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BLAB

HANDOUTS

PERFORMANCE MEASUREMENT AND CONTROL SYSTEMS

-GENERAL ATTENDING-

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PERFORMANCE MEASUREMENT

Revenues are on top of IS, and a relevant part of the IS and therefore a relevant part of the business. They can be defined as value given by the *market* (the exception to this definition are the companies like Apple that have been capable of building a monopoly for their customers, meaning that for those customers there is no alternative product -> if someone is not an Apple customer, it is probable that will look around for finding better opportunities with the same amount of money they would have spent in an iPhone.) to product and services *sold* (we use the past because when we look at the IS we are looking at something occurred in the past) by the company in a period of time -> they are value created by selling output. Obviously, there are different types of markets where the company can operate, which is the place where supply and demand match, and where all players can contribute (customers and company itself included). We cannot define it as cash inflow (as, in first, we are talking about an economic dimension), because they can be different in time, there could be some uncollected/uncollectible credits -> we use a monetary measure to identify and quantify this value.

Costs -> value given by the *market* (if a company has a monopolistic position, they have more power to influence these factors) to productive factors *consumed* (if we purchase raw material, for example, if they are not expired and they are in line with the current technology, they could be sold again. This doesn't mean that when we decide to purchase something just for reselling it we do not incur other types of costs, such as storage costs or financial costs) by the company in a certain period of time -> they are value created by purchasing input.

Companies are organizations running by making exchanges for satisfying human being needs. If we take the components of the IS, we can say that are the *monetary measure of exchange with all the different stakeholders* (which includes customers, workers, creditors, suppliers, governments, financial institutions, shareholders, local communities...), which have an interest in the company because by interacting with the company they are capable of satisfying their interests (investors provide money and they expect a remuneration from the company, as well as suppliers provide to the company the productive factors it needs for the company's activities and they expect some money in exchange) -> the positive difference between the *value generated by the sales* and the *value consumed by costs* we create an increase in value -> **cost measurement systems** are necessary for comparing the value consumed with the value created.

Do companies need to increase value? Yes, because in management the last stakeholders are shareholders, which they only get a marginal income through dividends -> if we are not capable of generating enough value, we are not capable to satisfy the interests of all stakeholders. If we don't generate enough value, we are not capable of choosing between alternatives for the different stakeholders, they can access to the best stakeholders. For example, if we generate enough additional value, we can take the decision to leave our current suppliers and go to the suppliers that we believe to be the best. Furthermore, if we generate enough value, we are capable of retaining the best management we have and so on.

Why do we say "doing shopping" and not "doing the costs"? When we do shopping, we spend money to purchase something -> the richness before and after the purchase is the same (assuming we are not considering the personal value we give to the product and not considering fluctuations of prices), but we cannot resell these products. When we allocate the products are allocated to the warehouse, we allocate the price of the products to the different parts, but the total value is still the same -> in order to have a change in this variable, we have to consume part of it (like if we consume a can of coke that we have previously allocated on top of the shelf).

Costing systems: Traditional approach

Costs = monetary value of productive factors consumed in a business activity. Costs are initially accumulated by nature (raw materials, labour, depreciation, power, rents, spare parts, sales commissions, advertising, etc.) in the *Financial Accounting chart of accounts*, as they are managed differently. Subsequently are assigned and allocated to cost objects, in *Managerial Accounting procedures*, to support management's decision-making. **Cost objects** are anything for which managers require a specific cost measurement:

- *product/services* -> all businesses sell products and services, which are the most relevant cost objects
- *geographical areas* -> if we operate in different geographical areas and each of one produce revenues, we have to calculate the relative costs (this analysis is particularly relevant if we have to decide to start or stop our activity in a specific country)
- *organizational units/departments/offices* (such as Administrative department, Customer Relationship Department, Maintenance departments…) in order to track their activities and control them
- *specific investments* -> if we have specific problems, we have to know the specific costs connected to it
- *distribution channels* (sales could be equal, but depending on costs connected to the distribution channel one could be convenient or not)
- *subsidiaries*
- *cost of internal processes* (such as delivering processes, which is a cross-functional process)
- *managing a precise category of customers*

The *purpose of cost measurement systems* is to assign costs to multiple objects managed by companies, known as *cost objects*. The most common cost objects are the *products or services produced and sold by the company* (all businesses pursue the production and sale of products or services, consequently, firms find useful formal mechanisms for measuring their cost). However, management need to calculate the cost of other objects (to support economically rational decision-making), such as *organizational units and departments, business processes, single specific activities like customer orders, distribution channels used, business areas managed, market segments in which the company competes, individual customers or groups of customers served, and so on*.

The most common decisions that management takes on cost information produced by costing systems include:

- *Setting selling prices*
- *Inventories valuation of work in progress and finished products*
- *Long-term decisions that affect the company's structure*
- *Short-term operational management decisions*
- *Application of the break-even point model*
- *Analysis of operational efficiency*
- *Analysis of structural efficiency*.

Variable Vs Fixed costs

Whenever we want to estimate the behaviour in advance of costs, the distinction between variable and fixed costs becomes very relevant.

- **Variable costs** -> *all costs items* where their total depends on volume -> if we increase volume, total variable costs increase, and vice versa.
- **Fixed costs** -> all costs items where their total do not depend on volume

➔ Across the world, the prices are kept the same (we ignore the efficiency that could reduce them), we have to move *only* the *quantity*

Let's assume we want to produce a marker. The *raw material* is an *example of variable costs*. Let's assume that 1€ is the variable price -> we need to assume that the price remains constant (we have to ignore factors such as efficiency or discounts) -> if we produce 100 markers, we spend 100€, if we produce 1mln markers, it costs 1mln€. On the other hand, let's suppose we use a machinery for the markers production. Assuming it has the adequate productive capacity, the fixed costs connected to it, such its depreciation of 10,000€, will be the same independently if we are producing 1, 100, 1,000 or a million units.

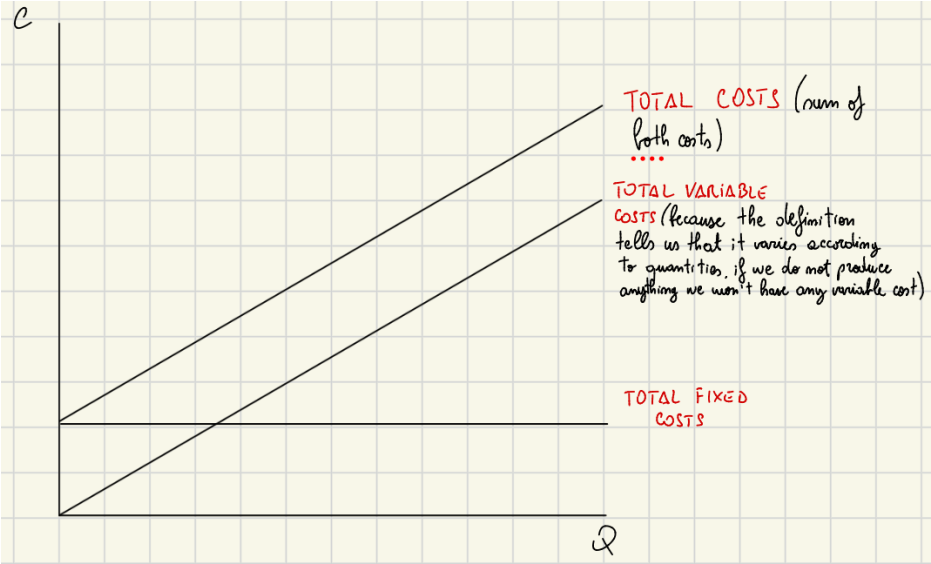
When we want to analyse variable and fixed costs, we have to look at the **behaviour of total amount of units**, not the behaviour of the single unit:

- For the variable costs, if we take the cost of a single unit, that price will be fixed (for example, independently by the amount produced, the cost of a single marker will always be 1€) -> we have to look at the behaviour with the total amount of unit to see how the variate
- For the fixed costs, if we take the cost of a single unit, that price will change, it is variable (for example, the depreciation of a machinery per unit is different depending on the amount of unit we have produced) -> we have to look at the behaviour with the total amount of unit to see how it remains constant

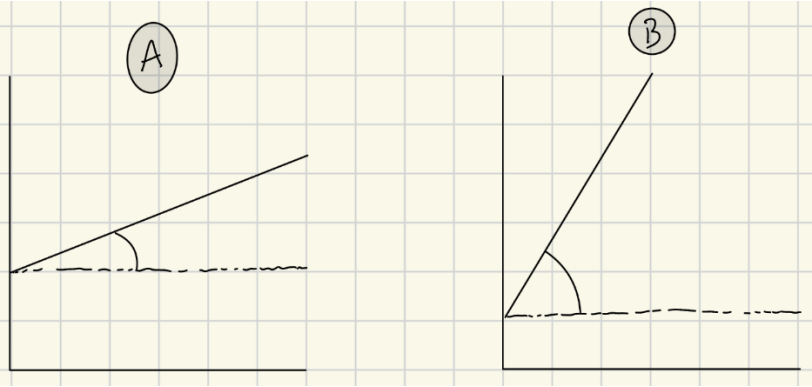
➔ In order to make a distinction between variable and fixed costs, we have to calculate it in total.

Break-even point -> is a model that connects prices, quantities, fixed and variable costs -> there is the possibility to play on graphs.

It is possible for us to create a graph to explain how the different costs behave.



The **cost structure** is different depending on the *sector* in which the company operates and also on *firm specific characteristics*, which can help us identify the risk profile of the company itself.

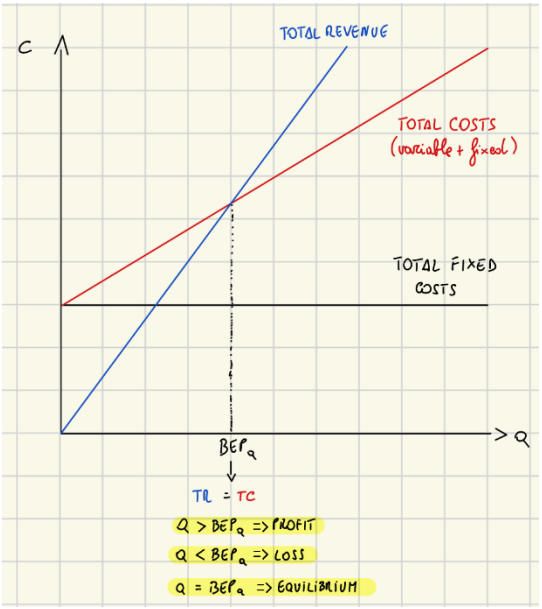


A and B have two different cost structures, as A has a more *rigid structure* (higher fixed costs, lower variable costs) while B has a *more flexible structure* (lower fixed costs, higher variable costs)

- ➔ *A* is considered to be *riskier to be managed*, mostly because the high level of fixed costs forces the company to produce higher quantities of products for reaching the BEP -> in some cases, it can be used as an incentive for managers to produce more, because otherwise the company will default. On the other hand, *B* is perceived to be *less risky* because having a lot of variable costs give the company the possibility to stop purchasing in case prices become to high.

Examples of companies like A are hotels of flight companies -> in both cases there are low variable costs (such as the soap, washing costs, power consumption, water consumption… which are almost irrelevant compared to fixed costs), but in case they are not capable of filling the rooms/seats, they are going to face high levels of fixed costs -> most of the time we refer to these costs as "capacity costs", which include all the costs that we face for having a certain level of capacity.

In today's world, it is very complicated to find companies that can be classified as *pure fixed* or *pure variable* structures, as in all companies we always both have a variable and a fixed part. In addition, there are cases where the *behaviour of a costs is ambiguous*, making difficult for us to classify it correctly and identify the most relevant drivers of that cost -> in these situations, in real life, it is better to classify these costs as fixed, as it stimulates managers to think of ways for taking care of them (otherwise, in case we classify them as variable cost, the common behaviour is not paying much attention to it as there will be the belief that it is something manageable).



After identifying the function of Total costs, we identify the **function of Total revenues**, which we'll represent as a linear function of quantities and price (which starts from the origin of the axes, as if we don't sell anything we won't have any revenue). Once we put these two functions together, we obtain the **Break-Even model**, which allow us to better understand the behaviour of the costs and put together *quantities*, *costs* and *revenues*. In particular, the model allows us to *define the quantity of product at which total costs are equal to total revenues*. It is a model frequently used for making simulation and to make analyses.

How do we calculate the BEP?

$$TR = TC$$

$$q * p = TVC + TFC$$

$$q * p = q * VCu\ (Variable\ Cost\ per\ Unit) + TFC$$

$$q * p - q * VCu = TFC$$

$$q * (p - VCu) = TFC$$

$$BEP_q = \frac{TFC}{p - VCu} = \frac{TFC}{CMu}$$

Where CMu refers to the Contribution Margin per Unit, which is different from the Gross Profit (which is Revenues – Manufacturing costs).

Example:

- TFC = 2,000€
- p = 50€
- VCu = 45€

➔ Every period we have to recover from 2,000€ of Fixed costs -> how do we cover them? With margin -> whenever we sell something, we receive 50€, but then we have to sustain 45€ of Variable costs -> we have a margin of 5€ per unit -> BEP tells us how many 5€ margin we need in order to cover those 2000€

$$BEP_q = \frac{2{,}000€}{50 - 45} = \frac{2{,}000€}{5€} = 400\ units$$

Another important formula is the **Break-Even Sales (BES),** which is the amount of revenues that we need to reach in order to cover all costs. We could calculate it by multiplying the *BEP*p* (in the previous example: 400 units * 50 € = 20,000€), but alternatively we can calculate it as:

$$BEP_q = \frac{TFC}{p - VCu} = \frac{TFC}{CMu}$$

$$BEP_q * p = \frac{TFC}{CMu} * p$$

$$BES = \frac{TFC}{\frac{CMu}{p}}$$

$$BES = \frac{TFC}{CMu\%}$$

In our example:

$$BES = \frac{2{,}000€}{\frac{5€}{50€}} = \frac{2{,}000€}{10\%} = 20{,}000€$$

The main reason why the BES formula is needed is because the calculation of the BEP becomes more difficult in case, instead of a single product line, the company operates by selling a multitude of products and services -> by using the *Weighted Average Contribution margin* we can solve the problem -> we need to identify the mix of the different products that allow us to reach the objective, where the weights are the *percentual impact of the revenues of that product over the total amount of sales generated by the company*. We have to consider that in reality companies that have a huge number of

product already know that there are some products that are not going to be sold, and it is better for them to focus on the most profitable products to generate the majority of required revenues and then leave only a small percentage of revenues to the rest of products.

If the BES and the BEP formula are used to find the quantity/sale level that allow us to reach the equilibrium, we should consider that it is common that some **objectives in terms of profit** could be established -> the formulas are the following:

$$BEP_q = \frac{TFC + Target\ profit}{CMu}$$

$$BES = \frac{TFC + Target\ profit}{CMu\%}$$

Direct vs Indirect costs

Another important distinction regarding the cost's classification is between direct costs and indirect costs:

- **Direct costs** -> they can be specifically and exclusively traced to a unit of product or to another cost object. Examples include the direct materials used in the production of a product and the commissions paid to salespeople on the revenue generated.
- **Indirect costs** -> they cannot be specifically and exclusively traced to a unit of product or to another cost object. However, they can be assigned to cost objects through an *allocation process* that uses *reliable output measures* (*allocating bases - cost drivers*). Example: depreciation of a production facility.

The **allocation of these costs is different**:

- *Direct costs = Price * Quantity* -> the problem in this case regards identify the *correct price* for these cost objects and the *quantities of direct factors*
- *Indirect costs = Total indirect costs/Allocating base* -> in this case, the problem regards *which* and *how many indirect cost pools should be allocated* and *which allocation bases* (cost drivers) should be selected

Assigning direct costs to products and services is particularly easy. It consists of valuing the production factors used in getting each unit of product or service

$$Direct\ costs\ =\ Price\ x\ Quantity$$

- Which elements should be considered in the *prices* of direct factors? Price of productive factor + custom duties + transportation costs taxes – (potential) volume discounts
- Which elements should be considered in the *quantities* of direct factors? + Quantity of productive fact + Over consumption for scraps + Over consumption for waste + Reworks + Set-up time -> we should not include the net consumption of productive factors, but the gross one

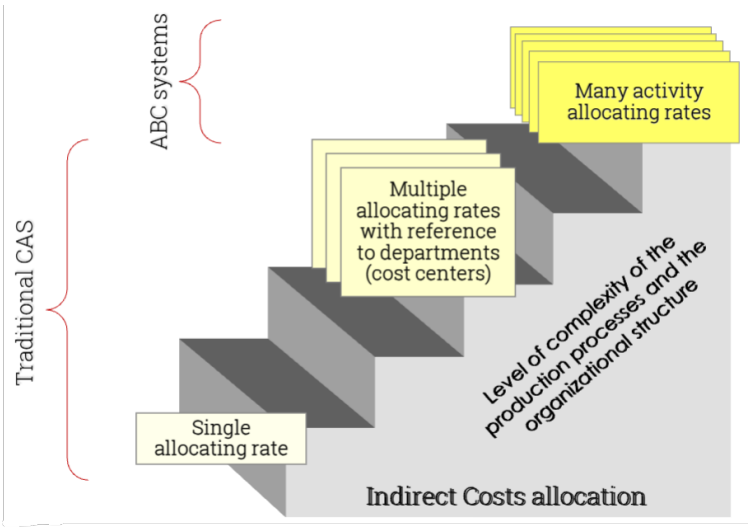
The **Indirect Costs allocation** is the *main issue in measuring the cost of whatever object* (particularly for the products or services sold). Raises in production investments and automation commonly determine growths in the Indirect Cost amount, but the contribution of each product to the increase of these costs is different, as they regard the production of different products. The allocation is based on the identification of a specific *allocation base*, which is strictly connected to the nature of the indirect cost we have to allocate -> we divide the indirect costs for the total amount of the allocation base and

then we multiply this *Allocating Ration* for the specific consumption of allocation base of the different cost objects (so, for example, we could divide the depreciation of a machinery for the total machine hours and then we multiply this result times the specific machine hours used by a specific cost object). There is no Indirect costs allocation method that can lead to a value considered the true cost of the product -> all methods for allocating indirect costs are *based on assumptions, estimates, and calculations*. It is responsibility of Management Accounting managers and Controllers to select cost assignments and allocation methods:

- In coherence with the production system features
- In coherence with the managerial information needs (relevance of cost information in making decisions).

Two alternative Costing Systems:

- *Traditional CS* -> Traditional Costing Systems (CS) are commonly focused on the full manufacturing cost calculation (so these method works very well in case our main source of costs are manufacturing costs). As a result, they have a *primary focus on production costs*, while *non-production costs* have often been *allocated using simplified methodologies*. In small and simple firms (with few cost objects) and where the most relevant costs consist of *direct materials (DM)* and *direct labour (DL)*, indirect manufacturing costs are combined into a single cost pool and allocated using a single allocation base (or cost driver). As complexity increases, indirect costs are split over multiple cost pools, which may be identified as process stages (manufacturing departments), and are allocated to cost objects using specific cost drivers.
- *Activity-Based CS* -> Activity-Based Costing (ABC) systems measure all costs that are relevant for management and extend cost assignment beyond manufacturing, including *design, marketing, order processing, logistics, sales, and other related departmental costs*. In highly complex situations (with many cost objects) and when indirect costs represent a significant share of total costs, these costs are first allocated to the individual activities of a department, function, plant, etc., and are subsequently allocated to cost objects.



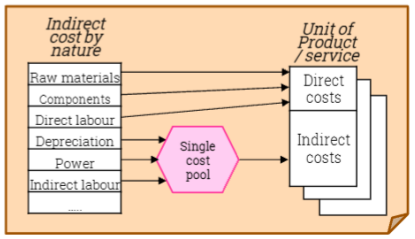
Traditional Costing Systems approach

The indirect cost allocation, throughout the traditional CS, can be implemented using two alternative models:

- **SINGLE BASE cost allocation system** -> Use of a single allocation base applied to a single cost pool grouping all the indirect costs.
- **MULTIPLE BASE cost allocation system** -> Use of multiple allocation bases defined with reference to cost pools representing process stages (cost centres/process-oriented approach). These cost pools are allocated to final cost objects using specific cost drivers.

Single base CS -> With this method, indirect (manufacturing) costs are grouped into a *single cost pool*, for which a *single allocation base is identified* (direct labour hours, direct labour cost, machine hours, etc.). In past, many companies used *direct labour hours* as common allocation base for indirect costs. This was because, in case of labour-intensive production processes, it was *reasonable to assume that indirect costs were in some way proportional to labour costs*.

$$\text{Single Allocating Rate} = \frac{\text{Total Indirect costs}}{\text{Total Direct Labour Hours (or another base)}}$$



Multiple base CS -> This process-stage-oriented (the costs are assigned depending on the different phases of the productive process) method consists of two steps:

1. *assign indirect costs to process-stages* which normally coincide with production departments (aggregate indirect costs according to destinations represented by *Cost Centres – C.C.*), to which we identify the most adequate allocating base and for which we identify the most adequate allocation rates
2. *allocate the cost pools to the unit of product/service*, through allocation rates, determined for each centre based on centre-specific allocation bases.

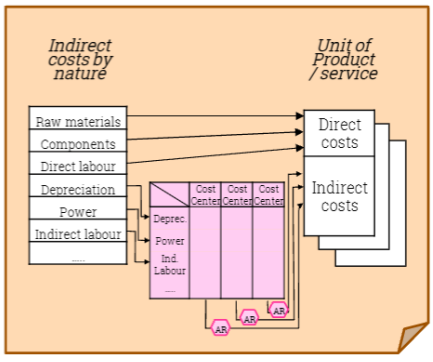
➔ For example, if we assume that the most adequate driver of the first cost centre are the machinery hours, we sum the machine hours of all cost object, calculate the allocating rate for the first cost centre and then we multiply this allocation rate with the consumption of machinery hours of each cost object, and we conduct this process for each C.C.

$$\text{CC (1) C.C. Allocating Rate} = \frac{\text{Indirect costs per C.C}}{\text{Allocating base per C.C.}}$$

$$\text{CC (2) C.C. Allocating Rate} = \frac{\text{Indirect costs per C.C}}{\text{Allocating base per C.C.}}$$

$$\text{CC (3) C.C. Allocating Rate} = \frac{\text{Indirect costs per C.C}}{\text{Allocating base per C.C.}}$$

$$\text{CC (4) C.C. Allocating Rate} = \frac{\text{Indirect costs per C.C}}{\text{Allocating base per C.C.}}$$



Example: Undersea Breathe UB Co. (A part)

Undersea Breathe is a company specialized in the development and production of diving masks. All components are manufactured through 3D printing in the Forming Department, while the finished products are assembled in the Assembling Department. Once the production process is completed, the Packing Department prepares the finished products for shipment to customers. Sales activities are managed by the Marketing Department, which is also responsible for several general and

administrative activities. The company's main products are two diving mask models: Overseas and Mediterranea. The General Manager has requested that the Controller implement a costing model to measure the total cost of each mask. The following information was available:

Product data	Oversea	Mediterranea
Unit price	200.00 €	270.00 €
Production and sale volumes	10,000	25,000
Component costs (per unit of product)	35.00 €	32.00 €
Forming machine hours (per unit of product)	1.4	2.2
Assembly direct labour hours (per unit of product)	1.5	1.4
Direct labor cost per hour	24.00 €	24.00 €

Indirect costs	Total
Indirect labour	1,200,000 €
Depreciation	800,000 €
Utilities	80,000 €
Rents	530,000 €
Indirect material	20,000 €

Calculate the full cost per unit of product using a Single Base cost allocation system. Allocate indirect costs using direct labour hours as the allocation base

	OVERSEA	MEDITERRANEA
COMPONENTS COST (components of different parts × price)	35.00 €	32.00 €
DIRECT LABOUR	36.00 € ($1.5\ h/u \cdot 24\ €/h$)	33.6 € ($1.4\ h/u \cdot 24\ €/h$)
INDIRECT COSTS	78.9 € ($1.5\ h/u \cdot 52.6\ €/h$)	73.64 € ($1.4\ h/u \cdot 52.6\ €/h$)
FULL COST PER PRODUCT	149.9 €/u	139.24 €/u

↳ we need to create the cost pool :

$$\frac{1,200,000€ + 800,000€ + 80,000€ + 530,000€ + 20,000€}{(10,000\,u \cdot 1.5\,h/u) + (25,000\,u \cdot 1.4\,h/u)}$$

$$= \frac{2,630,000€}{50,000\,h} = 52.6\ € \text{ of indirect cost / direct labour hour}$$

↳ ALLOCATING RATE

we assume indirect costs are directly proportional to direct labour hours

probably by knowing the intensity of labour activities we can affirm the goodness of the allocation method

Calculate the full cost per unit of product using a Multiple Base cost allocation system: the four departments are the cost centres. In developing the CS consider the additional information below:

Indirect costs data	Forming	Assembling	Packing	Marketing
Indirect labour costs refer to 6 workers with the same salary. These workers are staffed in the department shown here	2	6	3	3
Depreciation costs have to be assigned to cost centers accordingly with these percentages	50%	20%	20%	10%
Utilities specific costs are	45,000 €	20,000 €	10,000 €	5,000 €
Rental specific costs are	250,000 €	150,000 €	100,000 €	30,000 €
Indirect material costs are proportional to depreciation	50%	20%	20%	10%
Cost Centers allocating basis	Forming machine hours	Direct labour hours	Units sold	Total revenues

	FORMING	ASSEMBLING	PACKING	MARKETING
INDIRECT LABOUR $\frac{1,200,000€}{14} = 85,417.29$ €/workers	171,429 € (85,417.29€ · 2)	514,286 € (85,417.29€ · 6)	257,143€ (85,417.29€ · 3)	257,143€ (85,417.29€ · 3)
DEPRECIATION (the percentages can be found considering total investments and the use of each department)	400,000 € (800,000 · 50%)	160,000 € (800,000 · 20%)	160,000 € (800,000 · 20%)	80,000 (800,000 · 10%)
UTILITIES	45,000 €	20,000€	10,000 €	5,000 €
RENTAL COSTS	250,000€	150,000 €	100,000 €	30,000 €
INDIRECT MATERIAL	10,000 € (20,000€ · 50%)	4,000 € (20,000€ · 20%)	4,000 € (20,000€ · 20%)	2,000 € (20,000€ · 10%)
TOTAL COSTS PER COST CENTER	876,429 €	848,286 €	531,143 €	374,143 €

↳ from now on, we'll only care about the total costs of each cost center

ALLOCATING BASE	forming machine hours	direct labour costs	units sold	total revenues
	10,000 · 1.5 + 25,000 · 2.2 = 69,000 MH (machine hours)	10,000 · 1.5 + 10,000 · 1.4 = 50,000 DLH (direct labour hour)	10,000 + 25,000 = 35,000 u	10,000 · 200 + 25,000 · 270 = 8,750,000 €
ALLOCATION RATE	$\frac{876,429€}{69,000} = 12,70$ €/MH	$\frac{848,286€}{50,000 DLH} = 16,97$ €/DLH	$\frac{531,143€}{35,000 u} = 15,18$ €/u	$\frac{374,143€}{8,750,000} = 4.28\%$ ↓ for each euro of revenues we spend 4c in marketing

	OVERSEA	MEDITERRANEA
COMPONENTS	35,00 €	32,00 €
DL	36,00 €	33.60 €
FORMING	17.78 € (1.4 · 12.7 €/MH)	27.94 € (2.2 · 12.7 €/MH)
ASSEMBLING	25.45 € (1.5 · 16.97 €/DLH)	23.75 € (1.4 · 16.97 €/DLH)
PACKING	15.18€	15.18€
	8.55 €	11.54 €
TOTAL COST	137.96 €	144.02 €

The two methods give two different results. The second method is more detailed, but how could we say that it is more accurate? The second method, which is more complex than the first one, has some situations where it is better to use -> The production processes are highly diversified:

- *products differ in terms of manufacturing activities required* -> with the first method, we assumed that indirect costs were directly related to direct labour hours (so, the assumption behind is that the amount of indirect costs is proportional to direct labour hours) -> the accuracy depends on the level of technology used (in case we have a manufacturing activity mainly manual, then it is a good)
- *production processes operate with different levels of automation* -> if the different technologies used in the different steps are manually used, then the first method is more adequate. But instead, if you have different levels of automation, if we try to make an average by using the same allocation base with different productive phases that have different methodologies (like using direct labour hours for everything, but there are some departments that are highly manual and others that are not), we can make mistakes
- there are *differences in the use of departments/process stages by products*.

➔ We are capable of considering the difference level of technology and complexity in each cost centre

The use of a Multiple Base model serves a **twofold purpose**:

- to provide more relevant product/service cost information for *cost management* (we are more aware of the costs of each product) and decision support
- to facilitate the accounting and tracking of costs related to products and services.

Advantages of Multiple Base CS:

- The allocation of Indirect Costs reflects more accurately the use of resources (type of departmental direct labour) and production capacities (departmental technologies) employed for each product
- The use of different Allocating Rates makes it possible to adopt a differentiated Allocating Bases according to the technological characteristics of each department (direct labour hours, machine hours, etc.)
- The differentiation of Allocating Bases requires the clear identification of cost drivers within each department.

When we want to apply these traditional systems, which kind of numbers should we use? If we have to use all the costs *known*, then traditional methods are good. Differences in direct & indirect costs *estimation* determining the cost values used as input to a Costing System:

- **Direct costs can be measured in real time while production is underway**. This is because they are calculated by multiplying the current price of each production factor by the quantity of that factor consumed at any given moment -> If we need 1000 markers, we know how much plastic we are using for producing the marker, and by looking at the current price of plastics, and we calculate the direct costs. As a result, *direct costs can be observed and monitored continuously as production progresses*.
- **Indirect costs, on the other hand, are incurred over a specific period of time and may be either variable or fixed**. For this reason, they cannot be measured directly when they arise. Instead, they must be estimated in advance, based on *expected levels of activity*. Their actual amount becomes *known only at the end of the reference period*, when production has already been completed (and the cost information would be late), making real-time measurement impossible

➔ The approach combining actual direct costs and estimated indirect costs is called **Normal Costing** (on the base of a specific period).

Normal costing advantages -> Budgeted-estimated overhead rates, for indirect costs, grant the following advantages:

1. Calculate product costs in real time, also for the indirect cost items, without having to wait until the end of the period
2. Eliminate the fluctuations of the overhead rates that will occur if actual monthly rates are used (if we calculate allocating rates on a monthly base, we could have indirect costs that fluctuate between the different months)

For example:

Indirect cost	January	February	March	April	Annual Total
Fixed indirect costs	2,000,000 €	2,000,000 €	2,000,000 €	2,000,000 €	24,000,000 €
Machine hours	200,000	100,000	400,000	300,000	2,400,000
Hourly overhead rate	10 €/hour	20 €/hour	5 €/Hour	6.67 €/hour	10 €/hour

Therefore, budgeted (estimated, predetermined) overhead rates are used (normal costing system) to allocate indirect costs.

Under- and Over- recovery of overheads

Example:

Estimated annual indirect costs (overhead)	2,000,000 €
Estimated allocating base (machine hours)	1,000,000 mac. hrs
Estimated (or predetermined) allocating rate	2 €/machine hour

If actual allocating base (level of activity) or overhead spending are different from that used to compute the estimated overhead rates, there will be an under or over recovery of fixed overheads, that need to be disposed at the end of the period.

Assume actual level of activity is 900,000 Machine hours and actual overhead are 2,000,000€:

Overhead allocated to products are	1,800,000 € *(900,000 x 2€)*
Under-recovery is	200,000 € *1,800,000 € -2,000,000 €*

Assume actual level of activity is 1,000,000 Machine hours and actual overhead are 1,950,000€:

Overhead allocated to products are	2,000,000 € *(1,000,000 x 2€)*
Over-recovery is	50,000 € *2,000,000 € - 1,950,000 €*

When we have an under-recovery, we have to reduce our profit, because we have charged less than the actual level of fixed costs. The opposite is the over-recovery.

Activity-Based Costing approach

If we take the production of plastic water bottle, the highest costs regard activities that are outside of the manufacturing activities, such as *marketing* or *logistics*. If we take the production of a smartphones, because they produce millions of products, it means that the efficiency is very high, and therefore the productive costs are not that high (less than 100€) -> we would miss the real costs, such as design, technology, innovation…some intangible items that are not part of the manufacturing process -> we need a Costing System capable of considering this costs.

Activity Based Costing Systems -> measure all costs that are relevant for management and extend cost assignment beyond manufacturing, including *design*, *marketing*, *order processing*, *logistics*, *sales*, and *other related departmental costs*. In highly complex situations (with many cost objects) and when indirect costs represent a *significant* share of total costs, these costs are first allocated to the individual activities of a department, function, plant, etc., and are subsequently allocated to cost objects -> the methodology is the same of the Multiple-bases approach, but instead of cost centres we use activities.

ABC: needs a more accurate CS than traditional ones

- Technology has *reduced the relevance of direct costs* and, more generally, of manufacturing costs, thanks to the process of *servitization* (which is the process where manufacturing companies start selling additional services), losing their hard parts (making the requirement for material requirement) -> when we talk about servitization, *direct labour is disappearing* (also because of the automation of productive processes). The most relevant examples are music and videos
- *Intense competitive pressure* has *compressed margins*, making accurate cost measurement essential
- *Product variety and customer requirements have increased complexity*, leading to more differentiated activities across the company's organizations (such as the flavour range of Pringles, which can reach to 46 different products -> it is not complex from the technological point of view, but from a managerial point of view, because, for example, it requires an ID product for each flavour). Within the complexity, we have to consider also the customer complexity, as *customers require customization*, which does not impact significantly on productive process but rather in other activities (delivering, selling, working with customers…)

- Variety and complexity require *more accurate cost drivers to be properly measured* -> these drivers differ from simple production volume determinants
- The *growing relevance of cross-departmental control objects*, such as processes & activities, highlights how ABC supports a process-oriented organizational approach
- *Variety and complexity generated by the offer to customers*, together with the cross-departmental nature of many activities, require the valuation of new cost objects that were previously not relevant, such as customers, business processes, distribution channels, and so on

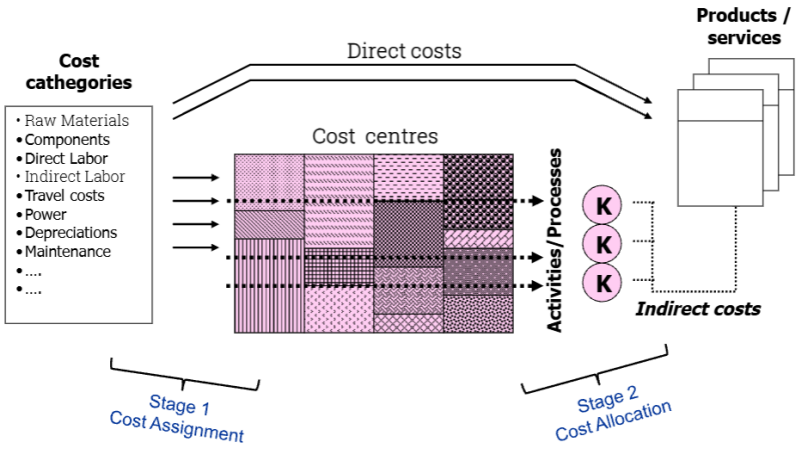
For example, because Amazon is capable of tracking the behaviour of customers (what product the customer usually buy, if they usually buy more expensive or cheaper product, how often you send back

a packages), and because one of the most expensive and complex procedures are connected to sending back the product purchased (which need to be tracked considering the single customer), they do not have to consider the profitability of product, but the profitability of customers

ABC and Customer Profitability analysis -> Assume that the company serves several customers and is now assessing the profitability of its commercial relationship with two key customers: Customer A and Customer B. Both have *generated the same annual revenues*, ordering a *similar product mix*, with a *Cost of Goods sold equal to 45%*. A detailed analysis of the orders placed by the two customers reveals the following situation:

	Customer A	Customer B
Total revenues	100,000€	100,000€
Total CoGS	45,000€	45,000€
Total Gross margin	55,000€	55,000€
N. of items ordered	200	2000
N. of orders managed	10	200
N. of deliveries	4	100
N. of invoices issued	50	250

Even though the two customers generate the *same gross margin on sales*, it is easy to see that *the cost incurred by the company to serve them is not the same*. To achieve a gross margin of € 55,000, Customer B requires the performance of many more activities. If the cost of picking each ordered item, as well as the costs of order processing, shipping, and invoicing, were calculated and allocated to customers using an ABC system, *Customer B would be far less profitable than Customer A*. *Customer B is more complex to serve (and costly) than A*.



To design an ABC system the four **following steps** are necessary:

1. *Determine the key components of the system* (cost items, activities, cost drivers, final cost objects, and activity drivers)
2. I*dentify the relationships between resources and activities*, and between *activities and final cost objects* (through management interviews). ABC requires a deep understanding of business processes);
3. *Collect the relevant data on costs, cost drivers, and activity drivers*
4. *Calculate and interpret the new cost information for each final cost object*

ABC vs Traditional systems:

- The allocation bases, used in traditional systems for assigning indirect costs, in ABC systems are called *drivers*
- Both systems use the two-stage allocation process:

  - In the first stage *traditional systems* tend to assign costs to departments whereas *ABC systems* assign costs to activities (ABC systems tend to have more cost pools)
  - In the second stage *traditional systems* rely on a small number of volume-based allocating bases (typically direct labour or machine hours) whereas *ABC systems* use many second stage cost drivers
- ABC systems seek to use only cause-and-effect cost drivers whereas traditional systems sometimes rely on arbitrary allocation bases
- ABC systems tend to establish separate cost driver rates for support departments whereas traditional systems merge support and production centre costs.

