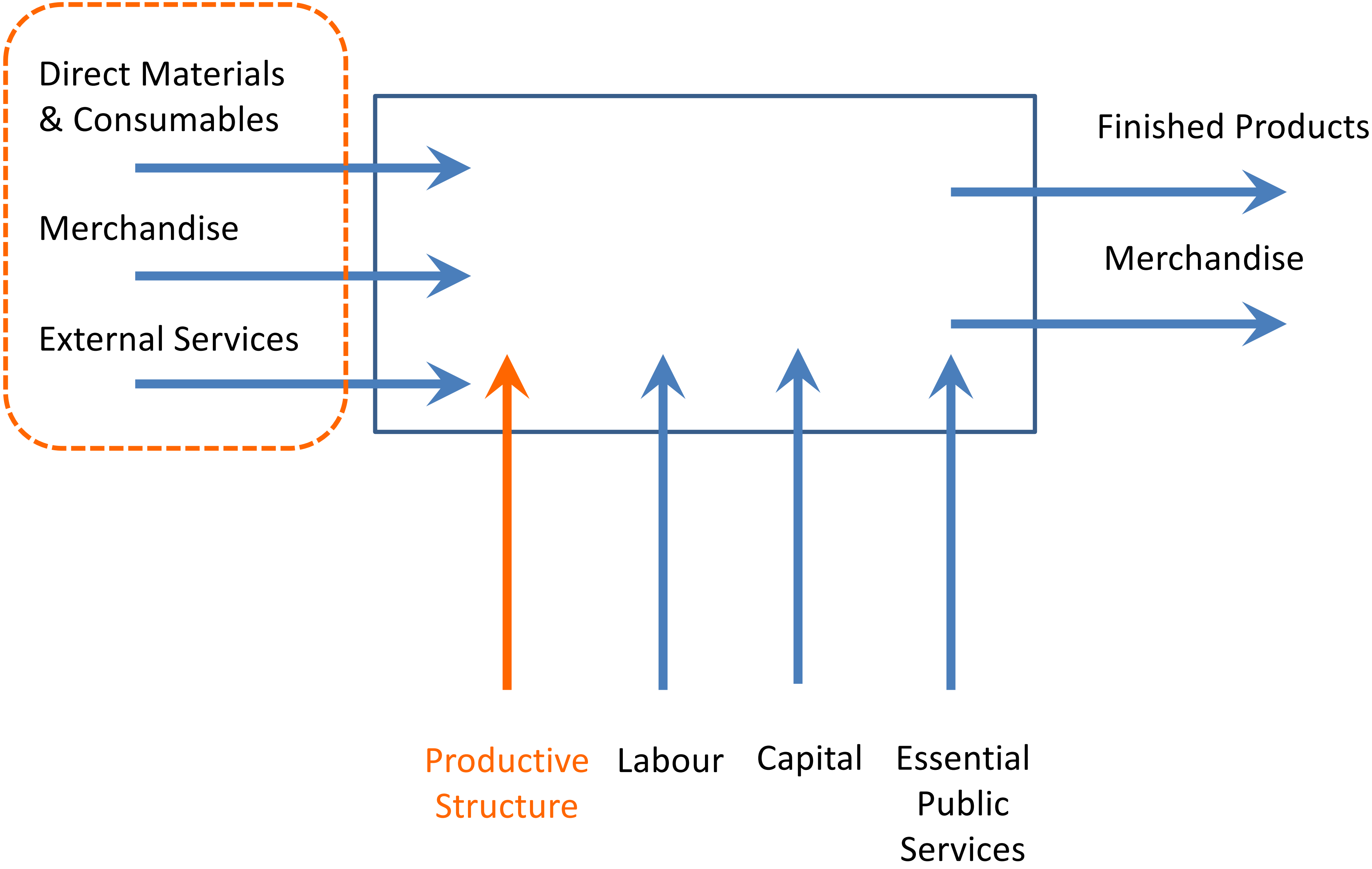
	COMPANY "A"	COMPANY "B"
+ TOTAL OUTPUT	100 €	100 €
- INTERMEDIATE CONSUMPTION	(10 €)	(60 €)
= ADDED VALUE	90 €	40 €
- OTHER OPERATING COSTS	(85 €)	(35 €)
= EBIT	5 €	5 €

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.

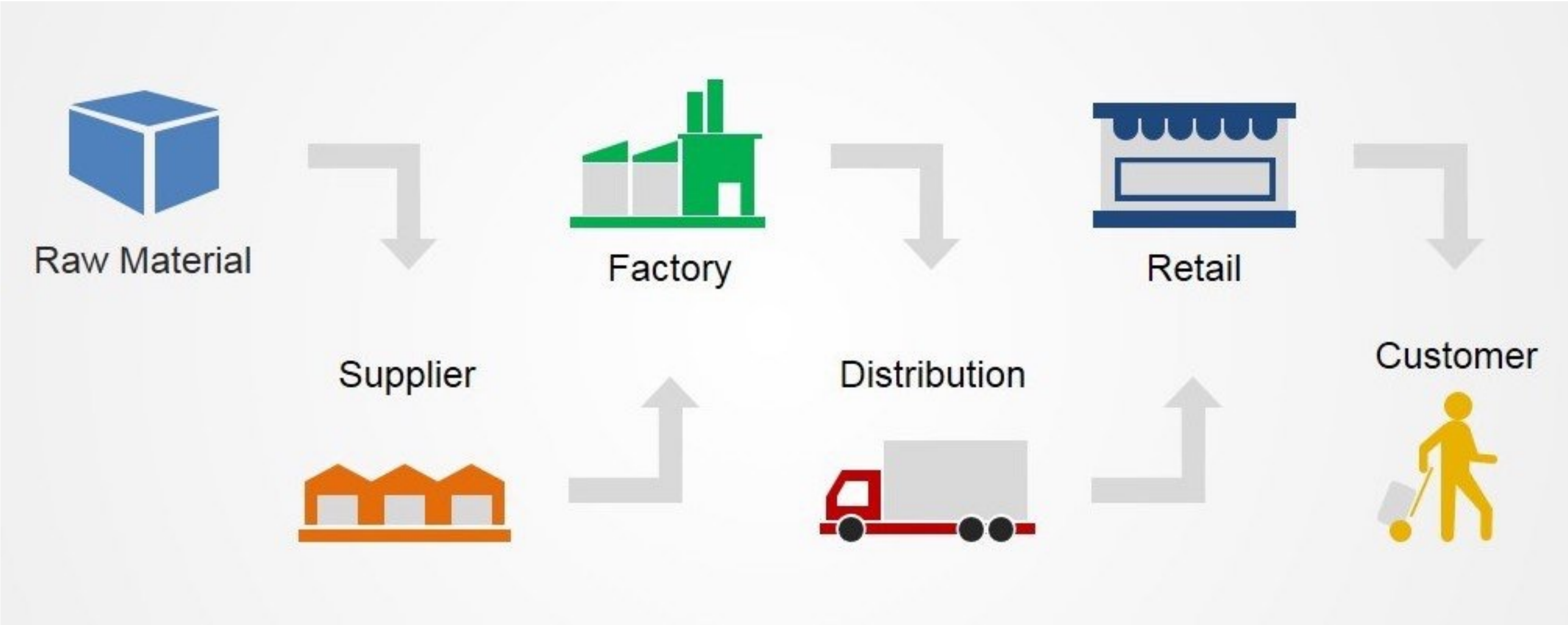
The value thus added is **ideally used to sequentially remunerate all the internal factors of production considered**, in a cascading process in which equity contributors are only rewarded in residual terms (with the possibility that instead of gaining value, they lose it to other parties)

ADDED VALUE



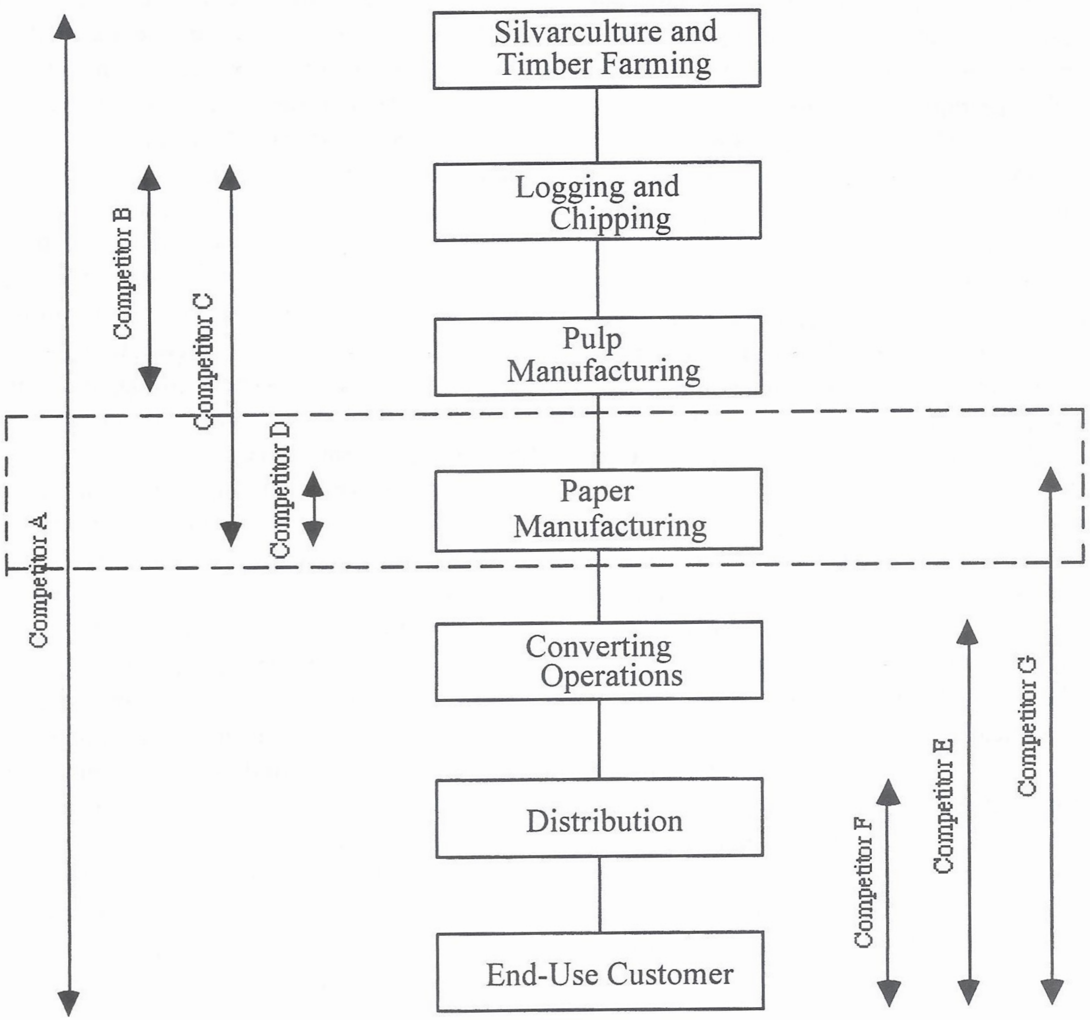
Direct Materials & Consumables
Merchandise
External Services
Finished Products
Merchandise
Productive Structure
Labour
Capital
Essential Public Services

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.

