



LYFE CYCLE COSTING AND TARGET COSTING

Session 12 (b)

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15 November 2018

Strategic management accounting - A.Y. 2018/2019

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Agenda

- Life cycle costing
- Target costing

Life cycle costing

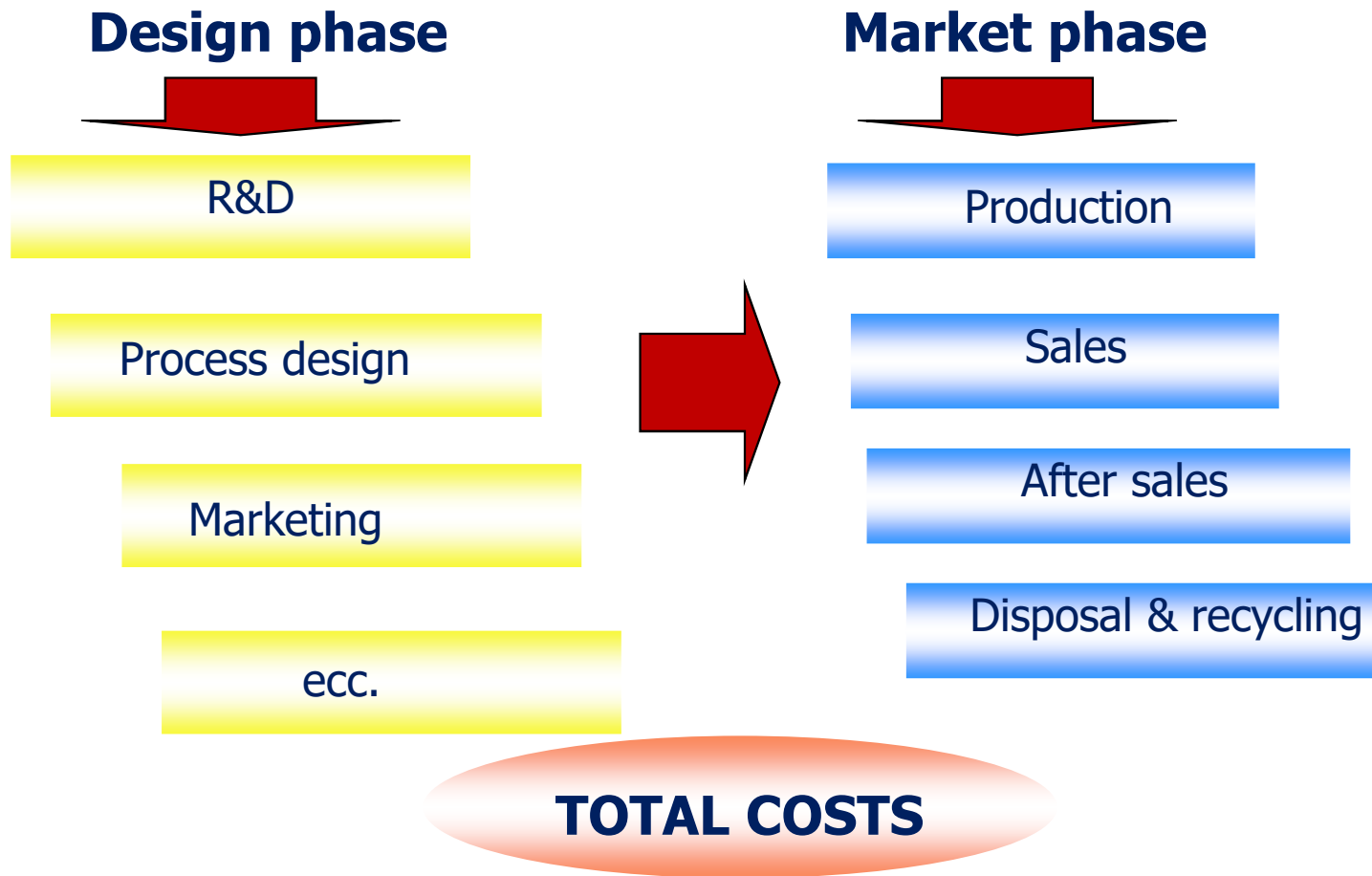
Life cycle costing: definition

- It pursues the objective to **forecast costs sustained in the whole product-service life cycle**, from the product-service R&D until disposal and recycling;
- It aims to **commit in the life cycle a level of total costs** consistent with the firm profitability targets in the medium-long term and with customer value and product-service price (along with target costing);
- It focuses on the **total cost of ownership** that the customer has to sustain to own and use products and services in the product-service life cycle, as it considers not only the firm's perspective, but also the customer's point of view.
- It represents a methodology for forecasting, analyzing, designing and developing not only costs and profitability, but also the levels of **quality, functionality and time to market**, by considering the whole life cycle of a product-service system