Example: Undersea Breathe UB Co. (B part)

Undersea Breathe is a company specialized in the development and production of diving masks. All components are manufactured through 3D printing in the Forming Department, while the finished products are assembled in the Assembling Department. The Packing Department prepares the finished products for shipment to customers, and the Marketing Department manages the sales and other general and administrative activities. To improve the cost measurement of the products produced (Overseas and Mediterranea masks), the Controller of the company decided to implement a new Activity Based Costing system. The following information was available:

Product data	Oversea	Mediterranea
Unit price	200.00 €	270.00 €
Production and sale volumes	10,000	25,000
Component costs (per unit of product)	35.00 €	32.00 €
Forming machine hours (per unit of product)	1.4	2.2
Assembly direct labour hours (per unit of product)	1.5	1.4
Direct labor cost per hour	24.00 €	24.00 €

Indirect costs	Forming	Assembling	Packing	Marketing
Indirect labour	171,429 €	514,286 €	257,143 €	257,143 €
Depreciation	400,000 €	160,000 €	160,000 €	80,000 €
Utilities	45,000 €	20,000 €	10,000 €	5,000 €
Rents	250,000 €	150,000 €	100,000 €	30,000 €
Indirect material	10,000 €	4,000 €	4,000 €	2,000 €
Total Indirect costs assigned to Cost Centers	876,429 €	848,286 €	531,143 €	374,143 €

Calculate the full cost per unit of product using the Activity Based Costing. Below are shown the activities mapped in each department and the time spent by departmental workers to run each activity.

Activities mapped	Forming	Assembling	Packing	Marketing
Machinery set-Up	30%			
Machining	70%			
Components' grouping		15%		
Assembly		85%		
Order management			20%	
Products packing			30%	
Deliveries			50%	
Selling				90%
Invoicing				10%
Total time worked in each department	100%	100%	100%	100%

The information regarding the activity drivers to be used is following:

Activity drivers	Overseas	Mediterranea	Total
N. of set-up	500	2,500	3,000
Machine hours	14,000	55,000	69,000
N. of components	40,000	150,000	190,000
Assembly DL hours	15,000	35,000	50,000
N. of orders	1,250	6,250	7,500
Unit sold	10,000	25,000	35,000
N. of deliveries	1,250	12,500	13,750
Unit sold	10,000	25,000	35,000
N. of invoices	1,000	500	1,500

First step, we have to apply the percentages in order to allocate the costs of the different departments to the different activities

Cost per activity

Activities mapped	Forming	Assembling	Packing	Marketing
Machinery set-Up	262,929 €			
Machining	613,500 €			
Components' grouping		127,243 €		
Assembly		721,043 €		
Order management			106,229 €	
Products packing			159,343 €	
Deliveries			265,571 €	
Selling				336,729 €
Invoicing				37,414 €
Total dipartmental costs	876,429 €	848,286 €	531,143 €	374,143 €

Activity driver rate calculation

Activities mapped	Activity costs	Activity driver	Q.ty of activity driver	Activity driver rate
Machinery set-Up	262,929 €	N. of set-up	3,000	87.64 €
Machining	613,500 €	Machine hours	69,000	8.89 €
Components' grouping	127,243 €	N. of components	190,000	0.67 €
Assembly	721,043 €	Assembly DL hours	50,000	14.42 €
Order management	106,229 €	N. of orders	7,500	14.16 €
Products packing	159,343 €	Unit sold	35,000	4.55 €
Deliveries	265,571 €	N. of deliveries	13,750	19.31 €
Selling	336,729 €	Unit sold	35,000	9.62 €
Invoicing	37,414 €	N. of invoices	1,500	24.94 €
Total dipartmental costs	2,630,000 €			

Total cost per product line	Oversea	Mediterranea
Components	350,000.00 €	800,000.00 €
Direct labor	360,000.00 €	840,000.00 €
Machinery set-Up costs	43,821.43 €	219,107.14 €
Machining costs	124,478.26 €	489,021.74 €
Components' grouping costs	26,787.97 €	100,454.89 €
Assembly costs	216,312.86 €	504,730.00 €
Order management costs	17,704.76 €	88,523.81 €
Products packing costs	45,526.53 €	113,816.33 €
Deliveries costs	24,142.86 €	241,428.57 €
Selling costs	96,208.16 €	240,520.41 €
Invoicing costs	24,942.86 €	12,471.43 €
Total cost per product line	**1,329,925.69 €**	**3,650,074.31 €**
Total units produced and sold	10,000	25,000
Full cost per unit of product	**132.99 €**	**146.00 €**

ABC advantages:

- Intermediate aggregation by activity brings CAS to the highest level of detail, setting a more accurate CAS
- The focus of ABC systems is on the indirect costs allocation, particularly the SG&A costs
- In *complex contexts*, with *many cost objects* and a *high share of indirect costs*, costs are first assigned to the activities of a department, function, or plant, and only afterwards allocated to the cost objects.
- ABC systems enable management to understand the cost of activities performed by different business functions and assess the costs in relation to the value generated by activities for both the company and its customers -> we have always to remember that increasing services and product sold by the company imply more resources and more complexity
- ABC systems also facilitate the profitability analysis of multiple cost objects, such as customers, geographic areas, market segments, and other similar categories.

ABC: instructions for use (cautions):

- ABC systems influence behaviours and require incremental resources/information (we need to identify the products, the relevant activities, the costs, the drivers, the total amount of drivers

and the specific drivers for each cost object…), as well as *significant expertise*. They are more costly than traditional systems -> the *benefit of increased information relevance must outweigh these additional costs*.

- ABC systems produce results that are very different from those produced by traditional costing systems. The ABC results need a higher attention to be understood and used.

➔ Data generated by the application of the ABC methodology should be used with care in the decision-making process.

Another advantage of applying the ABC methodology is that you realize what are the original costs behind the different activities allow the company to managing activities as costs-objects, in order to increase the efficiency of the company.

	Accuracy of measurements	Accountability	Price & Cost Management	Cost of implementation and maintenance
Plantwide/ Blanket allocation	Low	Low	Low	Low
Departmental allocation	Medium	High	Medium	Medium
Activity-based allocation	High	Low	High	High

Accuracy of measurement:

- single based systems are very simple and fast, with a very low accuracy
- With multiple based systems, we increase the accuracy of measurement, but there are additional conditions we have to respect
- ABC -> much more detailed information, more complex system but more accurate

Accountability -> means who is in charge and who is responsible for that specific cost object:

- Single based systems -> high-level management is responsible for it, but because they are responsible for everything, we don't know how much time and effort they have spent in that cost object
- Multiple based system -> it is normal that every department has its responsible
- ABC -> usually it is difficult to have a specific responsible for the different activities, in particular when they are cross-functional

Price & Cost measurement:

- Single based systems -> they are simplifying a lot the situation of the company
- Multiple based system -> there is a more accurate distinction between costs
- ABC -> it is easier to identify the most profitable and value creating activities and customers

Cost of implementation and maintenance:

- Single based systems -> very low, because it is a very easy system
- Multiple based system -> more complex, more costly
- ABC -> maintenance and monitoring activities are more complex (both in terms of structures and information required), therefore more expensive

The design of performance measurement and control systems

Performance measurement & control systems (PMCS) are the formal, information-based routines and procedures managers use to maintain or alter patterns in organizational activities -> instruments to *stimulate management to active* -> we stimulate organisations in *continuing, maintaining, or in changing*. In organizations, managers seeks to impose structures for two main purposes: facilitate the work flow (of both information and materials) and focus attention (regarding where people focus their time and energy). There are 4 important aspects:

1. *They convey information* -> we are addressing information. Suppose that in the case of company, starting from tomorrow, okay, we are using individual cross-margin, so cross-margin produced by each salesperson as a sample system. So the idea is that starting from the 1st of March, instead of, we'll be rewarding based on that use of your boxes, instead of being based on that, we will be based on cross-margin -> we are *addressing attention of salespeople*. They know that something is changing.
2. *They are "formal"* -> we made an official communication, *where companies tell how the performance measurement and control systems will change*. We made an official communication starting from the 1st of March. We modified our control systems tracing orders by orders and the cross-margin per order in the case of our salespeople. The money, the cross-margin, they are producing day by day.
3. *They are used by managers*
4. *They influence patterns in organizational activities* -> the scope is to influence the behaviour of people. Because probably starting from the 1st of March our salesperson will start taking care about the marginality of what they propose to customers. Probably they will realise that if we apply if they exceed in terms of discounts, they have their own problems. Because the more they make discounts the more they lose results because their performance is based on cross-margin not on revenues.

PMCS are **meant to solve different trade-offs**:

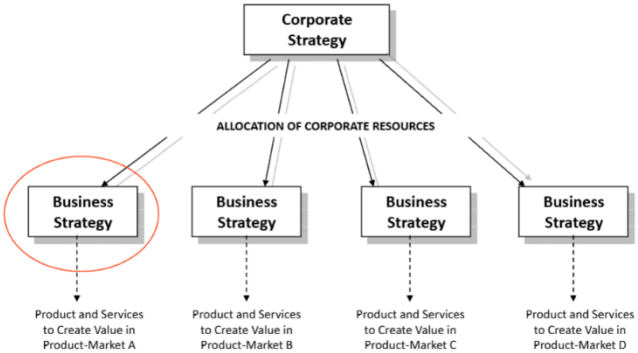
1. *Profit, Growth and Control* -> in case we promote one, we risk to sacrifice the others.
    a. if we say that we want to grow, we could mean increasing sales, customer base, enter new markets… if we want to increase sales we could face a limit with profit, as we might decide to reduce the price in order to increase the sales.
    b. Selling out in other countries could be, could be but probably entering new countries we need to spend money. If we want to remain in the same geographic area, probably we need to improve something in terms of context, in terms of quality, in terms of service -> increase costs and reduce profitability
    c. If we want to grow, we risk improving complexity and we risk losing control -> If we increase the customer base, we face risk to meet new customers to stimulate trials, promotion and samples but we are not sure about the return of this. And we are not sure that all the new customers will be, financially speaking, good customers (because if we sell but they don't pay you know that bad credit more or less are proportional to our sales)

   d. If we grow, we increase complexity and we risk to lose control (for example, in case we want to reach new customers, we might not be capable of better reaching them)

1. *Short-Term Results against Long-Term Capabilities and Growth Opportunities* -> if we want to produce results now, we are not allowed to sacrifice anything. On the other hand, if we want to reach objectives in the long-run, we have to spend money today (reducing our performance) in order to be better in the future by making investments that allow the development of a new product
2. *Performance Expectations of Different Stakeholders* -> common shareholders want profits and dividends, workers to receive salaries, customers want good quality -> good quality means lower margins, profits, and dividend
3. *Opportunities and Attention* -> opportunities is more long-term, attentions means understand what is happening now to motivate human behaviour.
4. *Motives of Human Behaviour* -> In order to maximise profit, we need to stimulate our manager with benefits, incentives, whatever. But if you have other kind of managers, suddenly this kind of pressure, they don't want to be engaged, they don't want to be involved, they have other kind of expectations they want to have a good work-life balance. They would like to have certain kind of benefits that different generations don't want
   ➔ We have to find a balance between these tensions

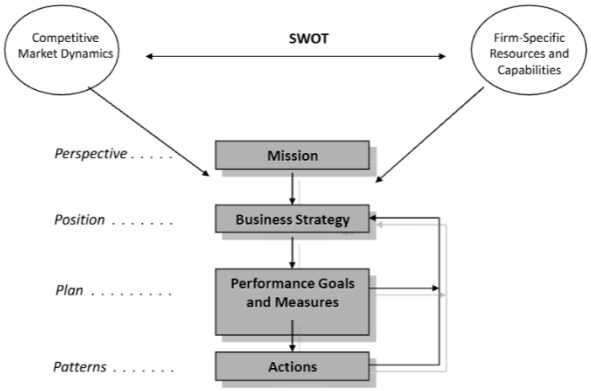
The design of PMCS: the relevance of strategy -> PMCS provide the analytic discipline and communication channels to formalize business strategy and ensure that strategic goals are communicated throughout the business. PMCS are the primary vehicle to monitor the implementation of strategies -> it is important the coherence between performance, measurement, and control systems and strategy, because if we use strange measures or inappropriate measures or wrong measures, to the end, we stimulate wrong behaviours or incorrect behaviours, "you get what you measure". For example, if I track managers based on revenues, we are forcing them to focus on sales -> they will start to try to sell as much as they can, without considering prices, discounts, credit collection, profitability...but not because they are stupid, but because the measurement system is designed to force them to behave in a certain way.

We need to understand the **relevance of the performance measurement control system** to brand strategy implementation, because if we use wrong measures, probably it will be impossible to put in place strategies as people *behave differently than what we expect*. There are 2 levels of strategy:



- *Corporate strategy* -> definition of *overall strategy of the company, the main values, principles and objectives*
- *Business strategy* -> companies work in different industries, selling specific products/services, by using specific productive processes -> we have to *deploy the overall strategy of the company into more specific and detailed business strategy*

➔ At *corporate level*, we have the overall allocation of resources among the different businesses, in order to *allocate investments according to the specific needs and strategies* that want to be implemented



Hierarchy of business strategy:

- *Perspective* -> we define the mission, we define the values and principles
- *Position* -> we have to define how to translate the values at business level (for example, if the value and objective of the company is to preserve the health of our customers, we have to define by which activities we want to implement in order to do it)
- *Plan* -> identify resources, assign resources, we create a sequence of actions, decisions, investments to put in place the business strategy.
- *Implementation* -> we have to consider also the context, so we need to adapt

Obviously, we can even plan everything in details, but we always have to consider the context in which the company is operating and adapting in case it changes. In particular, it is important to define an **efficient feedback system** that allow us to *communicate the results achieved* in order to *readjust the target and plans if the expectations are not met* -> in order to deploy the mission, and to create more powerful business strategies, usually we take into account all the potential information that are relevant. An important instrument for this analysis is the **SWOT analysis**, which allows us to compare the competitive market dynamics (and identify the relevant risks and opportunities) with the firm-specific competences and resources (in order to identify strengths and weaknesses) and identify coherences.

In order to analyse the competitive market in which we operate, we can use the **Porter's Five forces model**:

- *Potential Entrants to the Market* (which can compete by using maybe different perspectives, so different distribution channels, or different technologies, or different approaches to solve the same problem)
- *Substitute Products or Services*
- *Suppliers of Inputs and Resources*
- *Buyers and Customers* (in our competitive environment, pressures could also come from changes in customer behaviours, as buyers could change something, could modify their expectations, could have different needs)
- *Rivalry among Existing Competitors*

Assets and resources:

- An *asset* is defined as a resource, owned or controlled by the entity, that will yield future economic benefits.
- A *resource* is more broadly defined as a strength of the business embodied in the tangible or intangible assets that are tied semi-permanently to the firm

Assets are customarily recorded on the balance sheet, and these accounts are *imposed to test* and *must add future value to the firm* and the *value must be quantifiable with reasonable precision* -> we have to use a **formal representation**, as thanks to the financial statements we are communicating to the world our ownership of those assets.

Intangible assets are much more problematic for accounting purposes: their monetary value is difficult to measure so they more rarely appear on a firm's balance sheet. Whenever we talk about assets, we talk about assets shown in the BS, of which we have to be capable of protect our ownership of those assets -> there are *some intangible assets that can be protected* (such as ideas thanks to copyright) and, therefore, written in the BS, and *others that you cannot*. If, for example, if we have a good reputation on the market, and we have a customer base of 10,000 customers (we are well-recognised on the market, and we have a customer base of formal information, such as all the names of customers, their locations, so everything), it is something valuable (because if there is another company buying us, we have to include in the valuation), but we cannot expose them in the BS, because it is not something secret. Another example: if we invest a lot of resources in the training of a managers, we are creating something valuable for the company, but we cannot write that experienced manager in our balance sheet, because we cannot stop it to leave the company

Intangible resources:

1. *Distinctive internal capabilities*: special resources and know-how possessed by a firm that give it competitive advantage in the marketplace (Functional skills, Market skills or Embedded resources) -> here, if we talk about patents and trademarks, we can easily identify and protect them because they are formally evaluated
2. *Market franchises*: a business's distinctive ability to attract customers who are willing to purchase the business's products and services based on market wide perceptions of value.
3. *Relationships and networks*: long-term relationships with important suppliers and customers.

The design of PMCS: the relevance of organizational structure -> PMCS are aimed at supporting the control of work units on the basis of the *accountability principle*. A *work unit* represents a grouping of individuals who utilize the firm's resources and are accountable for performance (we have the operational manager who's carrying the operation, we have sales manager or marketing manager is their responsibility to put in place the strategy) -> It is the *basic building block of organizational design*. Accountability defines:

- The *outputs that a work unit is expected to produce*
- The *performance standards that managers and employees* of that unit are *expected to meet*

➔ you are in charge of something. You are accountable for something. You will be considered responsible for something. Because we are expecting you to do that and you produce this kind of results. You maximise these outcomes

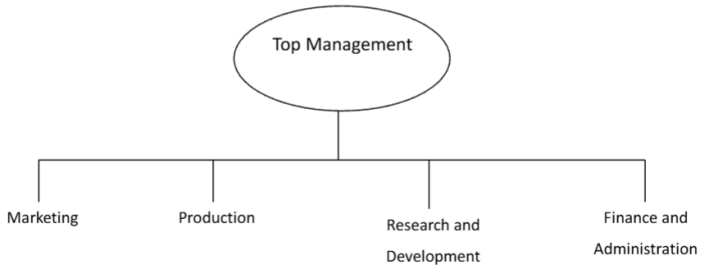
The *organizational chart* is a picture, a diagram of accountability units that can be of two basic types:

1) *Groups of people and resources engaged in a similar work process* (FUNCTIONS)
2) *Groups of people and resources focused on a specific market* (DIVISIONS or BUSINESS UNITS)

➔ We group people. We put people with the same expertise facing the same problems managing a specific business process

Units clustered by work processes: the functional organization

A **FUNCTION** is the most basic organizational component, comprising a group of managers and employees who specialize in *specific work processes*.



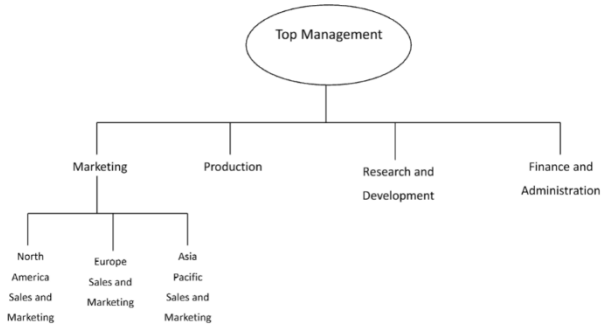
Whenever we create marketing or sales departments, we are talking about *people who's main function is to*, basically, *sell* (Sales is selling) and *promote our business* (Marketing is communicating), *maximising the exposure of our brands and our product lines*. If we talk about production, basically we are talking about *managers mainly working on production in a certain company, they are working on production processes, they are working on our plans* -> the approach is different because they are probably *much more technical*. The other are *more focused on communication*, in trying to sell, in involving, in interacting with the market. Production is more focused on *internal competencies*, they are usually more technical, they are probably e*xperts on technologies of raw material, of transformation process,* while the other *are experts of the way to communicate*, the way to present in the best way the company and the offer.

➔ they are **doing totally different jobs**, they usually have *different skills* and usually they could have also *different personalities*. Markets and sales are mainly focused on outside the company. Production is more focused on inside the company.

In function organisation, *people are divided by their specialisation* -> All technicians are mainly in production department, all salespeople are in sales and communication people are in marketing, sales, and whatever -> they are running segments of the same business, different segments of the same business, and the concept is to *integrate these different perspectives*. Functional analysis is an organisation mainly focused on the internal knowledge = we look inside us and we organise our competencies, our capabilities in function.

Units clustered by market focus

Market-focused units (DIVISIONS or BUSINESS UNITS -> in each division we have a combination of competencies focussing on a specific businesses) are normally found as:



1. *Units clustered by PRODUCT*: in such cases units are called *product divisions*. These are created in order to exploit *economies of scale* (using large-scale dedicated resources to drive down unit costs) and *scope* (using the same resources across related products or activities to increase throughput for a given fixed cost) related to product specialization
2. *Units clustered by CUSTOMER*: these are found when the market needs of each customer segment are unique so that specialized expertise and knowledge about customers are essential to compete, as they allow the recognition of needs and
3. *Units clustered by GEOGRAPHY*: they are often referred as regional business. Specialization is required to understand and respond to local specificities

➔ each business area is a sort of small company combining all competencies referred to a specific market, to a specific product, to a specific geographical area (in fact, most of the time

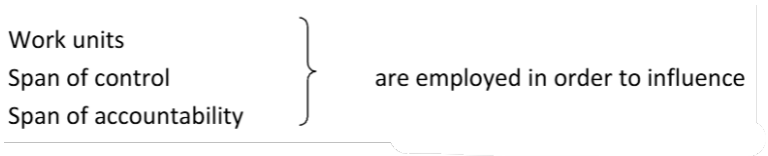
everyone has its own marketing division, product division…), focussing their attention on that specific business. Depending on the external perspective, we *organise our internal competencies* and *workforce* in order to reach our objectives

Span of control and span of accountability

SPAN OF CONTROL -> indicates how many (and which) subordinates and functions report to each manager in the organization. It describes the *resources*, in terms of *people* and *work units* (department, business units, functions), directly *under a manager's control*. Span of control outlines reporting relationships (who is accountable to whom) but does not tell us what they are accountable for, it tells us the hierarchical relationships.

SPAN OF ACCOUNTABILITY -> describes the range of performance measures used to evaluate a manager's achievements -> we use *measures to evaluate managerial performances*, and we consider these measures accountable for really precise kind of results. When we talk about responsibility accounting is deployed by using *financial responsibility centres* (Financial measures to rate managerial performances we compare to responsibility centres):

- *cost centres* -> evaluated on the capability of control costs -> we require them to reduce the variability, not necessarily minimize costs (as we'll face additional risks, because we could sacrifice security, safety, quality). Typical cost centre could be, a typical cost centre could be, raw material (which is an organisational unit, not a cost item)
- *profit centres* -> organizational unit with the responsibility of keeping under control cost and maximise revenues -> we are extending responsibility
- *investment centres* -> we are increasing the responsibility by making them responsibility of investments too -> ROI becomes a relevant measure (we are combining the capability of manager to access investment, or to create a price between the profit you create to maximise the return on investment).
- *engineering expense centres* -> there are connections between effort and resource and where the efficiency of each production line (which is a relationship between input and output), there is a sort of algorithm behind (as we know exactly which will be the output of the machinery if it works in a certain way and, therefore, we are capable of measuring their work).
- *discretionary expense centres* -> If we take the Customer Care department, they spend money -> could we measure the efficiency in the same way we measure it with machinery? No, because we need all the time to talk with the customer. Usually, the way we measure performance is respecting the budget and non-financial measure, such as *satisfaction rate* -> differently from manufacturing activity, we cannot measure precisely the efficiency.
- *revenue centres* -> organizational units that do not manage costs, but only revenues, such as the Sales department. Whenever we talk about revenue centres, we talk about net revenues centres -> they have to decide about *discount, order management, contractual conditions, promotion* -> these are costs in the end, so we have to subtract them from revenues



SPAN OF ATTENTION -> which refers to the domain of activities that are within a manager's field of view and defines what an individual will attempt to gather information on and influence. Basically, it is impossible to interact and control all the collaborators, in particular in case the department is required to produce high number of documents and reports, which will not be analysed entirely by the

manager. This will consume the memory and energies of a person. The way we decentralise, we need to create feasible situations where managers can really take care about the portion of the business -> performance management control systems are systems to support these limited capabilities of people, of human beings, to manage a complex situation, as the PMCS *select and identify the critical issues to simplify the reporting system*, just to reduce attention on the most critical issues

Five Strategic Organizational Configurations

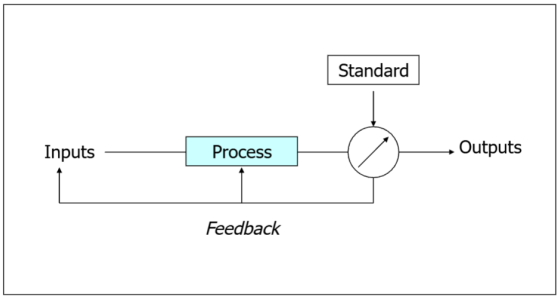
The organisation design that can be found in most of the companies can be summarized into **5 main configurations**, each aligned to a distinct customer-value proposition:

- *Low Price* -> allocate *most of the resources to the operation-core activities* in order to maximise efficiency and provide to the customer the lowest possible cost. This configuration leverages the benefits of functional specialization to create economies of different types -> specialized resources, knowledge and dedicated support units can focus of minimizing costs by standardizing processes and products and driving economies of scale. Managers can chose this configuration in case consumers prefer standardized products and the main choice driver is the lowest price available. Managers are usually responsible only to costs and revenues specific for the single line.
- *Local value creation* -> some customers prefer products that are more aligned with their local conditions and are more willing to pay an additional price to obtain a product that is capable of meeting their specialized needs -> we need an organizational division divided according to *region or geographical area*. This choice is correct when customers preferences are *highly influenced by local tastes, languages, packaging rules and business regulations*. This configuration reduces the efficiency, as it is common to find duplication of activities that increases the costs. Differently from before, managers run entire business operation and, as a result, are fully responsible for the P&L of that region + responsible for the BS under their direct control.
- *Global standard of excellence* -> similarly to the "Local value creation" there is a *strong push towards the market-facing units*, but instead of focusing on the geographical area the configuration is organized into product groups, so that all the workers and knowledge can focus their attention exclusively on that range of products. Like before, managers are responsible for entire P&L + responsible for metrics related to the utilization of assets in their units. The main benefits related to this configuration relate to *economies in R&D* (scientists can spend all their time working on enhancing existing software products for defined target customers), *economies in production* (by allowing dedicated and specialized plant facilities) and *economies in distribution and marketing* (distribution channels and marketing campaigns can be focused on meeting the needs of defined retail customer segments).
- *Dedicated Service Relationships* -> they are tailoring resources towards specific customers or customer type. This configuration is typical of those institutions that have a *small number of large, important customers* with which the company instal a *long-term relationship through dedicated services*. Clustering of customers is done when the needs to be satisfied are highly unique so that specialized knowledge about that customer is necessary for satisfying correctly that customer. Serving a specific customer segment might require a dedicated sale forces that can understand the needs and what are the most adequate configuration of distribution channel, product features and additional services that allow the company to meet its objectives. Alternatively, to creating specific units for each customer, an alternative configuration include a combination of managers that are responsible for "vertical operation" (which are responsible for interacting directly with the customers of the dedicated industry)

and managers that are responsible for the "horizontal" activities (they provide assistance to the "vertical" managers)

- *Expert Knowledge* -> required in case the customer requires the specific technical solution, such as in an hospital -> workforce is organized with the specific technical competences.

Inputs – Process – Outputs Model of controls



Whenever we need to design a control/measurement system, what do we measure? In order to put under control, we could measure Input, Process or Output depending on the situations (sometimes you are forced to use one or the other):

- *Input* -> we check the Input used for the process (resources we use, the skills we are using…)
- *Process* -> we control the actions (we control the action, exactly what we do)
- *Output* -> focus on results produced

Let's consider three examples:

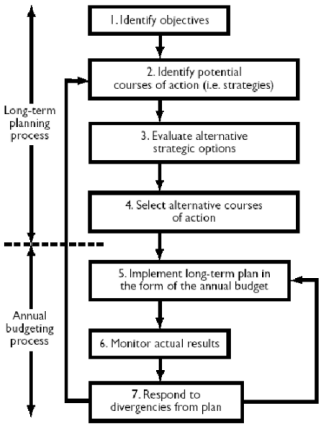
1. I want to plan and control an assembly line (we are in a manufacturing line) -> input moving slowly, workers need to make modifications -> we have to focus on Process, because we have to focus on the production, they do not make decisions and respects written manuals, they have precise activities to be done -> we
2. Control system for sales people (not online, in person, such as B2B situation) -> they have to meet in person. We are excluding the process, because there is not a manual for definition of a single style for selling -> we exclude process. Output -> we don't care about the approach, we just care about reaching objectives of sales
3. Hospital -> control the surgery department. Identify the output is difficult, and we could define some guidelines but -> in selecting people we care about the instruments we are going to use and the doctors we are hiring

➔ we can generate and distribute feedback about the controlling systems

The question at this point is: how do we decide which is the factor over which the company should focus?

INPUT	PROCESS	OUTPUT
- it is impossible to control process or output - Every time quality/safety of input is relevant - High input costs and/or input costs has impact on the total costs of the product	- Processes can be observed and measured - Cause-effect relationship is known - When standardization is critical for quality/safety - Process is key for competitive advantage	- Output can be measured - Cause-effect relationship is unknown - There's freedom for innovating - The cost of measuring output is known and low

Profit plans and budgets



Whenever we talk about **profit plans and budgets**, we are talking about planning instruments. Planning systems usually play their role *before* the action, before the period, at the beginning of the period by *setting targets and goals, plans and we identify targets*. After these goals identification, we normally supposed to act to put in place our, to implement our decisions. After this action, we control the results -> using various analysis, so *comparing budget values and actual values*, we understand how the management activity went.

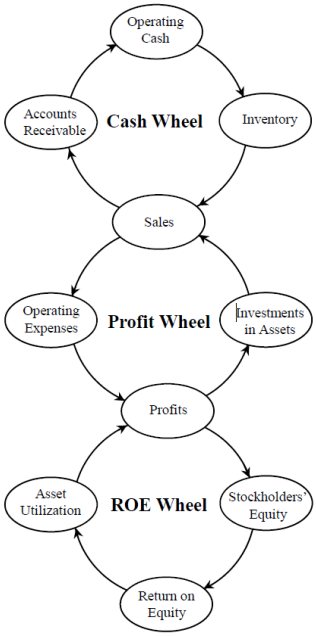
Profit planning -> is a simulating approach to planning, to get the best scenario that makes the highest performance. Whenever we set, whenever we have decided a scenario, deploying these targets and goals all over the organisation, usually we do the budgeted process. Budget usually is the way we deploy these scenario, involving all the infrastructures, all the organisation.

An **overview of the planning process**

1. *Identify the objectives of the organization.*
2. *Identify potential strategies.*
3. *Evaluate alternative strategic options* (profit planning).
4. *Select course of action* -> we deploy the scenario over the organization, we do budgeting.
5. *Implement the long-term plan in the form of the annual budget.*
6. *Monitor actual results* -> we make various analysis or respond to divergences from plan in order to readjust our long-term plans or readjust the potential actions we could analyse as alternatives.
7. *Respond to divergences from plan.*

Objectives of profit planning:

- *Profitability* ("profit wheel")-> translate an initiative into a detailed plan to create value -> Check of expected financial performance deriving from the strategic objectives and alternatives selected



- *Feasibility* ("cash wheel" because we have to verify our project from a financial point of view)-> To evaluate whether resources are available to implement the intended initiative -> Check of financial resources available and needed
- *Accountability* ("responsibility wheel")-> To create a link between goals and indicators of the intended initiative -> Definition of targets for performance evaluation of managers and to address the attention of managers and to maximise their contribution to the overall result of the company

Building a complete profit plan requires *simultaneously* analysing **three interlocking cycles**:

- The *Profit Wheel*: drives from sales projections through operating expenses, profit, and investment in new productive assets, which in turn generate future sales. The circular structure captures the reinvestment logic of a going concern.
- The *Cash Wheel*: tests whether the profit plan is feasible. It tracks the conversion cycle: Inventory → Sales → Accounts Receivable → Operating Cash, and checks whether the business generates sufficient cash from operations to fund working capital needs without exhausting reserves or borrowing capacity. This wheel is connected to both ROE wheel and Profit wheel, but in particular it is possible to identify the maximum growth rate a firm can sustain without issuing additional external equity (growth ambitions constrained by financing capacity create a binding limit on the profit plan):

$$Sustainable\ growth\ rate = ROE * (1 - Dividend\ Payout\ Ratio)$$
$$= ROE * (1 - \frac{Cash\ Dividends\ paid}{NI})$$

- The *ROE Wheel*: tests whether the profit plan is adequate from the perspective of shareholders. It connects profits and asset utilization to the return on equity that investors require. In particular, ROE can be split into different components:

$$ROE = \frac{Net\ Income}{Sales} * \frac{Sales}{Asset} * \frac{Asset}{Shareholders'Equity}$$
$$= Profitability\ Ratio * Asset\ Turnover\ Ratio * Financial\ Leverage\ Ratio$$

  This decomposition has critical managerial implications: lower-level managers who do not control shareholders' equity can still be held accountable for the asset turnover sub-component (sales ÷ assets).

The *three wheels interlock* -> if any wheel reveals an unacceptable result, managers must revise the plan and iterate across all three simultaneously.

The **Profit Plan/Budget**:

- A *master budget* can be divided into operating and financial budgets.
  - *Operating budgets* describe the income-generating activities of a firm: sales, production, selling and administrative activities (in fact, one of the most first intermediate result is Operating Income)

    - *Financial budgets* detail the inflows and outflows of cash and the overall financial position.

➔ Combining both we have a BS

The final synthesis is the *production of financial statements* (Balance Sheet, Income Statement and Cash Flow Statement), but we have to deploy all the components and the details of our plans (for example, whenever we talk about budgeted revenues, we need to deploy, what does it mean? How many products you want to sell? What kind of pricing? How many units? What mix? What price?).

For example, if we want to stimulate demand, we need to invest in market and sales. But investing in market and sales, we cause cost, and so we lose profit -> we have the profitability to respect. If we increase revenues will cause a proportional increase in account receivables, and probably we could have a similar proportional increase in stock of finished products to keep the same time to serve, right? But so increasing revenues, we are creating needs in terms of financing additional account receivable financial stocks.

The **operating budget** consists of a budgeted income statement accompanied by the following support schedules:

- *Sales budget* -> initial note we play in order to set-up the orchestra, as we are going to adjust all the other departments (for example, if we are planning to increase selling, the purchase department will need to know how much to purchase)
- *Production budget*
- *Direct materials usage and purchases budget*
- *Direct labour budget*
- *Factory overhead budget*
- *Selling and marketing budget*
- *Research and development budget*
- *Administrative budget*

➔ we normally only arrive to the operating income. So we are excluding taxes, we are excluding extraordinary items, because our main focus is to work on operating income

The usual financial budgets prepared are:

- *Capital budget* (asset allocation systems) -> it is related to investment, medium-long term budget -> if we make the annual BS, even though in the past we made an evaluation of the investment over multiple years, we have to take into account of the annual portion of an investment and the required capital only for the following year
- *Cash budget* (like the following) -> Cash budget is simply the estimation of inflows and flows, and outflows, and measuring our financial balance, if we are self-sufficient in terms of financial resources or not.
- *Budgeted Balance Sheet*

Beginning cash balance		$x,xxx
Add: Cash receipts		x,xxx
Total cash available		$x,xxx
Less: Disbursements	$x,xxx	
Minimum cash balance	x,xxx	
Total cash needs		x,xxx
Excess (deficiency of cash available over needs)		$x,xxx
Total financing:		
Plus: Borrowings		x,xxx
Less: Loan repayments and interest		x,xxx
Plus: Minimum cash balance		x,xxx
Ending cash balance		$x,xxx
		====

	Q1	Q2	Q3	Q4	Year
Sales units	10,000	15,200	20,000	40,000	85,200
Normal discount	0%	0%	10%	10%	
Direct materials per unit (square meters)	1	1	1	1	1
Direct materials cost per square meter	$ 100.00	$ 100.00	$ 100.00	$ 100.00	$ 100
Direct labor time per unit	1.5	1.5	1.5	1.5	1.5
Wage per hour	$ 40.00	$ 40.00	$ 40.00	$ 40.00	$ 40.00
Variable overhead rate	$ 40.00	$ 40.00	$ 40.00	$ 40.00	$ 40.00
Budgeted fixed overhead*	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 8,000,000
Variable marketing expenses per unit	$ 20.00	$ 20.00	$ 20.00	$ 20.00	$ 20.00
Fixed marketing expenses:					
Salaries	$ 700,000	$ 700,000	$ 700,000	$ 700,000	$ 2,800,000
Advertising	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 4,000,000
Depreciation	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 1,000,000
Travel	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 400,000
R&D expenses:					
Compensation for extern. researchers	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 400,000
Prototype design and development	$ 220,000	$ 220,000	$ 220,000	$ 220,000	$ 880,000
Administrative expenses:					
Salaries	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 1,200,000
Insurance	$ -	$ 1,500,000	$ -	$ -	$ 1,500,000
Depreciation	$ 125,000	$ 125,000	$ 125,000	$ 125,000	$ 500,000
Travel	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 40,000
Income taxes				$ 4,000,000	$ 4,000,000

*Operating depreciation for each quarter included: $500,000. OH are allocated based on DL hours

Detailed example – Data for operating budgets

The company sells the following products with the corresponding list price:

- Evelyine: $ 680
- Brigitte: $ 700
- Sophie: $ 720

The desired finished goods inventory is set at 40% of the next quarter sales. The desired ending inventory for direct materials is set at 50% of the next quarter needs. Sales for the first quarter of the next year are expected to be 12,000 units, while the amount for second quarter is 14,000 units. The ending inventory of the last year amounts to 10,000 units of finished goods and 13,000 units of direct materials (other inventories are negligible). Last year BS:

ASSETS		LIABILITIES	
Current assets:		Current liabilities:	
Cash	$ 1,600	Accounts payable	$ 5,000
Accounts receivable	$ 10,000		
Raw materials inventory	$ 1,300	Stockholders' equity:	
Finished Goods	$ 4,000	Common stock	$ 2,000
Total current assets	**$ 16,900**	Retained earnings	$ 16,400
		Total stockholders' equity	**$ 18,400**
Property, plant & equipment:			
Land	$ 500		
Building and equipment	$ 12,000		
Accumulated depreciation	$ (6,000)		
Total PP&E	**$ 6,500**		
Total assets	**$ 23,400**	**Total liabilities and equity**	**$ 23,400**

Data for cash budget:

a) A $100,000 minimum cash balance is required for the end of each quarter. Money can be borrowed and repaid in multiples of $100,000. Interest is 8% per year. (Assumption: all borrowing takes place at the beginning of a quarter and all repayment takes place at the end of a quarter).
b) 20% of all sales are for cash, 80% are on credit. Half of credit sales are collected in the quarter of sale, and the remaining half are collected in the following quarter. The sales for the fourth quarter of 20XX-1 were $25,000,000.
c) Purchases of raw materials are made on account; 50% of purchases are paid for in the quarter of purchase. The remaining 50% are paid for in the following quarter. The purchases for the fourth quarter of 20XX-1 were $10,000,000.
d) The capital budget for 20XX revealed plans to purchase additional equipment to handle increased demand at a small plant. The cash outlay for the equipment, $6,000,000, will take place in the first quarter. The company plans to finance the acquisition of the equipment with operating cash, supplementing it with short-term loans as necessary

Sales budget -> we are talking about expected quantities * expected price

	Quarter				
	1	2	3	4	Year
Units*	10	15.2	20	40	85.2
Unit average list price	$700	$700	$700	$700	x $700
Normal discount	0%	0%	10%	10%	
Unit average net price	x $700	x $700	x $630	x $630	
Sales	$7,000	$10,640	$12,600	$25,200	$55,440
	=====	=====	=====	=====	======

* Please notice that items in blue represent given data.

