

# Understanding and managing the cost structure in the value chain

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# Cost House / Valoptia

## Consulting, Benchmarking and Training



Cost Engineering



Competitiveness Improvement



Strategic Simulation



Benchmarking

- Information Systems (CIGREF Model)
- Support Functions (DFCG Model)

## Software Solutions



Calculate full cost of products and services



Estimate cost with simple formulas



Manage business operations, from time recording to billing



Manage improvement programs



Manage project costs



Quote mechanical parts from CAD files



## Key data

300

Client References

6,5 M€

Group Turnover  
2020 Actuals

37

FTEs

1.000+

Consulting Missions  
Since founding in 2004

10%

Yearly growth

4

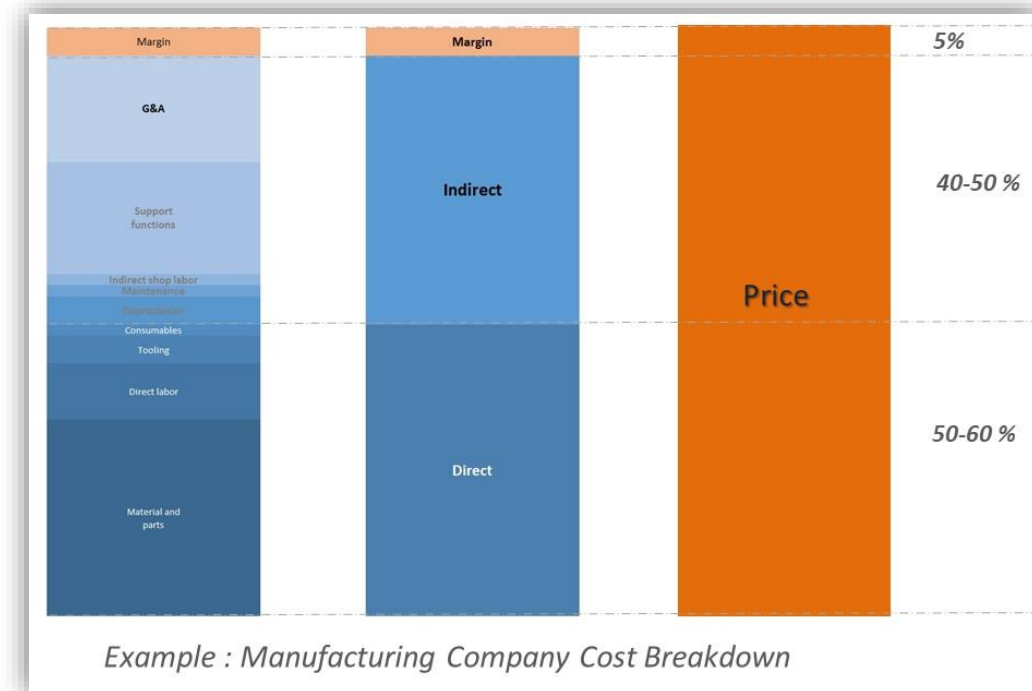
Countries  
France (Paris, Lyon, Nantes, Metz)  
Brazil - Morocco - Switzerland

# Agenda

- Introduction
- Understanding cost structures
  - Cost multiplicity
  - Cost breakdown standard
  - Cost simulation
- Importance of sharing cost breakdowns between actors

# Introduction

- Space industry is undergoing a major change with the rise of private funding. This evolution puts the European space industry's various stakeholders and their financing under pressure, and raises multiple questions, such as:
  - How to cope with competition from innovative startups and among European partners?
  - What is the impact of decreasing funding from Defense programs?
  - Is the Geographical distribution model still compatible with industrial efficiency and excellence?
  - Should scalability and recycling dictate future designs?
  
