



UNIVERSITA'
DEGLI STUDI
DI BERGAMO

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*CELS - Research Center on Logistics and
After-Sales Service*



UNIVERSITA'
DEGLI STUDI
DI BERGAMO

THE RESEARCH TEAM

Guess who is in the cover page.....



Sergio Cavalieri
Full
Professor



Stefano Ierace
Research
Fellow

Fabiana Pirola
Research
Associate



Barbara Resta
PhD
Candidate



Paolo Gaiardelli
Assistant
Professor



Sergio Terzi
Assistant
Professor



Roberto Pinto
Assistant
Professor



Stefano Dotti
Assistant
Professor



Giuditta Pezzotta
Research
Fellow

Elena Legnani
Research
Associate



Tommaso Lupo
PhD
Student



Nicola Pedrali
Research
Assistant



Emanuele Dovere
Research
Assistant



Enrico Cagnoni
Research
Assistant



Francesca Sandionigi
Communication &
Administration



You will win a research visiting period in our beautiful town!



XVI Summer School "Francesco Turco" Impianti Industriali Meccanici
Abano Terme (Padova, Italy) - 14-16 September 2011



OUR MAIN TEACHING ACTIVITIES

Undergraduate & Graduate Programme

| Mechanical Engineering (Under-) | Mechanical Engineering (Graduate) | Management and Production Engineering (Under-) | Management and Production Engineering (Graduate) | Computer Engineering (Under-) |
|--|--|--|--|---|
| <ul style="list-style-type: none"> • Impianti Meccanici - 9 CFU | <ul style="list-style-type: none"> • Progettazione degli Impianti - 6 CFU • Gestione dei Progetti di Impianto - 12 CFU | <ul style="list-style-type: none"> • Gestione della Produzione Industriale - 6 CFU • Impianti Industriali - 6 CFU • Tecnologie Industriali tessili I - 6 CFU • Tecnologie Industriali tessili II - 6 CFU | <ul style="list-style-type: none"> • Gestione delle Operations - 6 CFU • Sistemi Logistici Integrati - 6 CFU • Progettazione dei Sistemi Produttivi - 6 CFU • Supply & Service Chain Management - 6 CFU (in English) • Operations Management - 6 CFU (in English) | <ul style="list-style-type: none"> • Gestione della Produzione Industriale - 6 CFU |

Post-Graduate Programme

MeGMI - Master Executive in Asset Management
(in collaboration with Politecnico di Milano)



