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

Uwe Moser[a], Sebastian Maisenbacher[a]*, Daniel Kasperek[a], Maik Maurer[a]

[a]*Technische Universität München, Institute of Product Development, Boltzmannstr. 15, D-85748 Garching, Germany*

* Corresponding author. Tel.: +49-89-289-15134; fax: +49-89-289-15144. *E-mail address:* sebastian.maisenbacher@pe.mw.tum.de

Produktentwicklung

Technische Universität München

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
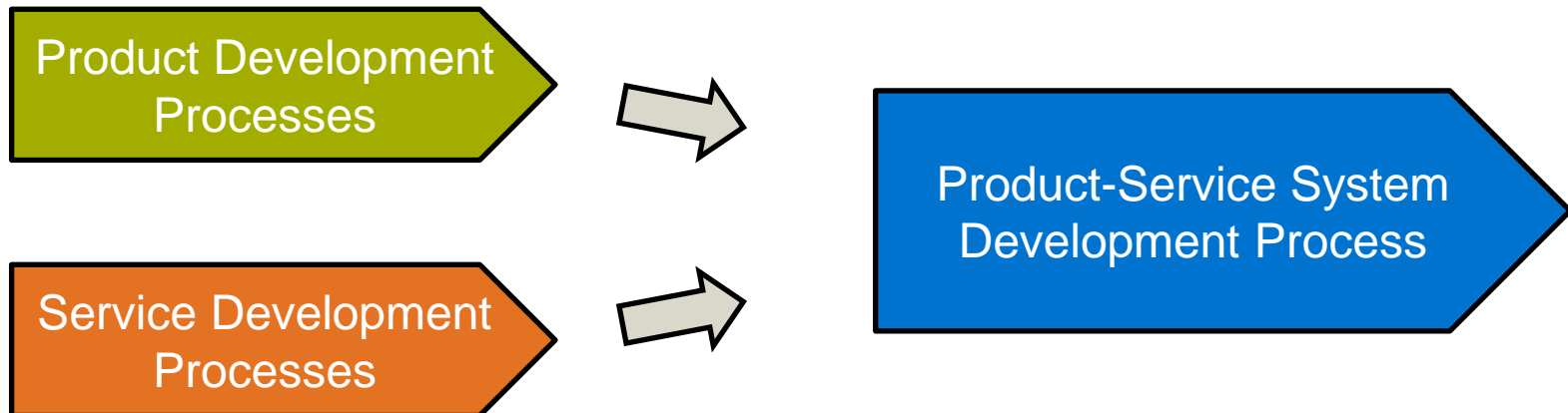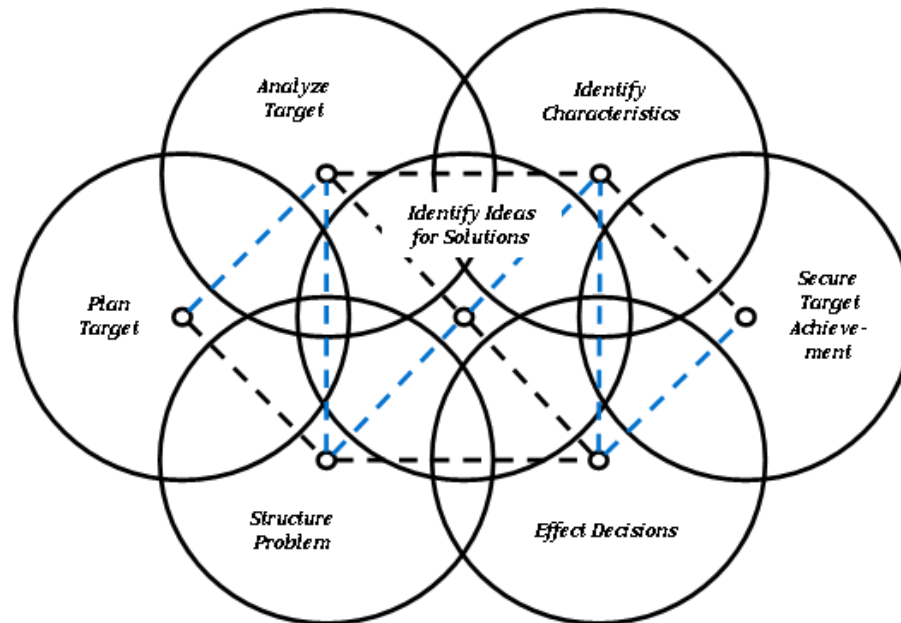
Deriving the Approach

Procedure:

