Design and engineering of product-service solutions

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DIGITAL DESIGN SKILLS FOR FACTORIES OF THE FUTURE

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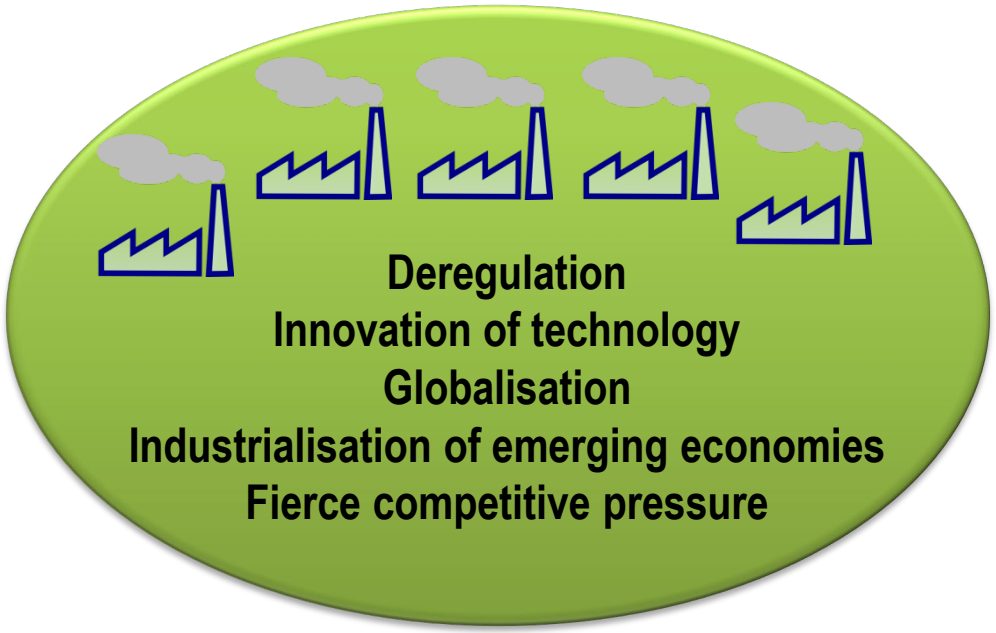
The University of Bergamo offers a wide variety of degree programs ranging from Engineering, Economics, Letters Philosophy, Communication and Law. The number of enrolled students is now over 20,000.

The strong connection with the territory through the creation of synergies with local institutions is a distinguishing feature of the university.

Agenda

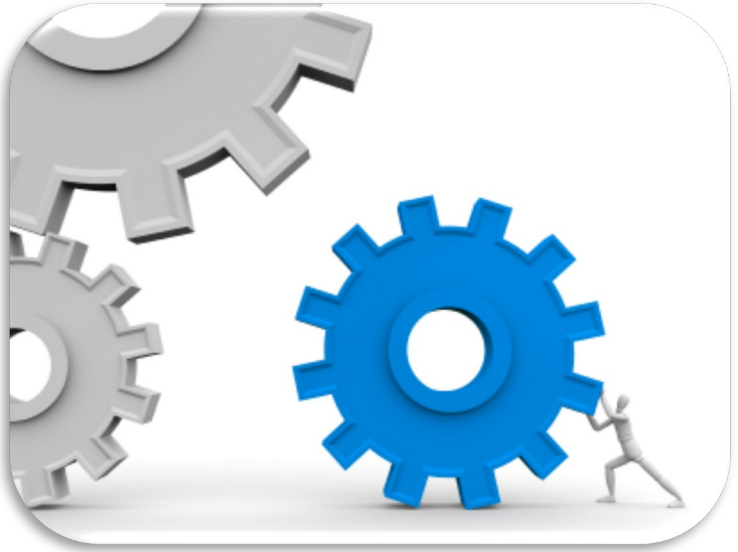
- The concept of servitization
- Methods and tools to design and engineer product-service solutions
- Use case with the SEEM tool

