

2 Research Concept

Before the manuscript focuses on the research depicted in the introduction, some opening words are called on the scientific foundation that structures this thesis. In the first two sub-chapters the underlying research paradigm and methodology will be elucidated in order to classify this work. The third sub-chapter outlines the work's structure and goes into more detail about the procedure of this thesis.

2.1 Research Approaches in Information Systems

Kuhn describes paradigms as "...achievements that some particular scientific community acknowledges for a time as supplying the foundation for its further practice" (Kuhn 2012, p. 10; first published in 1962). It can be seen as a scientific consensus and conceptual framework within a community of researchers that determines with its mental map and view on the world a specific way of thinking that provides through education patterns, practices and prime examples for the solution of problems. As the association is a base element of this definition, the social component represents an important part of paradigms. This is why the term "school of thought" is often used in science to refer to paradigms (i.a. van Aken 2004, p. 220).

This thesis is assigned to the domain of Information Systems (IS), in which the differences between the paradigms are of particular importance and significance. Due to its dichotomy IS is a good example of a multi-paradigmatic community (Vaishnavi and William 2007, p. 8). The IS discipline can be described as the study of "...interrelated components that collect (or retrieve), process, store, and distribute information to support decisions making and control in an organization" (Laudon and Laudon 2012, p. 47). Accordingly, IS deals with behavioral as well as technical research.

In the domain of IS two science paradigms have been solidified over the years which coexist to a large degree independently of each other (Frank 2006). These paradigms are namely Behavioral Science Research and Design Science Research. Although the two paradigms are not contrary but rather complementary, they are often considered in competitive terms. Both paradigms aim to evolve value in the discipline of Information Systems, but with different approaches.

Behavioral Science Research (BSR) has its origins in natural science (Frank 2006, pp. 2–3), which accumulates empirical knowledge through the measurement and surveying of natural phenomenon. The model of natural science and its paradigm has been adapted to many fields such as social science and psychology. The intention in these contexts is to understand a problem by developing and approving theories that can explain or even predict the phenomena observed. In IS the object of interest is the interaction between human and computer. Accordingly the discipline strives to understand “...organizational and human phenomena surrounding the analysis, design, implementation, management, and use of information systems” (Hevner et al. 2004, p. 76) by justifying cause-effect and target-means relations. As BSR is very much oriented on the paradigm of natural science it is a very much accepted and internationally widespread approach, particularly in the Northern American hemisphere (Baskerville 2012, p. 581). Nonetheless, due to its close relations to other disciplines, the approach struggles with its scientific identity. Moreover, the relevance of the results it arrives at is frequently disputed as these often have little practical impact.

In contrast to the behavioral approach, whose objective is to deduce statements of truth in the form of hypotheses and theories, Design Science Research (DSR), which originates from the engineering discipline and is rather established in Europe (especially in German speaking countries), deals with the development of useful artifacts to solve a problem. So instead of trying to understand a specific problem and provide truth, DSR focuses on the identification and development of useful solutions to a problem in the form of artifacts. Information Technology related artifacts for such solutions range from “...constructs (vocabulary and symbols), models (abstractions and representations), methods (algorithms and practices) to instantiations (implemented and prototype systems)” (Hevner et al. 2004, p. 77). Even though the relevance of this research approach and its practical impact are held in high regard, its scientific contribution and value are often disclaimed. While the process of artifact creation still builds on core theories the research relies on, innovative artifacts often touch the boundaries of existing theories (Markus, Majchrzak and Gasser 2002). Furthermore, no consensus exists for the evaluation of artifacts (Cleven, Gubler and Hüner 2009, pp. 1–2). DSR lacks evaluation principles and a body of methodical and empirical standards. As a result it

can be rather difficult to publish articles based on DSR in international channels which most likely follow the BSR approach (Baskerville 2012).