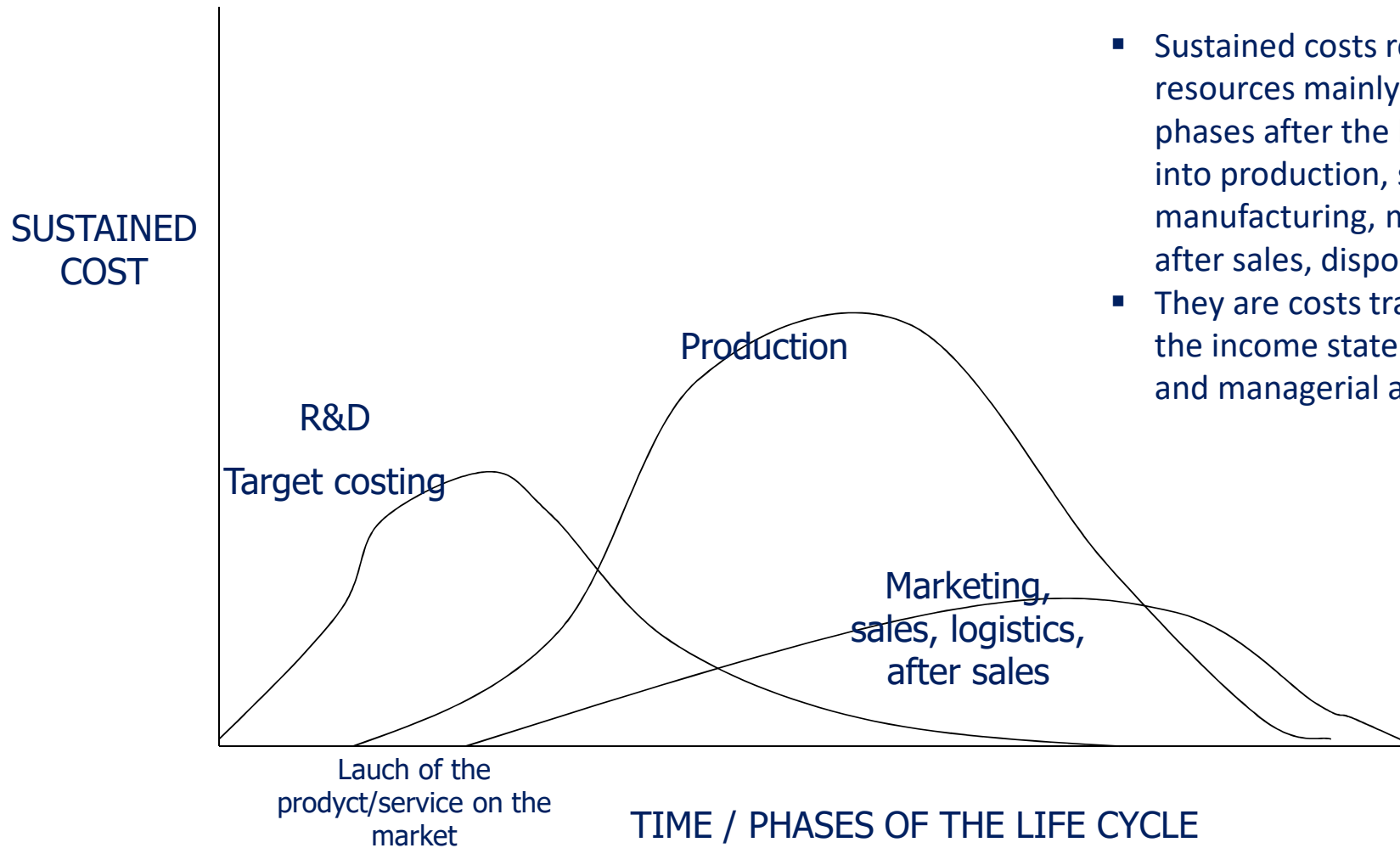
Life cycle costing: sustained vs committed costs

- Life cycle costing points out that, when dealing with R&D of products and services, **costs sustained in the R&D activities are not very relevant**, as they represent a quite limited amount of total costs of the life cycle.
- However, in R&D another category of costs has to be put attention on, namely **committed costs**.
- Committed costs are costs that **are committed by decisions** on the characteristics of the product-service system **taken during the R&D**.
- They may arise to **around 80% of total cost in the life cycle** and are very difficult to influence after the launch of products into production.

