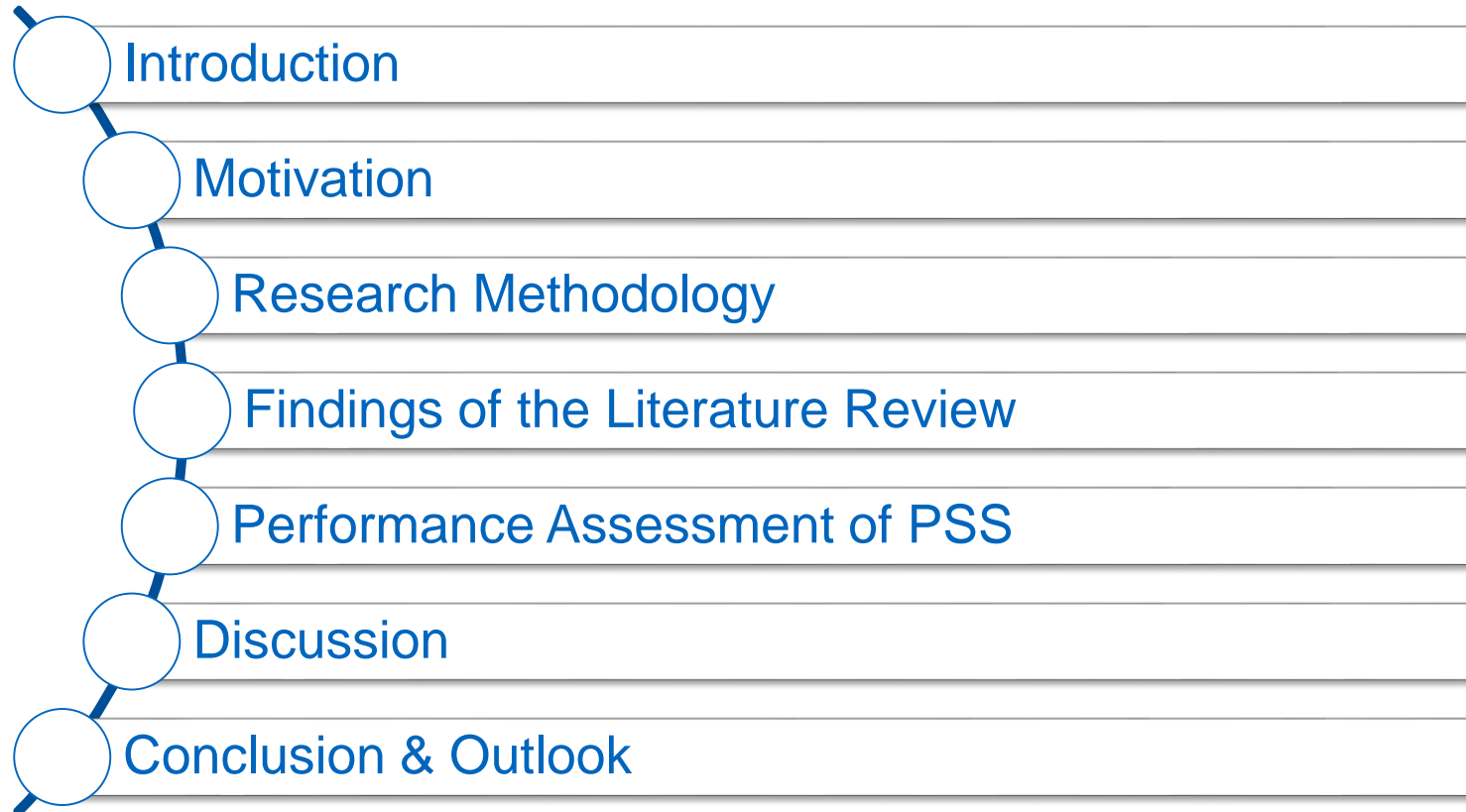


# Supporting the Performance Assessment of Product-Service Systems during the Use Phase

**Julian Wilberg**, Christoph Hollauer, Mayada Omer



# Agenda



# Introduction

- **Basics**

- Product-Service Systems (PSS) are a combination of a product and service
- Offering PSS leads to competitive advantages because the user need is addressed more precisely
- Compared with normal products the PSS provider often stays the owner of the product
- The responsibility of the provider is larger compared with a regular product manufacturer



# Motivation

- **Relevance of the Use Phase**


- PSS deliver the customer value during the use phase
- The performance of the PSS during use is important for the customer instead of the ownership of a product
- The PSS provider becomes responsible for the performance of the PSS during the use phase
- Due to enlarged responsibility the entire lifecycle must be considered by PSS providers