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

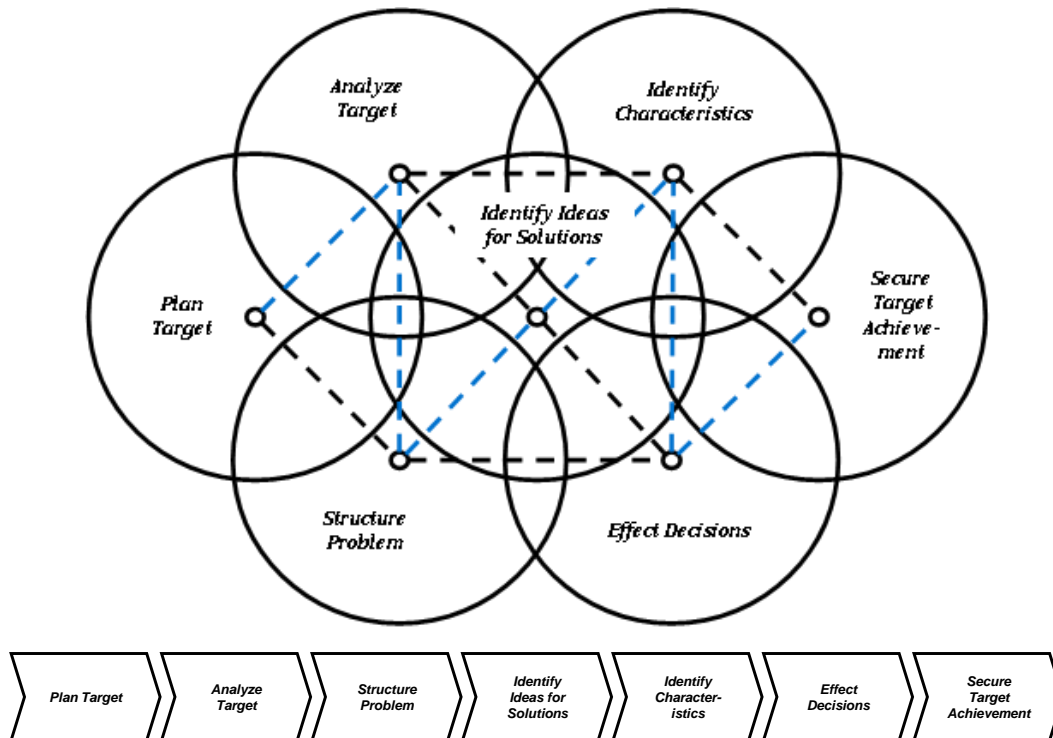| Product Development Processes	Service Development Processes
Product Development Process (Feldhusen and Grote 2013)	Service Development Process (Meiren and Barth 2002)
Development Process (Ulrich and Eppinger 1995)	Knowledge-based Development Process for Services (Wildemann 2002)
Stage-Gate System for Major Product Development Projects (Kahn 2013)	The Lifecycle of a Service (Hepperle 2013)
Stages of Life of a Product (Ehrlenspiel and Mehrkamm 2013)	Planning Cycle for Successful New Service Integration (Tax and Stuart 1997)
Munich procedural model (Lindemann 2013)	

Deriving the Approach

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- Transformation of the processes into an uniform depiction

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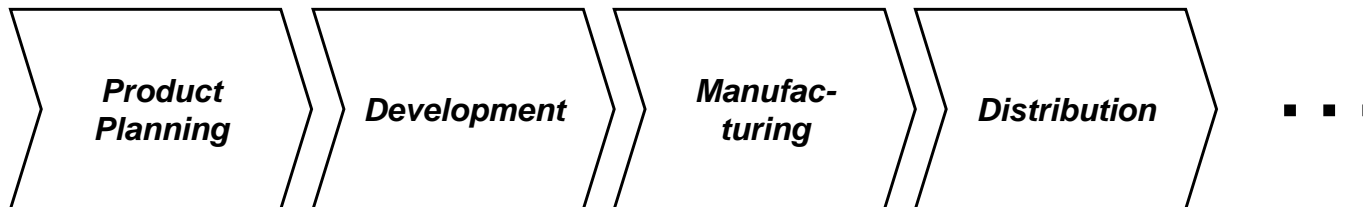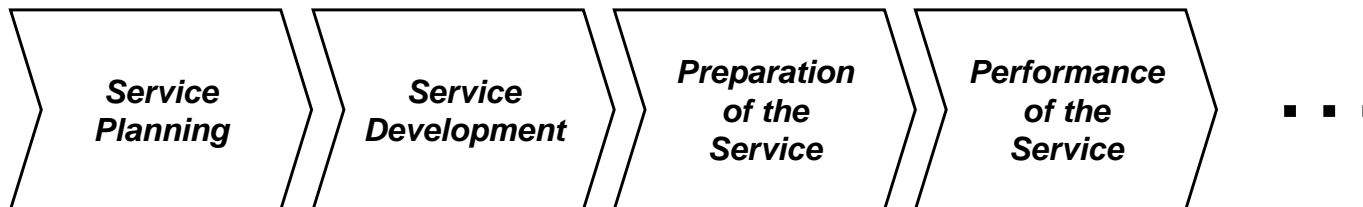- Transformation of the processes into an uniform depiction
- Comparison of the processes

