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IT-enabled Business Process Change in Private and in Public Sector Organizations

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Preface

This PhD thesis represents a culmination of work and learning that has taken place over a period of almost five years (2009 - 2014) at the Chair of Information Systems at the Technische Universität München. Throughout this time, I have been given many unique opportunities, projects, and challenges and I am thankful for each one of them. All of these experiences allowed me to grow into a more confident, more resilient, and more knowledgeable researcher. On my way to complete this thesis I have experienced many joyous moments, as well as hurdles. Fortunately, I was not alone on this road, but accompanied by an extended team of experts and friends, always willing to coach, sponsor, help, and motivate me. For this, I would like to kindly thank those who gave me the strength and courage to continue and press forward.

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Thanks and love to my mother Christiane Jurisch and my father Dietmar Jurisch for their continuous support in all my pursuits. I owe a lot to my parents, who encouraged and helped me at every stage of my personal and academic life, and longed to see this achievement come true. This last word of acknowledgment I have saved for my dear friend Kristin Bothur, who has been with me all these years and has spent endless evenings on the phone listening to me.

Marlen C. Jurisch

Abstract

Motivation: Only a few private and public sector organizations have not passed through a number of information technology (IT) enabled business process changes (BPC) in the past decades. Despite the many promises of BPC, many organizations are daunted by the challenges and risks that BPC imposes. According to the literature, between 60 and 80 percent of all BPC efforts are considered a partial or even complete failure. Various researchers have addressed the topic of BPC success, but their research outcomes produced to some extent conflicting and mixed results. Notwithstanding the fast growing body of knowledge and more than three decades of experience in BPC, the staggering failure rates of BPC projects demonstrate the lack of clarity on the determinants impacting the success of BPC projects. The field of BPC itself is still rather disorganized, with little prospect of classifying or comparing the various research streams. Therefore, it is not surprising that BPC research outcomes have often been ignored by practitioners. This doctoral thesis intends to address these issues by building up a theoretically grounded understanding of how BPC can be implemented successfully in private and public sector organizations.

Research Approach This doctoral thesis employs a multiphase mixed-methods design to analyze different and loosely connected aspects of our phenomenon of interest (BPC). This research strategy employs both qualitative and quantitative data analysis. Concerning its epistemological foundations, we adopt a pragmatic and balanced or pluralist position. The methods employed for answering the research questions were literature reviews, case surveys and a case study. This thesis reviewed literature on BPC experiences in private and in public experiences as well as relevant formal theories. These insights informed the case survey, which was the dominant method in two publications of this thesis. Furthermore, we conducted a case study to obtain a solid understanding of the phenomenon under study in a public sector setting.

Results: The publications offer insights on how formal theories can help identify and explain the factors impacting the success of BPC projects and business processes. In specific, we identify the resource-based theory (RBT) as a suitable theory for understanding which capabilities and resources contribute to the success of BPC. The results presented also constitute a test of RBT at the business process unit of analysis. We show that IT capabilities matter equally for the project and the process performance. Other capabilities such as change and project management also impact process performance – but their impact is mediated via the project performance. The analysis of the key differences between private and public sector BPC implementations looked at all types of process change in both sectors. The results show that the experiences relating to success factors, risks and challenges in BPC are much more numerous and well-supported for private sector applications. Yet, most concerns valid for BPC projects in the private sector seem to be of similar importance when dealing with public organizations. While there appears to be some differences in character (process scope and intended improvements), most aspects deserving attention in private sector projects also play a major role when initiating change in public organizations, albeit sometimes for different reasons (change management, resource management). Based on our analysis, we concluded that a top-down BPC approach appears to be best suited for public sector BPC

implementations. We show in a case study in Germany, how public sector BPC can be addressed through a top-down approach such as process bundling.

Contribution: As for BPC in general, we contribute detailed descriptions and analyses of past projects (as reported in case studies) by means of comprehensive empirical meta-analysis research. We theorized and examined the influence of various drivers on the implementation of BPC projects and their specific arrangements in private and public organizations. These theory elements (including boundary definitions, context variables, etc.) could be reflected and added to the move of further efforts to understand BPC and, here specifically, resource arrangements and influencing variables. All of the discoveries can serve to help practitioners in planning their BPC projects more carefully. As for private and public sector BPC implementations, we disclosed that the available evidence does not provide clear support for the view that public and private BPC implementations are fundamentally dissimilar in all important respects. The established knowledge on the differences in public and private sector BPC implementations can provide guidance to practitioners. The proposed approach for public process bundling is to serve as a guideline for practitioners, aimed at reducing costs and improving process quality. With the help of the proposed approach, managers in public organizations can analyze their processes for overlapping content, recurring information and related redundancies.

Limitations: Like any research project, the publications presented within this doctoral thesis are subject to certain limitations. First and above all, this thesis' publications were written over a period of more than four years. During this time, the research has progressed significantly, both regarding theory and methodology; but most importantly our personal understanding of the subject under study evolved as well in respect to the terminology, concepts, methods and theories used. Besides these issues and other methodological limitations, additional external factors had an impact on how well the spectrum of analytical perspectives was able to be covered in the individual publications.

Future Research: Given the results and limitations of this doctoral thesis, it opens up for several potentially fruitful avenues for future research. Additional empirical inquiries are needed to examine which capabilities impact BPC success. Another interesting avenue for future research presents dynamic capability theory. We identified BPM capabilities as dynamic capabilities. How do these capabilities impact IT, project and change management capabilities? Do other dynamic capabilities matter for the success of BPC projects and the changed processes? These are questions that need to be addressed in greater detail in order to improve BPC success. For future BPC research, the involvement of external experts could provide an interesting control variable for future empirical studies. In addition, future research should explore their role for the success or failure of a BPC project. The study of failed BPC projects provides another fruitful avenue for future research and could help to shed a different light on the complexities experienced in the situations, which ultimately led to the failure. Last, future research is needed to investigate the transferability of the proposed approach to other domains and different sets of process flows.

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List of Abbreviations

AVE	Average Variance Extracted
BPC	Business Process Change
BPI	Business Process Improvement
BPM	Business Process Management
BPR	Business Process Reengineering
BPT	Business Process Transformation
B2G	Business to Government
CEO	Chief Executive Officer
CM	Change Management
Conf.	Conference
CPI	Continuous Process Improvement
CSF	Critical Success Factors
C2G	Citizen to Government
DCT	Dynamic Capability Theory
e.g.	for example
eGovernment	Electronic Government
ERP	Enterprise Resource Planning
i.e.	that is
IFIP	International Federation for Information Processing
GI	Gesellschaft für Informatik
G2G	Government to Government
ICT	Information and Communication Technology
IT	Information Technology
IS	Information Systems
No	Number
P	Publication
PLS	Partial Least Squares
PM	Project Management

RBT	Resource-Based Theory
RBV	Resource-Based View
RQ	Research Question
TQM	Total Quality Management
VHB	Verband der Hochschullehrer für Betriebswirtschaft
VIF	Variance Inflation Factors
WKWI	Wissenschaftliche Kommission für Wirtschaftsinformatik

PART A: Introduction to the dissertation's publications

1. Introduction

This doctoral thesis aims to build a theoretically grounded understanding of how IT-enabled business process change (BPC) can be successfully implemented in private and public sector organizations. By providing a theoretically grounded understanding the thesis fills various gaps in BPC research (see chapter 1.2). The following chapter motivates this doctoral thesis and provides detailed problem statements for the three research questions, which guided this research project.

1.1. Motivation

The terms “business process” and “business process change” (BPC) are omnipresent in organizations worldwide. For the purposes of this thesis, we define business processes (in private and public organizations) as a collection of activities that takes one or more kinds of input and creates an output (adapted from Hammer and Champy's (1993) original definition) (see chapter 2.2 for a review of business process definitions). Notwithstanding the size, the industry sector or the country of origin, organizations strive to improve the efficiency and effectiveness of their business processes. Only a few private and public sector organizations have not passed through a number of information technology (IT) enabled process changes in the past decades (Sorge 2004). BPC presents a management concept that involves any type of process change (radical and continuous). The goals behind such improvements range from reducing costs to improving service quality.¹ The change of business processes can be incremental, disruptive or transformational (see chapter 2.3).

If we look at the past, BPC has often been spurred by technological advances (Scholl, 2003). According to Grover, Kettinger, and Teng (2000, p. 18) “the power of modern information technologies is one of the major impetuses for [BPC].” New technologies and infrastructures have often led to new business processes (Harmon 2012). For instance, the introduction of telephones, computers, smart phones or even the Internet, have each led to new or changed business processes within organizations. In fact, information and communication technologies (ICT) have led to rapid changes and innovations in organizations, which usually catalyzed some sort of BPC (Scholl, 2003; Short & Venkatraman, 1992). Research suggests a recursive relationship between IT and BPC (Davenport & Short, 1990). On the one side, IT is needed to support new or changed business processes. On the other side, BPC and business processes “should be considered in terms of the capabilities information technology can provide” (Davenport & Short, 1990, p.2). Consequently, BPC as discussed within this dissertation always refers to IT-induced or IT-enabled BPC.

¹ For a full overview of business process improvement criteria please refer to the following article: Ley, Jurisch, Wolf, & Krcmar (2012). Kriterien zur Leistungsbeurteilung von Prozessen: Ein State-of-the-Art. In: Proceedings of Multikonferenz Wirtschaftsinformatik (MKWI). Braunschweig, Germany.

Despite the many promises of BPC, many organizations are daunted by the challenges and risks that BPC imposes (Hill & McCoy, 2011). According to the literature, between 60 and 80 percent of all BPC efforts are considered a partial or even complete failure (Al-Mashari, Irani, & Zairi, 2001; Berman et al., 2008; D. Koch & Hess, 2003; Trkman, 2010). Notwithstanding the fast growing body of knowledge and more than three decades of experience in BPC, the staggering failure rates of BPC projects demonstrate the lack of clarity on the determinants impacting the success of BPC projects (Al-Mashari et al., 2001; Hammer & Champy, 1993; Trkman, 2010). In addition, most organizations no longer have the luxury of funding BPC projects that may not succeed.

The failure or even the partial failure of a BPC project can have drastic consequences for the respective organization. Table 1 provides an overview of prominent IT-enabled BPC project failures.

Year	Organization	Sector	Project description	Consequences	Source
1996	FoxMeyer Drugs	Private	In an attempt to increase efficiency, FoxMeyer purchased an SAP system and a warehouse automation system.	They hired consulting support to integrate and implement the two systems in what was supposed to be a \$35 million project. At the end of the project, the company was bankrupt and was eventually sold to a competitor.	(Widman, 2008)
1999	Hershey Food	Private	\$112 Million Project to renew the order system, with a mix of systems from SAP, CRM provider Siebel and supply chain software from Manugistics.	Launched in one of the busiest season with too tight of a schedule, the project resulted in orders not being pushed through the system. Hershey could not deliver candy and other products worth of \$100 Million in the Halloween season, resulting in a 19% drop in profits for Q3.	(CIO.com, Computerworld)
2000	Federal Bureau of Investigation (FBI)	Public	The Virtual Case File was intended as user application to enhance the ability of agents to organize, access and analyze information. In addition, the IT Enterprise Architecture/Infrastructure was supposed to be modernized.	The project was officially abandoned in April 2005. The original plan was for a modest project that would cost taxpayers \$119 million for implementation, offset by \$117 million in licensing fees. By 2001, the costs had ballooned to \$688 million.	(Widman, 2008)
2002	German Bundeswehr, Isic 21 (CSC, Mobilcom, EADS) and SBS, IBM	Public	In order to modernize and connect all non-military information and telecommunication systems, the German army replaced most of their infrastructure.	The project failed for the first time in 2006, as the assigned consortium Isic21 could not deliver in the wanted service-price ratio. The project was later resumed together with SBS and IBM, and was completed in 2012, although the satisfaction among users was still low.	(Krampe, 2012; Handelsblatt; CIO.de; General Anzeiger Bonn)

Table 1: Examples of BPC project failures in private and public sector organizations

Private organizations can face extreme financial losses or in the worst case even extinction resulting from an aggregation of a series of small failed changes or as the result of one sudden and dramatic BPC (Haveman, 1992). The bankruptcy of FoxMeyer Drugs in 1996, which at the time was the fourth largest distributor of pharmaceuticals in the U.S., is an example of a

failed BPC project. In an attempt to increase efficiency, FoxMeyer purchased an SAP system and a warehouse automation system. They hired consulting support to integrate and implement the two systems in what was supposed to be a \$35 million project. At the end of the project, the company was bankrupt and was eventually sold to a competitor (Widman, 2008). Public sector organizations², on the contrary, might not face extinction, but failed BPC projects can result in enormous financial deficits on the account of the tax payers. For instance, the Federal Bureau of Investigation (FBI) Virtual Case File project was approved for \$379.8 million in 2000. Only two years later the project needed another \$123.2 million. By 2001, the costs had ballooned to \$688 million (Widman, 2008).

The question that arises from the examples above is why do organizations embark on BPC projects if they increase the risk of failure or financial losses for the respective organization? It stands to reason that change must be a necessary risk that private and public sector organizations need to take in order to adapt to new environmental demands (Haveman, 1992). In fact, if organizations fail to adapt to new technological advances, new customer demands, new competitors, new market structures or new policies, they are just as likely to face financial losses or potentially extinction (Davenport, 1993; J.E. Fountain, 2007; Sims, 2010). For public sector organizations “change is ultimately a question of the old system no longer corresponding to the altered conditions” (Haveri, 2006, p.36). Hence, the need to adapt to changes imposed by the environment is commonly the reason for conducting BPC.

If BPC is an unavoidable risk that private and public sector organizations need to take, how can they be successful with their change efforts? This question has been discussed controversially in the literature. Various researchers have addressed the topic of BPC success, but their research outcomes produced to some extent conflicting results and few reliable generalizations. Till today, none of the proposed success factor models for BPC managed to prevail (e.g., Guha et al. 1997; Huizing et al. 1997; Kettinger and Grover 1995; Teng et al. 1998). Markus and Grover (2008) stated that the field of BPC still suffers from a lack of knowledge on adequate theories and methods. In fact, research on BPC success or failure has remained largely “atheoretical” (Sarker, Sarker, & Sidorova, 2006). Only few formal theories have been applied to understand why and how certain BPC projects fail while others succeed (i.e., Niehaves, Plattfaut, & Sarker, 2011; Sarker et al., 2006; Trkman, 2010). Only isolated empirical BPC studies build their assumptions on formal theories, but often only for one or few specific causal relations, e.g., impact of IT or change management on BPC success (i.e., Grover et al. 1998; Huizing et al. 1997). These causal relations stand somewhat isolated in the overall context of BPC success. In addition, these studies often adopt a “factor” approach in order to explain BPC outcome. Thereby, these studies tend to overlook the emergent, complex and frequently contradictory sociotechnical interactions that are fundamental to any BPC initiative (Karimi, Somers, & Bhattacharjee, 2007). The majority of research on BPC success approaches the topic with the help of explorative single case studies in specific domain or industry settings (i.e., Caron et al. 1994; Larsen and Myers 1997), which limits the

² Public (or public sector) organizations as discussed within this doctoral thesis refer to public administrations or government agencies, which are funded through taxation and legitimized by law and regulations.

generalizability of their research results. Most case studies are either in private or public sector organizations. The transferability of the obtained results between private and public sector BPC experiences are rarely explored. According to Sarker, Sarker and Sidorova (2006, p. 52), previous research has also tended to approach BPC in an overly ‘techno-centric fashion’ by overlooking the importance of critical aspects such as communication, leadership or governance (i.e., Karimi, Somers, & Bhattacharjee, 2007; Sarker & Lee, 2000). Similarly, Grover and Kettinger (2000) have stated the need for a more holistic understanding of “the context of process change and how process change influences and is influenced by the context. This can facilitate the construction of rich knowledge in the area by focusing on the full complexity of human sense making as a process change situation emerges” (p. 172).

The short summary of existent research on the topic of BPC shows that the field itself is still rather disorganized, with little prospect of classifying or comparing the various research streams (Trkman, 2010). Therefore, it is not surprising that BPC research outcomes have often been ignored by practitioners (Sarker et al., 2006). This doctoral thesis intends to address the aforementioned issues with the following overall research objective:

To build up a theoretically grounded understanding of how BPC can be implemented successfully in private and public sector organizations.

To achieve this overall research objective the following three sub-objectives are formulated:

1. Identify theoretically grounded relations of cause and effect for successful BPC implementations in private and public sector organizations.
2. Identify the main differences between private and public sector BPC implementations.
3. Define an approach for BPC implementations that accounts for the unique characteristics of public sector organizations.

This cumulative doctoral thesis consists of the following two parts: Part A consists of five chapters. The first chapter motivates this research, outlines the problem statement, defines the research questions and introduces the publications that make up this thesis. The second chapter provides the conceptual background of this thesis by defining the main terms, concepts and methods for BPC. In addition, this chapter highlights the differences between private and public sector organizations. The third chapter provides an overview of the overall research strategy and describes the applied research methods. Chapter four discusses the findings of the publications presented in Part B. After a short summary of findings, the implications, limitations and further research opportunities are outlined. Chapter five concludes Part A of this thesis. Part B comprises the six peer-reviewed publications that were published in the context of this thesis.

1.2. Detailed Problem Statements and Research Questions

In the following, each of the three research questions of this thesis is motivated by a detailed problem statement.

Problem statement 1: No clear understanding exists of which underlying cause and effect relations can explain the complexities in BPC implementations.

Melao and Pidd (2000, p. 111) assert that “there are few significant attempts to develop theoretical positions [...] to [BPC], possibly because the development of [BPC] has been driven by practitioners rather than academics”. However, Kurt Lewin (1951, p. 169) once said that “there is nothing more practical than a good theory.” Researchers should aim to develop theories that can be used to explain and solve social and/or practical problems (Vansteenkiste & Sheldon, 2006). In order to explain the success or failure of BPC projects experienced in practice, a sound theoretical understanding of BPC itself is necessary. More so, the development of BPC theory is important to answer questions on how and why such initiatives succeed or fail (Markus & Robey, 1988).

The BPC research field builds on a wealth of knowledge derived from a large number of explorative case studies (e.g., Ireland, Humphreys, & Huang, 1997; Leknes & Munkvold, 2006; Paper, Rodger, & Pendharkar, 2001; B. Tan, Pan, Chen, & Huang, 2010). These case studies aimed at understanding the complexities involved in BPC implementations. The authors rarely used a theoretical lens to direct their research efforts. All of these case studies produced valuable insights of past BPC projects and exploratory reviews of past failures and successes. As far as one can tell from the published evidence, these explorative case studies did not result in theory development, even though case study research is particularly suited for generating theory (Smart, Maddern, & Maull, 2009). Nonetheless, the results of case studies hardly ever emerge as full-blown theories (Weick, 1995). But even if the results are not labeled as theories they might still approximate theories. Merton (1967) suggests that approximations take at least four forms: “(1) [...] broad frameworks specifying types of variables [...], without any specification of relationships among these variables; (2) analysis of concepts in which concepts are specified, clarified, and defined but not interrelated; (3) post-factum interpretation in which ad hoc hypotheses are derived from a single observation, with no effort to explore alternative explanations or new observations; and (4) empirical generalization in which an isolated proposition summarizes the relationship between two variables, but further interrelations are not attempted” (Merton as cited in Weick, 1995, p. 385). While none of these four forms alone present a full-blown theory, they still show that theorizing is taking place. Based on this understanding, existing case study research on the topic of BPC has resulted in preliminary theory development. Most of these theorizing efforts ended with the publication of the research results and were not subject to empirical tests or replications. But BPC research could and should build on this rich pool of knowledge captured in case study evidence. So far, this evidence has remained largely unexploited for further theorizing on the topic of BPC.

This discussion shows that no BPC specific theories have emerged yet. However, a variety of formal theories originally home to other research areas exist, which could also help explain the success or failure of BPC implementations. For instance, recent case study research drew on the resource-based view of the firm (RBV) to inform their BPC-related inquiries (e.g.,

Niehaves, Plattfaut, & Sarker, 2011; Trkman, 2010). These studies examined the role of capabilities and resources in successful BPC implementations. Sarker et al. (2006) used the concepts of actor-network theory, which provide a socio-technical perspective, to understand the interactions between IT and human processes in a failed BPC project.

Besides these examples, only “few formal social theories have been applied to understand why and how human processes such as communication, leadership, and politics interact with IT-related issues to contribute to BPC failure, and how to manage these processes” (Sarker et al., 2006, p. 52). As a consequence, no clear understanding exists of which formal theories can help explain the specific complexities in BPC project implementations (e.g., IT, strategy, organizational structure, resources, capabilities, leadership). The issue with most of these attempts of generalizing BPC is that most BPC projects have different goals and process scope focuses. Some changes might take place at the level of workflows while others are more global changes encompassing process networks. Hence, studying BPC success is subject to an inherent methodological crux and oversimplification, which we need to accept, if any generalizable insights are to be gained.

All of the aforementioned observations lead to the formulation of the following research question:

Research question 1: Which theoretically grounded cause and effect relations can help explain successful BPC implementations in private and in public sector organizations? (RQ#1)

Problem statement 2: No clear description exists of the differences between private and public sector BPC implementations.

Private organizations continually monitor and improve the competitiveness of their processes (Abdolvand, Albadvi, & Ferdowsi, 2008; O’Neill & Sohal, 1999; Terziovski, Fitzpatrick, & O’Neill, 2003). For this purposes, they have a variety of BPC methods and tools at their disposal. Since many of today’s businesses exhibit a process-oriented form of organization (Schwarzer & Krcmar, 1995), the concept of BPC has proven to be a powerful and elaborate concept.

Similar to the business environment, the demands and the requirements made on the public sector have undergone considerable changes in the past decades. The early 1980s saw the emergence of criticism regarding the size and the capabilities of the public sector. Administrations found themselves confronted with rising expectations and fiscal problems (Parys & Thijs, 2003). Longwinded procedures, non-transparent processes, unclear responsibilities, increasing personnel costs and complex communication paths exacerbated the situation (Scheer, Nüttgens, & Zimmermann, 1996). The resulting pressures to cut budgets and increase efficiency while maintaining performance prompted public managers to turn to the private sector for solutions (Parys & Thijs, 2003). Originating from the business

environment (Otenyo & Lind, 2006), the idea of BPC found its way into the realm of public sector organizations (Parys & Thijs, 2003). As a means of rightsizing government, cutting red tape and reducing bureaucracy (Otenyo & Lind, 2006), BPC promises to become a valuable and a much needed tool in public organizations. By facilitating resource efficiency and allowing for a more straightforward way of service provision, BPC assumes a leading role in the transformation of public organizations. This change commonly includes organizational, political, procedural and technological aspects (Fountain, 2001). As a consequence, BPC can present a cross-sectional challenge for public organizations.

Past research suggests various differences between the private and the public sector, including such aspects as their organizational structures, processes, and management styles (McAdam & Donaghy, 1999b; Stemberger, Kovacic, & Jaklic, 2007). Various authors attempted to analyze and synthesize the unique characteristics of each sector (Halachmi & Bovaird, 1997; Scholl, 2004; Sims, 2010). Some of these comparisons are based on the personal experiences of the authors. Other researchers summarized public and private sector BPC experiences in the forms of single and multiple case studies (i.e., Harrington et al. 1998; Hesson et al. 2007; Hughes et al. 2006; Thong et al. 2000).

Various challenges can be related to the transfer of BPC methodologies between the two sectors (Gulledge & Sommer, 2002; MacIntosh, 2003). Private businesses feature independent decision-making processes and flexible hierarchies. Public administrations are obligated to adhere to multiple external restrictions mainly embodied by laws and political guidelines (Fountain, 2003). While private entities are free to develop their own internal strategy, public sector organizations are bound to ensure the political alignment of their actions. In contrast to this public-is-different from private organizations perspective, it has also been argued that some of these distinctly private or public characteristics are merely myths that need further clarification (Perry & Rainey, 1988).

Assuming that some of these suspected differences hold true, diverging expectations and conditions regarding public and private sector BPC implementations would be the result. In order to satisfy these requirements, public organizations are bound to modify the methods, implementations and best practices established for BPC in private organizations. These observations lead to the formulation of the following research question:

Research question 2: What are the key differences between private and public sector BPC implementations? (RQ#2)

Problem statement 3: *While many BPC methods exist for private organizations, no designated approach exists for public sector BPC implementations.*

Rising customer expectations add pressure on public organizations to improve the delivery and quality of their services and processes. Their customers (i.e., citizens, businesses, or other public agencies) demand a proactive integration of their needs (Peristeras & Tarabanis, 2000).

Public officials, legislators and politicians are urged to provide more customer oriented public services and enhance the corresponding processes (Jane E Fountain, 2001; Janssen, Gortmaker, & Wagenaar, 2006). As a consequence, public organizations are impelled to focus their reform efforts on processes that directly affect their customers (Jane E Fountain, 2001).

Such customer oriented processes or services often transcend the periphery of a single public organization (Janssen et al., 2006). Recent research efforts emphasize the value of inter-organizational information sharing in the public sphere (e.g., Jörg Becker, Algermissen, & Niehaves, 2004; Drake, Steckler, & Koch, 2004). Many public organizations are required by law and regulation to work across organizational boundaries (Jane E Fountain, 2001). On the one hand, public organizations at the federal, state and local level maintain relationships with other agencies (Ney, 2002) with whom they must cooperate under certain specific conditions (J.E. Fountain, 2007; Wimmer, 2002). On the other hand, inter-organizational relationships also subsist between public and non-governmental actors (i.e., companies, citizens or intermediaries) (Ney, 2002). These relationships focus primarily on monitoring the compliance of companies and citizens to legal regulations (Mulgan, 2006). In short, most public organizations maintain interagency (i.e., government to government (G2G)) as well as intersectoral relations (i.e., business to government (B2G) and citizens to government (C2G)) out of necessity (Jane E Fountain, 2001).