Total costs in the life cycle

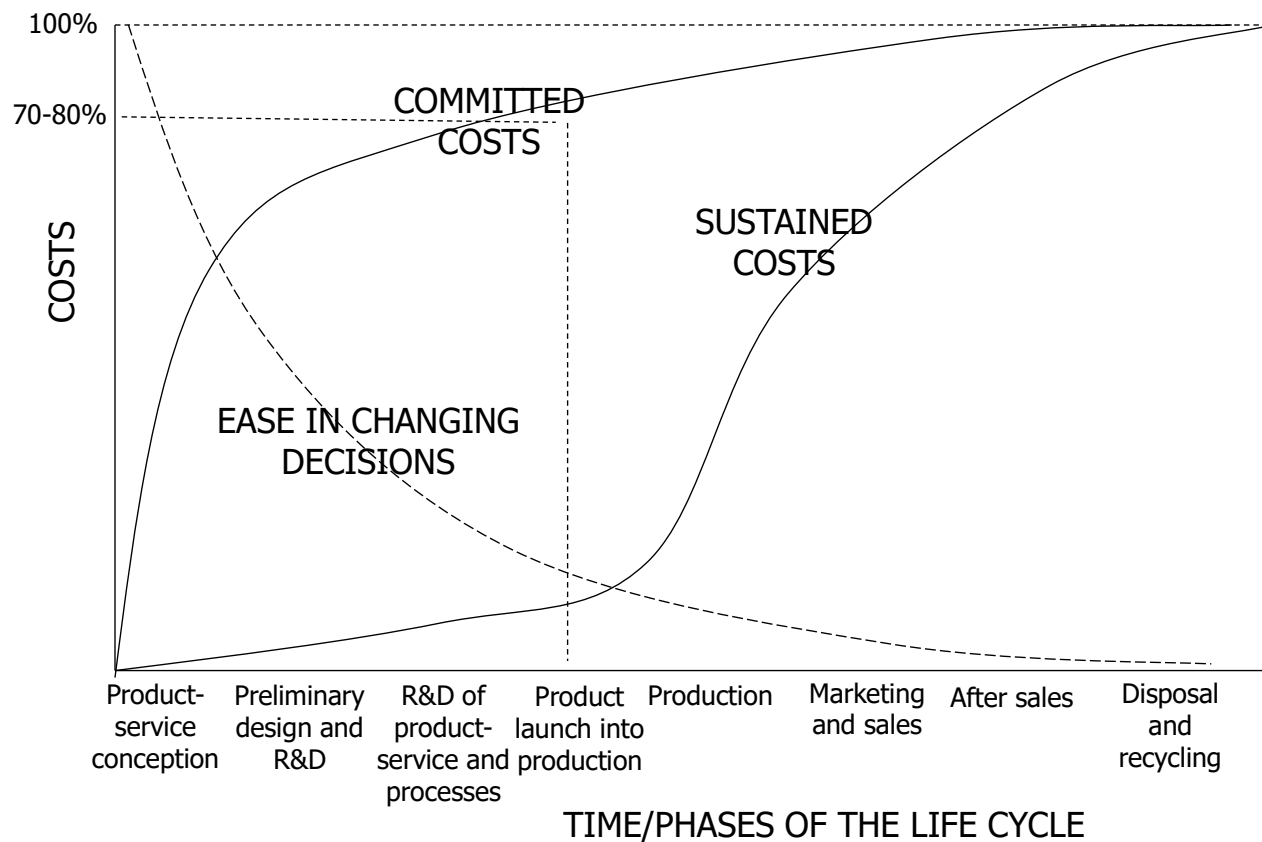


Product/service life cycle and sustained costs



- Sustained costs represent costs of resources mainly used in the life cycle phases after the launch of product into production, such as manufacturing, marketing and sales, after sales, disposal and recycling.
- They are costs traditionally recorded in the income statements by financial and managerial accounting

The life cycle and the difference between sustained and committed costs. The firm's point of view



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- The object analyzed by LCC is represented by the **product-service system**, considered during all the time it can perform its functions.
- **Committed costs** refer to costs conditioned by decisions taken on the structure and features of products, services and processes, during the R&D stages, but that have an impact until the product-service disposal.
- As we move forward in the life cycle, it becomes harder and harder to modify committed costs. In fact, **around 80% of product-service costs sustained in the life cycle are committed by decisions taken during phases before the launch of product into production**

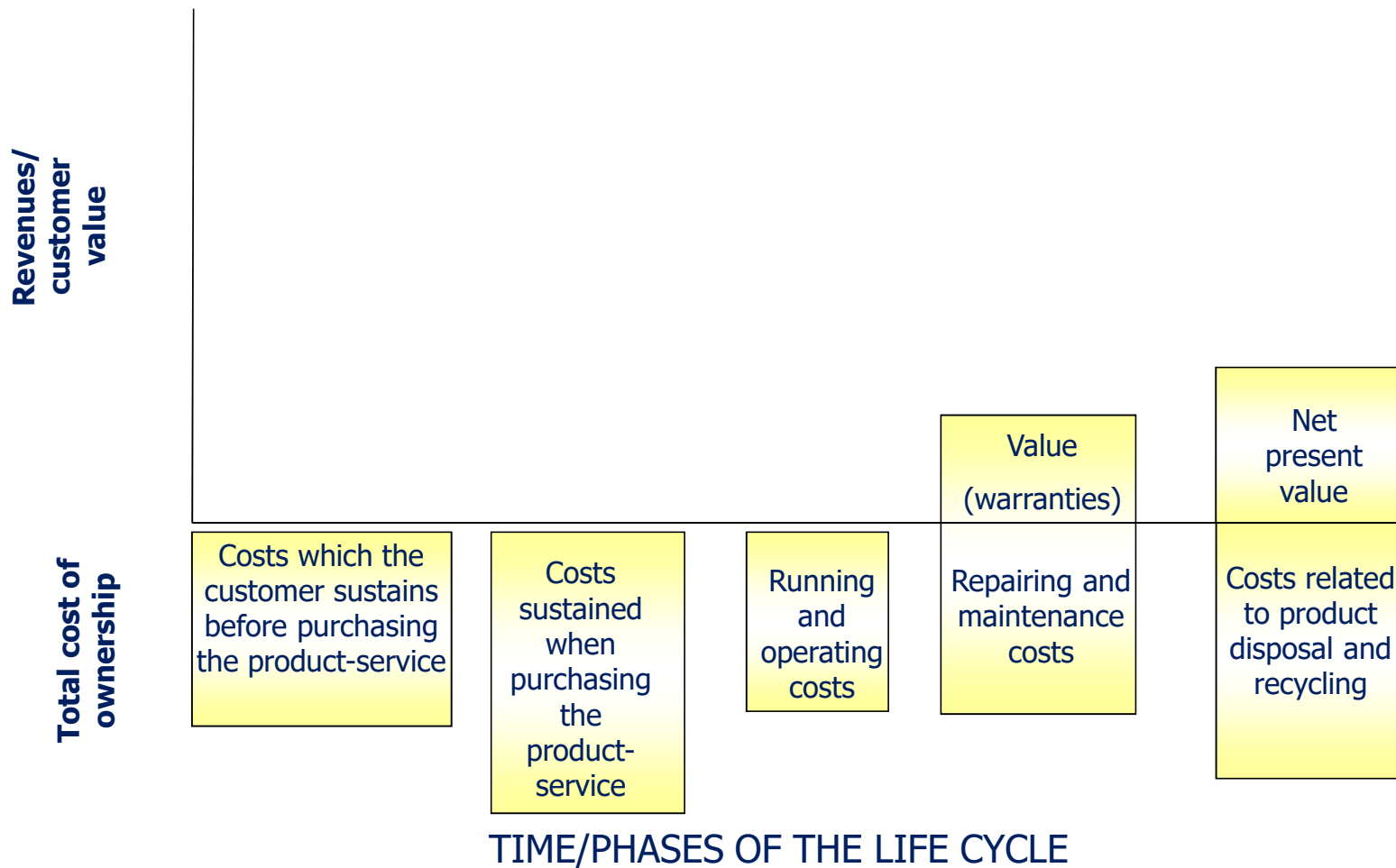
Committed costs: the firm's point of view