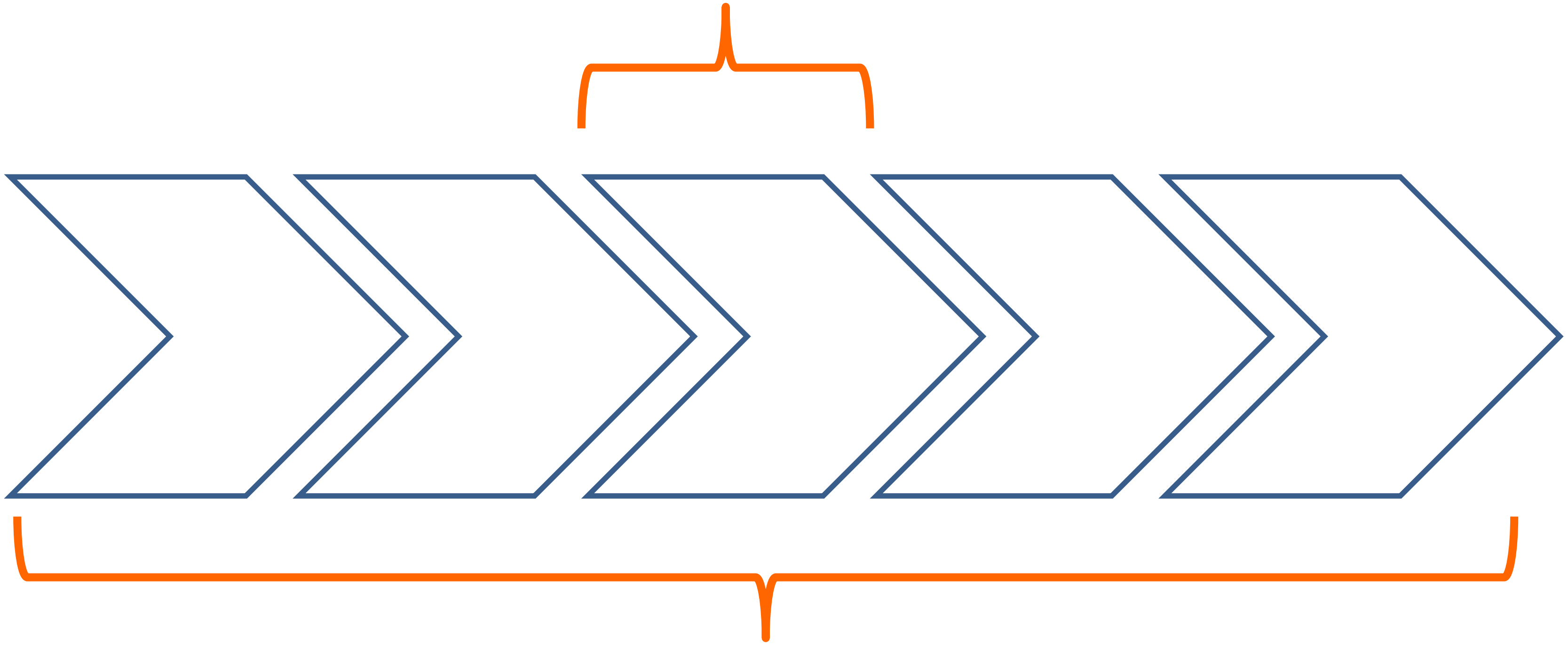
SUPPLY CHAIN IN THE PAPER PRODUCTS INDUSTRY



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.

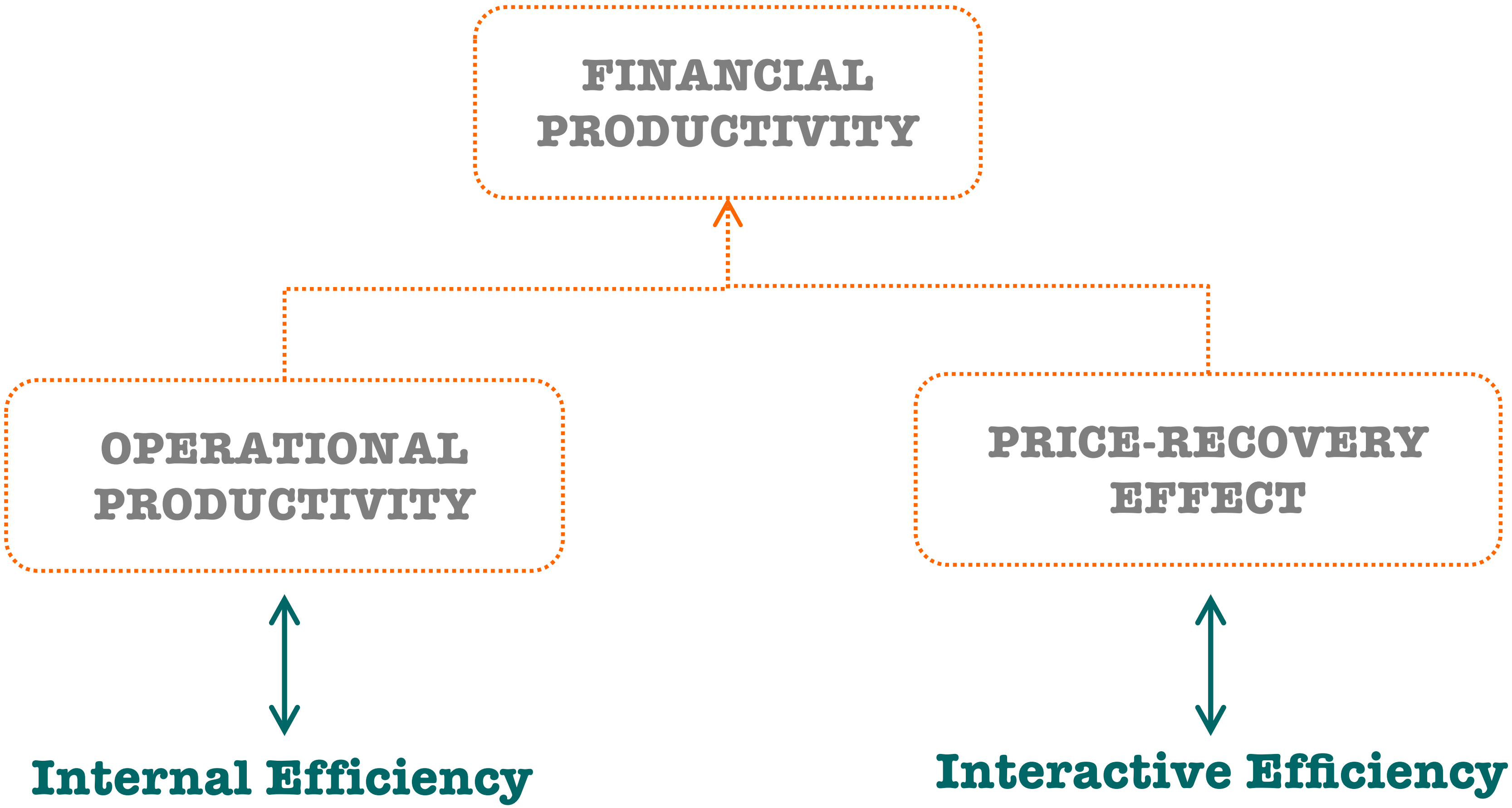
ANY CONNECTION?

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

DIFFERENT PRIORITIES?

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

CAUSES AND EFFECT



EFFICIENCY

1. OPERATIONAL PRODUCTIVITY

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

a) **Partial** ✔

b) **Total** ✘

2. FINANCIAL PRODUCTIVITY

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

a) **Partial** ✘

b) **Total** ✔

EFFICIENCY

1. **OPERATIONAL PRODUCTIVITY**
   a) **Partial** ✔
   b) **Total** ✘

2. **FINANCIAL PRODUCTIVITY**
   a) **Partial** ✘
   b) **Total** ✔

EFFICIENCY

1. **OPERATIONAL PRODUCTIVITY**

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

   a) **Partial**
   b) **Total**

2. **FINANCIAL PRODUCTIVITY**

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

   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%**

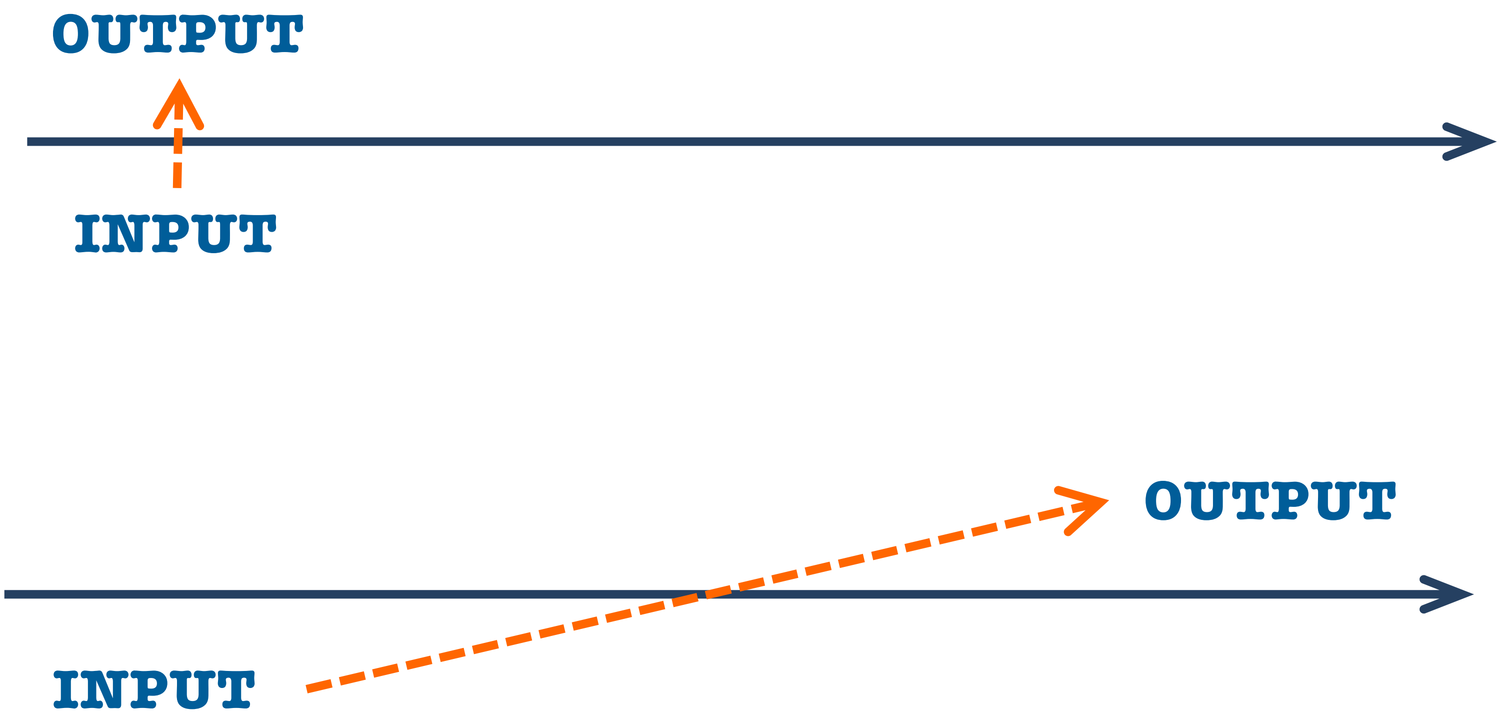
EFFICIENCY IN THE SHORT TERM

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

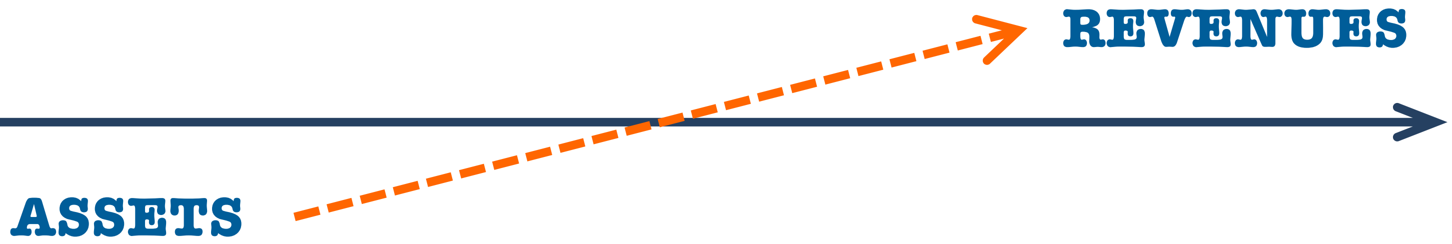
The "sacrifice" of economic resources is made in this period in order to be able to achieve an economic "benefit" in the same time frame. From an economic point of view this normally determines the incurrence of **one or more costs** and the attainment of **one or more revenues.**

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

TWO DIFFERENT ISTANCES



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**.