The two paradigms are often treated as contrary and mutually exclusive. Discussion of the two paradigms and the relationship between them is commonly known as “rigor versus relevance” (i.a. Österle, Winter and Brenner 2010). Rigor refers to the scientific conclusiveness and stringency of research. It considers a systematic methodical approach, which is compliant with academic research standards and rules that facilitate evaluation of the quality and validity of research. The BSR paradigm in particular strives to generate rigorous research outcomes. The term relevance, in contrast, points to the impact of research results in practice. As DSR seeks to originate applicable solutions for a specific problem, it is often associated with relevance.

Although each paradigm tends to emphasize one and neglect the other, both – rigor and relevance – are essential in IS research. Hevner et al. (2004) try to settle the difference by arguing that the approaches are complementary to each other. They state that both are very much of importance and that the challenges or disadvantages one paradigm faces can be covered by the other. Accordingly, artifacts have the potential to sort out not yet dissolved problems, while theories analyze the implementation and use of those artifacts as well as their impact on the organization and may, in doing so, discover further challenges that need to be solved. Thus, results that base on one paradigm initiate research that refers to the other.

As the present work proposes to bridge an academic void by means of a methodical conceptualization of a customer-oriented process management, it is rather allocated to DSR. In order to give the reader a deeper insight into the approach and basic elements of DSR, the next chapter will comment on the methodology of DSR.

2.2 Research Methodology

As DSR originates from engineering and the design of the artificial, it also includes parts of their body of principles and techniques. In reference to the methods of engineering, in the early 1990s researchers began discussing DSR frameworks and procedure models for a systematic development of artifacts in DSR. Those frameworks can

be seen as mental models for the demonstration and evaluation of DSR in IS. Peffers et al. (2007) reviewed proposed frameworks in their article on Design Science Research Methodology (DSRM) and united them by appropriately combining their elements.

The presented DSRM process model is widely accepted in IS related DSR publications due to its consensus building approach (Hevner and Chatterjee 2010, p. 28). Figure 1 illustrates the course of action, which consists of six activities that need to be taken consecutively. Based on Peffers et al. (2007) each activity is described in further detail in the following:

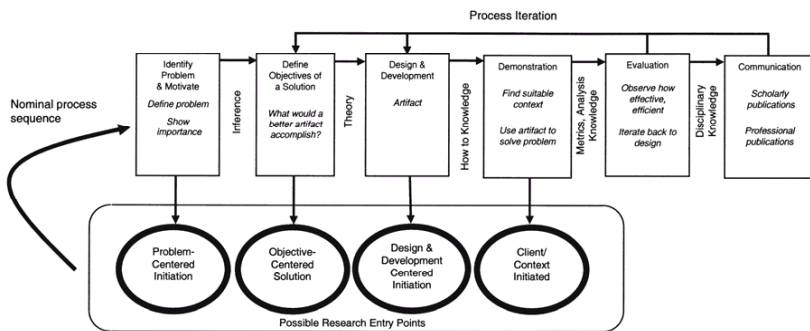


Figure 1. DSRM process model (Peffers et al. 2007, p. 54), full-page illustration in Appendix 1.

- (1) The first activity focuses on identifying the problem and motivation of research. In order to set research to the right direction, it is fundamental to explicitly define the problem that needs to be solved. It is important to show the relevance of the problem and the significance of a solution that solves it. Thus, identification of a need justifies the entire research.
- (2) Once the problem and the relevance of a solution has been depicted, the requirements a solutions needs to meet have to be extracted from the problem definition (i.a. Eekels and Roozenburg 1991, pp. 199–200). When the required specifications of a solution are elucidated clearly, the audience can follow the line of argumentation more easily and approve whether the developed artifact pursues the identified

problem. Objectives can be of a quantitative (e.g. measurements) and/or qualitative (e.g. description of the support to problem solving) nature.