Master in Technologies and Processes of the Textile Supply Chain

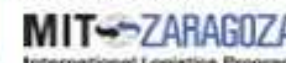


In collaboration with

CONFINDUSTRIA BERGAMO
Unione degli Industriali della Provincia

PhD in Logistics & Supply Chain Management

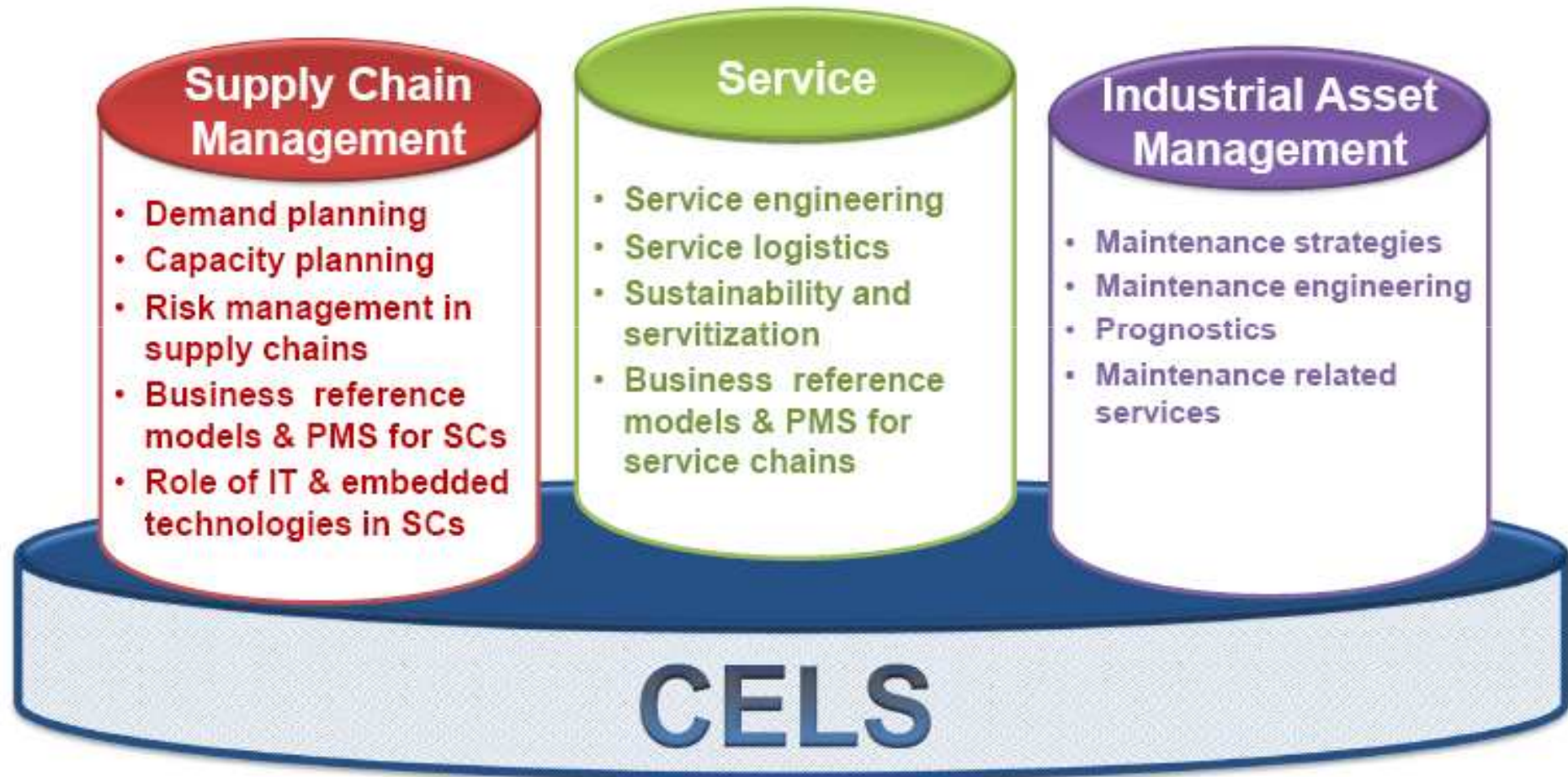
In collaboration with



XVI Summer School "Francesco Turco" Impianti Industriali Meccanici
Abano Terme (Padova, Italy) - 14-16 September 2011



THE THREE PILLARS OF CELS

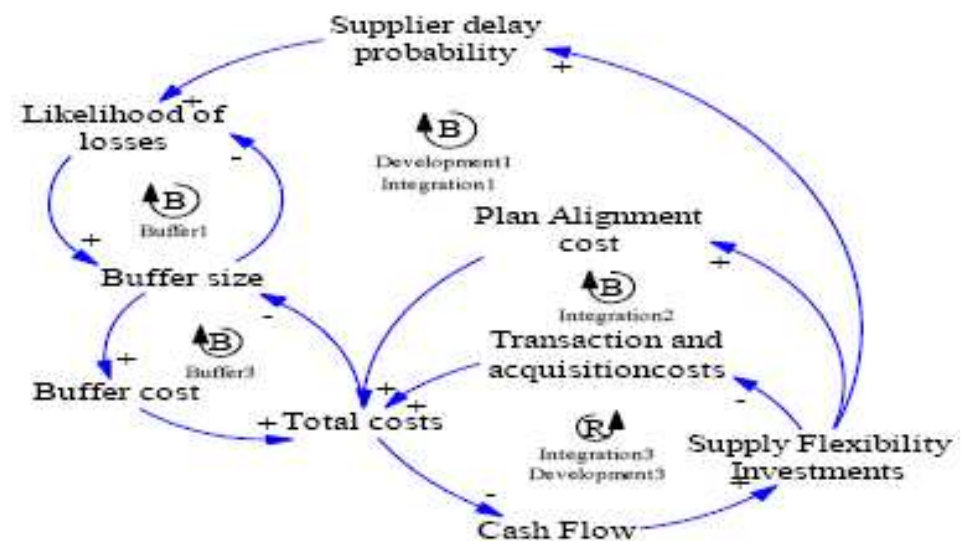
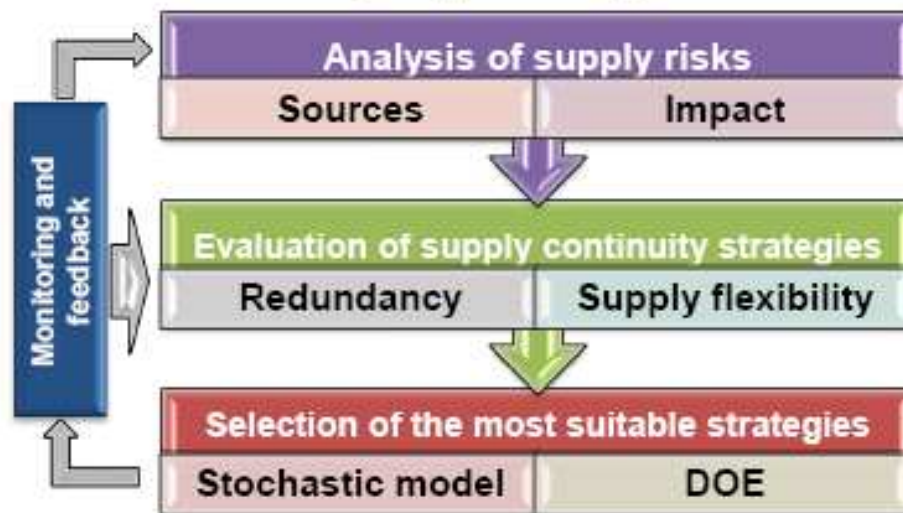




1. SUPPLY CHAIN MANAGEMENT

Supply-side risk dynamics

- **Context:** supply chain risk management with emphasis on supply-side risks.
- **Objective:** to understand and control supply risks and the conjoint effects of mitigating actions.
- **Tools:** systemic approach + stochastic programming.



