Definition of an Approach for the Development of Product-Service Systems

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Why are Product-Service Systems important?

Benefits:
- PSS: marketable set of products and services fulfilling a user’s need (Goedkoop et al. 1999).
- Differentiate products from low price competitors (Baines et al. 2007).
- Strategy focused on the customer by aiming to increase value (Marques et al. 2013).

Conclusion:
It is necessary to develop a methodology that fits the needs of the industry (Marques et al. 2013).
Literature Review of PSS-Development

Procedure:
- search for Product-Service Systems in the search engines:
  - “Web of Science”, “Google Books”, “Google Scholar” and “TUM Library”
- Aim: determine state of the art in PSS,
  - The definition of a PSS
  - Current development processes
- The references were extended by existing references at the Institute of Product Development

Conclusion:
- Many approaches available, but no secured development process could be found (Maussang et al. 2007 and Marques et al. 2013)
Research Goals

• Determine current product development processes
• Determine current service development processes
• Compare these development processes

Top Goal:
• Combine these development processes to a PSS-Development Process
Deriving the Approach

Procedure:

- Determination of 5 Product Development and 4 Service Development Processes as a result of an extensive literature review.

<table>
<thead>
<tr>
<th>Product Development Processes</th>
<th>Service Development Processes</th>
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<td>Product Development Process (Feldhusen and Grote 2013)</td>
<td>Service Development Process (Meiren and Barth 2002)</td>
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<td>Stage-Gate System for Major Product Development Projects (Kahn 2013)</td>
<td>The Lifecycle of a Service (Hepperle 2013)</td>
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<td>Stages of Life of a Product (Ehrlenspiel and Mehrkamm 2013)</td>
<td>Planning Cycle for Successful New Service Integration (Tax and Stuart 1997)</td>
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<td>Munich procedural model (Lindemann 2013)</td>
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**Deriving the Approach**

**Procedure:**

- Determination of 5 Product Development and 4 Service Development Processes as a result of an extensive literature review.
- Depiction of the processes in their original structure

![Diagram showing the procedure of deriving an approach for the development of product-service systems](image-url)
Deriving the Approach

Procedure:

- Determination of 5 Product Development and 4 Service Development Processes as a result of an extensive literature review.
- Depiction of the processes in their original structure
- Transformation of the processes into an uniform depiction
Deriving the Approach

Procedure:
• Determination of 5 Product Development and 4 Service Development Processes as a result of an extensive literature review.
• Depiction of the processes in their original structure
• Transformation of the processes into an uniform depiction
• Comparison of the processes

Ehrlenspiel and Mehrkamm 2013

Hepperle 2013
Approach for the Development of Product-Service Systems

Planning → Development → Preparation → Market Performance → Replacement
Approach for the Development of Product-Service Systems

Planning
Customer requirements → idea creation → the best-rated idea is chosen.

Development
Product development: provisional product architecture
Service development: description of service characteristics

Preparation
Secure the implementation of the PSS
**Approach for the Development of Product-Service Systems**

- **Market Performance**
  - production and distribution of the product + all activities that are carried out to provide the service.

- **Replacement**
  - The product is recycled and the service is no longer offered.
Expert Evaluation

Experts of an automotive company were interviewed to evaluate the Approach

Result:
Most of the experts wished for a development process that does not only define the development phases, but also provides methods for every phase that support the developer.

Further Procedure:
• Determine occurring challenges in the PSS-Development
• Determine methods for the PSS-Development

→ Matching these methods with the occurring challenges to support the developer
Literature Review of Challenges and Methods

- Collection of 41 challenges and 25 methods
- First step: assigning them to the development phases
- Second step: matching methods and challenges for every phase

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<td>The creation of proper business models is more difficult for Product-Service Systems.</td>
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Methods

- Ecosystem Map
- Product-Service Cross
- Role by third Parties
- TCO Chart
- User Activity Cycle

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Use-Case: The Service Mobil (real name withheld)

Validation:
Can the Approach really be applied to an use-case?
- Service Mobil: increase the available mobility for the customer
- After Tukker 2004, the Service Mobil is a product-oriented service

The Ecosystem Map of the Service Mobil

OEM quality department
OEM R&D department
OEM suppliers
Logistics services
OEM Workshops
Private and Business Customers
OEM Dealers
Breakdown service providers

http://www.volkswagen.de/content/medialib/vwd4/de/ServiceZubehoer/VolkswagenService/hilfe_und_sicherheit/stage/hilfe_rund_um_die_uhr/_jcr_content/renditions/rendition.file/hilfe_sicherheit_450x213_03.jpg


Discussion of the Service Mobil

- The applicability of this approach could be proven.
- Planning: initial ideas of the Service Mobil are well to display
- The detailed requirements of the development could partly be displayed
- The Market Performance best phase to display
  - Central problem: access to the necessary information
  - Altogether, the information about the development process is rather limited.
  - The improvement of the development by using this approach could not be proved.
Reflection of the Approach (Expert Survey)

- Development of products and services in combination ➔ great potential for the future.
- Product-Service Systems are increasingly appearing in the industry ➔ demand for a guideline
  - Presentation of the phases with more details, to make the application of the approach easier
Summary and Outlook


Procedure:
• Current approaches were analyzed and regarded as insufficient.
• Extension of the literature review
• Analysis and combination of current approaches
• Extension of the approach with challenges and methods
• Application to an use-case

Outlook:
• Creation of a more detailed approach
• Increase of the user-friendliness of the model (e.g. computer software)
• Extension of the provided methods
Thank you for your attention!

Any Questions?