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

Debit side	Credit side
+ Short-term Assets	+ Short-term Liabilities
	+ Long-term Liabilities
+ Long-term Assets	+ Stockholder Equity

CAPITAL-EMPLOYED ANALYSIS OF THE BALANCE SHEET

Debit side	Credit side
+ Inventory + Operating Debtors − Operating Creditors	+ Financial Liabilities − Financial Assets
+ Fixed Assets	+ Stockholder Equity

SOLVENCY-AND-LIQUIDITY ANALYSIS

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	
Invertory (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	
Invertory (slow moving)	320		Long Term Loans	18.500	
Property, Plant & Equipment	9.050		**Long Term Liabilities**		**20.780**
Intellectual Property & Patents	1.300				
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*

SOLVENCY-AND-LIQUIDITY ANALYSIS

+ Current Assets	8.000
+ Long Term Assets	32.000
= Total Assets	**40.000**
- Current Liabilities	-5.920
- Long-Term Liabilities	-20.780
= Owner's Equity	**13.300**

R.O.I.

R.O.D.

R.O.E.

+ Sales Revenues	15.584
- C.O.G.S.	-5.300
= Gross Margin	**10.284**
- S. G. & A. Expenses	-6.800
+ Dividends from Strategic Investments	150
+ Interest Revenues, Dividends & Gains	308
= EBIT	**3.942**
- Interest Expenses	-1.106
= EBT	**2.836**
- Income Taxes	-993
= EAT	**1.843**

SOLVENCY-AND-LIQUIDITY ANALYSIS

$$ROI_{SL} = \frac{\text{EBIT}}{\text{TOTAL ASSETS}}$$

$$ROD_{SL} = \frac{\text{- INTEREST EXPENSES}}{\text{- TOTAL LIABILITIES}}$$

$$ROE^{BT} = \frac{\text{EARNINGS BEFORE TAX}}{\text{OWNERS' EQUITY}} \qquad ROE^{AT} = \frac{\text{EARNINGS AFTER TAX}}{\text{OWNERS' EQUITY}}$$

TWO DIFFERENT NATURES

BSE Company

Cash	300		Short Term Loans	1.200	
Accounts Receivable	1.950		Accounts Payable	1.500	
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Total Assets		*40.000*	*Total Liabilities + Shareholders' Equity*		*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	
Invertory (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	
Invertory (slow moving)	320		Long Term Loans	18.500	
Property, Plant & Equipment	9.050		**Long Term Liabilities**		**20.780**
Intellectual Property & Patents	1.300				
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

- 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	
Invertory (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	
Invertory (slow moving)	320		Long Term Loans	18.500	
Property, Plant & Equipment	9.050		**Long Term Liabilities**		**20.780**
Intellectual Property & Patents	1.300				
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*

CAPITAL-EMPLOYED ANALYSIS

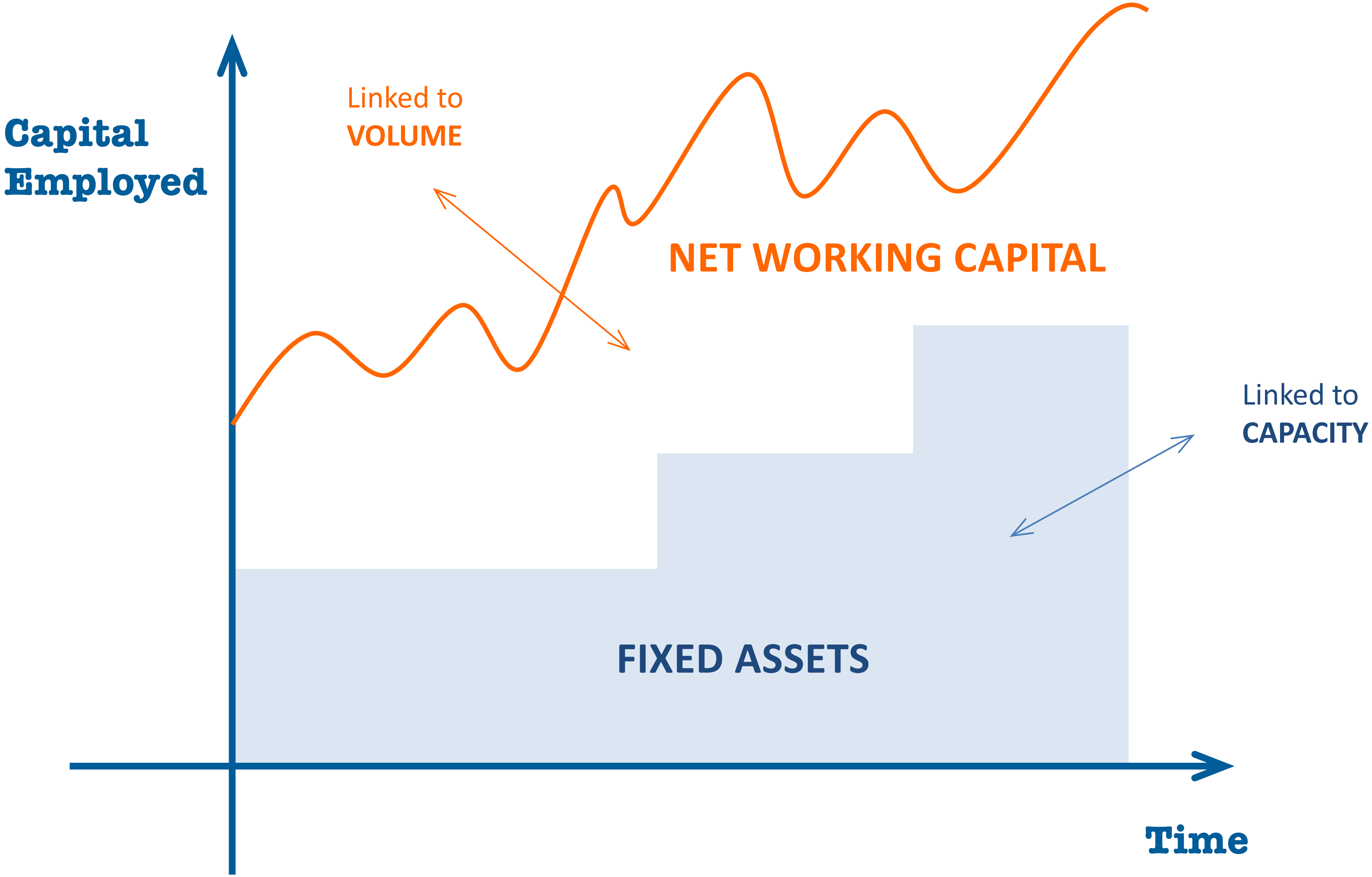
Also called to
NET FINANCIAL OBLIGATIONS (NFO)

BSE Company

+ Accounts Receivable		1.950		+ Short Term Loans		1.200	
+ Accruals and Prepaid expenses		230		+ Long Term Loans		18.500	
+ Other Operating Receivables (short terr		470		+ Financial Payables (short term)		2.420	
+ Invertory (short term)		2.900		- Financial Receivables (long term)	-	1.400	
+ Invertory (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		Share capital		2.000	
Net Working Capital			**1.290**	Paid in capital in excess of par		6.000	
				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**				
Net Capital Employed			*31.570*	*Sources of Net Capital Employed*			*31.570*

Also called to
NET OPERTATING ASSETS

CAPITAL-EMPLOYED ANALYSIS



CAPITAL-EMPLOYED ANALYSIS

+ Operating Debtors	2.650
+ Inventory	3.220
- Operating Creditors	-4.580
= Net Working Capital	**1.290**
+ Fixed Tangible Assets	9.050
+ Fixed Intangible Assets	5.930
+ Strategic Investments	15.300
= Capital Employed	**31.570**
- Net Financial Debt	-18.270
= Owner's Equity	**13.300**

R.O.I.

R.O.D.

R.O.E.

+ Sales Revenues	15.584
- C.O.G.S.	-5.300
= Gross Margin	**10.284**
- S. G. & A. Expenses	-6.800
+ Dividends from Strategic Investments	150
= EBIT	**3.634**
- Interest Expenses	-1.106
+ Interest Revenues, Dividends & Gains	308
= EBT	**2.836**
- Income Taxes	-993
= EAT	**1.843**

Please note: I purposely did not want to change the names of the different ratios. As a matter of fact, in the considerations we are making, the terms "return on investment" or "return on debt" or "return on equity" should be understood as "families, groups, of indicators" rather than as specific indicators calculated in a given way.

CAPITAL-EMPLOYED ANALYSIS

$$ROI_{CE} = \frac{\overbrace{EBIT_{SL} - \text{INCOME FROM FINANCIAL ASSETS}}^{EBIT_{CE}}}{\underbrace{\text{TOTAL ASSETS} - \text{FINANCIAL ASSETS} - \text{OPERATING DEBTS}}_{\text{NET CAPITAL EMPLOYED}}}$$

$$ROD_{CE} = \frac{\overbrace{-\text{ INTEREST EXPENSES} + \text{INCOME FROM FINANCIAL ASSETS}}^{\text{FINANCIAL OPERATIONS NET INCOME}}}{\underbrace{-\text{ TOTAL LIABILITIES} + \text{OPERATING DEBTS} + \text{FINANCIAL ASSETS}}_{\text{NET FINANCIAL OBLIGATIONS}}}$$

$$ROE^{BT} = \frac{\text{EARNINGS BEFORE TAX}}{\text{OWNERS' EQUITY}} \qquad ROE^{AT} = \frac{\text{EARNINGS AFTER TAX}}{\text{OWNERS' EQUITY}}$$

SOLVENCY-AND-LIQUIDITY ANALYSIS

What the company **owns** | What the company **owes**

Assets | **Liabilities** | **Net Equity**

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	
Invertory (short term)	2.900		Other Operating Payables	400	
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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*

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							Net Financial Obligations / Net Equity
+ Accounts Receivable		1.950		+ Short Term Loans		1.200	
+ Accruals and Prepaid expenses		230		+ Long Term Loans		18.500	
+ Other Operating Receivables (short terr		470		+ Financial Payables (short term)		2.420	
+ Invertory (short term)		2.900		- Financial Receivables (long term)	-	1.400	
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				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**				
Net Capital Employed			*31.570*	*Sources of Net Capital Employed*			*31.570*

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)

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.