- Understanding the cost structure of the complete service provided to final users, understanding and managing indirect and fixed costs along this value chain is key to securing the future



# Understanding cost structures

## *Introduction*

- The word “cost” hosts a complex variety of natures and behaviors. Taking the journey of costing and cost optimization without understanding and documenting this variety is like taking the road at night with no lights and no signs.
- Unfortunately, there is no such thing as a unique cost. Cost is a photograph of a situation at a given time
  - It varies with time
  - It is distorted by distance, location and models
- Various types and categories of costs can be considered:
  - Direct vs indirect : costing models or standard should apply to different layers of activities and cost in an organization: direct manufacturing, indirect manufacturing, upstream support (R&D, design, process design, supply chain, purchasing and procurement, ...), downstream support (marketing, sales, transportation, ...), organization support (executives, HR, finance, legal, ...)
  - Recurring Cost vs Non Recurring Costs
  - Fixed, variable, semi-variable
  - ...
- Those types and categories can not be defined in an absolute manner, they depend on each organization and on their ability to track the actual use of their resources.

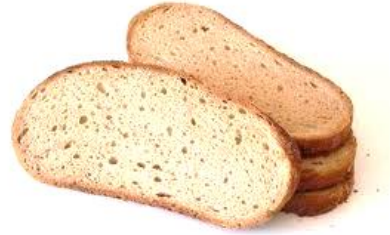
# Understanding cost structures

## Direct vs indirect

- Most standard models rely on direct cost or sales to allocate indirect costs => high runners take the biggest share of indirect costs

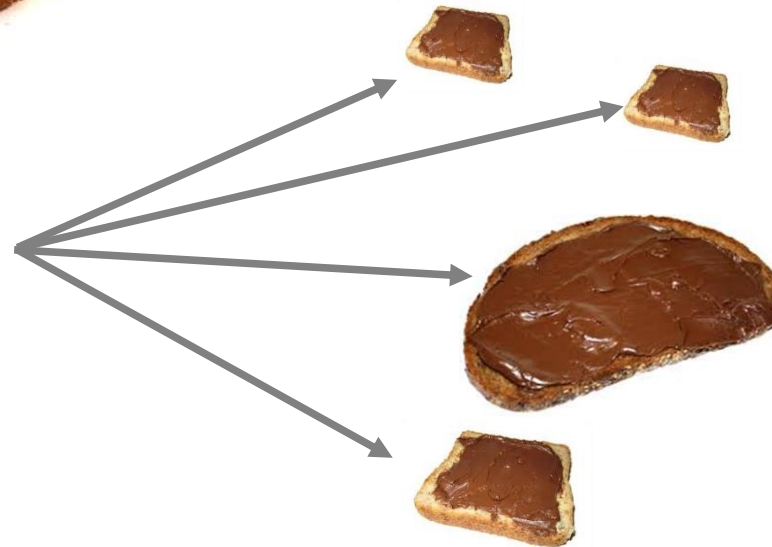
### Direct Costs

all costs (internal and external) which can be easily associated with one particular product or service.  
(e.g. material, assembly, machine time, project time, ...)



### Indirect Costs

can not be pinned down to one product or service  
(e.g. management, building maintenance, brand marketing, ...)