Example of a causal loop diagram

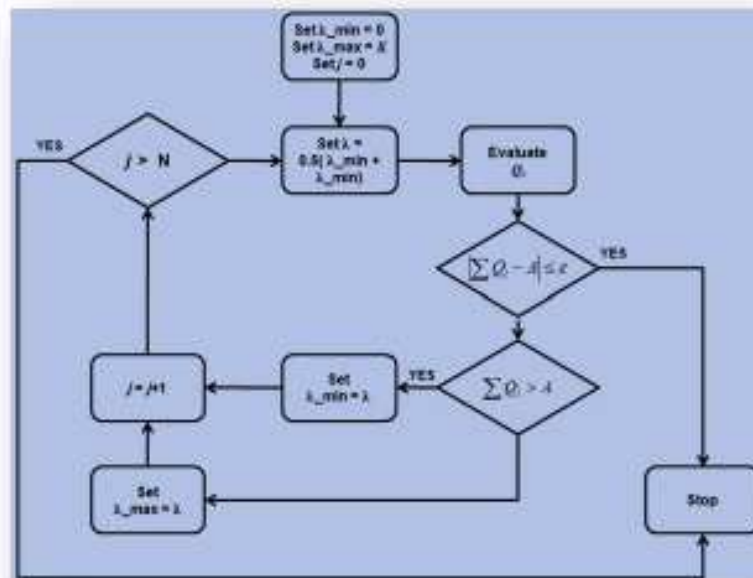
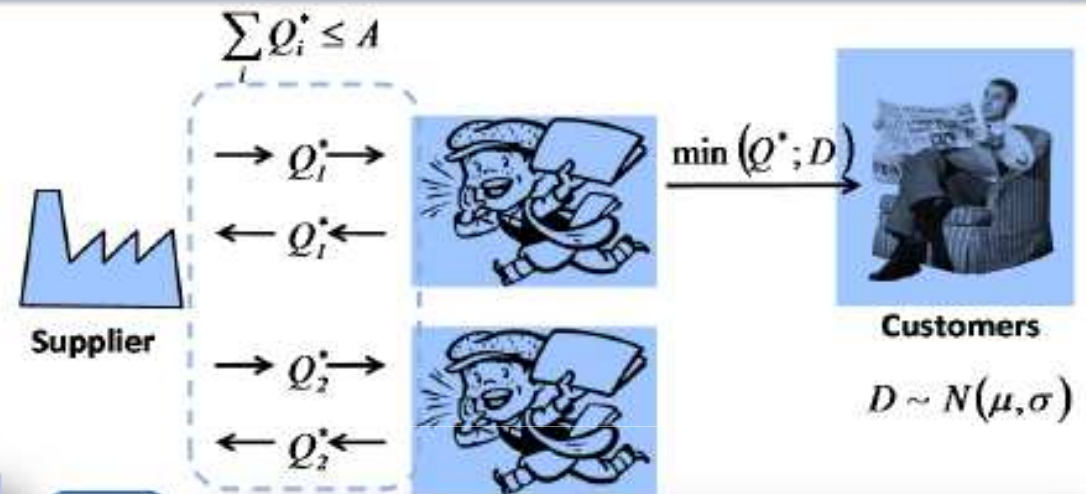




1. SUPPLY CHAIN MANAGEMENT

Rationing policies and inventory risk

- **Context:** allocation of scarce resources with emphasis on distribution.
- **Objective:** to effectively allocate production to retailers to maximize profit subject to customer service thresholds.



Allocation strategies

| Demand | % | Allocation |
|--------|-----|------------|
| 100 | 17% | 83 |
| 200 | 33% | 167 |
| 300 | 50% | 250 |
| | | 500 |

| Demand | Difference | Allocation |
|--------|------------|------------|
| 100 | 100 - 33 | 67 |
| 200 | 200 - 33 | 167 |
| 300 | 300 - 34 | 266 |
| | | 500 |



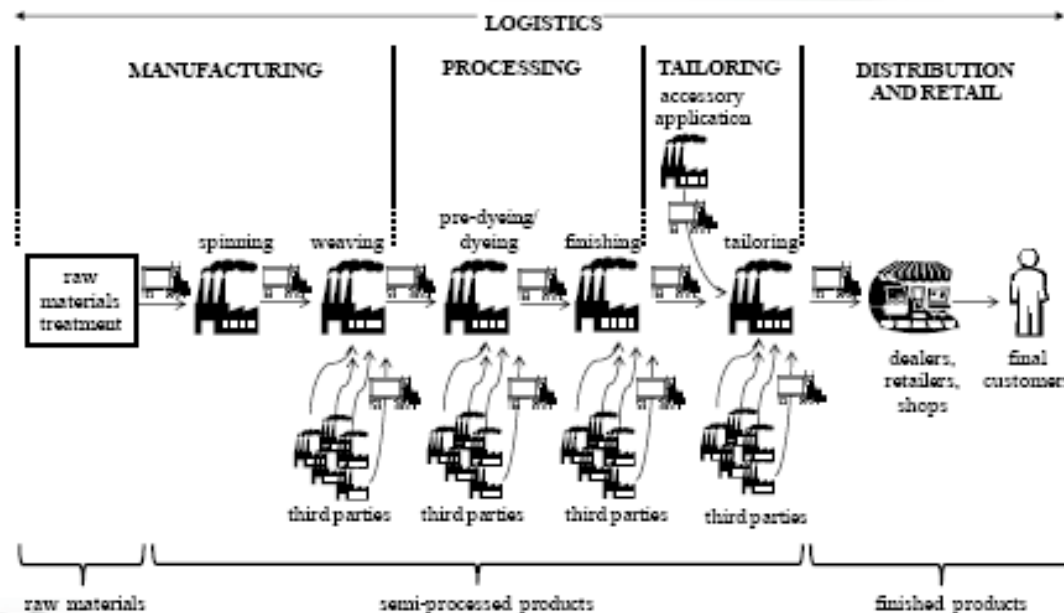


1. SUPPLY CHAIN MANAGEMENT RFID application in the textile sector



- **TAGGIE Project:** identification and traceability using RFID to preserve Made-in-Italy products.