Public organizations face intensive flows of information exchanged within and across these organizational boundaries (Janssen et al., 2006; K. G. Provan & Kenis, 2007). In fact, over ninety percent of all public processes are information-processing in nature (Wolf, Jurisch, & Krcmar, 2010). Not surprisingly, the intensive interaction, collaboration and coordination among actors throughout the provision of services, which are mandated by law, account for enormous bureaucratic costs (Jane E Fountain, 2003). This holds true particularly for the contacts between public agencies and companies. These B2G relations are characterized by numerous process repetitions and redundancies (J.E. Fountain, 2007; Gamper & Augsten, 2003). For instance, in 2008, the Federal Statistical Office in Germany identified 9,324 mandatory contacts and interactions between businesses and public organizations in Germany. Bureaucratic expenses for such mandatory information flows with public organizations amount to approximately 47.6 billion Euros annually (N.A., 2009; O.A., 2009). While 22.5 billion Euros account for the fulfillment of national legislation, 25.1 billion Euros are spent to fulfill EU- and international regulations (N.A., 2009; O.A., 2009). The need to become more customer orientated and enhance the service delivery while simultaneously cutting costs and increasing efficiency inevitably forces public organizations to improve and transform the process flows between the various actors (Keith G. Provan & Milward, 2001; Schooley & Horan, 2007; Zhang, Dawes, & Sarkis, 2005).

In the private sector, BPC is commonly discussed as a means for achieving the desired efficiency and effectiveness gains (V. Grover & Markus, 2008; Venkatraman, 1994). In the context of public sector organizations, BPC often addresses the restructuring of inter-organizational process flows and their automation through a shared information system (IS)

infrastructure (V. Grover & Markus, 2008; Saeed, Malhotra, & Grover, 2005; Word, 2009). However, time and cost savings are also dominant objectives for public sector BPC (H. Scholl, 2003). To our understanding, no designated approach exists for changing and improving public process flows, which could help public organizations in being more efficient and effective with the delivery of mandatory public services (Schooley & Horan, 2007). These observations lead to the formulation of the following research question:

Research question 3: What is a purposeful approach for BPC implementation in public sector organizations for transforming public process flows? (RQ#3)

1.3. Publications Included in the Dissertation

This doctoral thesis consists of six publications, which aim to answer the aforementioned research questions (see Table 2). All publications have been published in double-blind peer reviewed conferences or journals. Three of these publications were accepted at international conferences and the other three publications at journals. Even though all publications were written with co-authors, the author of this doctoral thesis had the lead in each publication. All six publications were published at B-rated conferences and in B-rated journals. Each publication is referenced with the number P1 – P6.

In the following, the six publications embedded in part B are summarized by briefly outlining the research problem, the methodological approach, and the main contributions of each publication.

P1 - An Integrative Model of IT-Enabled Business Process Change: Causal Structures in Theory, Research and Practice. The purpose of this research was to provide an understanding for successful BPC that is grounded in relevant theories, prior work on BPC and case-based evidence. The outcome is an integrative model for IT-enabled BPC, which proposes causal structures between different impact factors. The proposed model presents a first step toward a theory for BPC success and prepares the ground for further research in this field. The proposed integrative model for IT-enabled BPC is grounded in the following three sources: (1) the success factors identified in 59 case studies, (2) existing BPC success factor models and the IT-value model proposed by Melville et al. (2004), and (3) relevant theories. The paper makes a contribution to BPC literature by providing insights on the drivers of BPC success. Moreover, the results show that existing theories like RBV, organizational, leadership and socio-technical systems theory are well suitable for understanding and explaining the complexities in BPC projects. As a theory development paper, we did not only identify the relevant success factors but also derived causal structures and relations between them. The findings of our study have implications for both practitioners and researchers. By providing practitioners with insights into the most important parameters in BPC projects, the model serves as a basis from which project and process managers can now manage what is typically a poorly-understood, complex and dynamic situation.

No	RQ	Authors	Title	Year	Outlet
P1	RQ#1	Jurisch, M.; Cuno, J.; Palka, W.; Wolf, P.; Krcmar, H.	An Integrative Model of IT-Enabled Business Process Change: Causal Structures in Theory, Research and Practice.	2012	Proceedings of 45th Hawaii International Conference on Systems Science (HICSS)
P2	RQ#1	Jurisch, M.; Palka, W.; Wolf, P.; Krcmar, H.	Which Capabilities Matter for Successful Business Process Change?	2014	Business Process Management Journal (BPMJ)
P3	RQ#2	Jurisch, M.; Ikas, C.; Palka, W.; Wolf, P.; Krcmar, H.	A Review of Success Factors and Challenges of Public Sector BPR Implementations.	2012	Proceedings of 45th Hawaii International Conference on Systems Science (HICSS)
P4	RQ#2	Jurisch, M.; Ikas, C.; Wolf, P.; Krcmar, H.	Key Differences of Private and Public Sector Business Process Change.	2014	e-Service Journal (eSJ)
P5	RQ#3	Jurisch, M.; Wolf, P.; Krcmar, H.	Toward a Formal Approach to Process Bundling.	2010	Proceedings of Conference on Electronic Government (EGOV)
P6	RQ#3	Sharafi, A.; Jurisch, M.; Ikas, C.; Wolf, P.; Krcmar, H.	Bundling Processes between Private and Public Organizations: A Qualitative Study.	2011	Information Resources Management Journal (IRMJ)

Table 2: List of publications included in Part B of this doctoral thesis

P2 – Which Capabilities Matter for Successful Business Process Change? BPC initiatives are complex endeavors, which require many different sets of capabilities from the organization (e.g., IT, change management, project management capabilities). Although much has been written about critical impact factors for BPC the literature is surprisingly mute on which specific capabilities matter for BPC project and process performance. This study examines which capabilities matter for successful BPC. We adopted the case survey methodology, which combines the richness of case studies with the benefit of analyzing large quantities of data, to analyze the relationship between capabilities and BPC success. We identified and analyzed 130 case studies reporting past BPC project experiences. Our results show that project management, change management and IT capabilities have a positive impact on BPC project performance. IT capabilities also have a positive impact on the final process performance. Thus, IT capabilities matter for both, BPC project and process performance. The analysis also disclosed that a strong relation exists between the project and the final process performance. This study fills a gap in the literature concerning which capabilities matter for successful BPC. The discoveries reported in this publication can serve to help practitioners in planning their BPC projects more carefully. Furthermore, this publication offers a theoretical explanation of the effects of capabilities on the BPC project and process performance.

P3 – A Review of Success Factors and Challenges of Public Sector BPR Implementations. With this research paper we consolidated the ample literature on BPR success from the private and public sector. We conducted a literature review of 67 articles on

the topic of process reengineering in the private and public sector. We identified the relevant success factors and showed that a surprising similarity exists between private and public BPR related success factors. Besides the shared success factors, we identified differences between the two sectors regarding their structure, operation and objectives. Based on these differences, we proposed that different approaches are necessary for realizing the identified success factors in public and private sector organizations. Next, we derived propositions aimed at encouraging future research into the subject matter. First, the differing motivations of public and private entities when engaging in BPR projects need to be examined and incorporated in the design of a dedicated BPR methodology for the public sector. Second, in order to ensure the necessary top-down commitment, the potential of BPR in the public sector needs to be validated and appropriately communicated. Third, as a central focus, a dedicated methodology for BPR in the public sector should be derived. This methodology should account for the peculiarities in public administration. Finally, in order to monitor and control the realized benefits, practical measures for efficiency and service quality need to be derived.

P4 – Key Differences of Private and Public Sector Business Process Change. In order to tackle the current financial, social and political challenges, public sector organizations all over the world need to rethink, adapt and change their underlying service processes. Prompted by these challenges public managers have turned to the private sector for solutions. However, the public sector should not only learn from its own failures, but also from the mistakes made in private sector BPC implementations. With this research paper we consolidated the experiences of 128 BPC related case studies from the private and public sector. We identified the relevant differences between the sectors in BPC implementations. For instance, private sector organizations are more likely to embark on interorganizational change projects. More so, the ratio between intended versus achieved improvements appears to be higher in the public sector. On the other hand, public sector organizations invest more efforts in establishing commitment to their BPC projects, which results in higher senior management and employee support. However, public BPC projects are more likely to be exposed to strategy or political/regulatory volatilities due to their highly politicized environment. We also identified some interesting differences between the sectors. For instance, the improvement goals which guide BPC projects are rather similar between both sectors (e.g., cost cutting and quality of services/products). We synthesized the identified differences into unique characteristics of public and private sector BPC implementations. Finally, we discussed how both sectors could learn from each other.

P5 – Toward a Formal Approach to Process Bundling. Excessive information and data exchanges between private and public organizations create a need for the bundling of processes. Process bundles are created whenever cross-organizational processes are combined or interlinked. While a considerable amount of literature addresses the topic of reorganizing, optimizing or reengineering processes, much less is known about concrete approaches which facilitate the identification of suitable process bundles. This paper presents a review of identification criteria relevant for process bundling. Our literature review comprised 36 scholarly articles and books in the fields of process management, reengineering and E-

Government. The analysis discloses the existence of primary and secondary process bundling criteria. This literature analysis provided evidence to assume that secondary identification principles are commonly comprised of performance, process integration and complexity indicators. However, the mere focus on secondary identification criteria does not help to identify purposeful bundles of public service processes. In addition, the plain focus on secondary process identification criteria (e.g., inefficiencies and redundancies) neglects to assess if the processes actually fit together. Premised on these results, we synthesize the insights from the cited literature into a methodological intermediary step to support the purposeful elicitation of bundling candidates. The proposed methodological intermediary step which introduces content, context, and events as primary process bundling criteria fills this gap in current process identification research.

P6 – Bundling Processes between Private and Public Organizations: A Qualitative Study. Businesses are aching under the burdens entailed by public reporting duties while public organizations are faced with rising cost pressures. An effective means of meeting these challenges is through the bundling of processes caused by reporting duties. By incorporating corresponding BPC concepts from the business sector, we developed an approach for process bundling tailored to the peculiarities of public organizations. The aim of this approach is to design and evaluate process bundles in the domain of B2G contacts. This is achieved by a top-down study of the respective domain and a subsequent selection of the relevant processes. Based on this analysis we compiled an as-is profile of each of the identified domain specific processes. We applied the approach in the domain of waste disposal reporting duties in Germany. We conducted a series of 18 semi-structured interviews with 15 experts over a period of 24 months. In total we identified 339 processes on the topic of waste disposal. The analysis of these processes led to the bundling of three processes. The feasibility of the proposed process bundle was evaluated with a multidimensional benefit analysis. The results show that by reusing previously recorded information in a purposeful manner, process bundling can help to remove redundancies in the information flow and reduce the administrative burden of the affected companies.

1.4. Remarks on Format

The formatting styles of the six original publications were different from one another. For the purpose of consistency, the original research works have been reformatted for this thesis, applying a uniform formatting style. The tables and the figures were redesigned and unified throughout the entire document. Furthermore, the tables and the figures were numbered sequentially across all parts of the thesis. Consequently, the numbering of figures, tables and in-text-references differs from the original publications. The original section numbering in the publications was substituted by the overarching structure of the present document. Each major part (A to B) comprises a unique numerical structure of sections and subsections. For the purpose of simplicity, all references to other sections of the same part omit the indication of the part number. For instance, a reference in Part A to Section 2.1 of Part A is presented ‘see

section 2.1'. Minor editorial revisions to the original publications were also made (e.g., adaptation of reference styles, orthographical and minor grammatical revisions).

2. Conceptual Background

This chapter provides the conceptual background for the remainder of this doctoral thesis. First, the chapter exposes the main differences between the private and the public sector in order to provide a basis for the review of the distinctions in BPC implementations in P3 and P4. An insight of the differences between both sectors is also necessary to motivate the need for a unique public sector BPC approach as discussed in P5 and P6. The chapter also defines the term “business process” for both sectors. Last, this chapter presents the definitions for the main BPC terminology.

2.1. *Private and Public Sector Differences*³

The term economic-entity subsumes all organizations that directly or indirectly aim to satisfy fundamental human needs (Thommen & Achleitner, 2006). The economic entities that satisfy these needs can be classified into private and public households as well as organizations. Organizations can be further divided into private, public and third-sector organizations (Thommen/Achleitner 2006, 33-39) (see Figure 1). Third-sector organizations are jointly-owned hybrids between private and public organizations. Private organizations are usually a means of enterprise for profit and they are usually not controlled by the state. Public sector organizations are controlled by the state and concerned with providing government services.⁴

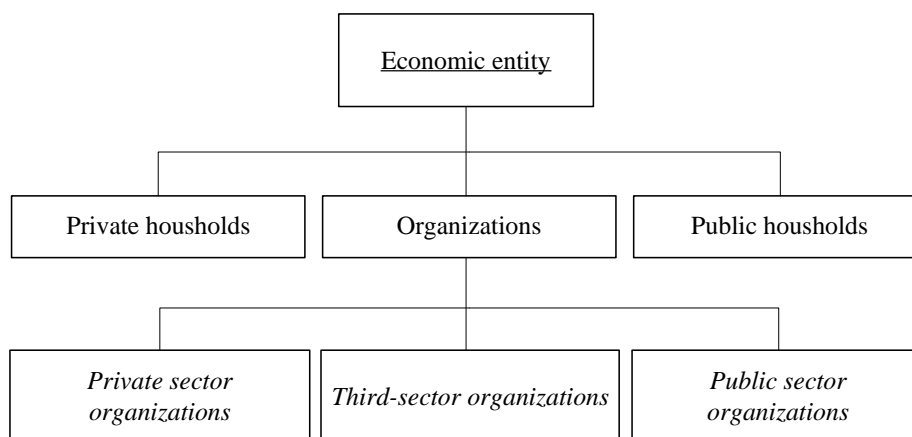


Figure 1: *Economic entities*

(Adopted from Thommen & Achleitner (2006, pp. 37-39))

³ For years, authors have cautioned against making oversimplified distinctions between private and public sector organizations (Murray, 1975; H. G. Rainey & Bozeman, 2000). But for the purposes of this doctoral thesis it is important to illustrate the main differences between private and public organizations, because these distinctions impact the implementation of BPC in both sectors (see P3 and P4).

⁴ We understand that the public and the private sector are not two distinct and internally homogenous domains. In fact, only few organizations are exclusively public or private. Most organizations can be placed somewhere on a continuum between these two extremes (Johnson & Scholes, 2001). But for purposes of simplification, we build our differentiation on the terms: private or public organization.

The terms ‘private’ and ‘public’ are taken from Latin. Private translates into ‘set apart’ while public means ‘of the people’ (P. Nutt & Backoff, 1993, p. 210). A private for profit-organization sells products and services to customers in markets to create wealth for shareholders (Nutt, 2005). Hence, profits and self-interest legitimize the actions of private organizations. Private organizations are defined as ‘open, dynamic, complex, autonomous, market-oriented, productive, social systems’ (Thommen & Achleitner, 2006, p. 40). The general purpose of a tax-supported, non-for-profit public sector organization is to provide services to people and collect information about the needs of people that require a potential public response (Nutt, 2005). Public sector organizations are ‘part of the executive (not the judiciary or legislative) branch of a country or state, who act based on laws, regulations and policies’ (Thommen & Achleitner, 2006, p. 39). These organizational differences result in structural, task, ownership, role and employment differences. Table 3 provides an overview of the main differences between the two sectors.

Environmental market. Environmental market factors are external to the respective organization. For private organizations the buying behavior of the people defines the market (Nutt, 2005). In addition, the buying behavior of people is the principal source of information indicating which organizational actions (e.g., products or services) are effective (Nutt & Backoff, 1993). Hence, the market enforces penalties and incentives for private organizations to reduce production costs, increase operating efficiency or performance effectiveness (H. Rainey, Backoff, & Levine, 1976). A public sector organization, such as a city’s registry office, lacks a market to provide revenues (Nutt, 2005). Instead, financial funds supporting public sector operations stem from tax money. Financial resources are allocated by oversight bodies or defined by reimbursement rules (P. Drucker, 1976; Nutt, 2005). Because public sector organizations are accountable to the people for the appropriation of their tax money, they have been described as private organizations in a ‘fishbowl’ (Starling, 2010). In fact, the higher the public impact of their actions, the higher is the prospect of scrutiny for public organizations (Nutt & Backoff, 1993). The fish bowl management illustrates how carefully public organization have to devise their strategies.

Previous research has also “stressed the connection between exposure to markets and allocational efficiency, in the economist’s sense of maximizing satisfaction by matching supply to demand, reflecting consumer preferences, etc.” (Rainey et al., 1976, p. 237). As a result of their lower market exposure, public sector organizations are subject to a number dysfunctions (Lachman, 1985; Ostrom, 1973). For instance, public organizations are less sensitive to diseconomies of scale and often fail to adequately account for their consumers’ preferences (H. Rainey et al., 1976).

Legal and formal constraints. The autonomy and flexibility of public sector organizations are constrained by legal mandates (Nutt & Backoff, 1993). Public organizations have a service objective which needs to be fulfilled, because each service is legitimized and thus required by a legislative mandate. Hence, organizations in the public sector have almost no freedom to add or delete a given service, whenever customer demand is low. “Court rulings,

the demands of contractors, enabling legislation, and newly elected administrators all produce directives that public organizations must accept” (Nutt & Backoff, 1993, p. 216). Private organizations also need to obey the law and regulations when conducting their business, but in comparison to public organizations their purposes of operations do not tend to be defined by legislation (H. Rainey et al., 1976). Nonetheless, their actions are also constrained by legislation.

	Private organizations	Public organizations
Environmental market	Buying behavior of people define market	Oversight bodies compose market
Legal and formal constraints	Autonomy and flexibility limited only by law and the need for internal consensus	Mandates and obligations limit autonomy and flexibility
Coerciveness	Consumption voluntary and payment based on use	People must fund and consume the organization’ s services
Political influence	Political influence indirect and internal	More direct political influence from authority network and users
Cooperation vs. competition	Competition among organizations that offer a given service or product	Collaboration among organizations that offer a given service expected
Product/service and customer segmentation	Homogenous	Heterogeneous
Ownership	Ownership vested in stockholders whose interests are interpreted using financial indicators	Citizens act as owners and impose their expectations about organization’ s activities and the conduct of these activities
Organizational structure	High degree of freedom for design of structures	Limited degree of freedom for design of structures, bureaucratic model
Tasks and responsibilities	Fulfillment of customer requirements	Implementation of laws and regulations, Social Good
Governance structures	Undivided power, Limited checks	Division of power, Comprehensive checks and balances
Goals	Goals often clear and agreed upon; efficiency dominant concern	Goals shifting, complex, conflict-ridden, and difficult to specify
Models of compensation	Heterogeneous payment and career models (financial incentives)	Civil service career models; (inflexible incentive and compensation models)

Table 3: Differences between private and public sector organizations

(adopted from Nutt & Backoff, 1993; Nutt, 2005; Perry & Rainey, 1988; H. Rainey, Backoff, & Levine, 1976; Thommen & Achleitner, 2006)

Coerciveness. The legislative mandates of public organizations frequently give them a coercive power (Nutt & Backoff, 1993). Sometimes this coercive monopolistic nature of public organizations’ actions is cited as a basic distinction between both forms of organization (H. Rainey et al., 1976). People usually have no choice in the consumption and participation in the funding of public services. They are required to fund most government activities with

tax payments. Obviously, this situation can also be attributed to the absence of the lack of the aforementioned market mechanisms (Hal G. Rainey, 1983). The coercive power declines, however, whenever the use of services is optional and partially funded by government agencies (Nutt & Backoff, 1993). In the private sector, the consumption of products and services is voluntary for consumers and commonly payment based.

Political influence. Nutt and Backoff (1993, p. 217) assert that “the environment of a public organization is littered with political considerations.” For instance, elections and new political appointments can result in new legislative initiatives and mandates. These political volatilities result in shorter time-horizons of public sector strategy (Boyne, 2002). But also less formal political influence, such as those asserted by interest and lobbying groups, can impact government activities (H. Rainey et al., 1976). Similarly, private organizations can suffer from short time-horizons due to management incentive schemes. Frequently, private organizations use the help of interest and lobbying groups to assert political pressure and influence on public organizations. These different political influences necessitate bargaining and result in more complex decision-making processes in public organizations. Frequently, public managers need to engage in coalition buildings and rally support from constituencies, interest groups, authorities and political leaders for their activities. Unfortunately for public sector activities, political interests and visible outcomes are sometimes more important, depending on the political orientation of those involved, than measurable improvements (Kock & McQueen, 1996). The political power games in private organizations are rather internal.

Cooperation vs. competition. An interesting distinction between the two sectors is that public organizations are not allowed to compete for customers or with other organizations that offer similar services (Nutt, 2005). Instead public organizations are expected to collaborate with other organizations offering a comparable range of services (Nutt & Backoff, 1993). Competition among public organizations could result in a duplication of service offers. As a consequence, public organizations are encouraged to cooperate and collaborate “by giving many of the key players an opportunity to suggest alternatives” (Nutt, 2005, p. 293). This is quite opposite to the private sector where organizations tend to hold ideas and insights closed in order to gain a competitive advantage over competitors.

Product/service and customer segmentation. Both, private and public, organizations rely on resources (inputs) to produce products and services (outputs). Private organizations tend to produce as many products and services as desired by their customers and at minimal cost – hence at the lowest price (G. Johnson & Scholes, 2001). However, this model assumes the existence of a competitive market, which incentivizes private organizations to maximize their performance. In addition, private organizations also need to define their position in the market (e.g., which products and services are produced/offered for which markets). As a consequence, the range of products and services offered by private organizations are rather homogenous (Jörg Becker, Algermissen, & Falk, 2007). Similarly, the customers that purchase these products and services are more homogenous, too.

Public organizations are involved in the production of “public” and “quasi-public” goods (services) (H. Rainey et al., 1976). The nature of public services also rules out the application of prices and market mechanism (H. Rainey et al., 1976). For quasi-public services prices can be applied, but these are often offered below the costs of production. The mix of objectives and services is very complex in public organizations. Hence, the array of public services offered is very heterogeneous ranging from public security, education to public health (Jörg Becker et al., 2007). Consequently, the people (customers) using these services are also quite heterogeneous in regard to their age, educational background, ethnicity, incomes and many other aspects.

Ownership. The type of ownership also distinguishes public from private organizations. Private organizations are characterized by diverse ownership structures: privately held, publicly traded, family owned, etc. (La Porta, Lopez-de-Silanes, & Shleifer, 1999). Public organizations are subject to ubiquitous ownership conditions, because everyone somewhat has an ownership stake in them (Nutt & Backoff, 1993; Nutt, 2005). Devising strategy is very different in ubiquitously owned organizations. The needs, desires and expectations of the entire constituency need to be accounted for when designing a strategy in such organizations. This is a particularly cumbersome task when considering that the interest groups of public organizations are extremely diverse and multilayered. Public managers employ public meetings, task forces, public announcements and other measures to identify public interests and needs (Nutt & Backoff, 1993). However, a unified public opinion is rarely the case. As a consequence, strategic decisions in public sector organizations often trigger a complex web of transactions (Nutt, 2005).

Organizational structure. In the past decades, various researchers examined the structural differences between private and public sector organizations (Boyne, 2002; H. Rainey et al., 1976; H. G. Rainey & Bozeman, 2000; Starling, 2010). Three distinctive characteristics emerged from these studies: more bureaucracy, more red tape and lower managerial autonomy.

Higher *bureaucracy* in public organizations is caused by more formal procedures for decision making and less flexible structures (Boyne, 2002). Rainey and Bozeman (2000, p. 454) assert that “commissions and professional associations have for years lamented the excessive rules and constraints in government agencies.” Bolstering this statement, empirical findings show that public organizations have higher levels of formalizations than private organizations (Barry Bozeman & Bretschneider, 1986; Hal G. Rainey, 1983). The higher level of formalization can be in respect to job and communication formalization. The higher standardization of processes in public organizations leads to public managers relying more on job formalization to promote and reward employees instead of personal performance (Kurland & Egan, 1999). In addition, communication between public managers and employees is often very structured and formalized. For instance, Kurke and Aldrich (1983) found that managers in high-tech manufacturing organizations spent less time in meetings than a public school

superintendent. Kurland and Egan (1999) also found that public managers are more likely to spend more time formally communicating than managers in private fast-moving organizations.

The higher levels of *red tape* in public organizations are frequently regarded as a side-effect of bureaucracy (Boyne, 2002). The existence of red tape implies a stronger focus on rules and processes rather than results and outcomes. However, a strong endorsement of rules is a natural phenomenon in formal organizations (Blau & Scott, 1962). Bozeman et al. (1992, p. 291) assert that “just as the original annoyance with red tape resulted from the delay caused by untying and tying the tape surrounding (official) documents, red tape today refers not to rules and procedures themselves but to the delays and subsequent irritation caused by formalization and stagnation.” Bozeman (2000) discovered that the existence of red tape varied between private and public sector organizations based on the type of organizational activity carried out. Some activities, such as starting a new project, resulted in similar levels of red tape in both types of organization. More administrative activities (e.g., hiring and firing) typically take much longer in public organizations.

The *lower levels of autonomy* refer to the lower degrees of freedom, which public managers have in order to react to managerial circumstances (Boyne, 2002). Managers in private organizations are assumed to have higher levels of autonomy, because they control more hierarchically structured organizations. This enables private managers to lead more by direction or by issuance of orders to employees with less risk of contradiction (Allison, 1983). “By contrast, public managers have the costs of hierarchy (rules and red tape) without the benefits (the freedom and power to manage their subordinates)” (Boyne, 2002, pp. 101-102).

Tasks and responsibilities. Any organization should be answerable to someone or something outside of itself (H. Rainey et al., 1976). This is particularly important whenever projects or products fail and someone needs to be held responsible. But responsibility is frequently blurred or even faceless in public organizations (Starling, 2010). Legislative mandates not only determine tasks but also responsibilities in public administrations. For instance, unlike managers in private organizations, public managers cannot define their organizational budget (Nutt, 2005) or autonomously hire qualified personal if needed (Starling, 2010). More so, whenever public managers engage in strategic planning, they need to share their plans and often also get them approved by legislative bodies (Starling, 2010).

Goals. It has been frequently argued that public organizations face greater goal complexity and ambiguity than private organizations (Boyne, 2002; Nutt, 2005; H. Rainey et al., 1976). Managing the interests of the numerous stakeholders presents one reason for more complex, conflict-ridden, and shifting goals in the public sector (Boyne, 2002). For most private organizations the single most important goal is profit maximization (Elcock, 1996). Public organizations might lack profit or sales indicators, but are still subject to effectiveness and efficiency measures (H. Rainey et al., 1976). The aim of this section is not to say that private organizations do not face goal complexity or ambiguity. Rather the multiplicity, vagueness, and conflict of goals are higher in the public sector (H. G. Rainey & Bozeman, 2000).