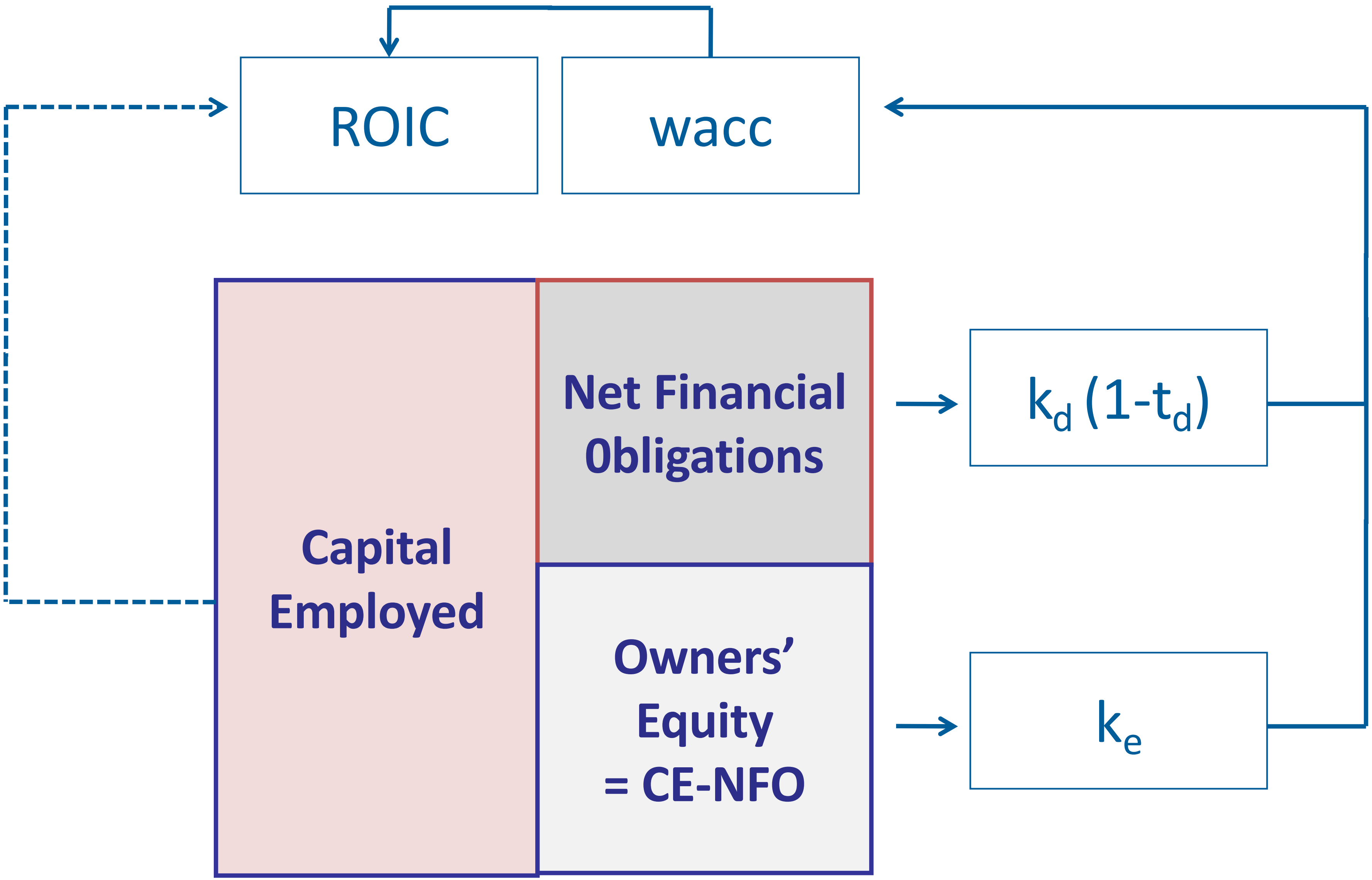
FLAWED GOALS

"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.

CREATING VALUE



WEIGTHED AVERAGE COST OF CAPITAL

NFO → $K_d \times (1-t_d) \times w_d$

$+$

Owners' Equity → $K_e \times w_e$ ↔ $K_e = r_f + (r_m - r_f) \times \beta$

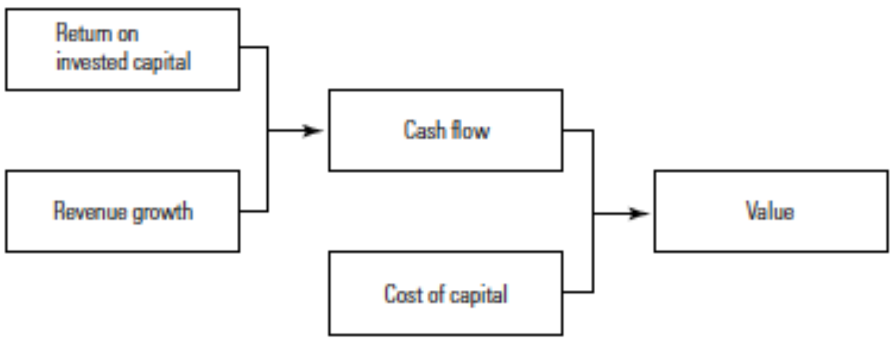
$=$

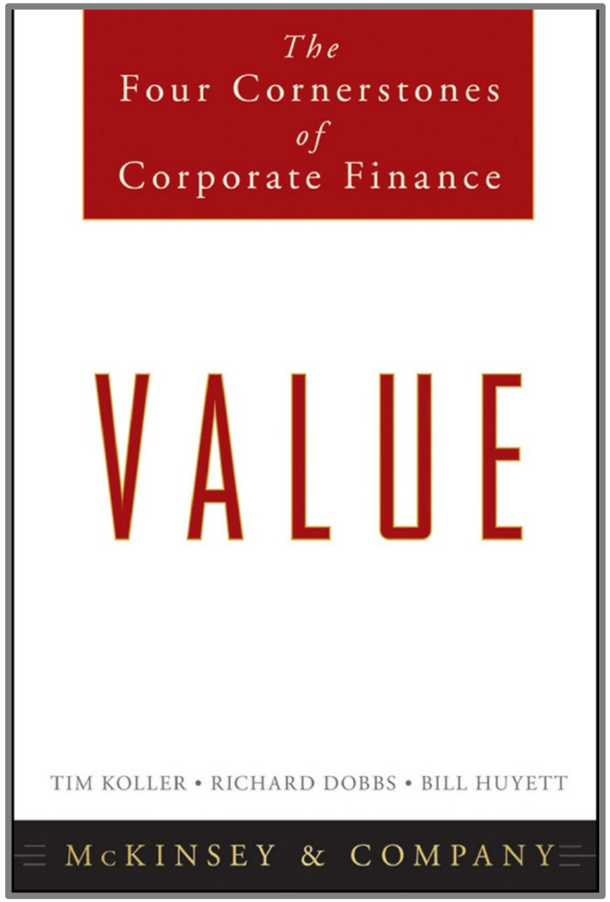
WACC

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

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

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.

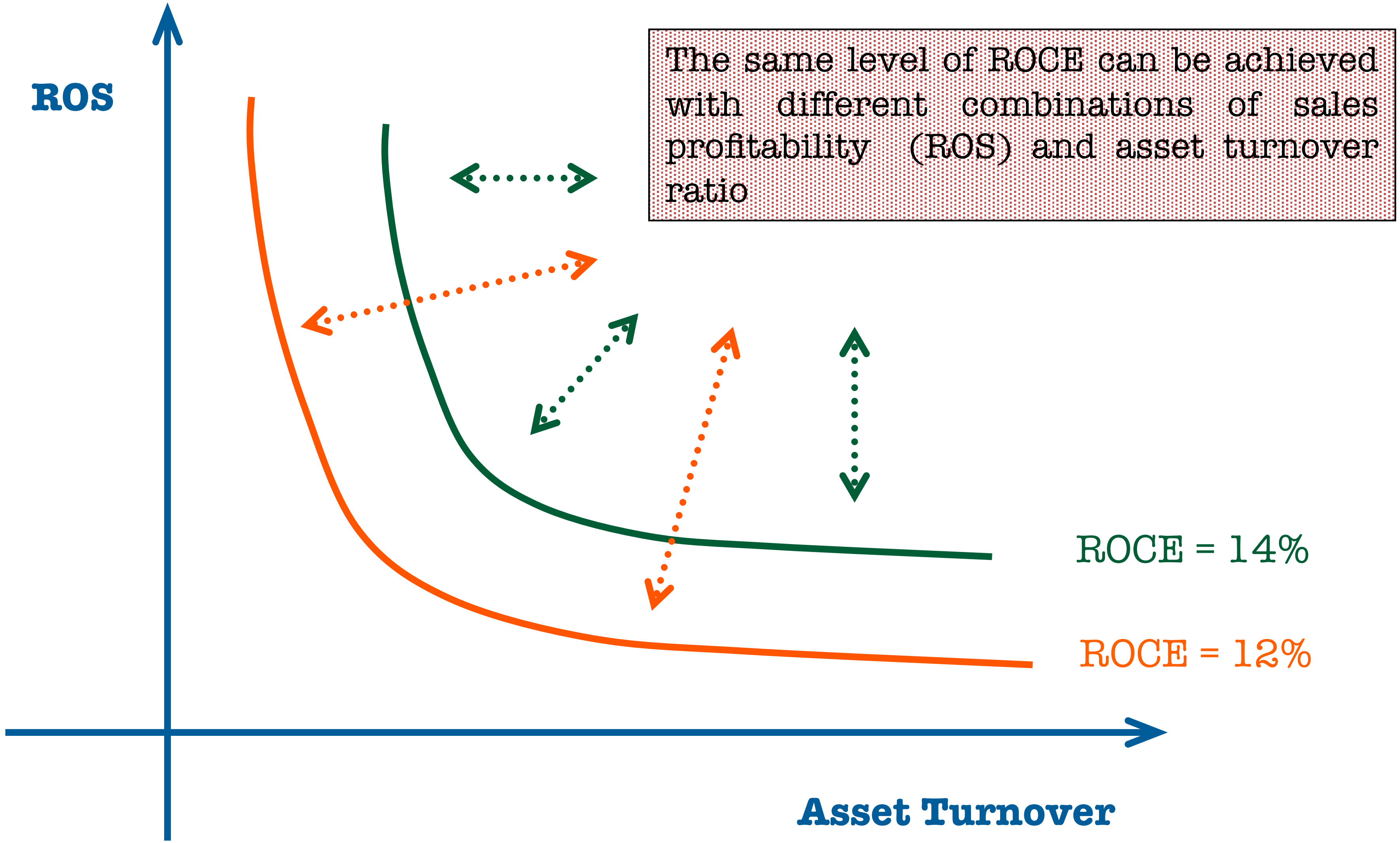
TURNOVER RATIOS

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.