- **CLOTH Project:** introducing the RFID technology in a very upstream phase of a textile and clothing supply network.

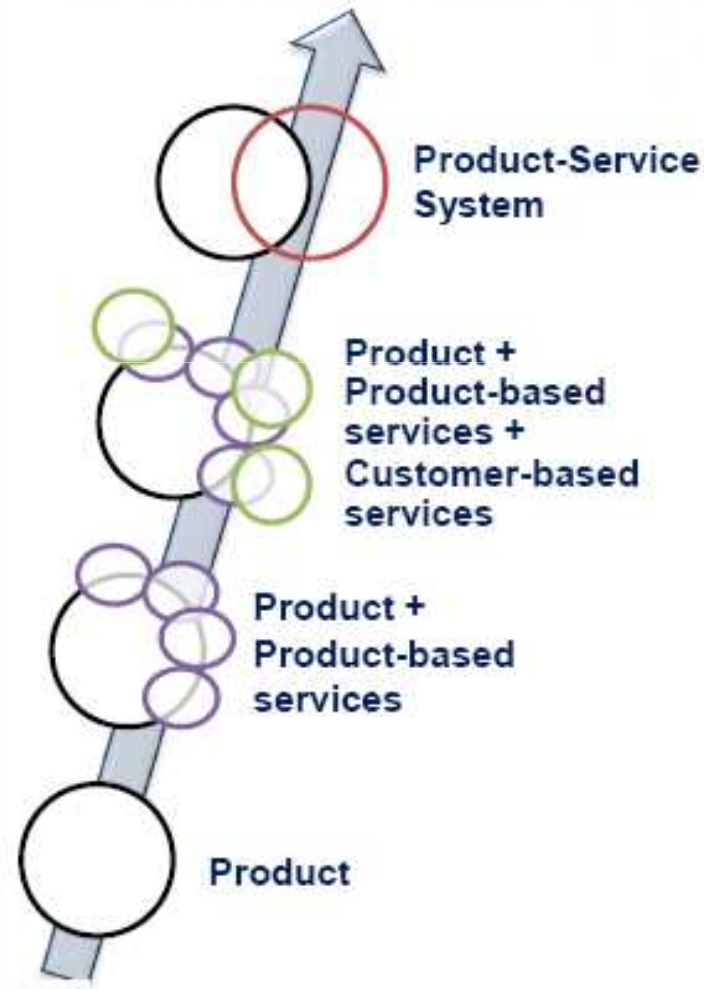




2. SERVICE

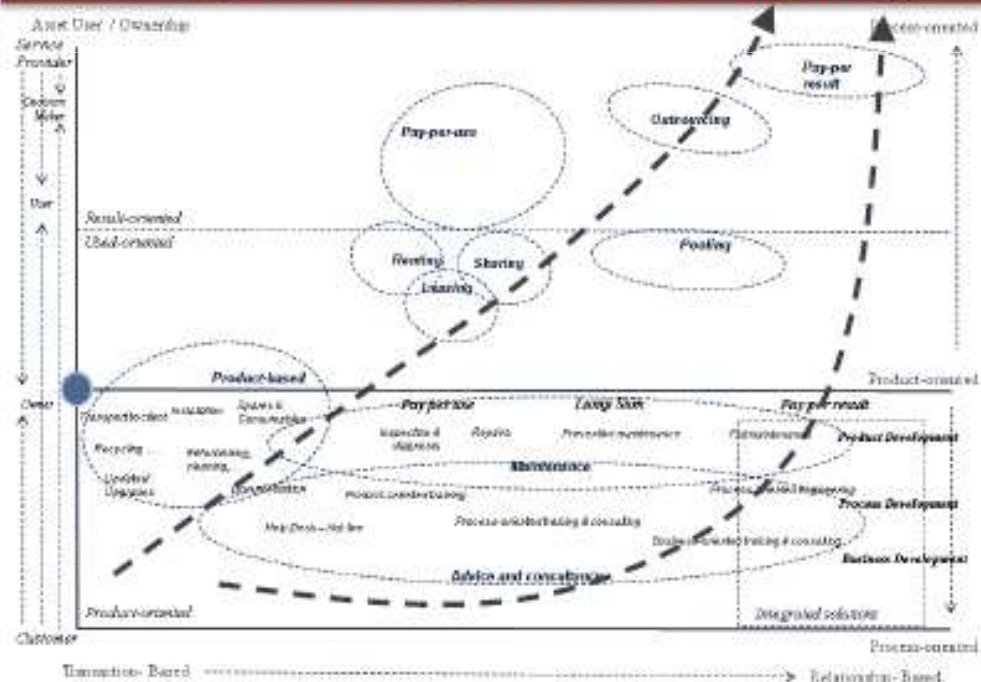
The servitization of manufacturing

Servitization of manufacturing



“Servitization is the trend where firms move from manufacturing goods to providing services or integrating products and services into solutions or functions”
(Lindberg and Nordin, 2008)