Figures are in thousands

If we are planning to use special discount policies, because we believe that these discount policies will boost, will influence in a positive way volumes, we could include here discount. Obviously, including these discount percentages, we need to remember in developing the last row sales, that we have to subtract those discounts. Because we have quantity of one product and price of one. In reality,

probably we could have more products with different expected prices, but to the end, it's a sum of quantities and prices.

Production budget -> the conversion should take into account the inventory at the beginning and the end of each period. In this case, we want to keep in the inventory 40% of next period sales -> in order to calculate the desired ending inventory of Q4, we have to predict which will be the sale quantities of Q1 2xx+1. In this way, we calculate the total need -> in order to identify the quantity to be produced, we subtract the inventory of bop. In the Year column, we have to include the inventory at the beginning and ending of the year, not of the last period.

	Quarter				
	1	2	3	4	Year
Sales (units) (Schedule 1)	10	15.2	20	40	85.2
Desired ending inventory	6.08	8	16	4.8*	4.8
Total needs	16.08	23.2	36	44.8	90
Less: Beginning inventory	10	6.08	8	16	10
Units to be produced	6.08	17.12	28	28.8	80

*12 x 40% (12 = sales in Q1 20XX+1)

Units to be produced in Q1 20XX+1:
(Q1 200X+1) Sales (units): 12
(Q1 20XX+1) Desired ending inventory: 14 x 0.4 = 5.6 (14 = unit sales in Q2 20XX+1)
(Q1 20XX+1) Total needs = 12 + 5.6 = 17.6
(Q1 20XX+1) Units to be produced= 17.6 - 4.8 = **12.8**

Direct materials usage and purchases budgets

	Quarter				
	1	2	3	4	Year
Units to be produced (Sch. 2)	6.08	17.12	28	28.8	80
Direct materials per unit	x 1	x 1	x 1	x 1	x 1
Production needs	6.08	17.12	28	28.8	80
Cost per sqm	x $100	x $100	x $100	x $100	x $100
Total DM usage cost	$608	$1,712	$2,800	$2,880	$8,000
DM Production needs	6.08	17.12	28	28.8	80
Desired ending inventory	8.56	14	14.4	6.4*	6.4
Total DM needs	14.64	31.12	42.4	35.2	86.4
Less: Beginning inventory	13	8.56	14	14.4	13
Direct materials to be purchased	1.64	22.56	28.4	20.8	73.4
Cost per sqm	x $100	x $100	x $100	x $100	x $100
Total DM purchase cost	$164	$2,256	$2,840	$2,080	$7,340

* 12.8 x 0.5 (12.8 is the forecasted units to be produced in Q1 20XX+1)

Note: the production needs are changing in square meters -> we have to change the unit of measurement in order to calculate the need of direct material. In order to calculate the need of direct material to be purchased, we have to identify the inventory policy for direct material, which could be different from the inventory policy for finished products.

Direct labour budget -> we assume it is proportional to units produced -> similarly from before, we have to convert the finished products into direct labour hours.

	Quarter				
	1	2	3	4	Year
Units to be produced (Sch. 2)	6.08	17.12	28	28.8	80
Direct labor time per unit	x 1.5	x 1.5	x 1.5	x 1.5	x 1.5
Total hours needed	9.12	25.68	42	43.2	120
Wage per hour	x $40	x $40	x $40	x $40	x $40
Total direct labor cost	$364.8	$1,027.2	$1,680	$1,728	$4,800

Factory overhead budget -> the hypothesis is that factory overhead is proportional to DLH.

	Quarter				
	1	2	3	4	Year
Budgeted DLH (Sch. 4)	9.12	25.68	42	43.2	120
Variable overhead rate	x $40	x $40	x $40	x $40	x $40
Budgeted variable overhead	$364.8	$1,027.2	$1,680	$1,728	$4,800
Budgeted fixed overhead	2,000	2,000	2,000	2,000	8,000
Total overhead	$2,364.8	$3,027.2	$3,680	$3,728	$12,800

Ending finished goods inventory (figures not in thousands) -> the 8,000,000$ refers to fixed overheads while 120,000 refers to the DLH, as we can found in the previous budget. The 4,800 finished goods represent the desired ending inventory that emerge from the production budget.

Unit cost computation:	
Direct materials (1 sqm. @ $100)	$100
Direct labor (1.5 hr. @ $40)	$60
Overhead:	
Variable (1.5 hr. @ $40)	$60
Fixed (1,5 hr. @ $66,6667*)	$100
Total unit cost	$320

*$8,000,000/120,000 = $66.666

	Units	Unit Costs	Total
Finished goods	4,800	$320	$1,536,000

Cost of goods sold

Direct materials used (Schedule 3)	$8,000
Direct labor used (Schedule 4)	4,800
Overhead (Schedule 5)	12,800
Budgeted manufacturing costs	$25,600
Beginning finished goods (from balance sheet)	4,000
Goods available for sale	$29,600
Less: Ending finished goods (Schedule 6)	1,536
Budgeted cost of goods sold	$28,064

Another way to estimate COGS is by multiplying the volume sold times the unit cost of good sold -> 85,200 units * 320 $/unit = 27,264 $ -> the difference is due to the fact that beginning inventory is values at a different cost per unit. This method works if the unit cost at which we value inventory does not change.

Marketing budget

	Quarter				
	1	2	3	4	Year
Sales (units)	10	15.2	40	20	85,2
Variable marketing expenses per unit	x $20	x $20	x $20	x $20	x $20
Total variable expenses	$200	$304	$800	$400	$1,704
Fixed marketing expenses:					
Salaries	$700	$700	$ 700	$ 700	$2,800
Advertising	1,000	1,000	1,000	1,000	4,000
Depreciation	250	250	250	250	1,000
Travel	100	100	100	100	400
Total fixed expenses	$2,050	$ 2,050	$ 2,050	$ 2,050	$ 8,200
Total marketing expenses	$2,250	$2,354	$2,850	$2,450	$9,904

Here the values in blue are budgeted values/input, and the total marketing expenses consider both the Variable Marketing costs and the Fixed Marketing costs.

Research and development budget

	Quarter				
	1	2	3	4	Year
Salaries	$100	$100	$100	$100	$400
Product design and development	220	220	220	220	880
Total R & D expenses	$320	$320	$320	$320	$1,280

They are not usually related to sales volumes.

Administrative budget -> these are usually fixed costs. Budgeting process: manufacturing expenses tend to be connected to volumes. Whether we enter into estimation of administrative costs, it becomes difficult to do so -> the main concern of SGAI costs is that we do not have a clear algorithm -> we usually estimate them by using an incremental approach (i.e. using last year + increase).

	Quarter				
	1	2	3	4	Year
Salaries	$300	$ 300	$300	$300	$1,200
Insurance	--	1,500	--	--	1,500
Depreciation	125	125	125	125	500
Travel	10	10	10	10	40
Total administrative expenses	$435	$1,935	$435	$435	$3,240

Budgeted income statement -> before the Operating Income, we have the Operating Budget, which include all the values included in the Operating Income calculation. In order to calculate the Net Income, we need some values from the financial budget, such as the interest expenses and taxes.

Sales (Schedule 1)			$ 55,440
Less: Cost of goods sold (Schedule 7)			28,064
Gross margin			$ 27,376
Less:	Selling and marketing expenses (Schedule 8)	9,904	
	R & D expenses (Schedule 9)		1,280
	Administrative expenses (Schedule 10)		3,240
Operating income			$ 12,952
Less: Interest expense (Schedule 12)			14
Income before taxes			$ 12,938
Less: Income taxes			4,000
Net income			$ 8,938

Cash receipts from customers -> collection and payment criteria related to operating budgets. We have to take the budgeted sales and look at the collection policies. In particular, we assume that all the remaining account receivable from the previous year is collected, 20% of sales of each quarter are collected immediately, 40% are collected in the following quarter and the remaining 40% in two quarters from now.

	Quarter			
	1	2	3	4
SALES (Sch. 1)	**$ 7,000**	**$10,640**	**$12,600**	**$25,200**
Cash sales	$1,400	$2,128	$2,520	$5,040
Received on account from:				
Quarter 4, 20XX-1 (from BS)	10,000			
Quarter 1, 20XX	2,800	2,800		
Quarter 2, 20XX		4,256	4,256	
Quarter 3, 20XX			5,040	5,040
Quarter 4, 20XX				10,080
Total cash receipts	$14,200	$9,184	$11,816	$20,160

Cash disbursements for direct materials -> similarly to before, we assume that all the account payable for direct materials are paid in the first quarter and then the purchases are paid 50% immediately and the remaining half in the following quarter of the purchase.

	Quarter			
	1	2	3	4
PURCHASES (Sch. 3)	**$ 164**	**$ 2,256**	**$ 2,840**	**$ 2,080**
Current quarter	$82	$1,128	$1,420	$1,040
Prior quarter	(from BS) 5,000	82	1,128	1,420
Total cash disbursement for raw materials	$5,082	$1,210	$2,548	$2,460

Cash Disbursements (total) -> we put together all the cash outflows, both the ones coming from operating activities and the investments and taxes

	Quarter			
	1	2	3	4
Direct materials	$5,082	$1,210	$2,548	$2,460
Direct labor	364.8	1,027,2	1,680	1,728
Overhead	1,864,8	2,527,2	3,180	3,228
Marketing expense	2,000	2,104	2,600	2,200
R&D expense	320	320	320	320
Administrative	310	1,810	310	310
Income taxes	--	--	--	4,000
Equipment	6,000	--	--	--
Total disbursements	$15,941.6	$8,998.4	$10,638	$14,246

Cash Budget -> we have to remember that it is different from the cash flow. Cash flow take aggregate of total inflows and outflows, flows can be added/subtracted and stock value per quarter does not sum together (they are totals at a certain point in time),

	Quarter				
	1	2	3	4	Year
Beginning cash balance	$ 1,600	$ 152.4	$ 132	$ 1,208	$ 1,600
Cash collections	14,200	9,184	11,816	20,160	55,360
Total cash available	$ 15,800	$ 9,336.4	$11,948	$21,368	$56,960
Total disbursements	$15,941.6	$ 8,998.4	$10,638	$14,246	$49,824
Minimum cash balance	100	100	100	100	100
Total cash needs	$16,041.6	$ 9,098.4	$10,738	$14,346	$49,924
Excess (deficiency) of cash	$ (241.6)	$ 238	$ 1,210	$ 7,022	$ 7,036
Add: Borrowings	300	--	-	--	300
Less: Repayments	--	200	100	--	300
Start of quarter short term debt	300	300	100	--	--
Less: Interest paid	6	6	2	--	14
Ending cash balance	$ 52.4	$ 32	$ 1,108	$ 7,022	$ 7,022
Plus: Minimum cash balance	100	100	100	100	100
Ending cash balance	$ 152.4	$ 132	$ 1,208	$ 7,122	$ 7,122
	====	====	====	====	====

Budgeted balance sheet

ASSETS		LIABILITIES	
Current assets:		Current liabilities:	
Cash	$ 7,122	Accounts payable	$ 1,040
Accounts receivable	$ 10,080		
Direct materials inventory	$ 640	Stockholders' equity:	
Finished Goods	$ 1,536	Common stock	$ 2,000
Total current assets	**$ 19,378**	Retained earnings	$ 25,338
		Total stockholders' equity	**$ 27,338**
Property, plant & equipment:			
Land	$ 500		
Building and equipment	$ 18,000		
Accumulated depreciation	$ 9,500		
Total PP&E	**$ 9,000**		
Total assets	**$ 28,378**	**Total liabilities and equity**	**$ 28,378**

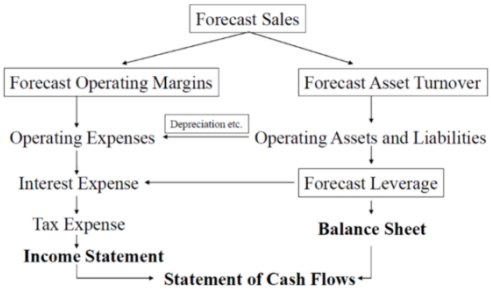
Surveys of financial officers of the largest industrial companies indicate that the use of master budgets is wide-spread in all countries:

- United States 91%
- Japan 93%
- Australia 100%
- United Kingdom 100%
- Holland 100%

Differences arise with respect to some other dimensions of budgeting. U.S. controllers and managers prefer more participation and regard return on investment as the most important budget goal. In contrast, Japanese controllers and managers prefer less participation and regard sales revenues as the most important budget goal. Surveys of Australian and Japanese managers report that budgeting is the management accounting practice that has the single highest benefit to them. Given the fast changing nature of business, companies seems to prefer use of models that adjust input in real time.

QUANTITATIVE METHODS FOR SALES FORECASTING

Importance of Sales Forecasting



The **sales forecasting** process involves the estimation of sales that a company expects within a plan period. If we think about *profit planning and budgeting*, the most challenging part is projecting sales. *Sales are the real goal of the company*, as when we set sales all economic and business decisions depend on them, such as:

- Production volume is calculated as Sales volume – ending stock + beginning stock
- Purchase volume is calculated as Production volumes + ending stock – beginning stock -> depends indirectly on sales

➔ Whenever we decide sales volumes, everything depends on it, because after it production volumes depends on sales volumes, which will influence the purchase volumes…

Naïve Method -> Simplest method, every prediction equals the last observed value, and the other observations are disregarded. Here, we are not talking into accounts of the global economics, the trends, mega trends, or whatever, we are simply using past information to make estimations on future revenues.

Month	Sales value
January	1.000.000 €
February	1.100.000 €
March	1.500.000 €

Prediction value for April?

1.500.000€ !

Moving Average -> The average method forecasts future values by making a simple average of the observed data (so we take some observations from the past and we make the average). *All the observations have equal weights* when generating the prediction.

$$\hat{y}_{T+1|T} = \frac{1}{T} * (y_1 + y_2 + \cdots + y_t)$$

Month	Sales value
January	1.000.000€
February	1.100.000€
March	1.500.000€

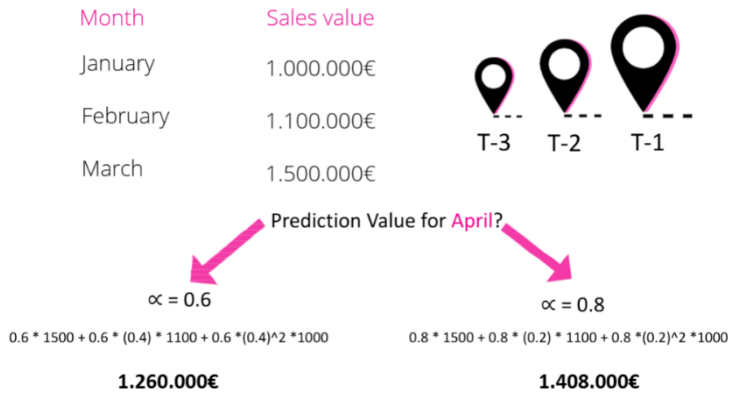
Prediction value for April? 1.200.000€ !

Simple Exponential Smoothing (SES) -> Similarly from before, we make an average of the previous observations, but SES attaches greater importance to more recent data by applying weights (in our

example alfa, which is a number between 0 and 1) that decrease geometrically with the age of the observations.

$$y\hat{}_{T+1|T} = \propto y_T + \propto (1-\propto) y_{T-1} + \cdots + \propto (1-\propto)^n y_{T-N}$$

Different exponential smoothing methods are available to model *trends* (Holt, 1957) and *seasonality* (Holt, 1957; Winters, 1960).
Increasing the value of the parameter "∝" diminishes the weights given to less recent observations -> *the closer alfa is to 1, the more relevance we are giving to the most recent observations.*



ARIMA Model -> ARIMA (p, d, q) stands for *Autoregressive Integrated Moving Average*:

- *AR (p)*: Uses past sales values to predict future sales. If last month's sales were high, this month might also be high. "p" represents the *number of past periods used*.
- *I (d)*: Handles trends in the data by differencing. If your sales are steadily increasing over time, ARIMA removes the trend to make the data stable (stationary). "d" represents *number of times the data is differenced*. For example, if in January we sold 100, and in February we sold 110, instead of considering 100 and 110, the system is considering the grow of 10 -> it's just eliminating the real values, but it's just focussing on changes
- *MA (q)*: Uses past forecast errors to improve predictions. If last month's forecast was off by a lot, the model adjusts. "q" represents the *number of past error terms used*.

ARIMA Models are based on **three main concepts**:

- *Autoregressive model*: multiple regression where the dependent variable is a linear combination of the variable's observed values (lagged values of sales).

$$y_t = c + \varphi_1 y'_{T-1} + \varphi_2 y'_{T-2} + \cdots + \varphi_p y'_{t-p} + \varepsilon_t$$

- *Differencing*: a methodology that removes (or reduces) seasonality and trend by eliminating changes in the time series level

$$y'_t = y_t - y_{t-1}$$

- *Moving average model*: it uses past forecast errors (lagged errors) to predict future values of the variable of interest

$$y_t = c + \varepsilon_t + \theta_1 \varepsilon_{t-1} + \theta_2 \varepsilon_{t-2} + \cdots + \theta_q \varepsilon_{t-q}$$

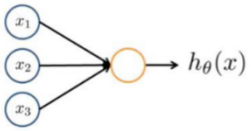
Combining the different models, we obtain a *non-seasonal ARIMA model*:

$$y_t = c + \varphi_1 y_{T-1} + \cdots + \varphi_p y'_{t-p} + \theta_1 \varepsilon_{t-1} + \cdots + \theta_q \varepsilon_{t-q} + \varepsilon_t$$

The predictors of the differenced series (that may be differenced more than once) include both *lagged errors* (moving average models) and *lagged values of the variable itself* (autoregressive models). The equation describes an ARIMA (p,d,q) model, where:

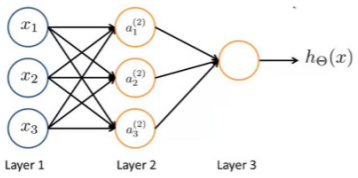
- p is the order of the autoregressive part
- d is the degree of first differencing involved
- q is the order of the moving average part

Machine Learning -> Machine learning is the field of study that gives computers the ability to learn without being explicitly programmed. By analysing all of these inputs and identifying the correlation between these inputs, this model is able to produce the output -> the idea is that the model developed itself this kind of interpretation of inputs in order to convert input in output -> connections are frequently unknown. In forecasting literature, we use a particular class of machine learning techniques named *artificial neural networks*. These tools try to *mimic the human brain structure*. A neuron is *feed with inputs* (x1, x2, x3), and *it outputs the final value computed through the activation function*. The activation function is usually the *same logistic function used in classification*.



Single Neuron

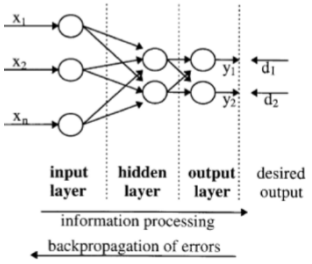
Artificial Neural Networks (ANNs) -> The simplest structure of ANNs considers the *input layer*, the *hidden layer* (whose aim is the determination and communication of specific patterns), and the *output layer*. The functioning is similar to the one of a single neuron. However, the features fed into the logistic regression are not simple external inputs but are the values computed by the hidden layer.



Neural Networks

Feed-Forward Neural Networks -> In Feed-forward neural networks, information flows from left to right without circular patterns -> we introduce a lot of input in the machine, there is a hidden layer working and connecting all the information to produce the output, but these outputs are compared with the real output. *Inputs* are typically represented by the *time series' lagged values*, while the *output* is the *future value*. The quality of the answer or the estimation we get obviously depends on the quality of the machine, but also depends on the quality of the data that we use to train the machine. Every network has a training algorithm that allows the ANNs to *modify its weights iteratively to minimise the distance between the actual and desired output value*. The most used training technique is the backpropagation algorithm.

$$y_{t+1} = f\,(y_t, y_{t-1}, \cdots, y_{t-k})$$



Comparison:

- *TRADITIONAL METHODS*
  - Based on assumptions on underlying trends
  - Poor performance in presence of non-linear relationships -> in case we have a trend, it is easier to make estimations
  - Easier to apply
- *NEURAL NETWORKS*
  - More complex
  - Self-Adaptive with few prior assumptions

- Capable of capturing subtle non-linear relationships

EVALUATING STRATEGIC PROFITABILITY THROUGH VARIANCE ANALYSIS

Introduction

Whenever we have to design our PMCS, after *completing our budgeting process*, we have to *implement it*, we *collect the results* -> to the end, these results are compared to the target we have set in the budgeting process -> this comparison will fuel the **feedback processes**. **Control** is *not something just related to inspection or formal control*, but also creating information to support management to improve decision making and better reaching the target. In putting in *comparison the actual values with budget results*, we use the **variance analysis** in order to *identify the differences and trying to identify the reasons for that* -> this is the first step in order to understand where the company should change and how.

For example, if we want to estimate the cost of raw material in the budget, what are the data we need to estimate the amount of raw material? We need:

- volumes = number of markers we are going to produce -> the amount of output
- quantity = the amount of plastic per unit -> the amount of input

➔ *quantity x volumes = total need of plastic*

- price

➔ *total need of plastic x price = total cost of plastic*

Variances can rise from each of these items:

- *volume variances* = producing more/less items, for example, will mean more/less plastic consumption -> matter of effectiveness
- *quantity/efficiency variances* = when producing the marker, we might use little more/less plastic per marker -> matter of efficiency
- *Price variance* -> from a particular perspective, we could talk about effectiveness of the procurement environment or we could talk about efficiency of the cost of procurement

➔ We potentially have 3 variances per each productive factor per product -> depending on the number of phases, the analysis will be more or less complicated

What is the meaning of these variances? What is the meaning of these volume variances? What do we put in evidence? So, making our calculations and evaluating volume variances, to the end we will conclude that if we produce more than we expect, all our costs are higher, while if we produce less, all our costs are lower.

The reason behind our decision to produce more or less than our budgeted values might *be connected to the amount we have to sell* -> if we produce more, we sell more, if we produce less, it means that we sell less. We could try to simplify this variance analysis avoiding volume variances. Whenever we have to analyse the variances in volumes, we have to look at the *change in contribution margin* (less production = less revenues and less costs = decreasing contribution margin), as the *fixed costs are not connected to volumes*. Instead of repeating if volume varies on all the items, why don't we simplify the analysis and say how much is the budget contribution margin? The methodology of simplifying the analysis is called **flexible budget**, where we use the actual quantities in order to analyse only the effect of quantities and price -> *without adjusting the budget for actual volume achieved, cost variances are contaminated by pure volume effects that are outside the cost-centre manager's control*. So, for example, in case in our static budget we planned to sell 9,000 units but after one year we have sold 10,000 units, we would have to recalculate the whole flexible budget considering 10,000 units, in order to make our own analysis based on the changes in contribution margin.

We want to measure the change in revenues in selling a product. **Total revenues** depend on:

- *Volumes = the amount of output* -> what could be a cause of change in volumes? Quality, marketing, communication services…but also because the market as a whole has grown -> we have to think about:
    - Dimension of market -> the market as a whole increased, which is out of our control
    - Market share -> we were more effective; it is a dimension more under our control (at least partially)
- *Price – std variable costs per unit* -> talking about prices, we are talking about the absolute amount, but we don't know the quality of these sells. If two products have the same selling price, in order to understand the effect of the composition of the mix of products we have to look at contribution margin. By considering the actual or budgeted price together with the std variable costs per unit we are allowed to analyse the revenues from the contribution margin but considering the impact of the differences on prices

What kind of explanation we could identify in contribution margin variance?

- If the variance is caused by the price, we are talking about price variance
- Mix variance -> if we change the mix of product, even though there are no changes in the individual prices or in the standard variable cost, we are generating a different contribution margin
- Volume change -> it can be caused by changes in the overall market or a change in our market share

Before conducting variance analysis, *three conditions* must hold for the performance measures to be meaningful:

- *Objectivity*: the measure must be independently verifiable.
- *Completeness*: the measure must capture all relevant dimensions of performance being evaluated.
- *Responsiveness*: the measure must be within the manager's ability to influence.

Competitive effectiveness vs Operating efficiencies

Role and definition of strategic profitability analysis -> Strategic profitability analysis is a tool to evaluate the success of a business in generating profit from the implementation of its strategy. Strategic profitability is made up of two components, as defined by the following formula:

$$\begin{aligned} &Strategic\ profitability \\ &= profit\ (loss)\ from\ competitive\ effectiveness \\ &+ profit\ (loss)\ from\ operating\ efficiencies \end{aligned}$$

Recall:

- *Effectiveness* refers to the extent to which an activity achieves desired outcomes -> it implies the comparison of actual results against preset expectations/standards
- *Efficiency* refers to the level of resources consumed to achieve a certain level of output -> it implies the ratio of inputs to outputs

Specifically:

- *Competitive effectiveness* drives *sales on the profit wheel* and focuses on *how well a business fared against its competitors and the environment in which the company operates* (as measured by market share growth, price premium and drive the most profitable mix)
- *Operating efficiency* drives *operating expenses on the profit wheel* and focuses on the *business's ability to manage costs* (both variable and non-variable costs) *and internal activities*

Steps in performing strategic profitability analysis

In order to perform a complete analysis of strategic profitability, a **series of variances** has to be computed:

1. *profit plan variances* (in absolute and relative terms)
2. *market share variances* (Market size, Market share…)
3. *revenue variances* -> Selling price and Mix
4. *production efficiency and cost variances*
5. *variances for non-variable costs*

Profit plan variances -> Recall:

- *variance (Δ)* = *actual income or expense as reflected on accounting statements - corresponding item as estimated on a profit plan/budget*.
    - Favourable variance if *actual profit > planned profit*
    - Unfavourable variance if *actual profit < planned profit*

➔ We have to be careful when making our evaluations, because *in case we are analysing a cost variance instead of a profit variance, the interpretation of the results will be the opposite* (favourable in case actual costs < budgeted costs, unfavourable if actual costs > budgeted costs)

- *Profit plan variances*: simple differences, line by line, *among actual items on the income statement and the items set out in the profit plan/budget*. They can be expressed both in absolute and relative terms

Competitive effectiveness: Market share variances -> Profitability attributable to market share depends on two key variables:

- increase (decrease) in profit due to changes in market size (for example, we have planned the market size to be 1mln units, but the actual size is 800,000 units -> the reduction of 200,000 units is the variation in the market size) -> in order to isolate the only changes in market size, we have to use the planned market share we set during the budgeting process and the planned average contribution margin.

$$\Delta\ market\ size\ *\ \boldsymbol{planned}\ market\ share\ *\ planned\ average\ contribution\ margin$$

- increase (decrease) in profit due to changes in market share -> differently from before, we are using the actual market size because in our evaluation we have to include also the increase (decrease) in the market size that we have missed (so for example, if our marker share is 8% instead of a planned 10%, we have to record this decrease. If in addition to this we have missed an increase in the market size, we cannot record this missed opportunity just by looking at the change in market share)

$$\Delta\, market\ share\ *\ \boldsymbol{actual}\ market\ size\ *\ planned\ average\ contribution\ margin$$

Revenue variances -> Profitability attributable to revenues depends on two key variables:

- increase (decrease) in profit due to changes in prices

$$\begin{aligned}&(product\ \#1\ actual\ selling\ price\ -\ product\ \#1\ standard\ selling\ price)\\&*\ product\ \#1\ actual\ volume\ +\ (product\ \#2\ actual\ selling\ price\\&-\ product\ \#2\ standard\ selling\ price)\ *\ product\ \#2\ actual\ volume\\&+\ \ldots.+\ (product\ \#n\ actual\ selling\ price\ -\ product\ \#n\ standard\ selling\ price)\\&*\ product\ \#n\ actual\ volume\end{aligned}$$

- increase (decrease) in profit due to changes in product mix -> we are evaluating change in volumes product times the planet contribution margin times the difference between the planet contribution margin and the average contribution margin for each product

$$\begin{aligned}&(product\ \#1\ actual\ volume\ -\ product\ \#1\ planned\ volume)\\&*\ (product\ \#1\ planned\ contribution\ margin\\&-\ planned\ average\ contribution\ margin)\ +\ (product\ \#2\ actual\ volume\\&-\ product\ \#2\ planned\ volume)\ *\ (product\ \#2\ planned\ contribution\ margin\\&-\ planned\ average\ contribution\ margin)\ +\ \ldots.+\ (product\ \#n\ actual\ volume\\&-\ product\ \#n\ planned\ volume)\ *\ (product\ \#n\ planned\ contribution\ margin\\&-\ planned\ average\ contribution\ margin)\ )\end{aligned}$$

Production efficiency and cost variances -> Profitability attributable to variable costs depends on three key variables:

- changes in sales volume (already considered in the previous step)
- changes in the use of inputs in relation to outputs (efficiency variance)

$$\begin{aligned}&Efficiency\ variance\\&=\ (planned\ quantity\ of\ inputs\ per\ units\ of\ output\ SQA\\&-\ actual\ quantity\ of\ inputs\ per\ units\ of\ output\ AQ)\\&*\ planned\ cost\ of\ one\ unit\ of\ input\ SP\end{aligned}$$

- changes in the unit cost of those inputs (spending variance)

$$\begin{aligned}&actual\ quantity\ of\ inputs\ per\ units\ of\ output\ AQ\ *\ (planned\ cost\ of\ one\ unit\ of\ input\ SP\\&-\ actual\ cost\ of\ one\ unit\ of\ input\ AP)\end{aligned}$$

We have to remember that:

- SQA = Standard quantity = volume of output * std q.ty (for example, if we plan to produce 10,000 markers with a standard quantity per marker of 0.5 kg per marker, we should have been consumed 5,000 kg of input)
- AQ = Actual Quantity = volume of output * actual q.ty (we spent 0.6 g per marker -> the actual quantity was 0.6 times 10,000 markers)

➔ they are applying the flexible model without declaring it, because we are still evaluating the consumption on the basis of actual volumes

Variances for non-variable costs -> *Spending variance = (planned cost – actual cost)*. It can be calculated for two different types of non-variable costs:

- Committed costs -> you signed a contract, and you are committed to fixed costs, such as when we sign a leasing contract
- Capacity costs -> connected to the capacity I want to have, I'll have different costs, such as depreciation for a bigger plant
- Discretionary expenses -> we took a decision during the budgeting phase to make a specific expense, such as marketing, training…

Interpreting strategic profitability analysis -> Strategic profitability analysis enables us to *isolate the variance effects associated with each profit plan variable* at a time. But variances per *se do not explain the reasons underlying them* -> managers must investigate the reasons for these changes and initiate actions to rectify problems and take advantage of unforeseen opportunities.

Managers use strategic profitability analyses for three purposes:

- *strategic learning*, i.e. evaluating the adequacy of the intended strategy of the organization and of the underlying cause-effect assumptions
- *early warning and corrective action*, i.e. assessing whether the strategy is on track or, on the contrary, implementation is not proceeding according to plan and corrective action is needed
- *performance evaluation*, i.e. evaluating the success of individual managers in implementing strategy and the success of business units in creating value

DESINING ASSET ALLOCATION SYSTEMS

Whenever we split responsibilities, it's sufficiently easy to identify responsibilities in terms of profit, simply because it is sufficiently easy to delegate revenue to responsibilities (we are talking about revenues coming from selling a precise mix of products and services), cost responsibilities (identify the total cost that managers under evaluation could manage), and consequently profit responsibilities.

One critical aspect is the delegation of investments -> one reason could be that usually investments require big amount of money compared to cost and revenues. One reason could be that usually investments require big amount of money compared to cost and revenues. Investments can be common for several kinds of businesses, which is fundamental for achieving economies of scale.

An **asset allocation system** is the set of formal routines and procedures designed to process and evaluate requests to acquire new assets (we are delegating the decision to make an investment). It is also known as a *capital budget or capital investment plan*. The main benefits of asset allocation systems:

- They provide guidelines specifying what they can decide, what they can spend…to limit their discretionality (if this system would not exist, managers could decide to make enormous investments that could favour an agency problem) -> manager propose, corporate level approve
- They can be used to communicate -> at corporate level we are communicating to management their authority and autonomy in making investment decisions

They specify the minimum constraints that must be considered when *proposing assets for potential acquisition*, i.e. they create boundaries to managerial decisions and actions. They specify the process by which proposals are evaluated and approved, typically in the form of *procedures setting out* (we create a process, declaring the limits that managers have to respect for making their proposals):

- *The analyses needed to document a request* (what do we ask as explanation, as justification and analysis to submit this investment proposal)
- The *process* by which proposals will be *gathered together and reviewed* by top managers
- The *time frame* (when the proposals can be submitted)

If we are corporate managers and we receive 5/6 proposals, we have to make a decision. Also because *the amount of money is limited* -> we need a logic to prioritize a specific

The **boundaries** defined by asset allocation systems are used to prescribe decision making authority. These are function of:

1. The *SPAN OF ACCOUNTABILITY* -> which affects the type of assets for which a manager has authority to commit
2. The *POSITION IN THE ORGANIZATIONAL HIERARCHY* -> which affects the amount of money that a manager can commit (which means that the manager would need authorization at corporate level)

An example: the Briggs & Stratton asset allocation process:

- Step 1: B&S's capital budgeting process starts in February, when James Brenn, VP and controller, asks the other VPs to submit a preliminary capital budget request. Included in this preliminary request are both new-product and cost-improvement projects.
- Step 2: To pare the requests down to fit the funds available for capital spending, the controller meets with each VP to discuss the feasibility of each individual project. The process of determining which projects should be founded and which ones should be cut or deferred requires a lot of time and energy from both Brenn and the VPs. According to the controller: "I would characterize the initial capital budgets more as a "wish list" than a realistic capital budget. The budgets are loaded up with virtually every possible new product and every conceivable cost-reduction, efficiency-enhancing project. The vice presidents know that we are going to cut down to the essentials, so they naturally ask for too much at the outset… those kinds of cuts don't happen without some tense moments and heated conversations".
- Step 3: After trimming the budget requests down to the most feasible projects, the resulting budget is submitted to B&S's board of directors for approval.

An example: the B&S asset allocation system rules

1. Each VP can approve projects costing less than $25,000.
2. If the cost of the project exceeds $25,000, the CEO's approval is needed. Projects of $1 million or more, however, require approval by the board of directors.
3. Projects are not considered viable unless the IRR exceeded 15 % (hurdle rate) -> within the documentation required, there is a capital investment evaluation. Except for environmental

and safety projects, however, it is extremely rare for a project to be submitted with an estimated IRR of less than 25%.

Evaluating asset acquisition proposals -> In most businesses' investment projects fall into three general classes, each of which has different criteria for evaluation:

1. *Assets to meet safety /health/ regulatory needs* -> Analysis focuses on the most effective way to comply with health, safety, or regulatory needs -> we have a qualitative goal, not necessarily a financial goal, we have to be sure we are complying with regulation. Financial return analysis is inappropriate. The evaluation question is which option best achieves compliance at minimum cost, not whether to invest.
2. *Assets to enhance operating efficiency and/or increase revenue* -> all the following methods can be used, but it is different decisions rules:
    a. *Payback* -> accept if payback period < specified threshold; prefer shorter payback
    b. *Discounted Cash Flow (DCF)* -> accept all projects with NPV > 0, prefer highest NPV among mutually exclusive alternatives
    c. *Internal Rate of Return (IRR)* -> accept all projects with IRR > cost of capital, prefer highest IRR among alternatives
3. *Assets to enhance competitive effectiveness* (e.g., new product platforms, brand investments) -> cash flow projections are highly uncertain, and value often arises from synergies with existing capabilities that are difficult to quantify. The text cautions against over-reliance on DCF for this class and emphasizes qualitative strategic judgment.

Evaluating assets to enhance efficiency and/or increase revenue -> Managers need to *demonstrate that the economic benefits of acquiring the new assets exceed the costs*. They can use three different techniques:

PAYBACK (in years): The use of the Payback as a Capital Budgeting decision rule specifies that all independent projects with a *Payback Period less than a specified number of years should be accepted*. When choosing among projects, the project with the quickest payback is preferred. The main limitation is that ignores cash flows beyond the payback period and ignores the time value of money.

$$\frac{\text{Total cash outlay to acquire asset}}{\text{Annual cash inflow or savings during each year of asset's life}}$$

- *DISCOUNTED CASH FLOW (DCF)* -> Projects with a *positive NPV are expected to increase the value of the firm*. Thus, the NPV decision rule specifies that all independent projects with a positive NPV should be accepted. When choosing among mutually exclusive projects, the project with the largest (positive) NPV should be selected. The main limitation is that it is highly sensitive to the assumed discount rate and to long-term cash flow projections, both of which are subject to manipulation and estimation error.