- **Research and development costs:** represented by costs sustained for market research, product-service conception and design, documents and information handling, prototype development;
- **Industrialization costs,** sustained before the launch of product into production or the service delivering;
- **Cost of purchasing production factors,** such as: raw materials, components, labor, industrial equipment, etc.;
- **Production costs** of different production phases and costs of service delivery process and activities;
- **Logistic costs** related to distribution, storing and transportation;
- **After sales costs:** spare parts, labor, warranty, assistance network, etc.;
- **Costs of product disposal and recycling** at the end of the life cycle.

The product-service life cycle and total cost of ownership. The customer's point of view

- From the customer's perspective, the product-service life cycle comprises **four phases**:
 - activities carried out **before the decision to buy** the product-service,
 - the product-service **purchase**,
 - the **use** of the product-service
 - its **disposal**.
- The **total cost of ownership (TCO)** represents all costs that the customer sustains along all the four phases of the life cycle to purchase and use the product and related services.
- If the firm's perspective is adopted, **costs included in the TCO represent revenues for the company** generated by product sales and services delivered to customers in the life cycle.

The product-service life cycle and total cost of ownership. The customer's point of view



TCO: type of costs and revenues for the customer

- **Costs which the customer sustains before purchasing the product-service**, when he/she gets information on different competitors' offerings, through internet or visiting stores and shops: cash expenses (i.e. costs sustained to visit a shop/store or to browse the web) and intangible costs, related to time spent to get information, or to actions aimed to verify product requirements and feasibility of purchase;
- **Costs related to the product-service purchase**, such as the product price, costs of loans, maintenance contracts, extended warranties, and other extra charges (interests, taxes, etc.);
- **Costs sustained during the use of the product-service**, such as running and operating costs (i.e. fuel for a car), as well repairing and maintenance costs.
- However, if in the period when legal guarantees operate a fail in the product occurs, and if the customer bought an extended warranty or a maintenance contract, a **“value” for the customer emerges**, because he/she does not have to pay anything at this stage for repairing and maintenance;
- **Costs related to product disposal and recycling;**
- They may be compensated by a positive **net present value**, namely the difference between the price paid for purchasing the new product, in the past, and the resale price of the used product in the second-hand market, at this stage.

TCO: data from different industries

A truck, operating on international routes

Main elements that have an impact on the TCO: the value of initial investment (8%), maintenance and repairing costs (5%), **fuel costs (36%)**, **driver costs (33%)**, and toll charges and taxes (18%). (A truck manufacturer).

White goods (washing machines, dishwashers, and refrigerators)

Operating costs account for around **60-70%** of the TCO. Costs of the purchase phase (product price, delivery and installation costs) amount to about 20% for washing machine and dishwasher and 40% for refrigerators. (Bonetti et al., 2012)

A washing machine

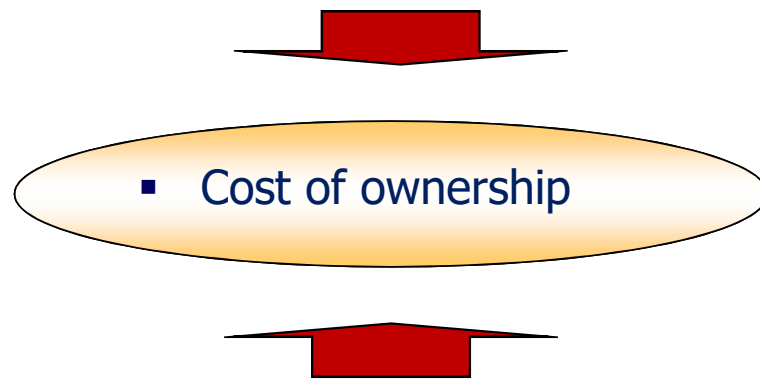
The purchasing cost represents around **40%** of the TCO, while **operating costs** (detergents, electricity, water, etc.) account for around **50%** of it. (Electrolux)

A company IT system

About 10% of the TCO depends on the purchasing cost of hardware and software licenses, while around **90%** on **operating costs** sustained in the life cycle, such as: cost of IT personnel, training, time lost for malfunctions and breakdowns, maintenance, etc. (Bonetti et al., 2012)

Total cost of ownership and value: customer's point of view

- Durable goods
- Financial and emotional investment



In the after sales the cost of ownership may be influenced through operating/maintenance costs and residual value