- (3) All of the proposed research frameworks see the key element of DSR in the design and development of artifacts. Once the specifications are outlined, the creative phase of developing an artifact that addresses the desired functionalities can be initiated. As artifacts' functionalities are often developed step-by-step, they may need revision and adjustment. This step is therefore an iterative one. In order to provide insight into the steps taken, the functionality specifications and the process of development are often documented in further detail.
- (4) With regard to the framework, a demonstration of the artifact's application is appropriate (Nunamaker, Chen and Purdin 1990, p. 100). This allows for the basic idea of how the artifact provides a solution to the problem to become more tangible and comprehensible. This step can be seen as an informal evaluation, ensuring that the idea to solve the problem works properly. It can be demonstrated, for instance, by exemplifications or even concrete examples.
- (5) Once the artifact is developed and its suitability has been demonstrated, the artifact has to be evaluated (Hevner et al. 2004, pp. 88–90). The main purpose of this activity is to measure to what extent the artifact solves the problem that has been defined at the beginning of the research. Stated more concretely, the evaluation verifies whether its functionalities suit the requirements of activity 2. This can be obtained by logical proof or empirical evidence, such as performance indicators (quantitative) or client feedbacks (qualitative). The results of the evaluation show whether the objectives are fulfilled or further adjustment is necessary. For example, one may revise the artifact in order to raise performance indicators. However, due to a lack of principles almost no guidelines are currently available for the choice of evaluation method, which complicates the justification of one's selection.

(6) After research is completed, the created process needs to be documented and made available for insight so that the gathered knowledge is spread and can be discussed in respective academic and/or practicing communities (Hevner et al. 2004, p. 90). The DSRM can be seen as a structuring element for publications. Books, working papers or theses are formats that can cover all research activities at once. Parts of the research project such as the literature review, the design or evaluation can also be published a priori in the form of articles.

Though the DSRM follows a nominal process, iterations are considered and advised. It also can be stated that research does not necessarily need to start with the first activity. Entry points for research are given throughout activity 1 to 4. Instead of the common problem-centered start of research, also objective, design/development or context-oriented initiations are conceivable. Also leaps between the activities might be conducive and informative. In summary, the DSRM with its sequence of six activities reflects a typical procedure in DSR. Though procedure details depend on the nature of the specific research (e.g. problem context, design situation), it provides a well-founded guideline (Hevner and Chatterjee 2010, p. 28).

2.3 Outline of Research

As recommended by Hevner and Chatterjee (2010, p. 31) the nominal DSRM explained above has been used to structure the further proceeding of this thesis and the relative research. Chapter 1, 2 and 7 of this thesis are not further considered in the outline as they are rather of a framing and summarizing character. Figure 2 illustrates which chapter and sub-chapters cover which of the six DSRM activities. As the last activity “communication”, which focuses on documentation and publication of the research proceedings, is complied with this thesis, it contains an outlook on further research possibilities instead.

Chapter 3 highlights the problem and its relevance by referring to recent research on customer orientation and customer processes in the domain of marketing and BPM. In chapter 3.1 evolving marketing concepts and current findings as well as the signifi-

cance of customer processes for business performance are described. Chapter 3.2 pans the view to BPM and analyses in a comprehensive literature review the extent to which the customer and his or her processes have been picked up in BPM. Besides an explanation on the review procedure, the literature review contains a quantitative and qualitative analysis. In chapter 3.3 the critically analyzed findings of the literature review are transformed into a problem definition, on which the subsequently described objectives and requirements of solution are based.