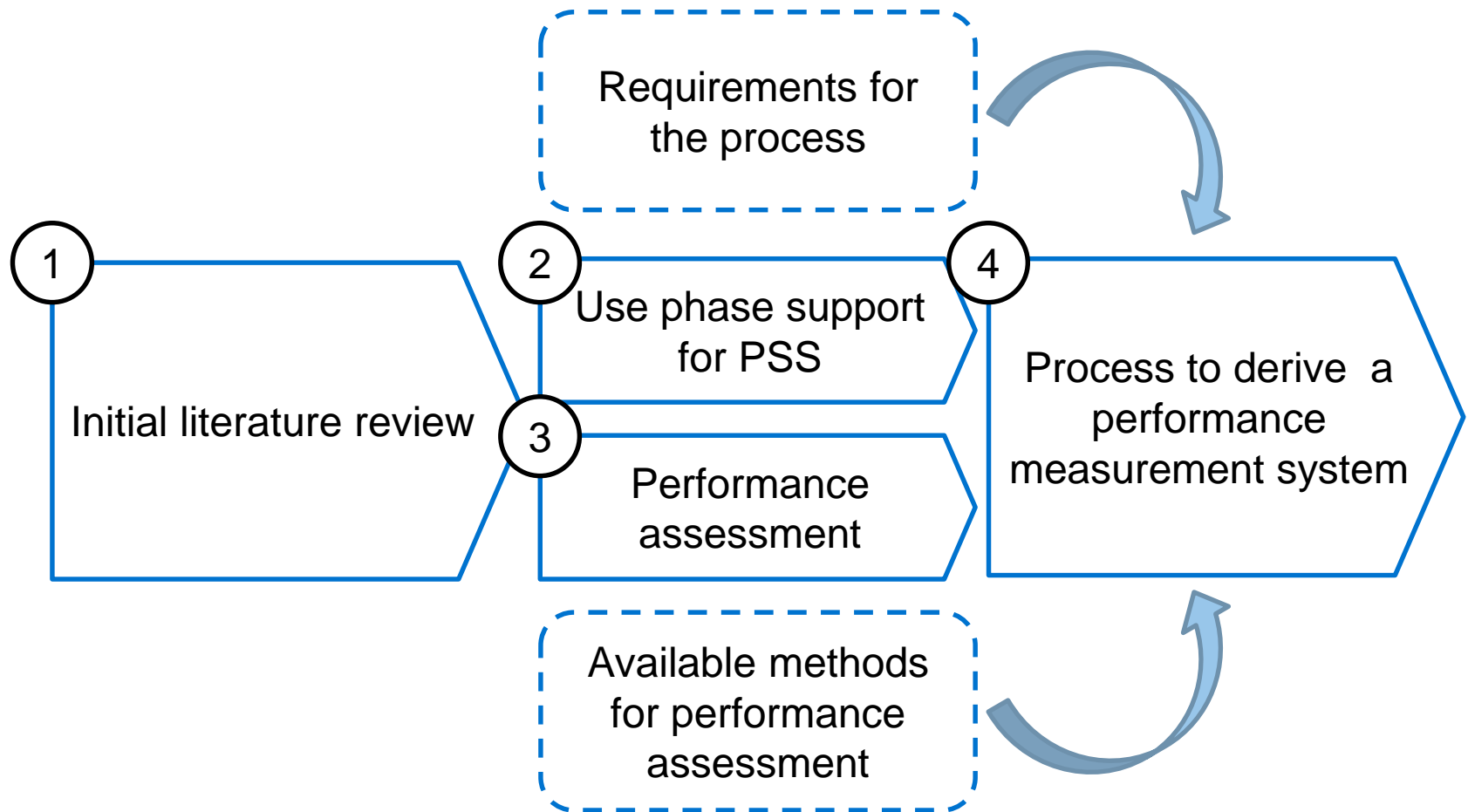
**Use phase** monitoring and assessment is of great importance for PSS providers



# Motivation

- **Potential of Use Phase Assessment**
    - Important information is generated during the use phase
    - Systematically collecting information during use is very beneficial for PSS providers
    - Gathered knowledge helps to improve the current PSS in use or develop better PSS in the future
  - **Existing approaches**
    - Many of the existing approaches in literature focus only on the development phase
-  **Approach** needed to support PSS providers to set up the performance assessment system