The new manufacturing context



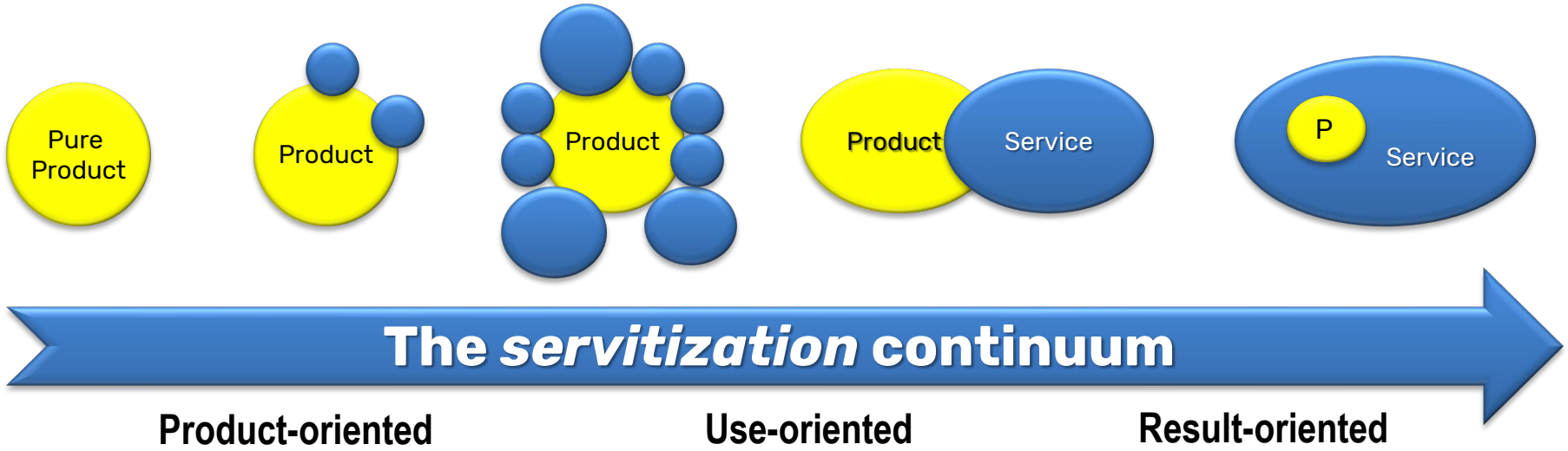
…they have to move beyond manufacturing and offer services and solutions, delivered through their products.

To survive manufacturing firms can rarely remain as pure manufacturing firms …



The servitization phenomenon

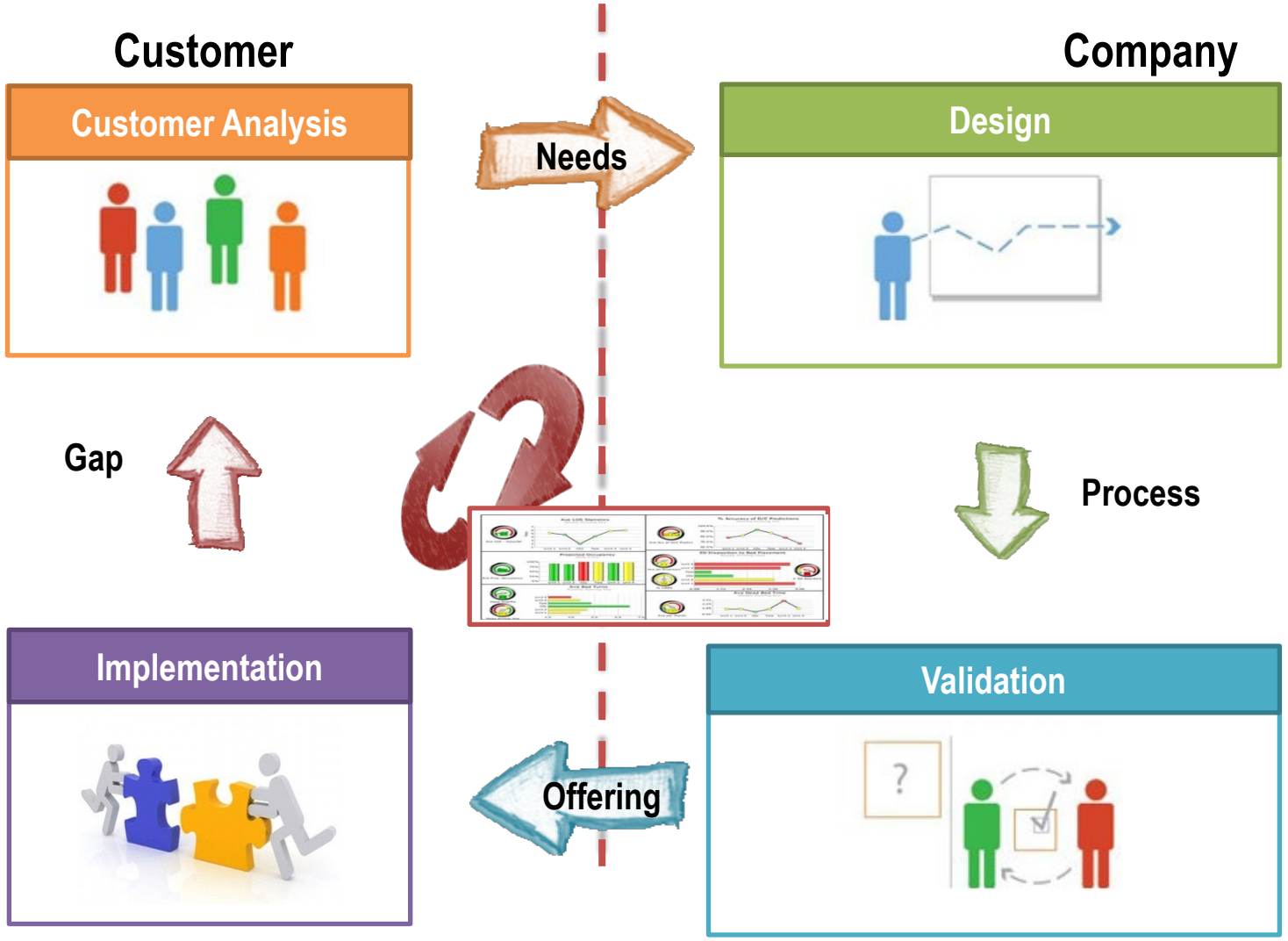
Servitization is the evolutionary phenomenon of the **business model** of a **manufacturing company**, moving from a product-centric perspective towards **Product-Service Systems** (PSSs), based on the provision of integrated bundles consisting of both physical goods and services.