Models of compensation. Another fundamental difference between both sectors refers to the models of compensation and incentivizing. Banfield (1975) argues that the most important incentives offered to private sector employees are financial incentives. In public organizations non-financial incentives such as job security, involvement in important affairs and ‘power and glory’ are more important. It needs to be remarked that public managers often also have less flexibility and capacity to offer financial incentives to their employees (Nutt & Backoff, 1993; H. G. Rainey & Bozeman, 2000). Consequently the public sector lacks the scope and scale of incentive schemes available to the private one. Nutt and Backoff (1993, p. 225) propose that “participation in strategic change offers a way out of this dilemmas,” because it would allow employees to take on important tasks and roles and assert influence.

2.2. Defining the Term ‘Business Process’

Information systems is an interdisciplinary discipline (Schwarzer & Krcmar, 2004). The multidisciplinary nature of the field (drawing on reference disciplines, e.g., political science, management science and others) makes it difficult to find a universally accepted definition for the term ‘business process.’ Each reference discipline promotes a differentiated understanding of the term. This becomes apparent when attempting to find a universal definition for the term ‘business process’ that is accepted for private and public sector organizations. Therefore, we define the term ‘business process’ separately; first for private organizations and second for public sector organizations. For the purposes of this thesis, we define business processes (in private and public organizations) as a collection of activities that takes one or more kinds of input and creates an output (adapted from Hammer and Champy's (1993) original definition).

2.2.1. Businesses Process in Private Organizations

The main body of literature contains a multitude of definitions for the term ‘business process’, in particular the literature on BPR. Table 4 summarizes the most frequently cited definitions.

Source	Definition
Hammer/Champy (1993, p. 35)	We define business processes as a collection of activities that takes one or more kinds of input and creates an output that is of value to the customer.
Davenport/Short (1990, p. 14)	We define business processes as a set of logically-related tasks performed to achieve a defined business outcome. This is similar to Pall's (1987) definition of process as “the logical organization of people, materials, energy, equipment, and procedures into work activities designed to produce a specified end result (work product)”.
Davenport (1993, p. 5)	In definitional terms, a process is simply a structured, measured set of activities designed to produce a specified output for a particular customer or market. It implies a strong emphasis on how work is done within an organization, in contrast to a product focus's emphasis on what. A process is thus a specific ordering of work activities across time and place, with a beginning, an end, and clearly identified inputs and outputs: a structure for action.

Harrington (1991, p. 9)	<p><i>Process.</i> Any activity or group of activities that takes an input, adds value to it, and provides an output to an internal or external customer. Processes use an organization's resources to provide definitive results.</p> <p><i>Production process.</i> Any process that comes into physical contact with the hardware or software that will be delivered to an external customer, up to the point the product is packaged (...). It does not include the shipping and distribution processes.</p> <p><i>Business process.</i> All service processes and processes that support production processes (...). A business process consists of a group of logically related tasks that use the resources of the organization to provide defined results in support of the organization's objectives.</p>
Harrington (1997, p. 1)	A process is a logical, related, sequential (connected) set of activities that takes an input from a supplier, adds value to it, and produces an output to a customer.
Earl (1994, p. 13)	Essentially a lateral or horizontal organizational form (...), process encapsulates the interdependence of tasks, roles, people, departments, functions etc. that is required to provide a customer (internal or external) with a product or service.
Johansson et al. (1993, p. 57)	A process is a set of linked activities that take an input and transform it to create an output. Ideally, the transformation that occurs in the process should add value to the input and create an output that is more useful and effective to the recipient either upstream or downstream.

Table 4: Business process definitions in the context of private organizations

The summary of definitions shows that the terms process and business process are often used synonymously. The term process is often used as a short form of business process (i.e., Davenport, 1993; Hammer & Champy, 1993). Processes in private organizations have a clear relation to the business context; hence, the term business process (Davenport, 1993). Harrington (1991) originally differentiated between the terms process, business process and production process. According to this understanding, business processes are either service processes or processes supporting the production of goods. However, only six years later Harrington abandoned this differentiation in favor of the short term process (Harrington, Esseling, & van Nimwegen, 1997).

A process is commonly initiated by an input and completed by an output (Hammer & Champy, 1993). Often the output of one activity in a business process is the input for the next one (Malone & Crowston, 1994). Both input and output are typically comprised of information (Kock et al. 1997). The definitions above also show that as an output business processes provide value to customers (Abdolvand et al., 2008; Hammer & Champy, 1993). This value can be in form of a product or a service. Examples of business processes include the process for acquiring supplies and other raw materials, the process of producing products or services, the process of delivering products or services to customers, and the process of providing after sales service (Porter, 1985).

A business process also has a horizontal dimension. Usually it is not possible for the same person to perform all the activities related to one business process (e.g., product delivery). Instead these activities are executed in different departments (potentially even different

geographical locations) and each activity is performed by a different specialist. Hence, these activities are organized by process and not by function (Hammer & Champy, 1993). This is frequently referred to as horizontal process segmentation (Osterloh & Frost, 2006a).

Figure 2 illustrates the main attributes of a business process in a private organization.

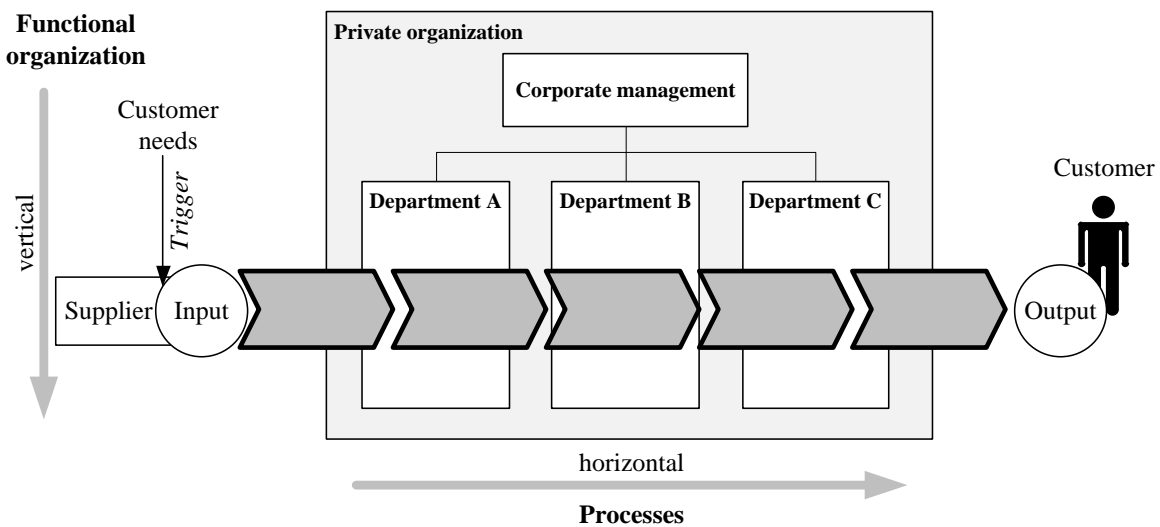


Figure 2: Business processes in private organizations

(Adopted from Ley, 2010, p. 26)

In addition to the understanding of business processes promoted in Figure 2, it should be remarked that processes in real-world settings are often more complex than just simple, horizontal input - output transformations. Instead, business processes can also be understood “as networks in which a number of roles collaborate and interact to achieve a business goal” (Melao & Pidd, 2000, p. 112).

2.2.2. Business Processes in Public Sector Organizations

Already in the year 1999, McAdam und Donaghy (1999b) contested that only little information exists on the specifics of business processes in the public sector. Seven years later, Sundberg and Sandberg (2006a) could not identify significantly more relevant literature. Because of this lack of distinctive definitions of the term business process, the private sector definitions are frequently transferred to the public sector. We will not review the same definitions here as cited in chapter 2.2. Instead we focus on definitions that have a direct relation to public sector organizations. Table 5 summarizes the most frequently cited definitions.

Source	Definition
Wind (1995, 18)	A process (...) is a chain of purposeful activities (...) which satisfy a specific customer need/request by delivering a public good or service.
Hoffmann (2000, 110)	A process (denotes) a specific procedure, but also the processing of a business case and the processing of the corresponding forms and documents.

Scheer/Bold/Heib (1996, 120)	A business process presents a sequence of functions (procedures) and activities. Functions are carried out by organizational units and are triggered through specific events. Business processes in public organizations are commonly detected by their specific file records, which are necessitated by workflow management and the need for written documentation (“Aktenmäßigkeit“).
Scheer/Nüttgens/ Zimmermann (1996, 14)	A public process describes in its basic form the relevant objects and activities related to its function.
Knaack (1999, 13)	A process is defined as set of work-sharing, time consuming and separate activities, which are triggered through a specific event (e.g., a formal request, application, etc.). Each process activity can be related to a file record, procedure or document and results in one or more outputs.

Table 5: Business process definitions in the context of public sector organizations

When comparing the citations in Table 4 to Table 5 it becomes apparent that much less clarity and consensus exists among researchers on what constitutes a business process in a public sector organization. In the definitions, the researchers refer to a variety of terms such as procedure, business process, administrative process or just process. The term business process is subject to ambiguity when used in the context of public organizations.

Public sector business process definitions include both a process and an object dimension (see Figure 3). The process dimension describes the sequence of process related work step whereas the object dimension defines the documents and the respective case file that are the recorded outputs of each process activity (Knaack, 1999). According to this understanding, documents and case files are the central objects of an administrative process, because they contain the relevant records for an administrative procedure and are handed on from administrator to administrator. Therefore, a process is often referred to as an administrative procedure in public organizations (Behjat, 2003; Knaack, 1999). The recorded information in administrative documents can be differentiated based on their functional reference: factual information (primary information), process information (context and steering information) and general information (meta information such as name, address, etc.) (Engel, 1996).

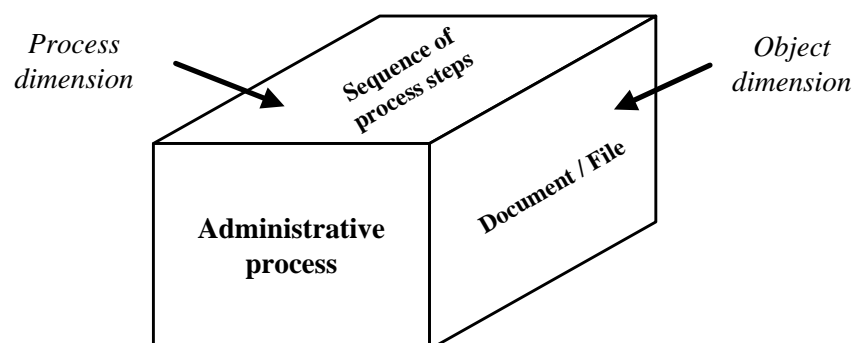


Figure 3: Process vs. object view

(Adopted from Knaack, 1999, p. 10)

Based on the number of different definitions for administrative business processes (see Table 5), we can summarize that processes in public organization have a defined input. This is similar to business processes in private organizations. However, in public organizations the input is triggered by a legislative obligation on the side of the customer. For instance, this input can be an application, a report, a notice or a register inquiry by the customer. On the basis of a legislative mandate, this input initiates a logical sequence of activities and process steps. Each process step is carried out by either one or several administrators. The corresponding documents and case file are handed over to the next administrator at the end of each process step. The administrative process ends with an output (e.g., directive, response letter, request for further documents, etc.) that is send to the customer via a feedback channel (Knaack, 1999). Basically, administrative processes aim to assure that the people abide by the law, which should provide a value to public welfare (see Figure 4).

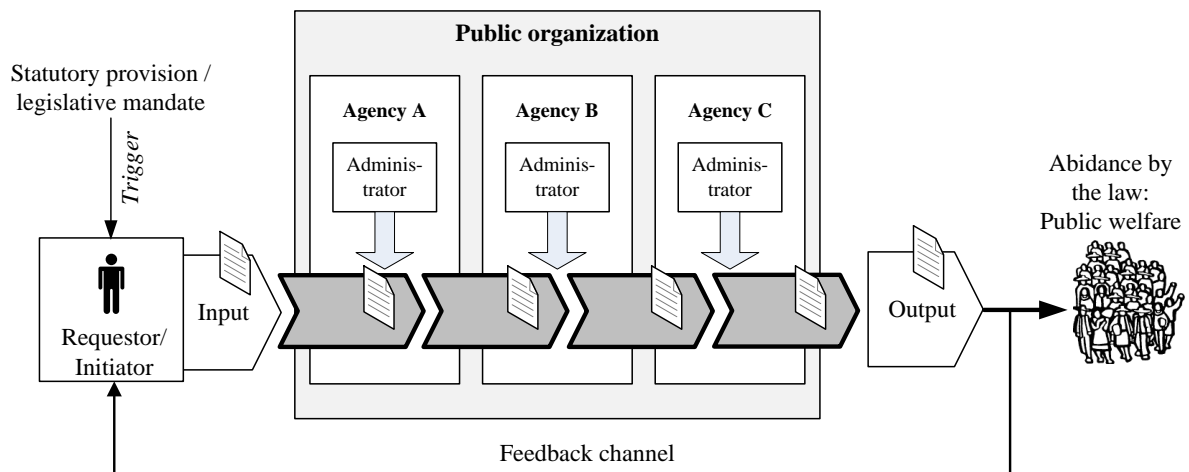


Figure 4: Business processes in public organizations
(Adopted from Ley, 2010, p. 29)

2.3. Defining Business Process Change

BPC is an elusive term that is frequently confounded with a number of terms with similar, though not necessarily identical, meanings (e.g., business process reengineering (BPR) or business process transformation (BPT)) (Sarker et al., 2006). The term BPC was coined by Grover and colleagues (Grover & Kettinger, 1997, 2000b; Grover et al., 2000; William J. Kettinger, Teng, & Guha, 1997a) in an attempt to shift the focus on the importance of process instead of the radicalness of the change. In the 1990s, radical change (such as BPR) was the dominant tenor. However, the focus of reengineering processes on the account of people and performing major work force reductions frequently did not yield the anticipated results (V. Grover et al., 2000). Today, BPC reflects a management concept that involves any type of process change (radical and continuous). As such the term BPC “is more inclusive, and avoids the negative connotations of some of the earlier-used terms such as BPR” (Sarker et al., 2006, p. 83). In the following, we define and differentiate the major terms connected to the realms of BPC (see Table 6 for a summary).

Name	Definition	Scope of change	Sources
BPM	Corporate management philosophy and discipline		(Aalst, Hofstede, & Weske, 2003; Brocke & Rosemann, 2009)
BPC	Management concept that involves any type of process change	Radical & continuous	(V. Grover et al., 2000; B Niehaves et al., 2011; Sarker et al., 2006)
TQM	Management concept	Continuous	(M. Tan & Yap, 1994; Zink, 2004)
BPR/BPT	Method	Radical	(V. Grover & Markus, 2008; Hammer & Champy, 1993)
Six Sigma	Method (statistical)	Continuous	(Nave, 2002; Revere, Black, & Huq, 2004; Sidorova & Isik, 2010)
Kaizen/CPI	Method	Continuous	(Brunner, 2008; Suárez-Barraza & Lingham, 2008)

Table 6: Overview of terms in the context of BPC

Business Process Management (BPM). The idea of viewing work-related activities as processes and improving them is not new. In fact, these concepts date back to the beginning of the twentieth century and probably even before (V. Grover & Markus, 2008). The emergence of the term “BPM” is hard to pin down in terms of time and space. Nonetheless, BPM, like BPC, has its origin in the works of Frederick Taylor.

Modern BPM is not a monolithic principle, but rather a wide umbrella of activities, concepts, approaches, methods, techniques and tools for designing, controlling, analyzing and changing processes in organizations (Mathiesen, Bandara, & Delavari, 2011). Van der Aalst et al. (2003, p. 4), define BPM as “supporting business processes using methods, techniques and software to design, enact, control and analyze operational processes involving humans, organizations, applications, documents and other sources of information.” Based on this definition, BPM is best understood as a process-oriented management discipline (Hill, Massimo, & Yefim, 2008).

BPC. BPC refers to a management concept that involves any type of process change – revolutionary/radical or evolutionary/continuous (Grover et al., 2000; Grover and Markus, 2008) as well as quality programs, enterprise resource planning (ERP) implementation or the retooling of business processes for e-commerce (Sarker et al., 2006). While both approaches, radical (e.g., BPR, BPT) and continuous (e.g., TQM, CPI, six sigma), share the common goal of improving processes, they are also frequently used complementary (Grover and Markus, 2008). Margherita and Petti (2010, p. 473) posit that many projects are only labeled as BPR while they are in fact “normal improvement activities which are unlikely to bring radical innovation within the organization”.

Total Quality Management (TQM). TQM is an integrative management concept (Zink, 2004). TQM is considered to be a more evolutionary and continuous concept to constantly optimize and change business processes (Bucher & Winter, 2007). Furthermore, it aims at

improving the quality of products and services in all departments and functions (S. Koch, 2011). TQM consists of different concepts for continuous process change (e.g., Kaizen, Six Sigma).

BPR/BPT. Hammer and Champy (1993) define BPR as the fundamental rethinking and radical redesign of business processes. Research shows that the implementation of BPR often results in fundamental changes of the organization's structure, culture and processes (Al-Mashari and Zairi, 2000; Cao et al., 2001). The successful implementation of BPR can result in dramatic improvements in critical efficiency and effectiveness measures such as cost, quality, service and time (Sharafi et al., 2011; Jurisch et al., 2012a). Past experiences also show that all BPR implementations are effectively change management programs (Zairi and Sinclair, 1995; Cao et al., 2001). Hence, BPR not only necessitates top management support, but also bottom-up employee empowerment (Paper et al., 2001).

BPR or business process transformation (BPT) are frequently used synonymously for the same phenomenon. According to Grover and Markus (2008) these variations in name of essentially the same concept were part of a bandwagon effect. Both BPR and BPT projects are radical, revolutionary, and one-time undertakings (Davenport, 1993; Hammer, 1990; Grover et al., 2000; Grover and Markus, 2008).

Kaizen. Kaizen originated in Japan and is a continuous process improvement method. In the West, Kaizen can be translated into Kai = Change + Zen = Good (Autorenteam, 1994). It refers to many minor changes in an organization that are applied to existing products and services. More so, Kaizen is a bottom-up approach, which is frequently pursued by employees at lower levels within the organization. Suárez-Barraza and Lingham (2008, p. 2) summarize Kaizen as a method that involves all the employees of the firm, implements small and incremental improvements, and uses teams as the vehicle for achieving incremental changes.

Six Sigma. Six Sigma has been promoted as a more continuous organizational change and improvement method (Sidorova & Isik, 2010). Six sigma projects rely on statistical methods to identify problems. Six sigma projects include the designing, improving, and monitoring of business processes with the goal of reducing costs and enhancing throughput times (Nave, 2002; Revere et al., 2004).

3. Research Approach

3.1. Research Strategy

This thesis followed a mixed-methods research strategy in order to answer the aforementioned research questions. This research strategy employs both qualitative and quantitative data (Hesse-Biber, 2010). While mixed-methods and multi-methods are sometimes used synonymously, this thesis differentiates between these two terms: The term multi-methods research “refers to the mixing of methods by combining two or more qualitative methods in a single research study (such as in-depth interviewing and participant observation) or by using two or more quantitative methods (such as a survey and experiment) in a single research study” (Hesse-Biber, 2010, p. 3). “Mixed-methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration” (R. B. Johnson, Onwuegbuzie, & Turner, 2007, p. 123). The mixing of methods is not limited to a single study, but can be carried out in a program of research or across closely related studies (Hanson, Creswell, Clark, Petska, & Creswell, 2005).

Concerning its epistemological foundations, we adopt a pragmatic and balanced or pluralist position. This is a necessary selection, because mixed-methods asks for paradigms to be combined (Creswell & Plano Clark, 2011). Mixed-methods research can be positioned “between the extremes Plato (quantitative research) and the Sophists (qualitative research), with mixed research attempting to respect fully the wisdom of both of these viewpoints while also seeking a workable middle solution for many (research) problems of interest” (R. B. Johnson, Onwuegbuzie, & Turner, 2007, p. 113). Pragmatism can help researchers understand how different research approaches can be combined successfully.

Besides many others, mixed-methods designs have the following strengths (see Table 7 for a list of strengths and weaknesses): Firstly, they allow for methods *triangulation* while studying the same aspects of a research problem (Hesse-Biber, 2010). Triangulation strengthens and enriches the results of a study in a way that a single form of data might not permit (Hanson et al., 2005). Relying on this principle may also produce results that are superior to those of mono-method studies (R Burke Johnson & Onwuegbuzie, 2004). The second strength is *complementarity*. Combining both qualitative and quantitative data allows for more complex generalizations by gaining a deeper understanding of a social phenomenon (Hanson et al., 2005; Hesse-Biber, 2010). Mixed-methods strategies, and as such both triangulation and complementarity, are particularly useful “for cross-validation when multiple methods produce comparable data” (Yauch & Steudel, 2003, p. 215). In addition, analyzing a certain phenomenon (such as BPC) from different angles can automatically help to clarify meaning. As previously discussed, a large amount of research exists on BPC success. However, these

studies have produced conflicting results and few reliable generalizations. Therefore, a mixed-methods strategy was deemed appropriate for the purposes of this doctoral thesis, namely building a theoretically grounded understanding of how BPC can be implemented successfully in private and public sector organizations.

Strengths	Weaknesses
<ul style="list-style-type: none"> - Words, pictures, and narrative can be used to add meaning to numbers. - Numbers can be used to add precision to words, pictures, and narrative. - Can provide quantitative and qualitative research strengths. - Can answer a broader and more complete range of research questions because the researcher is not confined to a single method or approach. - A researcher can use the strengths of an additional method to overcome the weaknesses in another method by using both in a research study. - Can provide stronger evidence for a conclusion through convergence and corroboration of findings. - Can add insights and understanding that might be missed when only a single method is used. - Can be used to increase the generalizability of the results. - Qualitative and quantitative research used together produce more complete knowledge necessary to inform theory and practice. 	<ul style="list-style-type: none"> - Can be difficult for a single researcher to carry out both qualitative and quantitative research, especially if two or more approaches are expected to be used concurrently; it may require a research team. - Researcher has to learn about multiple methods and approaches and understand how to mix them appropriately. - Methodological purists contend that one should always work within either a qualitative or a quantitative paradigm. - More expensive. - More time consuming. - Some of the details of mixed research remain to be worked out fully by research methodologists (e.g., problems of paradigm mixing, how to qualitatively analyze quantitative data, how to interpret conflicting results).

Table 7: Strengths and weaknesses of mixed-methods research

(Adopted from Onwuegbuzie & Johnson, 2006)

For the purposes of this study, we selected a multiphase mixed-methods design (i.e. sometimes also referred to as sandwich design) (Creswell & Plano Clark, 2011). Multiphase designs occur when a researcher examines a problem or a topic through an iteration of connected qualitative and quantitative studies that are sequentially aligned, with each new approach building on what was learned previously to address a central problem. The purpose of multiphase designs is to investigate a set of research questions that all advance one programmatic research objective. Multiphase mixed-methods designs provide an overarching methodological framework to a multiyear project such as this doctoral dissertation.

This doctoral thesis employs the multiphase mixed-methods design to analyze different and loosely connected aspects of our phenomenon of interest (BPC). Figure 5 provides an overview of the three different phases of our mixed-methods research strategy. This overview highlights how our three research questions relate to the six publications. In addition, it illustrates that P1 and P2, P3 and P4 as well as P5 and P6 build upon each other sequentially. In phase 1 the literature review was the dominant method. In phase 2 we build upon the insights gained in phase 1 and employ a case survey and a case study. Phase 3 comprises the

summary of contributions of each publication discussed in chapter 1 of this doctoral thesis. The methods employed within each research phase are discussed in detail in chapter 3.2.

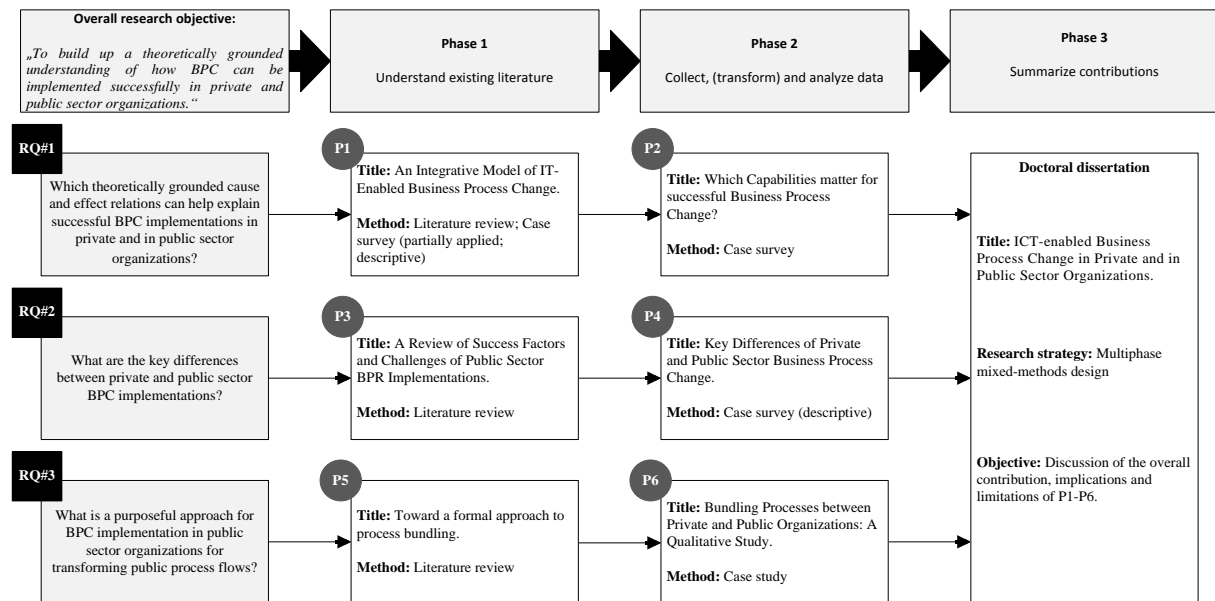


Figure 5: Phases of the applied multiphase mixed-methods design

3.2. Research Methods

3.2.1. Literature Review

A thorough literature review is the foundation of any successful academic research project (Baker, 2000; Hart, 1998). Thus, it is commonly carried out at the beginning of a new research project with the aim of uncovering the relevant sources and thus understanding what is already known about the topic under study (vom Brocke et al., 2009). Webster & Watson (2002, p. xiii) refer to this step of a research project as “understanding the past to prepare for the future.” A literature review can be defined as “a summary of a subject field that supports the identification of specific research questions” (Rowley & Slack, 2004, p. 31). The results of a literature review should not only be a mind-numbing list of citations, but rather conceptual interpretations, structuring and discussions of existing research (Webster & Watson, 2002).