# Research Methodology



# Results of the Literature Review

- **Use Phase Support for PSS**

- PSS providers face additional complexity because they act more as a service provider rather than a producer
- The additional responsibilities requires the application of additional tools and methods
- A service strategy and objectives needs to be defined
- PSS providers must set up a performance measurement system that allows a constant monitoring of the achievement of the objectives
- An iterative process is required because the customer expectations need to constantly exceeded



# Results of the Literature Review

- **Performance assessment in General**

- Decision makers face an increasing complexity and assessing the performance through metrics increases the transparency
- Two general categories of metrics exist:
  - » (K)PIs – (Key) Performance indicators
  - » (K)RIs – (Key) Result indicators
- KPIs are of special interest because they help to obtain insights concerning the measures required to achieve the future objectives
- A mix of different KPIs – performance measurement system – is needed
- Using KPIs serves various benefits but the effort must also be considered

[7],[8],[9]





# Results of the Literature Review

- **Need for a Performance Measurement System**

- Being a PSS provider requires a shift in the companies role including the application of new tools and methods
- Constant performance measurement is an important aspect to ensure that the promised customer value is delivered
- Existing methodologies for PSS support especially for the development phase rather than the use phase
- KPIs are often only used to assess the performance of projects



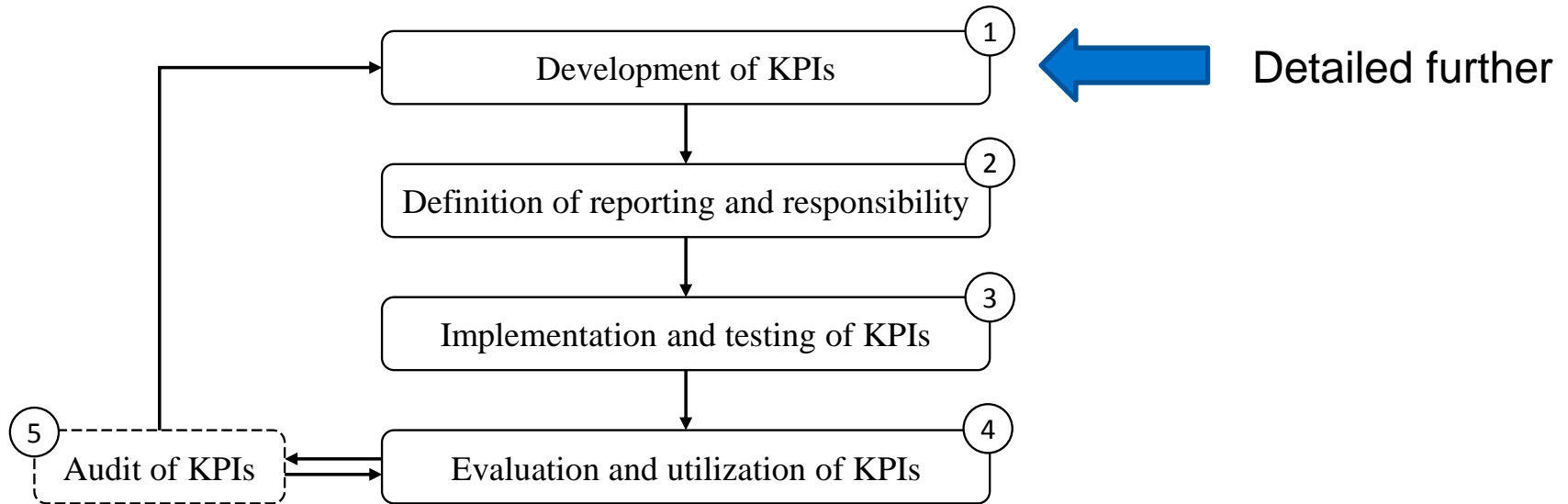
**Using a performance measurement systems** in the new context seems promising to assess the PSS performance