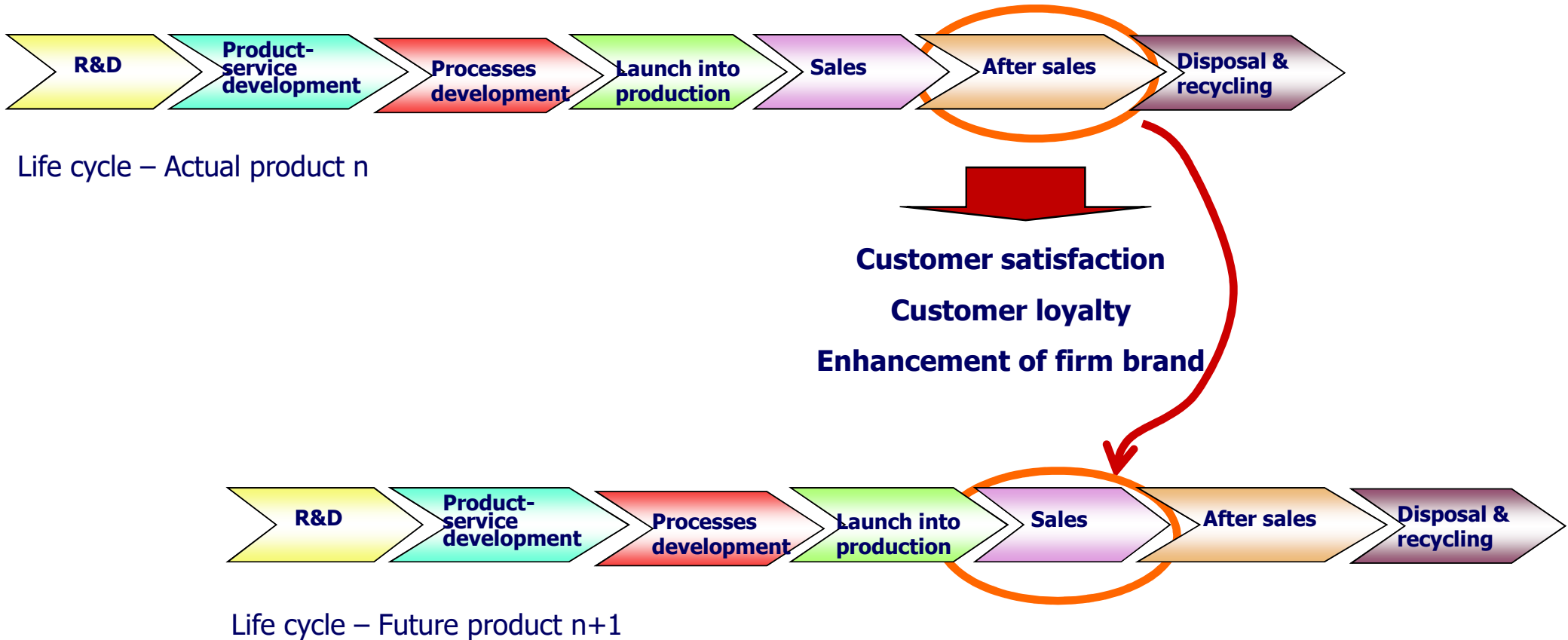


Product price + operating/maintenance costs – residual value

Factors that impact on the product's net present value and on operating and running costs

Product's net present value	Running, maintenance, warranty and repair costs (after sales costs)
<ul style="list-style-type: none"> ▪ market success of a new model ▪ market segment (luxury or other) ▪ product features (e.g. feeding and motorization for cars) ▪ economic trend ▪ legislation ▪ product offer ▪ expected launch of new models or restyling of actual models ▪ time to market of new products ▪ running, maintenance, warranty and repair costs ▪ brand image ▪ second-hand market trend 	<ul style="list-style-type: none"> ▪ fuel/energy consumption ▪ cost of labor ▪ cost of spare parts ▪ maintenance programmes/contracts ▪ insurance costs ▪ expected trend of new products' price ▪ product offerings in the market ▪ ▪ ▪

The role of after sales as «pre-sales» of new products and related services



TCO: benefits

Producers

- Increased possibilities to reduce their costs, improving firm's profitability, and at the same time to maximize customer value, thus positively impacting on customer satisfaction and loyalty and so on future sales of products and services
- Offering solutions, such as extended warranties and maintenance contracts

This allows to:

- gain profit by selling services in advance,
- take advantage of a higher number of contacts with the customer during the product life cycle
- improve customer satisfaction and loyalty
- Defining more consciously pricing policies

Customers

- Benefit from more diversified and with higher quality offerings, and improve their efficiency
- Choose suppliers more consciously, if they know supplier's TCOs
- Extended warranties and maintenance contracts free customer from the risk of a future rise of such costs and simplify product running and management.

LCC and TCO: weaknesses and difficulties in its adoption

Relevant difficulties in calculating committed costs and TCO

- Issues in forecasting relevant estimates on future costs, prices and profits, by appropriate statistical methodologies and by gathering and elaborating large amount of historical data on similar products and services
- Issues in estimating committed costs and TCO due to the advanced competences required in cost analysis and measuring as well the capability to identify and analyze different scenarios
- The need to use average data, which can be too rough to be used for different countries, customers and distribution channels
- The relevant amount of time and resources to be devoted, as well high quality and timeliness data and information (which often are not available or are barely quantifiable and verifiable) needed to to get reliable results.

Other issues

- Resistance to change of people
- Lack of competencies of people
- Inadequacy of tools and technologies, such as specific IT solutions.