Ehrlenspiel and Mehrkamm 2013

| *Product Planning* | *Development* | *Manufac-turing* | *Distribution* | ▪ ▪ ▪ |

Hepperle 2013

| *Service Planning* | *Service Development* | *Preparation of the Service* | *Performance of the Service* | ▪ ▪ ▪ |

Approach for the Development of Product-Service Systems

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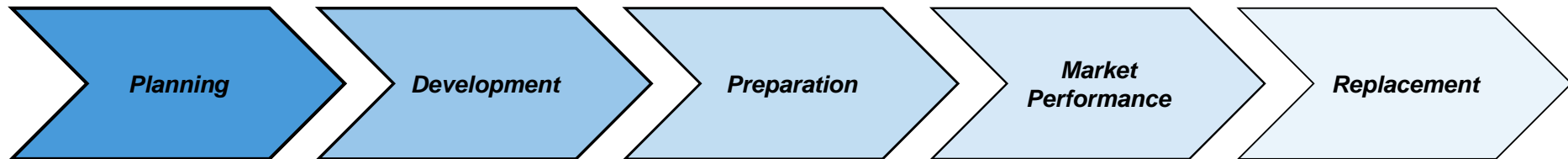
Approach for the Development of Product-Service Systems

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

| Problem or Challenge	Reference
A social system or infrastructure that would accept or support the suggested Product-Service System scenario has to be found.	Mont 2002
It can be more difficult to identify the requirements of stakeholders of a Product-Service System.	Vasantha et al. 2012
The creation of proper business models is more difficult for Product-Service Systems.	Meier et al. 2010

	Ecosystem Map	FINKEN ET AL., 2013
Short Description	The Ecosystem Map maps the interactions between stakeholders relevant to the company, a Product-Service System concept or a single offering (FINKEN ET AL., 2013).	
Purpose	The Ecosystem Map is applied to ensure that important aspects are identified and can be taken into account when developing new offerings and solutions (FINKEN ET AL., 2013).	
Process Step	The Ecosystem Map can be applied in the Planning, Development, Replacement and Market Performance to take the stakeholders into account.	
Area of Application	The method is applied to a group of people that know the stakeholder relations (FINKEN ET AL., 2013).	

	Methods				
Challenges	Ecosystem Map	Product-Service Cross	Role by third Parties	TCO Chart	User Activity Cycle
A social system or infrastructure that would accept or support the suggested product–service scenario has to be found (Mont 2002).	✓		✓		
It can be more difficult to identify the requirements of stakeholders of a Product-Service System (Vasantha et al. 2012)	✓		✓		✓
The creation of proper business models is more difficult for Product-Service Systems (Meier et al. 2010).	✓	✓	✓	✓	

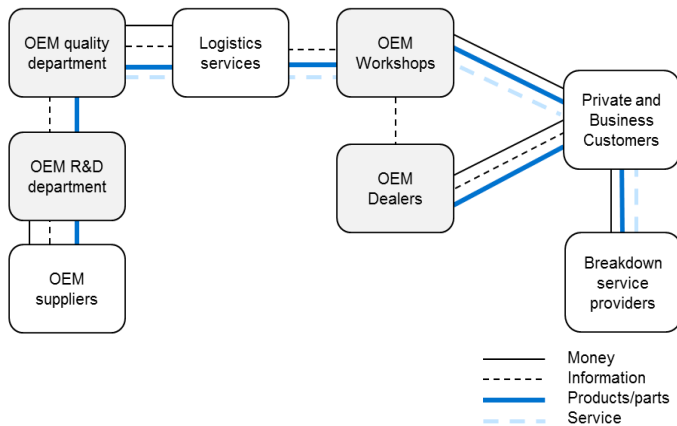# Use-Case: The Service Mobil (real name withheld)

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

| *Planning* | *Development* | *Preparation* | *Market Performance* | *Replacement* |
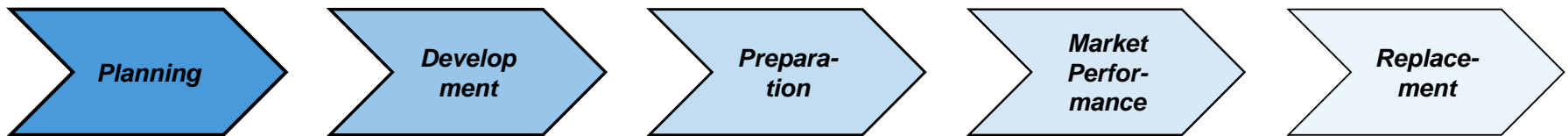
The Ecosystem Map of the Service Mobil

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

Central aim: create an Approach for the Development of Product-Service Systems.

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?