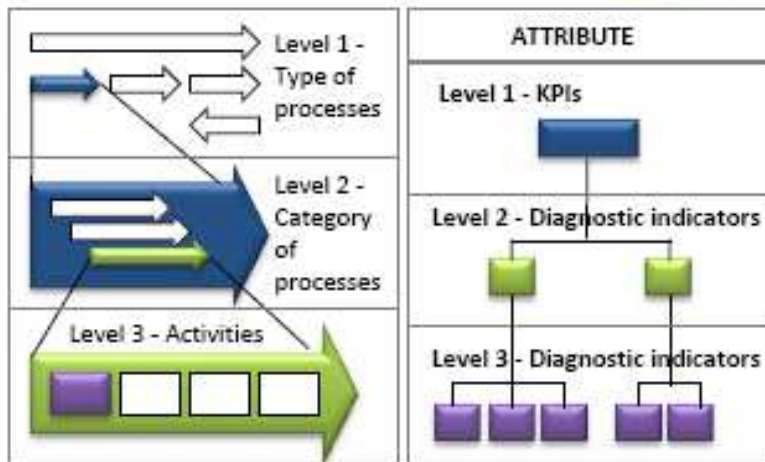
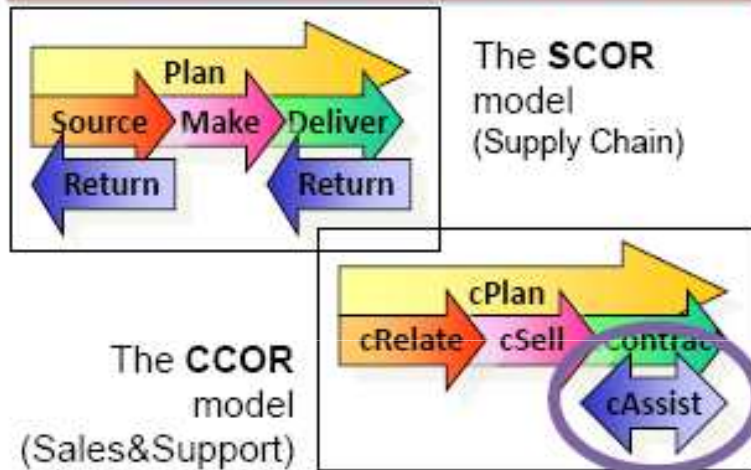
Product-Service System configuration along the servitization journey



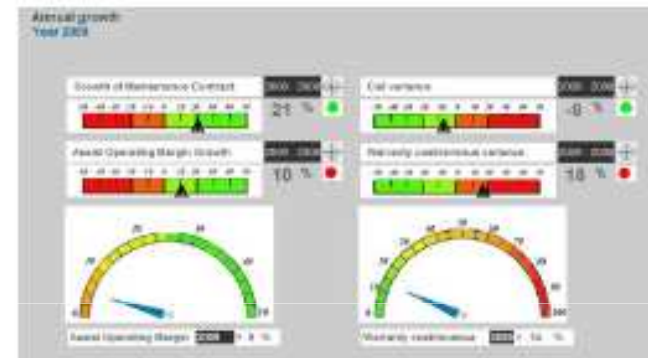


2. SERVICE Controlling and improving the provision of after-sales services

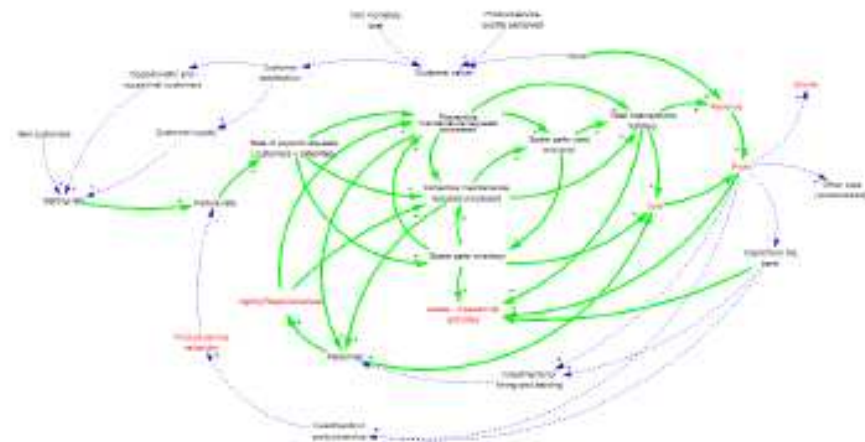
1. The methodological approach



2a. Static analysis: Monitoring & controlling results



2b. Dynamic analysis: Improving results

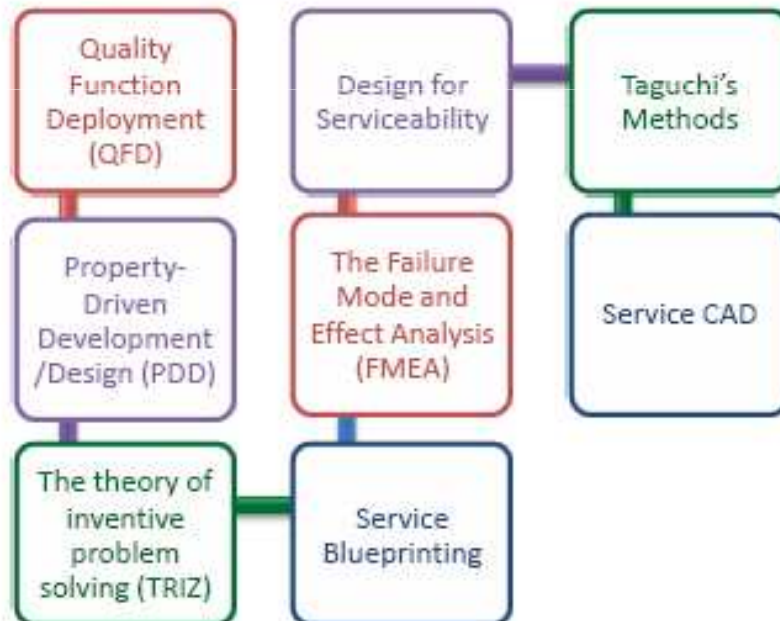




2. SERVICE Service engineering

“A technical discipline concerned with the systematic development and design of services using suitable models, methods and tools.”
(Bullinger et al., 2003)