# Performance Assessment of PSS

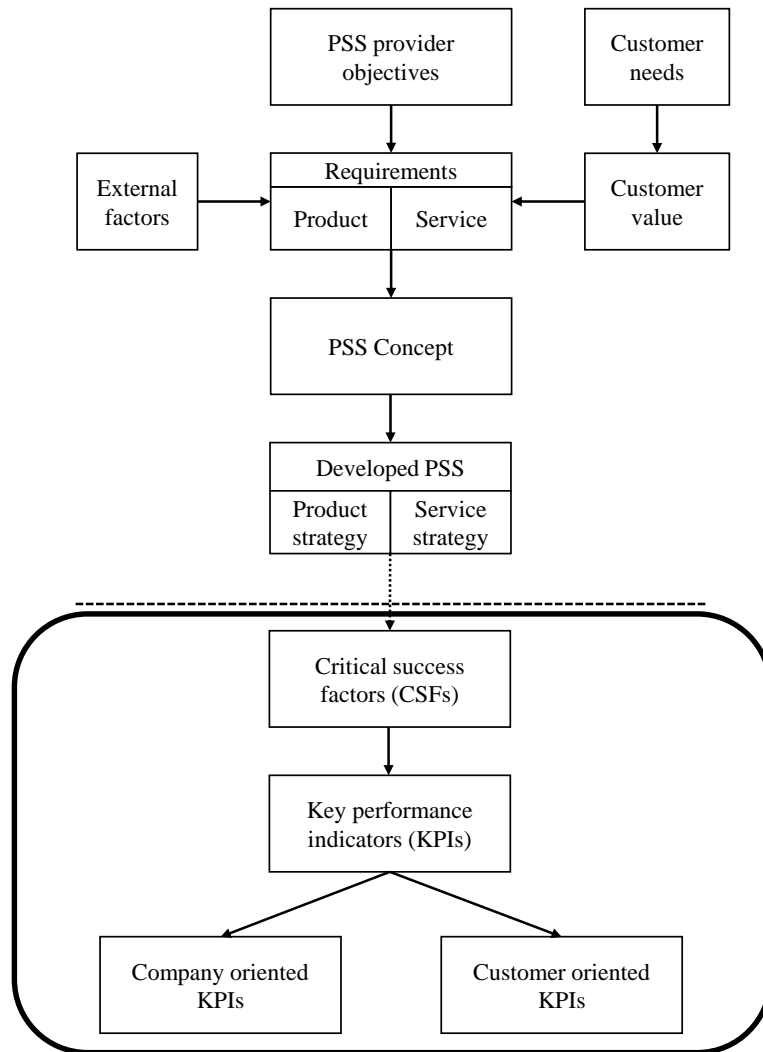
- **Supporting the implementation of performance measurement system**
  - No approaches exist that use KPIs to assess the PSS performance during the use phase
  - Setting up a PSS specific performance measurement system requires an iterative process
  - Focus on supporting the use and result-oriented PSS
  - Incorporation of a performance measurement system includes three general steps: Design, implementation, and use

# Performance Assessment of PSS



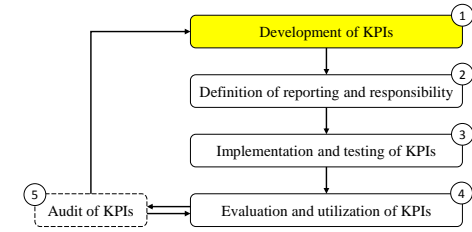
- Generic process for the implementation of a performance assessment system
- Iterative design to allow a constant adaption and improvement

# Performance Assessment of PSS

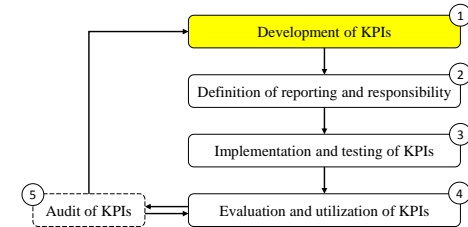
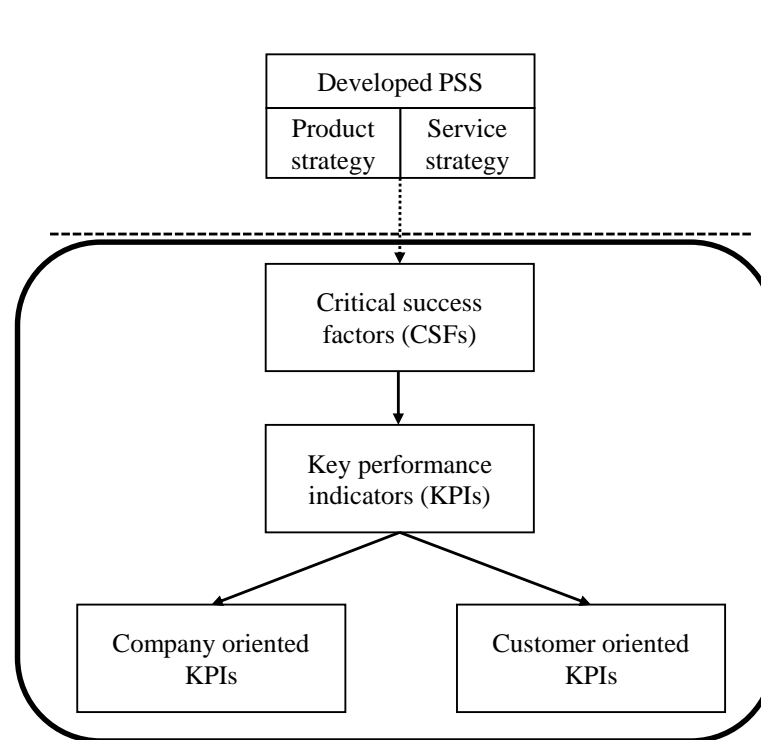