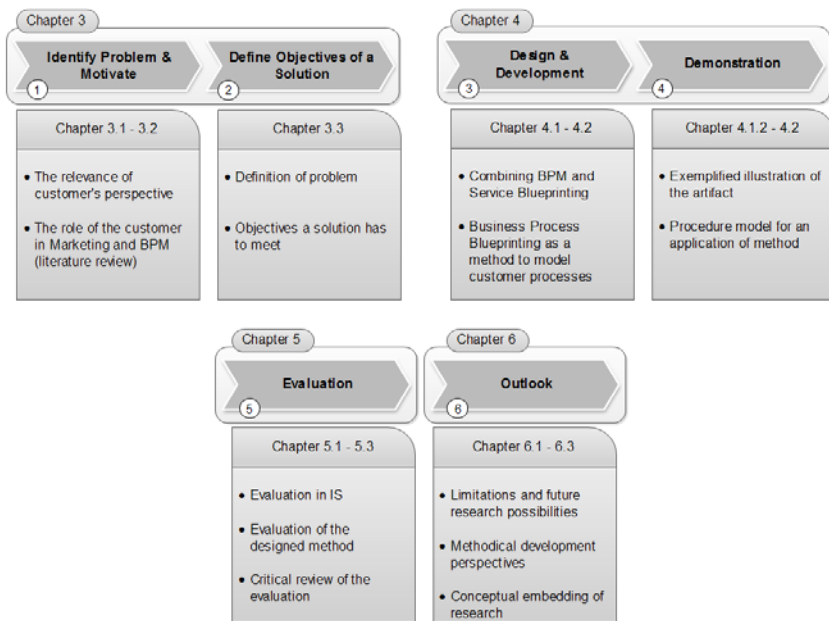


Figure 2. The research outline according to the six DSRM activities

Chapter 4 describes the design and development of an artifact and demonstrates its use by examples. Based on previous publications, the first sub-chapter elucidates the general concept behind the method and goes into detail on how the method emerged from an interdisciplinary synthesis of concepts to highlight interaction processes. Next, the method will be enhanced in order to illustrate usage processes. The expansion of the traditional perspective to the customer side is one of the key aspects of this work as it strengthens the process designers' awareness of (autonomous) customer processes. In

the second sub-chapter a procedure model for the implantation of method is provided in order to minimize ambiguity. The last sub-chapter verifies by means of logical reasoning whether the artifact meets the requirements that are proposed in chapter 3.3.

In *chapter 5* the artifact is evaluated in a case study. For the sake of clarity the setting of the case study is explained in sub-chapter 5.1. The case study “BIOTRONIK Home Monitoring” resides in the field of e-health and can be seen as a prime example to show the importance of analyzing customer processes. In chapter 5.2 the artifacts deployment is described, which results in not yet considered design options. The last sub-chapter sums up the case study and its results and critically reviews the quality of evaluation.

Before the last chapter of this thesis summarizes the research process, limitations are outlined and an outlook on future research possibilities is given in *chapter 6*. The first sub-chapter considers the limitations of this research project. Further, the developed artifact can be seen as a toolkit, which provides additional instruments or a starting point for deeper analysis with additional concepts, methods and tools. This issue is exemplified in the second sub-chapter by a potential enhancement of method, which enables the determination of willingness to pay for sub-processes in BPM. Advancement is also seen in the combination of customer process modeling and Business Analytics. The third sub-chapter embeds this research to its context and relates it to principal concepts such as process landscapes that not only consider the provider and customer, but also third parties and connected networks as well as their infrastructure.

Although the outlook replaced the “communication” activity, which is already fulfilled by this thesis, it should be stated that the method has already been discussed and approved through publications on which the further explanations are based. Moreover, this thesis builds upon the lines of thought and achievements of previously published research. The artifact presented here draws on the concept and method of a working paper that presented the combination of methods (Gersch, Goeke and Lux 2006). The further enhancement of this method develops ideas from Fließ (2001) and Frauendorf (2006). However, their concepts contain certain limitations and thus invite certain perspectives for development that have been outlined throughout this manuscript and to

which this research project refers. An overview of prior research in comparison to the knowledge developed by this thesis can be seen in Table 1.