Target costing

II target costing: definition (1)

“Target costing is a mechanism of strategic cost management which is capable of linking products, markets and resources on a strategic basis and transforming this information into quantitative operational measures. It is a methodology based on mechanisms of cost planning, management and control, that aims to steer product cost structure since the first phases of R&D of product and production processes, in order to align it with market and customer’s needs as well firm’s strategic long term objectives. Target costing process requires the coordination and collaboration among all functional units and sometimes of external actors”

(Horvath, 1993)

II target costing: definition (2)

“Target costing is not simply a technique of cost valuation, but it is a complete program of reducing costs, that begins since the product R&D. It aims at decreasing new products’ costs in the life cycle, but at the same time at satisfying customers’ needs with regard to quality, reliability, and functionality, by considering all predictable ideas to reduce costs since the product R&D and prototyping. It is not a simple method of cost reduction, but a whole system of strategic profitability management”

(Kato, 1993)

II target costing: definition (3)

“Cost management tool for reducing the overall cost of a product over its entire life cycle. It needs the help of the production, engineering, R&D, marketing, and accounting departments” (Sakurai, 1989)

“Target costing aims to identify the production cost of a proposed product so that, when sold, it generates the desired profit margin” (Cooper, 1995)

II target costing: definition (4)

“Target costing is a system of profit planning and cost management, that is market oriented, driven by prices, focused on customers, used in R&D, involving all functions and considering all life cycle stages” (Ansari, Bell e al. 1997)

“Target costing is a set of management methods and tools to drive the cost and activity goals in design and planning for new products, to supply a basis for control in the subsequent operations phase, and to ensure that those products reach given life cycle profitability targets” (CAM-I, 1983)

Key principles and features

- **Prices determine costs:** target costing allows to gain greater benefits when competition is very fierce and profits are very weak, because it treats prices as determined by market forces rather than simply marking up the cost with a sufficient profit
- **Focus on customer drives cost management:** target cost is defined consistently with product functionalities and customer value, thus adopting a market-driven approach to efficiency
- **Focus on R&D of products, services and processes, in order to plan and commit an adequate level of costs in the life cycle:** target costing considers committed costs and manages costs of future products and services
- **Need for a corporate culture and managerial mechanisms focused on an inter-functional and inter-organizational perspective:** only the involvement of all functions and all actors of the supply chain may assure the pursuit of the target cost and the target profit. Through the involvement of different actors of the supply chain, target costing allows pressures stemming from the market to be passed on to extended enterprises, favoring creativity and cost control.

The relationship among price, cost and profit

Target costing

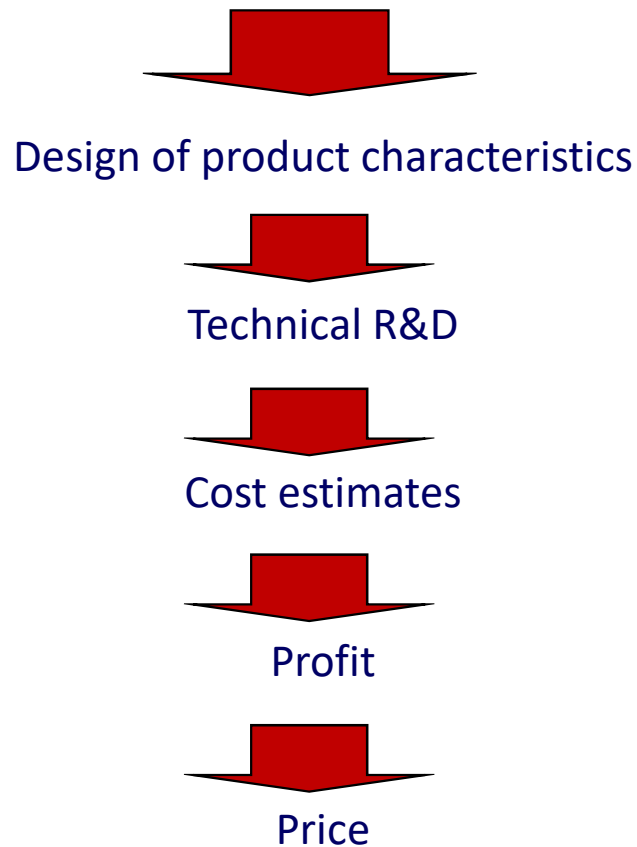
$$\text{Target Cost (Allowable cost)} = \text{Target Price} - \text{Target Profit}$$

Cost plus methodology

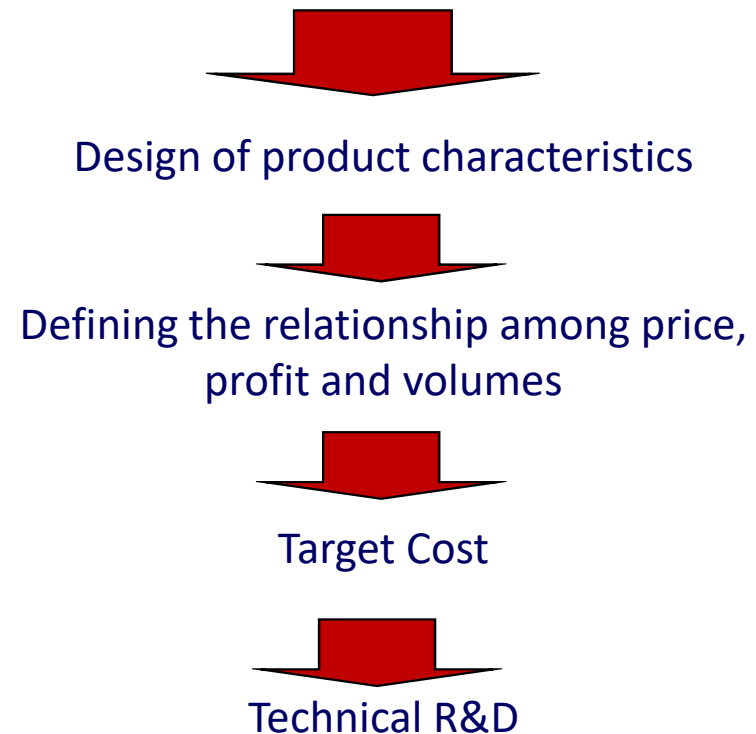
$$\text{Price} = \text{Cost} + \text{Profit (Mark Up)}$$