← Development of the PSS (e.g., [5] or [13])

← Focus of this work: Derive PSS specific KPIs



# Performance Assessment of PSS



- Critical success factors (CSFs) help to link the PSS strategy and KPIs
- Process needs to be conducted regularly to respond to the dynamic environment
- The set of derived KPIs should serve a balance between the customer and company perspective

# Discussion

- Mentoring the performance of a PSS is an important task for PSS providers
- Implementing a performance measurement systems helps to obtain a clear picture concerning the achievement of objectives and serves as a trigger for continuous improvement
- KPIs need to be embedded in an organizational structure that not only measures the performance but also decides about measures
- Using KPIs means also effort and does not serve benefits right from the beginning

# Conclusion and Outlook

- **Conclusion**

- PSS providers must assess the performance of PSS during the use phase to ensure that the customer value is delivered and to allow for constant improvement
- Existing methodologies for PSS focus only on the development phase
- Deriving a PSS specific performance measurement system helps to monitor the achievement of objectives and increases the transparency
- The developed iterative process guides PSS providers through the development of a specific performance measurement system

- **Outlook**

- Applying the developed process in a case study in order to test the usefulness
- Using a performance measurement system in combination with simulation models to evaluate the potential to support the development process of PSS



# Contact & Literature

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- [1] Andersen, J.B., McCloone, T.C., Garcia i Mateu, A., Mougard, K., Neugebauer, L., Husan, J., and Ahm, L.T., PSS Business Models: A workbook in the PROTEUS series, PRO-07. 2013, Technical University of Denmark.
- [2] Baines, T.S., Lightfoot, H.W., Evans, S., Neely, A., Greenough, R., Peppard, J., Roy, R., Shehab, E., Braganza, A., and Tiwari, A., State-of-the-art in product-service systems. Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture, 2007. 221(10): p. 1543-1552.
- [3] Oliva, R. and Kallenberg, R., Managing the transition from products to services. International journal of service industry management, 2003. 14(2): p.160-172.
- [4] Tan, A., McAloone, T.C., and Andreasen, M.M. What happens to integrated product development models with product/service-system approaches? in IPD 2006: Proceedings of the 6th Workshop on Integrated Product Development, Magdeburg, Germany. 2006.
- [5] Aurich, J., Fuchs, C., and Wagenknecht, C., Life cycle oriented design of technical Product-Service Systems. Journal of Cleaner Production, 2006. 14(17): p. 1480-1494.
- [6] Ramaswamy, R., Design and Management Service Processes: Keeping Customers for Life. 1996, Addison Wesley, Boston, MA.
- [7] Parmenter, D., Key performance indicators (KPI): developing, implementing, and using winning KPIs. 2010, John Wiley & Sons, Hoboken, New Jersey.
- [8] Kerzner, H.R., Project management metrics, KPIs, and dashboards: a guide to measuring and monitoring project performance. 2013, John Wiley & Sons, New York.
- [9] Neely, A., Gregory, M., and Platts, K., Performance measurement system design: a literature review and research agenda. International journal of operations & production management, 1995. 15(4): p. 80-116.
- [10] Vasantha, G.V.A., Roy, R., Lelah, A., and Brissaud, D., A review of product-service systems design methodologies. Journal of Engineering Design, 2012. 23(9): p. 635-659.
- [11] Chan, A.P. and Chan, A.P., Key performance indicators for measuring construction success. Benchmarking: an international journal, 2004. 11(2): p. 203-221.
- [12] Bourne, M., Mills, J., Wilcox, M., Neely, A., and Platts, K., Designing, implementing and updating performance measurement systems. International Journal of Operations & Production Management, 2000. 20(7): p. 754-771.
- [13] Morelli, N., Developing new product service systems (PSS): methodologies and operational tools. Journal of Cleaner Production, 2006. 14(17): p. 1495-1501.