Vandermerwe, S. and Rada, J. (1988). Servitization of business: Adding value by adding services. *European Management Journal*, 6 (4), 314-324.

SErvice Engineering Methodology (SEEM)

Engineering and Re-engineering a Service



Engineering and Re-engineering a Service

SEEM TOOL

Use case description

The company is a producer of automation systems for residential use, namely automation systems, and the related accessories (e.g. remote controls, photocells, flagship light), for gates and garages.

Historically, the company has al-ways been strongly product-oriented and its service offering is limited to support installers and final users through an external call center. Given the possibilities offered by technological advancement and the global trend toward servitisation, the company is willing to move towards PSS provision to increase its revenue and customer loyalty

Customer analysis

The main channel that can be identified:

- **Wholesalers of electrical equipment**: this is the most important channel in terms of sales volumes since it accounts for about 60% of the company's turnover. The company sells its products to wholesalers, who, in turn, sell to "small" installers who sell and install the product to the final users. The installers in this channel are mainly generic electricians who carry out about 5-6 interventions of this type per year.

Customer: the installer, namely the generic electricians who sells and installs the product into the customer house.

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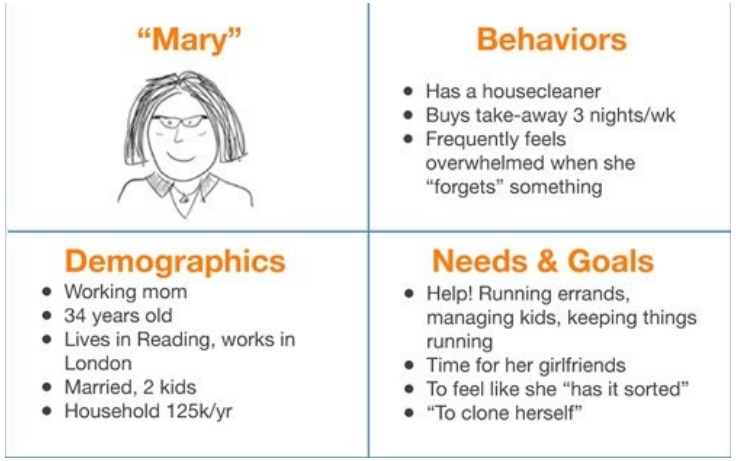
Persona Model