### Full Costs

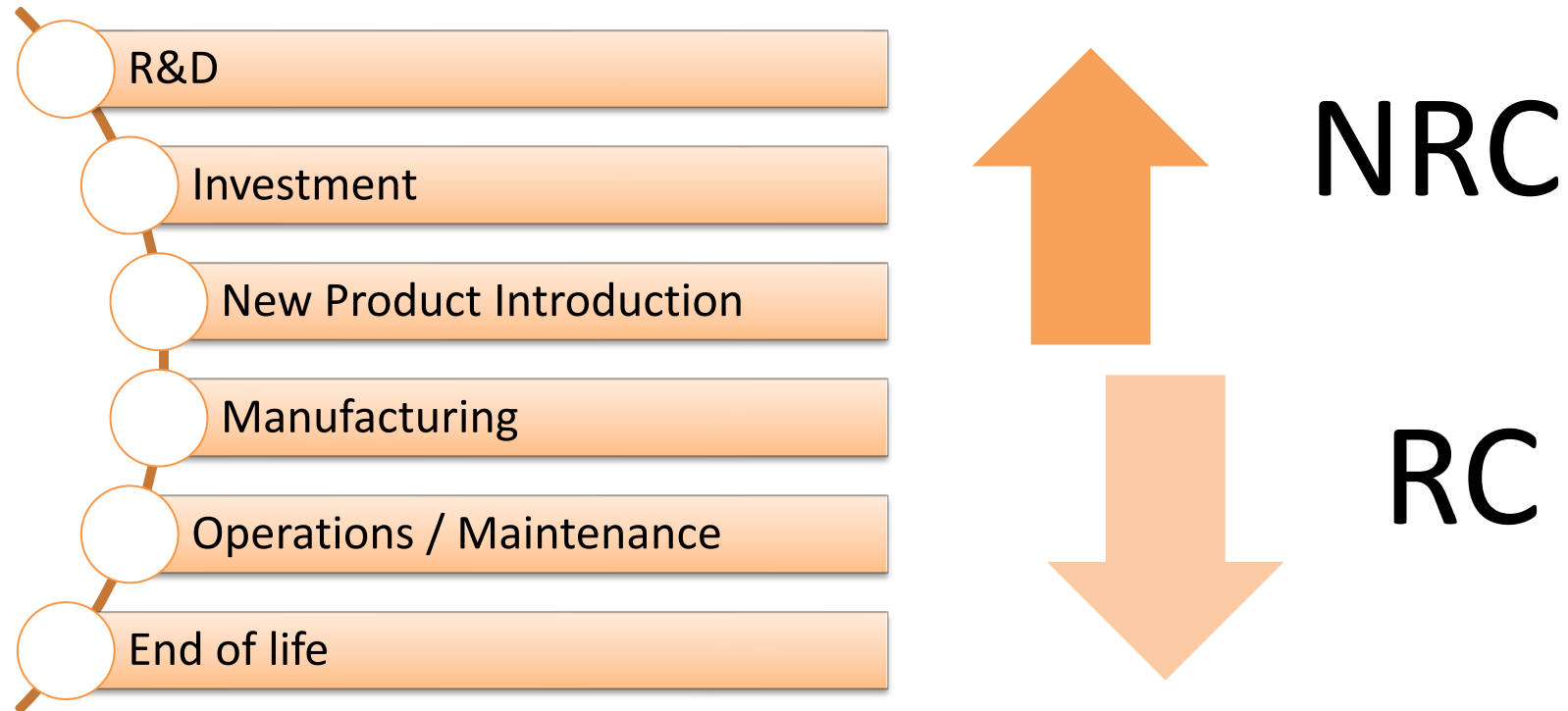
The bigger the toast, the more Nutella !

➔ Though simple, quick and easy, this approach does not reflect what actually happens on the field

# Understanding cost structures

*Recurring vs non recurring, lifecycle cost*

- Non recurring costs include all resources which are necessary to deliver a new product on the market.
- Recurring costs cover all resources which are necessary to manufacture, operate and dispose of the products based on this initial new product.