The target costing logic

Traditional R&D and managerial accounting



Target Costing



Target costing features

Traditional R&D and managerial accounting

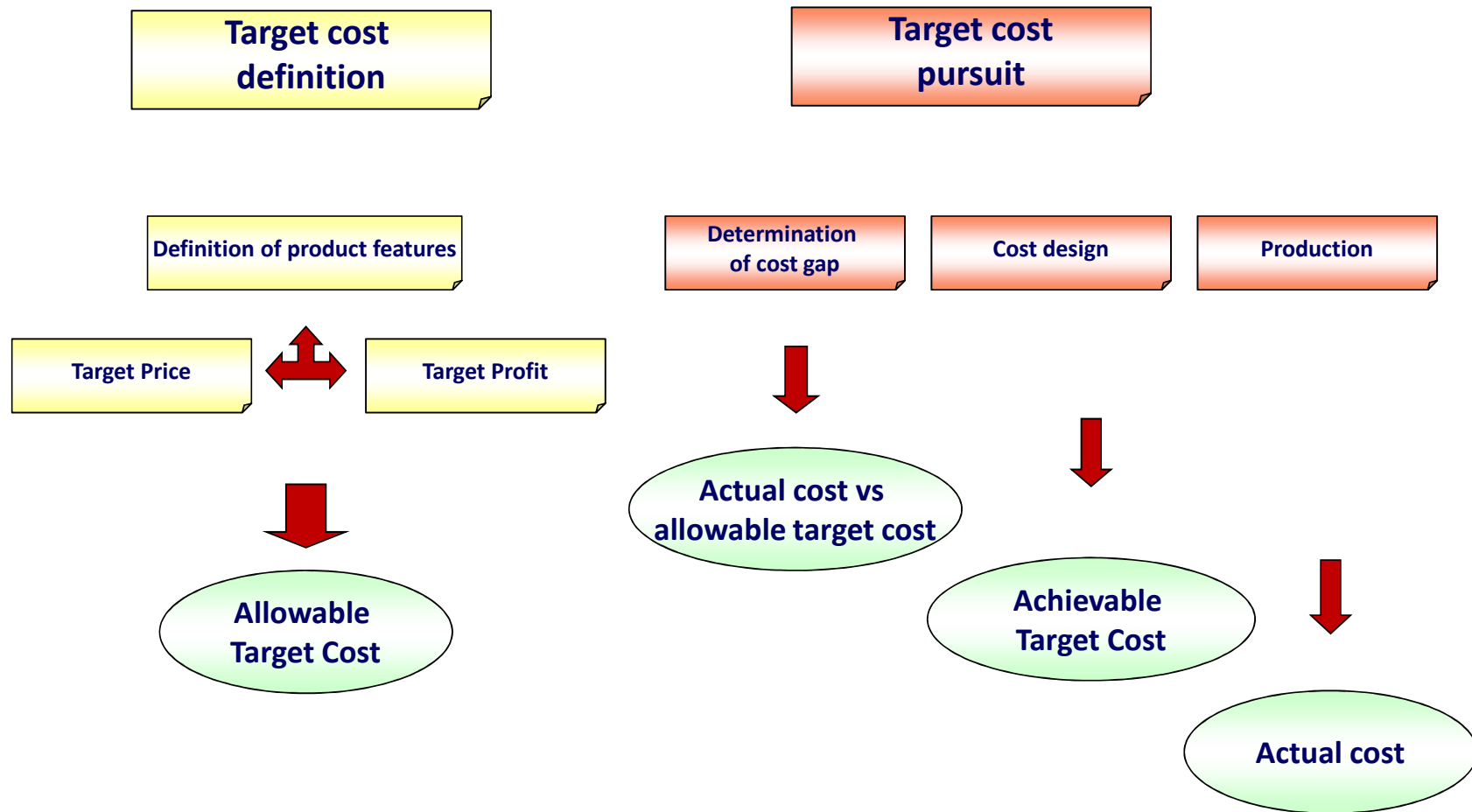


Target Costing



Object	Production costs and standard costs	Committed cost in the life cycle
Products	Actual products	Future products and services
Market issues	They are not considered by cost planning	They drive cost planning
Cost-price relationship	Cost determines price (cost-plus)	Price determines cost
Focus of cost control	Inefficiencies and wastes	R&D
Input to cost control	Internal firm efficiency	Customer
Person in charge of cost control	Controller	Interfunctional teams
Suppliers' role	They are involved after R&D	They are involved since the beginning of R&D
Object to be reduced	Product price paid by the customer	Total cost of ownership for customer
Value chain	Not or little involved	Involved since the beginning of R&D

Main phases of the target costing process



The target costing process

- **Iterative process:** it does not imply a rigid sequence of steps. A series of analyses and evaluations, as well as trials and errors activities are carried out until product-service system's features and related activities are defined which are consistent with the target cost;
- **Adaptive process:** it starts from the customers' needs and competitors' actions, in order to implement a R&D process and a profitability and cost management driven by the external competitive environment;
- **Inter-organizational and intra-organizational process:** it involves all organization functions and actors of the supply chain;
- **Highly structured process:** it consists of different steps, each of them with specific aims, involved actors, managerial tools to be used and delivered outputs.