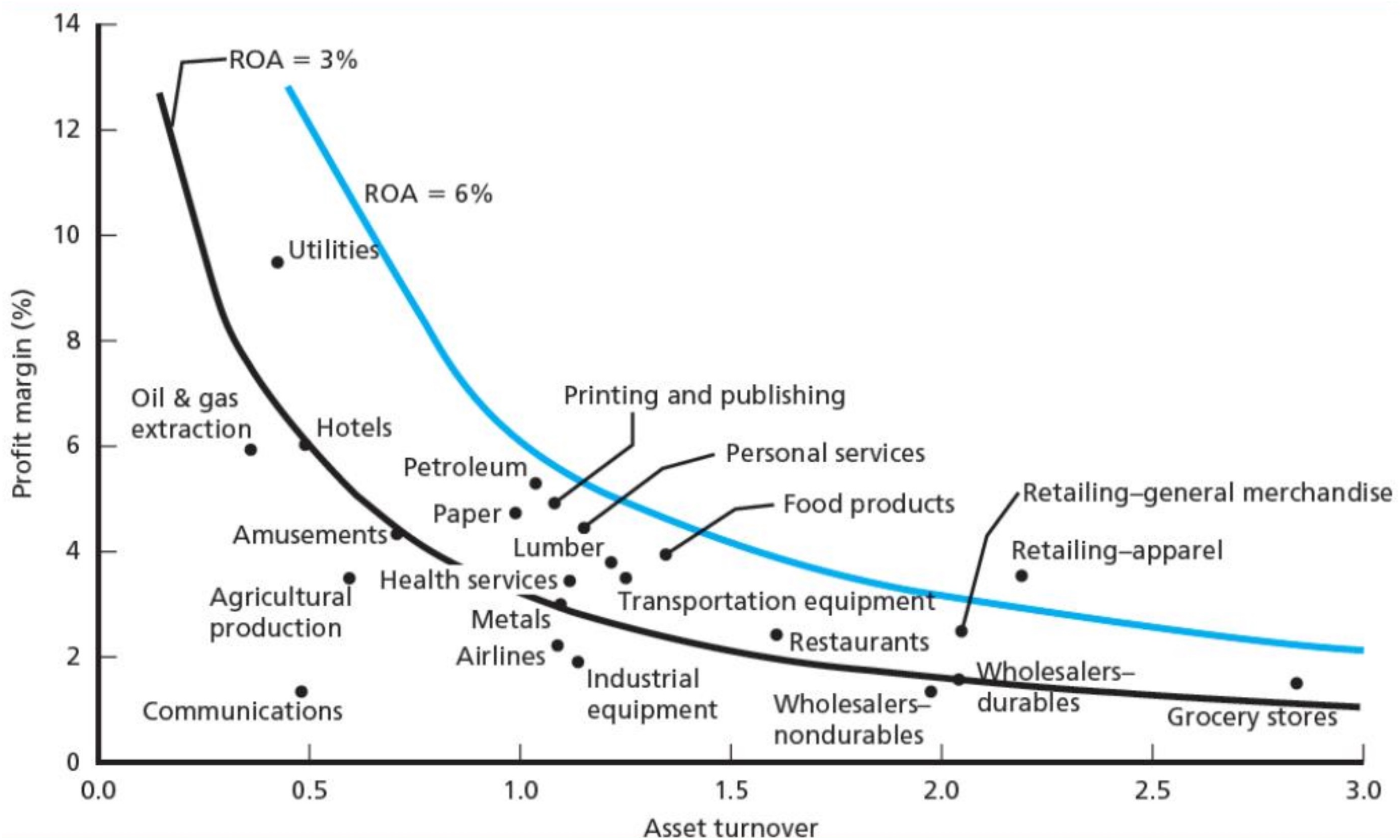
Turnover ratios include:

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

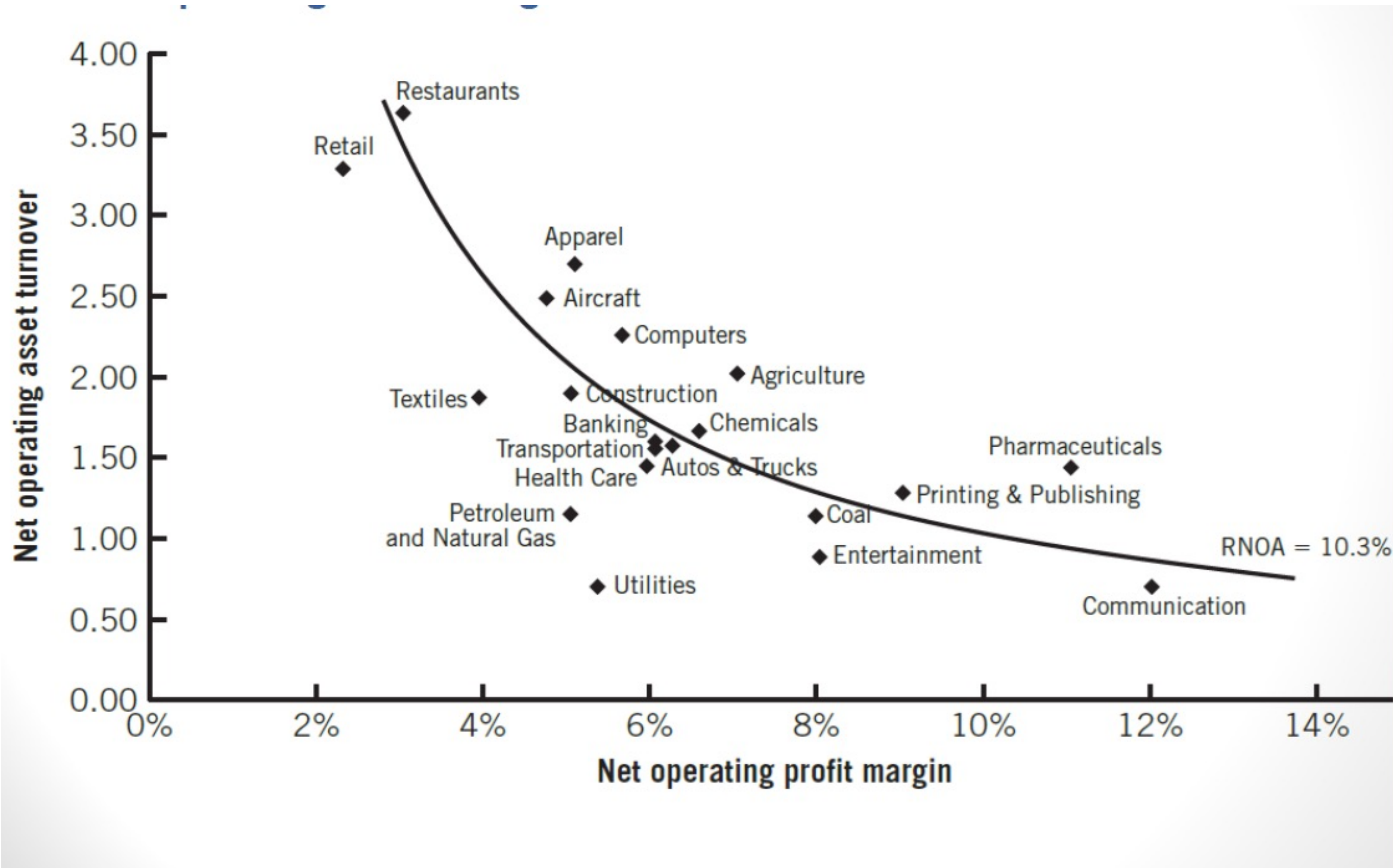
DISAGGREGATION OF ROCE



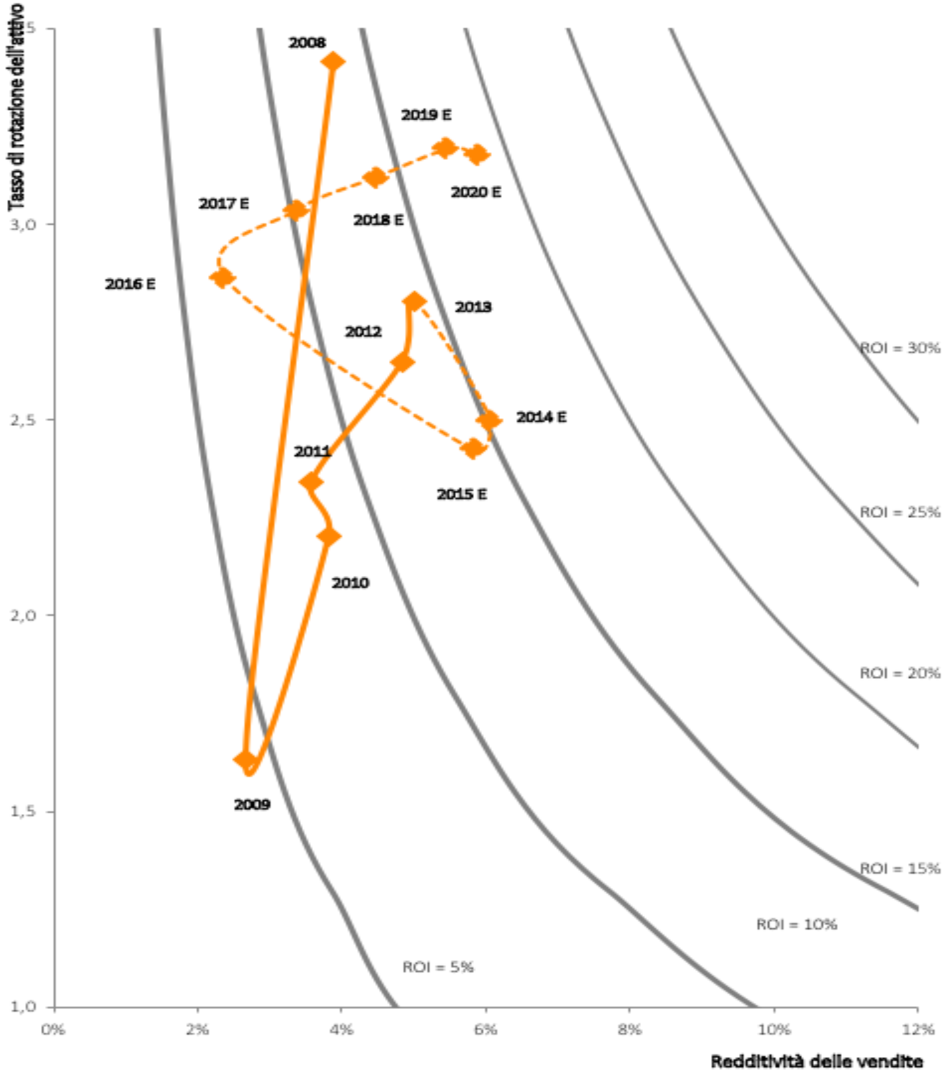
DISAGGREGATION OF ROCE (ROA) IN REAL LIFE



DISAGGREGATION AT A DIFFERENT LEVEL



DISAGGREGATION OF ROCE IN REAL LIFE



STORE PROFITABILITY ANALYSIS

RETURN ON CAPITAL EMPLOYED		
19,39%		
EBIT:	€	124.300
CAPITAL EMPLOYED:	€	641.000

RETURN ON INVENTORY		
42,14%		
EBIT:	€	124.300
INVENTORY:	€	295.000

RETURN ON SALES		
25,54%		
EBIT:	€	124.300
SALES REVENUE:	€	486.750

GROSS PROFITABILITY		
73,46%		
GROSS MARGIN:	€	357.567
SALES REVENUE:	€	486.750

LABOR COST IMPACT		
40,18%		
LABOR COSTS:	€	195.600
SALES REVENUE:	€	486.750

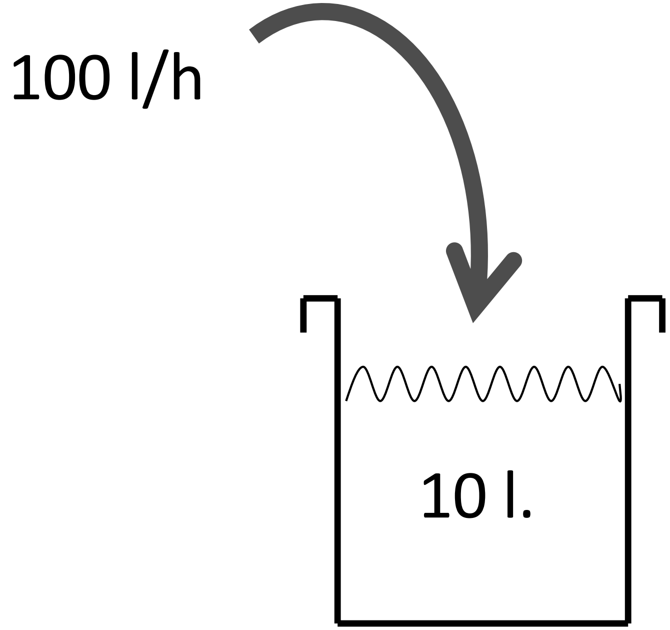
RENTAL IMPACT		
28,50%		
RENTAL COSTS:	€	138.700
SALES REVENUE:	€	486.750

OTHER EXPENSENS IMPACT		
4,78%		
OTHER EXPENSES:	€	23.267
SALES REVENUE:	€	486.750

INVENTORY TURNOVER		
1,65		
SALES REVENUE:	€	486.750
INVENTORY:	€	295.000

INVENTORY INCIDENCE		
46,02%		
INVENTORY:	€	295.000
CAPITAL EMPLOYED:	€	641.000

BACK TO ELEMENTARY SCHOOL

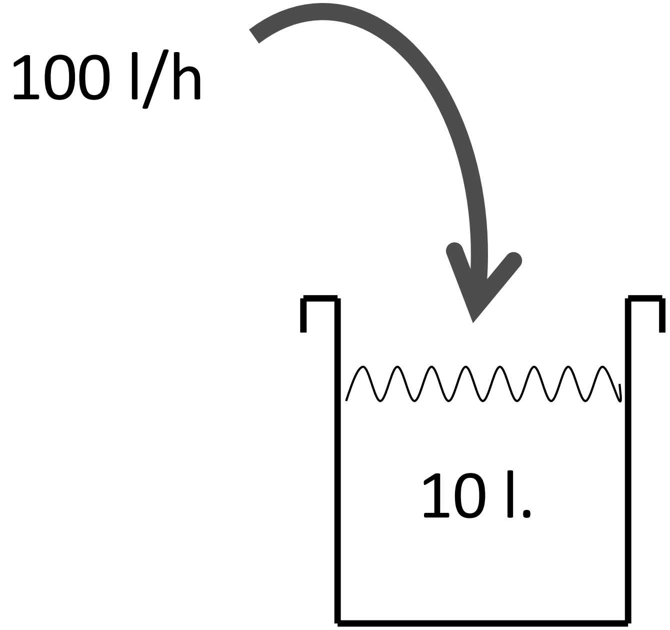


A tap leaks 100 litres of water every hours into a 10 litres container.

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:

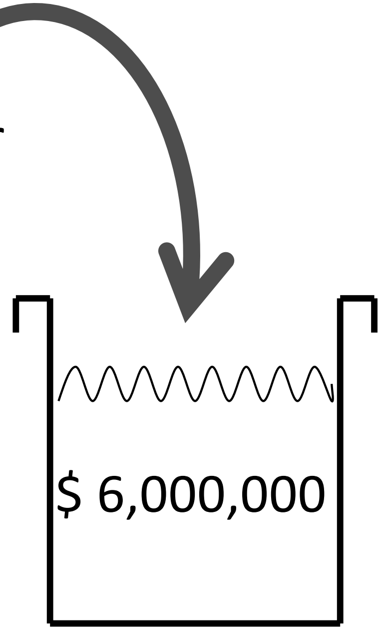
$$\frac{100\ \text{l/h}}{10\ \text{l.}} = 10\ \text{times/hour}$$

Time required :

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

BACK TO ELEMENTARY SCHOOL

$ 2,400,000 per year



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

$$\frac{\text{Sales}}{\text{Capital Employed}} = \frac{1}{\boxed{\dfrac{\text{Capital Employed}}{\text{Sales}}}}$$

It is easier to decompose from a mathematical point of view

$$\frac{\text{Capital Employed}}{\text{Sales}} = \boxed{\frac{\text{Fixed Assets}}{\text{Sales}}} + \boxed{\frac{\text{Net Working Capital}}{\text{Sales}}}$$

$$\frac{\text{Net Working Capital}}{\text{Sales}} = \boxed{\frac{\text{Accounts Receivables}}{\text{Sales}}} + \boxed{\frac{\text{Inventory}}{\text{Sales}}} - \boxed{\frac{\text{Account Payables}}{\text{Sales}}}$$

MANAGING ASSET TURNOVER

$$\frac{\text{Sales}}{\text{Capital Employed}} = \frac{1}{\dfrac{\text{Capital Employed}}{\text{Sales}}}$$

Short Term Decisions

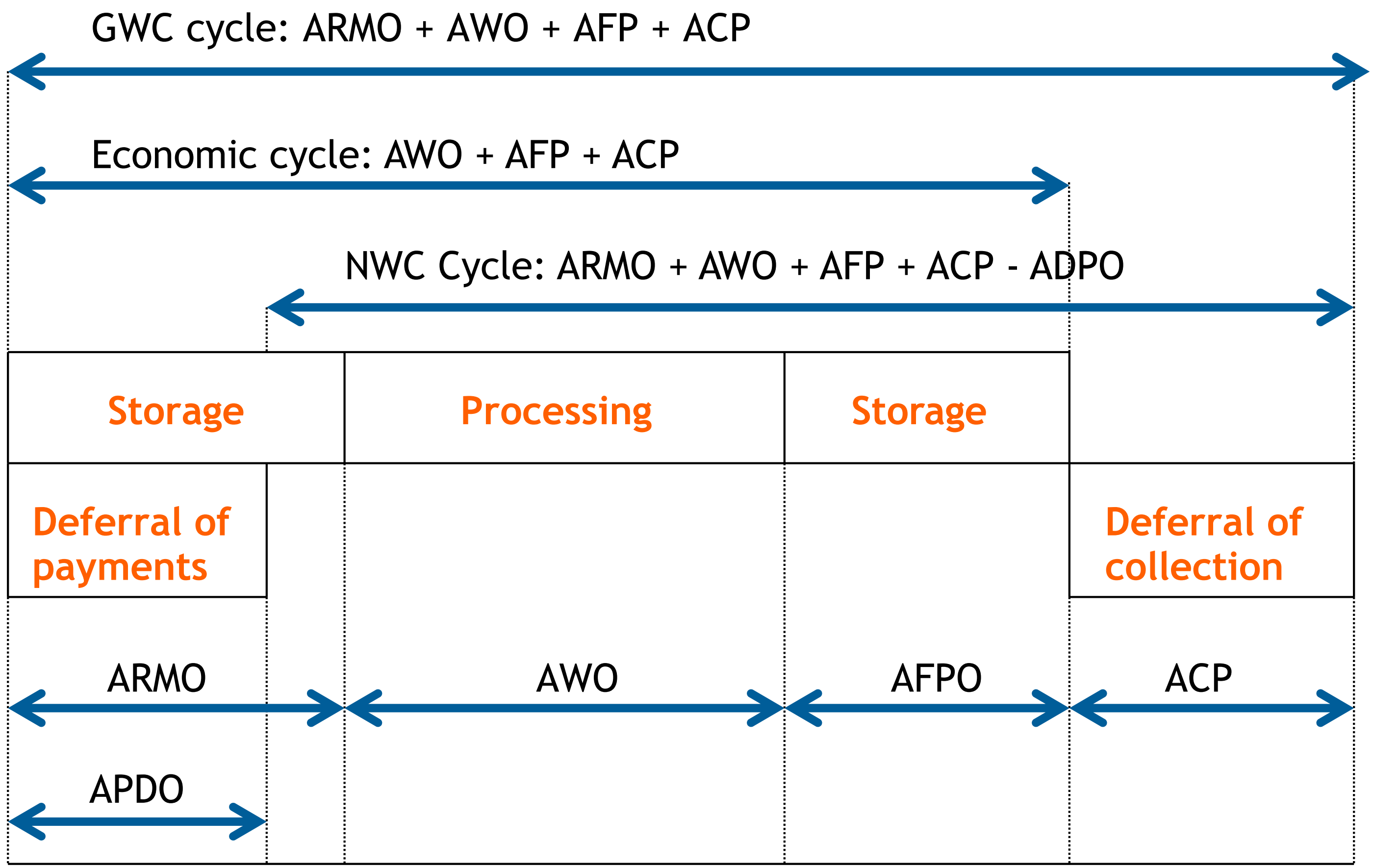
Long Term Decisions

$$\frac{\text{Fixed Assets}}{\text{Sales}} + \frac{\text{Net Working Capital}}{\text{Sales}}$$

$$\frac{\text{Accounts Receivables}}{\text{Sales}} + \frac{\text{Inventory}}{\text{Sales}} - \frac{\text{Account Payables}}{\text{Sales}}$$

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.

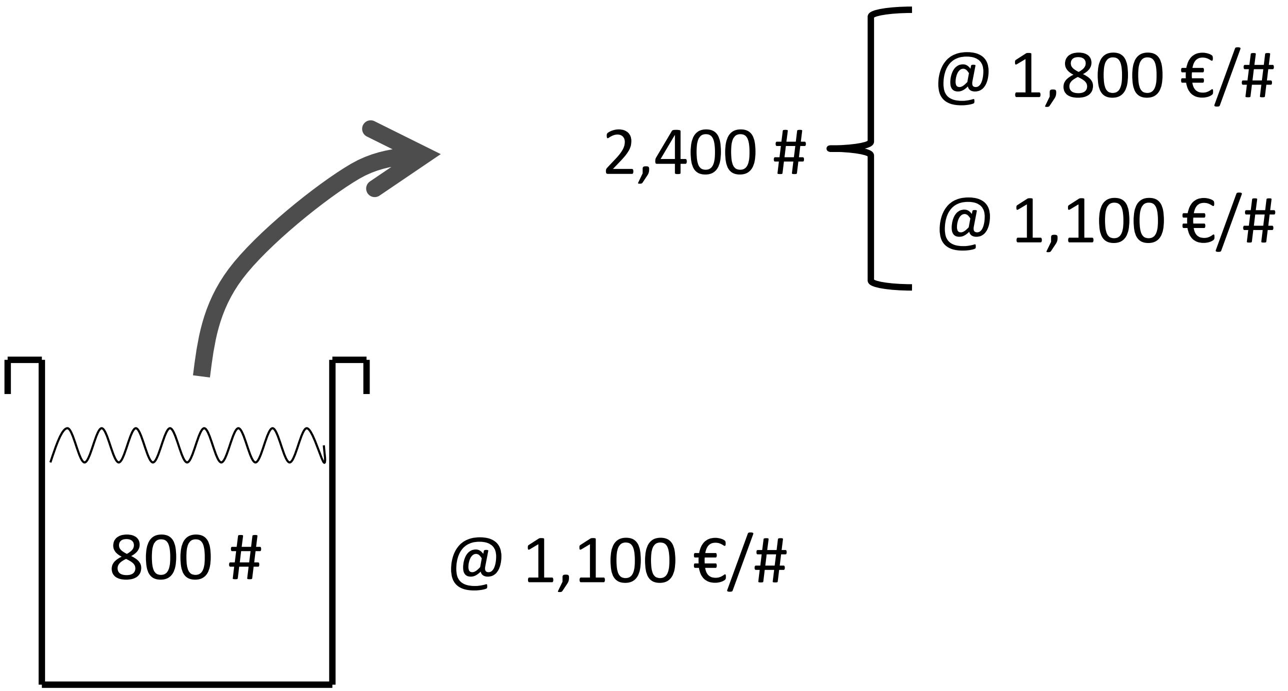
Required:

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

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

$$= \frac{\text{COGS}}{\text{Inventory}} * \frac{\text{Sales}}{\text{COGS}}$$

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

$$= \frac{\text{Inventory}}{\text{COGS}} * 360 * \frac{\text{COGS}}{\text{Sales}}$$