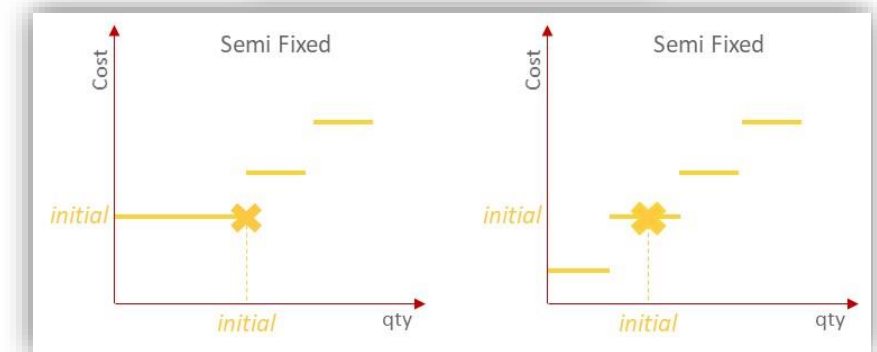
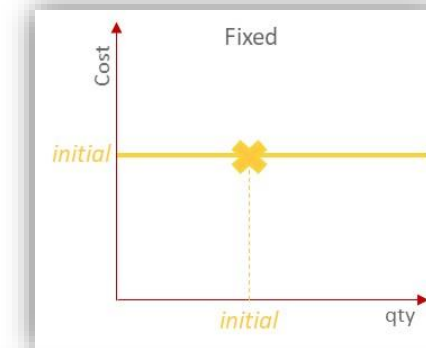
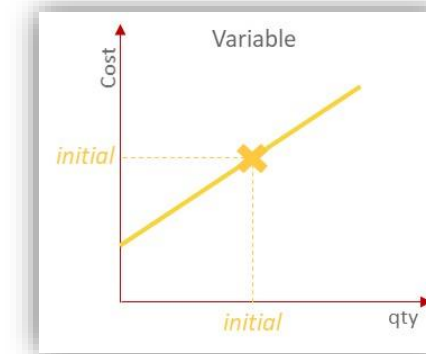


➔ Understanding NRC/RC split and the impact of NRC on RC is key to defining competitive programs

# Understanding cost structures

*Fixed, semi-variable, variable*

- Costs are qualified as “variable” if they change with the number of products manufactured
  - Material, parts and components,
  - Contracted labor,
  - ...
- On the contrary, fixed costs stay constant whatever the number of products manufactured
  - Buildings,
  - Machine depreciation,
  - ...
- Semi-fixed (or semi-variable) costs can fluctuate with the number of products manufactured, in steps
  - Management,
  - Transportation,
  - Machine depreciation (!)
  - ...



➔ **Fixed/variable costs qualification depends on each organization and play a major role in defining profitability and margin levels, breakeven points**



# Understanding cost structures

## *The limitations of standard hourly rates*

- With such a variety of cost natures and behaviors, a unique model based on standard hourly rates and simplistic allocation of indirect costs is hazardous :

- Scope of analysis

standard hourly rates usually blend various cost natures (fixed/variable, shared/specific, accessible/non accessible) with different behaviors into a single, monolithic cost object

- Load and capacity

by definition and construction, standard hourly rates are calculated for a given level of activity, which does not allow to see the impact of over or under utilization of resources and may lead to damaging decisions

- Batch size and setup times

setup and production don't necessarily use the same resources. Using the same standard hourly rate for both can be misleading when defining batch sizes

- Organization

2<sup>nd</sup> and 3<sup>rd</sup> shift salaries are higher but amortization cost does not depend on time of day.

- Consumables

various manufacturing processes can use various levels of consumables (energy, spare parts, ...). Standard, global hourly rates usually don't reflect those differences

- ➔ **It is now necessary to implement cost models at a more detailed level to take into account different behaviors and drivers**