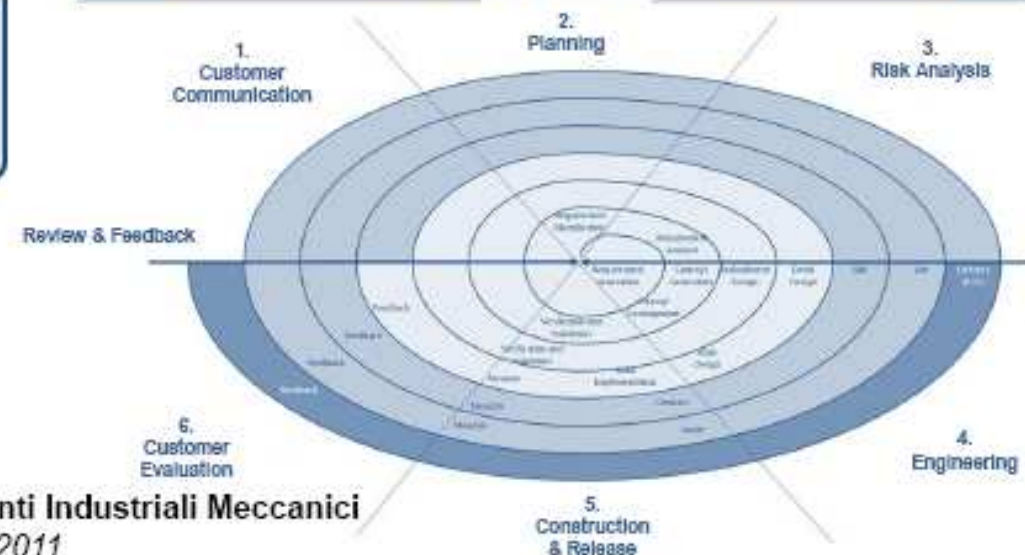
1. Application of SE models, methods and tools in real contexts



2. Definition of a methodological approach to select the appropriate tool/method



3. Definition of a PSS Engineering process

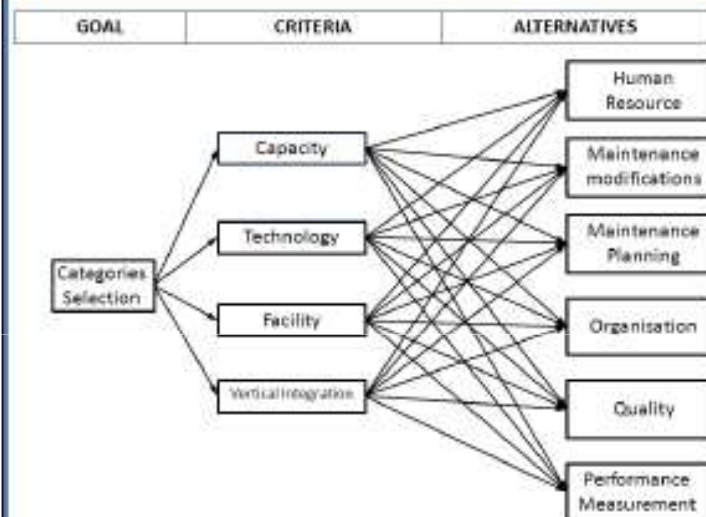




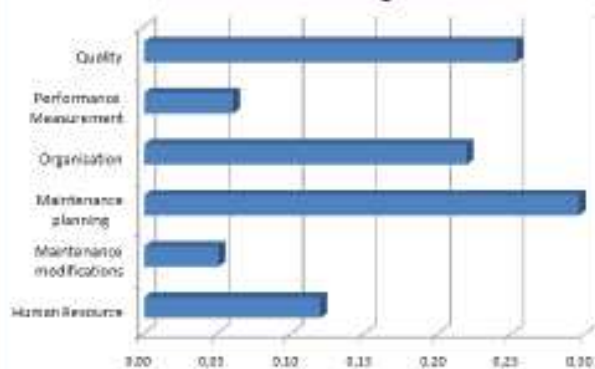
3. INDUSTRIAL ASSET MAINTENANCE

Industrial maintenance

Maintenance Strategy

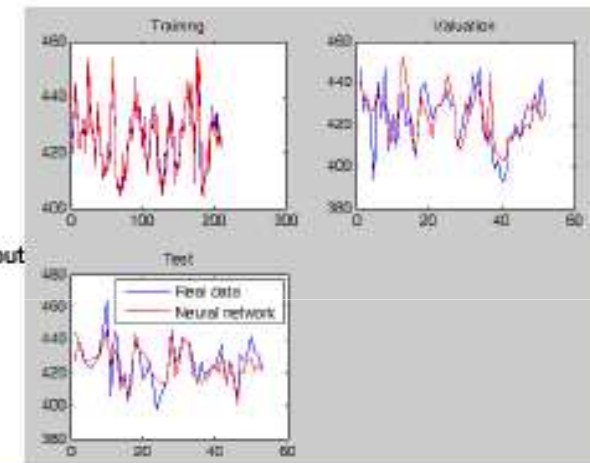
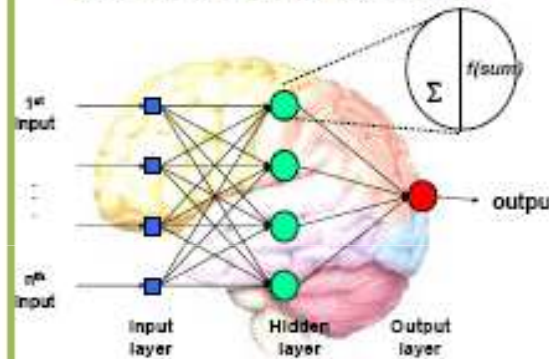