In the following, we present the main steps of a literature review, which we applied in P1, P3 and P5.

Searching for relevant publications. Ideally, the search for relevant literature on a topic should not be “confined to one research methodology, one set of journals, or one geographic region” (Webster & Watson, 2002, p. xv). However, often it is impossible to examine the entirety of existing literature on a specific topic. That being said, it is crucial that one defines an appropriate scope at the beginning of the search. A crucial part of defining a scope is the

identification of relevant keywords and their combinations. Baker (2000, p.222) recommends to start with “those sources most likely to contain a summary or overview of the key issues relevant to a subject” (e.g., seminal textbooks, encyclopaedias, or handbooks). Next, the identified keywords can be employed to the search of relevant publications in leading journals and conference proceedings of the field. It is recommendable to search for these outlets in bibliographic databases such as ABI/INFORM, Science Direct, and Emerald Insight. Focusing on the field’s leading publication outlets helps to ensure the quality of the obtained results (vom Brocke et al., 2009). Since certain journals or conference proceedings are not accessible in bibliographic databases, the search should be complemented by a manual scan of the journals’ and conference proceedings’ archives. Once a certain set of publication are identified, their citations should be scanned for additional publications that are relevant to the topic. This form of search is often referred to as back-ward search (vom Brocke et al., 2009; Webster & Watson, 2002). Finally, a forward search identifying the publications citing the key publications concludes the search. If necessary, the search can be restricted by publication’s time period, status or research design. Subsequently to the search, the relevancy identified publications to the research topic needs to be evaluated (e.g., through reading of abstracts).

Structuring and synthesis of the review. After identifying the sample population of the literature review, the publications should be structured and analyzed with the research question in mind. Two different approaches exist for the structuring and analysis of the review: author-centric and concept-centric (Webster & Watson, 2002) (see Table 8 for comparison of both approaches).

Structuring by concept	Structuring by author
Concept X [Author A, Author B, ...]	Author A [Concept X, Concept Y, ...]
Concept Y [Author A, Author B, ...]	Author B [Concept X, Concept W, ...]

Table 8: Comparison of structuring approaches

(Adopted from Webster & Watson, 2002, p. xvii)

The concept-centric approach should be preferred over the author-centric. The author-centric approach presents usually nothing more than a summary of the relevant publications, without a proper synthesis of the identified literature (Webster & Watson, 2002). The transition from an author- to concept-centric review can be accomplished with the help of a concept matrix (i.e., Salipante, Notz, & Bigelow, 1982). Once the publications’ results are structured in a concept-centric manner, the synthesis of the review should begin. The objective of the synthesis is “to assemble the literature being reviewed for a given concept into a whole that exceeds the sum of its parts” (Levy & Ellis, 2006, p. 200). The synthesis involves the activities such as combining, integrating, modifying, rearranging, designing, composing, and generalizing (Levy & Ellis, 2006).

3.2.2. Case Survey⁵

The case survey method was originally developed for public policy analysis (Lucas, 1974; Yin & Heald, 1975). It is sometimes referred to as structured content analysis of cases (Jauch, Osborn, & Martin, 1980) or meta-case analysis (Bullock & Tubbs, 1990). The case survey method allows to convert qualitative case study data into statistically analyzable quantitative data, using a coding scheme and expert judgments by multiple coders (Larsson, 1993; Lucas, 1974; Yin & Heald, 1975). In the past five decades, the case survey method was successfully employed and developed further in political science (Lucas, 1974; Yin & Heald, 1975), management science (Larsson, 1993) and public administration (Jensen & Rodgers, 2001). Applications of the method in these disciplines have proven that case surveys are powerful and rigorous. Next, we discuss the stages and techniques of the case survey method, which should be adhered to, if rigorous outcomes are to be achieved. Figure 6 provides an overview of the method's five major stages, each of which generates a certain output.

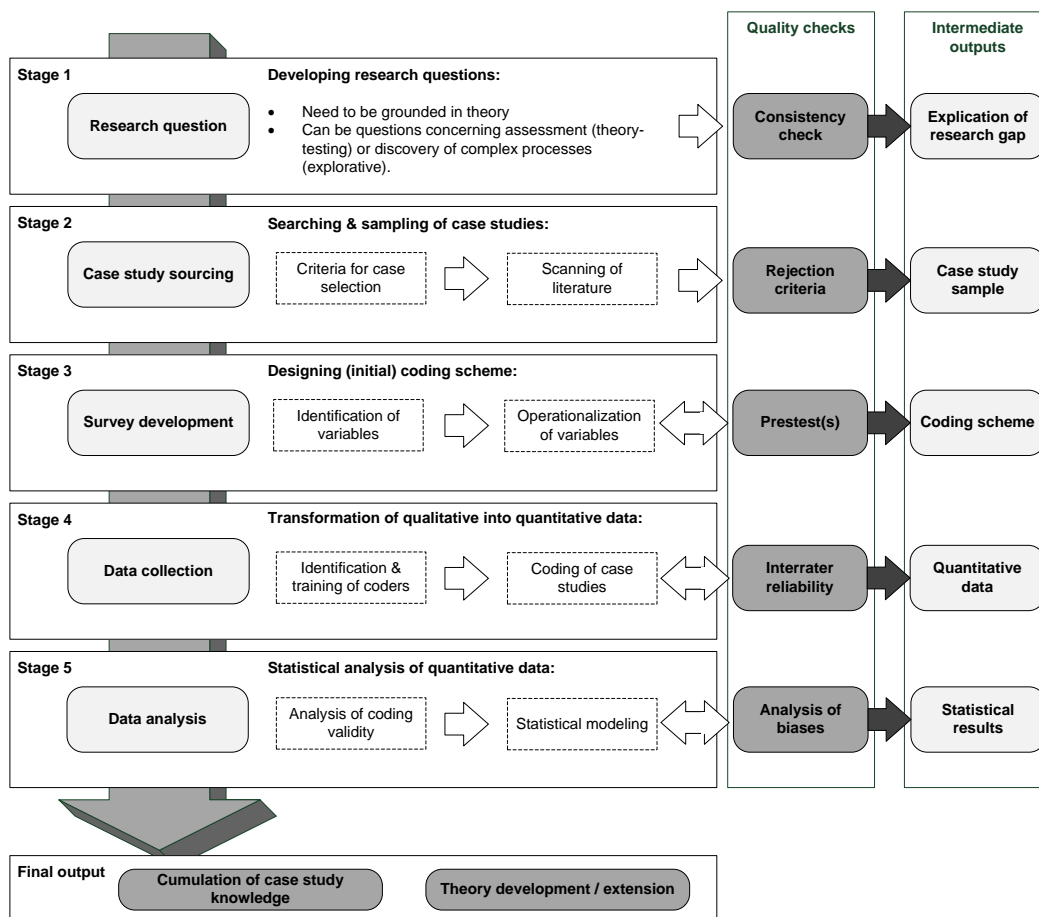


Figure 6: A Blueprint for the Case Survey Method

⁵ The following discussion of the case survey method was originally published by Jurisch, Wolf and Krcmar (2013): Using the Case Survey Method for Synthesizing Case Study Evidence in Information Systems Research. In: 19th Americas Conference on Information Systems (AMCIS). Chicago, USA.

In the following, we present the main stages of the case survey method, which we applied in P2, P4 and partially in P1.

Developing a Research Question. Developing carefully structured and clear research questions are the natural starting point for a case survey. These questions can either be concrete and transferred into testable hypothesis or they can be more of explanatory nature (Larsson, 1993). However, previous case studies in public policy analysis and management science showed that the case survey method may be more appropriate for questions of assessment than the discovery of complex processes (Larsson & Finkelstein, 1999; Robert K Yin & Heald, 1975). An example of such a question of assessment can be found in Stahl and Kremershof's (2004) case survey on mergers and acquisitions. They structured their research with the question "whether trust mediates the relationships between characteristics of the integration process and post-combination integration outcomes" (Stahl & Kremershof, 2004). Jurisch et al.'s (2013) case survey provides an example of a more explorative research question: "Which capabilities matter for successful business process change?". Notwithstanding the type of research question posed, it appears essential to thoroughly reflect on the type of knowledge one seeks to gain from the analysis of patterns across case studies (Newig & Fritsch, 2009).

Searching and Sampling of Case Studies. The identification of the case study sample is one of the most crucial stages in the case survey method. In order to achieve reliability and generalizability, the sampling of the case studies has to be planned and executed systematically (Miles & Huberman, 1994). This stage can be separated into the following two steps: (1) definition of case selection and rejection criteria and (2) the scanning of the literature.

Very clear selection and rejection criteria are needed in order to decide which cases studies should be included in the case survey sample (Lucas, 1974). These criteria should be explicit and based on the theoretical domain the research questions define (Bullock, 1986). Thus, the researcher has to first identify which theoretical domain(s) the phenomena studied apply to (Lucas, 1974). For IS researchers this can vary considerably. For instance, if a researcher is interested in examining the impact of trust on e-government adoption, he or she should not only include IS relevant literature, but also case studies from public administration, political science and management science. The identification of the right population is essential for the generalizability of the case survey results (Lucas, 1974). However, compared to more traditional reviews, the case survey sample should not be restricted by the type of time period, publication status or research design (Larsson, 1993). As part of the statistical analysis, the case survey method can control for the impact of these aspects (Newig & Fritsch, 2009). Another important selection criterion is the amount of data reported on the phenomenon of interest within the case study. If too little information is reported, the case study should be discarded. In case that two case studies exist that report the same empirical evidence (cf., Bence, 1995; Hughes & Golden, 2001), one of them should be dismissed or both should be

combined in one coding set (Bullock, 1986). Otherwise, the occurrences would be counted twice.

Given that the research questions, the boundaries of the theoretical domain and the criteria for selection and rejection are defined, the next step is to scan the literature for relevant case studies. In order to obtain a representative sample of case studies from the defined universe of cases, the researcher needs to identify as many case studies as possible from as many sources as possible (Larsson, 1993). Of course the question of sample size needs to be addressed. Larsson (1993) asserts that collecting all relevant case studies may not only be impossible, but also difficult to handle by the available resources. Thus, the sample size is not only limited by the number of existing case studies and statistical sufficiency, but by the available resources. At the end, the researcher has to decide whether the total sample or a random subset of cases is used for the coding (Newig & Fritsch, 2009).

Unfortunately, the current literature on the case survey method provides no insights on how to deal with the different epistemological foundations of the case survey population. No references exist on how the different epistemological assumptions of case studies (e.g., positivistic vs. explorative) would impact the overall results of the case survey. Larsson (1993) only states that the case survey method holds the potential to bridge over traditional research gaps, such as those between positivistic and humanistic approaches. In addition, not much clarity exists on how to evaluate the validity of the case studies' results or if this even a necessary step. However, this is a crucial topic that needs to be addressed, since invalid results could taint the case survey's conclusion.

Design of Coding Scheme. After the sampling of the case studies, their qualitative information needs to be converted into quantified variables through a coding scheme (Bullock, 1986). One advantage of the case survey method compared to conventional questionnaires is that lengthier and more comprehensive coding schemes can be used to allow for maximal information extraction (Lucas, 1974). Since the reading and coding of the case studies presents a substantial effort, it is recommendable to collect as much information as possible. To minimize potential biases, the researcher should even code all factors presenting possible unwanted influence (e.g., author, publication, selection, coding and other biases) as variables. Newig and Fritsch (2009) assert that "coding twice as many variables, implies considerably less than twice the effort".

Even if the researcher is following a theory-testing research design, he or she should be open for surprises. Thus, the coding scheme should account for the possibility that unpredicted correlations between variables might occur (Newig & Fritsch, 2009). Throughout the statistical analysis, the researcher can always exclude or aggregate data, but not the other way around. The same is true for the design of the coding scales. A complex and potentially unreliable coding scheme can always be collapsed into a more reliable one. For instance, a five-point Likert scale can be collapsed into a three-point Likert scale, but not vice versa (Larsson & Finkelstein, 1999).

One has to be aware, however, that more complex and detailed coding schemes may lead to lower interrater-reliability. Larsson (1993) posits that the limit on how much complexity a case survey can capture is reached whenever interrater-reliability becomes unacceptable. But the only way to identify this point is to start with a more comprehensive coding scheme and to simplify it throughout several pretests until the level of reliability is acceptable (Larsson, 1993).

Transformation of Qualitative into Quantitative Data. The coding of the case studies refers to the systematic assignment of codes (numbers) to units based on the coding scheme (Srnlka & Koeszegi, 2007). This stage is typically the most time and resource consuming one in the entire case survey. Each case study should be read and coded by a minimum of two and ideally three trained coders (Bullock, 1986). In order to avoid undue coding influences, it is recommendable that the coders are unaware of the theoretical hypotheses (Larsson, 1993). We can report from our own experiences with the case survey method that it is quite a lengthy and expensive endeavor. The reading and coding (survey of 37 variables and 125 items) of a case study (15 pages on average) takes a trained coder typically around 3.5 hours. Since our sample consisted of 129 case studies, the overall coding hours amounted up to 450 hours per coder. Hence, it is recommendable to include some of the original case study authors in the coding process. The authors can provide more information than what is reported in the published evidence of their case study. Even though the original authors present an excellent form of secondary validation (Larsson, 1993), the researcher has to be aware that the case survey will take even longer once the authors are involved. Furthermore, author participation does frequently result in lower interrater-reliability (Larsson & Finkelstein, 1999).

Statistical Analysis. As a minimum criterion of validity the construct validity should be assessed (Larsson & Finkelstein, 1999). An item has high construct validity when it correlates with other items of the same construct (convergent) and is uncorrelated with items of dissimilar constructs (discriminant) (R. P. Weber, 1990).

Whenever coding validity is established, the researcher can start to statistically analyze the large amounts of generated code. Bullock (Bullock, 1986) posits that research questions in case surveys are either bivariate (e.g., the effect of size on results) or multivariate (e.g., the effects of process and implementation variables on results). Thus, manifold methods exist for their statistical inquiry. Next to bivariate and multivariate correlations, regression and path analysis are also common techniques in case surveys (Bullock & Svyantek, 1985; Marlen C. Jurisch et al., 2014; Larsson, 1993; Newig & Fritsch, 2009). For instance, Bullock and Svyantek (1985) relied on bivariate statistics, whereas Larsson and Finkelstein (1999) and Bullock and Tubbs (1990) used multivariate statistics. LISREL and structured equation modeling are suitable for studying the complex relationships in case studies (Marlen C. Jurisch et al., 2014; Larsson, 1993).

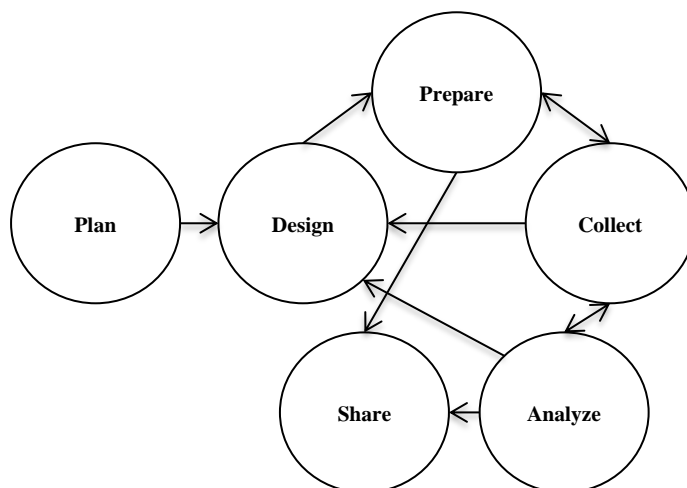
It is crucial that the case study aggregation must have no hidden biases. The researcher must apply the same standards and procedures of rigorous inquiry as to any other statistical analysis (Lucas, 1974). In a case survey, researchers need to estimate potential biases and apply

weights to adjust for them. A number of methods exist for adjusting signs and magnitudes of the combined effect sizes to reduce sources of potential bias. One of the goals in many meta-analytic inquiries is to calculate a main effect or overall effect size (Whiston & Li, 2011). The case survey method offers the opportunity to identify even small and non-significant effects, which can also contribute to the overall picture of the results.

3.2.3. Case Study

A common characteristic of the information systems (IS) discipline is that the bulk of the empirical evidence is embodied in case studies (Alavi & Carlson, 1992). According to Yin (2009, p. 18) „a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident.” The number of case studies conducted in IS research even exceeds that of survey research (Chen & Hirschheim, 2004). Case studies are extremely versatile, which may explain their popularity in the IS community (Harrison & Wells, 2000). They can follow a positivist, interpretivist, or critical approach and involve single-N or multiple-N cases (Shanks, 2002). Case studies can be employed to derive detailed descriptions of a phenomenon and to develop or test theory (Darke & Shanks, 1998). With this versatility, case studies present a well-suited mode of scientific inquiry to IS research.

Yin (2009) proposes six steps for the iterative, but linear process of conducting a case study: plan, design, prepare, collect, analyze and share/report (see Figure 7). In the following, we



discuss these steps of the case study method, which we also applied in P6.

Figure 7: Case study process
(Adopted from Yin, 2009)

Plan. The planning of the case study requires the identification of an appropriate research question. Not all research questions are suited for case study inquiry. For instance, how and why, and, thus, questions of inquiry and understanding, are best suited for case studies (Yin,

2009). In addition, a sound theoretical understanding of the phenomenon of interest is also crucial for defining precise research questions. At this point of the case study project, the researcher should also decide whether to adopt an exploratory or a confirmatory research strategy (Gerring, 2004).

Design. The research design involves the description of the execution steps of the case study, which will enable the researcher to obtain necessary results to answer the research questions (Yin, 2009). This being said, the design phase requires the careful definition of the unit of analysis, boundaries, theoretical foundations and propositions to guide the researcher “where to look for relevant evidence” (Yin, 2009, p. 27). To avoid the collection of irrelevant data, the data sources (e.g., interviews, observations, other documents) and techniques (e.g., cross-case comparison, pattern-matching) need to be identified cautiously.

Prepare. The case study preparation requires the selection of one or more suitable cases. Theoretical or selective sampling of cases guarantee that the selected cases fit the research objective and theory at hand (Eisenhardt & Graebner, 2007). In case study research, selective sampling is often a practical necessity that is “shaped by the time the researcher has available to him, by his framework, by his starting and developing interests, and by any restrictions placed upon his observations by his hosts” (Schatzmann & Strauss, 1973, p. 39). Theoretical sampling as defined by Glaser (1978, p. 36) refers to “the process of data collection for generating theory whereby the analyst jointly collects, codes, and analyses his data and decides which data to collect next and where to find them, in order to develop his theory as it emerges.” Thus, both, selective and theoretical sampling, denote a purposeful selection of cases. Subsequent to the case selection, the researcher should create a protocol for the case study and, if the external constraints permit, a pilot case study should be conducted (Yin, 2009).

Collect. Even though Yin (2009) presents the data collection and analysis as two distinct activities in his case study process model (see Figure 7), he also points out that it is an iterative process. The data collection not only involves the collection of case study evidence from multiple sources, but it also involves execution of the case study protocol, the creation of a case study database and the establishment of a chain of evidence (Yin, 2009).

Case study evidence may be collected from six sources: documents, archival records, interviews, direct observation, participant observation and physical artifacts (Yin, 2009). Although a multitude of data sources exist in case study research, interviews are the dominant data collection technique (Eisenhardt & Graebner, 2007). While information from secondary documents may provide useful insights, they should be handled carefully and primarily used to confirm or enrich other case study evidence (Yin, 2009). The triangulation of different data sources can help establish construct validity. Finally, Yin (2009) recommends storing the collected evidence in a case study database.

Analyze. The data analysis stands at the heart of case study research, but also presents “the most difficult and the least codified part of the process” (Eisenhardt, 1989, p. 539). „Data

analysis consists of examining, categorizing, tabulating, testing, or otherwise re-combining evidence, to draw empirically based conclusions (Yin 2009, p. 126).” Ideally, the data analysis should be guided by an analytic strategy. Yin (2009) differentiates between four general strategies for the analysis: 1) Relying on theoretical propositions, 2) developing a case description, 3) using both qualitative and quantitative data and 4) examining rival explanations. Different analytical techniques exist for the discovery of patterns, relationships, similarities and differences within and across cases (see Table 9 for an overview).

Within case analysis	Cross case analysis
- Pattern matching	- Comparison of group
- Explanation building	- Comparison of couples
- Time-series analysis	- Division of data between different
- Logic models	researchers

Table 9: Techniques for within and cross case comparison
(Adopted from Yin, 2009)

Given a general strategy, specific analytical techniques should be selected. For within case analysis, pattern matching, explanation building, time series analysis and logic models can be relevant. For cross case synthesis different levels of analysis exist (e.g., across groups, couples, etc.) (Yin, 2009). If multiple case studies are conducted, all of these techniques should follow a similar replication logic. However, for each individual case, threats to individual validity should be identified and comparisons for rival propositions.

Share. Sharing and thus reporting the results, presents the last step of a case study project (Yin, 2009). Depending on the publication outlet and type of publication, the target audience needs to be identified. Next, the material should be composed in a way that it provides satisfactory evidence for the presented theory (Yin, 2009).

4. Discussion

4.1. *Summary of Findings*

The following chapter summarizes the results of the six publications included in this doctoral dissertation. We highlight how each of these publications contributes to answering a specific research question. The publications do not provide exhaustive answers to each research question, but rather shed light on some of many research aspects that the respective research question raises.

RQ#1: Which theoretically grounded cause and effect relations can help explain successful BPC implementations in private and in public sector organizations?

Summary of findings in P1. This publication introduces an integrated model for IT-enabled BPC. The model proposes causal structures between the factor business process performance and the various impact factors which are grounded in theory, prior work and case-based evidence. To establish a sound theoretical basis for this model, we reviewed relevant formal theories. In this publication, we propose a novel combination of four underlying theories: RBT, the socio-technical system theory, the organizational theory and the leadership theory. RBT presents the primary theoretical foundation of our model. It is a powerful theory for understanding how resources/capabilities are exploited through business processes to gain a competitive advantage (Gautam Ray, Barney, & Muhanna, 2004a). A limitation of the RBT is that it falls short to specify the underlying mechanisms by which the resource exploitation is accomplished (Melville et al., 2004). We therefore also included the secondary set of theories such as the socio-technical systems theory, the organizational theory and the leadership theory to inform our understanding of successful BPC.

Based on the reviewed theories, prior models and case-study evidence, we identify the following impact factors: resources (i.e., IT, human, others), change management, organizational culture and structure, project management, project scope, management commitment, organizational performance, business processes and business process performance (see figure 8). The variable business processes adopts a mediating role in the model. In accordance with Melville et al. (2004), we propose that the factors resources (IT, human and others), project management, change management, project scope and management commitment impact the dependent variable business process performance via intermediate business processes. The final result of this publication is a model that integrates all of these impact factors and draws causal relations between them. The introduced model will help future research to explore the potential success of BPC initiatives in a more systematic manner.

Summary of findings in P2. This publication presents an extension of our work in P1. We provide empirical support for RBT by examining which capabilities impact BPC project and business process performance. We show that certain capabilities directly influence the project and/or process performance, while others have no impact on either one. The lack of certain capabilities can prevent BPC projects and the changed business processes from being successful (Niehaves, 2010).

Based on the analysis of 130 case studies, we identify that IT capabilities are very important for both, the BPC project and process performance. Consistent with RBT, the findings suggest that valuable, rare, and costly to imitate IT capabilities directly affect the business process performance. This finding suggests that IT can improve the efficiency and effectiveness of processes in an absolute sense (i.e., the cost and/or quality of processes can be superior with IT compared to what was the case before IT was used) (Gautamy Ray, Muhanna, & Barney, 2005).

The results also show that project management and change management capabilities have a positive impact on BPC project performance, but no direct impact on the business process performance. Rather the impact of project management and change management capabilities on the business process is mediated by the BPC project performance. Surprisingly, we found no support for the hypothesized positive relationship between BPM capabilities project and process performance. Instead, BPM capabilities had no positive impact on either one. This provides support for the argument that BPM capabilities are dynamic in nature. Dynamic capabilities have no direct impact on the success of a project (Eisenhardt & Martin, 2000; Teece, Pisano, & Shuen, 1997). Instead they reconfigure other (operational) capabilities and thus their resources, which have a direct impact on the project or process success (Helfat and Peteraf, 2003). This leads us to assume that the impact of BPM capabilities on BPC project and process performance might be mediated by other capabilities (e.g., IT, change management or project management capabilities) and therefore not directly measurable.

The causal linkage between BPC project performance and business process performance has remained rather unexplored in BPC literature. We hypothesized that if a BPC project fails to meet its objectives (e.g., in time, budget, and scope) or is abandoned, the changed business process is also likely not to meet its performance goals. Our empirical results support this hypothesis. We show that a strong positive relation exists between the success of a BPC project and success of the changed business process.

Contribution to RQ#1. Both publications (P1 and P2) offer insights on how formal theories can help identify and explain the factors impacting the success of BPC projects and business processes. In specific, both publications identify RBT as a suitable theory for understanding which capabilities and resources contribute to the success of BPC. The results presented also constitute a test of RBT at the business process unit of analysis. The empirical results reported in P2 are consistent with resource-based expectations.

In P1, we use RBT as our primary theory and a set of secondary theories as a support. Through the lens of these theories we identify factors that impact BPC success. RBT allows us to measure the success of a BPC project and the impact of different factors at the process level. In P2, we empirically test the impact of specific capabilities on BPC success. We measure the influence at the project and process level. This breakdown of BPC success into project and process success is rather unique, but consistent with RBT. It enabled us to show exactly which capabilities are important at which level. Most importantly, we can show that IT capabilities matter equally for the project and the process performance. Other capabilities such as change and project management also impact process performance – but their impact is mediated via the project performance.