# Understanding cost structures

The limitations of standard hourly rates – quick example

- Simplified workshop's cost structure

c fixed costs  
f(x) variable costs

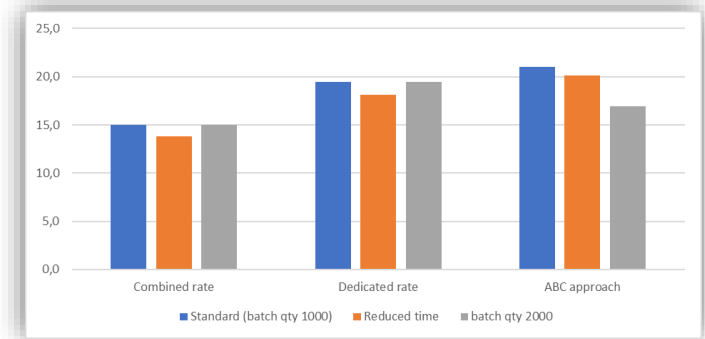
|  | Store                | Feed line         | Cut         | Paint         | Assemble    | Store             |
|--|----------------------|-------------------|-------------|---------------|-------------|-------------------|
| c Tools depreciation, maintenance, buildings | 945 k€               | 80 k€             | 1 210 k€    | 410 k€        | 210 k€      | 30 k€             |
| f(x) Consumables                             | 10 k€                | 25 k€             | 150 k€      | 100 k€        | 30 k€       | 10 k€             |
| c Indirect labor (quality, supervisors, ...) | 75 k€                | 70 k€             | 185 k€      | 65 k€         | 160 k€      | 25 k€             |
| f(x) Direct labor                            | 430 k€               | 325 k€            | 650 k€      | 275 k€        | 825 k€      | 175 k€            |
| cost driver and allocation unit              | m <sup>2</sup>       | nb of work orders | Labor hours | Machine hours | Labor hours | nb of work orders |
| Global hourly rate                           |                      |                   | 90 €/h      | 90 €/h        | 90 €/h      |                   |
| Dedicated hourly rate                        |                      |                   | 123 €/h     | 184 €/h       | 49 €/h      |                   |
| cost by activity                             | 124 €/m <sup>2</sup> | 9 €/work order    | 81 €/h      | 121 €/h       | 32 €/h      | 18 €/work order   |

- Current cost with 3 different models (batch of 1000)

- Global standard hourly rates: 15 €
- Line standard hourly rates: 19,5 €
- Activity model: 21 €

- 2 improvement scenarios

- Cutting and assembly times reduced by 10%. Estimated savings based on cost models :
  - global rates: -1,2 €
  - Dedicated rate: -1,3 €
  - Activity model: -0,9 €
- Double quantity, double lot sizes. Estimated savings based on cost models :
  - Combined rate: 0 €
  - Dedicated rate: 0 €
  - Activity model: -4,1 €