RAW MATERIALS INVENTORY

$$\text{Raw materials turnover rate} = \frac{\text{Sales}}{\text{Inventory}}$$

$$= \frac{\text{Consumption}}{\text{Inventory}} * \frac{\text{COGS}}{\text{Consumption}} * \frac{\text{Sales}}{\text{COGS}}$$

$$\text{Raw materials days outstanding} = \frac{\text{Inventory}}{\text{Sales}} * 360$$

$$= \frac{\text{Inventory}}{\text{Consumption}} * 360 * \frac{\text{Consumption}}{\text{COGS}} * \frac{\text{COGS}}{\text{Sales}}$$

OPERATING DECISIONS

- EARNINGS AFTER TAX / SHAREHOLDERS' EQUITY
  - EARNINGS BEFORE TAX / SHAREHOLDERS' EQUITY
    - EARNINGS BEFORE INTEREST & TAXES / NET CAPITAL EMPLOYED
      - EARNINGS BEFORE INTEREST & TAXES / SALES REVENUE
      - SALES REVENUE / NET CAPITAL EMPLOYED
        - NET CAPITAL EMPLOYED / SALES REVENUE
          - NET WORKING CAPITAL / SALES REVENUE
          - FIXED ASSETS / SALES REVENUE
    - CAPITAL EMPLOYED / SHAREHOLDERS' EQUITY
    - EARNINGS BEFORE TAX / EARNINGS BEFORE INTEREST & TAXES
  - EARNINGS AFTER TAX / EARNINGS BEFORE TAX

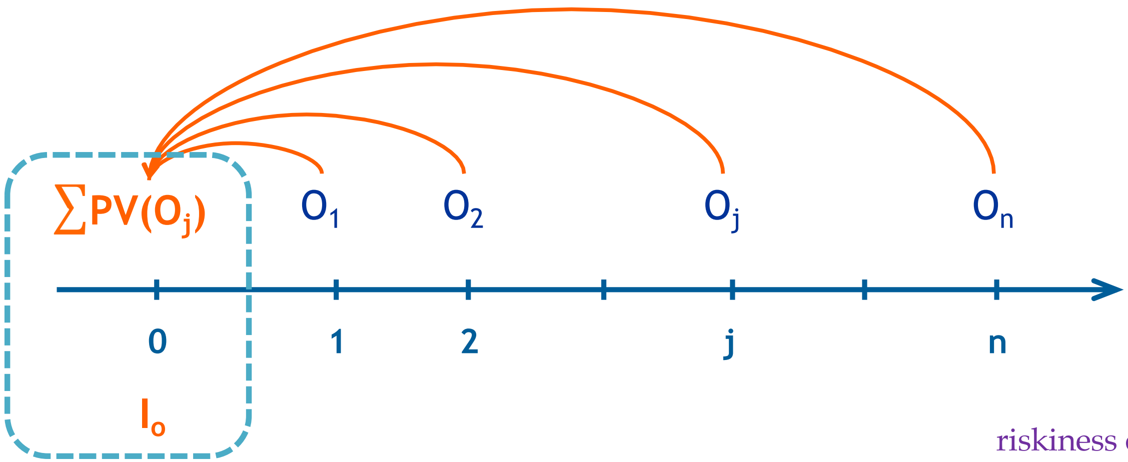
ABC Company Vertical Analysis

	Year 1	Year 2	Year 3
Sales	100%	100%	100%
Cost of Goods Sold	30%	29%	40%
Gross Profit	**70%**	**71%**	**60%**
Salaries	24%	23%	30%
Rent	6%	6%	5%
Marketing	5%	5%	10%
Utilities	1%	1%	1%
Other expenses	2%	2%	2%
Total Expenses	**38%**	**37%**	**48%**
Net Income	**32%**	**34%**	**12%**

CAPITAL INVESTMENTS

This slide concerns concepts that have only been partially examined and will not be assessed in the exam

«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».



$$PV(O_j) = \frac{O_j}{(1+r)^j}$$

riskiness of future flows

$$r = \boxed{r_f} + \boxed{(r_m - r_f) \times \beta}$$

time value of money

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

CAPITAL INVESTMENTS

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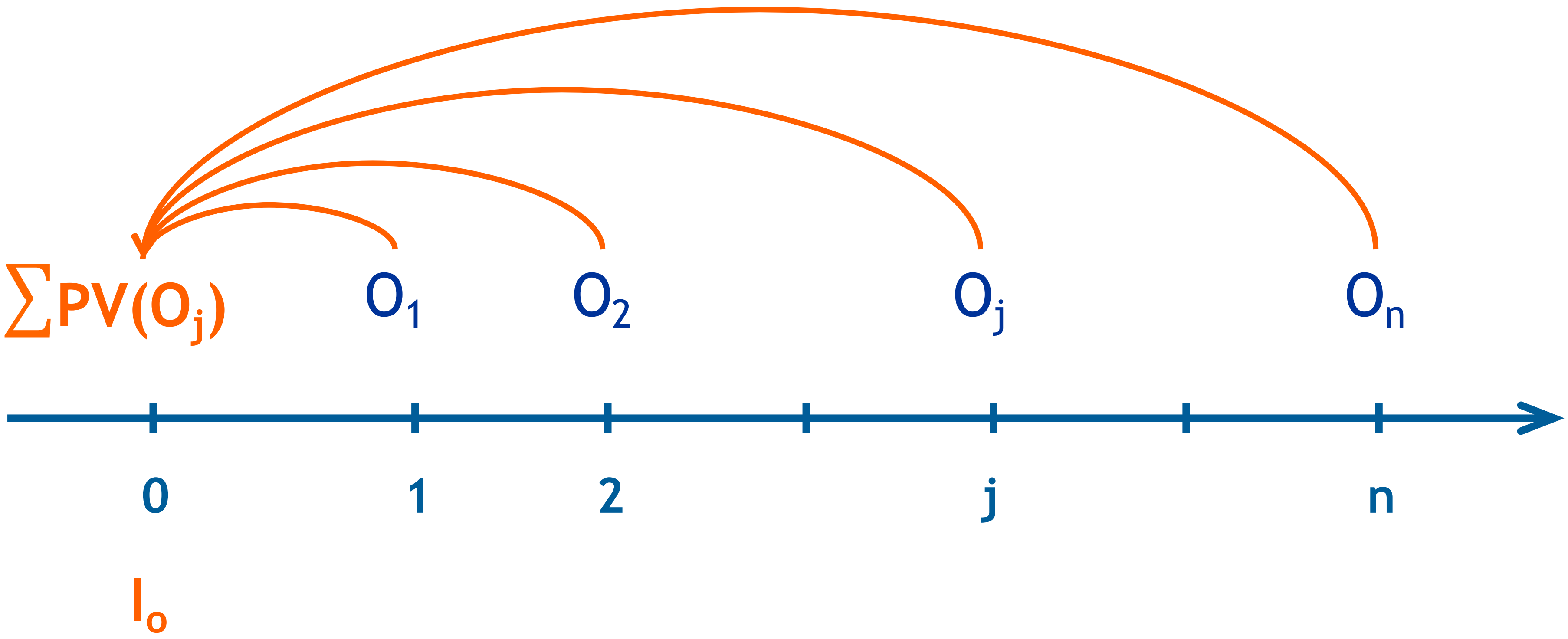


$$\frac{\sum PV(O_j)}{I_o} > 1$$

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

VALUE BASED MANAGEMENT

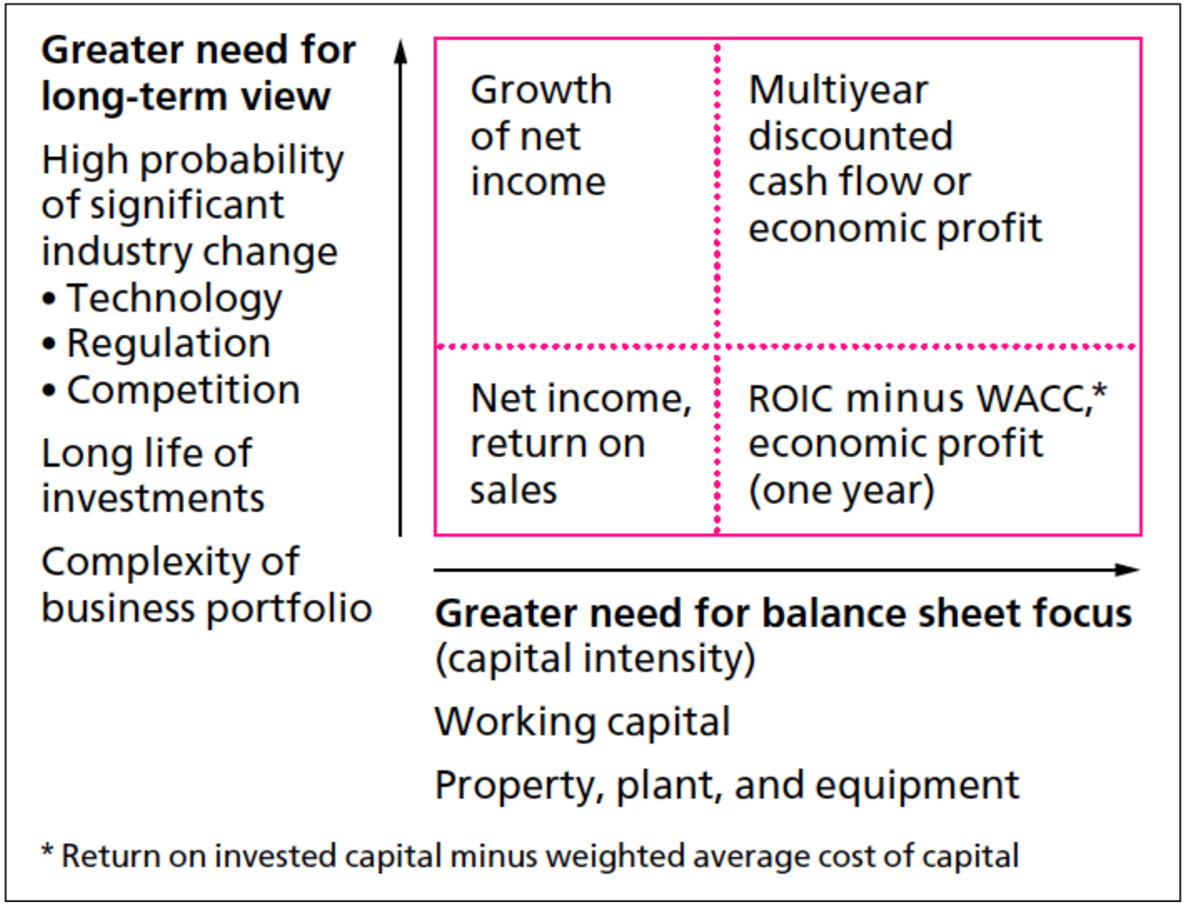
«The thinking behind VBM is simple. The value of a company is determined by its discounted future cash flows. Value is created only when companies invest capital at returns that exceed the cost of that capital. VBM extends these concepts by focusing on how companies use them to make both major strategic 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

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.