The RBT might provide further explanatory power for explaining the concept of dynamic capabilities such as BPM. Dynamic capability theory (DCT) presents an extension of the RBT (B Niehaves et al., 2011). Our empirical test in P2 provides support for previous assumptions that BPM can be considered a dynamic capability. From a process perspective, BPM can be defined as a management principle, which helps organizations to sustain competitive advantage (Hung, 2006). According to this understanding, dynamic capabilities present “a set of specific and identifiable processes, such as product development, strategic decision-making, and alliances” (Trkman, 2010, p. 127). Therefore, the impact of a dynamic capability such as BPM on BPC success is expected to be mediated by other capabilities. Further empirical research is needed to completely understand the role of BPM as a dynamic capability. DCT could provide an adequate lens for this exploration.

RQ#2: What are the key differences between private and public sector BPC implementations?

Summary of findings in P3. In this publication we identify and analyze the BPR related success factors and requirements in public and private sector organizations. Our analysis yielded five success factor dimensions: project scope, top-level management commitment, resources, project management, and change management. While the success factor top-level management commitment forms a dimension of itself, all other dimensions serve as umbrella terms subsuming several success factors of related nature. Our analysis shows that organizational, socio-technical and technical aspects each play a significant role in the success of BPR projects, illustrating the cross-sectional nature of the subject. But to our surprise the identified success factors in the public sector largely conformed to the ones in the private sector.

Since these results did not offer sufficient explanation for the continuing issues encountered by public sector BPR projects, we continued the analysis of the peculiarities and requirements of public BPR implementations in contrast to the private sector. In spite of the shared success factors, we identified differences between the two sectors regarding their functions and intentions, processes, organizational structure, economic feasibility, political feasibility and expectations of BPR.

We found that the obligation to strictly adhere to existent legislation restricts process change in the public sector organizations (Feltz & Hitzelberger, 2004). Consequently, BPR efforts in public organizations are often much less radical in nature than those in private organizations. We also found that public sector managers exert far less power over their organization's structure and changes of thereof. In addition, rigid internal hierarchies (McAdam & Donaghy, 1999a) and the concept of legalism (Otenyo & Lind, 2006) limit the capabilities for change of public organizations. Being bound by legal regulations and bureaucratic principles, BPR in the public sector often does not entail considerable changes of internal processes. Instead, public sector BPR efforts often focus on external processes related to the citizen-friendly provision of services. Our analysis also disclosed that the limited financial means available for BPR efforts in the public sector may restrict personnel, know-how and IT resources. Owing to these economic constraints, BPR projects in the public sector frequently fail at the decision and planning stage (Halachmi, 1995).

Based on these differences, we propose that different BPR approaches are needed in public and private sector organizations for realizing the identified success factors. We synthesis our research findings in the formulation of five propositions aimed at encouraging future research into public sector BPR implementations.

Summary of findings in P4. While P3 examines radical process change in private and public sector organizations, P4 looks at all types of process change in both sectors. In addition, P4 builds on a substantial analysis of 128 case studies. The case sample consists of a wide set of international BPC initiatives, 92 in private and 36 in public organizations. This unequal distribution of published case studies shows that BPC in the public sector has neither received equivalent attention in the past nor reached a state of theoretical saturation.

The public sector has collected experiences from BPC implementations for almost two decades. As discussed in P3, public sector BPC projects are confronted with different organizational and environmental settings. Our results indicate that private and public organizations are guided by surprisingly similar improvement goals, but different measures of success apply. The top three objectives of public and private organizations in BPC projects were the reduction of costs, reduction of cycle times and the improvement of product and service quality. Even though the starting goals were rather similar for both sectors, private organizations were more likely to achieve their improvement goals than public sector organizations. However, defining and measuring the value of BPC projects is often harder for public organizations. One reason for this is that public organizations produce their value for a more diverse cast of actors (e.g., citizens, companies, other agencies, politicians, interest groups, etc.) and each of them has their unique interests. Public organizations have the unenviable task of managing a multitude of, often inconsistent, interests and aims of internal and external stakeholders when embarking on BPC initiatives (Llewellyn & Tappin, 2003). As a result, public organizations invest considerable efforts in managing stakeholder interests and building support for change. Our results also show that frequent changes of government appointments and changing political agendas result in higher strategy and political/

governmental volatility. Little is known what exactly the impact of these volatilities on the performance of BPC is.

Another topic in which public organizations invest considerably more efforts is resource forecasting and planning for BPC projects. Due to stringent annual budgets, public organizations face extreme resource dependencies (Johnson & Scholes, 2001). Consequently, resource allocations have to be planned long before BPC initiatives can commence.

Within the private sector, standardized methods and techniques for managing change have emerged. These methods are used for the analysis of processes and workflows, for measuring the performance of projects but also for project management and change management (William J. Kettinger, Teng, & Guha, 1997b). On the contrary, public organizations are less likely to rely on classic project and change management methods and tools. Instead public projects often create “completely new methods without expending any detailed analysis” (Hans Jochen Scholl, 2004).

The perceived capacity to change appears to be much higher in private organizations than in public ones. Our analysis discloses that 60% of public and 70% of private BPC projects were identified as successful. In contrast, 6% of BPC endeavors in the public and 9% in the private sector were deemed a failure. A higher percentage of public projects remained incomplete (23%) than private projects (14%). The development of a capacity for change is closely related to the establishment of a learning organization. In private BPC projects, interdepartmental integration and cooperation of different departments is very important since it facilitates the learning from past failures and successes (MC Jurisch et al. 2012). This includes the better anticipation of risks, lower costs due to reusable artifacts and more effective implementations based on documented best practices. In contrast to the private sector, the knowledge accumulated on BPC in public organizations is usually kept within the respective organization and not shared for the benefit of interested parties.

Contribution to RQ#2. In P3 and P4 we provide detailed answers to RQ#2. In P3 we examine BPR related success factors and contest that the identified success factors apply to both sectors. P3 looks at radical BPR projects and approaches the differences on a higher level. P3 concludes that very radical changes as put forth by BPR might not be desirable for public sector organizations. P4 examines the implementation of all types of process change in both sectors. The differences analyzed in P4 pertained directly to the implementation of BPC projects. We looked at the following set of factors reported in actual BPC case studies: decision to change, process scope definition, intended vs. achieved improvements, change management, project management, resource management, interdepartmental integration, volatilities and project performance. Overall, we can contest that the experiences relating to success factors, risks and best practices in BPC are much more numerous and well-supported for private sector applications. Yet, most concerns valid for BPC projects in the private sector seem to be of similar importance when dealing with public organizations. While there appears to be some differences in character (process scope, intended improvements), most aspects deserving attention in private sector projects also play a major role when initiating change in

public organizations, albeit sometimes for different reasons (change management, resource management). Certain influences, such as volatilities, still pose a relatively blank sheet to public sector BPC research.

Both public and private organizations have accumulated considerable experiences with BPC in the last decades that the other sector could benefit from. Why should learning only work in a one-dimensional manner - from private to public? Our results show that there are certain aspects that public administrations appear to have more experience in, while there are others that private organizations are more accomplished in. This is particularly important when considering that public and private sectors are not two distinct and internally homogenous domains. In fact, few organizations are purely public or purely private. Most organizations sit somewhere on a continuum between these two extremes (Johnson & Scholes, 2001).

However, one aspect that appears to be very unique to the public sector is the focus on changing customer-oriented processes (see P3). These processes are characterized by enormous information and process flows between the various stakeholders. Based on our results, we concluded that a top-down BPC approach might be most suitable for the analysis of such customer-oriented processes. Normally, large numbers of potential processes need to be analyzed for the identification of suitable BPC candidates. The bottom-up process analysis employed by many BPC-related approaches in the private sector would be too expensive and time-consuming in the public sector (Rosenkranz & Holten, 2010). The process landscape is too diverse and heterogeneous for a bottom-up approach. Hence, we posit that a top-down approach is needed in order to account for the special requirements of public sector organizations. The various functional, hierarchical and bureaucratic restrictions of public organizations challenge the transfer of BPC methodologies from the private sector. Thus, a public sector specific BPC for analyzing and changing such customer-oriented processes is needed.

RQ#3: What is a purposeful approach for BPC implementation in public sector organizations for transforming public process flows?

Summary of findings in P5. In this publication, we review criteria that allow for the identification of purposeful process bundling candidates in the public sector. From a customer perspective, process bundles are created whenever cross-organizational processes are combined or interlinked either organizationally or technically with the objective to create a coherent data base. A process bundle, within the context of public organizations, constitutes the purposeful alignment of separate activities, and accordingly processes, along a well-defined value chain [12].

We reviewed 36 scholarly articles and books to identify suitable process criteria. Based on this review, we conceptualize that the majority of relevant process identification criteria can be categorized according to the following three identification principles: (1) performance, (2) process integration, and (3) complexity. Parameters assessing the process' performance and efficiency were among the most frequently listed. Fewer criteria existed for the purpose of

process and information integration. Most public service processes stretch across different functional departments. Therefore, they often split across individuals and across time [24]. Information integration in public processes focuses on facilitating the seamless flow of information. Complexity indicators commonly disclose processes that can be simplified through integration. While most processes are usually quite simple at their initiation [20], they often grow considerably more complex over time. The more cases, variants, or actors that are involved, the more complex the process grows.

However, none of the identified criteria offered insights on how to prioritize the various processes for bundling. Private sector approaches for process identification and bundling promote a bottom-up identification of potential bundling candidates. These approaches start the identification process by choosing one or a selected number of processes that exhibit the greatest malfunctions (e.g., in regard to (1) performance, (2) process integration, and/or (3) complexity). Accordingly, the improvement process always has one specific process as a starting point without providing a holistic picture of the process landscape. However, this bottom-up approach does not support the comprehensive screening of several hundred of public service processes. Screening all public processes for bundling candidates would be extremely time-consuming and cost intensive.

In this publication, we propose that the identification and analysis of public processes should follow a top-down approach for investigating the complex information flows between and within public organizations. We argue that tailoring the identification of processes to a superordinate principle (e.g., content, context, or business event) can yield a more anchored approach and account for the top-down perspective. We, therefore, propose a methodological intermediary step that promotes first a focus on these superordinate process bundling principles (e.g., content, context, or business event). These principles assess the similarity or complementarity of the future process bundles in regard to their content, context, or a specific business event. Only one primary principle at a time should be pursued. Subsequently, processes with a similar or complementary content, even across departments, can be analyzed with the previously discussed performance, integration and complexity criteria.

Summary of findings in P6. In this publication we introduce an approach for public service process bundling. The approach consists of the following four phases: Domain Analysis, Process Analysis, Process Bundling and Multidimensional Cost-Benefit Analysis. The aim of this approach is to identify, design and evaluate process bundles for B2G process flows. This is achieved by a top-down analysis of the respective domain and a subsequent selection of relevant processes. After undergoing further analysis from a top-down perspective, each of these processes is depicted in an as-is profile and potentially assigned to a process bundle before being merged into a to-be profile. Finally, a multidimensional benefit analysis assesses the potential of the process bundle as well as its feasibility, providing assistance in selecting and prioritizing process bundles for their final implementation.

After describing each phase of the process bundling approach in detail, we apply it in a case study. The case study focuses on environmental reporting duties of businesses in Germany. To conduct the necessary information for our case study, we conducted a series of 18 semi-structured interviews with 15 experts in private and public organizations.

In the case study, we apply each phase of the bundling approach to elicit potential bundling candidates in the domain of waste disposal reporting duties in Germany. In the domain analysis, we identified 339 processes between businesses and public entities. We collected these processes with a unique set of information attributes in a data library. Next we analyzed all processes for similarities with the help of content-based criteria (e.g. common legislative basis, involved actors). The analysis disclosed three processes that could potentially be bundled: eANV, PRTR and the environmental statistic report on waste disposal. All three processes feature the same involved actors on the business side, the same direction of information flow and a significant overlap in the information content. Next, we aimed to purposefully bundle these three processes by aggregating and reusing data between these processes. Our proposed process bundle uses data collected within the context of eANV to cover the reporting duties incurred by PRTR. Simultaneously, the same data also suffices to meet the information needs put forth by the environmental statistic report waste disposal. The described process bundle shows that no actual changes were conducted to these processes (e.g., their actors, purpose, function, or outputs). Any changes solely result from removing redundancies, uniting related information flows, and similar measures. We conclude the case study with a benefit analysis for the proposed process bundle.

The proposed approach for public process bundling can serve as a guideline for practitioners, who aim to reduce costs and improve process quality. With the help of this bundling approach, actors in public organizations can analyze their processes flows for overlapping content, recurring information and related redundancies. Furthermore, the approach facilitates the integration of processes with similar structure, for instance in terms of identical actors or overlapping flows of information.

Contribution to RQ#3. In P5 and P6 we show how public sector BPC can be addressed through process bundling. The proposed process bundling approach focuses on the identification and redesign of B2G process flows. In P5 we propose that the identification of suitable process bundling candidates should follow a top-down instead of the classical bottom-up approach. The proposed identification principles (e.g., content, context, or business event) provide a suitable approach for examining the huge amounts of public information and process flows. In P6 we integrate the identification principles in an approach for process bundling. The discussed bundling approach consists of four phases and detailed steps. We show the applicability of this approach in the domain of waste disposal reporting duties in Germany. Here we identify 3 bundling candidates out of 339 processes. We show how these three processes can be bundled purposefully and discuss the benefits of their bundling.

The proposed process bundling approach was only applied to the identification, analysis and design of B2G processes. Future research is needed to investigate the transferability of the proposed approach to other domains and different sets of process flows (G2G, C2G, etc.).

4.2. Implications for Research

Our research on BPC in private and public organizations bears several implications for research, including:

- (1) Concerning **BPC** in general, we contribute detailed descriptions and analysis of past projects (as reported in case studies) by means of comprehensive empirical meta-analysis research. We consolidated existing knowledge on BPC that has so far remained dispersed over 130 case studies. Based on this analysis, this doctoral thesis contributes to BPC research by providing insights on the drivers of BPC success. We theorized and examined the influence of various drivers on the implementation of BPC projects and their specific arrangements in private and public organizations. For example, IT capabilities were shown to positively impact BPC project and process performance (P2). Our findings add to the ongoing debate on the business value of IT by showing that IT clearly matters for BPC success. P1 presents a concise set of variables (e.g., change management, project management, volatilities, etc.) and their relations to process performance in BPC projects. These theory elements (including boundary definitions, context variables, etc.) could be reflected and added to the move of further efforts to understand BPC and, here specifically, resource arrangements and influencing variables.
- (2) As for **RBT**, the thesis' publications contribute a tangible instantiation in terms of BPC. We show in P1 and P2 that RBT provides a purposeful lens for understanding BPC success at the project and process level. In P2 we empirically test RBT on a sample of 130 case studies. Our findings disclose that IT capabilities have a positive impact on BPC project and process performance, while change management and project management capabilities only have a direct positive impact on BPC project performance. Their impact on the process performance is mediated over the project performance. Moreover, P1 shows how other formal theories such as the organizational, leadership and socio-technical systems theory can contribute to RBT for understanding and explaining the complexities in BPC projects. However, the work in P1 was only conceptual and additional empirical evidence is needed to validate the proposed causal structures. Our results in P2 provide support for the thesis that BPM capabilities are dynamic in nature. Dynamic capabilities do not directly affect output of a BPC project, but contribute indirectly to the output through an impact on operational capabilities (Helfat & Peteraf, 2003). In accordance with Niehaves et al. (2011) we define BPM capabilities as a set of techniques to integrate,

build, and reconfigure an organization's business processes for the purpose of achieving a fit with the market environment.

- (3) Regarding the ongoing debate on **private and public sector organizational differences**, this thesis' publications provide detailed reviews of BPC differences and similarities for each domain. P3 and P4 disclosed that the available evidence does not provide clear support for the view that public and private BPC implementations are fundamentally dissimilar in all important respects. For instance, we found no significant differences between private and public sector BPC success factors. This is not to argue that there are no differences between public and private BPC implementations. We found differences in regard to the methods, techniques and procedures employed, but also to the measure of success which private and public organizations employ. Additional differences exist in respect of the scope of change, risk taking behavior, support for change, perceived capacity for change, resources forecasting, volatilities and the criteria used in deciding whether or not to launch a BPC project. P4 highlights the need for two-dimensional learning between both sectors. So far, public management research has primarily turned to business administrations for help. However, our results indicate that research should also look vice versa. Research should aim to understand why private and public organizations might have been historically better in certain aspects of managing change and what they can learn from the other sector.
- (4) This thesis introduces **process bundling** as a novel approach for public sector BPC (see P5 and P6). Existing (and predominantly private sector) BPC approaches for public sector organizations provide not sufficient information on how to identify, change and design B2G process flows. In particular, established bottom-up approaches for process identification render unsuitable for thousands of B2G processes. We advocate a top-down identification of suitable process bundling candidates along the following principles: content, context or business event. This top-down identification approach pays attention to the unique requirements of the public sector. In P6, we implement the proposed process bundling approach in a case study. Further empirical applications of this approach in different domain, organizational and national settings are needed to further to further develop and refine it.

4.3. Implications for Practice

Our research on BPC in private and public organizations bears several implications for practice, including:

- (1) **Manage factors impacting BPC success.** P1 and P2 identify and discuss important factors for BPC success. Managers should devote attention to the availability of the right resources/capabilities, in particular to their IT resources and capabilities, but also to management commitment, project scope, and change and project management. All

of these factors are grounded in formal theories and practical experiences. Without the theoretical foundation organizations and their managers are often left with no clear guidance. As a consequence, organizations often turn for help to outside consultants (see P2). However, managers should be aware that the capabilities contributed by outside consultants to a BPC project usually leave the respective organization after the project is completed. The empirical enquiry in P2 disclosed that a strong relationship exists between project and process performance. In order for the changed process to perform efficiently and effectively the necessary capabilities need to be available or build within the organization as well. All of the discoveries described in P1 and 2 can serve to help practitioners in planning their BPC projects more carefully.

- (2) **Understand and learn from the differences.** The established knowledge on the differences in public and private sector BPC implementations can provide guidance to practitioners. We summarized the unique characteristics of private and public sector BPC implementations. The results of our analysis regarding the specific characteristics of the public sector call attention to the need for an appropriate implementation strategy. Our findings can assist practitioners in the public sector to timely identify obstacles and impediments to their efforts and aid in the understanding of the underlying circumstances. Highlighting the need for top-down support of BPC initiatives, we encourage decision makers in the public sector to review the potentials of BPC for their organizations and initiate activities where appropriate. Some of the issues impeding the success of public sector BPC are rooted in the somewhat ill-preparedness of public organizations for change (Halachmi & Bovaird, 1997). This applies to their organizational structure, culture, resources and capabilities. Qualified and experienced project and process managers are still rare in the public sector (O. E. Hughes, 2003; Thong et al., 2000). Consequently, public organizations need to devote significant attention to training before, during and after a BPC project.

However, learning should not only be conducted one-dimensionally. Both public and private organizations have accumulated considerable experiences with BPC in the last decades that the other sector could benefit from. Why should learning only work one-dimensional - from private to public? Our results show that there are certain factors that public administrations appear to have more experience in, while there are others that private organizations are more accomplished in. For instance, public sector BPC projects have generally have been focusing considerable attention on identifying, managing and involving salient stakeholders (H. J. Scholl, 2004). Here, experiences were made that private sector managers could contribute of when embarking on their next change projects. Hence, we propose that both public and private organizations may actually learn from one another's BPC implementations. This is particularly important when considering that public and private sectors are not two distinct and internally homogenous domains.

- (3) **Analyze and improve processes through bundling.** The proposed approach for public process bundling is to serve as a guideline for practitioners, aimed at reducing costs and improving process quality. With the help of the proposed approach, managers in public organizations can analyze their processes for overlapping content, recurring information and related redundancies. The application of process bundling can lead to cost savings for public organizations; thus, taking the pressure off of heavily strained public budgets. In addition, process quality can be improved and error rates decreased as redundancies and duplicated data are removed. This can support public managers in their quest to provide more effective, well-structured and user friendly services. By offering single points of contact for frequently recurring concerns and requests, public service providers will be able to significantly enhance their E-Government capabilities. This is crucial for meeting the demands posed by the evolving information society. The affected private organizations would encounter more streamlined public processes, enabling them to reduce the time (and thus the costs) spend for interacting with public organizations.

4.4. *Limitations*

Like any research project, the publications presented within this doctoral thesis are subject to certain limitations. While each publication features a detailed discussion of their particular shortcomings, we will now address some general limitations of this doctoral research project and of the methods applied. First and above all, this thesis' publications were written over a period of more than four years. During this time, the research has progressed significantly, both regarding theory and methodology; but most importantly our personal understanding of the subject under study evolved as well in respect to the terminology, concepts, methods and theories used. Besides these issues inherent to the doctoral thesis, additional external factors had an impact on how well the spectrum of analytical perspectives was able to be covered in the individual publications.

- (1) **Limitations of literature reviews.** The main limitations of a literature review are the complete reliance on previously published research, their availability and appropriateness. As such the literature review is subject to same limitations as the case survey method such as the garbage in and garbage out rule (Rosenthal & DiMatteo, 2001) or that generalizations only apply within the realm of the selected domain (King, 2005) (for a full list of limitations please refer to the section on case survey limitation). A unique limitation which we experienced in most of literature reviews (P1, P3 and P5) is that the theoretical domain - BPC in private and public organizations - stretches into many research disciplines. We examined literature published in IS, economics, business administration and public administration. As it is hard enough to be a master of the literature of a single discipline, it is even harder to cover many disciplines with a single literature review. Hence, even though we tried to include all relevant literature, it must be acknowledged that some publications were not identified for review in P1, P3 and P5.

- (2) **Limitations of case surveys.** The case survey method, which we applied in P2, P4 and partially in P3, has some inherent biases by virtue of the inclusion and exclusion criteria and the methods chosen to review the literature. In fact, those biases are very similar to those of other review methods. First is the garbage in and garbage out rule (Rosenthal & DiMatteo, 2001). If the information presented in the case studies is too vague or too little, no statistical analysis can repair this damage (Bullock & Svyantek, 1985). We controlled for this bias in the searching and sampling stage of the case survey. Second, the results are limited to theoretical domain, which the researcher identifies in stage two of the case survey method. Thus, generalizations only apply within the realm of the selected domain (King, 2005). Third, since the case survey method focuses on knowledge accumulation, it may not give sufficient attention to the unique factors of an individual case (Yin & Heald, 1975). This trade-off, however, applies to any review method. The fourth limitation is the publication bias, which refers to the fact that significant results are more likely to be published than non-significant results (King, 2005). However, these published results may not always be representative for the entire research population. The fifth limitation addresses the sample size of a case survey. The statistical power of detecting a genuine effect size depends on the number of case studies included in a case survey. However, no information exists on the minimum sample size of a case survey. For instance, Larsson and Finkelstein's (1999) final sample consisted of 61 case studies, whereas Stahl and Kremershof's (2004) sample comprised 50 case studies on mergers and acquisitions. The smallest reported case survey had a sample size of 33 case studies (Bullock & Tubbs, 1990). Hence, further specification on the minimum sample size is needed.
- (3) **Limitations of case studies.** Besides its many advantages for gaining deep insights into a specific domain or topic of study, the case study method is subject to a number of limitations. First, case studies do not allow for generalizations in the conventional sense. Case studies are usually routed in one or few cases (Eisenhardt & Graebner, 2007). In P6 we conduct a case study on waste reporting in Germany. Therefore, the conclusions of this study are limited to the specific domain, to the organizations studied and in P6 even to the country, where the study was conducted. Nonetheless, we employed several methodological techniques in this doctoral thesis to increase the validity and reliability of our case study results and thus their generalizability (Lee & Baskerville, 2003). For instance, we triangulated different sources of data and methods (R.K. Yin, 2009). Second, the main sources of data in case studies are frequently interviews. While interviews provide a rich source of information, they are also subject to a number of biases that can affect the final product. For instance, in qualitative case studies the researcher presents the primary instrument of data collection and analysis (e.g., in interviews). The researcher is therefore often left to rely on her/his own instincts and abilities throughout most of this research effort. A third limitation concerns to what Guba and Lincoln (1981, p. 378) refer to as "unusual problems of ethics. An unethical case writer could so select from among available data

that virtually anything he wished could be illustrated.” The fourth limitation addresses another downside of the case study method: they take place in completely open and uncontrolled environments. As a consequence, case studies are not very reliable indicators of cause and effects since the variables in the study are uncontrolled.

4.5. Future Research

Given the results and limitations of this doctoral thesis, it opens up for several potentially fruitful avenues for future research.

- (1) **Explore and test formal theories to better understand BPC.** This thesis provided conceptual and empirical support for RBT and its potential for understanding BPC success. Additional empirical inquiries are needed to examine which capabilities impact BPC success. The case survey in P2 did not differentiate between capabilities for private or public sector BPC. Considering the identified differences in P3 and P4, one could assume that different capabilities are needed for successful private and public sector BPC. Another interesting avenue for future research presents DCT. P2 identified BPM capabilities as dynamic capabilities. How do these capabilities impact IT, project and change management capabilities? Do other dynamic capabilities matter for the success of BPC projects and the changed processes? How can the concept of DCT be transferred to the study of BPC in public sector organizations? These are questions that need to be addressed in greater detail in order to improve BPC success. In addition, the role of other formal theories such as contingency or coordination theory for explaining BPC success should be explored further. Most recently, more organizations embarked on business network transformations, which presents the next logical step to BPC (Venkatraman, 1994; Word, 2009). Managing interdependencies in business network transformation presents a critical task. Coordination and contingency theory could both help to develop a more detailed understanding of factors impacting the success of BPC at a network level.
- (2) **Assess the role of external consulting support for BPC success.** Our analysis in P2 and P4 disclosed that over fifty percent of all BPC projects rely on the support of external experts (consultants). For future BPC research, the involvement of external experts could provide an interesting control variable for future empirical studies. In addition, future research should explore their role for the success or failure of a BPC project. For instance, the question that could be explored is which of the PM, IT and CM capabilities are specific to external experts and which are specific to organizations. This aspect is particularly important when considering the strong relation between project and process performance. It needs to be guaranteed that not only the external experts’ possess the capabilities to successfully complete the BPC project, but also that the organization itself possesses the capabilities for executing the changed business process successfully.

