Mixing the product and service domains in development and manufacturing challenges and learning's from research and practice

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Mixing the product and service domains in development and manufacturing challenges and learning’s from research and practice

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Agenda

i. Servizitation and the manufacturing industry

ii. The Product-Service mix

iii. Example of means for developing the Product-Service mix

iv. The interplay between academia and industry

v. Discussion!
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“Servitization” is happening in almost all industries on a global scale. Swept up by the forces of deregulation, technology, globalization and fierce competitive pressure, both service companies and manufacturers are moving more dramatically into services.”

Vandermerwe and Rada, 1988
Servitization thinking – not new

“Hello, Central, give me the Sextet from Lucia.”

> 100 years ago the Tel-musici company provided music streaming via telephone


Car service anno 1928

Lubrication map, Chevrolet 1928
Car service 2012

Service 2.0 concept, Volvo Car

From www.volvocar.com
Observations

> As the car matures, the function of using a car is valued more than the ownership

> A modern car comprises of vast amount of sophisticated technologies – changing the game play for both users and manufactures…

From www.volvocar.com
Availability of a Car as a service

North American Carsharing Members and Vehicles

http://www.carsharing.net/
Manufacturing evolution – evolutionary thoughts

- Historically, users built their own products
  - Increasingly skilled people specialized (service providers) as new technologies were introduced as products (clocks, machines..)

- Industrialization boosted manufacturers
  - And created the need for service suppliers (retailers, repair workshops, etc)

- Mass production, created complex supply chains
  - And a need for development and manufacturing organisation and specialised methods (concurrent engineering etc) to manage and keep focus on quality, cost etc

- Servitization, re-emphasises the value-in-use focus
  - What is produced and sold is more than the artefact
  - Service providers increasingly need to differentiate by using tailored/specific product technologies
Drivers for service integration in manufacturing industry

- Differentiation and competitiveness
  - Difficult to copy a service
  - Valued by customers
  - Increased life cycle responsibilities required
  - Continuous upgrade and refinement

- For manufacturers, services that are based on product knowledge are particularly valuable
  - Opportunity to offer better value for the user
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About Services and Products

A service valued by the customer

Offered by a provider

Enabled by products and services
A Product Service System map
following Tukker och Tischner 2002, 2006

Value mainly in products content

Product-Service System

Service Content (Intangible)

Product Content (tangible)

Value mainly in Service Content

Pure Product

A: Product-oriented

B: Use-oriented

C: Result-oriented

Pure Service
Characteristics of product vs services

<table>
<thead>
<tr>
<th>Products</th>
<th>Services</th>
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<tbody>
<tr>
<td>Tangible</td>
<td>Intangible</td>
</tr>
<tr>
<td><strong>Production and distribution separated from consumption</strong></td>
<td><strong>Production, distribution and consumption simultaneous processes</strong></td>
</tr>
<tr>
<td>A thing</td>
<td>An activity or process</td>
</tr>
<tr>
<td>Core value produced in factory</td>
<td>Core value produced in interactions</td>
</tr>
<tr>
<td>Transfer of ownership</td>
<td>No transfer of ownership</td>
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The interplay between provider and consumer need to be well understood when shifting business models
As well as the relations in-between the partners of the providers supply chain

> Long term relations
> Benefit and risk sharing
> Technology obsolescence
> Product and technology support
> Transparency of product use for providers
> ...

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Broad challenges for Product-Service System

- Multi-disciplinary research and collaboration needed to succeed
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Example of means

➢ A framework to facilitate understanding, communication and establish common expectations

➢ A process to enable development

➢ A way of organizing engineering models to comply with both products and services

➢ A way to visualize the tangible value contribution of services
A framework to facilitate understanding, communication and establish common expectations

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<tr>
<th>Need Phase</th>
<th>Solution Seeking</th>
<th>Solution Development</th>
<th>Solution Realization</th>
<th>Solution Support</th>
<th>Solution Closure</th>
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Isaksson et al. *Towards a framework for developing product/service systems*  
A process to enable development
Example: Volvo Group has introduced a "Service" development process

- Requirements decomposed, clear logics for phased development
- Verification through (virtual) testing
- Resulting in "hard" products
- Recognizing the simultaneous production and consumption
- Verification via User involvement
- Resulting in a "soft" product
A way of organizing engineering models to comply with both products and services

Organizing engineering models to comply with both products and services involves the use of modularized methods and service elements. This approach facilitates the generation of design studies using pre-defined method- and product-elements. The modularization allows for the re-use of generative engineering methods, as demonstrated in the work by Peter Thor and Ola Isaksson, which focuses on automated design of aero engine structural components.
A way to visualize the tangible value contribution of services

Once the service value contribution is calculated – it can be linked and associated to the relevant product sub-system.

Value additions (Better logistics for these components, i.e. less number of parts)

Value losses (Worse logistics of these components, i.e. reduced commonality with the IMC in storage)

Bertoni et al. *Communicating the value of PSS design alternatives using color-coded CAD models*

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“What can academia and industry do to facilitate the observed transition?”

➢ The ”Servitization” in manufacturing has been ongoing for a long time
  ➢ Develop behaviour and views takes time and require knowledge and competence
  ➢ The mixed product and service dimension need to be understood, conceptualized, measured and justified
  ➢ There is a need for new methods, tools and services for development and provision of mixed products and services
  ➢ There is still a need to emerge a ”best practice” – generic and applicable

➢ Academia can provide all of these through research and education…
➢ .. yet this require deep insight and tight collaboration with industry
Categorizing the collaboration between academia and industry to address the product-service mix

A. Position new areas of knowledge
B. Understanding practices
C. New methods, tools and practices
D. Exploiting and transferring knowledge

Within each of these areas – academia and industry can benefit from collaboration
Explorative view

A. Position new areas of knowledge

Industry need to understand emerging practices

What can be “transferred” from one discipline to another?

Search for “State of the Art” technologies and approaches
Descriptive view

Industry need to understand current practice, phenomena and measures

What can be determined, what are root causes and what measures need to be taken?

Search for “State of the Practice” and analysis of situations in industry

For “success” stories – what are the underlying explanations?
Prescriptive view

Industry need new competences, technologies, methods and tools in order to develop solutions – mixing services and products.

Academia can invent and mature new “means”

“The Virtual Demonstrator”

“Validation and verification” of such means need active industry participation
Exploitation view

Industry need “help” in change management.

Academia can provide well educated graduates

Academia can assist in knowledge transfer activities

Industry need to invest in new ways of working strategically

Collaborative, long term, relations between universities and industries often fruitful

D. Exploiting and transferring knowledge
A note on academia and industry collaboration

Industry: Co-creation to understand **how to make use** of new knowledge

Academia: Co-creation to understand **what** new knowledge is needed

Suppliers of new Knowledge
"Nothing is as practical as a good theory"
Kurt Lewin, (1890-1947)
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Discussion

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