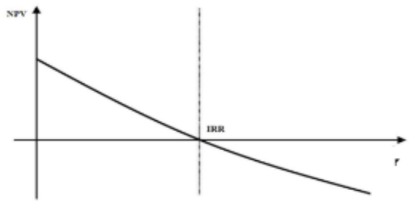
$$DCF = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \cdots + \frac{CF_n}{(1+r)^n}$$

CF = Cash Flow

r = discount rate (WACC)

Where
CFt = the cash flow at time t and
r = the cost of capital.

- *INTERNAL RATE OF RETURN (IRR)* -> The IRR decision rule specifies that all independent projects with an *IRR greater than the cost of capital should be accepted*. When choosing among mutually exclusive projects, the project with the highest IRR should be selected (as long as the IRR is greater than the cost of capital). The main limitation is that it can produce multiple solutions when cash flows change sign more than once, can mislead when comparing projects of different scale



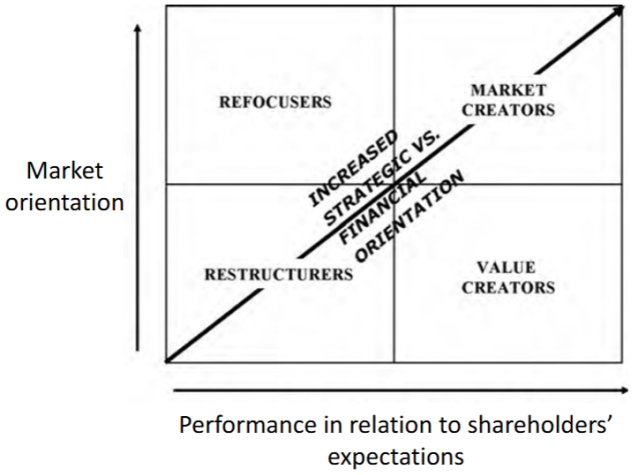
IRR = r at which NPV equals 0

Evaluation of assets to enhance competitive effectiveness -> Payback, DCF, and IRR can be used to evaluate asset acquisition proposals intended to improve competitive position. However, managers use cash flow analysis with caution for two reasons:

- the *cash flows* associated with the acquisition of strategic assets are usually *extremely uncertain* -> we have to pay attention to the assumptions we are making for predicting these CF
- the *strategic value of newly acquired assets* is often function of an *interaction with existing resources and capabilities*

➔ Managers must take quantitative information and combine it with qualitative judgments

A contextual approach to strategic investment decisions practices



We have a 2×2 strategic investment decision framework:

- *Market Orientation* (low to high) -> how market-focused the division's strategy is.
- *Financial Return* (low to high) -> how adequate the projected returns are.

This generates four diagnostic positions:

- *Low orientation + Low return*: restructuring or exit decisions are necessary.
- *High orientation + Low return*: the division is market-effective but not financially efficient; refocus investment priorities.

- *Low orientation + High return*: the division is a value creator but may be missing market opportunities; redirect resources outward.
- *High orientation + High return*: the ideal state, as the division is a market creator generating strong returns.

We could say that investment will support development of the company (So, position of the company, the market orientation of the company). On the other side, the return in terms of satisfaction expectation of shareholders. And so, if we are in a position where we have a low return for shareholders and low market orientation, probably we need to put in place restructuring decisions because we need to redefine the profitability of the return to shareholders and on the other side, to be effective in front of the market. If we are on this position, so when we are extremely market orientated, but our performances are not particularly satisfying the expectation of shareholders, probably we need to refocus our investment and readdress our activity.

If we are in this position where market orientation is not particularly high but performances are really strong, we are value creators. So, if we are able to combine these two dimensions, the idea to readdress our activity in the direction of the market. Market orientation and on the other side, be able to be profitable and generate return for shareholders. We are market creators because we are willing to integrate the strategic perspective of the division.

So, these two dimensions. The vertical dimension is just suggesting the idea of the strategic orientation. The other one, so the horizontal dimension is more focused on the financial orientation. So, in other words, develop growth and make money. So, these are more or less the two dimensions. And so, depending on our position, our investment, I may address it in one direction or in another one.

LINKING PERFORMANCE TO MARKETS: TRANSER PRICES

How do top managers evaluate and address the performance of a single business unit when two or more related business units of the same organization trade with one another goods or services. We have the transfer price problem when we have to evaluate the performance of multiple divisions and one division sells its product/service to another division, which will generate revenues for the first one and a cost for the second one -> in case both divisions *are treated as profit centres*, they will impacted differently. For example, the selling division might want to sell at the market price, while the buying division wants a little discount in order to facilitate the transaction.

Definition -> A *transfer price* is an internally set transaction price to account for the transfer of goods or services between divisions of the same firm. Transfer prices are used to value and coordinate the work flows of interdependent organization units that are each held accountable for financial performance

Inside markets and transfer prices -> related to *performance measurement*, problems arise when the revenues and expenses shown on a BU's profit plan include product flows to and from sister divisions of the same firm -> whenever we create profit centres there is no problem if these profit

centres are independent and they interact with the market -> this is due to prices not defined on an arm's length market logic. Distortions can be i*ntroduced into each BU's reported revenue, expenses, and profitability*. These distortions can affect both performance evaluation and resource allocation. Why do we judge these internal transactions as a problem? Simply because if these two divisions don't find an agreement the two by company has an *extra cost*. If we are inside the same company and we have a division selling something to another division all the value added remain inside. In case we have to buy a semi-finished product, we lose the first step of value added because we are paying a supplier the value semi-finished -> it's a cost for us.

Vertical linkages -> describe how a firm's profit plan connects to three distinct external markets, each of which evaluates the firm's performance in a different way:

1. *Customer/product markets*: customers evaluate value through product quality, price, and service. The firm monitors these through revenue, gross margin, product returns, and customer satisfaction.
2. *Factor markets* (suppliers, labour, capital equipment): suppliers and workers evaluate the firm through its operational reliability and creditworthiness. Key metrics include Days Sales Outstanding (DSO) and Days Payable Outstanding (DPO) — both rooted in the cash wheel.
3. *Financial markets*: investors and analysts evaluate the firm through ROE, EPS, dividend growth, and financial leverage ratios.

➔ The profit wheel is the integrating mechanism connecting all three

Transfer pricing alternatives

There are two main ways of setting transfer prices:

1. Based on market prices.
2. Based on internally generated accounting data (variable cost, full cost, full cost plus profit, negotiated prices, activity-based TP)

Based on market prices -> In cases where TP are based on market data:

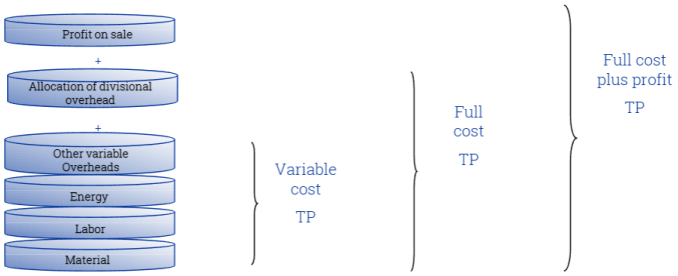
- the selling division records the transfer as a sale. The associated revenue is set equal to the *price that would have been realized if the product/service had been sold to an arm's length customer on the outside market*.
- the downstream division records the transfer as an increase in its inventory. The recorded price is the *same that the division would have had to pay for purchasing similar goods from an external supplier*.

Pros and Cons of TP based on Market Data:

- Pros of market prices:
  - *Representing true market prices*, TP based on market allow accurate performance evaluation and minimize the potential for misallocation of resources based on faulty performance measures -> we are assuming market prices are absolutely there, neutral, no negative impact on divisions involved in this transaction
  - *Simple*
  - *Objective*, and seen as valid by managers in all divisions
  - Provides managers with the *sense that they are running their own business*.

- Cons of market prices: *for most intermediate goods* and services transferred within a firm, *market prices are typically not available* -> something like this where there is no market reference, we don't know how to identify a market price because there is no market price

Transfer Prices using Internal Cost Data -> Often managers must rely on internal cost accounting data to establish transfer prices. There are several methods of setting TP using cost data -> variable costs, full cost, full cost plus a markup



Each method must be evaluated against **three simultaneous criteria** (and no single method optimally satisfies all three):

- *Performance measurement accuracy*: does the price correctly reflect the true cost of the intermediate good or service, allowing both divisions' performance to be fairly evaluated?
- *Managerial motivation and incentive alignment*: does the price create incentives for the supplying division to produce efficiently and for the receiving division to source optimally (make-or-buy decision)?
- *Pricing decisions for external markets*: does the price provide the receiving division with accurate cost information for setting prices in the external market?

Variable cost of manufacture is the lowest accounting-based transfer price. For the selling divisions, *TP based on variable costs produce understated revenues* (profits) relative to what they could have received if they had sold the goods to outside markets. The downstream divisions typically receive *goods at a price significantly below a market-based price*.

- Pros:
  - *Simple*
  - Allows *pure marginal cost decision analysis*.
- Cons:
  - *Arbitrarily shift profits from selling to buying divisions* -> Obviously in using variable transfer price, we are sacrificing the selling division and we are giving an advantage to the because the buying division is buying at a lower price and the selling division is selling at a lower price also
  - *No incentives for the upstream division to manage efficiently overheads and for the downstream division to look elsewhere for sources of supply* -> if we just charge variable cost, the buying division thinks they have space, they pay a small amount for this object, they have a lot of margin and they have no incentive to be efficient in the buying division.
  - *Marginal cost may vary* over a range of output due to *economies of scale*
  - *May limit the overall profit* when selling division is at full capacity and is forced to sell to sister division
  - May cause *purchasing division to underprice products* ultimately sold into final customer markets because it's taking benefit of these advantages, because we lose

margin on the final product simply because the buying division could reduce prices made less

Full Cost TP -> includes direct costs plus an allocation for the divisional overhead (a portion of manufacturing overheads). Full cost is calculated using standard costs rather than actual costs, to eliminate the possibility of passing through inefficiencies in manufacturing or processing, which will remain in the selling division. This way of setting TP is quite common in practice.

- Pros:
  - *Simple*, calculated by *routine cost-accounting systems* -> we use information that the company normally has.
  - *Allows upstream division to recover all its costs*.
  - By charging *downstream managers* with overheads, they have an i*ncentive to monitor costs and pressure for more efficiency upstream* -> if we charge the buying division, buying also overheads, they take care of our costs and the way they use resources and the way they margin
- Cons:
  - *Subject to inaccuracies* of the cost accounting system.
  - *Fixed cost of the upstream division become variable costs for the downstream division*. Potentially the decisions of downstream managers can lower the profitability of the firm (i.e., new investments).
  - The *upstream division may refuse to sell to downstream division* in favour of sales in outside markets at prices that include a profit margin.

Full Cost + Profit -> represents the highest accounting-based TP attempting to approach market price, including full costs and a profit margin. Full cost + profit is something simulating, simulating a market price, because we are *considering the total cost plus a markup plus a profit*. The upstream division recovers costs and overheads, and also some profit on sales.

- Pros:
  - *Attempts to mirror market prices*, including direct costs, overheads, profits
  - *Allows upstream division to receive full credit for internal transfers* -> So the upstream division will pay more or less a price similar to market. So it's more fair, also, for the upstream division receiving this new credit.
- Cons: It can result in the *downstream division paying costs that are higher than the value of the products received*

Transfer prices based on negotiated prices -> Managers often choose in practice to negotiate among themselves some satisfactory transfer price. The negotiated transfer price is usually based on standard direct costs plus some allowance for profit or ROCE.

- Pros -> *Perceived fairness among managers who negotiate final prices* -> seems to be absolutely fair because you have to take a decision, organise the transaction and decide by yourself
- Cons:
  - *Time consuming*
  - Profit and performance evaluation can be *biased by the negotiation skills of the managers representing each division* -> the manager with convincing the other probably could be the winner.

Activity-based transfer prices -> Transfer prices are charged using two separate approaches. Unit- and batch-level costs are *charged based on unit volume*. Product-based and plant-level costs are charged annually *based on planned levels of usage as reflected in profit plans and budgets*.

- Pros:
  - Provides a *more accurate measure of profit performance* in each division.
  - *Separates short term decisions from long term ones*.
  - *Motivates downstream managers to help selling division managers effectively manage capacity and other costs*.
- Cons:
  - *Relatively complicated*
  - Depends on the *accuracy of cost driven assumptions* and availability of reliable data.

Trade-offs to be managed when defining transfer prices -> Managers at different levels in a firm often attempt to achieve different objectives through their transfer pricing policies:

- *Corporate managers want transfer prices to*:
  - Encourage division managers to make decisions that maximize long run profitability of the entire company
  - Provide relevant information so that managers can make good short term decisions (bids for special orders) and long-term decisions (i.e. adding or deleting product lines)
- *Division managers want transfer prices to*:
  - Fairly represent the financial performance of their division
  - Reflect the impact of good business decisions within their division (i.e. product mix and improved efficiency)
  - Require downstream division managers to include the full costs associated with the products they are receiving from upstream divisions
- *Financial staff want transfer prices that*:
  - Are simple and credible, so they can be used and be useful to managers
  - Are easy to use and easy to explain

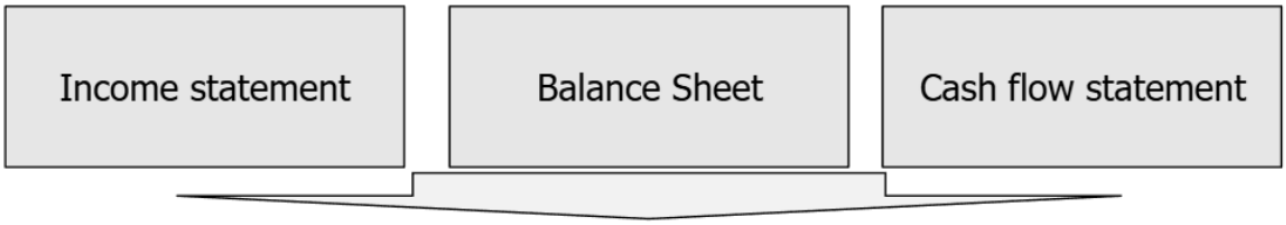
Let's consider that here we are not including just other goals, for example, if we are talking about *international companies selling*, making *cross-selling products in different countries*, there are also tax advantages. Suppose we are selling from country A, we are selling, we are selling a selling chain, finishing product, working product, whatever, from country A to country B. If you want to keep profit in country A, we increase the transfer price. The profit will be made here. They buy at a higher cost and so they utilise lower profit. If you want to transfer the profit in another country, we reduce the transfer price so we transfer a very cheap value, they pay profit and they purchase from there. So, increasing transfer price we keep profit here, reducing transfer price we are using from there. It depends on the tax system. If we pay a lot of taxes here, it's better to reduce transfer prices. If we pay no taxes here, it's better to increase the transfer price because we are keeping profit here or transfer there, in there, taxing the shipments and shipping. So, we did everything now. So, we discussed about the Islam and the transfer price policies.

LINKING PERFORMANCE TO MARKETS: MEASURING CORPORATE AND DIVISIONAL PERFORMANCE

What is performance? Corporate performance refers to a firm's level of achievement in creating value for market constituents. If we consider the performance, we can get 3 different perspectives:

- *Financial perspective* -> they *interact with the company with monetary resources*. The expectation of financial markets is the *return on their investments, RI (profit less capital charge), market value, EVA*...
- *Customer/product perspective* -> they are *transferring revenues to the corporation*. They judge their relations with the company with the *Value proposition*, which is a mix of price, quality, features, services...
- *Factor markets* -> the company purchases from *different markets the productive factors required to conduct its own operation* (suppliers, workers, energy, services...). In exchange for these factors, they receive *cash payments* from the company.

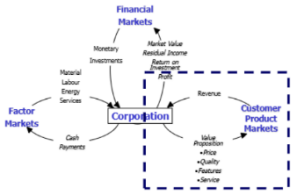
Accounting-based performance measures are usually based on these documents:



How do we rate a company's performance? In rating company performance and basically their capability to meet needs of stakeholders, we have to use financial statements. In order to analyse these statements, we calculate ratios that can be classified into 4 main groups:

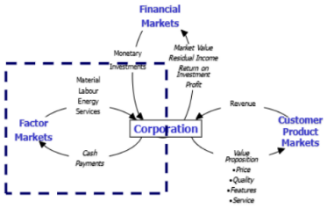
- *PROFITABILITY* -> The company's aptitude to produce adequate remuneration of the capital employed in its activities
- *SOLVENCY* -> The company's aptitude to bear internal or external events (particularly) negative
- *GROWTH* -> The attitude of the company to increase its size without compromising its existence and autonomy
- *LIQUIDITY* -> The ability of the company to cope with all the monetary exits that the conduct of management involves -> attention goes to liquidity with bankruptcy. Even if we have a good profitability, even if we are solvent, but if we don't have cash to repay for debts in the short run, then probably we risk bankruptcy in any case

Let's consider how the accounting-based measures could create value, could measure the capability to satisfy the expectation of our stakeholders.



Products and services meet customer expectations -> Revenues exceeding the costs is a demonstration of meeting customer expectations (because we are capable to set a price that is coherent with our position) for creating and delivering the value propositions

➔ We can evaluate it with *Revenues, Revenues growth, Gross profit margin and Product returns, warranty expenses….*



Interaction with market factors (so with workers, suppliers, energy and services providers…) -> Company has cash available to satisfy expectations of strategic suppliers (which means understanding if we are treating fairly our suppliers, if we are respecting the payment deadlines, we able to assess better suppliers because we have more value to address to our purchases…)

➔ We can evaluate it based on *CFFO, Days Sales Outstanding, Days Payable Outstanding* -> we need an equilibrium between inflows and outflows, and our capability to remain in managing our business

Interaction with financial markets -> Increase the monetary value and financial return of investments made by stockholders (or investors in general) -> *Return on Equity (ROE), Dividends distribution and retention, EPS, Return on investments (ROI or similar), Financial lever*

➔ moving to the perspective of financial market, now we are shifting slowly our perspective -> from *operating profitability to net profitability, but from managerial perspective to shareholder perspective*

EQUATION OF FINANCIAL LEVER

ROE = [ROI + (ROI - i) * liabilities/E] * NI/EBT

i = Average Cost of Debt

Interest expenses/Liabililties

Some relationships among performance dimensions:

- Generating positive income is the first source of liquidity, as evident from the structure of the cash flow statement, where income is the first item.
- *Working capital* management influences the conversion of income into cash, and is also a determinant of asset turnover, which in turn is a lever for operating profitability.
- Liquidity enables short-term operational decisions that improve profitability, such as negotiating counterparty-friendly collection and payment times in exchange for cheaper prices.

- Liquidity facilitates investment for growth, innovation, and through these the defense and improvement of profitability over time.
- Firm size itself generates benefits in terms of profitability (economies of scale, learning curves, lower incidence of overhead costs), and a 10% ROI provides ten times more resources at the disposal of the firm with invested capital of €50 than to a competitor with invested capital of €5.

- Liquidity enables debt servicing, i.e., repayments and interest outflows.
- Profitability allows the firm to sustain higher financial expenses, and therefore a higher level of debt, without compromising ROE performance.

- Debt, when supported by profitability, increases investment potential for growth.
- Debt, through the financial leverage effect, increases return to shareholders (ROE) given the same level of operating profitability (ROI).

The **role of performance measures**:

- *Target setting*
- *Investment decisions and M&A*
- *Operating decisions*
- *Communication and Training*
- *Strategic Planning*
- *Incentive Systems*
- *Performance measurement*

Main limits of accounting-based measures:

- *Delay in representing the consequence of decisions and actions can induce operating and strategic myopia* -> accounting measures, unfortunately, are really slow, they provide feedback too late, while sometimes we need something faster. Sometimes we suffer of strategy myopia because accounting measures are usually annual measures, focus on periodical results. They don't have any geological strategy. If we use the ROI and we make investments, the denominator increases and the index falls
- *Low predicting power of future performance* (sustainability of achieved results) -> actual values don't have a high predicting power
- *Misalignment between local decisions/interests and corporate objectives* because after 1950s corporate became more global, and the dynamics of local markets are less relevant
- *Intangibles are poorly reported by accounting*, but they are often the primary source of value
- *Poor correlation between accounting measures and MVA*

Value Based Management movement

The competition on financial markets has stimulated companies to look for *new ways to measure and communicate performance*, i.e. more complete and meaningful reports for investors than the traditional accounting-based ones -> the **VALUE BASED MANAGEMENT** approach proposes to focus on performance measures directly correlated and more correlated with shareholder value creation. Known since the 1920s in General Motors and connected with Residual Earnings/Income. But more recently, the value-based management proposed economic benefits.

Residual Earnings/Income -> Investments add value only if they earn above their required return -> it *introduces the concept of return over the capital*. Residual income is the positive difference we are able to create between our actual earnings and the expected return on investments.

$$Residual\ earnings_1 = Profit_1 - (Required\ return\ x\ Investment_0)$$

	A	B
Investment t0	$ 1,000	$ 1,000
Revenues t1	$ 500	$ 500
Costs t1	$ 400	$ 380
Required return	10%	10%

A)
$ROI = (500\text{-}400)/1000 = 10\%$
$Residual\ earnings_1 = 100 - (1{,}000\ x\ 10\%) = 0$
B)
$ROI = (500\text{-}380)/1000 = 12\%$
$Residual\ earnings_1 = 120 - (1{,}000\ x\ 10\%) = 20$

The Valuation model that measures <u>forecasted residual earnings is the Residual Earning Model</u>.

$$Value = Book\ Value + Present\ value\ of\ residual\ earnings$$

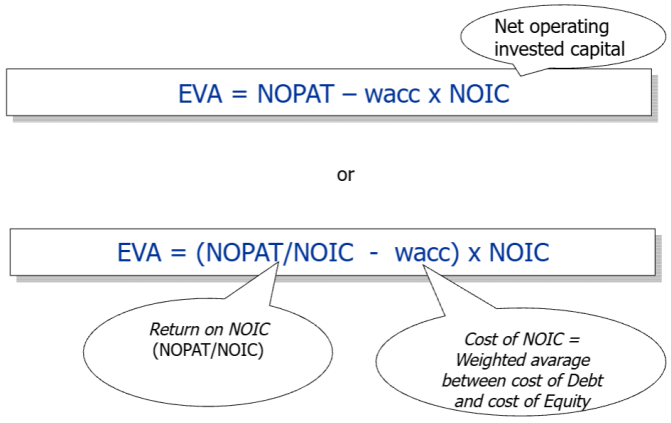
$$\text{A) Value} = 1{,}000 + \frac{0}{1{,}10} = 1{,}000$$

$$\text{B) Value} = 1{,}000 + \frac{20}{1{,}10} = 1{,}018.18$$

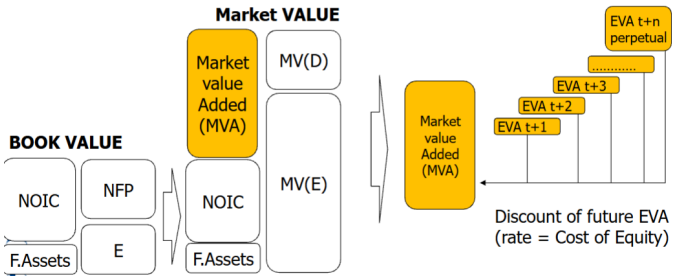
The ratio model that measures forecasted residual earnings is the residual earning model. Now, we could use this logic to produce residual earnings, but on a medium-long term period. For a *terminal project*, the <u>residual earnings value is always the same as that calculated with Discounted cash flow methods</u>.

$$\text{Value (DCF)} = \frac{1{,}000 + (500 - 380)}{1{,}10} = 1{,}018.18$$

EVA (Economic Value Added) -> is a ratio as an evolution considering different consumer adjustments. In addition, instead of just simply profit, we talk about *net operating profit after taxes (NOPAT)*, *weighted average cost of capital (wacc) and net operating invested capital (NOIC)* -> <u>the logic is the same, as we are always calculating a residual income, but we're making several adjustments</u>.



The EVA generated in the period proxies the difference in company's value measured by DCF methods.



Market value added is the *discounted flow of the EVA* and so *evaluated at the cost of EVA*. And so the market value added is the EVA generated in the period, the difference in company's value measured by the discounted cash flow methods.

What are the main components?

- *NOPAT* -> Net Operating Profit After Taxes = EBIT * (1-t)
- *NOIC* -> Net Operating Invested Capital = Operating asset – Operating Liabilities = Net financial position (=Financial Liabilities – Cash Excess) + Equity
- *WACC* -> Weighted Average Cost of Capital = $r_e * \frac{MV(E)}{EV} + r_d * (1-t) * \frac{MV(D)}{EV}$ where $r_e = rf + MRP * \beta$

The detachment of NOPAT and NOIC from accounting-based values is achieved through *adjustments and corrections on all components*. For EBIT alone, over *150 adjustments are approved*, although only few of them are normally applied (that need to make accounting measure more in line with the value needed for evaluation).

Accounting data do not always reflect economic reality -> few adjustments are done in order to translate accounting effect into economic value (because they are made on the basis of national and international principles that do not always reflect the economic reality) and reduce this depicting effect. Examples:

- *LIFO Inventory*: because the fist stock that goes out of the inventory is the one that is the further in time, inventory is evaluated at historical value -> inventory is distorted vs current inventory value
    - NOPAT -> The value of inventory is *adjusted to current costs* (eliminate the fact that we are evaluating at the historical costs)
    - NOIC -> The distortion due to the *reduction in inventory stockpiles and the consequent liquidation of LIFO layers is reversed*

➔ *Deferred Tax Expense* -> taxes include actual taxes paid and cost for deferred taxes (which are included as a cost, as a provision) -> only effective taxation is considered, avoiding temporary accounting effect and considering only taxes that have been actually paid

- NOPAT -> The *current year's income tax expenses* attributable to the accrual of deferred taxes is *added back to income*
- NOIC -> *Liabilities related to deferred tax payable are not deduced from Assets* (or, it is the same, are considered part of NOIC)

- *Impairment of goodwill* -> When goodwill is impaired, we have a *cost* and the *value decreases*, but the original investment does not change. For EVA purposes, *equity investments that generate revenues and profits* are considered Operating invested capital and therefore *included in the capital base*. Goodwill is the *value of the purchased company which is not recorded in the formal accounting records*. The book value of goodwill is written down when there is evidence it is impaired due to changed market conditions. For EVA purposes, profit are correlated with the entire investment made, and managers are considered responsible for it.
    - NOPAT -> The value of *impairment is added back to profit*, increasing the NOPAT
    - NOIC -> The *value is restored to reflect the full purchase price* of the acquisition

➔ Management is responsible for the whole investment, not just its current good value

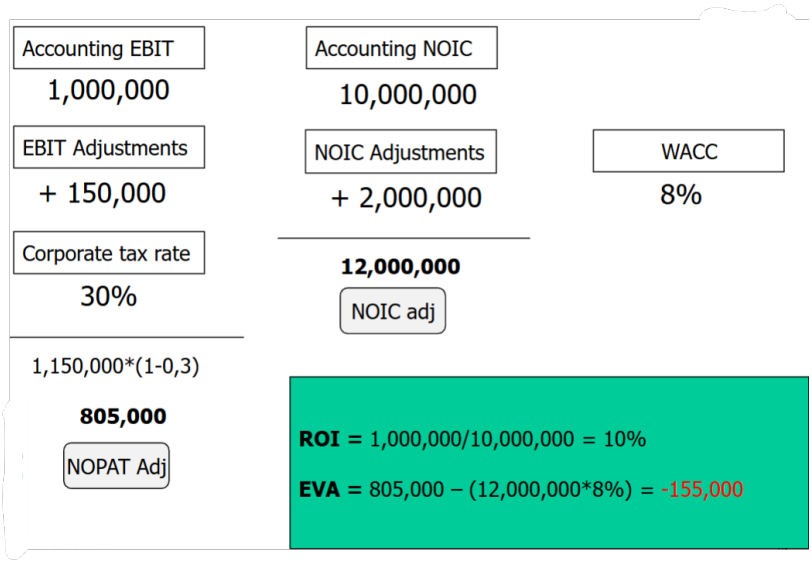
- *Research and Development* -> R&D costs are usually expensed in the period they are incurred in order to be prudent. For EVA purposed they are *considered Assets and amortized over useful life* (5 or 10 years)
    - NOPAT -> The *amount of expenses of the period is added back to profit*, the amortization of R&D capitalized in the past is included

    - NOIC -> The *capital base is increased by the capitalized costs* (over the previous periods) net of accumulated amortization
- *Provisions for risk and charges* -> they appear as current liabilities, but they are operating activity
    - NOPAT -> *No adjustments*, they are considered operating costs
    - NOIC -> Differently from the current liabilities, *provisions for risk and charges represent capital invested in the business*. Whether operating (ex. Warranty, maintenance, tc.) they are included in the capital base
- *Depreciations*:
    - NOPAT -> *Accounting depreciations are replaced with economic depreciation* to reflect the correct «consumption» of long-term assets
    - NOIC -> *No adjustment is made in most cases* (90%), the net book value is not restated The book value is usually modified in advanced valuation methodologies

If we go through this kind of changes, probably, we could reach more than 150 potential changes. There are basically **three main kinds of adjustments**:

- one kind of adjustment is to *eliminate accounting distortions* -> we have to eliminate accounting distortions like leave-all valuation or deferred taxes
- The second kind of adjustment is to *convert costs into investments*, like what happened with R&D
- the third aspect is to *align managerial responsibility with invested capital*, like goodwill not reduced for EVA purposes

EVA does not measure the accounting profit, but the value created from the investment



EVA and Divisional performance:

- EVA Provide a *simple way for evaluating investment proposals* (just compare return with average cost of capital)
- *EVA is a number*: if *higher than zero, the investment generates value* (difference from ROI that stimulate comparison with past average performances)
- *Required return could be differentiated among periods* (or even among divisions/investment centres) to *stimulate alignment between corporate and local interests* -> we could have different deployment of EVA depending on periods, depending on specific context, depending on organisational units

- *EVA does not reduce the importance of accounting-based performances* (it starts from them)
- Including WACC among its component, *EVA focus the management not only on Classic drivers of performance* (revenues, cost incidences, mix, overhead costs, working capital management…) but also on *drivers behind WACC*, in particular Risks behind the cost of capital
- As for classic investment centres measures, to be consistent with accountability principles, *EVA require to decentralize the governance of invested capital to business units* -> Because we are evaluating the capability of each business unit to produce a return, and so we have to assign investment capital responsibilities to local units

BALANCE SCORECARD

Introduction

Balanced Scorecard is a multidimensional measurement and accountability framework for strategy execution.

Kaplan and *Norton* (the inventors of this idea in mid 90s') believe that it is important to observe the actual and future performance of a company NOT ONLY by the *"traditional" economic-financial* perspective, but also by the *customer perspective*, the *processes perspective* and the *learning and growth perspective*. This is because the economic-financial dimension only refers to the results we obtain at the end of the business process -> *focussing only on the economic financial aspect*, we lose all that comes before (so why that results come), and, above all, we miss what might happen next.

The fundamental idea of the Balanced Scorecard is to translates an organization's mission/strategy into a comprehensive set variables and objective parameters (KPI - Financial and No Financial). Kaplan and Norton suggested to introduce no more than 15-20 indicators in order to allow manager to not lose focus and balance short-term and long-term objectives -> we should not consider too many indicators as managers do not have the capabilities of comprehending, keeping track of all the performance and create a efficient and informative reporting system (as otherwise it will be useless). The KPI should be developed in four balanced perspectives.

- *Multifaceted measurement and accountability framework* for strategy execution
- *Allows managers to measure forward-looking indicators* that link intangible assets to future business performance and *focalizes the attention of management on strategic variables* necessary for the success of the company in business
- Allows managers to *articulate a clear theory of value creation* to ensure that employees, processes and business functions are aligned with company goals
- It is an *effective way to communicate strategy* throughout the organization

➔ it's a system which helps me understand whether my strategy is pointing towards a correct objective or better if my objective is supported by a coherent strategy (thanks to the fact that I can understand throughout my value flow the relationship of drivers, determinants and outputs)

Pros and cons:

- *Pros*:

  - *Capture the intangible dimensions of daily operations*
  - *Track leading indicators*
  - *Focus on Long-term results*
- *Cons*:
  - *Increasing performance measurement costs*
  - *Increasing reporting & validity checks costs*
  - *Difficulty in determining the proper balance*
  - *Danger of information overload*
  - *Increase opportunities for disputes*

4 Steps in building a Balanced Scorecard:

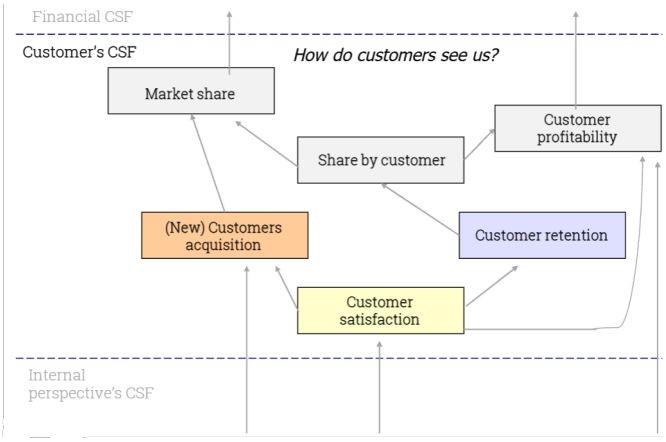
1. Define the business's strategy and relative goals (Where do we want to go? How?)
2. Determine, through the strategy map, the strategic variables and critical process for each perspective (What is it required to achieve the strategic goals? CSF & cause-effect logic)
3. Choose measures (indicators) for each variable/process, with reference to the time chosen, to track progress
4. Translate measures into specific accountabilities (that can be assigned to individual managers), fixing specific/controllable target

What are the ECO-FIN variables from which the results depend?

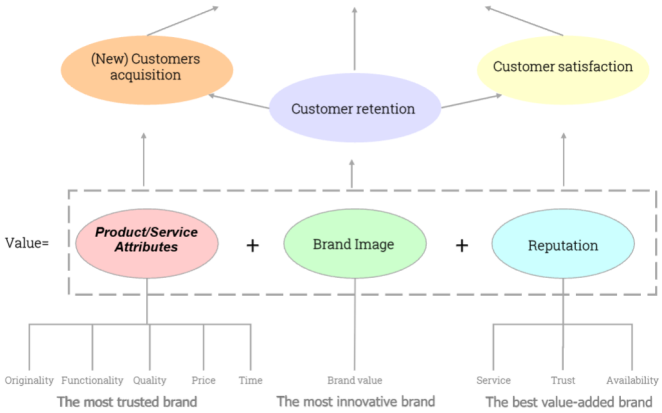
Objectives	*Measures*
Revenue growth:	
Increase the number of new products	Percentage of revenues from new products
Develop new customers and markets	Percentage of revenues from new customers/markets
Change to a more profitable product (or service) mix	Sales growth percentage for targeted segments
Cost reduction:	
Reduce product/service cost per unit	Percentage reduction in cost per unit
Reduce selling/general administration costs	Percentage to total revenues of selling and administration costs
Asset utilization:	
Improve asset utilization	Return on investment Economic value-added

➔ Almost the same for any company, based on specific stakeholder needs

Customer perspective



Customer Value Equation

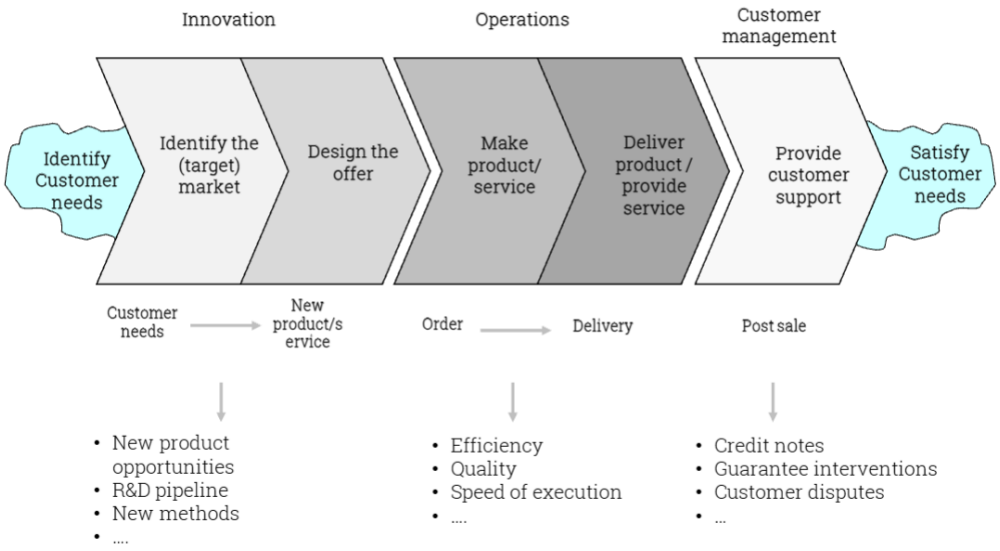


What are the variables from which client satisfaction and loyalty depend?

Objectives	*Measures*
Core:	
Increase market share	Percentage market share
Increase customer retention	Percentage growth in business from existing customers
Increase customer acquisition	Total sales to new customers
Increase customer satisfaction	Customer survey satisfaction ratings
Increase customer profitability	Customer profitability analysis
Customer value propositions:	
Improve product functionality	Customer survey product functionality rating scores
Decrease price relative to competitors	Price relative to competitors
Improve product/service quality	Percentage returns from customers
Improve delivery time	Percentage on-time deliveries

Internal perspective

What must we excel at to generate value for the customer?