- (3) **Examine failed BPC projects.** The majority of the case studies analyzed within this thesis report accounts of successful BPC implementations. In fact, only around 8 percent of the case studies included in P2 and P4 were reported as a failure. A similar picture can be found when looking for reports of failed BPC projects in press articles. Most failed BPC projects in private and public organizations are never reported to the public (or the press), but instead these failures are kept private in the respective organization. However, learning from these failures could provide a more fruitful approach than the study of successes. The study of failed BPC projects could help shed a different light on the complexities experienced in the situations, which ultimately led to the failure.
- (4) **Further develop and apply process bundling approach.** The process bundling approach, which was introduced and applied in P5 and P6, has so far only been applied in one domain in Germany. This public sector specific BPC approach is based on our experiences made within the German public sector. The proposed process bundling approach was only applied to the identification, analysis and design of B2G processes. Future research is needed to investigate the transferability of the proposed approach to other domains and different sets of process flows (G2G, C2G, etc.). In addition, this approach should be applied to different domain, organizational and national settings in order to further develop and refine it.

5. Conclusion

Business process change (BPC) has been on the agenda of organizations for decades (Hammer & Champy, 1993). The latest Gartner surveys show that improving business process performance is still the #1 priority on CIO agendas (e.g., Hill and McCoy, 2011; Lopez, 2011). BPC is concerned with the adaptation of an organization's business processes to its market environment. To achieve this value proposition, BPC offers a set of methods and techniques to integrate, build, and reconfigure an organization's business processes (B Niehaves et al., 2011). Despite the importance of BPC, a holistic understanding is not yet to be found in the literature. This doctoral thesis set out to build up a theoretically grounded understanding of how BPC can be implemented successfully in private and public sector organizations. This thesis employed a mixed-methods approach to empirically address the research objective. Contributions are made to theory development by applying RBT and other formal theories to the study of past BPC projects. In accordance with the RBT, the publications included in this doctoral dissertation show that for a BPC project to be successful the right IT, project management and change management capabilities need to be in place. IT capabilities play a particularly important role for the success of BPC projects and the altered business processes. Besides the study of impact factors on BPC success, the publications also examine the differences and similarities in private and public sector BPC implementations. For instance, this research disclosed that BPC implementations in the two sectors differ predominantly in character (process scope, intended improvements). However, most aspects deserving attention in private sector projects also play a major role in public BPC projects, albeit sometimes for different reasons (change management, resource management). Based on the identified differences and unique traits of the public sector, this thesis formulated the need for a public sector specific BPC approach. The final two publications included in this thesis address this issue and introduce process bundling as an approach for changing public sector processes. Potentially fruitful future studies lie, among others, in the study of business network change, the role of external consulting support for BPC success, other formal theories and their explanatory power for BPC, failed BPC projects, process bundling methodology as well as dynamic capability development.

PART B: Publications

Publication 1

An Integrative Model of IT-Enabled Business Process Change: Causal Structures in Theory, Research and Practice⁶

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Abstract

Although various researchers have addressed the topic of BPC success, BPC still suffers from a lack of knowledge on adequate theories and methods. This lack of knowledge is also evident in prominent BPC models. Research outcomes produced to some extent conflicting results and few reliable generalizations. The development of a theory that is falsifiable, generalizable, criticizable and useful is indispensable for future BPC research.

The purpose of this research is to provide an understanding for successful BPC that is grounded in relevant theories, prior work on BPC and case-based evidence. The outcome is an integrative model for IT-enabled BPC, which proposes causal structures between different impact factors. The proposed model presents a first step toward a theory for BPC success and prepares the ground for further research in this field.

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1. Introduction

In the 20 years since the fundamental articles of Hammer and Champy (1993) and Davenport and Short (1990), numerous researchers have embraced the topic of business process change (BPC) in organizations and its implications for organizational design (Kettinger & Grover, 1995). To this day, a huge number of empirical research studies including numerous case studies exist that examine the topic of BPC success.

BPC or business process transformations are often complex initiatives, which are frequently associated with high costs for the organization. Consequently, it is not surprising that the failure rates of BPC initiatives remain high. Between 60% and 80% of the organizations' initiatives to improve their efficiency and effectiveness via rethinking and redesigning their business processes still fail (Trkman, 2010). Therefore, it is of utmost importance that researchers and practitioners determine the critical factors driving BPC success.

Various researchers have addressed the topic of BPC success over the last years. However, their research outcomes produced to some extent conflicting results and few reliable generalizations. Till today, none of the proposed success factor models for BPC (e.g., Guha et al., 1997; Huizing et al., 1997; Kettinger & Grover, 1995; Teng et al., 1998) managed to prevail. Markus and Grover (2008) stated that the field of BPC still suffers from a lack of knowledge on adequate theories and methods. This lack of knowledge is also evident in prominent BPC models and leads to the following shortcomings. First, the majority of research models for BPC success are rather atheoretical (i.e., Karimi, Somers, & Bhattacharjee, 2007; Kettinger & Grover, 1995; Teng et al., 1998). Most of them fail to evaluate the identified BPC success factors from different theoretical angles. Second, another group of researchers makes theoretical assumptions on only specific causal relations, e.g., impact of IT or change management on BPC success (i.e., Grover et al., 1998; Huizing et al., 1997), which sometimes stand isolated in the overall context of BPC success. Third, some research models on the topic of BPC success stem from only one or few case studies in domain specific settings (i.e., Caron et al., 1994; Larsen & Myers, 1997) which also limits the generalizability power of these research results. The short summary of existent research on the topic of BPC shows that the field itself is still rather disorganized, with little prospect of classifying or comparing the various research streams (Trkman, 2010).

The development of a BPC theory is indispensable (Markus & Robey, 1988) to answer questions on how and why BPC initiatives succeed or fail. The purpose of a theory is the conduction, coordination, explanation and prediction of phenomena. With a theory the crucial determinants of a problem can be constituted and their relations to each other discovered (Speck, 1980). Theory also holds the advantages of being falsifiable, generalizable, criticizable and useful (Speck, 1980). The lack of consistent and generalizable knowledge on the topic of BPC success emphasizes the necessity for a theory (Grover & Markus, 2008).

In this paper, we propose an integrative model for IT-enabled BPC, which presents a first step toward a theory for BPC success. The purpose of the model is to provide an understanding for successful BPC that is consistent with the state of the art of research and grounded in theory. We aim to identify the theoretical rationale for each impact factor and specify propositions for each causal relation of the integrative model. Underpinning this aim, the principal objectives of the paper are threefold. (1) We strive to identify the relevant theories that establish a basis for the theoretical model. This paper proposes a novel combination of four underlying theories: the resource-based theory, the socio-technical system theory, the organizational theory and the leadership theory. (2) We aim to investigate the impact factors for the success of BPC initiatives grounded in a detailed screening of relevant BPC cases. (3) We integrate prior BPC models and the IT-value perspective in the development of the model.

The structure of the paper is as follows. In Section 2, we present a summary of the current research in this field. Section 3 outlines the relevant theories, which inform the model. Section 4 depicts the BPC case study sample. Section 5 describes the integrative model and its constructs. In Section 6, we conclude the paper and present our considerations regarding research and practical implications.

2. Related Work

Over the last two decades, the success of business process change has been studied through several theoretical and practical lenses. Two dominant streams of research can be identified. The first group of researchers (e.g., Grover, 1999; Guha et al., 1997; Kettinger & Grover, 1995) address the topic of business process change primarily from an organizational change perspective, while more recently a second group of researchers (e.g., Grover et al., 1998; Melville et al., 2004; Radhakrishnan, Zu, & Grover, 2008) analyze the impact of IT investments on organizational performance from a process-oriented perspective. Both streams of research inform our choices concerning the impact factor selection and the modeling of their interrelationships.

The most prominent models analyzing the critical success factors for BPC (i.e., Grover, 1999; Guha et al., 1997; Kettinger & Grover, 1995) share the same assumption, namely, that successful BPC is strategy-driven. In this respect, BPC is always a strategic change (Guha et al., 1997). Top management holds a key role in supporting the respective strategic change initiative while also encouraging a change ready organizational culture (Kettinger & Grover, 1995; Skerlavaj, Stemberger, Skrinjar, & Dimovski, 2007). Often this is referred to as establishing an innovative organizational environment, which assumes a central role in most BPC models (Guha et al., 1997; Kettinger & Grover, 1995).

The success of BPC also depends on the quality of the implementation process (Trkman, 2010). Therefore, BPC needs to be accompanied by change management to ensure joint efforts between managers and employees. Grover (1999) argues that a lack of change management inhibits the success of BPC projects with respect to processes and people factors.

Bearing this in mind, it is no surprise that all BPC models (e.g., Grover, 1999; Guha et al., 1997; Huizing et al., 1997; Kettinger & Grover, 1995) propose an alignment of process and change management practices, along with the change environment, in order to improve business processes and obtain measurable and sustainable competitive performance gains.

Huizing et al. (1997) add an interesting perspective to common BPC research models: the concept of fit and organizational performance in change projects. Their framework distinguishes five dimensions: level of ambition, breadth, depth, planning, and coordination of the change process. Based on thorough empirical verification of their research framework with 90 organizations Huizing et al. (1997) conclude that the ambition for change has to be balanced with the organization's ability to change. They further identify that "the higher the level of ambition, the larger the number of critical activities [...] that need to be tackled and the more organizational aspects that have to be changed [...]" (Huizing et al., 1997, p. 112). Even though theoretical and practical evidence highlights the importance of the dimension level of ambition or project scope, none of the prominent BPC models (i.e., Guha et al., 1997; Kettinger & Grover, 1995) incorporate it as a critical success factor for BPC.

The employment of the dimension IT and its relation to BPC success has produced contradicting results. While some researchers argue that IT poses an important catalyst and enabler for BPC (Trkman, 2010), others argued that IT may not necessarily be a critical success factor for BPC (Grover, 1999; Guha et al., 1997; Kettinger & Grover, 1995). Besides the ongoing debate on the business value of IT, the effect of IT on business performance has in fact often been contested (Karimi et al., 2007; Radhakrishnan et al., 2008). For instance, the relationship between IT investment and firm performance through an input-output perspective is well described in production function and process-oriented models (Melville et al., 2004). Particularly, process-oriented models offer helpful insights on how IT can provide business value through the use of business processes. Soh and Markus (1995) introduced a conceptual framework which posits that IT investments lead to IT assets (IT conversion process), IT assets to IT impacts (IT use process), and IT impacts to organizational performance (competitive process). Melville and colleagues (2004) also introduce a process-level model, which depicts that IT resources and complementary organizational resources have to be combined into a business process which then yields business process performance. Recently, Trkman (2010) has argued that the value of IT for successful BPC should also be measured at the process level, since the prime effects of IT are in fact expected to be realized at the process level (Melville et al., 2004).

In summary, analyzing prior BPC models reveals that (1) BPC projects should be embedded in a strategic initiative and (2) supported by the top management; (3) an innovative organizational environment is necessary to absorb the change; (4) change management should accompany the change initiative; and (5) it is important to consider the level of ambition and its impact on critical activities and organizational aspects when undergoing a BPC project. Additionally, we analyzed the relation between IT, business processes and organizational performance from process-oriented perspective. This analysis discloses that (6) a real fit

between IT and business processes must be established in BPC research and (7) the value of IT for successful BPC should be measured at the process level.

3. Theoretical Paradigms Used for the Model Derivation

The resource-based view (RBV) of the firm presents the primary theoretical foundation for our model development. The RBV is a powerful theory for understanding how resources are exploited through business processes to gain a competitive advantage (Ray et al., 2004). However, a limitation of the RBV is that it falls short to specify the underlying mechanisms by which the resource exploitation is accomplished (Melville et al., 2004). We therefore rely on a secondary set of theories such as the socio-technical systems theory, the organizational theory and the leadership theory to inform our understanding of successful BPC.

To motivate the selection of our primary and secondary theory base, we begin by summarizing the theoretical paradigms of each theory.

3.1. Resource-Based View of the Firm

According to the paradigm of the RBV of the firm, organizations achieve based on certain, e.g. valuable and rare, resources long-term competitive advantages (Barney, 1986; Wernerfelt, 1995). Within the RBV, firms are characterized as a conglomerate of productive, physical and human resources. The productive opportunity of a firm results from the input of firm resources.

These can be classified into three categories: first, the physical capital resources, e.g. technologies, assets and raw materials; second, the human capital resources, e.g., intelligence, experience and relationships; and third, organizational capital resources like formal reporting structures as well as controlling and coordinating systems. Barney (1991) argues that resources of a firm and its capabilities lead to a competitive advantage that is valuable, rare, imperfectly imitable and non-substitutable. The RBV explains the differences in performance – at the process level – in terms of types of resources and capabilities that different firms control. Ray et al. (2005) further argue that resources can only be of value to an organization if they are exploited in these processes.

In a nutshell, the RBV constitutes an impact of physical, human and organizational resources on organizational performance, which are exploited at the process level.

3.2. Organizational Theory

According to Weber's (1919) organizational theory, the organizational structure has an impact on the organizational performance. A wide consensus exists that a good organizational structure is a crucial prerequisite for the productive opportunity and the effectiveness of an organization. Nevertheless, a good organizational structure does not necessarily lead to high

organizational performance (Drucker, 1974), while a bad structure may result in reduced organizational performance. This leads to the following proposition: the quality of the organizational structure has an impact on allocation of responsibilities, decision-making, controlling and gratification (Child, 1988).

In addition, the organizational environment has an impact on the organization and its projects. Note, in this paper we concentrate on the project perspective. Therefore, we consider more intra-organizational factors and less the external environment like socio-cultural, economic and political factors. In combination with the environment, organizations are faced with the major challenge to react in a fast and appropriate way to shifting conditions. An organization has to establish a culture for learning to motivate employees on all levels to embrace change. This leads to the following relationship: organizational culture has a significant influence on the organizational performance (Argyris & Schön, 1978).

In summary, organizational theories depict an impact of organizational structure and culture on organizational performance.

3.3. Socio-Technical System Theory

According to the socio-technical system theory (STS), an organization is a social-technical system that consists of two independent but interacting subsystems. These subsystems are the social and the technical system (Bostrom & Heinen, 1977). To accomplish various upcoming tasks, the social and technical elements have to interact. This leads to a bidirectional relationship between technology and humans. In accordance to Appelbaum (1997), STS is probably the most extensive empirical and conceptual approach that considers the participation of employees. Both the integration of organizations' employees and the appropriate application of technology are indispensable. Therefore, both factors have a significant impact on the overall organizational performance.

3.4. Leadership Theory

Leadership theories postulate an impact of managers ("leaders") on organizational performance. In accordance to Winston and Patterson (2006), leadership is defined as the process by which a leader – one or more people – selects, trains, equips, and influences one or more persons to help achieve organizational objectives. The impact of managers differ between a direct and indirect impact (Pfeffer, 1981). An example of direct impact is strategy selection, while an indirect impact is the manager's effort to increase employee commitment.

Furthermore, Campbell et al. (1970) also stated that leadership has a significant impact on organizational performance. Kaiser et al. (2008) also identify this relation, but they additionally consider the employees. The more effective the leaders are, the more committed, motivated and performing the employees become.

In a nutshell, leadership theories constitute an influence of management commitment, goals, strategy and visions of management on organizational performance.

4. BPC Case Study Sample

For this paper, we applied a detailed screening of literature to assess relevant BPC cases. We used “business process”, “business process change”, “BPC” and “business process transformation” as the key words for the initial literature research. In addition, we combined each key word with the appendix “case study”. After the initial screening, we identified more than 500 references for each combination of key words and “case study” from online database services (e.g., Emerald, EBSCO, Science Direct and Google Scholar). To determine the relevancy of these articles, we further explored titles, abstracts and keywords. In summary, 83 case studies on BPC were collected from research journals, conference proceedings and book chapters. By casting such a wide net for potential BPC cases, we excluded case studies with the following attributes: (1) no or very little information about the case, (2) no or very little information about the impact factors for the success of the BPC initiative, (3) focused on the technology, not on the BPC initiative.

A detailed screening of the cases to assess the completeness and relevance of the actual case descriptions yielded a final sample of 59 case studies. The final sample consisted of a wide set of international BPC initiatives, 38 in private and 21 in public organizations. The cases were collected between 1993 and 2010 and had an average length of 13 pages.

We coded the critical success factors based on their frequency of mention. This led us to the following set of frequently cited success factors in practice: organizational factors, management commitment, business processes, market forces, resources (IT-related and human factors), change management activities, goals, business process performance and others.

5. Integrative Model for IT-enabled BPC

The proposed integrative model for IT-enabled BPC (see figure 8) is grounded in the following three sources: (1) the success factors identified in the 59 case studies, (2) the previous BPC models and the IT-value model proposed by Melville et al. (2004), and (3) the relevant theories discussed on chapter three.

The model includes only success factors, which influence the performance of business processes and in a broader sense impact the overall performance of an organization. In most of the previously described theories and models the factors organizational performance and overall productivity of an organization assume a central. In accordance with Ray et al. (2004), we propose to adopt business process performance as an alternative central impact factor. One reason for this decision is that the performance of business processes, which is measured by their effectiveness and efficiency, is that an organization might excel in some of its business

processes, but is only average in others and in some even below average (Ray et al., 2004). Even though, an organizations overall performance depends on all of these business processes, aggregating the outcomes of each business process renders it nearly impossible to examine whether a particular set of resources and/or capabilities actually contributes competitive advantages for an organization (Ray et al., 2004). Thus, in accordance with the RBV we adopt business process performance as another central impact factor. This selection allows for the identification of what resources and capabilities influence the performance at a process-level.

The following impact factors inform the model: resources (i.e., IT, human, others), change management, organizational culture and structure, project management, project scope and management commitment. The variable business processes adopts a mediating role in the model. Based on Melville et al. (2004), we propose that the factors resources (IT, human and others), project management, change management, project scope and management commitment impact business process performance via intermediate business processes. The proposed model comprises two domains: (1) BPC initiative and (2) organization. In the following sections, we discuss the impact factor selection in detail and propose first causal relations of each impact factor at the two domain levels.

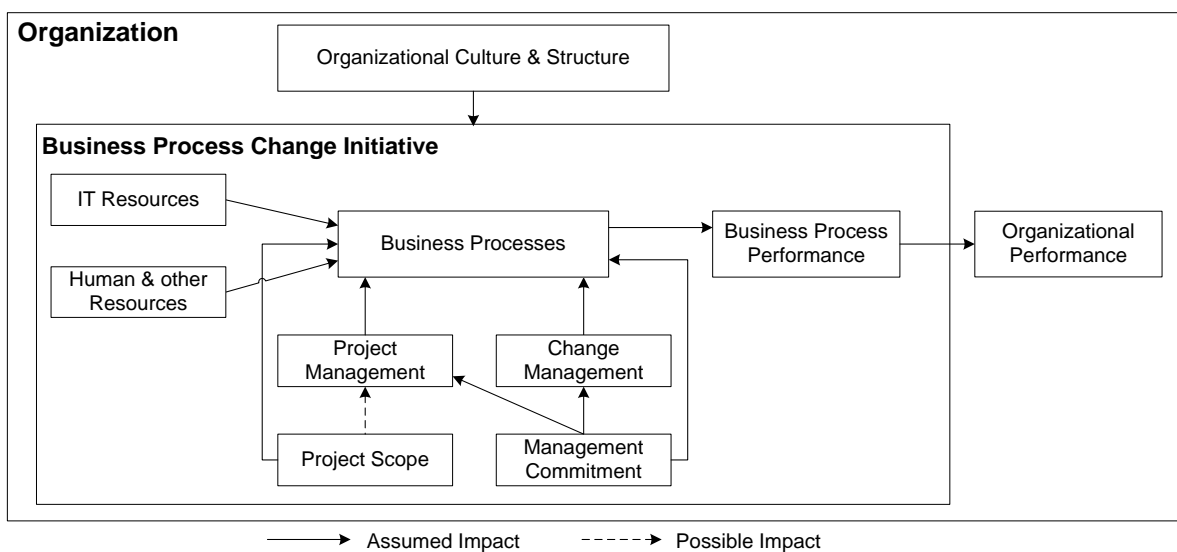


Figure 8: An integrative model for IT-enabled business process change

5.1. Resources

The kind of resources (e.g., technical, financial, or others) available to an organization for completing specific tasks often directly impacts the success of BPC initiatives (Ray et al., 2004). The term resource is not only tied to material goods but also includes immaterial goods such as the organizations' human resources and their knowledge, skills, know-how and talent

(Jay B. Barney, 1991) (Olalla, 1999). IT-based resources can be separated into IT infrastructure, human IT resources and IT-enabled intangibles such as customer orientation and knowledge (Bharadwaj, A.S., Bharadwaj & Konsynski, 1999). Other resources comprise financial, organizational and physical resources (Melville et al., 2004).

We meld the various identified resources into two impact factors: (1) IT-resources and (2) human and other resources. Because of their value for an organization's performance, which can be explained by the RBV (McKee & Smith, 1993), IT-resources are assigned a separate role in the integrative model. Researchers conceded that technical, human or other resources, by themselves, do not pose a source of competitive advantage for an organization (Melville et al., 2004; Ray et al., 2004). Resources only add to the competitive advantage of a firm whenever they are used to 'do something' (Ray et al., 2004). In the context of BPC this leads to the conclusion that resources need to be exploited through business processes. This relational linkage may be summarized as follows:

Proposition 1: Resources such as information technology, human capital and others impact – mediated by the business processes – the overall performance of these business processes.

5.2. Change Management

Launching a BPC initiative is not likely to succeed if the people and the structure of the organization are unprepared for and incapable of change. Change management refers to the processes employed on a BPC project to ensure that changes are carried out in a visible, controlled and orderly way. In that sense, change management comprises communication and motivational activities, undertaken to govern the effects of BPC systematically (Kettinger & Grover, 1995). The relevance of continuous change management and employee participation for successful IT-enabled process-oriented change can also be explained by the socio-technical systems theory (Appelbaum, 1997). The second proposition that informs the causal relations on change management in the integrative model can be summed up as follows:

Proposition 2: The implementation of consequent change management parallel to BPC initiatives has – mediated by the business processes – a positive impact on the performance of these business processes.

5.3. Project Management

Since BPC initiatives are usually project driven, the variable project management assumes a central role in the proposed model. The quality of the project management as well as the competence level of the assigned project manager impacts the success of a BPC project, and thus the performance of the changed business processes, which then may lead to improved organizational performance (Crawford, 2005). According to Crawford (2005), competence refers to the skills, knowledge, personal characteristics and demonstrated performance that a project manager exhibits at the job. The causal linkage between project management and

project success has been discussed from a BPC perspective (Kettinger & Grover, 1995) and in research on the implementation of ERP-systems (Karimi et al., 2007; Umble, Haft, & Umble, 2003). Besides the competence of the employed project managers, Karimi et al. (2007) operationalize the impact factor project management through the tools and techniques employed for the organization of the project and time planning.

The identified causal relation between project management and business process performance leads to the formulation of the following proposition:

Proposition 3: The project management including aspects of project planning and organization impacts – mediated by the business processes – the overall performance of these business processes.

5.4. Management Commitment

The impact factor management commitment refers to the approval, sponsorship and support of the BPC initiative through the organizations' top management (i.e., Karimi et al., 2007; Trkman, 2010). Classic project management research also acknowledges the importance of top or senior management commitment for project management success (Pinto & Slevin, 1987). Furthermore, if top management fails to provide the project management with the necessary empowerment, the project will not produce the anticipated results (Schwarzer & Krčmar, 1995).

Figure 8 illustrates that management commitment is expected to impact business processes mediated over the variables change and project management. Yetton et al.'s (2000) model on project performance also depicts a mediating relationship of senior management commitment for end-user resistance and project completion. End-user resistance can only be reduced through continuous change management. Project completion, as described by Yetton et al. (2000), depends on the project management of BPC initiative.

Nonetheless, based on the current state of theory and research, we cannot exclude a direct causal relation between top management commitment and business processes.

The variable management commitment is assumed to exhibit the following causal relations:

Proposition 4a: The commitment of the top management impacts – mediated by the business processes – the overall performance of these business processes.

Proposition 4b: The commitment of the top management impacts – mediated by the change management activities and the business processes – the overall performance of these business processes.

Proposition 4c: The commitment of the top management impacts – mediated by the project management activities and the business processes – the overall performance of these business processes.

5.5. *Project Scope*

The integrated model also includes the impact factor project scope. The scope of a project is among time and costs one of the classic dimensions to classify the success of a project (Lamers, 2002). Project scope encompasses the goals, content and breadth of a BPC initiative (PMI, 2008).

Even though empirical evidence exists showing that the impact of BPC projects on organizational performance is related to the projects' scope (Ozcelik, 2010), this impact factor has only been marginally recognized in existing BPC frameworks and models. Some researchers provided empirical evidence to believe that a high project scope (Ozcelik, 2010) or high levels of ambition (Huizing et al., 1997) have a high impact on firm performance. However, Ozcelik (2010) also identifies that the failure risk of BPC projects can increase beyond a certain level of scope.

Studies of ERP-systems implementations also showed that projects with higher functional and organizational scope resulted in significantly increased positive share-holder returns (Ranganathan & Brown, 2006) and thus increased business process performance (Karimi et al., 2007).

Additionally, we propose that the impact of project scope on business process performance is mediated through the activities of the project management (Ozcelik, 2010). In order to better investigate this issue empirically we present this relationship as a dashed line in the model. The fifth proposition can be summed up as follows:

Proposition 5: The scope of a project impacts – mediated by the business processes and potentially through the activities of the project management – the overall performance of these business processes.

5.6. *Business Processes*

The business processes and their performance are modeled in two autonomous factors. The reason for this decision is that the activities of a business process often reside in a “black box” (Melville et al., 2004; Osterloh & Frost, 2006b) and are therefore difficult to measure. From a RBV perspective, business processes offer a framework through which to examine the point of direct resource exploitation (Melville et al., 2004). For the proposed research model we adopt Davenport's (1993) understanding of business processes. He defines business processes as „the specific ordering of work activities across time and space, with a beginning, an end, and clearly identified inputs and outputs” (Davenport, 1993, p. 5).

In line with the work of Melville et al. (2004) and Karimi et al. (2007), business processes assume a central role within the model and most impact factors are mediated through them. The corresponding proposition is as follows:

Proposition 6: The business processes impact as a moderating variable between the independent variables the overall performance of these business processes.

5.7. Organizational Culture and Structure

The second domain of the model is the organizational environment in which the BPC project is embedded in (Melville et al., 2004). At this domain, the organizational culture and structure present the most important impact factors. The impact of the organizational structure on the overall firm performance is well described in organizational theory research. Kettinger and Grover (1995) depict that the structure of an organization impacts the success of BPC initiatives. The term organizational structure often encompasses several elements (e.g., hierarchy systems, responsibilities, tasks, rules and the extent of bureaucracy) (Fountain, 2001; Kettinger & Grover, 1995) and most definitions are rather imprecise. Therefore, we follow Vroom's (2002) understanding of organizational structure, who defines it as the way in which an organization is built up; the way in which relations and relationships between people in an organization are more or less regulated.