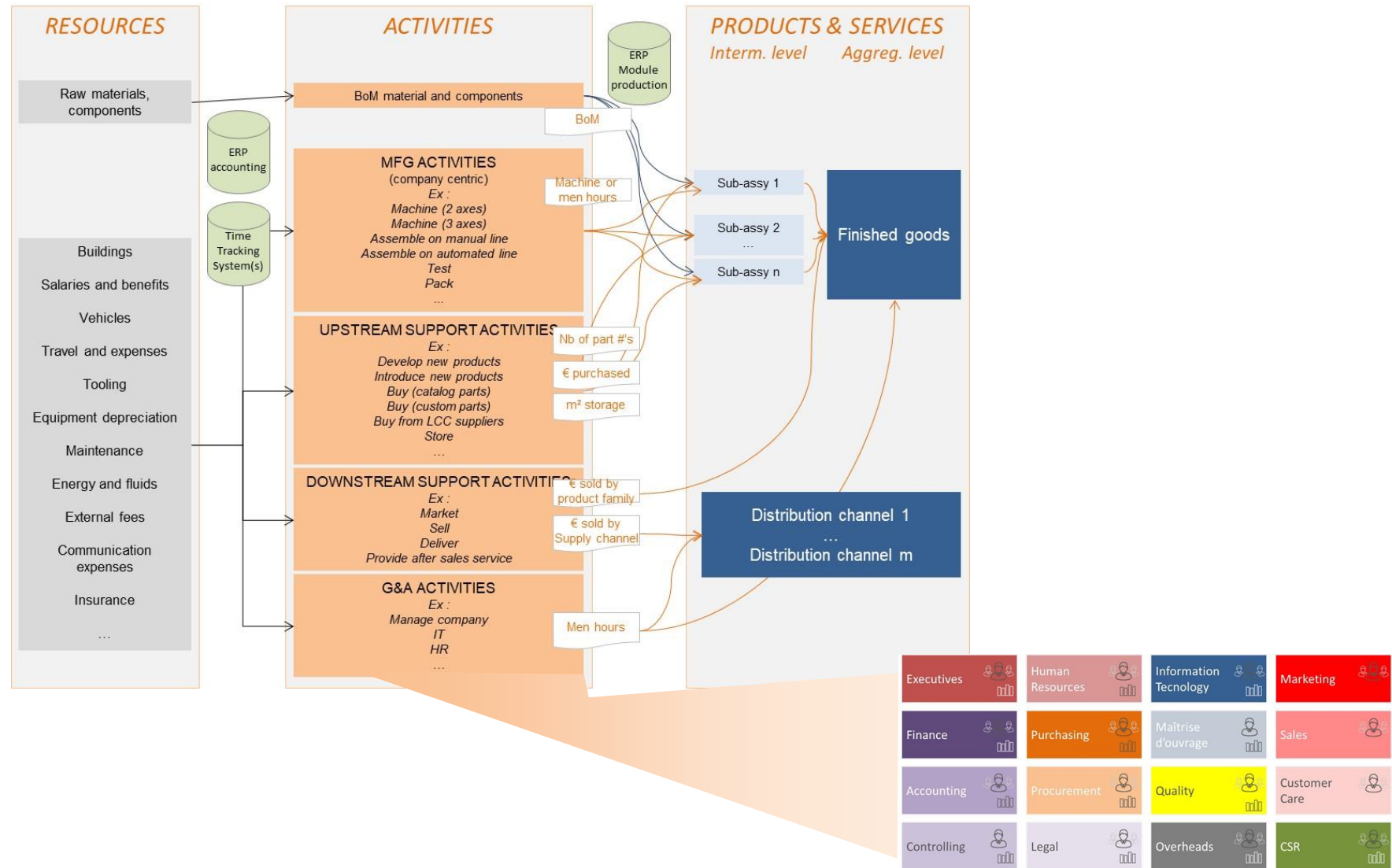


## ➔ Basic labor rate models

- Over-estimate savings related to manufacturing time savings
- Do not easily differentiate fixed and variable costs to account for batch size variations

# Understanding cost structures

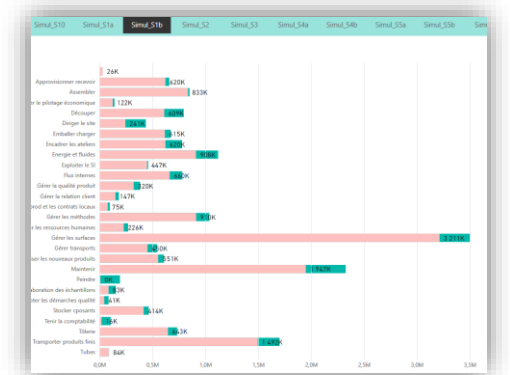
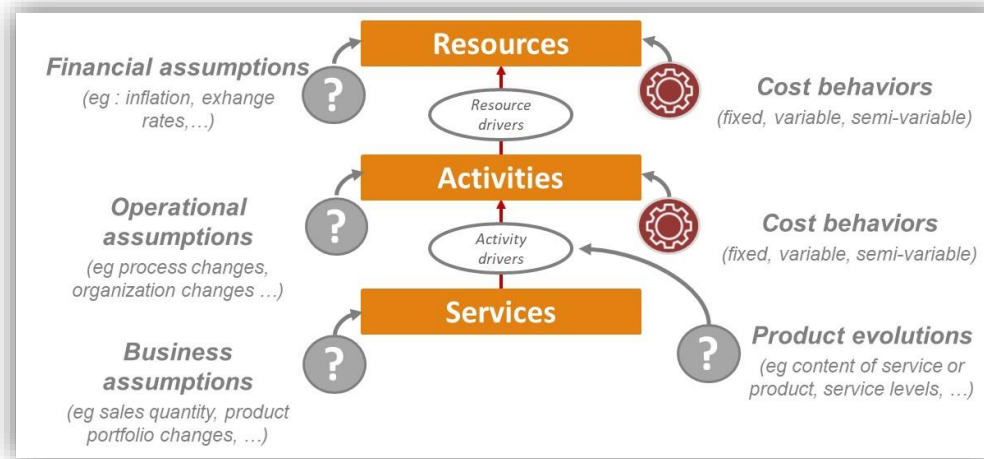
Proposed Cost Breakdown standard to share within an industry