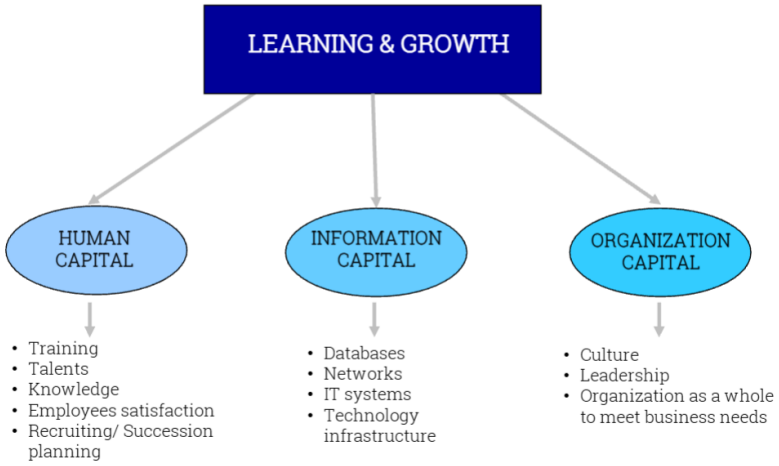


What are the processes in the company from which client satisfaction depend?

Objectives	*Measures*
Innovation:	
Increase the number of new products	Percentage of sales from new products New product introductions versus competitors
Develop new markets and customers	Percentage of sales from new markets
Decrease the time taken to develop new products	Development cycle time (time to the market)
Operations:	
Increase process efficiency	Output/inputs ratios
Increase process quality	Total quality costs as a percentage of sales Percentage of defective output
Decrease process cost	Unit cost trends
Decrease process time	Manufacturing cycle efficiency
Post-sales service:	
Increase service quality	Percentage of customer requests that are handled with a single call
Increase service efficiency	Output/inputs ratios
Decrease service time	Cycle time in resolving customer problems
Decrease service cost	Unit cost trends

Learning & Growth Perspective

How can we continue to improve and create value?



What is learned from the experience of translating product innovation into a process?

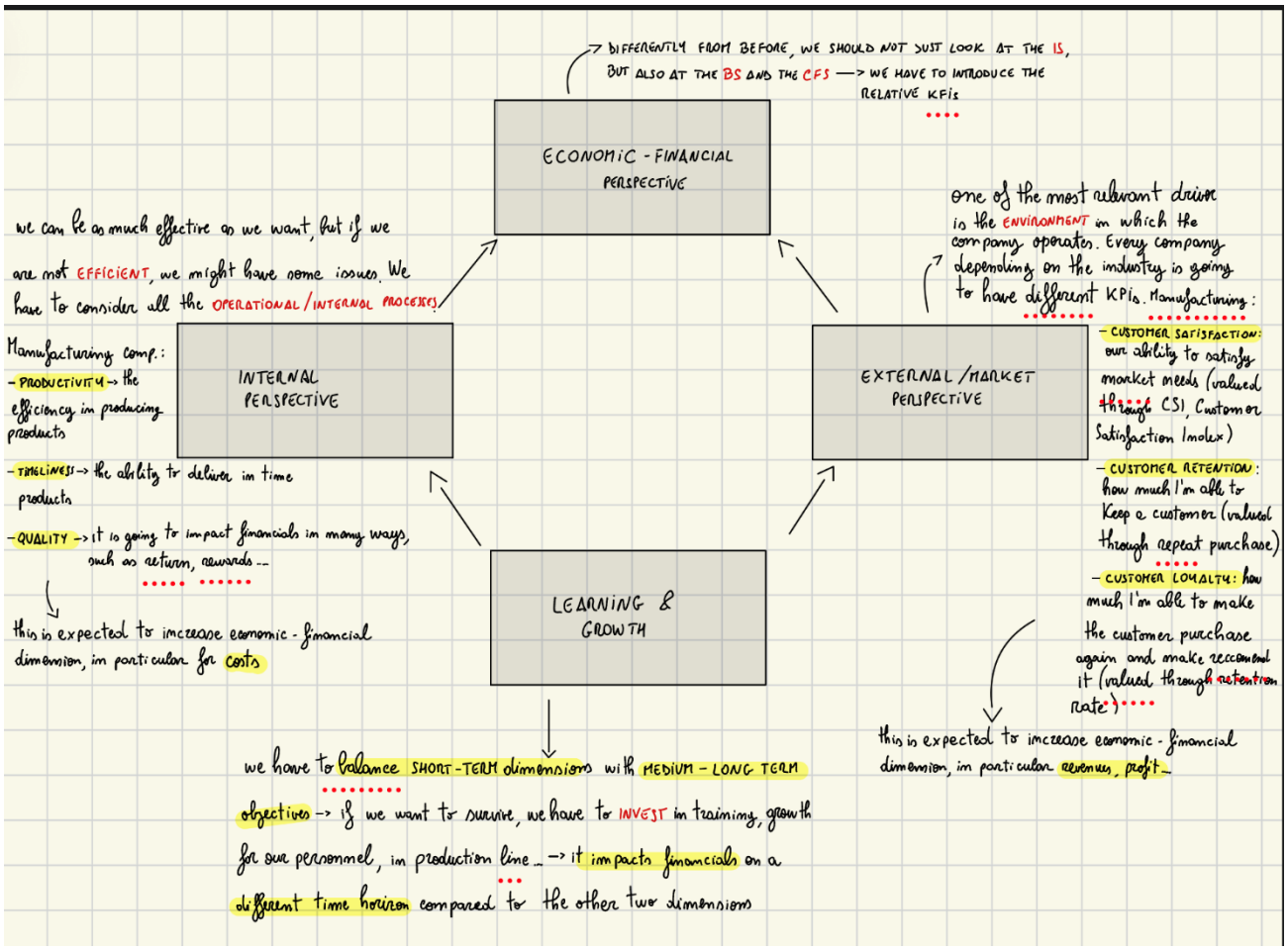
Objectives	*Measures*
Increase employee capabilities	Employee satisfaction survey ratings Annual percentage of key staff leaving Sales revenue per employee
Increase information system capabilities	Percentage of processes with real time feedback capabilities Percentage of customer-facing employees having on-line access to customer and product information
Increase motivation, empowerment and alignment	Number of suggested improvements per employee Number of suggestions implemented per employee Percentage of employees with personal goals aligned to the balanced scorecard Percentage of employees who achieve personal goals

What get measured, gets managed -> When *incentives are linked to performance measures*, managers across the organization are strongly motivated to exert their best efforts to achieve the goals defined in the balanced scorecard.

Evolution over time

In the first version of the BSC, the economic perspective still represent the starting and most important dimensions is still the economic dimension, but with this scheme the dimension is expanded not only to include just the IS, but also the BS and the CFS. But after the introduction of

these KFIs we have to include other dimensions also to look at the determinants and not only at the results.



Even though the book where the inventors of this idea has been an enormous success, after just few months most of the companies that implemented it abandoned it and went back to use only KFIs. This is because it is more complicated to integrate the needs of the different divisions inside the company. For example, marketing wants the maximum customization for a product, which is a nightmare for operations. And even though one of the management's role is to find a balance among the different realities inside the company, the presence of control make these inefficiencies arise more easily -> If functions cannot solve the tension, there is an escalation.

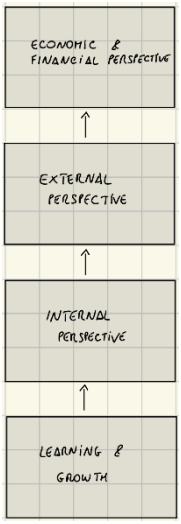
Second book: Strategic-Focused Orientation -> Kaplan and Norton affirmed that the model is not wrong, but it's the way in which you implement it that is wrong. The visualization is the same of the previous model, but we have to add the strategy of the company (which represents its priorities), that we can represent as an eye:

- if it looks on the right, you are giving priority to the market, to the customer satisfaction -> you are likely to be a differentiation leader
- If you are looking on the left, you are probably aiming to be a cost leader.

➔ Independently by the choice the company makes, there is a minimum threshold under which the company should not go for the other dimensions that are not perceived as crucial

Similar to the first version, also in this case companies started to abandon it after few months. The fact is that if we consider one of the two perspectives as strategic, we clearly say that it's the function pertaining to that perspective which are truly important in our company, leading the other divisions to

not operate as they have the perception of being useless to the value creation for the company -> My strategic function will go at a higher pace while the constraint will go at a lower pace -> this situation, at a certain point, becomes unsustainable.



Third version -> the authors affirm that the model is correct, but the application of the strategy is not, as companies focus too much on the trade-offs internal which pertain to my different functions -> they also change the warning. We have no more strategic perspective and the constraint, but we now have the strategic and the enabling perspective (changing also the structure of the diagram). This change is fundamental because it allow the company to invest not only on the strategic areas, but also in the enabling activities. Why? Because if we invest for example in a new production line or in training for my machine operators. This will improve the internal perspective which has an impact on the external perspective.

we have a cause and effect relation which helps us. Why? Because if we build a balanced world card in this way, we build our strategy map we can understand where in our company if there has been a problem where this problem originates. So if my strategy is okay, I want to increase customer satisfaction to increase my revenues and it happens that's perfect. But if I want to increase revenues and I assume that revenues grows because of customer satisfaction so that's the driver of my financial results and that does not happen there might be several reasons, and it helps us identify it.

ALIGNING PERFORMANCE GOALS, MEASURES AND INCENTIVES

The **common mechanism** that we have in companies starts from the *definition of strategy*, the *implementation of an operational plan*, the *definition of targets* and *activities that become the daily activity for these people*. Once the employee has done the activity, it is necessary to measure results and compare results with the budgeted values. In order to reinforce these mechanisms, and in order to be sure that these mechanisms will impact managerial behaviour, we need **incentive systems** -> *economic and non-financial instruments used to stimulate managers in doing their best to achieve companies' goals*.

The **design of incentive systems** -> For the design of incentive systems, we must focus on:

1. The *identification of performance goals/targets* -> we need to be clear in front of managers because they have to be *absolutely conscious about the expectations*, what they have to do, how they have to perform
2. The *design of performance measures* -> we have to *share with management the metrics over which they are going to base the evaluation* of management's performance
3. The *definition of targets*, the *expected values for the different measures*
4. The *definition of incentives* -> they *need to be coined with the targets* we are asking to achieve

Performance goals simultaneously serve **three functions** that can conflict with one another:

- *Motivation*: goals must be challenging enough to elicit maximum effort but attainable enough to avoid discouragement — the optimal level lies in the middle of the difficulty spectrum.
- *Planning and coordination*: goals carry information about future resource needs and allow units to coordinate their plans; for this purpose, accurate (not aspirational) forecasts are needed.
- *Performance evaluation*: goals define the standard against which outcomes are judged; for this purpose, demanding targets are preferred.

Another important distinction we have to consider in the definition of the performance measurement systems is between:

- *Extrinsic motivation*: driven by external rewards (bonuses, salary, recognition, promotion).
- *Intrinsic motivation*: driven by internal satisfaction derived from the work itself (mastery, autonomy, sense of purpose).

➔ We have to avoid the **crowding-out phenomenon** -> poorly designed extrinsic incentives can undermine intrinsic motivation -> employees shift focus from the inherent value of the work to the mechanics of earning the reward, potentially reducing overall effort quality.

Identification of performance goals

Why are they important? The term **performance goal** is used to denote a desired level of accomplishment against which actual results can be measured. Management need to be *aware about the expectations* for having a good reward. They are important because:

1. *Goals signal the preferences of top managers*, i.e. they indicate a set of strategic priorities -> managers have to *understand exactly what is good and what is bad*, *what is preferred* and *what is the second option*, because they have to be aware of the expectations, of how they have to behave in order to get a positive reward.
2. When goal achievement is linked to bonuses and promotions, they *provide managers with motivational tools* -> we need to create motivational instrument in order to direct the management behaviour towards the strategic objectives of the company
3. *Performance goals can be shared with stockholders* and analysts to *communicate the prospects of the business* -> in order to be sure that all the organisation is properly set in front of the expected goals in order to stimulate all positive contributions inside the organisation to support the goals achieved -> we will be able to grant a coherence between managerial results and expectations within stockholders

Design of a performance measures

In order to identify the performance measure that is going to be effect, we have to conduct **three tests**:

1. *Alignment with strategy* -> A measure is a good one, *if the person accountable for it can infer the goals that managers want him to focus on and*, ultimately, the *intended business strategy*, which comes only in case there is a good alignment between the performance measure and the strategy -> "*you get what you measure*" = measures usually impact people's behaviour, and so if we use the wrong measure, probably we are stimulating people in moving in the wrong direction.
2. *Their nature* -> Ideally, measures should be:
    a. objective: *can be derived from clear formulas and independently verified* -> the idea is the value we are using has to be the *most objective possible, independent, not*

influenced by the company or by managers. Preferably we would use external measures or measures provided by external counterparts in order to be fair and to be sure that these values are not influenced by the calculation system

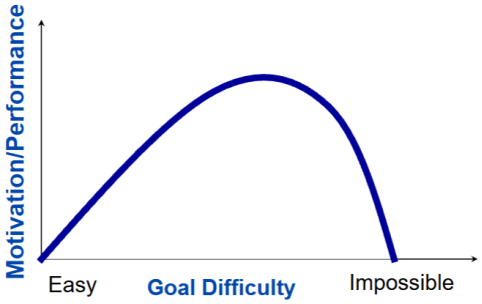
   b. complete: *capture all the relevant attributes of the achievement* -> we should try to avoid partial measure (measures representing just part of the performance). Sometimes it's not so easy because the only one solution is to use more general and generic measures to be sure that they are all comprehensive -> we need to find the right balance
   c. responsive: *reflect actions that a manages can directly influence* -> we should avoid measures that are not controllable by the manager (as, otherwise, these incentive systems do not develop their specific effects to stimulate managerial decisions).

3. *The link to value* -> Output measures (i.e. lagging indicators, as they give the highest confidence that economic value is being created) give the highest confidence that economic value is being created -> they are present in the financial statements and they are commonly used, but they *do not always reflect correctly the performance of management*. Input and process measures (i.e. leading indicators) are valid only if managers are confident that they understand the cause-and-effect relationships -> If this cause-and-effect relationship is unclear or unsecure, so it's better to use output measures (they are not complete, but they are objective)

Setting the performance bar

In any goal setting process managers are required to **choose the target** or desired level of achievement. There are mainly two steps toward this:

1. *Definition of benchmark comparisons* -> whenever we set a target, are we setting them in absolute or relative values? In setting a feasible expectation, a real expectation, probably we need to use comparison items and adjust our expectation into the real context:
   a. Internally/externally-derived -> Target costing, Benchmarking (e.g. Best-in-industry)... which can be set on the base of historical data
   b. Fixed/Flexible -> Should managers be held accountable for achieving their plans regardless of the business conditions they face? Relative performance targets -> we have to adjust the target according to the evolution of the environment.
2. *Definition of level of difficulty* (impact on motivation): the purpose of the incentive systems is to stimulate people in doing their best. In order to use the best the incentive system, we should consider the impact the incentive systems has on the motivation of manager -> *not set targets* that, at least, are *perceived as too difficult* (as otherwise the managers will lose motivation) but neither too easy (as otherwise there would be no stimulating effect) -> whenever we increase this level of difficulty, we have a proportional increase on motivation and performance. But *whenever we reach a challenging level of difficulty*, you see that we are *dropping in terms of motivational effect*. We should not set too difficult targets as otherwise we will lose control, meaning that we are going to stimulate opportunistic behaviour (manager could increase the level of risk, could apply fraud behaviours...)



"Business practice" (field research): Targets are about 80-90% achievable -> To *minimize dysfunctional management actions* (i.e. myopic behaviour, data manipulation), to *increase manager's commitment to budget targets*, to *reduce the cost of organizational interventions* (i.e. management-by-exception) we have to be careful in setting the targets and goals.

When to introduce participation of managers in the definition of targets? It depends by the uncertainty of environment:

- *Uncertain environments* -> When organizations face uncertain environment (meaning that we *don't know what will happen in the future and the direction of the company changes continuously*) and information relevant to address these changes can be dispersed throughout the organization, then the planning and budgeting processes are used interactively with intense participation. This participation *helps people exchange information* in order to *better understand and improve performance by collecting different perspectives and suggestions*
- *Stable environments* -> Organizations operating in stable environment do not need to exchange information. *Managers know exactly what to expect from the future*. In these cases, planning and budgeting processes are used to challenge people in the organization to achieve challenging objectives and ensure that objectives are met -> we need to stimulate people in performing better, in performing the best they can, simply because the expectations are clear.

The definition of the participation of managers *depends also by where the information is located*. If there are local managers that have *some critical information about the local area, then it is better to involve them*. If we believe that centrally we have a clear understanding of each country*, we don't need to involve many people*. Making managers participate in the decision process make them feel more involved and make the system more democratic, but inevitably *make the situation more complex* to manage (we have to take into account the expectations of these managers)

Bottom-up target setting -> The employee is both involved and has influence over setting the budget.

- Leads to better acceptance of budget targets, and hence, commitment to achieve them, because they feel part of the process -> sometimes this level of participation can be used as a system of promotion. If you are part of this committee, probably you believe more, you trust more on the decision-making
- Is an effective way of information sharing (being part of this committee, so you know exactly the expectations): lower-level insights about business potentials and risks -> there is no need for communicational instrument, because they were present in the process, making them aware of the potential problems.
- BUT slack, bias, conservatism, lack of budgeting experience (people could put in place a sort of self-protection approach prior to bias) -> participation is particularly relevant when we need to collect all the information within the committee and to make decisions

Top-down approach -> it is the opposite of the bottom-up approach. There is less delegation, there is less autonomy, and people are not asking to decide or to judge the goals and targets.

Incentive definition

What is an incentive? The term "**incentive**" implies that individuals are paid more when performance exceeds some base or threshold, a system for rewarding positive performance, and therefore it is necessary to make *clear the connection between incentives and performance* (people need to understand exactly that they will receive this bonus) -> there could be some change in the remuneration for factors that are not related to performance, such as age or transfer to a different country, that should not be confused with the increase in remuneration because of performance. This means that *higher performance generates higher pay, lower performance, lower pay*. In the Western world, we just have *positive incentives* (meaning that, at maximum, we are not receiving), while in the Eastern countries it is common the introduction of *negative incentives* (there is the possibility that, in case we don't reach a minimum level of performance, we might have a decrease in salary).

There are three **major design decisions** that must be made in designing incentives:

1. *The bonus pool* -> Bonus incentives are usually paid out of a bonus pool, i.e. a *pot of money that is reserved for the payment of such incentives*. This pool is generally determined by reference to business or corporate level performance
2. *The allocation formula* -> The allocation is based on three categories of performances: *Individual performance* (the most coherent perspective, as in case we make a good performance, we are getting paid, while in case our colleague performs better it will receive the bonus. The main problem with this system is that we risk to compromise collaboration as the manager will behave as an individual person not caring about the other colleges), *Business performance* (in order to stimulate the participation between colleagues from the same business) and *Corporate performance* (in order to avoid the excessive competition among the different businesses) -> individual performance represents the most relevant component, but in order to stimulate the cooperation also an important weight should be given to business and corporate performance. Decisions must be taken on the *weights* of each category of performance. A further decision must be made about how to calculate the amount of the payment -> *allocation formula* is a formula adjusting or establishing the way this bonus will be distributed proportionally to your goals achievement, as there is a distribution of bonus levels according to the performance achieved. We need both upper (we are setting the maximum level of performance above which we are not going to deliver bonus -> the purpose is to avoid delivering too much high bonus maybe because of luck) and lower cut off (if the performance is lower than a specific value we are not going to deliver you any bonus, because we need to avoid to pour performance) There are two alternatives:
    a. *Objectively, by formula* -> Rewards can be specified with precision but there is little uncertainty or ambiguity about performance standards (performance is easily quantifiable). There is an increase in the incentive given

If profit = X,	then bonus = Y
If X< profit < X + 10%,	then bonus = Y + €20,000
If X + 10% ≤ profit < X + 20%,	then bonus = Y + €50,000
If profit ≥ X + 20%,	then bonus = Y + €75,000

    b. *Subjectively* -> Especially desirable when the manager's personal control over the business unit's performance is low, performance is not easily quantifiable (e.g. R&D activities). There is the risk that manager might influence the evaluation. But we need subjectivity when we are in front a particularly complex situation (such as in the context of a pandemic or a war). In this kind of situation subjectivity could be a good solution because managers have the possibility to understand and to evaluate the behaviour of their collaborator even if the context is particularly worse and the

situation is particularly negative. Another example could be R&D which, no matter how much effort they put in doing their work, they haven't found a proper solution -> it will be unfair to evaluate just on the basis of output, while it will be more reasonable to consider the process they have been through

3. *The type and mix of incentives* -> The final design of incentives concerns what types of incentives to provide to employees to recognize their achievements. There is a wide range of options concerning the *types of financial incentives that can be provided*: Awards of company stock, Gifts and prizes, Deferred cash payments, Grants of options for the future purchase of company stock

We have also to define:

- *Rewards*:
  - Monetary -> Salary increases, Bonuses, Benefits, Club memberships, Vacation trips…
  - Non-monetary (meaning that we cannot translate directly into a monetary dimension) -> Promotion, Autonomy, Recognition, Participation in decisions, Office assignments, Preferred parking places, Titles, etc
- *Punishments* (more difficult to find in the Western cultures):
  - Monetary -> Zero salary increase, zero bonus, zero perquisites.
  - Non-monetary -> Interference in job from superiors (this is dangerous because it is close to mobbing), Loss of job, assignment to unimportant tasks, no promotion etc.

The **compensation package**:

- *Salary* -> they tend not to vary a lot over time, maybe just few adjustments for inflation or in case there has been a significant change in the role of the person
- *Benefits* -> Pension and health benefits, Perquisites of various types -> they are usually the most relevant part of the compensation
- *Incentive compensation*:
  - Short-term incentive plans -> Based on the performance in the current year or less (e.g., bonuses, commissions) -> they are usually distributed immediately, because it has the effect of stimulating managers but also to retain managers performing particularly well
  - Long-term incentive plans -> Based on the performance measured over periods greater than 1 year and often related to the company's stock price. Usually restricted to relatively high management levels.
    - Accounting performance (e.g., EPS, ROE, ROA) over a period of 3 to 5 years.
    - Market-based performance -> Stock options, Phantom shares

The bonus proportions of compensation generally decrease at lower organization levels. Performance-dependent rewards impose risk on the employees as performance is never fully controllable. The problem relies on the fact that manager does not face the risk in its integrity, as in case of a negative or a not particularly good performance, at least in the Western countries, the worst that could happen is receiving no bonus -> over the medium-long term, this incentive system is not so efficient for the management of risk.

Incentive systems are only part of the motivational architecture. They must be complemented by:

- *Organizational culture*: shared norms and values that define acceptable behaviour independent of what is measured and rewarded.
- *Belief systems*: explicit communication from senior management about the mission, values, and purpose of the organization.

Managers who internalize the mission of the organization self-regulate their behaviour without requiring constant monitoring or explicit incentive triggers. Overemphasis on formal controls can signal distrust and crowd out this self-regulatory behaviour.

CASE STUDIES

Forrest gamp case study

It is about the profitability of these products -> how the movies generate profits, so which are the revenues generated and the relative costs. The case tells us that the product, the "Forrest Gump" movie, even though it has been a success (the case takes in consideration only the revenues from theatre and the year after), Paramount affirms that the movie produced losses, as it is shown in the following Table:

Table 1. Statement of Profit and Loss for net profit participants on the motion picture, *Forrest Gump*, through December 31, 1994

Box office gross revenues			$382
Amount retained by movie theaters (approx. 50%)			191
Paramount's gross revenues			$191
Negative costs:			
Direct costs:			
Production costs	$66.8		
Gross profit participation by director, actors, etc. (16% of studio gross revenues)	30.6		
Total direct costs	$97.4		
Studio overhead (allocated — 15% of direct costs)	14.6		
Total negative costs		$112.0	
Promotion and distribution costs	$67.2		
Advertising overhead (allocated — 10% of promotion and distribution costs)	6.7		
Distribution fee (32% of studio gross revenues)	61.1		
		135.0	
Financing costs (calculated at 3% above prime, on unrecovered costs — the 'loss' below)		6.0	
Total costs			253
Profit (loss) through December 31, 1994			($62)

As we can see, according to communication made by Paramount the Forrest Gump movie has been the 25th movie of all time for adjusted revenues -> we take the revenues of the different movies, and we adjust them for inflation. In addition, differently from Paramount, by including all sources of revenues (not only revenues from theatre, but also cassette and cable tv) -> in the end, the movie has generated above 700m$.

Let's consider the remuneration system that could have been applied to different players. We usually define a proportional remuneration system in case we are self-confident about the performance of that product. On the other hand, if you are not sure about the performance or, at least, you are just a minor player, it is better to receive a fixed amount of money, which implies that the person does not take any risk. If we look at the structure of the product, we can see how there are 5 kinds of stakeholders that participate to the generation of value in different ways:

- Investors (producers) -> they incur in financing costs and they take part in the net profit/loss
- Productions:
    - Subcontractors (companies providing for logistics, locations…all the supporting activities required to produce the movie) -> paid on the basis on production costs and studio overhead
    - Major talents (such as the actors) -> salary, but because they are usually big actors, they usually take part to the gross profit/loss -> even if the net profit might be negative, in the end they could receive an additional compensation because it is calculated on the gross profit

    - Minor talents (like irrelevant actors) -> wages and salaries + participation in the net profit -> if net profit < 0, they do not receive nothing in addition to their salaries
- Distribution -> based on promotion and distribution costs, advertising overhead and distribution fee

➔ In this case, Paramount is at the same time producer and distributor, and the only players that are left out are major and minor talents -> their risk to receive a compensation is very different, because the gross profit will be obtained by subtracting a percentage to revenues (so it is basically sure that is going to be positive), while the net profit takes into account several additional costs (and the risk of facing a negative net profit increases)

Because Paramount plays different roles, there is a suspect that some costs are not accounted correctly:

- Financing costs -> these are the costs of financing the activity, which are charged as 3% of gross revenues -> because it's a convention, the risk that it hides a portion of profit is very high
- Studio overhead -> they are calculated as a percentage of direct costs, which are calculated as a percentage of gross profit -> also in this case there is the risk that they hide some profit. Within the production costs are included also the costs related to major actors, such as Tom Hanks that received 20M$
- Advertising overhead -> fixed costs connected to the infrastructure of managing advertising, mostly the salary of people connected to the advertising activity -> fixed costs that are not directly connected to the production of the movie, but they are put as a percentage, which include profit
- Distribution fees -> also in this case, they are put as a percentage of gross profit even though they are fixed costs

➔ Several items include profits, charged as a cost by Paramount in order to reduce the amount of money that should be given to minor actors. This happened because Paramount did not properly trace the actual costs, but they just put some estimates. An example of the impact of this practice was from Winston Groom, which has received 250,000€ in advance even though technically he shouldn't have received anything because of negative net profit. Because in reality the profit generated by the company was much higher, they should have paid him much more than 250,000€.

In order to better understand the cost behaviour, we have to make a distinction between variable and fixed costs connected to the production:

We have to remember that for Paramount the movie Forrest Gump is a product and a cost object -> because of this, we can make a distinction between the direct (so that can be directly allocated to Forrest Gump) and the indirect costs (which cannot be allocated directly to the movie because it might refer to other movies' production) that should be attributed to it.

- Among the costs identified before, there are some costs that can be assigned directly to the movie, such as the production costs (because the location, the cameras...used for Forrest Gump are not the same for the Batman movie production).
- Overhead are clearly indirect costs, because they are usually backoff costs that regards also other movies, such as the costs connected to a Public Relations Office

➔ The problem is in the allocation of overheads -> in order to do it, if they would have used percentages based on fixed amount, they would have charged a fixed amount of overhead. But instead, if they would have charged an amount based on variable amount (like Paramount did), we don't know if it is the actual costs that the companies have sustained for that product (for

example, if we say that distribution fees are 32% of gross revenues, in order to accept this percentage we have to assume that for all products the company has sustained the same percentage for all products, which is very complicated) -> by doing this procedure, it is very likely the company will destroy value in order to achieve a specific objective of distributing remuneration among participant, as if the net profit is negative because of overcharging of indirect costs, minor participant will receive nothing

After we have done this, we can calculate the BES (box office gross revenues):

$$BES = \frac{TFC}{CMu\%} = \frac{156.7M\$}{24.8\%} = 632M\$$$

➔ Assuming the cost structure shown by Paramount is real, these should have been the revenues the company should have achieved in order to cover all costs -> actual revenues of the movie, adjusted for inflation, were 790M$, much higher than BES

As we said before, because the company has shown negative net profit Winston Groom could get nothing more than the compensation of 250,000$ against his net profit participation, as otherwise they should have paid an additional 3% on positive net profit -> let's calculate the required BES Paramount should have achieved so that those 250,000$ represent the percentage given to Winston Groom on an hypothetical profit:

$$250{,}000\$ = 3\% * profit$$

$$profit = \frac{250{,}000\$}{3\%} = 8.33M\$$$

$$BES_{profit} = \frac{TFC + profit}{CMu\%} = \frac{156.7M\$ + 8.33M\$}{24.8\%} = 666M\$$$

➔ Still, way lower than the 790M$ generated by the movie

Last simulation: let's not consider the overhead shown as a percentage of box office gross revenues, because we believe that they are exaggerated (because they include an hidden profit of Paramount) and we want to consider only the real variable costs-> the CMu% is higher than before, as from the variable costs in percentage (0.752) we have to subtract the studio overhead (0.012) and distribution fees (0.16) -> the new BES becomes:

$$BES = \frac{TFC}{CMu\%} = \frac{156.7M\$}{(1 - 0.58)} = 373M\$$$

➔ Lower than the real revenues, but closer to the box office gross revenues shown by Paramount

Wilkenson case study

The company is about mechanical devices (focused on the water purification equipment) operating in a context where competitors are reducing prices in order to create a competition, as apparently Wilkenson is losing money -> probably, they say, there is something wrong in the way we evaluate the cost of our products. The company has 3 main products which refers to different market situations, because they are completely different in terms of productive process and component requirements

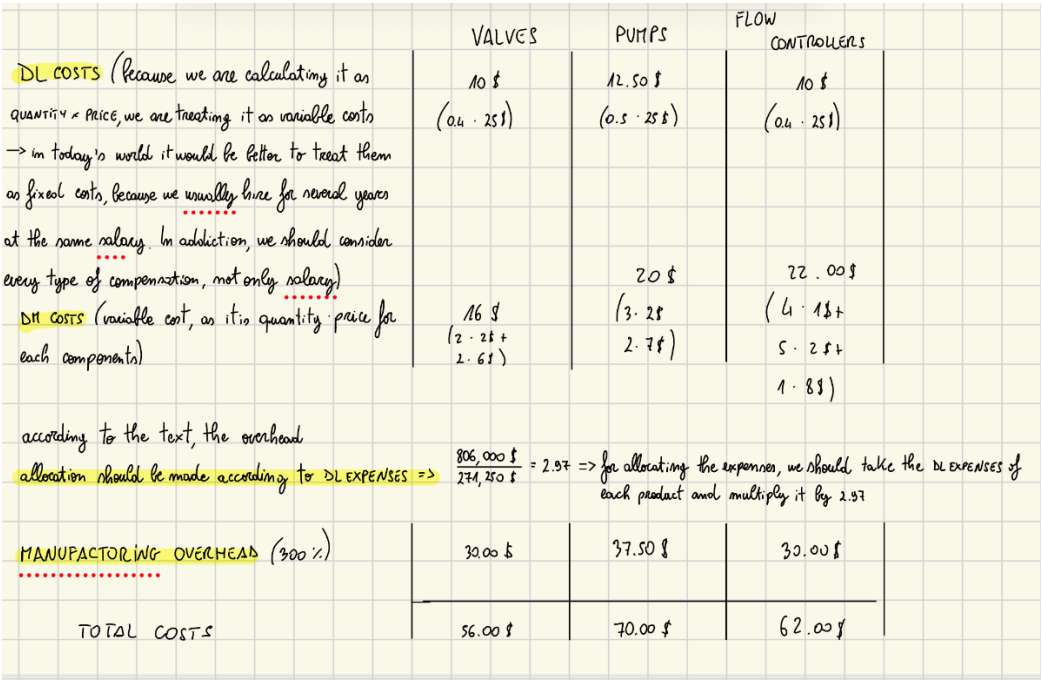
- Flow controllers -> are customized, so we are answering specific request from the market -> market is less competitive and the demand is inelastic (if we increase prices, customers are willing to purchase them because they can obtain a product that fits their needs)
- Valves -> standard product shipped in large loots, delivered in large quantities and the margin is high (still, little below than 35%), with high competition from companies that can set competitive prices
- Pumps -> very similar to valves, they are basically commodities, usually produced in high volumes and competition is about prices -> margin is falling below 20% (this information is important because they are considering increasing in some cases the prices of the products)

➔ The nature of the products is very different

The company is leader in quality, but the exposition is under attack because of the increasing presence of competition on the market -> they are preparing for a competition in prices (as competitors are getting ready to reach the company in terms of quantity produced), and because of this they are discussing the role of overhead, in order to measure and assign them correctly to the products -> if we want to understand the impact of the new assignment process and make proposals, we have to know the starting point.

Exhibit 2 Product Profitability Analysis (March 2000)

	Valves	Pumps	Flow Controllers
Direct labor cost	$10.00	$12.50	$10.00
Direct material cost	16.00	20.00	22.00
Manufacturing overhead (@300%)	30.00	37.50	30.00
Standard unit costs	$56.00	$ 70.00	$ 62.00
Target selling price	$86.15	$107.69	$95.38
Planned gross margin (%)	35%	35%	35%
Actual selling price	$86.00	$87.00	$105.00
Actual gross margin (%)	34.9%	19.5%	41.0%



So as you are suffering a lot of pressure, so they are planning, they are making hypotheses on prices -> increase the prices in order to keep the gross marginality above 30%. Let's start talking about pumps. They are planning to increase prices from 87 to 107, 108, but they know it is really difficult because competitors are making pressures over prices.

As regards flow controllers, if they want to keep 35%, they could reduce prices in flow controller, and so as regards valves, so the price could remain more or less similar. But we know that pumps are ecologically, they are under pressure because of competitors, while flow controllers are custom products where the demand usually is insensitive. So the idea to change prices in the way they are planned, so we see here the hypothetical target price, sounds strange, probably impossible to realise.

Let's consider different factors in the overhead allocation.

The first idea could be to abandon the hypothesis to assign overheads because they are mainly fixed. We have to recover these overheads, selling everything because we are running three different products. Why do we exclude the overheads? Could we exclude the overall allocation over these three products and think about the logic of contribution margin? If we exclude the manufactured overhead, okay, we just focus on time and labour -> price - labour – material = contribution margin. Could we work just in terms of contribution margin and try to produce a total contribution margin in order to recover the common infrastructure of overheads? So the first answer to this hypothesis is no. Why? Simply because whenever we talk about these direct costing or contribution margin analysis, okay, we need to be aware that contribution margin or direct costing analysis approach is more relevant for short-term decisions, for break-even analysis, as we did with the first case study -> in the long run, companies have to recover fixed costs, which cannot be skimmed. We need to take into account because if we just focus on valuable costs, we need to have an unprecise picture. We don't understand exactly because we are excluding overhead in the evaluation of the cost of each product.

The problem with this one is we need to change approach because the current approach is classified as a volume-based approach -> The more we consume direct labour, the higher will be the allocation of fixed overhead = products consuming more labour will receive additional, more than others, more overhead. The problem with this approach is that it simplify a lot the problem, also because of the importance of manufacturing overhead (which, as we said before, represent 3 times the cost of overhead).

Let's try to apply ABC:

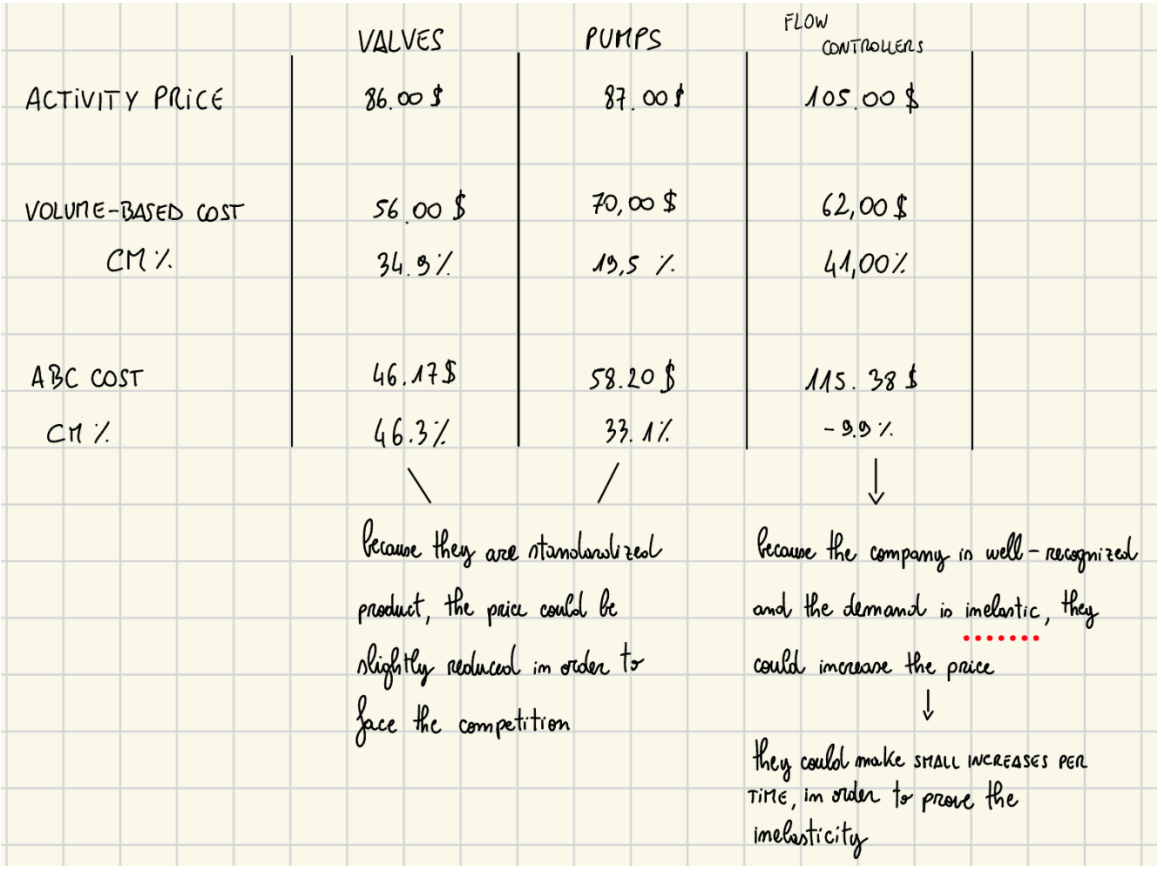
We have to identify the activities behind the production of these products. They identified 5 activities: machinery activity, set-up activity, receiving and production control, engineering and packaging activity. Packing and shipping is something outside the plan, outside the real manufacturing, as well as engineering (which is design, is planning process) -> It's not pure manufacturing or productive.