Furthermore, we model impact factors that can be summarized under the term (intra)organizational culture. Kettinger and Grover (1995) propose the umbrella term 'change environment', which refers to the organizational culture and cultural willingness to change. In reference to the organizational learning theory and the work of Skerlavaj et al. (2007), the ability of an organization to learn can also be identified as success factor for BPC.

The impact factors organizational culture and structure were placed purposely outside of the direct BPC project into the second domain. Even though the impact of the variable for the entire BPC project can be established, the impact of this factor may be difficult to validate empirically. It is not plausible to assume that the organizational culture and structure only impact one factor, for instance the business processes. Rather, we argue that the structure and other organizational factors such as culture and ability to learn impact the overall performance of the entire company and thus the performance of the respective BPC initiative. This causal relation may be summed up as follows:

Proposition 7: The organizational culture and structure impact the success of the entire BPC initiative.

5.8. Business Process Performance

Organizations strive to improve the performance their business processes to achieve the maximum of output with a minimum of input (Nippa & Picot, 1995). This relation is measured by efficiency (Thommen & Achleitner, 2006), which is defined as the extent of resources used and needed to achieve the desired result – output per unit of input (Davenport, 1993). Efficient business processes achieve the desired output with a minimum of effort. Thus, the process efficiency primarily addresses the benefit of the process owner – the

organization. To stay competitive means not only “doing the things right”, it also means “doing the right things” – the needed products and services have to fulfill the customers’ expectations (Harrington, 1991). Thus, the performance of business processes is measurable through efficiency and effectiveness criteria.

According to Harrington (1991), the effectiveness of a business process is defined as the extent to which the output of a process meets the needs and requirements of its customers. Therefore, the desired products or services, which are the results of business processes, are related to the effectiveness criterion.

In line with Melville et al. (2004) and Ray et al. (2005) we postulate that the performance of the business processes may impact the organizational performance. As suggested earlier, this may not always be the case. Ray et al. (2005) assert that not every change in a process’ performance directly impacts the overall organizational performance. This phenomenon can be explained by the fact that some process changes can compensate one another or the level of complexity in this specific context. Considering that organizations are open systems (Kettinger & Grover, 1995), they are exposed to several environmental factors. Consequently, the performance of an organization depends on several global, economical, socio-cultural and political factors.

The causal relation between business process performance and organizational performance can be distilled into the following proposition:

Proposition 8: Changes in the performance of business processes can (but do not have to) impact the overall performance of an organization. (However, organizational performance changes may not always be measurable.)

5.9. Organizational Performance

The performance of an organization is theoretically the ultimate factor that is influenced by all impact factors and mediating factors. Similar to the performance of business processes, the organizational performance can be operationalized by efficiency and effectiveness criteria (Steers, 1975). While organizational efficiency presents output-to-input-relations, organizational effectiveness describes the degree of goal realization in regard to the overarching organizational goals.

Due to the aforementioned difficulties of increased complexity and the problematic of quantifying BPC achievements at the organizational level, the focus of the integrative model is not placed on organizational performance, but rather on the impact factor business process performance.

6. Discussion and Concluding Remarks

This paper introduces a much needed integrated model for IT-enabled BPC. The model proposes causal structures between the factor business process performance and the various impact factors which are grounded in theory, prior work and case-based evidence. The introduced impact factors will allow future research to explore the potential success of BPC initiatives in a more systematic manner.

The findings of our study have implications for both practitioners and researcher. By providing practitioners with insight into the most important parameters in BPC projects, the model serves as a basis from which project and process managers can now manage what is typically a poorly-understood, complex, and dynamic situation.

From a theoretical standpoint, the results contribute to the existing literature in a number of ways. The paper makes a contribution to BPC literature by providing insights on the drivers of BPC success. Moreover, the results show that existing theories like RBV, organizational, leadership and socio-technical systems theory are well suitable for understanding and explaining the complexities in BPC projects. As a theory development paper, we did not only identify the relevant success factors but also derived causal structures and relations between them.

One important differentiation of the proposed model to prior BPC frameworks (Guha et al., 1997; Kettinger & Grover, 1995) is that we expect the impact of BPC initiatives to take place at process level. In accordance with recent IT-value research, we moved the major focus of the change impact to the business process performance (Melville et al., 2004; Ray et al., 2005) This change presents a more appropriate way from a resource-based point of view (Ray et al., 2004). Previous research has also frequently argued that BPC success at an organizational level is not easy to assess, particularly due to various political aspects (Larsen & Myers, 1997). Measuring the success of BPC projects at the process performance level prevents such discussions.

Our model also views IT-resources to be of high importance for BPC. No BPC initiative can afford to ignore the role of IT (Trkman, 2010), because IT offers extensive efficiency and effectiveness benefits (Melville et al., 2004). Additionally to IT, the research model also identifies an impact of the external environment on the overall success of the BPC. However, to this point our knowledge is still incomplete about which and how organizational characteristics moderate the degree of business process performance. Much conceptual work has been conducted on this issue (Guha et al., 1997; Kettinger & Grover, 1995) but little empirical work, which may represent a potentially fruitful area of future research.

Though we endeavored to offer a broader process-oriented and integrative model encompassing theoretical perspectives from IT and especially strategy, organization theory and human resource management as well as prior research and case based evidence, our analysis is not without limitations. Most importantly, our work has only been conceptual and

additional empirical is needed to validate the proposed causal structures. However, instead of conducting yet another case study, we recommend using meta-analysis methods such as case survey research. Case surveys can present a powerful method for identifying and testing patterns across studies (Larsson, 1993).

Publication 2

Which Capabilities matter for successful Business Process Change?⁷

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Abstract

Purpose: Business process change (BPC) initiatives are complex endeavors, which require many different sets of capabilities from the organization (e.g., IT, change management, project management capabilities). This study examines which capabilities matter for successful BPC.

Design/methodology/approach: We posit that a structured analysis of case studies will help in identifying the capabilities relevant for BPC. Against this background, we adopted a case survey methodology, which combines the richness of case studies with the benefit of analyzing large quantities of data. We identified and analyzed 130 case studies reporting past BPC project experiences.

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Findings: Our results show that project management, change management and IT capabilities have a positive impact on BPC project performance. IT capabilities also have a positive impact on the final process performance. Thus, IT capabilities matter for both, BPC project and process performance.

Research limitations: The study had a few limitations, such as the use of secondary data. More so, assigning numbers to qualitative data unduly simplifies the complex phenomena under investigation and may leave out some of the richness of case research.

Practical implications: Our findings provide considerable support for determining which capabilities practitioners need to leverage and develop when improving their business processes.

Originality/value: Our study makes a number of contributions. It fills a gap in the literature concerning which capabilities matter for successful BPC. We offer a theoretical explanation of the effects of capabilities on the BPC project and process performance. Another contribution is methodological, in that we adopted the case survey method, which is still new to information systems research.

Keywords: Business process change, resource-based theory, capabilities, case survey methodology, PLS.

1. Introduction

Business process change (BPC) has been on the agenda of organizations for decades (Hammer & Champy, 1993b). The latest Gartner surveys show that improving business process performance is still a top priority of CIOs (e.g., Hill and McCoy, 2011; Lopez, 2011). However, many organizations are daunted by the challenges and risks that BPC imposes (Hill and McCoy, 2011). Most companies no longer have the luxury of funding BPC projects that may not succeed. Yet, the high failure rates of BPC projects show that not much clarity exists among practitioners and researchers on the factors impacting BPC success (Hammer and Champy, 1993; Al-Mashari et al., 2001; Trkman, 2010).

Resource based theory (RBT) suggests that inter-firm performance differences can be ascribed to non-imitable and non-substitutable organizational resources and capabilities being heterogeneously distributed among firms (Barney et al., 2011). Accordingly, performance differences between BPC projects – why some fail while others succeed – can be attributed to differences in resources and capabilities. Research shows that the resources, which are needed for a successful BPC project, do not present a source of competitive advantage by themselves but are rather mere input factors (Melville et al., 2004). Important for the success of a BPC project and the performance of the improved business process is that the organization possesses the necessary capabilities to select, deploy, and organize these resources. BPC initiatives are complex endeavors, which require many different sets of capabilities from the organization (e.g., IT, change management, project management capabilities). In accordance with the RBT, we argue that whenever a BPC project fails certain capabilities must be lacking (Barney et al., 2011). Consequently, organizations undergoing BPC need to develop and leverage those capabilities pertaining to the success of such change projects. However, this is a difficult task considering that not much clarity exists on which capabilities matter for BPC. Thus, we seek to answer the following research question: Which capabilities matter for successful BPC?

Researchers have provided valuable insights of past BPC projects (e.g., Kettinger and Grover, 1995; Huizing et al., 1997; Guha et al., 1997; Teng et al., 1998; Markus and Grover, 2008; Trkman, 2010). The BPC research field builds on a wealth of knowledge derived from a large number of case studies. All of these case studies provide comprehensive reviews of past failures and successes. This rich pool of knowledge has remained largely unexploited. We posit that a structured analysis of these case studies will help in identifying the capabilities relevant for BPC. Against this background, we adopted a case survey methodology, which combines the richness of case studies with the benefit of analyzing large quantities of data (Rivard and Lapointe, 2012).

The paper is organized as follows. After discussing the theoretical basis, we introduce the variables relevant for our research model and the corresponding hypotheses. In the method section, we discuss our approach for building a case database that includes 130 case studies reporting past BPC project experiences. More so, we show how the case studies were coded

and analyzed statistically. Following the presentation of results, we discuss the research limitations and draw some final conclusions.

2. Theoretical Background

The RBT provides an appropriate theoretical frame for analyzing BPC capabilities. To motivate the selection of our measurement variables and their latent variables, we begin by summarizing the core concepts of the RBT. Next, we define the concept BPC, show how it relates to other concepts and discuss the important impact factors.

2.1. *Resource-Based Theory*

The RBT is widely recognized as a powerful management theory for understanding and explaining organizational performance differences (Barney et al., 2011). According to the paradigm of the RBT, organizations achieve long-term competitive advantages based on certain, e.g., valuable, inimitable, and rare, resources and capabilities (Barney, 1986; Barney, 1991; Wernerfelt, 1995). The RBT explains the differences in performance – at the process level – in terms of types of resources and capabilities. Ray et al. (2005) argue that resources and capabilities can only be of value if they are exploited in the firm's processes.

Penrose (1959) first introduced the idea that firms are a collection of their productive resources. She defined resources as “the physical things a firm buys, leases, or produces for its own use, and the people hired on terms that make them effectively part of the firm” (Penrose, 1959). Other definitions are more inclusive by defining resources as the “assets, capabilities, organizational processes, firm attributes, information, knowledge, etc.” (Barney, 1991) or “anything which could be thought of as a strength or weakness of a given firm” (Wernerfelt, 1995). According to Kraaijenbrink et al., (2009), these loose and all-inclusive definitions of the core concept of the RBT present a major weakness, because it does not allow for distinctions between resources as inputs to the firm and the capabilities that enable a firm to deploy these inputs. Other researchers have pointed out the necessity to define the distinction between the terms resource and capability (Amit and Schoemaker, 1993; Kraaijenbrink et al., 2009; Makadok, 2001). Helfat and Peteraf (2003) assert that the heterogeneity of resources and capabilities constitutes one of the cornerstones of the RBT.

For the purposes of this paper, we follow the distinction of resources and capabilities put forth by Amit and Schoemaker (1993) and Makadok (2001). In line with Amit and Schoemaker (1993), we define the “firm's resources as stocks of available factors that are owned or controlled by the firm”. In contrast, capabilities refer to a firm's capacity to select, deploy, and organize resources (Amit and Schoemaker, 1993; Kraaijenbrink et al., 2009). Likewise, capabilities can be defined as repeatable patterns of actions (Wade and Hulland, 2004) or coordinated sets of tasks (Helfat and Peteraf, 2003).

2.2. *Business Process Change*

BPC has its roots in business process reengineering (BPR) and total quality management (TQM). Hammer and Champy (1993) define BPR as the fundamental rethinking and radical redesign of business processes. Research shows that the implementation of BPR often results in fundamental changes of the organization's structure, culture and processes (Al-Mashari and Zairi, 2000; Cao et al., 2001). Considering these extensive organizational changes, it is not surprising that many reengineering efforts fail to achieve their goals (Trkman, 2010). However, whenever BPR is carried out successfully, dramatic improvements in critical efficiency and effectiveness measures such as cost, quality, service and time can be achieved (Sharafi et al., 2011; Jurisch et al., 2012a). For instance, the reengineering of Mobil Oil Australia resulted in reduced costs and increased customer orientation (Martin and Cheung, 2002). Huq and Martin (2006) reported improved information sharing, increased efficiency and higher employee motivation as the benefits of an IT-driven approach to BPR implementation. Past experiences also show that all BPR implementations are effectively change management programs (Zairi and Sinclair, 1995; Cao et al., 2001). Hence, BPR not only necessitates top management support but also bottom-up employee empowerment (Paper et al., 2001).

BPR, business process innovation (BPI) or business process transformation (BPT) are frequently used synonymously for the same phenomenon. According to Grover and Markus (2008) these variations in name of essentially the same concept were part of a bandwagon effect. All BPR, BPI and BPT projects are radical, revolutionary, and one-time undertakings (Davenport, 1993; Hammer, 1990; Grover et al., 2000; Grover and Markus, 2008).

TQM is considered to be an integrated and more evolutionary approach for process improvement (Bucher and Winter, 2007). Furthermore, TQM aims at improving quality of products and services in all departments and functions (Koch, 2011). Similarly to continuous process improvement (CPI), six sigma has been promoted as a more continuous organizational change and improvement method (Sidorova and Isik, 2010). Contrary to CPI, six sigma projects rely on statistical methods to identify problems. Six sigma projects include the designing, improving, and monitoring of business processes with the goal of reducing costs and enhance throughput times (Revere et al., 2004; Nave, 2002). Chariani (2012a) showed in a case study carried out at a public Italian hospital that Six Sigma can not only lead to a reduction of financial costs but also to an improved work situation for employees. In fact, employees involved in Six Sigma projects often feel positive changes in many aspects of job satisfaction (Schön et al., 2010). Nonetheless, Six Sigma just like BPR can be highly cost-intensive and favor short-term improvements over other results (Chiarini, 2012b).

While both approaches, revolutionary (e.g., BPR, BPT, BPI) and evolutionary (e.g., TQM, CPI, six sigma), share the common goal of improving processes, they are also frequently used complementary (Grover and Markus, 2008). Margherita and Petti (2010) posit that many projects are only labeled as BPR while they are in fact "normal improvement activities which

are unlikely to bring radical innovation within the organization”. Against this background, BPC can be viewed as a management concept that involves any type of process change – revolutionary (radical) or evolutionary (continuous) (Grover et al., 2000; Grover and Markus, 2008). Figure 9 illustrates the central elements of BPC.

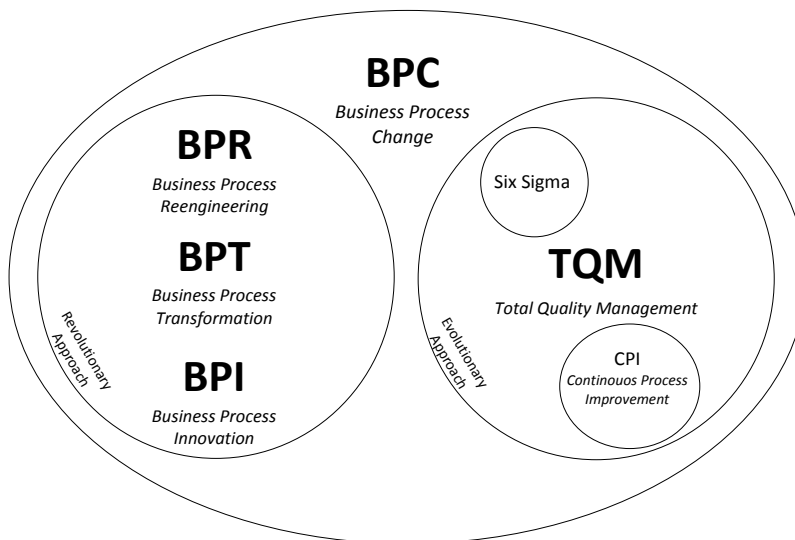


Figure 9: Central elements of business process change

Research shows that various factors impact the success of BPC projects (Jurisch et al., 2012b). These factors that need to be present whenever organizations conduct important changes, but they are rather independent from the approach selected (e.g., BPR or TQM) (Margherita and Petti, 2010). These factors can either be resources (Melville et al., 2004) or capabilities (Niehaves et al., 2011; Trkman, 2010) as well as the organizational structure, strategy and culture (Brock and Boonstra, 2008; Sarker et al., 2006; Grover and Markus, 2008). The structure and culture of an organization determine the patterns of interactions in which a BPC project is embedded in. Both the organizational structure and culture are rather stable concepts and thus hard to change (Lewis, 1999). Hence, the scope of BPC initiatives is frequently to not only improve the business processes, but also on changing the organizational structure and culture in order for the organization to adopt to changes in the business environment (Grover and Kettinger, 1995).

Resources in the context of BPC projects are technological resources (e.g., hardware and software), human resources (e.g., intelligence, experience and relationships), and other resources that can be traded (e.g., assets, raw materials, patents, and licenses) (Grover and Kettinger, 1995; Karimi et al., 2007; Teng et al., 1996). Researchers conceded that technical, human or other resources, by themselves, do not pose a source of competitive advantage for an organization but are rather mere input factors (Melville et al., 2004). Resources only add to the performance of a firm whenever they are used to ‘do something’ (Ray et al., 2004). Hence, in order for a BPC project to succeed and for the business process to perform, it is important that the organization possesses the necessary capabilities to select, deploy, and organize these resources.

The kind of capabilities available to an organization directly impact the success of a BPC project and the performance of the changed business processes (Ray et al., 2004; Saeed et al., 2005). The most frequently referred to capabilities in the BPC literature are change management (CM) capabilities (Ahmad et al., 2007), project management (PM) capabilities (Lynn Crawford, 2006), business process management (BPM) capabilities (Trkman, 2010; Mathiesen et al., 2011) and information technology (IT) capabilities (Melville et al., 2004; Grover et al., 1995). However, previous research does not address which of these capabilities impact the BPC project success as a whole and the performance of the improved business processes.

3. Research Model and Hypotheses

In the following sections we shortly introduce the dependent and independent variables as well as the corresponding hypotheses. It needs to be noted that the selection of capabilities was limited to main and most frequently discussed ones in BPC literature (e.g., Kettinger and Grover, 1995).

3.1. Business Process Performance

From a RBT perspective, business processes offer a framework through which to examine the point of direct capability exploitation (Melville et al., 2004). In accordance with Ray et al. (2004), we define the business process performance as our dependent variable. This level of analysis offers an appropriate way to examine the kinds of capabilities impacting BPC.

The measurement of business process performance is crucial for achieving sustainable improvement (Trkman, 2010). The performance of the changed business processes is measurable through efficiency and effectiveness criteria (Neely et al., 1995). Organizations strive to improve the performance of their business processes to achieve the maximum of output with a minimum of input (Nippa and Picot, 1995). This relation is measured by efficiency (Thommen and Achleitner, 2006), which is defined as the extent of capabilities used and needed to achieve the desired result – output per unit of input (Davenport, 1993). According to Harrington (1991), the effectiveness of a business process is defined as the extent to which the output of a process meets the needs and requirements of its customers.

3.2. BPC Project Performance

Since BPC is commonly project driven or part of a broader strategic initiative, the variable project performance assumes a central role in the proposed research model. A lack of capabilities can have a negative impact on BPC implementation and might prevent projects from succeeding (Niehaves, 2010). The success of a BPC project presents a multi-dimensional construct, which can be measured through classical project performance criteria

(i.e., time, budget, and scope) but also through the overall project completion (Yetton et al., 2000; Gemino et al., 2008).

The causal linkage between project performance and business process performance has remained rather unexplored in BPC literature. Syamil et al. (2004) identified a relation between business process performance and project performance in product development processes. Nidumolu (1995) distinguishes between process and project performance when analyzing the effect of coordination and uncertainty on the success of software projects. Drawing on these observations, we theorize that the success of BPC projects consists of the project performance and the business process performance. If the project fails to meet its objectives (e.g., in time, budget, and scope) or is abandoned, the changed business process is also likely not to meet its performance goals. Thus, we hypothesize:

Hypothesis 1 (H1): The higher the BPC project performance, the higher the business process performance.

3.3. Business Process Management Capabilities

Process-oriented literature views business process management (BPM) as “a structured approach to analyze and continually improve fundamental activities such as manufacturing, marketing, change management and other major elements of a company’s operation” (Zairi, 1997, p. 64). BPM capabilities refer to a set of techniques, which integrate, build, and reconfigure an organization’s business processes (Niehaves and Henser, 2011). In that BPM capabilities comprise the methods, techniques, and practices employed by an organization aimed at better stewardship of business processes. Depending on the objectives of the BPC these methods can be either revolutionary (e.g., BPM, BPI, BPT) and/or evolutionary (e.g., TQM, CPI, six sigma) (Guha et al., 1997).

Insufficient documentation or knowledge (e.g., BPM methodologies, standards, and best-practices) about the overall business process context of an organization may impede effective BPC (Niehaves and Henser, 2011). Hence, a lack of adequate BPM capabilities can result in a weak BPC project and process performance. Therefore, we formulate the following hypotheses:

Hypothesis 2 (H2): The better the BPM capabilities, the higher the BPC project performance.

Hypothesis 3 (H3): The better the BPM capabilities, the higher the business process performance.

3.4. Project Management Capabilities

The causal linkage between project management and project success has been discussed from a BPC perspective (Kettinger and Grover, 1995), in literature on IS project success (Gemino et al., 2008; Wallace et al., 2004) and in research on ERP-systems implementations (Karimi et

al., 2007; Umble et al., 2003). Karimi et al. (2007) operationalize PM capabilities through the tools and techniques employed by the organization for the project. PM capabilities, encompassing the body of knowledge, tools and techniques employed by the PM personnel, have a major impact on project performance and on business process performance (Crawford 2005, 2006). The identified causal relation between PM capabilities and project and business process performance leads to the formulation of the following hypotheses:

Hypothesis 4 (H4): The better the PM capabilities, the higher the BPC project performance.

Hypothesis 5 (H5): The better the PM capabilities, the higher the business process performance.

3.5. Change Management Capabilities

Launching a BPC initiative is not likely to succeed if the people and the organization are unprepared for and incapable of change. This is particularly important when considering that BPC can introduce new tools, technologies, work practices, roles and responsibilities among the staff. CM capabilities refer to the practices employed on a BPC project to ensure that changes are carried out in a visible, controlled, and orderly way. In that sense, CM capabilities comprise communication and motivational activities, undertaken to govern the effects of BPC systematically (Kettinger and Grover, 1995). It is imperative for an organization undergoing BPC to build the necessary CM capabilities to manage the changes introduced effectively. Thus, we hypothesize:

Hypothesis 6 (H6): The better the CM capabilities, the higher the BPC project performance.

Hypothesis 7 (H7): The better the CM capabilities, the higher the business process performance.

3.6. IT Capabilities

IT capabilities refer to the practices of an organization employed to mobilize and deploy IT-based resources (Bharadwaj, 2000; Kim et al., 2011). IT capabilities are not only found to be positively related to firm performance (Bharadwaj, 2000; Ravichandran and Lertwongsatien, 2005), but also to the successful execution of business processes (Melville et al., 2004; Ray et al., 2005). Ray et al. (2005) posit that only through the application of IT capabilities like flexible IT infrastructure and shared knowledge can organizations increase their process performance.

BPC projects often rely on an essential enabling IT core. Consequently, BPC projects cannot be implemented until the necessary technology and associated information systems have been successfully deployed (Piccoli and Ives, 2005). These imperatives provide the foundation for the final two hypotheses:

Hypothesis 8 (H8): The better the IT capabilities, the higher the BPC project performance.

Hypothesis 9 (H9): The better the IT capabilities, the higher the business process performance.

4. Research Method

As this study's objectives was to identify which capabilities matter for BPC project performance and which matter for the final process performance, an in-depth perspective such as that offered by case studies was deemed appropriate. To meet our objectives, we needed a relatively large sample of rich cases. Operationally, conducting such a large number of original case studies is very resource-intensive and difficult to achieve. Consequently, and given the availability of high-quality cases on BPC projects, we adopted a case survey strategy (Larsson, 1993). Case surveys "integrate qualitative studies, transforming qualitative data into (semi-) quantitative data, using a coding scheme and expert judgments by multiple coders" (Newig and Fritsch, 2009, p. 4).

The case survey method represents a powerful method for identifying and testing patterns across case studies (Lucas, 1974; Larsson, 1993). It integrates findings from diverse case studies by using coded variables to test relationships derived from a research model. More so, case surveys emphasizes "theory development and hypothesis testing, replicable and reliable measures, resolution of coding discrepancies, and data analysis techniques operating within the constraints of the hypothesized relationships and the sample" (Bullock and Tubbs, 1990).

The case survey method is particularly suited for our research due to the following criteria proposed by Larsson (1993): (1) the research area comprises a huge number of case studies (i.e., cases of BPC projects) (Yin and Heald, 1975); (2) the unit of analysis is the organization (i.e., the organization conducting the BPC project) (Jauch et al., 1980); (3) a broad range of impact factors is of interest (i.e., BPM, PM, CM and IT capabilities) (Jauch et al., 1980); and (4) it is difficult to do structured primary research across cases in this research domain.

In accordance with Larsson (1993), our meta-case analysis follows three major steps: (1) we selected existing case studies relevant to our research question; (2) to convert the qualitative case descriptions into quantified variables, we developed a coding scheme and used multiple raters to code the case studies; and (3) we will statistically analyzed the data that emerged from the coding procedure.

4.1. Case Selection

For the case sample collection, we applied a detailed screening of literature. We used the key words "business process" and "case study". After the initial literature screening, we identified more than 5000 references. These were found through traditional channels (e.g., libraries), conference proceedings, online database services (e.g., Emerald, EBSCO, Science Direct and

Google Scholar), consulting journals, and other web search tools. To determine the relevance of these articles, we further explored titles, abstracts, and keywords. After this step, the identified 5000 references were further reduced to 217 case studies.