Alternatives's Weights

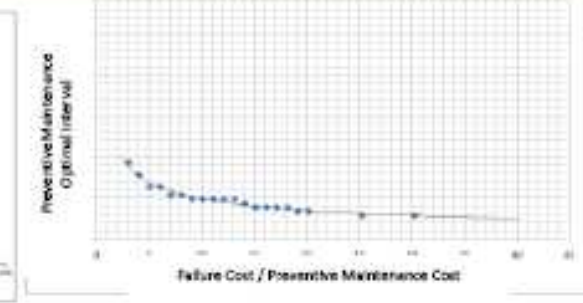
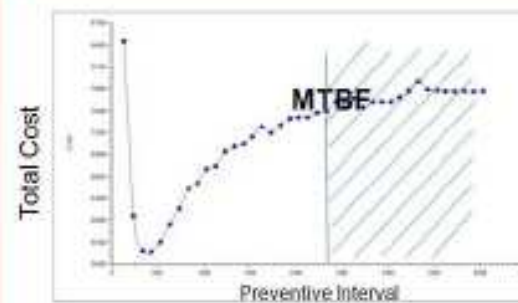


Condition Based Maintenance Program

Black Box models based on Artificial Neural Networks



Reliability Analysis

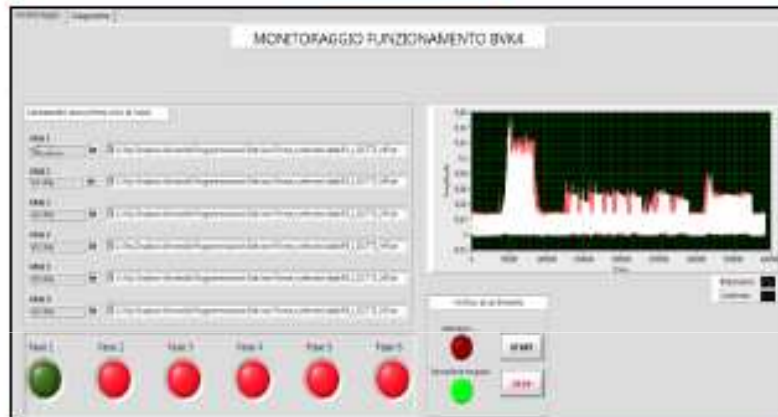




3. INDUSTRIAL ASSET MAINTENANCE

Electric signature analysis for industrial maintenance

1. Monitoring



2. Diagnostics



3. Maintenance Optimization

L4 – Maintenance Policy Optimization Toolbox

L3 – Prognostic

L2 - Diagnostic

L1 – Electric Signature Toolbox

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Remaining Useful Life

Reliability Approach

- Fault Detection
- Fault Isolation
- Fault Identification

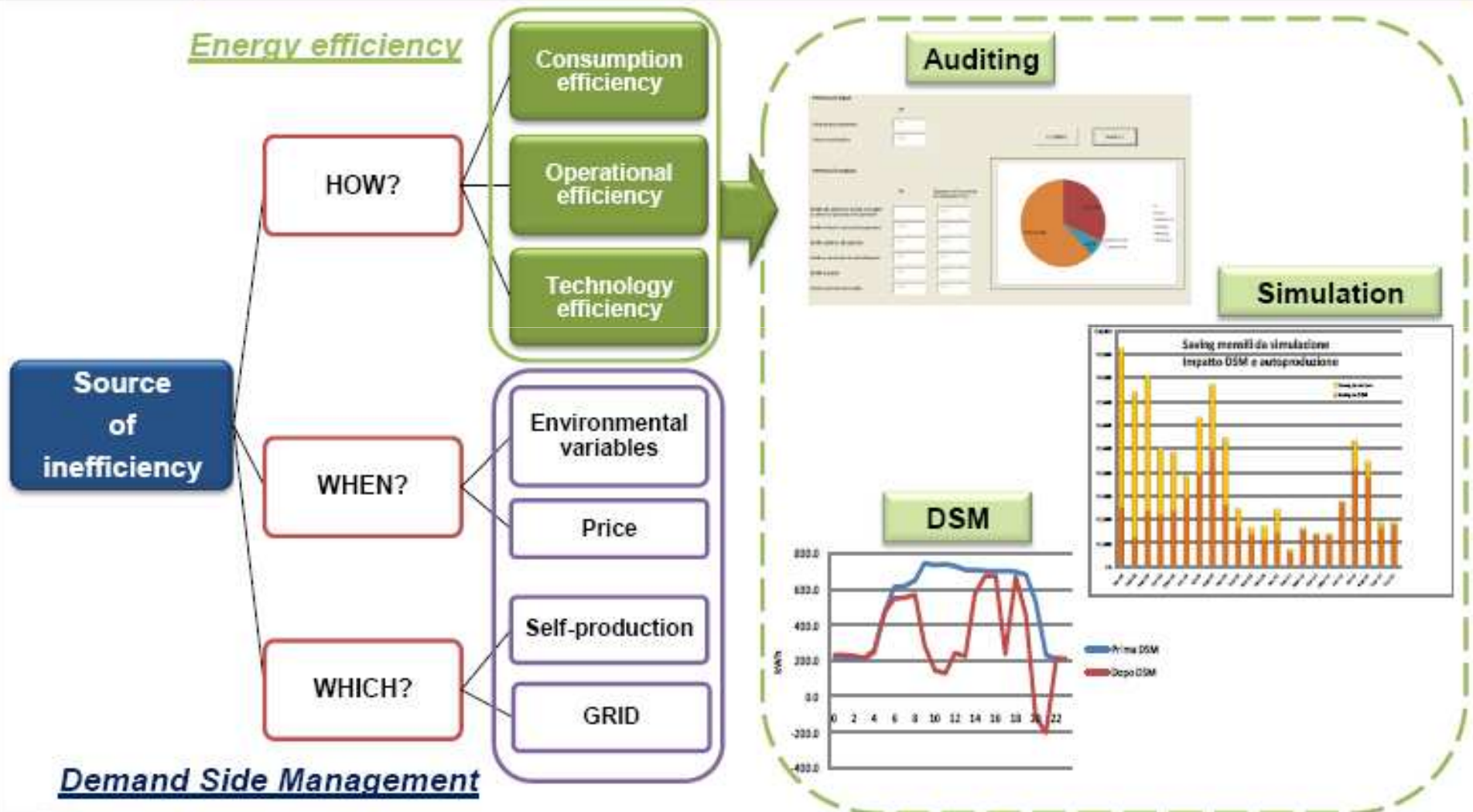
- Distortion Analysis
- Transient Disturbance
- Power Analysis