Exhibit 4 Monthly Production and Operating Statistics (March 2000)

	Valves	Pumps	Flow Controllers	Total
Production (units)	7,500	12,500	4,000	24,000
Machine hours	3,750	6,250	1,200	11,200
Production runs	10	50	100	160
Number of shipments	10	70	220	300
Hours of engineering work	250	375	625	1,250

COST POOLS	$	COST DRIVER	AMOUNT	ABC RATE
MACHINE RELATED EXPENSES	336,000 $	MACHINE HOURS	11,200 MH.	5.3 $/MH
SET-UP LABOUR (depends on the number of times we stop for preparing for a new prod. process)	40,000 $	NR. PRODUCTION RUNS	160 PROD. RUN	250 $/PROD. RUN
RECEIVING AND PROD. CONTROL (it depends on the nr. of set-ups, as if we would make the machine run with no problem, the control activity will be useless)	180,000 $	NR. PRODUCTION RUNS	160 PROD. RUN	1,125 $/PROD. RUN
ENGINEERING	100,000 $	HRS. ENGIN. HOURS (we measure them by filling timesheets in order to understand how much to charge to customer) ↓ they are going to be higher for customized products	1,250 HR	80 $/HR
PACKAGING ACTIVITY	150,000 $	NR. OF SHIPS	300 SHIP	500 $/SHIP

	VALVES	PUMPS	FLOW CONTROLLERS	
DM	10 $	12.50 $	10 $	* we are making the highest number of set-up for the product that has the lowest nr. of units
DL	16 $	20 $	22.00 $	
MACH. REL.	15,00 $ (0.5 · 30)	15,00 $ (0.5 · 30)	9,00 $ (0.3 · 30)	
SET-UP LABOUR	0.33 $ (10 · 250/7500)	1,00 $ (50 · 250/12,500)	6.25 $ (*100 · 250/4000)	we have to consider that we are calculating the cost per unit of product -> we have to divide the AR (which refers to the whole prod. run) for the units of each prod.
RECEIV. & PROD. CONTROL	1.50 $ (10 · 1125/7500)	4.50 $ (50 · 1125/12500)	28.13 $ (100 · 1125/4000)	
ENGINEERING	2.66 $ (250 · 80/7500)	2.40 $ (375 · 80/12500)	12.50 $ (625 · 80/4,000)	
PACKAGING ACTIVITY	0.67 $ (10 · 500/7500)	2.80 $ (70 · 500/12500)	27.50 $ (220 · 500/4,000)	
TOTAL COSTS	46.17 $	58.20 $	115.38 $	



Among the overheads, there are mainly fixed costs -> when we assign this costs, we are assigning them on the basis of current production/volumes, but now they are working at a certain level of capacity. If we think that the capacity required will be higher, probably the driver will be reduced. Stimulating the demand, reducing prices in automobiles, they probably have to take advantage of an increase in the workload. Because the number of fixed costs will be reduced by lower activity days of drivers or co-drivers.

Another topic. So by definition, sales managers want to sell at the lowest price they can, because by selling at the lowest price they have, they produce a huge revenue -> in this way, they don't care about the marginality of each product, they simply sell, because they are rewarding for sales. As we discover that these products are really different in terms of marginalisation, probably the best way to assign incentives to salesforce will be on the basis of profitability of each product in order to stimulate salesperson to sell, to maximise the most profitable product, not simply revenues involved -> changing the compensation system, probably we will create a connection between companies' results, maximised profits, and individual results.

North country auto INC.

We are talking about a car dealer where the performance measures have changed. Inside this dealer, there are several departments running new car sales, second-hand or pre-used car sales, and also a warehouse of parts, spare parts, a repair factory or laboratory, and so on. They decided to move from a collaborative model (all these activities are combined all together to run the business), to a divisional model (each one of these departments became a profit centre), trying to separate responsibilities of

these different departments. After the decision, so creating an independent profit centre, unfortunately, a problem happened when the new car department decided to over-evaluate a used car in order to sell a new model -> this event raised a discussion about this new kind of responsibility.

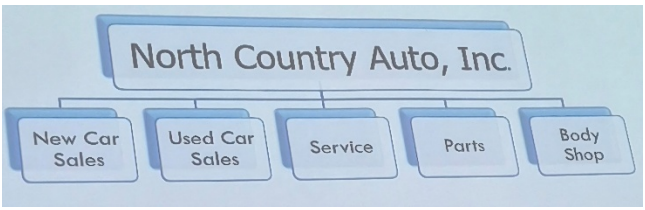
They are distributing three different cars pertaining to three different brands. Each of three manufacturers use a different computer system for tracking inventory (manage stock, to order spare parts...) and placing new orders and require dealers to maintain an adequate service facility with a crew of trained technicians and spare parts inventory.

They have a reference market in New York but also in other areas close to this core location. North Country, the company, began operation in 1968 owned as a corporation by George W. and Andrew Jones. George W. and Andrew Jones are the entrepreneurs owning the car dealership in New York. Mr. Liddy focused on a new and used car sales (so, he's focused on the selling activity), while Mr. Jones concentrated on managing the parts, service, and body shopping part (so, back office activities).

George Liddy was feeling pretty good about the new control systems recently put in place for his five department managers' new and used car sales, services, body, and fun partners. He's positively in the process of evaluating each department individually as profit centre, as I told you. So each department is a sort of autonomous profit centre.

- Regarding the industry in which the company operates:
- There is a strong pressure on prices, which means that frequently they put in place aggressive discounts, reducing the profits over which the performance are evaluated.
- The other point is that they need to run high inventory -> let's consider that if they run three brands, they have to keep a minimum amount of the most common spare parts per three brands -> the amount of stock is particularly heavy.
- So usually, they face with more educated customers, which means they have customers that pay attention to the service they receive, a customer particularly selected with high expectations.
- The industry is particularly competitive because of new covers in this dealership activity. Industry analysts estimated that fewer than 50% of dealers in the United States would make a profit on new car sales. So probably, the most profitable business is in new car sales.
- Overall, that profit margin, we're expecting to fall below 1% of sales. But in general, the net margins are not particularly high. Let's consider that the automotive industry is an industry particularly competitive, where in general, margins are not so big. On the contrary, they are usually particularly low. So, this is not a high profitable industry.

Departmental structure:



We need to understand better the change that you put in place in the organisation and in the platform of financial assistance to be able to discuss about the problems raised in front of the transaction involving a used car and the sales of a new car.

Before George made the decision, all five departments operated as part of one business. They were collaborating because the idea was to consider all the activities provided inside this leadership as an integrated business. When we decide to buy a new car, it's frequent that you have an old car to be

managed. And frequently, when you approach a car dealer, you are expecting to receive a good evaluation of your old car converted in a sort of discount for the new one -> problem to be managed. Department managers were paid salaries and year-end bonus determined on the owner's discretion based on overall results for the year (just because they were considering all the five activities as an integrated business) and a subjective appraisal of each manager. The system did not provide proper motivation for the managers because they didn't have individual goals, individual targets used to evaluate each individual performance.

George Mitty introduced these new changes in the performance measurement control systems, all five departments were operated as profit centres. He decided that each department was stimulated to maximise the profit run by each specific activity. Mr. Liddy believed in decentralised profit centres and performance-based compensation as a superior model of control -> decentralising, so delegating the responsibility to make profit in charge of each departmental manager, probably we are able to stimulate better these managers and focus their attention on maximising the profit of each centre. He instructed each of his departmental managers, new services, colleagues and partners, to run each of their department as if it were an independent business, because the idea is that now they are not part of the same, of a unique entity, but they are cooperating in different markets. And so they have to maximise its own results. So the management of each department were awarded bonuses based on departmental gross profit -> if we do that, what's happened to the under-dependence? So what's happened when a new customer approached this car dealer desiring to buy a new car, but also desiring to receive an evaluation of its pre-used or old car? Because this transaction typically involved at least two departments, new car departments and used car departments.

So the potential problem, in addition to finding a way to effectively track departmental performance, generally had to devise a sensible system from trust enterprises. So the idea is, if we evaluate an old car and we are the new car director, what's happened? Is all pre-used and all pre-owned car, what's happened? This used car became a responsibility of used car department. So there is a problem of transferring these cars from one department to the other.

Mr. Liddy acknowledged that a complex interrelationship existing among the profit centres is the cause of normal business transactions -> if you want to stress the idea of making profit, and we want to simulate our departmental manager can maximise it very soon, but we have to consider them to be multilateral transactions.

Now, if we are approached by a customer desiring to buy a new car without a pre-used, it's not a problem, because new car will be managed by the new car department. If we have another customer approaching this car dealer to buy an old, a pre-used car, it's not a problem. The problem is when we have a customer approach to this organisation, but with two different leads.

Using the data in the new transaction, compute the profitability of this one transaction to the new, used, parts and service departments. Assume a sale commission of 250$ for the trade-in on a selling price of 5,000$ (note: use the following allocation -> new 835$, used 665$, parts 32$, service 114$) for overhead expenses while computing the profitability of this one transaction.

They received these new customers, and the idea of new customers was to buy a new car. So the contact with the director of new car departments to purchase a new car. So, to purchase a new car, the price proposed for the new car was based upon the car evaluation. So, plus a cash amount for the new car and plus a bank loan -> the total value of the new car proposed by the new car department director, Mr. Alex Walker, was equal to:

$$cash\ 2{,}000\$ + used\ car\ evaluation\ 4{,}800\$ + bank\ loan\ 7{,}350\$ = 14{,}150\$$$

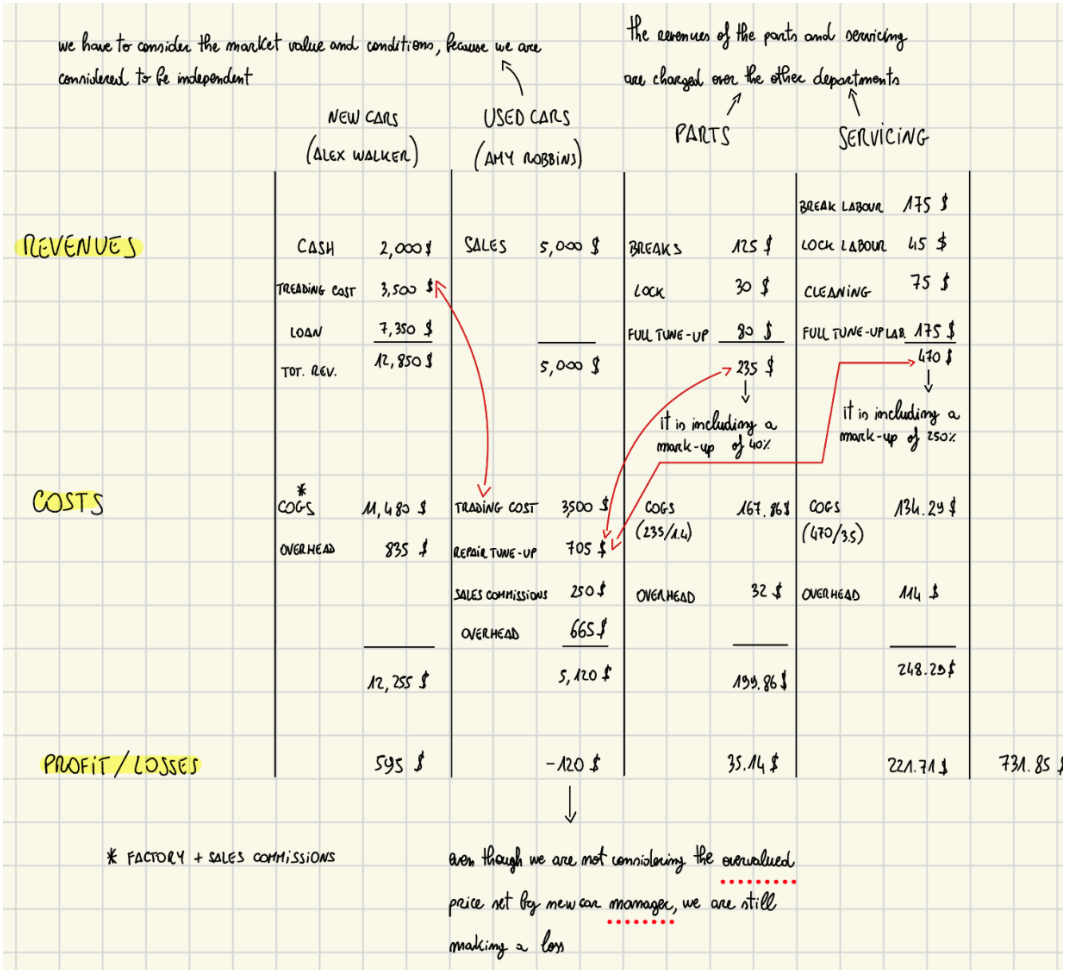
The value of the car as it is in this condition on the wholesale market is $3,500. How do we manage this used car? If the new car manager decided to over-evaluate in other words, so giving an extra discount to the customer. How do we manage this expense? In addition, if we want to sell this new car, the point is we have to adjust this new car -> the directors of the other departments analysed this new car and decided, so on how to manage the refurbishment of this car. To try to sell this car not on the wholesale market, but to provide the customers probably getting more value than the value recognised by the wholesale market.

The new car manager decided to require an evaluation of the refurbishing activities required to refurbish this model and he asked for a quotation coming from the colleagues of the other departments (the colleagues of the other departments produced these reports):

USED CAR REFURBISHING COST

DESCRIPTION	TOTAL	PARTS	LABOUR
BRAKE	300 $	125 $	175 $
LOCK ASSEMBLY	75 $	30 $	45 $
CLEANING TOUCH-UP	75 $	0 *	75 $
FULL TUNE-UP	225 $	80 $	175 $
TOTAL REFURBISHING	705 $	235 $	470 $
SALES COMMISSIONS	250 $	* it's just a service, not spare parts	
USED CAR WHOLESALE VALUE	3500 $		
GRAM TOTAL	4455 $		

We have to build an IS for each division:



Let's now consider the value of the transaction with the perspective of the company as a whole

NEW CAR	
CASH	2,000 $
TRADE-IN	4,800 $
LOAN	7,350 $
USED CAR VALUE	5,000 $
COSTS	
NEW CAR + COMMISSIONS	- 11,420 $
USED CAR VALUATION	- 4,800 $
SALES COMMISSIONS	- 250 $
PARTS	- 167.6 $
SERVICE	- 134.20 $
OVERHEAD	- 1,646 $
TOTAL PROFIT	731.85 $

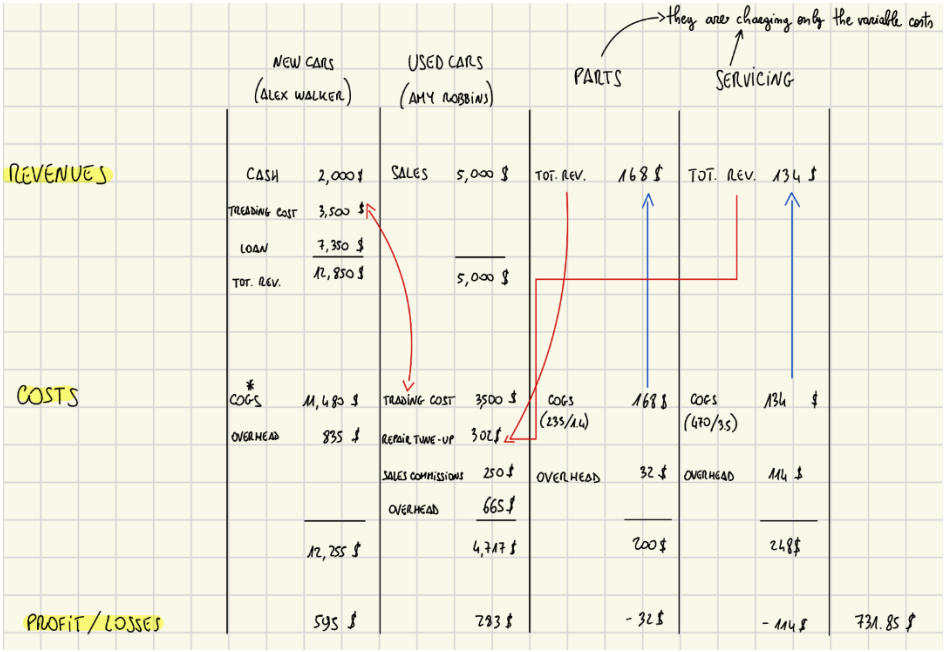
We get the same profit we had with the analysis of the different departments. But this way of splitting is a problem whenever we are in front of an integrated systems because here decision taken by for example new car or used car are affecting their own profitability, because the evaluation of the old car was provided by the new car but the responsibility of selling and managing a used car is in charge of another director -> probably this is a common situation.

The problem is if we really believe to create an independent profit centre this probably is the worst situation because we are talking about an integrated system or there is the problem of transfer pricing on how to evaluate transfers (transfer prices are based on market prices, transfer prices transfer of spare parts and services from these divisions to the old-car division...). Here this problem of integration, this problem of internal transaction will be particularly frequent so probably the idea of creating an independent profit centre is a bad idea not in general but here when we have a high interdependency among different departments so here the evaluation provided by this manager is impacting in a negative way the evaluation the performance of the used car manager.

How should the transfer pricing system operate for each department (market price, full retail, full cost and variable cost)?

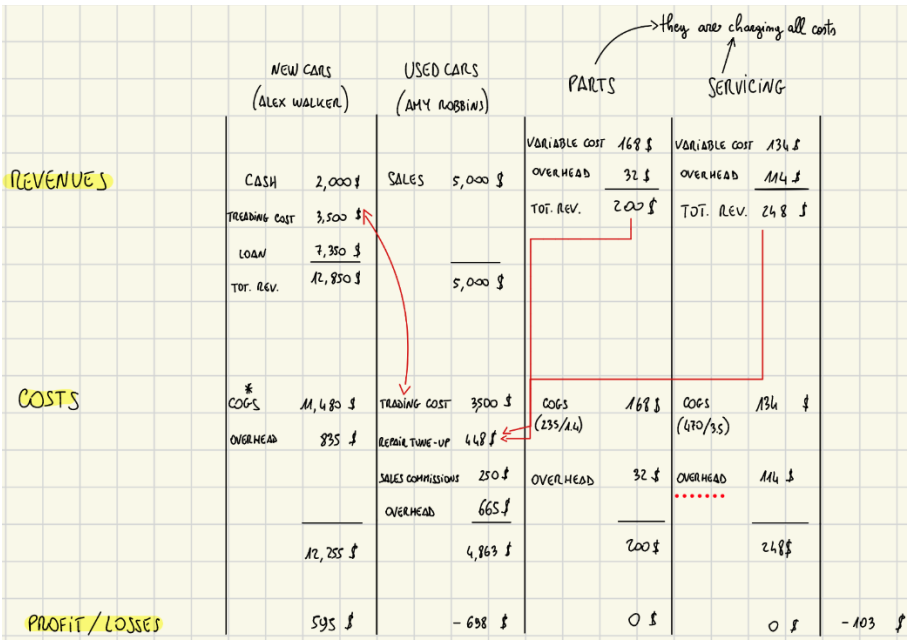
Whenever we talk about transfer prices, we have different alternatives. In the hypothesis we have seen before, because every department is independent, they are run as profit centres -> market price should be the rule because each department is requested to produce a profit.

If the company decides to use a not-market up prices, this means that they are not allowed to generate margin, so they are not responsible for revenues. Therefore, the part department and service department are treated as cost centres and transfer to the used car department only the variable costs:



As we can see, thanks to this methodology the used car department is finally generating profits, at the expense of the part/service department which are generating losses -> it implies that the company needs to change the evaluation system accordingly to this situation.

Let's keep considering part department and service department as cost services, but differently from before they decide to transfer the full cost (so, variable costs + overhead allocation). The IS configuration will be the following:



By transferring all costs to the used car department, the part/service departments will generate nil profits. The issue, in this case, is that we are transferring all the inefficiencies that can emerge in these departments to the used car department -> also in this case the evaluation system should be changed accordingly.

<u>If it were found one week later that trade-in could be wholesaled for only 3,000$, which managers should have taken the loss of 500$?</u>

We must check the strategy of the company all businesses are independent profit centres this is the decision transfer prices based on market prices we said many times if they are independent if they are considered as independent profit centre transfer has to be evaluated and minus 500 is the responsibility for the used car manager -> at the moment of transaction, the wholesale price was 3,500$ -> if it decreases on time, it is responsibility of the used car manager.

All businesses are part of an integrated system with several cost centres, they have to cooperate -> TB based on costs and -500$ is responsibility of new car manager.

If we force the situation assuming that they are independent, we are forcing the reality because this is one episode but probably this episode will appear constantly this similar episode will appear constantly.

North country incurred a year-to-date loss of about 59,000$ before allocation of fixed costs on the wholesaling of used cars. Wholesaling of used cars is theoretically supposed to be a break-even operation. Where do you think the problem lies?

North country incurred a year-to-date loss of about it's possible that this loss occurred because new car managers were giving trading allowance above the market evaluation. If we continue running like this, who is paying for this over-evaluation? The key problem that can define the loss can be the way in which we set the price. Maybe the head of new car is providing way to high discounts on sales, providing a larger trade-in allowance than the one set by the head of used cars.

Should cost centres be evaluated on gross profit or "full cost" profits?

It depends by the configuration we decide to implement. In case we keep the current one, because all departments are treated as profit centres is coherent to evaluate them based on the gross profit, because managers will be in charge of both costs and revenues. On the other hand, if we would treat part/service departments as cost service we should evaluate their managers according to the costs they have control on (which means they should be evaluated on the variable costs only in case we implement the "variable costs" configuration or also on the overheads in case we implement the "full costs" configuration).

What advice do you have for the owners?

It's better to go back to the previous situation because we are in a collaborative system -> if we are running a collaborative system and we force the creation of independent units we are forcing reality because we are forgetting the frequent transaction will happen among these entities because the profit has to be evaluated as the profit of the whole situation.

Alternatively, we could decide to implement the following alternative structures:

- New car, used car and bodyshop as profit centres + Parts, services as cost centre
- A unique profit centre that manages both new car and used car + bodyshop as profit centres + Parts, services as cost centre

Weakness: integration => business won't consider the overall picture. Integrate the gross profit with something that integrate their vision to the overall company "correction factor".

Compagnie du Froid

Compagnie du Froid is a company which sells ice creams in France (the original country), then in Spain and in Italy. They operate in a mono-business in a seasonal sector (they operate mainly in summer) as a market leader delivering a premium quality product (they are a brand recognised in

these three countries). We have to evaluate the performance of three divisions analysing the Italian results. In each country the division is autonomous in manufacturing activities, in marketing activities, in distribution sales and purchases, so basically all the operating activities are delegated to the original managers, they are responsible to run the business in these countries.

Basically, the span of control is sufficiently open because they decide the names of products, so they are autonomous in the level of investments in advertising, so they select local suppliers and they run several functional activities -> in the central office, basically they are running all the SG&A services, basically the administrative services and research and development.

Span accountability -> the divisions are profit centres, so they are evaluated based on the total profits of the country. The instruments commonly used are profit planning -> it is based on the previous year volumes, and they start every year setting goals through these profit planning. Then, during the summer season, they are asked to produce a report every two weeks, in order to measure the implementation of the profit plan. They are applying transfer prices whenever they transfer products from one country to another one, particularly that was transferred from France to Spain, and the transfer price they use is full cost + 5%.

So, the situation is that they are analysing the results of 2009, and these results differ from country to country, and currently, the rule they have is to recognise as incentive 2% of the corporate profit -> they reward these regional managers on the basis of the overall profit of the company, recognising 2% of profit evenly by simply distributing 2% of profit to all company managers disregarding their specific results.

So, based on the documentation reported, the EBIT results for the three different regions are the following:

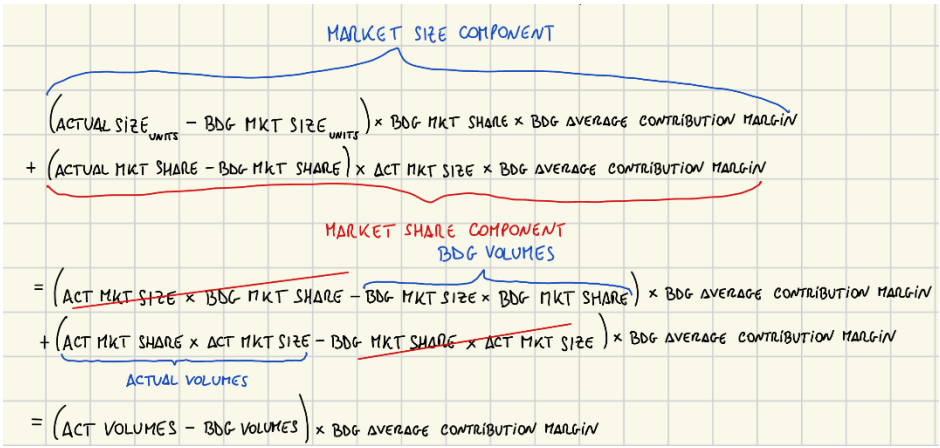
	PLANNED	ACTUAL	Δ
FRANCE	1,027	1,242	+ 21%
ITALY	459	517	+ 13%
SPAIN	1,028	(149)	- 114%
TOTAL	2,514	1,610	- 36%

Therefore, the total amount of compensation distributed evenly among managers is:

$$1{,}610{,}000€ * 2\% = 32{,}200€$$

Is it a fair method for rewarding the different managers? The performance of the different managers is significantly different, so this is an unfair way to distribute bonuses because it's promoting all these three managers, even if their respective performances are totally different. This difference is based on the total profit, but in order to understand clearly the performance of each country, we have to put in place various analyses in order to retain better the differences between the expectation and the actual results. In particular, we are going to focus our attention on Italy and to analyse the detailed variances of the Italian results.

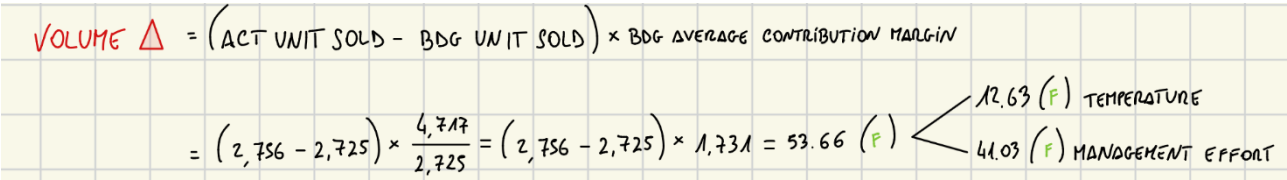
So, we start by analysing the market share variances, which is made of the market share variance and the market size variance:



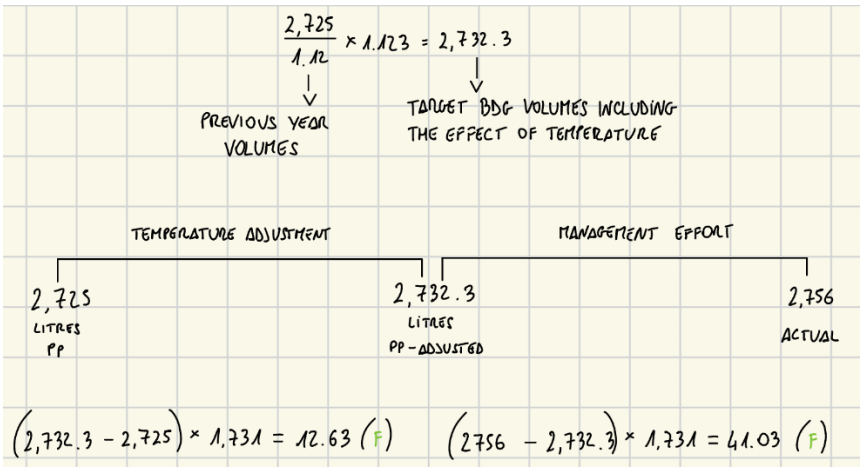
So, basically, we start with the most detailed formula showing the change in market size and the change in market share to deploy, to analyse the changing volumes and solving. We are proving that the changing volumes, so, volume variances are simply the difference between actual volumes minus budgeted volumes times the budgeted average contribution margin.

So, in this case study, we have no information on market share per country and in total, in the dimension of each country market. As we don't have information on the market for each country and our market share, but we were sufficient to have the dimension of each country market, it was possible to identify market share on the basis of our volumes. Anyway, we don't have this kind of information -> for this kind of variance, we simply measure the total volume changes without splitting between market size and market share. So now, let's deploy this formula with numbers and let's calculate the total volume variance in Italy.

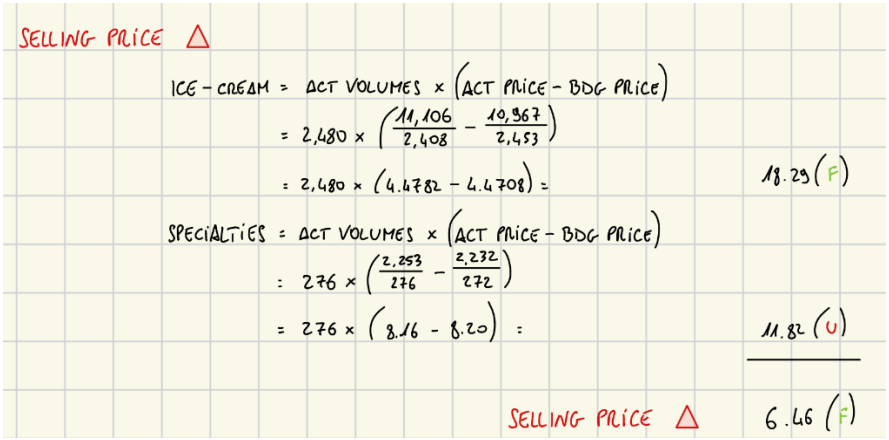
Following what we have in the text, we discover that, on average, for every increase in temperature of 1°C we can expect an increase in sales of 3%. Because there has been an increase in temperature of 0.1°C, we can expect an increase in sales of 0.3% with respect to the previous year sales.



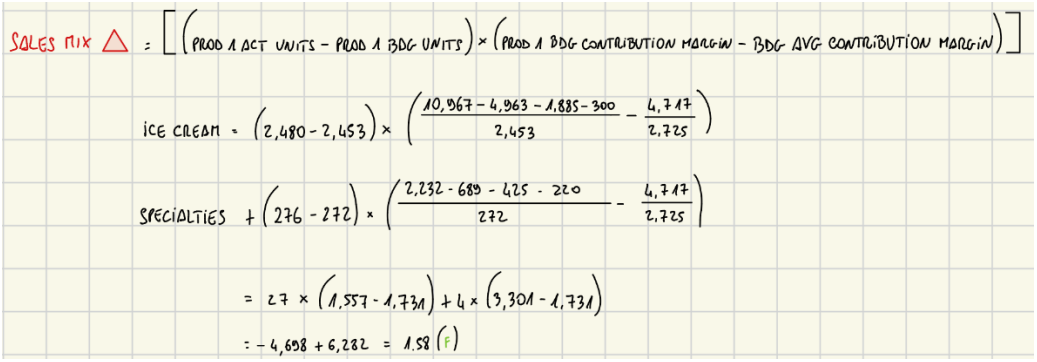
Obviously, increase in temperature is something out of management control -> we have to split the favourable variance into two components. We know that there has been an increase in sales of 12% from the previous year -> we divide the budgeted sales for 1.12 (in order to identify the previous year budgeted sales) and we multiply it by 1.123 in order to identify the target BDG volumes including the effect of temperature.



Let's analyse now the selling price variance per product:



The last variance we have to calculate is the Sales mix variance

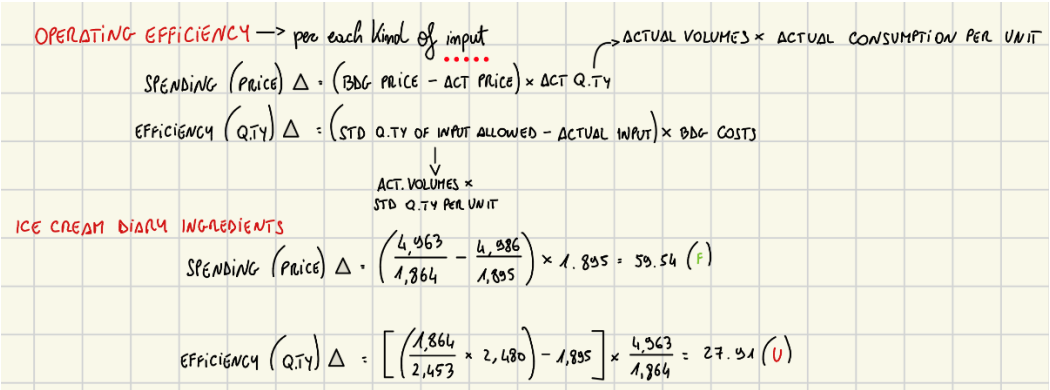


We can summarize all the variances:

△ VOLUME (MANAGEMENT EFFORT SHARE + SIZE)	41.03	(F)
△ VOLUME (TEMPERATURE − NON CONTROLLABLE)	12.63	(F)
△ PRICE (SELLING PRICE)	6.46	(F)
△ SALES MIX (MANAGEMENT EFFORT)	1.58	(F)
CHANGE IN COMPETITIVE EFFECTIVENESS	61.7	(F)

Here we are in front of profit managers running each company, and we know that a profit manager is a kind of responsibility where managers manage revenues and costs. It's not 100% contribution margin variance because we are missing the impact of variable cost. But in terms of mix, and in terms of volume, we already use contribution margin.

Let's now compare the operating efficiency and the competitive effectiveness.



Efficiency is usually depending on usage of productive factors (in that case direct material), while spending is usually connected to the purchase of these direct materials. Under the responsibility perspective, they could be referred to different responsibilities. Procurement office has to do with spending, while operating/manufacturing office if we talk about efficiency.

So in conclusion, as regards this specific component raw material, so daily ingredients regarding the ice cream, we have a positive performance in terms of spending, a negative performance in terms of consumption -> we pay less, but we consume more. If we recognise that spending variances are usually a responsibility of procurement manager, we could say that procurement manager, as it was a productive factor, did a good job, while in manufacturing, the usage of these ingredients we were less efficient. But this positive variance of 59€ minus 27€ -> the final effect is positive, but this is mainly due to a good job by the procurement manager -> we can see how we can use this analysis for evaluating managers.

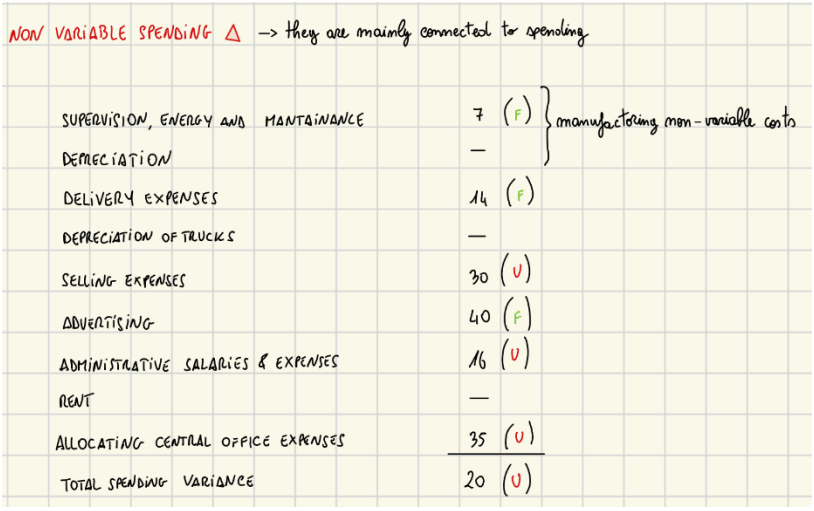
So now we have the possibility to summarise all of the variances.