Alfa case study: the company

- **Multinational enterprise** operating in the development, manufacture and sale of a growing line up of copying machines, printers, cameras, optical and other products that meet a diverse range of customer needs.
- In the last few years Alfa became a **solution provider** instead of a merely provider of office products and services.
- **Two divisions in Italy:**
 - ✓ **Business Solution Division:** it is devoted to offer output and document management, networking, and IT services to professional and business customers. It aims at optimize customer's processes and efficiency with regard to document management, which is outsourced by the customer and directly managed by Alfa. This division operates in two market segments:
 - corporate segment
 - vertical one (mostly printing industry's firms).
 - ✓ **Consumer Imaging Division:** it is in charge of products and services for the consumer market, such as cameras, computer peripherals and so on.
- **Market trends and profitability:**
 - ✓ **office automation:** pay per use is quite widespread; EBITDA on sales of around 3-4%. Short-term horizon contracts (1-2 years); customers ask for a higher service quality.
 - ✓ **professional service segment:** EBITDA on sales of around 15-17%, as a consequence of the value added by IT solutions.



Alfa Europe has recently decided to redirect its business approach from a provider of rental services **to a provider of solutions for managing printing service.**

Alfa case study: Charter parties and pay per use

They involve **selling the use and availability of the product** that is not owned by the customer.



The ownership of the product is retained by Alfa, who sells to customers the **functions of the products and related services.**

Competitive context

High competition

Prices aligned among competitors



In this business segment **managing costs is vital to gain profits.**



How to estimate cost and price per copy?

Cost and price per copy calculation

New product R&D

- **Definition of methodology and estimated parameters** to calculate the cost per copy and the click charge (price per copy).
- These **estimates are based on**:
 - the worldwide data of a similar legacy model (technologies and product characteristics),
 - some hypotheses regarding the customer's behavior in terms of type of prints (e.g. image coverage) and use of the machine (which impacts on the number and type of calls and technicians' visits).
 - the particular situation of each country, for instance with regard to labor costs.
- They are **adjusted** to consider the specific European market situation.



New product launch on the market

- Alfa Europe communicates to the Italian subsidiary the **methodology and the estimated parameters**, that allow to estimate costs and prices for a **great range of volumes**.
- It suggests both a **minimum gross profit and the optimal copy volume** which allows to maximize profits in the product life cycle.
- These estimates, carried out during the R&D of the new product, represent an **headquarter's commitment**.



Alfa Italy calculates cost per copy and click charge (price per copy)

Cost per copy calculation



The **cost per copy** is calculated as the sum of:

- the running costs
- labour costs

expected during the life cycle of the product.



To estimate this cost, some **coefficients** are used, which are predicated on different conditions of

- Target average monthly page volume (AMPV),
- Image coverage, distinguishing between black & white and colors.



These **predicated coefficients**, for different AMPV and image coverages, and for the product life cycle, are as follows:

- Copies between two different visits, distinguishing between call maintenance and periodical one,
- Visits per months, distinguishing between call maintenance and periodical one,
- Work time per visit: it is usually independent from page volumes,
- Travel time per visit: it is a theoretical parameter, that does not consider the real place of the visit,
- Labor time per visit: it is the sum of work time and travel time.

Cost per copy calculation



In order to **program the service capacity**, needed to deliver assistance and maintenance services in the product life cycle, the following data are estimated with regard to each national sales organization:

- Labour cost per hour,
- Response time to cope with a customer's call: the faster the response time, the greater the technician availability,
- Technician availability: number of hours per month,
- Travel time per visit,
- Time on other work than field work: it allows to estimate the available capacity for field work.

Activity based costing is used to estimate the cost per visit, distinguishing between work time and travel time



Other estimates concern:

- consumable parts
- related freight, insurance and tax costs (in percentage).

The initial parts, such as the drum, the starter and other parts, are excluded from copy cost calculation, while the toner and the installation call are included.

Considering an average machine life (e.g. 60 months), the quantity and net price for consumables and parts, such as drum and toner are then estimated.

With regard to the toner, toner coverages are estimated, that is the number of pages which a toner can print, according to the image coverage.

Cost per copy calculation



The click charge (price per copy) is defined by applying a percentage mark-up to the cost per copy, which is suggested by the European headquarter.



- After having estimated the cost per copy and the click charge, a **profit & loss simulation** is carried out, considering different monthly copy volumes and click charges.
- Both the **gross profit** (revenues minus cost of consumables and parts) and the **net profit** (gross profit minus cost of labor) **in the life cycle** are estimated.
- Alfa Italy adjusts the estimates of cost per copy and click charge to consider differences in **distribution channels**.
- **If actual costs of new products are systematically higher than target costs** in different European countries, the European headquarter can decide to change accordingly target costs and bear lower profits.
- **After about 1-1.5 years**, that are needed to stabilize cost target data after launching time, and to have enough and significant actual data concerning the installation of about 100-150 machines, **it is possible to calculate actual costs and to compare them to target costs, in order to analyze cost variances.**

A relevant case study: Magneti Marelli

<http://stream.sdabocconi.it/magnetimarelli>