3. INDUSTRIAL ASSET MAINTENANCE

Energy management and smart grid





TOP TEN PUBLICATIONS (2006-2011)

| Authors | Title | Journal | Year-Vol | Research Topic |
|--|--|--|---|----------------|
| Ghislandi W., Cavalieri S. | Understanding and using near-misses properties through a double step conceptual structure | Journal of Intelligent Manufacturing | 2010 - Vol. 20, No. 2, pp. 237 | 1 |
| Cavalieri S., Terzi S | Proposal of a performance measurement system for the evaluation of scheduling solutions | International Journal of Manufacturing Technology and Management | 2006 - Vol. 8, No. 1/2/3, pp. 248 – 263 | 5 |
| Cavalieri S., Garetti M., Macchi M., Pinto R. | A decision making framework for managing maintenance spare parts | Production Planning & Control | 2008 - vol.19, No.4, pp.379-396 | 5 |
| Terzi S., Bouras A., Dutta D., Garetti M., Kiritsis D. | Product lifecycle management – from its history to its new role | International Journal on Product Lifecycle Management | 2010 - Vol. 4, No. 4, pp.360–389 | 5 |
| Legnani E, Cavalieri S., Dotti S., Pinto R. | Evaluating the potential of RFID technology in the textile industry - opportunities, requirements and challenges | Unique Radio Innovation for the 21st Century: Building Scalable and Global RFID Networks | 2010 - Book Chapter – Springer Verlag | 6 |
| Resta B., Gaiardelli P., Pezzotta G. | Sustainability in the auto-repair industry: a lifecycle assessment application | International Journal of Product Lifecycle Management | 2009 - Vol. 4, No.1/3 pp. 146-165 | 6 |
| Legnani E., Cavalieri S., Ierace S. | A framework for the configuration of after-sales service processes | Production Planning and Control | 2009 - Vol. 20, No. 2, pp. 113 – 124 | 6 |
| Gaiardelli P., Saccani N., Songini L. | Performance measurement of the After-Sales Service network. Evidences from the automotive industry | Computers in Industry | 2007 - Vol. 58, No. 7, pp. 698-708 | 6 |
| Gaiardelli P., Cavalieri S., Saccani N. | Exploring the relationship between After-Sales service strategies and Design For X methodologies | International Journal on Product Lifecycle Management | 2008 - Vol. 3, No. 4, pp. 261-278 | 6 |
| Cavalieri, S. Pinto R. | Orientare al successo la Supply Chain | ISEDI, Torino | 2007 | 6 |

Research Topics – Ing/Ind-17

| | | | | | | |
|---------------------------------------|-------------------------------------|---------------------------------------|---|------------------------------|-----------|------------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Production system analysis and design | Auxiliary plant analysis and design | Processes and production technologies | Ergonomics and safety of industrial systems | Production system management | Logistics | Production system automation |



UNIVERSITA'
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RESEARCH & INDUSTRIAL PROJECTS

Some examples



Improving logistics
performance of SMEs in
the automotive sector



Supply Chain &
Logistics Roundtable



ProSSaLiC
Product-Service System
across Life Cycle

PROPHET
A prognostic platform for accomplishing
experimentation and testing



TRUCK
INDUSTRY
FOCUS GROUP



ASAP SMF
Service Management Forum

You can find more news on us on our web site

*CELS - Research Center on
Logistics and After-Sales Service*

CELS is located in the Department of Industrial Engineering - University of Bergamo.

It provides studies, researches and technology transfer projects in the fields of Supply Chain Management, Service Chain Management and Industrial Asset Management.

Main mission of the Center is to:

- DEVELOP** research and educational activities at national and international level.
- PROMOTE** collaboration and technological transfer with industrial and service companies, in particular with SMEs.
- CONTRIBUTE** to the local and regional development through the participation at industry-academia forums and Research Observatories.

Research Center:
Service Center
Colorful Network
Personalized Services

CELS logo

CELS presentation

Overview of CELS research activities

Report CELS 2010

CELS activities in 2010

Research reports

Free download of the research reports

Logistics

Logistics Roundtable activities (thanks to Savaris with Logimaster)

<http://cels.unibg.it/>



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