# Understanding cost structures

## Cost simulation

- Strategic decisions (make or buy, technological roadmap, supply chain, re-use/recycling, ...) and market uncertainties (volumes, operational life cycle, ...) have a major impact on final cost of service. Unfortunately, such impacts are difficult to assess intuitively or even with a few formulas on an excel sheet, due to the non linear behavior of costs and cumulative effects of assumptions on cost drivers.
- This led us to develop software solutions to take into account various cost behaviors and business assumptions
- These solutions allow to calculate changes in cost structures and full cost of product for various scenarios.



Animated demo

➔ A solid approach to budgeting and strategic decision making, based on a realistic cost model

# Sharing cost for common good

*The benefits of using a unified cost model and sharing cost breakdowns*

- Commercial and industrial organizations tend to think that cost secrecy is key to securing their profit margin and their financial survival.
  - As counter-intuitive as it may sound, ignorance of partners' actual cost drivers makes it much more difficult and hazardous to define the right value proposal and make the right decisions.
  - In a mature and competitive market where cost for end users prevails, keeping cost structures and cost drivers secret will eventually foster blind price negotiations (which jeopardize profitability of all stakeholders) and increase defiance between partners.
- 
- ➔ **Foster collaboration and find effective solutions to final users' needs by**
    - **Using industry standards (as shown earlier) to share cost structures,**
    - **Explaining cost drivers in good faith (with the right contract clauses)**

# Sharing cost for common good

*Low-cost country sourcing vs design for partner's capabilities in the electrical retail industry*

## ■ Starting point

- Manufacturing was outsourced in China for cost reasons
- Will to relocate in western Europe for shorter turnaround and better control
  - des contraintes techniques et réglementaires fortes
  - des petites séries à l'affaire

## ■ Improvement Actions

- Calculation of actual TCO (up to storage in local warehouse, including NRC for NPI) for current solution
- Letter of intent followed by contract with local supplier to collaborate on design and cost
- Local supplier shared complete cost structure
- Design changes made, based on local supplier's strengths (and weaknesses)
  - Fewer, more complex plastic parts to reduce number of assembly operations and seals
  - Size and shape adapted to fit local supplier's semi automated assembly line
- Batch sizes, test reports and project review procedures modified to reduce NRC and follow-up costs



## ■ Results

- **Production relocated to local supplier with much greater delivery times and flexibility**
- **Total cost increase limited to +3%**

# Sharing cost for common good

*Mass distribution and profit sharing between suppliers*

## Starting point

- Airline seats must include more and more functions while reducing cost and mass
- Some integrated accessories (such as video) are provided by external suppliers
- Difficulty to find cost effective complete solutions

## Improvement actions

- Partnership between seat, actuators and display manufacturers
- Cost structure shared between partners in order to maintain everyone's margin contributions
- All other costs were broken down and associated cost drivers explained, with particular emphasis on mass/cost ratios
- Mass/cost model shared between partners to exchange € and kg saved
  - Partner A can offer x kg to partners B or C in exchange for y €



## Results

- Technical feasibility achieved
- Cost on target for complete solution, -2% on mass

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