- Based on the general philosophy toward design that bring the users into the design process
- Powerful design tool for representing and communicating customer needs and values, introduced by Alan Cooper (1999)
- Central to Persona Model are Personas:
  - Fictional people describing the prototypical users of a product or service in terms of demographics and main values or needs

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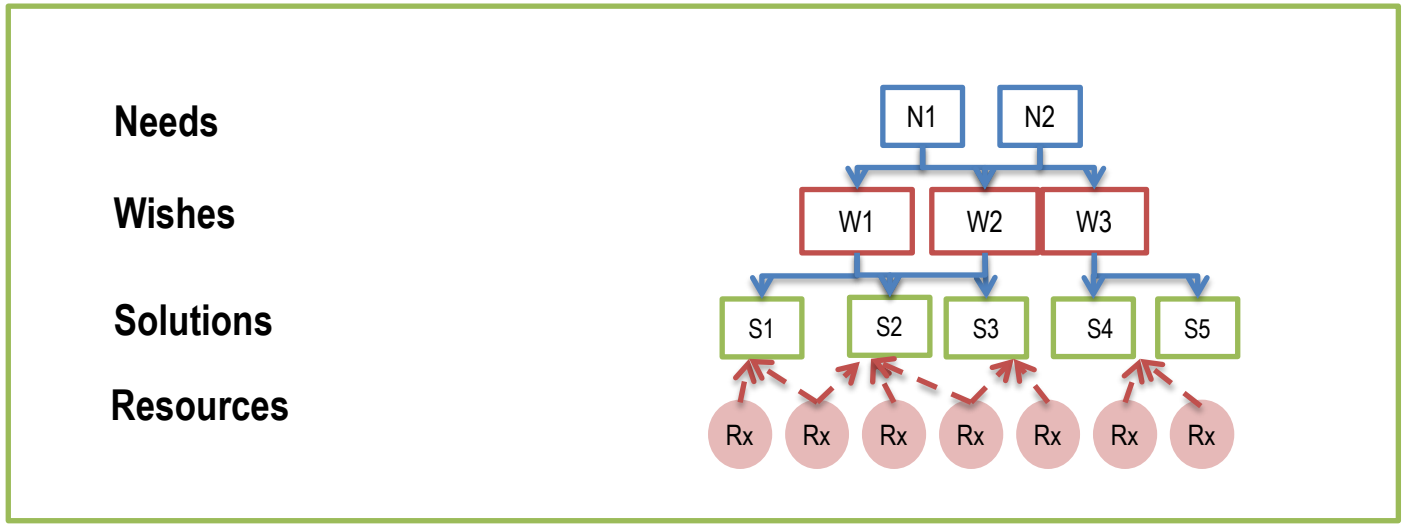
Product Service Concept Tree (PSCT)



- **Needs (Nx)=** customer's **main needs** identified through the customer segments analysis
- **Wish (Wx)= how** the **customer** wishes to satisfy his needs
- **Solutions (Sx)** = **how** the **company** can satisfy the customers' wishes
- **Resource (Rx)= who/what (and how)** supports the delivering of a design requirements

Value

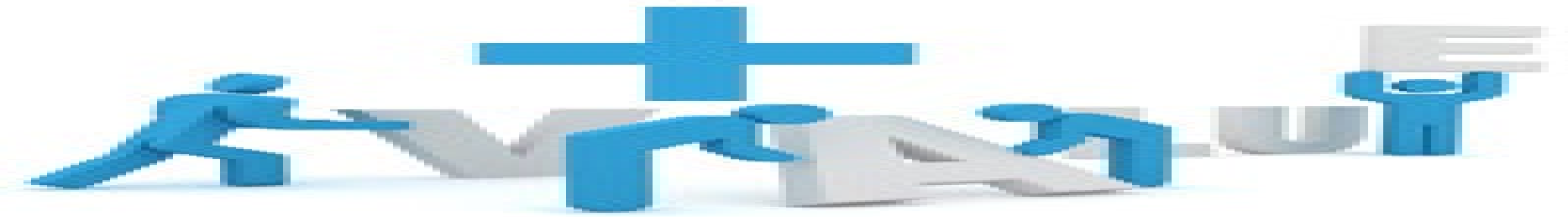
Value is the relation between the satisfaction of needs and the resources which are used to achieve a desired satisfaction