	SPENDING	EFFICIENCY	TOTAL
ICE CREAMS			
DAIRY INGREDIENTS	59.54 (F)	27.91 (U)	31.63 (F)
OTHER INGREDIENTS	15.94 (U)	10.30 (U)	26.25 (U)
LABOUR	1.44 (U)	23.25 (U)	24.70 (U)
SPECIALTIES			
DAIRY INGREDIENTS	7.68 (F)	15.54 (F)	23.13 (F)
OTHER INGREDIENTS	2.83 (U)	4.082 (F)	1.25 (F)
LABOUR	0.62 (U)	11.86 (F)	11.24 (F)
VARIABLE COSTS	46.37 (F)	30.07 (U)	16.30 (F)

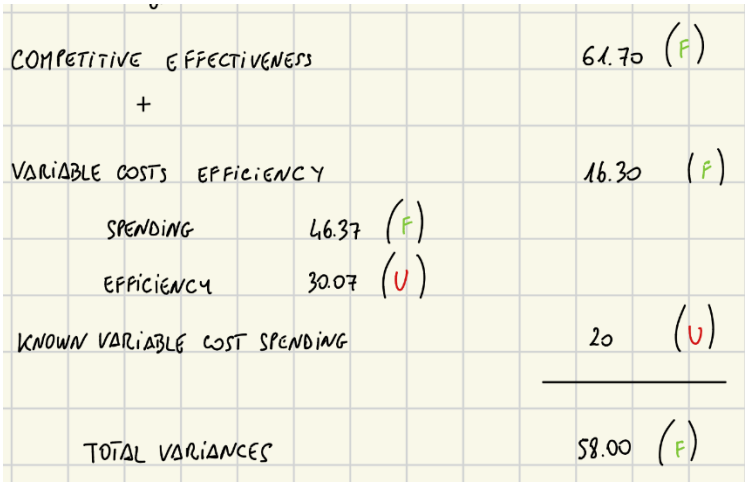
So simply analysing the overall results, we identify a positive variance in terms of spending. We see there in terms of daily, they were able to pay a lower price even if other ingredients and other liver variances are unfavourable. In any case, so the total spending variance is positive. So as regards the efficiency, they were inefficient in producing ice cream. You see here, all efficiency variances regarding

the ingredients and labour to produce ice cream are negative, while the speciality costs are positive. But to the end, the overall variance is negative. In conclusion, we could say that in total, combining positive and negative variances in total, that the spending is positive and efficiency is negative. So basically, assuming a global evaluation, so unfortunately, efficiency produces a negative variance, compensating more or less the total positive variance in total spending.

Now, we go through the various analysis of non-variable spending -> Simply in front of fixed costs or non-variable costs, we usually have just a spending variance.



Let's try to combine all variances and let's try to show describe the total variances using the numbers and using the results of our calculation.



If we look at the IS of the Italian region, we can notice how the variance occurred in EBIT is exactly equal to 58€.

Now we are able to describe the total variances between the budget amount and the actual amount but split it by responsibilities by the cause of variance -> in terms of effectiveness they were particularly performant, in terms of efficiency also the change is particularly positive, in terms of non-variable costs so in terms of non-variable costs, the total variance is negative (meaning that they spend more in non-variable costs -> one reason could be the fact that we have sold more and, therefore, we have to incur more selling expenses). The biggest negative variance among the non-variable expenses are the allocating central office expense, which, in case we would not count them, we would have had a positive result of 15 -> regional managers have only partial control over these

allocations (if regional manager require more support probably receive more charge yes but the amount of this the cost of this service is totally out of control).

In conclusion the evaluation of the Italian managers is particularly positive is particularly positive because they sustain growth in spending volumes, so they manage prices and mix in positive way in terms of manufacturing to the end they were more efficient even if the spending variance is negative spending over cost is negative.

By conducting this analysis we have been able to understand what the components of the overall performance of the Italian manager have been. We could conduct the same analysis for the other regions and isolate the contribution of management and external factors' contribution (such as temperature or expenses imposed at corporate level). In front of non-controllable items performance evaluation in front of non-controllable items usually is based on subjective evaluation, that we have to integrate with the objective evaluation when there are some components that are not clear or out of control.

Tennessee controls corporation

Located in Unicoi, Tennessee, the Process Control Division was TCC's newest and smallest division, reaching approximately $400 million in sales by 2009. It manufactured process controllers used in "wet" industries such as petrochemicals, food processing and waste treatment. Controllers monitored and adjusted process variables (temperature, pressure…) in real time and were designed to "fail safe" to prevent industrial accidents.

Despite satisfactory revenue growth, profitability had been disappointing (look at the table below), largely due to the costs of building the new facility, maintaining a large engineering staff, and paying dual distribution costs (sales force commission + distributor discounts). The Division manager was dismissed in 2009.

$ Million	2008 Total	2009 Total	YoY Change	Note
Net Sales Billed	346.2	395.2	+49.0	Solid revenue growth
Gross Profit Margin	122.6 (35.4%)	130.0 (32.8%)	-2.6 pts	Margin erosion
Division Profit	13.2 (3.8%)	4.2 (1.1%)	-9.0	Deeply disappointing

Judy Starnes (age 39) was hired in February 2010 via executive search, breaking TCC's tradition of internal promotion. An engineer by training, she had spent most of her career in brand management at Procter & Gamble. She was selected for her ability to combine technical complexity and marketing execution, and for her demonstrated record of turning around unprofitable product lines. One of her first actions was to lead a two-day management retreat that produced a new mission statement for the Division:

"The mission of the Process Controls Division is to apply the talents, knowledge, and skills of our people to make Tennessee Controls the market leader in enabling customers to reap the benefits of industrial control technology"

In September 2010, Starnes faced her first major resource allocation decision: ranking three competing investment proposals for the presentation at the Corporate Strategic Ranking Meeting.

The SRI is defined in a six-page Corporate Policy Manual (PM 2-3-6). All development funding requests exceeding 200,000$ must include documented SRI. Projects scoring below 10 are not considered without prior approval from the corporate officer. The composite SRI formula is:

$$SRI = \frac{Credibility\ Factor * Financial\ Return\ Factor}{Risk\ Factor}$$

Financial inputs are provided by Corporate Planning (Jim Williams) based on a standard "Cash Flow Wave" model. Credibility and Risk scores are the responsibility of Level 3 manager (Starnes). Achievement of projections is explicitly linked to Key Personnel Award compensation decisions

Component	What it measures	Scale
Credibility factor	Quality of strategic idea, adequacy of planning, and strength of the champion proposing it. Based on matrix of Champion Commitment vs. Strategy/Marketing Content	1 (weak champion, poor analysis) to 9 (proven champion, strong strategy & competitive assessment)
Financial return factor	Product of two ratios: (Cumulative Org. Profit/Max. Neg. Cumulative Cash Flow) * (Life Cycle/Years to Max. Neg. Cash Flow). Reflects both magnitude and speed of return.	Higher = better return relative to investment and time
Risk factor	Balance product uniqueness and expected market share (timeliness). In the denominator, so higher risk = lower SRI.	1 (unique product, market leadership) to 10 (copyable product, trailing share)

Investment proposal 1 -> High-Volume Market Segment (Steve Gregg, Marketing & Sales manager) -> Gregg argues that the low-price, high-volume segment is the next high-growth opportunity. Japanese manufacturers (early adopters) already favour streamlined, lower-costs controllers. TCC's current competitive advantage in this space has eroded as Allen Bradley and Modicon have matched the 005/008 product lines. The proposed 015 product would be priced at roughly one-third of the existing 005 line, targeting smaller application (<32 I/O points), drum-timer replacement and a ne low-priced segment.

- Gregg, age 40: electrical engineering + MBA; 12 years in the Division; highly regarded salesman with deep customer and product knowledge.
- Key risk: competitive retaliation. If followed (as followed with the 005), market share stabilizes at 40-50% rather than growing to 65%.
- Strategic fit: continuation of existing strategy; leverages current sales force and distribution network with no structural changes needed.

➔ Cost control is more effective, and we are reinforcing our position

Investment proposal 2 -> SCADA Technology Development (Steve Mowry, Engineering & Development manager) -> Mowry proposes a major push into Supervisory Control and Data Acquisition (SCADA) system – the networked, higher-lever control system that manage entire factories or processes. Large customers are already requesting this capability, and distributors are attempting to fill the gap. SCADA systems command premium prices due to their complexity and proprietary nature -> it is a system integrating digital data, integrating data collections, and is more expensive but more powerful in terms of flow management

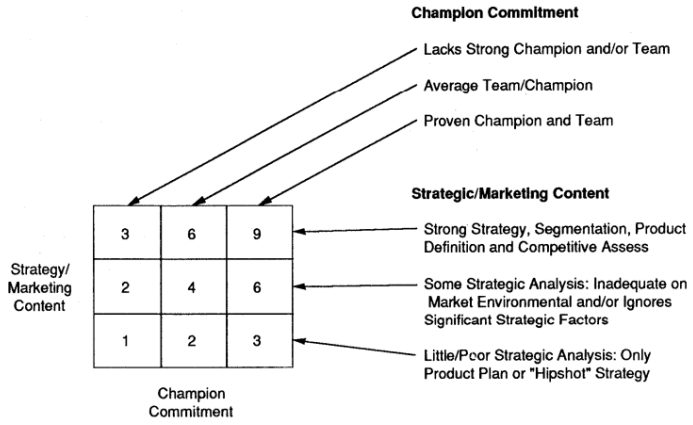
- Mowry, age 48, PhD electrical engineering, with the Division since inception, author of every product development effort, deep technical credibility
- Key argument: TCC is one of very few firms capable of building such systems. First-mover advantage is critical (If we insist on this data-driven technology, probably we will be the first and we will have the first position) – delay risks becoming a "me too" competitor.
- Business model: a core of reusable software (90% functionality) + 10% custom per job, enabling value pricing and increasing margins with each completed project.
- Requires hiring industry-specific engineers (petrochemicals, food processing, chemicals) and expanding the development team.

Investment proposal 3 -> Acquire MDA (Craig Neriman, Division Controller) -> Neirman proposes to acquire Maryland Data Acquisition Company (MDA) which has already built a profitable SCADA business unit Honeywell hardware with proprietary MDA software, holding a leadership position in the mid-market segment. MDA has 200 existing customers, 30% annual revenue growth for 3 years, and an aggressive commission-only sales force -> if we acquire this company, they are already present in the market of the SCADA technology (the digital assistive technology) -> Instead of developing our business from zero, we are acquiring this company

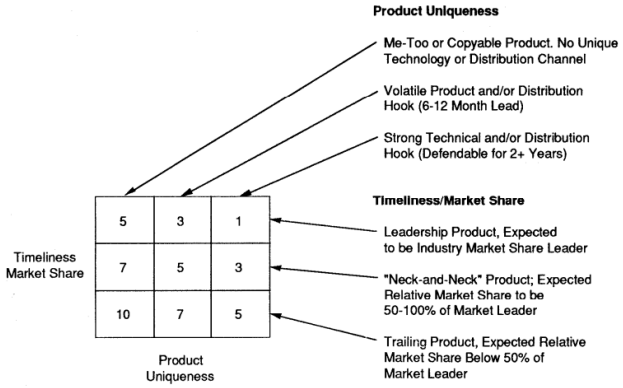
- Neirman, age 34, MBA, joined in 2008 from Corporate Control where he specialized in acquisition evaluation, newest member of the management team
- Key advantages: proven profitable business, immediate revenue, existing customer base, strong salesforce, and "pull-through" effect (MDA can specify TCC controllers to its own customers).
- Synergies: purchase-price reductions on electronic components, reduced admin costs on electronic component (because Tennessee is a bigger company), Honeywell representative status (because we are using hardware).
- Risk mitigation: TCC acquires capability rather than developing it, avoiding lengthy R&D cycles.

Question nr.1: Calculate the SRI and rank the projects.

Credibility factor -> the higher index, the better -> We will rate good opportunities with the highest grade. So, the index is low (in fact, they said a couple of points is below 10 cannot be approved, they need a special approval). In the matrix used to quantify the credibility factor, we have two dimensions: Champion commitment (if we stay on the right, the proposal is supported by well-known managers, otherwise we are on the left) and Strategy/Marketing Content (if we are on the top, segmentation is good, product definition and competitive assets are very good) -> the worst situation is on the bottom-left corner, the best one is on top-right corner. How are these points distributed? Moving from top-right to bottom-left. We have 4 managers to be evaluated the Credibility of the project, which is conducted by Level 3 managers -> it's a subjective evaluation, even though the final result is a number.



Risk factor: similarly, from before, the best situation is located in the top-right corner and the worst in the bottom-left corner. One dimension is the product uniqueness (when the situation is particularly strong, when we have strong technical and institutional quality, so is technologically speaking particularly strong, so the uniqueness is undermined) and the other factor is the timeliness and market share (If we are in the upper line, we suppose to reach a leadership position).



The Financial Return factor is calculated in the following way:

$$\frac{Org.\,Profit\ over\ Life}{Max.\,Neg.\,Cum\ CF} * \frac{Life\ Cycle}{Years\ to\ Max.\,Neg.\,CF}$$

Where the Maximum Negative cumulative CF refers to the negative CF that are generated in the first years when the product is initially launched. The scores are as follows:

Proposal	Org. Profit Over Life	Max Neg. Cash Flow	Life Cycle (yrs)	Yrs to Max Cash	Financial Return	SRI
High Volume	79.6	34.0	14	2	16.4	?
SCADA Technology	89.0	32.8	13.5	3	12.2	?
MDA Acquisition	217.0	50.0	25	6	18.1	?

- High Volume project -> 79.6/34.0 * 14/2 = 16.4
- SCADA project -> 89.0/32.8 * 13.5/3 = 12.2
- MDA project -> 217.0/50.0 * 25/6 = 18.1

How do we assign the value of the different factors that compose the SRI formula? We have third-level managers judging the project based on capital commitment. In the end, this number is a subjective evaluation, it's not coming from the formula -> it's ambiguous because to the end we get a number, but

behind this number there is a subjective evaluation. Following the formula for calculating the SRI score previously shown, when all proposal is assigned maximum credibility (9) and minimum risk (1) (making the SRI being the only difference between the different investment), the ranking becomes as follows:

Proposal	Org. Profit Over Life	Max Neg. Cash Flow	Life Cycle (yrs)	Yrs to Max Cash	Financial Return	SRI
High Volume	79.6	34.0	14	2	16.4	147.6
SCADA Technology	89.0	32.8	13.5	3	12.2	109.8
MDA Acquisition	217.0	50.0	25	6	18.1	162.9

- High Volume project -> 9 * 16.4/1 = 147.6
- SCADA project -> 9 * 12.2 / 1 = 109.8
- MDA project -> 9*18.1 / 1 = 162.9

Question nr.2: Comment the strength and weakness of the system.

Decision managers defend their ranking ad articulate the strategic rational behind each proposal -> because every single person is trying to sell their own idea, probably, in evaluators, there could be a bias influencing the decision, the grade they assign to risk and credibility:

- High volume: proven market position, addressed risk scenarios, stable market share in early years, leadership position.
- SCADA Technology: long company experience, large installed base, consistent with existing strategy, high barriers to competitive entry.
- MDA Acquisition: acquires proven capability rather than developing it internally, active salesforce, merges SCADA technology into acquisition strategy.

How could we demonstrate now that the profit over the life will be exactly 217 or 79 or 99? Is the result of assumptions -> how could we estimate the maximum negative cash flow, or the life cycle times in years? Sorry, we have to talk about the next 25 years. How many changes could happen in 25 years? So, here, this part, these financial returns seem to be more stronger than the others, just qualitative. But pay attention, because also, behind these numbers, we have subjective evaluations. Because decision makers are ranking these projects, by logically, the evaluation is not an objective evaluation.

How the system should be used:

- Should proposals be evaluated o absolute on absolute merit or relative to alternatives?
- How do you separate the quality of the idea from the quality if the analysis supporting it?
- What do these scores tell us? A Risk Factor score of 5 equates different situations in terms of product uniqueness/market share -> could refer to a product that is unique but has a low market share or a product that has market share but is copyable.

Decision makers realize that they did not use the SRI as an analytical input to reach a decision. Instead, they made an intuitive first and then used the scoring system to justify it. This reversal – data as justification rather than input – is a central insight of the case: objective scores to decide which are the results of a subjective evaluation.

Question nr.3: Apply the strategic management system analytic framework

The case is analysed using Simon's Levers of Control Framework, which distinguishes four control systems: Boundary System, Beliefs systems, Diagnostic control systems, and Interactive Control Systems. The SRI is examined against each lever:

Lever	Criteria	Assessment of SRI
Boundary System	Sets limits on unacceptable behaviour. Establish minimum hurdle rates.	WORKS – the minimum SRI threshold of 10 functions as a valid lower boundary.
Diagnostic control systems	Monitors critical variables against present goals linked to strategy.	PARTIALLY – could work if quantitative outputs feed informed management debate. Fails because no clear strategy is defined against which proposals are tested.
Interactive Control Systems	Requires: - Top management focus - Intensive use by operating managers - Face-to-face debate - Continual challenge of assumptions	FAILS - systems was designed by staff planners, not operating managers. It does not generate real management dialogue, face-to-face debate, and continual challenge and assumption.
Beliefs systems	Communicates core values and mission.	NOT APPLICABLE to this system.

Question nr.4: Provide with final comments

The recommended model for a properly functioning asset acquisition system is:

- Quantitative output (economic/financial criteria) are processed through the diagnostic systems
- Subjective factors (people credibility, strategi fit, qualitative fit) are introduced separately through open management debate. Instead of measuring a synthetic score like SRI, we would use qualitative evaluation to simulate managerial debates and to focus the attention of managers
- The final decision integrates both streams – it is not reduced to a single algorithmic score.

In management, in management software systems, usually we trust numbers -> the score is something quantitative, but in this case it's absolutely under discussion, it is absolutely critical of the process we are measuring. But if we have a subjective evaluation behind, it is a useless number, a useless score. Particularly if this evaluation is not based on a total discussion on a meeting team of managers, we need to evaluate managers with very simple judge to assign invalids.

Birch paper company

Small partially integrated paper manufacturer organized into four divisions:

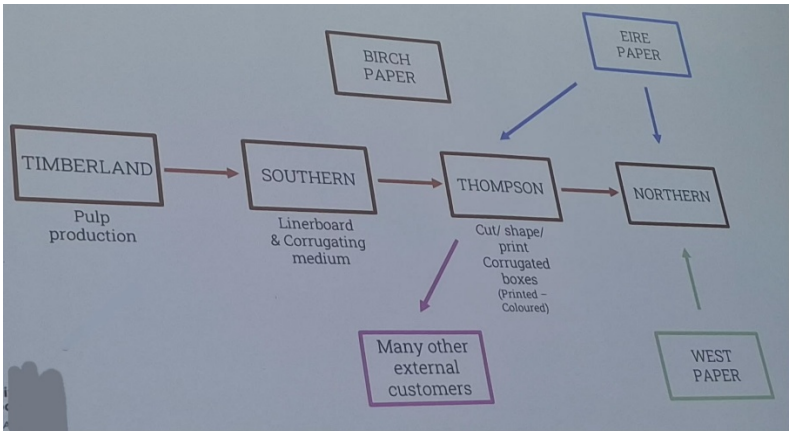
- Timberland -> they are producing raw material, basically producing pulp
- Southern -> use pulps to produce cardboard, linerboard & corrugating medium
- Thompson -> cut/shape/print corrugated boxes (Printed-coloured)
- Northen -> final selling division, selling packaging solutions to customers requiring special boxes to cover and to show their products

The Northen Divisions needs corrugated boxes for a new product and has received three bids from a customer to produce a custom series of boxes, one from the internal division Thompson and other offers coming from two external competitors, so the West Paper Company and the Eire Paper Company:

Bidder	Bid Price	Type	Key Note
Thompson Division	$480	Internal (sister division)	Highest bid — uses Southern Division paper as input ($280)
Eire Papers (external)	$432	External supplier	Uses some Thompson-supplied work ($25 out-of-pocket, sold at $30)
West Paper (external)	$430	External supplier	Lowest bid; Northern's apparent preference

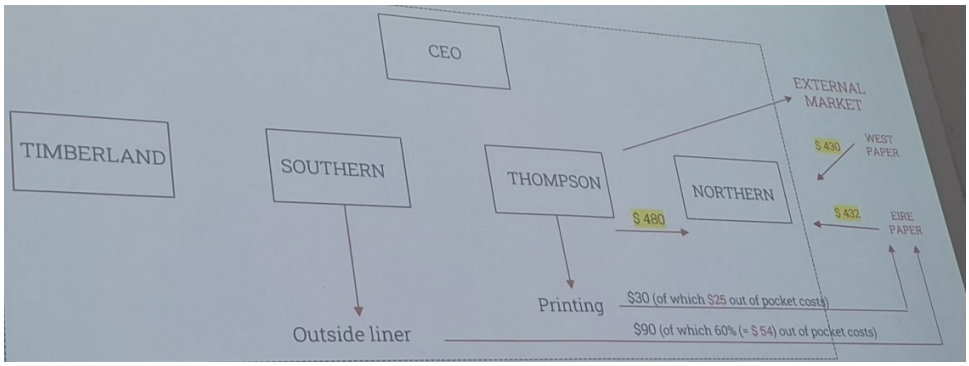
Thompson's bid is the highest, yet buying from Thompson is the best option for Birch as a whole. The tension between divisional incentives and company-wide optimality is the core of the case. Each division is a profit centre and every manager is incentivised to increase their own profits, independently by the effect on the company as a whole.

Let's look at a summary of the current situation:



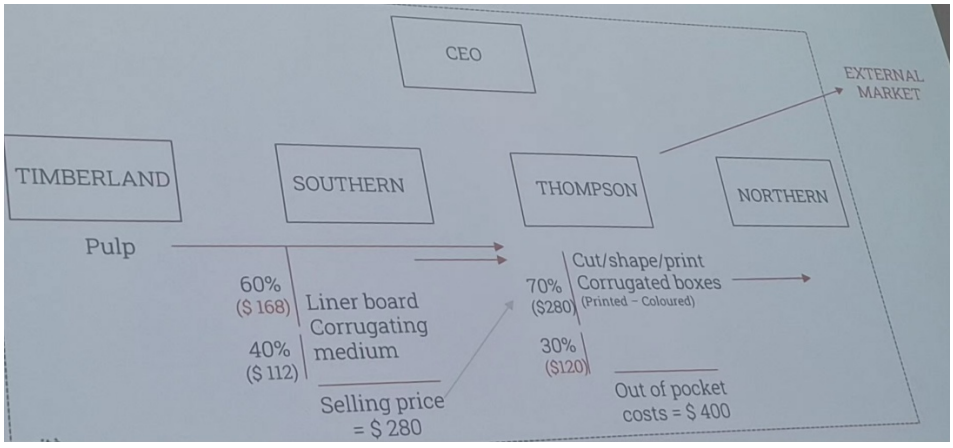
The bids that Northen has to go through are:

- Internal request from Thompson -> price proposed: $480 -> this value is generated entirely internally, starting from the semi-worked products realised by Southern
- External request from Eire paper -> price proposed: $432 -> in producing this product, will involve Thomson and other internal divisions to form part of the activity -> we have to consider or we need to understand on how to take into account the margin made on this external supply, margin made by another division, another band of paper. In particular, we know that of the $432, $90 will come from the raw material outside linear from Southwest (of which 60% are out-of-pocket costs, so cost from Southwest) and $30 comes from printed activity from Thompson (we also know that Thompson has a cost equal to 25)
- External request from West Paper -> price proposed: $430 -> is totally external, making it the lowest bid -> it seems to be the preferred solution because it's the cheapest one



So the point is that whenever we are in front of an internal supply or an external supply, so it's obvious that for the overall company, the best solution is to buy internally because we do not transfer value to other actors on market. Even if we have transfer prices, we are paying with our left hand something received by our right hand, it is still internal. So, there is no doubt that in front of these alternatives, do everything inside or buy something or partially outside, the best solution for the overall company is to stimulate the internal consumption. On the other hand, because all divisions are evaluated on their profits, Northen Division manager is incentivized to pick the cheapest alternative, even though this will imply transferring all the generated value outside of the company.

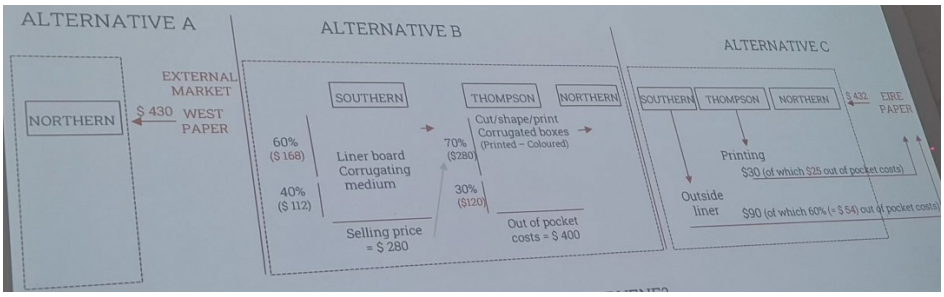
Question nr.1: Which bid should Mr. Kenton (Northen Division manager) accept?



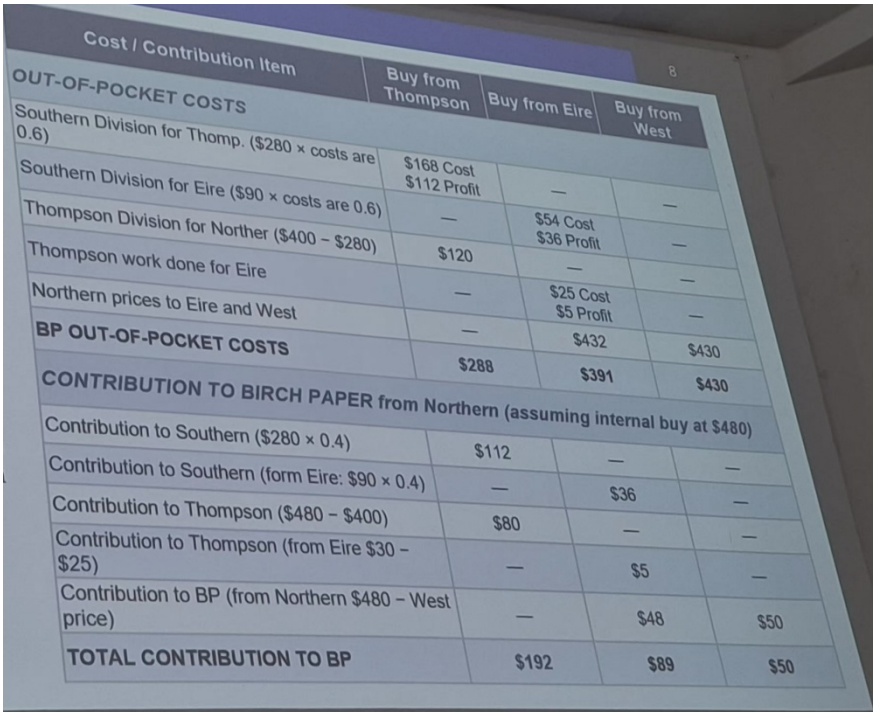
480$ is the transfer price proposed by Thompson to Northen -> let's breakdown this price along the supply chain:

- of these 480$, 80$ are profit generated by Thompson and the remaining $400 are the costs Thompson faced to get the product
- of the $400, 70% of that ($280) is the purchase price from Southwest to get the corrugated boxes, while the remaining 30% ($120) are internal costs made by Thompson
- of the $280, 60% of that ($168) are raw materials that have been obtained from Timberland, while the remaining 40% ($112) is the profit generated by Southern division.

If we just check the perspective of Northen division, the best solution is to purchase from West paper, because from the perspective of the manager of the division they have to focus on its own costs, even though this will transfer the value to the external of company. We have to analyse the three alternative from a quantitative perspective.



Question nr.2: Which bid is the best interest of Birch Paper Company as a whole?



Cost / Contribution Item	Buy from Thompson	Buy from Eire	Buy from West
OUT-OF-POCKET COSTS			
Southern Division for Thomp. ($280 × costs are 0.6)	$168 Cost $112 Profit	—	—
Southern Division for Eire ($90 × costs are 0.6)	—	$54 Cost $36 Profit	—
Thompson Division for Norther ($400 – $280)	$120	—	—
Thompson work done for Eire	—	$25 Cost $5 Profit	—
Northern prices to Eire and West	—	$432	$430
BP OUT-OF-POCKET COSTS	**$288**	**$391**	**$430**
CONTRIBUTION TO BIRCH PAPER from Northern (assuming internal buy at $480)			
Contribution to Southern ($280 × 0.4)	$112	—	—
Contribution to Southern (form Eire: $90 × 0.4)	—	$36	—
Contribution to Thompson ($480 – $400)	$80	—	—
Contribution to Thompson (from Eire $30 – $25)	—	$5	—
Contribution to BP (from Northern $480 – West price)	—	$48	$50
TOTAL CONTRIBUTION TO BP	**$192**	**$89**	**$50**

The key analytical step is to compute either (a) total relevant out-of-pocket costs (which means real costs for birch paper) and (b) total contribution to Birch for each of the three alternatives. The two approaches lead to the same conclusion.

Let's analyse the out-of-pocket costs:

- Buy from West paper -> it is totally external -> even if this offer is the cheapest one, if we take $430 Birch paper has a total final cost of $430 is recognised by Northampton
- Buy from Eire -> because Eire is an external player, we have to take the price Eire charges to the Northen division ($432) and subtract the profits generated by the divisions that deliver services to Eire, which are Southern ($36) and Thompson ($5).
- Thompson -> similarly from what we have done before, we have to take the price Thompson would charge to Northen division ($480) and subtract the profits generated by the other divisions, which are Thompson ($120, because Thompson sustained costs for $400, but of these $280 were costs recognised by Southern) and Southern ($112).

Conclusion: Buying from Thompson generates the lowest out-of-pocket costs ($288 vs. $391 vs. $430) and the highest contribution to Birch ($192 vs. $89 vs. $50). The internal option is clearly the best option for the company as a whole, even though it is the worst option from the perspective of the single manager.

The core problem (sub-optimization in a decentralized firm -> we are delegating the financial and managerial responsibility -> works in those companies where divisions are substantially independent, meaning that there are no significant internal transaction) -> despite the clear company-wide advantage, Northen's manager (Kenton) is inclined to buy from West Paper because it offers the lowest bid. Thompson's manager (Brunner) has set his bid at full cost ($480) and refuses to go lower – even though any price above his variable costs ($400) would improve divisional cash flow (we are selling at a price higher than division's variable costs, so we are generating a contribution margin) -> basically impossible because the manager has to maximise its profits.

The root cause: when profit accountability is decentralized across profit centres, each manager maximizes their own divisional P&L. Thompson's managers sees only his $30 margin at $430; he does

not account for the $112 contribution that Southern earns on the order. The commercial vice president is the only actor with visibility into the full picture. We have a conflict of interest because the corporate level managers should convince Thompson division manager to partially sacrifice their profit (reducing their compensation) in order to generate an additional contribution that will be completely kept inside the company.

Perspective	At $430 (meet market)	At $480 (full cost)
Thompson Division sees:	+$30 contribution	+$80 contribution
Birch as a whole sees:	+$142 total contribution	+$192 total contribution... but only if order is won
Risk:	Order secured internally	Northern buys from West → Birch earns $0

Question nr.3: Should the commercial vice-president intervene? If so, how?

- Arguments for intervention:
  - The VP is the only person with full information. The cost to Birch of Thompson refusing the $430 price is $142 is lost contribution; the cost to Thompson is only $30. This asymmetry justifies top-down coordination -> as they have different perspectives, the point is, we need to intervene and do something
  - The sub-optimization problem is structural, not a failure of individual judgment. It arises from the profit centre design itself -> it's not a problem of acquired behavioural matters, as these managers are deciding rationally, they are absolutely conscious
  - If Thompson rejects the order and Northen buys externally, Birch loses $142 per unit for no good economic reason
- Arguments against intervention:
  - Capacity constraints: the case hints Thompson has “an occasion” operated at capacity. If Thompson has a better-margin order waiting, forcing acceptance at $430 could cost Birch more than it saves -> if we suppose that Thompson is working at full capacity, and if we force Thompson in reducing price, probably we would cause losses.
  - Pricing policy credibility: Brunner may be establishing a defensible full-cost pricing policy. Accepting below-full-cost orders undermines prancing discipline and may reduce total contribution over time (e.g. holding $480/400 units at $32,000 vs. meeting market $430/1,000 units at $30,000 – full cost wins at lower volume).
  - Decentralization integrity: Overruling Brunner undermines the profit centre concept and removes decision-making from managers closest to the market -> if we apply a top-down approach for the decision-making process, we are going against the logic of the profit centre, which is giving autonomy to assign responsibility to individual managers to maximise profit. It signals that divisional autonomy is conditional, which erodes the entire incentive system.
  - Negotiating dynamics: Brunner may be using the VP as leverage to extract a abetter price from Northen – not genuinely refusing the order

If VP intervenes, how should the transaction be priced? If the VP forces the deal inside, the next question is: at what transfer price should the boxes be booked? Several approaches are possible:

Option	Mechanism	Assessment
Market prices	Thompson charges $430, Southern charges $280	Because there are no preferences, simply we are applying the prices set by the market -> we make an indifference between internal and external transaction.

		Theoretically clean, preserves competitive pricing. But forces Thompson below its stated policy (they affirmed that because of the higher volumes, they allow themselves to set higher prices compared to market ones).
Split contribution equally	Total contribution divided equally between Southern and Thompson -> Northen pays $430	Fair bur arbitrary; requires central calculation, as they are the only ones that have the full data
Split $50 reduction	Distribute the $50 discount (from $480 to $430) across all three divisions	Pragmatic compromise, still somewhat arbitrary.
Dual pricing	Thompson sells at $480, Northen buys at $430. The $50 gap is charged to a central account	Acceptable to all divisions but postpones the problem – central account show a loss -> who is responsible at year-end? We can call it the cost of decentralisation (Because the system is stimulating divisional manager in giving like this to the end as an overcharge of 50)
Negotiate internally	VP encouraged division to reach their own agreement on how to share the total contribution, hoping they'll be able to find a solution.	Preserves autonomy but case suggests this may not be feasible given the conflict
Two-step pricing	Variable cost per unit plus a fixed monthly charge for capacity and fixed costs.	Correct in theory for captive internal sales, does not apply here since this is not a captive arrangement

Thompson vs Birch: the volume-price trade off -> a key pedagogical insight is that Thompson and Birch face fundamentally different indifferent calculations when weighting a price of $430 and $480, which causes Thompson to move to just 37% of the margin they would have generated in case of a price of $480.

Perspective	Unit Contribution at $430	Unit Contribution at $480	Volume can fall to... and still break even
Thompson Division	$30	$80	37.5% of base volume
Birch as a Whole	$142	$192	74% of base volume

Thompson is willing to sacrifice far more volume than Birch will accept. This demonstrates that divisional profit maximization and company-wide profit maximization diverge significantly whenever Southern's margin is excluded from Thompson's calculus.

Broader lesson on transfer prices -> transfer prices are necessary in decentralized firms where interdependent division need autonomy to react to markets yet must remain coordinated as part of the same corporate entity. But transfer prices affect three things simultaneously:

- Performance measurement – how divisions results are reported
- Managerial motivation – the incentives created for divisional managers
- Pricing decisions – how divisions price their products to internal and external customers

The case teaches that no single transfer mechanism is optimal for all circumstances. Each alternative involves trade-offs between goal congruence, divisional autonomy, simplicity and incentive design.

The choice of transfer pricing policy ultimately reflects top management's view on strategy, decentralization, and the acceptable level of central coordination.

Additional complications arise with international divisions, where transfer prices also have significant tax implications – a dimension worth flagging even if not central to the Birch case itself.

Vyaderm Pharmaceuticals

The new CEO of Vyaderm Pharmaceuticals, Maurice Védrine, introduces an Economic Value Added (EVA) programme to shift the company's focuses from short-term earnings per share (which was the previous method for evaluating performance) to long-term shareholder value creation. The EVA programme consists of three elements:

1. EVA centres -> financial responsibility centres where we use EVA
2. EVA drivers
3. EVA-based incentive schemes

They have to set these investment centres, then they have to identify the drivers, and then they have to create a formula to rate divisional managers on the basis of EVA.

During a two-year implementation period, the programme encountered several stumbling blocks:

A) resistance from regional managers
B) complexity of managing multiple EVA centres -> Multiple EVA centres means we have to create several investment centres, and per each investment centre, we need to identify clearly the amount of investments
C) unexpected bonus adjustments driven by market events.

The central decision point involves the North America Dermatology division. The sudden FDA (Food and Drugs Administration)-imposed exit competitor PJL Laboratories produces a one-time "windfall" in revenues. The Food and Drug Administration imposed to a huge competitor of these bio-pharmaceutical companies to exit the market because of problems, healthy problems, and problems in production. So, immediately, these bio-pharmaceutical companies, and particularly the Dermatology Division, had a huge benefit in terms of revenues because of this decision by the Food and Drug Administration -> But you understand that this is an extraordinary event, not connected with managerial performances, but just due to issue problems regarding this competitor. Students must calculate EVA bonus payouts for the current year (when the bonus is unexpectedly high) and for subsequent years (when the bonus will be unexpectedly low), then advise the senior management on whether to adjust the EVA results.

1. **Using date from Case Exhibit 8, calculate:**
    a. **2017 EVA for the North America Dermatology division**
    b. **2017 EVA bonus payout for the same manager, assuming the bonus is 100% on divisional EVA**
    c. **2018 EVA and estimated bonus payout for the same manager, assuming profits revert to historical levels and the EVA improvement goal remains constant**

Exhibit 8 North American Dermatology Financial Data for EVA Calculation

($ 000s except bonus)	2013	2014	2015	2016	2017
Divisional EVA Calculation:					
Actual EVA				$3,745(a)	
EVA Improvement Goal					$2,150
EVA Target					$5,895
EVA Interval					$12,000
Profit & Loss:					
Income before following items:	$24,694	$31,512	$36,584	$42,545	$92,550
Research & Development Expense	12,487	14,610	17,094	20,000	39,000
Consumer Advertising Expense	34	38	41	45	50
Goodwill Impairment	0	0	0	0	10,000
Net Income Before Tax	$12,173	$16,864	$19,449	$22,500	$43,500
Current Year's Income Tax Payments	(4,261)	(5,902)	(6,807)	(7,875)	(18,725)
Balance Sheet:					
Net Operating Assets	$66,949	$79,000	$93,220	$110,000	$135,000
Capital Charge for EVA Purposes					11%
Divisional Manager's Bonus:					
Base Salary				$300,000	$300,000
Bonus Target				na	60%
Bonus Payout				$90,000	

2017 EVA bonus payout for a manager earning 300,000 euros, assuming the bonus is 100% on divisional EVA. And 2018, so the following year's EVA, estimated bonus payout for the same manager, assuming profit reserved to historical levels and EVA improvement goals remain constant.