Table 1. Overview of preliminary work and its advancement throughout this research project, full-page illustration in Appendix 2

No	Chapter	Focus*	Preliminary work (chronically)	State of the art*	Advancement throughout this research project*
1	3.1	Linkage of value creation and customer orientation to a process-based perspective	amongst others: Engelhardt (1996) Engelhardt/Kleinaltenkamp/Reckenfelderbäumer (1993) Gersch (2006) Vargo/Lusch (2004a)	Concepts that open up the view on value creation to the customer side	Plead for the importance of a process-based view on customer orientation by a review of the transformation from a product-over-service to an experience-oriented focus on value creation
2	3.2	Insufficient considerations of customer (modeling) concepts in BPM	Gersch (2006) Batista/Smart/Maull (2008)	First insights by conceptual discussions and an explorative analysis	Comprehensive literature review with quantitative and qualitative analysis affirms the proposition with a high level of reliability and validity
3	4.1.1	Artifact Development I: Combination of the Service Blueprinting with Business Process Modeling notations	Knackstedt/Dahlke (2004) Becker/Klose/Knackstedt (2005) Gersch/Goeke/Lux (2006) Meis/Menschner/Leimeister (2010) Coenen/Felten/Schmid (2011) Milton/Johnson (2012)	Initial combination of methods and technical explanations	Journal and conference publications with conceptual embedding, further evaluation and discussion of advantages/limitations (Gersch, Schöler, Hewing 2010; Gersch, Hewing, Schöler 2011; Hewing 2011)
4	4.1.2 4.2 5 6	Artifact Development II: Modeling of customer processes that take place beyond the direct interaction with the provider	Green/Simister (1999) Fließ (2001) Alt/Puschmann (2005) Frauendorf (2006) Eichentopf/Kleinaltenkamp/van Stiphout (2011) Heckl/Moormann (2007)	Initial reflections on and mapping of customer processes	Development of an approved method to model customer processes that has been critical reflected, considers current Business Process Modeling notations, the logic of the Service Blueprinting, evolving concepts on customer processes (in particular insight/influence) and to which further methods are applicable (Gersch, Schöler, Hewing 2011)

* detailed explanations can be seen in the relative chapters

One of the main achievements of this research project is that the concept, and its integration into Business Process Management have been seriously discussed in public and passed double-blind reviews. Articles concerning this research have been published in three highly ranked conferences, in a journal significant to the field of BPM and in a book chapter. Early publications rather explain the concept behind the method and show first evaluations of benefits (Gersch, Hewing and Schöler 2011; Gersch, Schöler and Hewing 2010). The two papers published subsequently discuss the implementation of method into Service Engineering (Rachmann et al. 2011) and its enhancement to enable the management of usage processes (Gersch, Schöler and Hewing 2011). The enhancement of method to usage processes is the other main achievement of this thesis. The most recent publication focuses on the framework and procedure model for the application of method (Hewing 2011). Table 2 lists sequentially these publications with a short note on the respective focus.

Table 2. Publications of the author that relate to this work

No.	Year	Publication	Type	Authors	Focus
1	2010	AMCIS	Conference	Gersch/Schöler/Hewing	An introduction to Business Process Blueprinting
2	2011	BPMJ	Journal	Gersch/Hewing/Schöler	BP ² as the link between BPM and Marketing
3	2011	ISO	Book Chapter	Rachmann/Maucher/Schöler/Hewing	Integration of BP ² into Service Engineering
4	2011	EMAC	Conference	Gersch/Schöler/Hewing	BP ² as a method to manage usage processes
5	2011	BPM	Conference	Hewing	The BP ² -Framework

Through this research agenda knowledge concerning a customer-oriented process management has been accumulated and advanced. The findings of this research reveal that although customer orientation is important for the creation of value, its processes are barely considered in BPM. However, through the introduction and evaluation of an enhanced method a solution has been developed that decreases this drawback and gives an outlook for possible directions for future research.

Now that the outline of research has been clarified and each activity has been allocated to the chapters of this thesis, the identification of the problem and its relevance are to be illustrated in the next chapter.

<http://www.springer.com/978-3-658-03728-4>

Business Process Blueprinting
A Method for Customer-Oriented Business Process
Modeling

Hewing, M.

2014, XVII, 229 p. 38 illus. in color., Softcover

ISBN: 978-3-658-03728-4