Balance between benefits and expenditure

Balance between stakeholders

$$\text{Value} \quad \alpha^1 \frac{\text{Satisfaction of needs } \textit{(monetary and non-monetary)}}{\text{Use of resources } \textit{(money, people, time, energy and materials)}} = \frac{\text{Benefits}}{\text{Expenditure}} = \frac{\text{Functions}}{\text{Costs}}$$

Balance between use of resources



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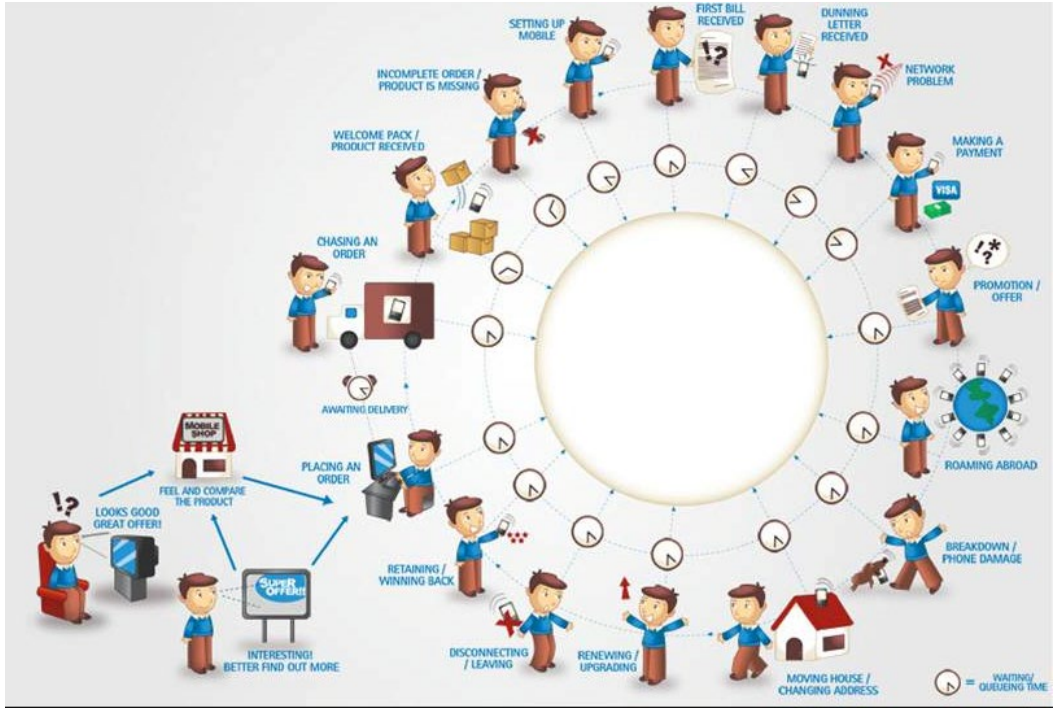
Customer journey map

Customer journey mapping is the process describing all the experiences and activities that customers have as they come across a service or set of services.



Customer journey maps

A customer journey map provides a vivid but structured visualisation of a service user's experience.

The touchpoints where users interact with the service are often used in order to construct a "journey" – an engaging story based upon their experience.

This story details their service interactions and accompanying emotions in a highly accessible manner.

A customer journey map provides a high-level overview of the factors influencing user experience, constructed from the user's perspective.