Why EVA? Maurice Védrine has a chosen to implement an EVA system because he sees the "ruthless objectivity" of EVA as a way to differentiate himself from his predecessor, who focused solely on quarterly EPS target (they were focused on dividends, on the short-term return, with little regard to the capital teed up in the business). If we want to analyse managers' financial responsibility, we have to remember how we classify the different centres:

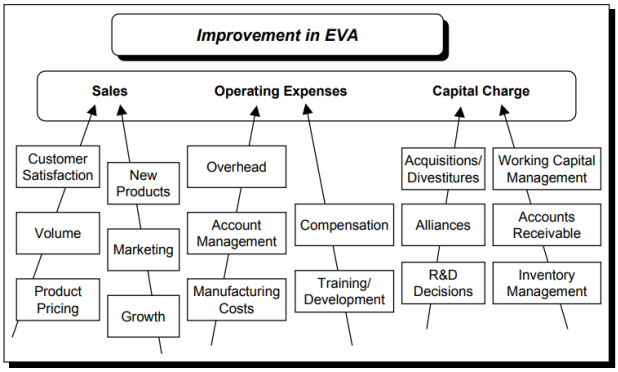
- Cost centres -> the most relevant instruments used for evaluation purposes are standard costing and value analysis
- Profit centres -> the most relevant instruments used for evaluation purposes are segmented income statement -> we divide the IS revenues and costs to the different BU in order to define the margin for each BU, which is something easy
- Investment centres -> by looking at the most relevant valuation instruments in this case (ROI, EVA, residual income...), we are combining profit and investment -> in case we want to understand the profitability of the single BU, we have to make a segmentation not only of IS but also BS (or, at least, we have to find the specific investments for each divisions) -> because of economies, companies use investments for different products -> much more complicated

Strengths	Weaknesses
Introduce Balance Sheet accountability, introducing the idea of responsibility also on investments -> Responsibility on income statement is more frequent and easier	Complex to set up (up to 164 possible adjustments)
Aligns managerial behaviour with shareholder expectations -> Value is more coherent with the expectation of shareholders. Early share is something like immediately a return, but we could also create value without distributing dividends	Key parameters (interval, improvement goal) remain subjectively set

Eliminates “sandbagging” of targets through objective calculation, because it becomes more manageable	Cannot accommodate unforeseen market conditions (e.g. windfalls)
Encourages year-to-year performance improvement	Lower-level managers may feel disconnected from corporate EVA, as it mainly involves mainly high-top managers

Organizational Design Issues:

- EVA centres (financial sustainability centres) -> an EVA system requires clearly defined business units with their own balance sheets. Vyaderm initially established 15 EVA centres, subsequently reduced to four, with a single company-wide centre as the ultimate goal. Managing many centres raises challenges of asset allocation for shared resources, transfer pricing and currency fluctuation, which is particularly complex



- Span of Control and Span of Accountability -> two concept are central to understanding EVA design:
    - Span of Control -> the resources a manager directly controls (headcount, budget, balance sheet assets) and its amplitude of power
    - Span of Accountability -> the range of performance measures used to evaluate a manager’s results (Do we measure just cost? Do we measure profit? Do we measure investments?)

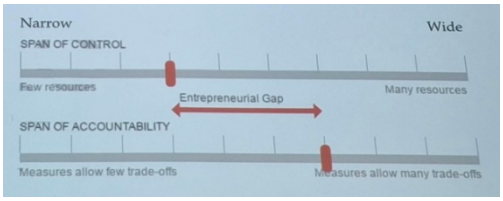
Vyaderm managers are used to running independent geographical businesses with little interference from corporate headquarters in Seattle. Accordingly, they want to be measured on variables over which they have day-to-day control -> the contradiction here lays on the assignment of authority and delegation of power to our investment centres called EVA centres (our division manager has had a lot of leverages to impact EVA). But the measurement will be calculated on a single EVA. They are ready to be accountable for measures that are “responsive” to their efforts and actions. We can see the decision these individual managers can make, decisions that individual managers can make, okay, to impact positive EVA. For example, managers usually manage proper pricing. Proper pricing is impacting volumes, and also volumes are impacted by customer satisfaction. The individual managers also are able to or have the possibility to stimulate growth through marketing and advertising expenditures to launch new products. So, these are leverages impacting sales. But also, individual managers have a huge impact on operating expenses and on capital charges.

However, MR. Védrine would like to establish a single, global EVA centre as the sole basis of managerial bonuses. This means that the EVA bonus bank for an individual manager would fluctuate with the overall performance of the corporation (I am evaluated on a common measure impacted by all my colleagues). Except for the highest level of management, this is not a responsive measure. Lower-level management may find it difficult to imagine that their individual effort can influence corporate EVA, and they do not want to be penalized for poor performance in other divisions.

To win the acceptance of the line managers. Vyaderm therefore compromises. The EVA program at Vyaderm starts out with fifteen EVA centres instead of a single corporate centre, and managerial bonuses are initially based 25% to 50% of EVA drivers, depending on reporting level.

If we have a span of control particularly reduced, small, few resources, many resources on the right -> the span of control is not particularly wide but if the span of accountability, so the measure used to

rate my performance, is wide, immediately I receive that there is an interperjudial gap. Because my power is this one, it's not particularly wide, but I am measured on a global measure. The point is there is a space in the middle.



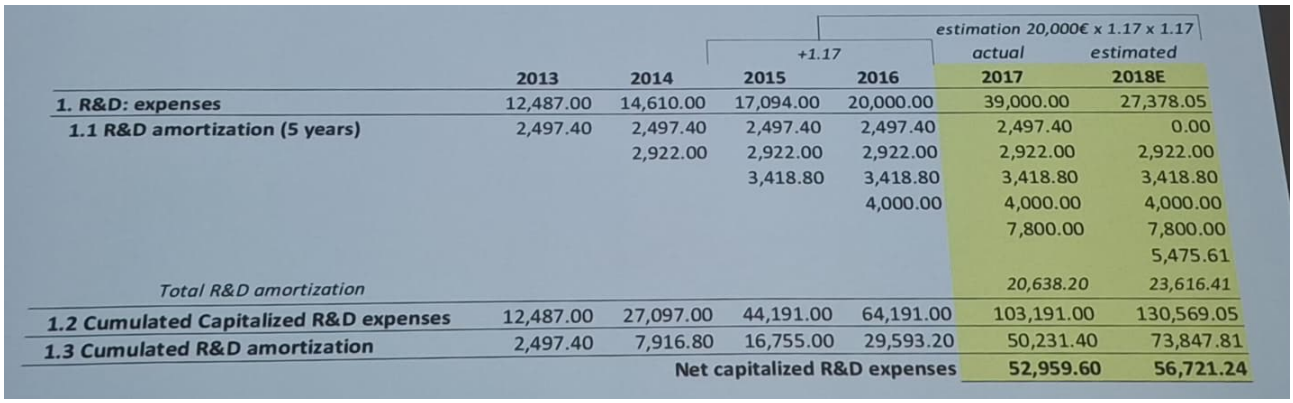
Please, when accountability exceeds control, managers face an interperjudial gap. They must innovate and influence others to achieve their targets. So, they are stimulating others in performing well because if all of us are performing well, we will have a benefit in proving the single global EPA. Védrine's shift to EVA widens the span of accountability (from P&L to include balance sheet), intentionally creating this gap to drive innovations. To manage political resistance, Vyaderm compromised: bonuses were initially based 25%-50% on EVA drivers, rather than 100% divisional EVA.

EVA Accounting Adjustments -> EVA-adjusted statement approximate true economic income, setting aside GAAP conservatism. Vyaderm applies three key adjustments:

Items	GAAP Treatment	EVA Adjustments
R&D Expenditure	Expensed immediately against current revenues (US GAAP conservatism)	Capitalized and amortized over 5 years on a straight-line basis. Increase both NOPAT and the capital base.
Consumer Advertising	Expensed immediately	Capitalized and amortized over 3 years. Recognizes that brand-building generates future benefits.
Goodwill Impairment	Charged to income, asset written down	Added back to income. Balance Sheet restated at full purchase price.

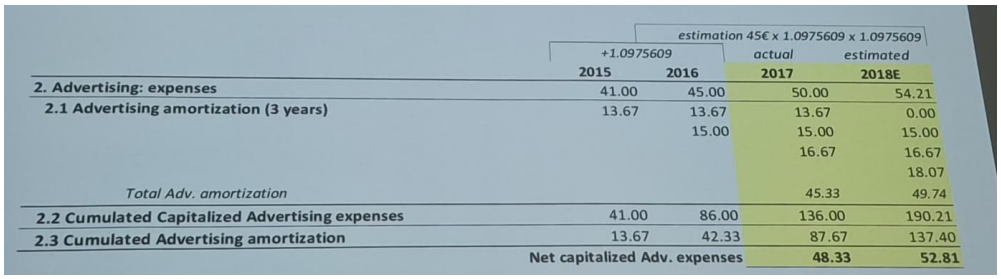
For 2017, these adjustments increased Vyaderm Dermatology's pre-tax operating profit from $43.5M to $71.9M, and net operating assets from $135M to $198M.

EVA Accounting Adjustments: R&D expenses -> we have to remember that Net capitalized R&D expenses = Cumulated R&D Expenses – Cumulated R&D amortization. In order to make our estimation for 2018 values, we cannot base our evaluation on the basis of 2017, because it has been an exceptionally good year -> we have to look at the growth rate that occurred from 2015 to 2016 (17%) and capitalize twice.



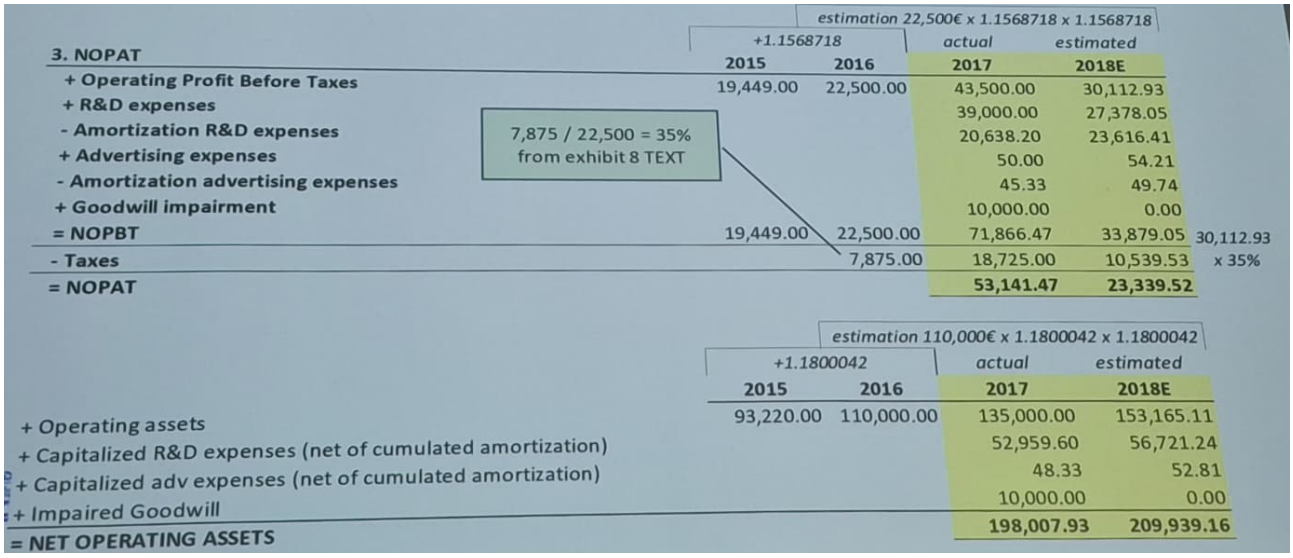
					estimation 20,000€ x 1.17 x 1.17	
			+1.17		actual	estimated
	2013	2014	2015	2016	2017	2018E
1. R&D: expenses	12,487.00	14,610.00	17,094.00	20,000.00	39,000.00	27,378.05
1.1 R&D amortization (5 years)	2,497.40	2,497.40	2,497.40	2,497.40	2,497.40	0.00
		2,922.00	2,922.00	2,922.00	2,922.00	2,922.00
			3,418.80	3,418.80	3,418.80	3,418.80
				4,000.00	4,000.00	4,000.00
					7,800.00	7,800.00
						5,475.61
Total R&D amortization					*20,638.20*	*23,616.41*
1.2 Cumulated Capitalized R&D expenses	12,487.00	27,097.00	44,191.00	64,191.00	103,191.00	130,569.05
1.3 Cumulated R&D amortization	2,497.40	7,916.80	16,755.00	29,593.20	50,231.40	73,847.81
				Net capitalized R&D expenses	52,959.60	56,721.24

EVA Accounting Adjustments: Advertising expenses -> the advantage in representation is that we have to amortize it over just 3 years instead of 5.



			estimation 45€ x 1.0975609 x 1.0975609	
	+1.0975609		actual	estimated
	2015	2016	2017	2018E
2. Advertising: expenses	41.00	45.00	50.00	54.21
2.1 Advertising amortization (3 years)	13.67	13.67	13.67	0.00
		15.00	15.00	15.00
			16.67	16.67
				18.07
Total Adv. amortization			45.33	49.74
2.2 Cumulated Capitalized Advertising expenses	41.00	86.00	136.00	190.21
2.3 Cumulated Advertising amortization	13.67	42.33	87.67	137.40
		Net capitalized Adv. expenses	48.33	52.81

NOPAT and Asset calculation



			estimation 22,500€ x 1.1568718 x 1.1568718		
3. NOPAT	+1.1568718		actual	estimated	
	2015	2016	2017	2018E	
+ Operating Profit Before Taxes	19,449.00	22,500.00	43,500.00	30,112.93	
+ R&D expenses			39,000.00	27,378.05	
- Amortization R&D expenses			20,638.20	23,616.41	
+ Advertising expenses			50.00	54.21	
- Amortization advertising expenses			45.33	49.74	
+ Goodwill impairment			10,000.00	0.00	
= NOPBT	19,449.00	22,500.00	71,866.47	33,879.05	30,112.93
- Taxes		7,875.00	18,725.00	10,539.53	x 35%
= NOPAT			53,141.47	23,339.52	

7,875 / 22,500 = 35% from exhibit 8 TEXT

		estimation 110,000€ x 1.1800042 x 1.1800042		
	+1.1800042		actual	estimated
	2015	2016	2017	2018E
+ Operating assets	93,220.00	110,000.00	135,000.00	153,165.11
+ Capitalized R&D expenses (net of cumulated amortization)			52,959.60	56,721.24
+ Capitalized adv expenses (net of cumulated amortization)			48.33	52.81
+ Impaired Goodwill			10,000.00	0.00
= NET OPERATING ASSETS			198,007.93	209,939.16

The core formula -> EVA (Economic Value Added) is a form of residual income, and applied to this case, we obtain (capital charge = 11%):

$$53{,}141.47 - (198{,}997.93 * 11\%) = 31{,}360.59$$

Bonus formula:

$$Calculated\ bonus = Target\ bonus * \left[1 + \frac{(actual\ improvement - target\ improvement)}{Interval}\right]$$

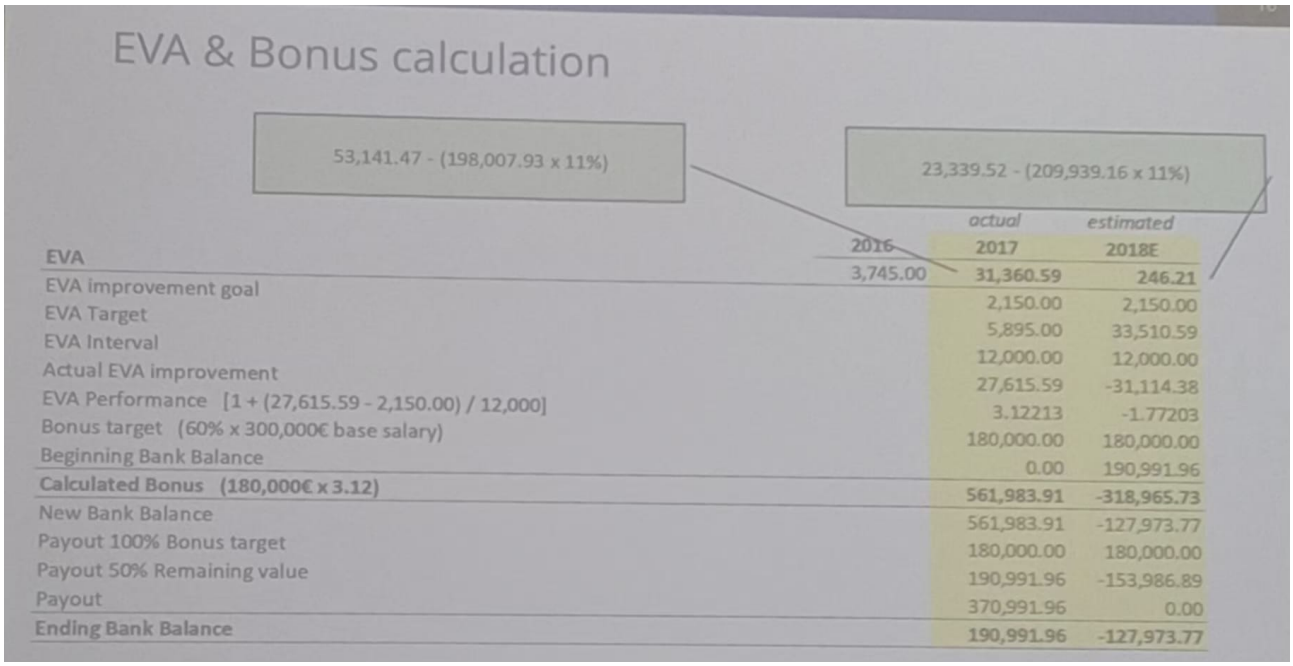
Bank balance formula

$$Bank\ Balance = Initial\ value + Calculated\ bonus$$

$$Payout = Target\ bonus + 50\%\ of\ remaining\ value\ (Bank\ balance\ - Target\ bonus)$$

$$Ending\ Bank\ Balance = Bank\ Balance - Payout$$

The bonus bank system carries forward surpluses and deficits across years to promote a long-term focus and discourage short-term gaming. Whenever we have an actual improvement, higher being the expected improvement, we have a sort of leverage because if these improvement between actual value and expected value, it is positive and higher than the minimum required improvement -> The effect of this formula is a leveraging effect, it's a multiplier.



	2016	actual 2017	estimated 2018E
EVA	3,745.00	31,360.59	246.21
EVA improvement goal		2,150.00	2,150.00
EVA Target		5,895.00	33,510.59
EVA Interval		12,000.00	12,000.00
Actual EVA improvement		27,615.59	-31,114.38
EVA Performance [1 + (27,615.59 - 2,150.00) / 12,000]		3.12213	-1.77203
Bonus target (60% x 300,000€ base salary)		180,000.00	180,000.00
Beginning Bank Balance		0.00	190,991.96
Calculated Bonus (180,000€ x 3.12)		561,983.91	-318,965.73
New Bank Balance		561,983.91	-127,973.77
Payout 100% Bonus target		180,000.00	180,000.00
Payout 50% Remaining value		190,991.96	-153,986.89
Payout		370,991.96	0.00
Ending Bank Balance		190,991.96	-127,973.77

So we consider the improvement in EVA compared to the expected improvement. So in this bracket, so basically we say, did they were able to improve EVA more than the minimum expectation, 2,150, for sure -> this was it. Now we have a sort of cutoff -> whenever we set bonuses, it is absolutely crucial to identify cutoff, both lower and upper limits in order to recognising bonuses. Why? Simply because we need a limit value -> above this limit, we do not recognise bonus. And a lower limit, below this minimum level, we do not recognise bonus. Why? Simply because lower cutoff is the limit saying, “if your performance is below, we do not recognise”, even if it's a positive performance, but this positive performance is too low. So it's also necessary to set this upper cutoff -> we don't want to promote, we don't want to really work lucky. If you are lucky, we don't want to give you a never-ending bonus simply because you are lucky

2. **Based on the analysis, what would you recommend to MR Maurice Védrine**

In 2017 they were particularly lucky because of the elusion of a competitor, So they sold huge volumes compared to normal situations. And we see in this benefit, obviously, we measure a very, very big bonus. But unfortunately, what's happened, supposing the year after goes back to a normal situation, probably we lose everything.

The dramatic swing from year 1 to year 2 illustrates the core dilemma: a windfall in 2017 leads to a wiped-out bank balance and a zero bonus in 2018, despite managers having no control over competitive shocks. In this situation, simply managers were lucky because they didn't provide a special job or special decision or special something to reach this kind of result. They simply were lucky. So via them, executive must decide how to handle the windfall EDA arising from the competitor exit, so the name of the competitor government.

Vyaderm’s managers must decide how to handle the windfall EVA arising from PJL Laboratories’ exit. The main broad positions could be:

Option	Argument in Favour	Key risk
Pay full 2017 bonus as calculated	Credibility of EVA system -> managers deserve a reward for seizing the opportunity	Destroy 2018 motivation. Risk of losing managers after the windfall payout -> it is a little bit perverse that I’ll not receive the

		entire bonus we have generated in 2017
Carve out the windfall from EVA results	Preserves the long-term incentive alignment. Reduce extreme swings	Undermines objectivity -> open doors to subjective interference
Revert to mixed bonus (EVA + subject evaluation)	Balance rigour with managerial judgement	Contradicts the original rationale for adopting EVA

Vyaderm untimely chosen to widen the EVA interval for 2017, reducing (but not eliminating) the windfall payout and provide more downside protection in the subsequent years.

Key takeaways:

- EVA is a powerful tool for linking internal profit to external capital market expectation, but its mechanical application can produce perverse incentive effects when competitive condition change unexpectedly
- Even an "objective" system like EVA requires subjective judgement about the EVA improvement goal, the interval and which accounting judgements to apply
- The bonus bank is designed in order to foster long-term orientation, but extreme year-to-year swings can undermine retention and motivation
- Span of accountability should be deliberately wider than span of control to encourage entrepreneurial behaviour – but the gap must remain manageable
- EVA fails to capture competitive strategy dynamics. It should be used alongside a broader performance measurement framework, not a standalone measure
- Senior management must distinguish between using EVA to evaluate a business and using it to evaluate an individual manager's performance

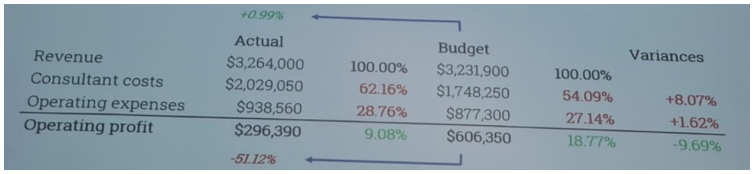
Software associates

We are going to conduct a variance analysis in an unusual situation. Usually, we apply a variance analysis for manufacturing company, but in this case, we are going to work on a consulting company. Software Associate is a mid-sized IT consulting firm founded by Richard Norton with annual revenues exceeding $12 million and typical profit margin of 15-20%. The firm offers two lines of service:

- Solutions business -> they provide consultancy services about the infrastructures, such as IT strategy, architecture, data warehousing
- Contact business -> placing experiences engineering in order to resolve specific issues.

Usually, Corporate business has a higher marginality and higher price, while Solution business are flatter in terms of results. At the end of Q2 2000, CEO Richard Norton noticed something puzzling in the quarterly P&L: revenues exceeded budget, yet operating profit came in at less than half what was planned ($296K actual vs. $606K budgeted, a profit margin of 9.1% vs. a budgeted 18.8%). He calls CFO Susan Jenkins for an explanation.

While revenue was slightly above budget (+1%, from expected $3,231,900 to actual $3,264,000), both consultant costs (+8.07% actual vs. budget) and operating expenses (+1.62% actual vs. budget) significantly overran, driving the profit collapse.



Underling drivers -> Jenkins's overnight analysis points to several computing issues:

- More consultants than budgeted -> 113 FTE (full-time equivalent, which represents a single consultant) actual vs. 105 budgeted (+7.6%), pushing salary costs up sharply
- Lower billing rate -> the average hourly billing rate fell to $83.69 vs. a budgeted $90.00 (it is like they have reduced the price), meaning each hour billed generated less revenue
- Lower productivity -> Despite more consultants, the billing percentage (hours billed/hours available) declined, suggesting consultants were less productively deployed. In terms of number of consultants times the working hour per day, the hours available represent the capacity in a consulting (as well in every service) company -> we change the rate between the sold hours over the available hours, and we have a problem in terms of selling capacity
- Operating expense overrun -> Several cost categories exceeded budget, particularly administrative/support staff and professional staff (people working in the head office supporting the overall company but they are not sold as consultant).
- Business mix shift -> Exhibit 4 reveals that the extra headcount came almost entirely from the Contract business (64 actual vs. 56 budgeted) which bills at much lower rate per hour (about $56/h) than the Solutions business (about $128/h). The Solutions business was flat versus budgeted. This mix shift towards lower-margin work is a major hidden driver of revenue and margin shortfall.

Exhibit 4 Line of Business Budget and Actual Operating Statistics: Q2 2000

	Contract	Solutions	Total
Actual			
Number of consultants (FTE)	64	49	113
Billed hours	24,000	15,000	39,000
Billed revenues	$1,344,000	$1,920,000	$3,264,000
Hours supplied	28,800	22,050	50,850
Consultant costs	$1,036,800	$992,250	$2,029,050
Budget			
Number of consultants (FTE)	56	49	105
Billed hours	20,160	15,750	35,910
Billed revenues	$1,088,640	$2,143,260	$3,231,900
Hours supplied	25,200	22,050	47,250
Consultant costs	$756,000	$992,250	$1,748,250

The social business was flat versus budget = the same volumes while the contract business increased. This makes shift towards lower margin work with major hidden reasons of the revenue and margin shortfalls.

The case illustrates that a top-line variance analysis ("revenues are up, so why profits are down?") is insufficient. The real story requires drilling into price, volume, mix and productivity effects simultaneously. The profit shortfall was not caused by any single factor, but by the combination of lower billing rates, a shift towards lower-margin contract work, reduced consultants productivity and a cost overrun -> none of which is visible by the P&L alone. The case is organized as a series of analytical exercises, each peeling back a new layer:

- Basic variance analysis from the top-level P&L (Exhibit 1) -> Exhibit 1 is insufficient, because we see exactly what we explain
- Detailed variance analysis separating consultant costs from operating expenses (Exhibit 2)
- Spending vs. volume variance on operating expenses, used fixed/variable breakdowns (Exhibit 3)
- Revenue decomposition separating the volume effect (more consultants) from the productivity effect (billing percentage)

- Line-of-business analysis comparing Contract vs. Solutions performance (Exhibit 4)

Exhibit 1 Software Associates Income Statement, Q2, 2000

	Actual	Budget
Revenues	$3,264,000	$3,231,900
Expenses	2,967,610	2,625,550
Operating profit	$296,390	$606,350
Profit percentage	9.1%	18.8%

Exhibit 2 Budget and Actual Income Statement: Quarter 2 2000

	Actual	Budget
Revenues	$3,264,000	$3,231,900
Less:		
Consultants' salaries and fringes	$2,029,050	$1,748,250
Operating expenses	938,560	877,300
Total expenses	$2,967,610	$2,625,550
Operating profit	$ 296,390	$ 606,350
Profit %	9.1%	18.8%
Operating Statistics		
Number of consultants (FTE)	113	105
Hours supplied	50,850	47,250
Hours billed	39,000	35,910
Average billing rate	$83.69	$90.00

Exhibit 3 Expense Items: Budget Q2 2000

	Actual	Budget	% Variable
Advertising and promotion	$22,100	$15,100	0%
Administrative and support staff	225,000	191,250	80
Information systems	126,200	120,000	80
Depreciation	23,400	22,700	0
Dues and subscriptions	11,800	13,100	80
Education and training	36,200	38,900	80
Equipment leases	23,500	22,440	25
Insurance	33,600	32,200	0
Professional services	39,500	34,700	0
Office expense	42,100	36,550	100
Office supplies	86,200	89,600	80
Postage	27,300	24,700	80
Rent - real estate	117,260	117,260	0
Telephone	40,000	38,500	100
Travel and entertainment	57,800	56,300	100
Utilities	26,600	24,000	25
Total	$938,560	$877,300	

REVENUES (effectiveness) 32,100 F

REVENUES QUANTITY VARIANCE : (AQ - EQ) × EP : (Actual Quantity - Expected Quantity) × Expected Price (we are talking about consultancy hours sold (because we are talking about revenues)

: (39,000 - 35,910) × 90 : 278,100 F

BILLING % VARIANCE : Actual Consultants Hours Supplied × (Actual Billing % - Expected Billing %) × Expected Billing Rate (change in percentage of hours sold)

= 50,850 × ($\frac{39,000}{50,850} - \frac{35,910}{47,250}$) × 90

= 50,850 × (76.7% - 76%) × 90 : 31,860 F (we are substantially in line)

CONSULTANT QUANTITY VARIANCE : (Actual Consultants Hours Supplied - Expected Consultants Hours Supplied) × Expected Billing % × Expected Billing Rate : (50,850 - 47,250) × 76% × 90 : 246,240 F

↳ adding more consultants increases the working hours, keeping the same billing percentage

REVENUE RATE Δ : (AP - EP) × AQ : (Actual Price - Expected Price) × Actual Quantity

: (83.64 - 90) × 39,000 : 246,000 U → if we add this variance to the previous one, we obtain the overall variance of 32,100 that regards revenues

BILLING RATE VARIANCE : (Actual Billing Rate - Expected Billing Rate) × Actual Billing Hours

CONTRACT ($\frac{1,344,000}{24,000} - \frac{1,088,640}{20,160}$) × 24,000 : (56 - 54) × 24,000 : 48,000 F

SOLUTIONS ($\frac{1,920,000}{15,000} - \frac{2,143,260}{15,750}$) × 15,000 : (128 - 136.08) × 15,000 : 121,200 U

48,000 F + 121,200 U = 73,200 U

=> Contracts services have been more effective compared to Solutions services in terms of billing rate

CONSULTANT RATE MIX VARIANCE : (Actual Billed Hours - Expected Billed Hours) × (Expected Billing Rate - Total Average Billing Rate)

CONTRACT = (24,000 - 20,160) × (56 - 90) = 3,840 × (54 - 90) = 138,240 U

SOLUTION : (15,000 - 15,750) × (136.08 - 90) = 34,560 U

138,240 U + 34,560 U : 172,800 U

COST (EFFICIENCY) 342,060 U VARIABLE COSTS: Stationery, Telephone, Fuel

CONSULTANTS EXPENSE QUANTITY Δ : (AQ - EQ) × EP : (Actual Quantity - Expected Quantity) × Expected Price

: (50.850 - 47.250) × $\frac{1,748,250}{47,250}$: (50.850 - 47.250) × 37 = 133,200 U

↳ increasing our capacity because of new consultants generates these additional costs

CONSULTANTS EXPENSE RATE Δ : (AP - EP) × AQ : (Actual Price - Expected Price) × Actual Quantity

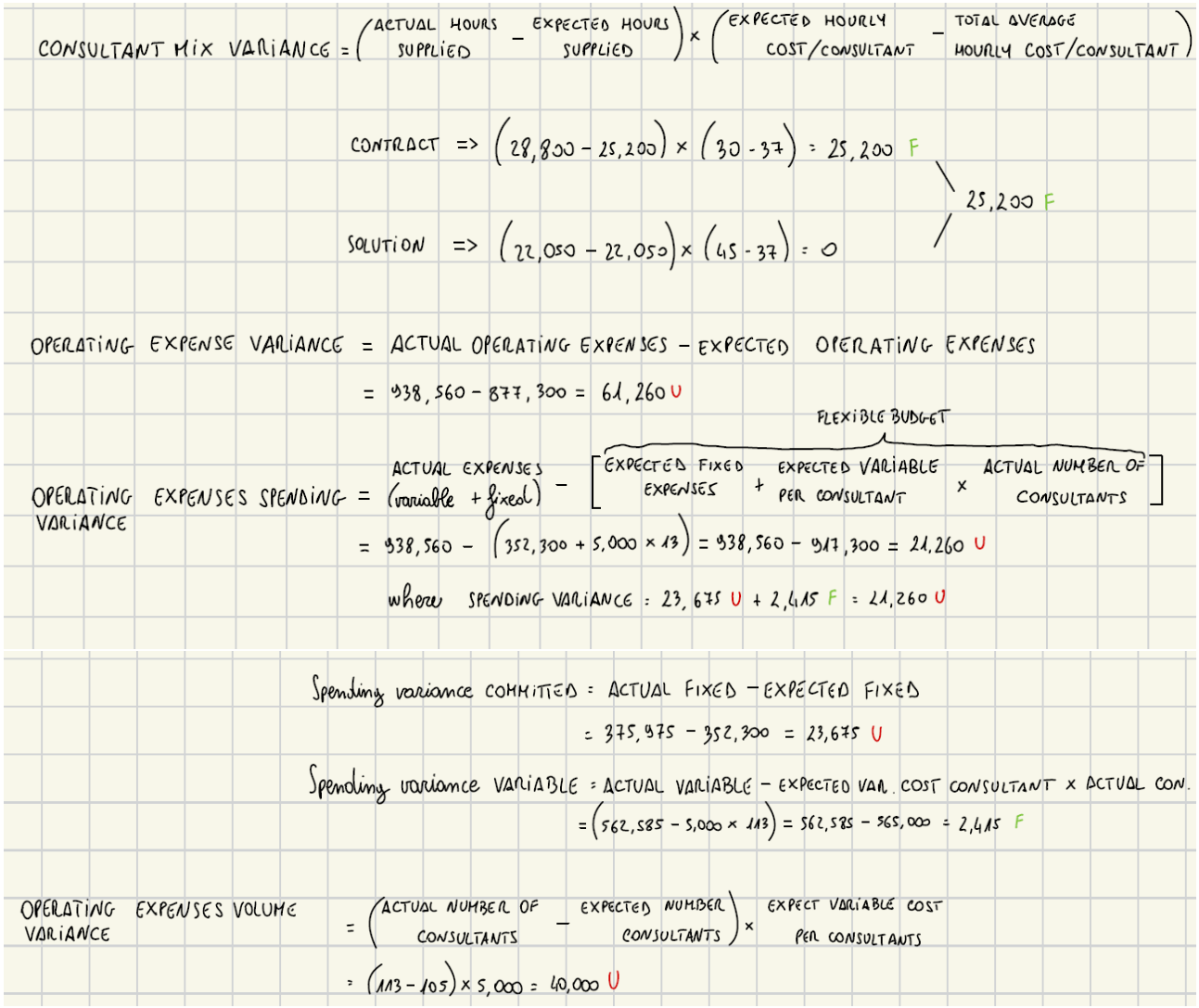
: ($\frac{2,029,050}{50,850} - \frac{1,748,250}{47,250}$) × 47,250 : (39.90 - 37) × 50,850 : 147,600 U → we spent more to get each additional consulting hour

CONSULTANT COST PRICE VARIANCE : (ACTUAL HOURLY COST/CONSULTANT - EXPECTED HOURLY COST/CONSULTANT) × ACTUAL HOURS SUPPLIED

we suppose that for Contracts serv. we are using junior consultants, while for Solutions serv. we use seniors

CONTRACT => ($\frac{1,036,800}{28,800} - \frac{756,000}{25,200}$) × 28,800 : (36 - 30) × 28,800 : 172,800 U

SOLUTION => ($\frac{992,500}{22,050} - \frac{992,500}{22,050}$) × 22,050 : (0 - 0) × 22,050 : 0



Alphatech

Why is profitability low? 4 intuitive cases -> they are managing revenues, not profitability:

- Costs are allocated incorrectly -> some overheads rates (25.1% of revenues) for all products, but ignores real complexity differences
- Engineering work is not charged (P3): €4.5m of engineering costs are hidden in the overhead costs -> customers get this value for free
- Capacity is used inefficiently -> P1 margin: 42%, P2 margin: 18%, but capacity is not prioritized towards P1
- Poor visibility over profitability -> no clear view by product, customer or project

Profitability does not improve by selling more. It improves by pricing correctly, controlling costs, allocating resources efficiently. How do we close the about 3m gap?

Reduction of procurement costs (of ~€1.5m).	Start charging for engineering (~€0.75m)	Use capacity better (~€0.67m)	Reduce non-essential costs (~€0.26m)
PROBLEM: too many suppliers, weak negotiation. **ACTION**: consolidate suppliers; renegotiate contracts. **ASSUMPTIONS**: • Materials ≈ **72%** of COGS (€40.4m) • Addressable: only **37.5%** (€15m) • Savings: **10%**	**PROBLEM:** engineering work is tracked but **not billed**. **ACTION:** add ~5% price uplift on **weaker** P3 projects €15m → strong client = €7m (already profitable)	**PROBLEM:** use your machines for what makes the most money. **ACTION:** • Shift **10% of capacity from P2 to P1** • P1 is much more profitable **ASSUMPTIONS:** • Shift: **€2.8m** (10% of P2 revenues) • **Margin gain:** 42% - 18% = 24%. **Net gain: (1.176 – 0.504)**	**PROBLEM:** some overhead is discretionary. **ACTION:** cut ~10% of discretionary overhead. **ASSUMPTIONS:** 12.5% is reducible (discretionary) 10% reduction

What to do first (Quick wins)? “First understand where you lose money, then act quickly”. In the first 3 months:

- Build basic profitability analysis
- Start supplier negotiation immediately
- Stop underpriced P3 immediately
- Begin capacity shift (P2 -> P1)

What ensures long-term success?

- Continuously optimise suppliers
- Manage production based on margin
- Price P3 projects correctly (including engineering)
- Track profitability monthly

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TEGAMINO'S

LA PIADINERIA

LA PIADINERIA dal 1994