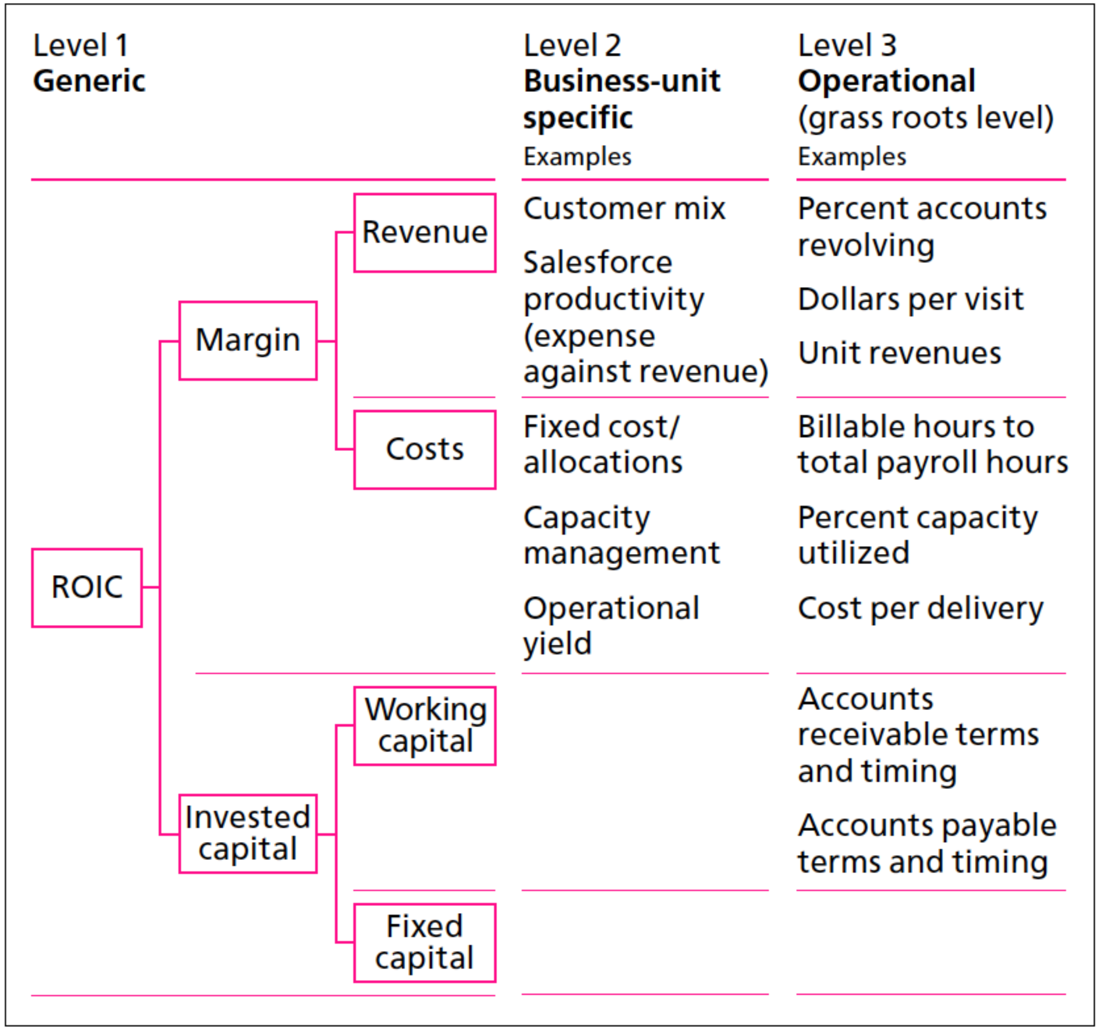
A value driver is any variable that affects the value of the company. To be useful, however, value drivers need to be organized so that managers can identify which have the greatest impact on value and assign responsibility for them to individuals who can help the organization meet its targets».

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

MANAGING VALUE DRIVERS

Exhibit 3

Levels of value drivers



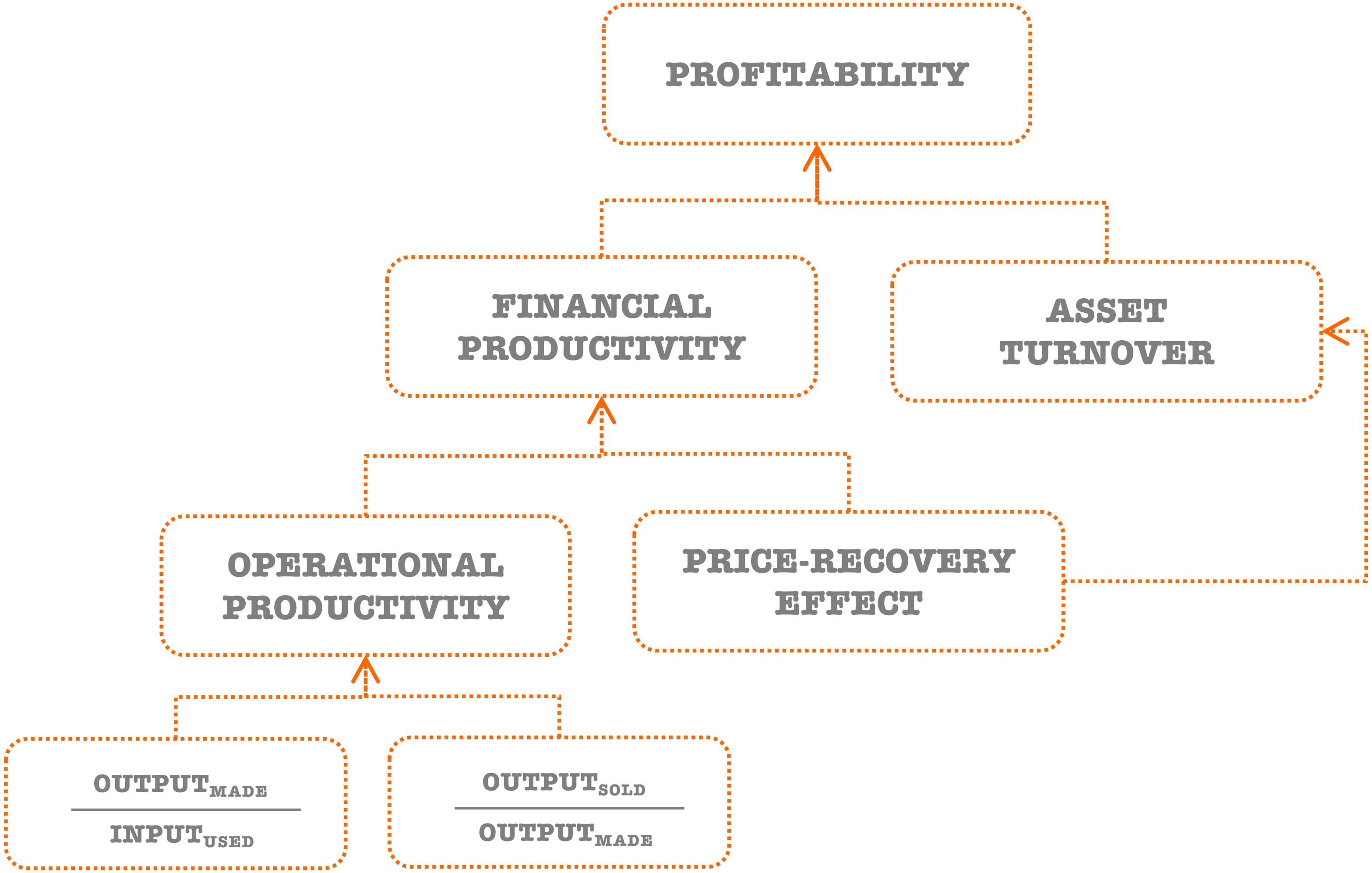
Excerpt from: T. Koller, “What is value-based management?”, The McKinsey Quarterly, 1994, Number 3

FOUR SETS OF METRICS

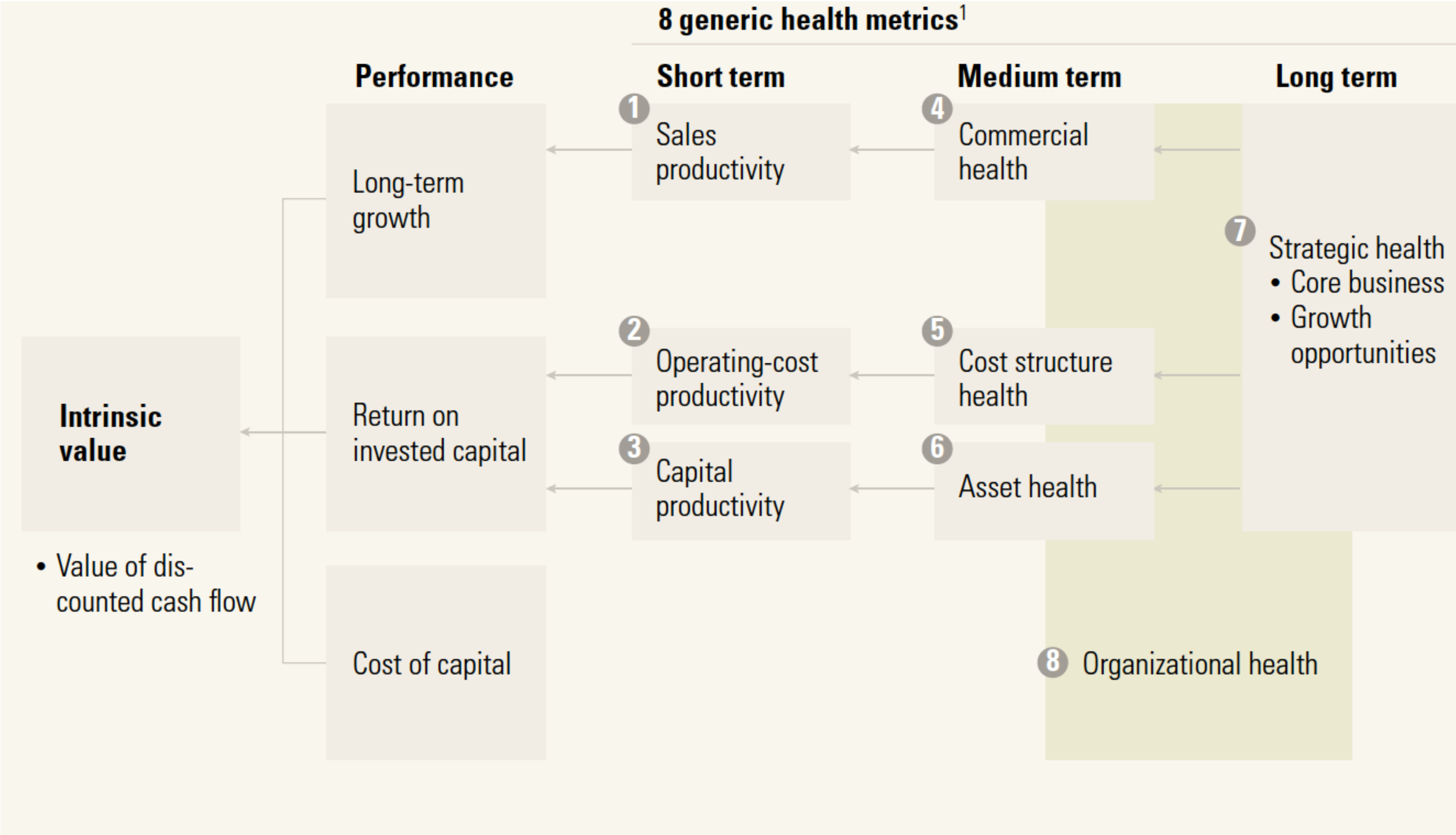
EFFICIENCY

1. **OPERATIONAL PRODUCTIVITY** $$\frac{O_{PHYSICAL}}{I_{PHYSICAL}}$$
2. **FINANCIAL PRODUCTIVITY** $$\frac{O_{REVENUES}}{I_{EXPENSES}}$$
3. **ASSET TURNOVER** $$\frac{O_{REVENUE}}{I_{ASSETS}}$$
4. **PROFITABILITY** $$\frac{O_{PROFIT}}{I_{INVESTMENT}}$$

CAUSES AND EFFECT



“PERFORMACE 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.