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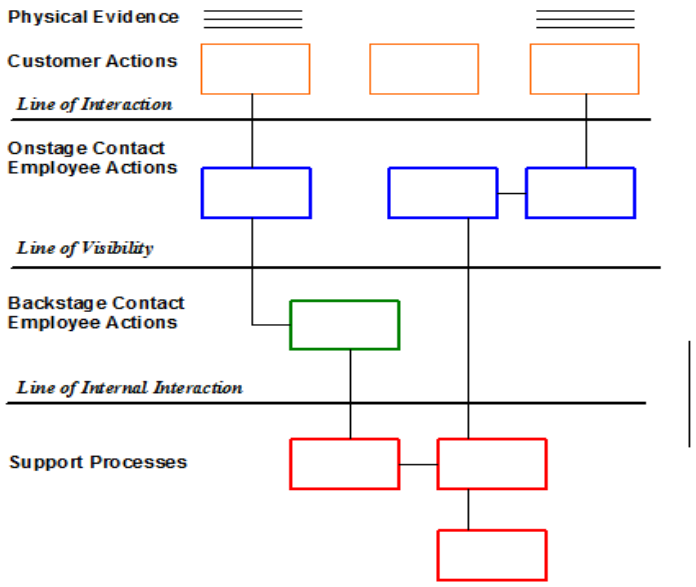
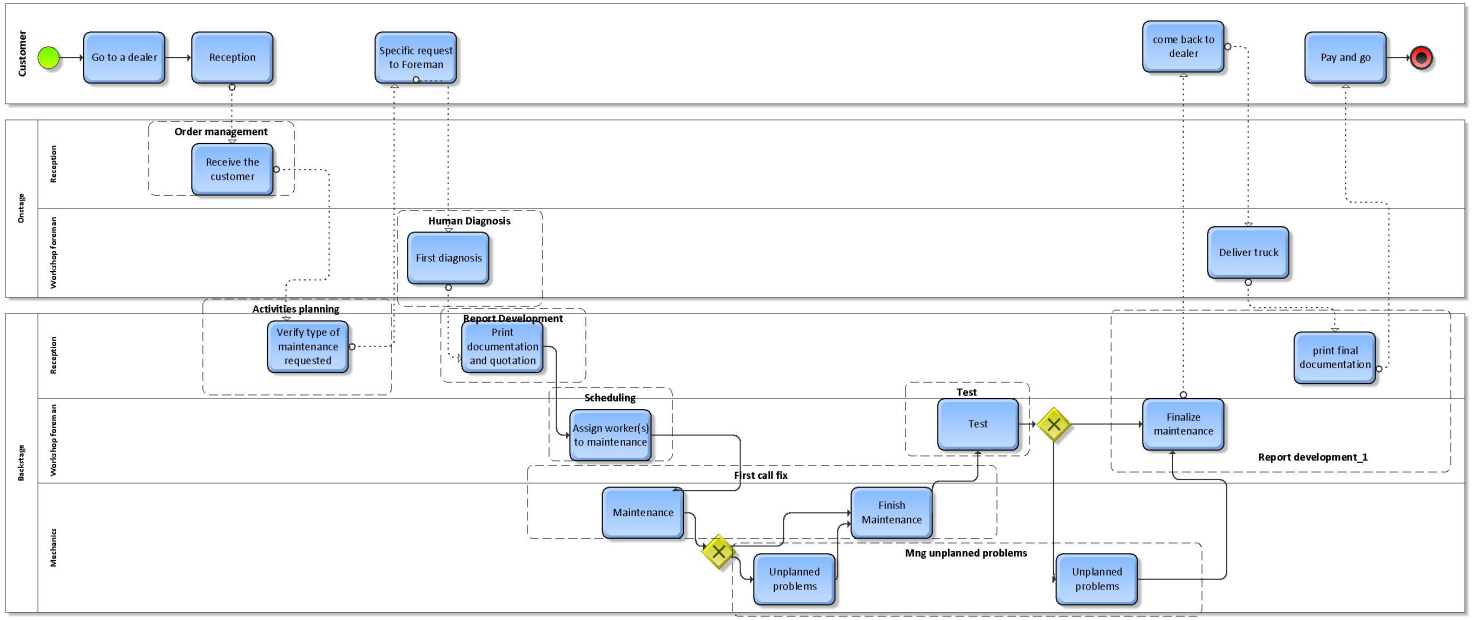
Process Modeling

Service blueprinting + BPMN 2.0





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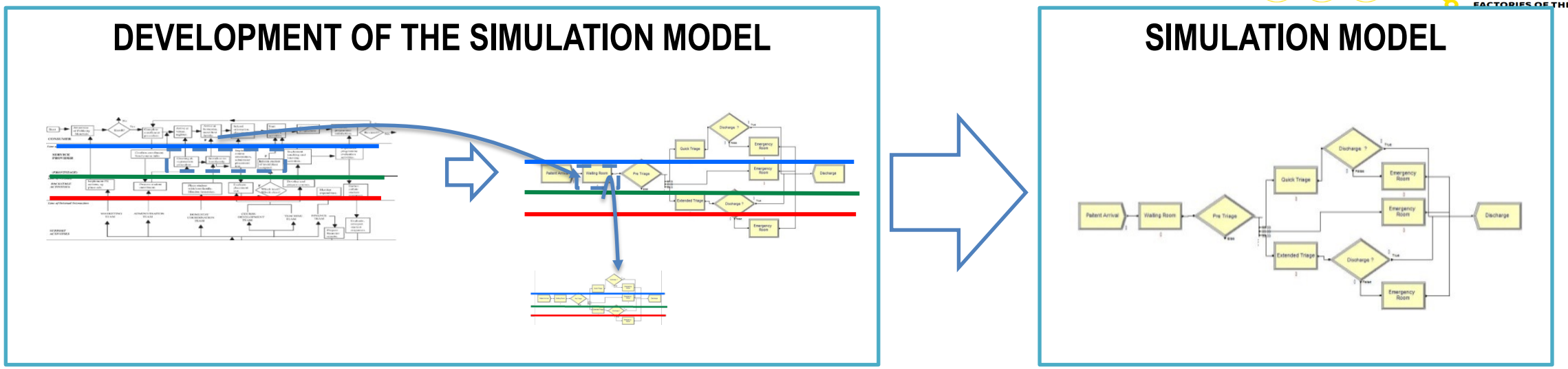
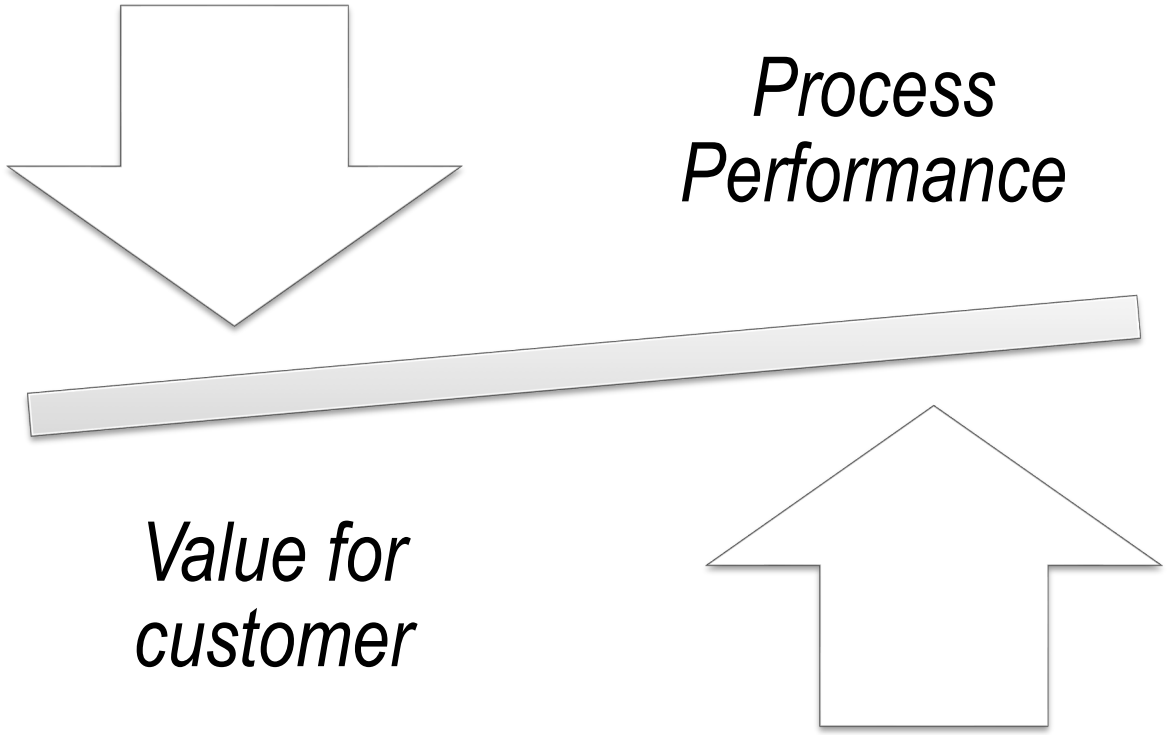
Prototyping and assessing: Simulation



The purpose of simulation is to:

- **Assess** the performance of a service system under different conditions (*what-if analysis*)
- **Evaluate** the effectiveness of possible changes in the service system organization
- **Support** the selection of the process configuration with the best trade-off between internal performance and value for customer
- **Provide** insights into the service system's dynamics and bottlenecks

Scenario Evaluation



⇨ Selection of the process configuration with the best trade-off between internal performance and value for customer

Thanks for your attention!!

Q&A

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