The selection process was further refined along specific criteria to ensure the quality of the material selected and allow for an in-depth analysis of each case and comparisons across cases (Lucas, 1974; Yin and Heald, 1975). The criteria were (1) that the case reported on the capabilities needed in a BPC project, (2) that it reported evidence of the project and process performance, and (3) that the narrative provided a rich description of the events. However, we excluded cases that fulfill these criteria when (1) no or very little information about the case was available, and (2) no or very little information about the capabilities for the success of the BPC initiative was available.

The final sample included 130 case studies published between 1992 and 2012. The majority (86) were from articles published in scholarly journals, mostly in information systems, but also in other domains including management, medicine, and operations management. Of the remaining 44 cases, 16 were from conference proceedings, 4 from Ph.D. theses, 22 from book sections, 1 from a magazine article and 1 from a working paper. The cases vary in terms of sectors (e.g., finance, health, education, and manufacturing) and types of BPC projects (e.g., business process reengineering, business process transformation, business process innovation, continuous process improvement, six sigma, etc.). The final sample consists of a wide set of international BPC initiatives, 93 in private and 37 in public organizations. The articles span the years 1993 to 2012 and have an average length of 14 pages.

4.2. Coding

The coding scheme “documents and guides the conversion of qualitative case study data into quantified variables” (Larsson, 1993, p. 1530) and thus stands as the core element of a meta-case analysis. In line with Larsson (1993), our coding scheme comprises variables that represent the aspects of the study design (e.g., IT capabilities, PM capabilities, etc.) and control variables relevant to the studied phenomenon (e.g., involvement of external (consulting) experts). In accordance with Albers and Götz (2006), we established multi-item scales (at least two items) for each latent variable. The coding scheme comprises six latent variables and four control variables with 19 items. We selected a five-point Likert scale to code our variables and capture the complexity of the model.

Two experienced raters independently coded each case study with the list of codes. Before they started coding the selected case studies, both raters coded several pilot cases to become familiar with our coding scheme and compared their coding for calibration purposes. Coding disagreements were reconciled by adopting a consensus approach. Together we reviewed the final coding of each episode and discussed any discrepancies until we had reached a consensus; this helped eliminate individual disparities (Bullock and Tubbs, 1990). Resolving discrepancies in this way is said to be a “superior way to correct coding mistakes” (Larsson,

1993, p. 1521). After both raters completed the coding, we used Krippendorff's (1980) Alpha to determine inter-rater reliability. Krippendorff's Alpha was 0.77, suggesting substantial agreement between the raters.

4.3. Data Analysis

The partial least squares (PLS) procedure (Wold, 1985), which uses component-based estimation, has gained significant popularity in IS research since the 1990s (Compeau and Higgins, 1995; Chin, 1998). Due to the following criteria, we relied on PLS instead of LISREL to analyze the data (Chin and Newsted, 1998; Chin, 1998): (1) the hypotheses are grounded in specified impact factors; (2) the epistemic relationships between the latent variables and its measures are both formative and reflective; and (3) the sample size is relatively small. More so, PLS is suitable if a more explorative analysis close to the empirical data is appropriate and preferred. It also allows researchers to determine the relationships between the factors of interest and the measures underlying each construct. These may result in a simultaneous analysis of two parts: (1) how well the measures relate to each construct; and (2) whether the hypothesized relations are empirically true. PLS provides more accurate estimates of the paths among constructs, which are usually biased by measurement error when using techniques such as multiple regressions (Diamantopoulos, 2006). We employed SPSS and SmartPLS 2.0 M3 to assess the measurement and the structural model.

5. Results

The PLS technique facilitates the exploration of two models of a structural equation model, the measurement (outer) model, examining the relations of measurement variables and their latent variables, and the structural (inner) model, examining the latent variables to each other (Diamantopoulos, 2006).

For the analysis we followed Hair et al.'s (1998) two-step procedure: Step 1 necessitates the testing of the quality of the measurement models including reflective and formative indicators. If successful and the latent constructs prove valid and reliable, step 2 necessitates the assessment of the structural model. This assures that the quality of the structural relationships is assessed on the basis of a set of measurement instruments with desirable psychometric properties. The following section provides (1) the results of the measurement model and (2) the results of the structural model.

5.1. Measurement Model

According to Chin (1998), PLS models with reflective and formative constructs have well-defined and widely accepted assessment criteria. We applied four assessment criteria for the measurement model with reflective constructs (Chin, 1998): content validity, indicator reliability, composite reliability, and discriminant validity.

To verify content validity, we conducted an explorative factor analysis (Krafft et al., 2005). In order to identify the loadings and the variance, we used direct oblimin rotations. The accumulated explained variance yielded 55.76% and the indicators of each construct charge on one factor. Thus, content validity was successfully verified. The indicator reliability relies on the expectation that latent variable variance should explain at least 50% of the indicator. Therefore, the factor loadings of latent manifest variables should be above 0.70 (Carmines and Zeller, 1979). The factor loadings were mostly beyond the acceptable value of 0.70, except for seven indicators. However, we had no indicator that was below the limit of 0.4 and thus did not eliminate them (Hulland, 1999). The composite reliability reflects the internal consistency of the indicators measuring a particular factor (Fornell and Larcker, 1981). Bagozzi and Yi (1988) recommend that the value of the internal consistency should be at least 0.60. Thus, composite reliability was successfully verified, because the internal consistency of the four constructs was at least 0.60 (see Table 10). The discriminant validity refers to the appropriate patterns of inter-indicators of a construct and other constructs (Gefen et al., 2000). The average variance extracted (AVE) value is for two constructs below (PM and IT capabilities) and for two constructs (BPM and CM capabilities) beyond the level of 0.50 (Fornell and Larcker, 1981). Although Rodgers and Pavlou (2003) state that values below this level are inadequate, the elimination of these constructs is not recommended. In accordance with Fornell and Larcker (1981), the crucial value is the squared root of the AVE value for each construct. This should be higher than the correlations between it and all other constructs (Fornell and Larcker, 1981). We verified discriminant validity successfully, since our data analysis disclosed that the squared roots were higher for all construct. As an excerpt of the performed tests, Table 10 exhibits the factor loading, the AVE and the composite reliability.

Construct	Items	Sources	Loadings	AVE	Composite reliability
BPM capabilities	The organization collected measurements to control and monitor business processes.	(Mathiesen et al., 2011; zur Muehlen and Ting-Yi Ho, 2005; Grover, 1999)	0.659	0.569	0.696
	The organization applied BPM methods, tools and techniques for business process design and change.	(Mathiesen et al., 2011; zur Muehlen and Ting-Yi Ho, 2005)	0.697		
PM capabilities	The PM team defined a realistic scope for the change project.	(Karimi et al., 2007)	0.672	0.451	0.694
	The PM team managed project risks and implemented proper measures to address them.	(Crawford, 2005)	0.414		
	The PM team applied PM methods, tools and techniques to plan and manage the change (e.g., project plan, frequent team meetings, etc.).	(Karimi et al., 2007)	0.629		
CM capabilities	The employees understood how the change would affect them.	(Huizing et al., 1997; Markus and Grover, 2008)	0.511	0.717	0.882

	The employees were satisfied with the quality of the information provided on the change.	(Kotter, 1996)	0.973		
	The employees were satisfied with the amount of information provided on the change.	(Kotter, 1996)	0.891		
IT capabilities	The necessary hardware, software and other technologies were in place for the purposes of the change project.	(Melville et al., 2004)	0.749	0.452	0.600
	The IT infrastructure including hardware, software, and other technologies played a significant role in the change project.	(Masseti and Zmud, 1996; Ray et al., 2005)	0.681		
	The different computing systems and software applications of the departments involved were linked physically or functionally throughout the change project.	(Teng et al., 1998; Reich and Benbasat, 2000)	0.699		

Table 10: Factor loadings, AVE, and composite reliability

We applied three assessment criteria for the measurement models with formative constructs: indicator relevance, multicollinearity, and nomological validity or rather the relevance of indicators (W. Chin, 1998).

Indicator relevance determines which indicators contribute most substantially to the construct (Sambamurthy and Chin, 1994). Thus, we had to compare each indicator's weight. Note, contrary to the elimination of indicators with marginal factor loadings (less than a level of 0.40) in reflective measurement models, the elimination of formative indicators with marginal weight is not recommended, because it may be a constituent part of the construct. In addition to the statistical value it is necessary to consider the indicator's content (Bollen and Lennox, 1991). Due to this fact, we refrained from eliminating indicators.

To verify multicollinearity, which indicates the indicator's degree of linear dependency, we examined both the indicator's correlation matrix and the variance inflation factors (VIF). The correlation coefficients were partially high (i.e., the highest correlation coefficient was 0.877). However, multicollinearity did not actually bias the results as all VIF were below the recommended level of 10 (Eckey et al., 2001).

The nomological validity and relevance of indicators (Sambamurthy and Chin, 1994) were also verified using PLS software. Bootstrapping with 2000 resamples (Efron and Tibshirani, 1993) was performed for testing the statistical significance of path coefficients using t-tests. All t-values were highly significant (i.e., at least 2.767 (see Table 11)).

Name of construct	Items	Weight	t-value
BPC project performance	The project was a success.	0.462	2.767**
	Indicate the extent to which the change project was completed in comparison with the original scope (e.g., “totally abandoned” or “smoothly completed”).	0.562	3.418***
Process performance	The process efficiency was improved.	0.636	4.546***
	The process effectiveness was improved.	0.551	3.823***

Weight: PLS Algorithm Path Weighting Scheme; t-value: Bootstrapping with 130 cases, 2,000 subsamples; *: $p < 0,05 \rightarrow$ t-value 1,960; **: $p < 0,01 \rightarrow$ t-value 2,576; ***: $p < 0,001 \rightarrow$ t-value 3,291; n. s. = not significant

Table 11: Nomological validity and relevance of indicators

In summary, the statistical analysis demonstrates empirical support for the reliability and validity of the scales of the measurement models.

5.2. Structural Model

To assess the explanatory and predictive power of the structural model, we employed the criteria recommended in PLS literature (Chin, 1998): the R2 values, the effect size f2, and the extent of significance and β -coefficients.

The central criterion for evaluating the structural model is the level of explained variance R2 of the dependent constructs. R2 values of 0.67, 0.33, or 0.19 for endogenous latent variables are substantial, moderate, or weak respectively (Chin, 1998). Both R2 of our structural values are moderate with 0.523 (project performance) and 0.529 (process performance). To estimate the extent β -coefficients, we conducted the PLS path algorithm procedure. For the significance of the path coefficients, we performed the bootstrapping re-sampling technique with 2000 resamples (Efron and Tibshirani, 1993).

The effect size f2 investigates the substantive impact of each independent variable on the dependent variable (Cohen, 1988). Values of 0.02, 0.15, and 0.35 indicate a small, medium, or large impact (Chin, 1998). The effect size f2 for the structural model was conducted by re-running several PLS estimations, excluding in each run one of the explaining latent constructs. The results of the effect sizes show a small, medium, and large impact of the independent variables on the dependent variables (from -0.004 till 0.495) (see Table 12).

	Correlation	β	t-value	Significance	f2
H1	Project performance \rightarrow Process performance	0.717	8.461	***	0.495
H2	BPM capabilities \rightarrow BPC project performance	-0.144	1,317	n.s.	0.044
H3	BPM capabilities \rightarrow Process performance	-0.022	0.333	n.s.	0
H4	PM capabilities \rightarrow BPC project performance	0.440	4.572	***	0.317
H5	PM capabilities \rightarrow Process performance	-0.157	1.355	n.s.	0.036

H6	CM capabilities → BPC project performance	0.217	2.762	**	0.080
H7	CM capabilities → Process performance	0.035	0.376	n.s.	-0.004
H8	IT capabilities → BPC project performance	0.276	4.156	***	0.136
H9	IT capabilities → Process performance	0.137	1.995	*	0.038

β: PLS Algorithm Path Weighting Scheme; t-value: Bootstrapping with 130 cases, 2.000 subsamples; *: p < 0,05 → t-value 1,960; **: p < 0,01 → t-value 2,576; ***: p < 0,001 → t-value 3,291; n. s. = not significant

Table 12: Path coefficients, t-values, and effect sizes

Figure 10 presents the results of the analysis with estimated path coefficients and associated t-values of the paths (Chin, 1998). Our results show that PM (H2), CM (H6) and IT capabilities (H8) have a positive impact on BPC project performance. IT capabilities also have a positive impact on the final process performance (H9). BPM capabilities appear to have neither an influence on the BPC project performance nor on the process performance (H1 and H2). The BPC project performance has a positive impact on the final process performance (H1).

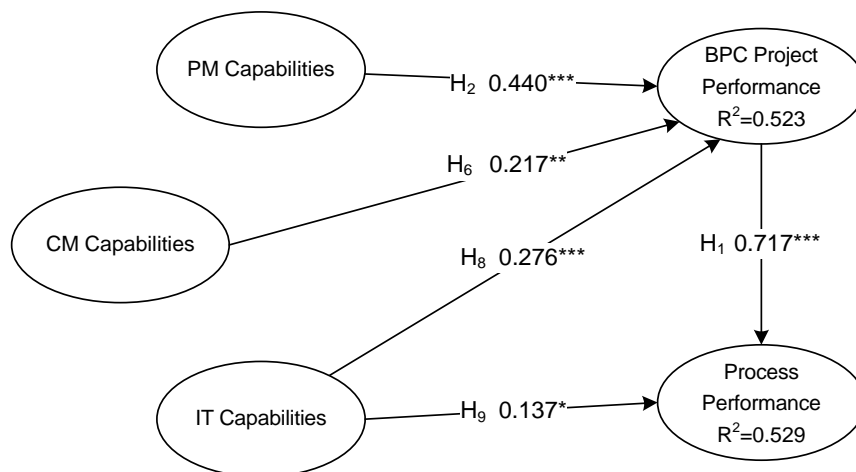


Figure 10: Capabilities impacting BPC project and process performance

6. Discussion

Our principle concern of this study was to examine which capabilities impact BPC project and process performance. The empirical results provide a tentative support for the RBT. We show that certain capabilities directly influence the project and process performance, while others have no impact.

The results of the literature on IT capabilities and BPC success have produced contradicting results. While some researchers assert that IT capabilities pose an important catalyst and enabler for BPC (Trkman, 2010), others contend that IT capabilities may not necessarily be a critical success factor (Kettinger and Grover, 1995; Guha et al., 1997; Grover, 1999). Besides the ongoing debate on the business value of IT, the effect of IT on business performance has in fact been contested (Karimi et al., 2007; Radhakrishnan et al., 2008). For instance, the

relationship between IT investment and firm performance through an input-output perspective is well described in production function and process-oriented models (Melville et al., 2004). Particularly, process-oriented models offer helpful insights on how IT can provide business value through the use of business processes. Melville and colleagues (Melville et al., 2004) also introduce a process-level model, which depicts that IT capabilities and complementary organizational resources have to be combined into a business process which then yields business process performance. Recently, Trkman (2010) has also argued that the value of IT for successful BPC should be measured at the process level, since the prime effects of IT are in fact expected to be realized at the process level (Melville et al., 2004). Our results support these findings. Based on the analysis of 130 case studies, we can show that IT capabilities are indeed very important for both, the BPC project and process performance.

Our study highlights several new issues with regard to BPC. Surprisingly, the empirical test shows that BPM capabilities have no direct impact on project or process performance, while past research suggests that BPM capabilities constitute a key success factor in BPC implementations (Trkman, 2010; Niehaves and Henser, 2011). However, theory also suggests that BPM capabilities are dynamic capabilities (Trkman, 2010). Our results show that BPM as a dynamic capability has no direct impact on the success of a project. Rather dynamic capabilities reconfigure other (operational) capabilities and thus their resources, which impact the success (Helfat and Peteraf, 2003). Other conceptualizations emphasize the nature of these capabilities, “a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness” (Zollo and Winter, 2002, p. 340). Niehaves et al. (2011) posit that BPM capabilities adapt the operational capabilities to the environment. Hence, the impact of BPM capabilities on the BPC project and process performance might be mediated by other capabilities (e.g., IT, CM or PM capabilities) and therefore not directly measurable. Even though this relation can be easily contested, it might be much harder to assess the impact of dynamic capabilities in a quantitative study. Instead, qualitative studies might be more suitable for assessing the impact of BPM as a dynamic capability on other operational capabilities.

Another interesting discovery of our analysis is that over fifty percent of all analyzed BPC projects relied on the support of external experts (consultants). For future BPC research, the involvement of external experts could provide an interesting control variable. In addition, the question that needs to be explored is which of the PM, IT and CM capabilities are specific to the external experts and which are specific to the organization. This aspect is particularly important when considering the strong relation between project and process performance. It needs to be guaranteed that not only the external experts’ possess the capabilities to successfully complete the BPC project, but also that the organization itself possesses the capabilities for executing the changed business process successfully. Hence, a strong need exists for building the necessary organization specific capabilities.

7. Conclusion

Some limitations of our study must be acknowledged. The first limitation stems from the use of secondary data, meaning that the cases we selected had not been written with the specific purpose of studying which capabilities matter for successful BPC. However, due to the care with which we selected – and excluded – cases, we are confident that the cases in our sample were indeed narrations of the experiences of BPC projects, and that they provided sufficient data for appropriate coding and analysis. A second limitation is that assigning numbers to qualitative data “unduly simplifies the complex phenomena under investigation” and may leave out some of the richness of case research (Larsson, 1993, p. 1519). However, the use of a large number of cases (here, 130 cases) compensates for such information loss (Larsson, 1993). More so, the coding procedure of case survey method carries a certain degree of subjectivity, which we tried to reduce by assessing inter-coder reliability. Another limitation has to do with the theoretical incompleteness of the identified capabilities. According to Molloy et al. (2011) the question of how to measure capabilities is “simultaneously very important to RBT yet very difficult to conceptualize and validly assess”. But since we primarily relied on predefined and tested constructs, we are confident that our items measure what they are supposed to measure. The last limitation refers to the focus of our analysis on the main capabilities listed in BPC literature. We are aware that additional capabilities (e.g., learning or integration) might also impact the success of a BPC initiative. Nonetheless, due to limitations imposed by the research method and by the information reported in the case studies, we could not assess these additional capabilities. Future research should analyze the effect of additional capabilities on BPC project and process performance.

Our study makes a number of contributions. First, it fills a gap in the literature concerning which capabilities matter for successful BPC. Although much has been written about critical impact factors for BPC the literature is surprisingly mute which specific capabilities matter for BPC project and process performance. Our results show that PM, IT and CM capabilities have a direct impact on BPC project performance. IT capabilities also directly impact the process performance. The analysis also disclosed that a strong relation between the project and the final process performance exists. These discoveries can serve to help practitioners in planning their BPC projects more carefully. The second contribution of our study is that it offers a theoretical explanation of the effects of capabilities on the BPC project and process performance. This explanation is anchored in our content analyses of the 130 case studies that constituted our sample and is enriched by the fact that we enfolded extant literature. The third contribution of our study is methodological, in that we adopted a research method – the case survey – that combines the benefits of analyzing a large quantity of data with those of conducting an in-depth analysis of qualitative data.

Publication 3

A Review of Success Factors and Challenges of Public Sector BPR Implementations⁸

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Abstract

Pressures to cut budgets and increase efficiency while maintaining performance prompted public managers to turn to the private sector for solutions. As a means of rightsizing government, cutting red tape, and reducing bureaucracy, the idea of BPR found its way into the realm of public organizations. The differing characteristics of private and public organizations introduce various challenges when transferring BPR methodologies between the sectors.

With this research paper we consolidate the ample literature on BPR success from the private and public sector. We identify the relevant success factors and show that a surprising similarity exists between private and public BPR related success factors. In addition, we determine the specific characteristics and requirements of the public sector highlighting gaps in current literature. Finally, we structure the research gap in five propositions and provide directions for further research.

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1. Introduction

Companies continually monitor and improve their competitiveness to stay in business due to the growth of international trade, the demand for high-quality products and services, an increase in competition in the global market, the rapid development of new technologies as well as shortened product lifecycles (Abdolvand et al., 2008; O'Neill & Sohal, 1999; Terziowski et al., 2003). A common way of meeting these challenges is the employment of a variety of business process management tools. As many of today's businesses exhibit a process-oriented form of organization (Schwarzer & Krcmar, 1995), the concept of Business Process Reengineering (BPR) has proven to be a powerful and elaborate tool. Yet, BPR projects still constitute complex and challenging endeavors. In spite of the concept's popularity, between 60 and 80 percent of reengineering efforts fail to achieve their goals (Al-Mashari et al., 2001; Cao et al., 2001).

Similar to the business environment, the demands and requirements made on the public sector have undergone considerable changes in the past decades. In the early 1980s, criticism regarding the size and capabilities of the public sector emerged. Administrations found themselves confronted with rising expectations and fiscal problems (Parys & Thijs, 2003). Longwinded procedures, non-transparent processes, unclear responsibilities, increasing personnel costs, and complex communication paths exacerbated the situation (Scheer, Nüttgens, et al., 1996).

The resulting pressures to cut budgets and increase efficiency while maintaining performance prompted public managers to turn to the private sector for solutions (Parys & Thijs, 2003). Originating from a business environment (Otenyo & Lind, 2006), the idea of BPR found its way into the realm of public organizations (Parys & Thijs, 2003). As a means of rightsizing government, cutting red tape, and reducing bureaucracy (Otenyo & Lind, 2006), BPR promises to become a valuable and much-needed tool in public administrations. By facilitating resource efficiency and allowing for a more straightforward way of service provision, BPR assumes a leading role in the transformation of public administrations. This transformation includes organizational, political, procedural and technological aspects (Fountain, 2001), designating BPR a cross-sectional challenge for the future of public administration.

Past research suggests various differences between these sectors (Stemberger et al., 2007), including such aspects as their organizational structures, processes (McAdam & Donaghy, 1999b), and management styles. Assuming these suspected differing characteristics to hold true, diverging expectations and conditions regarding BPR projects in the public and the private sector arise. In order to satisfy these requirements, public administrations are bound to modify the methods, implementations, and best practices established for BPR in private organizations.

As a consequence, various challenges would be introduced to the transfer of BPR methodologies between the sectors (Gulledge & Sommer, 2002; MacIntosh, 2003). Generally, private businesses feature independent decision-making processes and flexible hierarchies. In contrast, public administrations are obligated to adhere to multiple external restrictions mainly embodied by laws and political guidelines (Fountain, 2003). While private entities are free to develop their own internal strategy, public organizations are bound to ensure the political alignment of their actions.

Within this paper we aim to identify and analyze the BPR related success factors and requirements in public and private institutions. Specifically, our objectives are to (1) examine current literature and analyze the factors needed for a BPR project to be successful in private and public institutions, (2) highlight the peculiarities and requirements of public BPR implementations in contrast to the private sector and (3) derive and structure the need for future research.

In order to achieve our goals we consolidate the ample literature on BPR success factors in the private and public sector. On the basis of this comprehensive review of BPR specific literature, we drill down on the underlying differences between public and private organizations. Additionally, we separately analyze and compare the success factors prevalent in each sector. As a second step, we derive specific consequences for public sector BPR implementations. Finally, we structure the research gap with regards to public sector BPR implementations in five propositions and provide directions for further research.

The paper is organized as follows. Section 2 specifies the details of the literature review and displays an overview of its results. Afterwards, in section 3, we present the analysis of results. Based on this we synthesize the literature review results into five propositions in section 4. Finally, in section 5, we discuss and conclude our results.

2. BPR Success Factors – Literature Review

2.1. Methodology

The high failure rates of BPR efforts even in private organizations (Al-Mashari et al., 2001; Cao et al., 2001) call for a closer look at the factors impacting the success of such projects. As a first step to investigating the differences between public and private organizations, we analyzed the existent literature of BPR success factors. We focused on literature pertaining to business processes, business process change methods (in particular BPR) and the differentiation between the public and the private sector. We used “Business Process Reengineering” as the keyword for our initial search before scanning relevant databases (e.g., Emerald and ScienceDirect) for the term “BPR success factors”. Papers were selected according to their availability and relevance. Relevance was determined by reading the title and the abstract of each article and subsequently reading the full text of selected articles. Further, we identified additional literature by means of reference scanning. The final set

included 67 articles on the topic of process reengineering in the private and public sector. Of these articles, 29 dealt with the public sector, 16 with the private sector, and 22 were of general nature/applicable to both sectors. Setting out with a comprehensive analysis of the factors determining the success of a BPR project, this literature review provides a foundation for further evaluation of the differences between public and the private sector as pertaining to the implementation of BPR.

As a next step, we analyzed and structured the articles using a concept-centric methodology (Webster & Watson, 2002). Multiple success factors were identified during the analysis and classified into certain dimensions. We used an existent model business process change as a basis to identify relevant dimensions (Jurisch et al., 2012). The allocation of articles among them was based on thorough qualitative data analysis. Yet, any such classification is bound to be subject to the authors' personal judgment. We will elaborate on each of the dimensions in the following.

2.2. Overview of Results

Our analysis yielded five dimensions: project scope, top-level management commitment, resources, project management, and change management. While the success factor top-level management commitment forms a dimension of itself, all other dimensions serve as umbrella terms subsuming several success factors of related nature.

Prior to the start of a BPR project, the project scope needs to be determined. This includes realistic expectations regarding the requirements and benefits entailed by the project as well as a clear vision and goals. Top-level management commitment and sufficient resources are crucial in ensuring project success. In particular, relevant resources comprise BPR know-how within the organization as well as a conducive use, role and adoption of IT. During the actual execution phase of a BPR undertaking, many aspects of project management influence the success of the project. In particular, a thorough process analysis as well as a suitable implementation map/concept provide a sound footing for any subsequent activities. Adequate plan execution as well as a flexible and adaptive methodology represent further important success factors as pertaining to BPR project management.

In order to ensure plan compliance and react to unforeseen circumstances, continuous control of the project and the appropriate handling of barriers and risks further benefit the success of the project. As the concept of change is inherent to BPR projects, the organizational readiness for change as well as the motivation and/or resistance to change among stakeholders constitute pivotal success factors. Further, appropriate training and development of new skills among staff as well as cooperation and communication among all stakeholders facilitate successful progress. Table 13 summarizes the identified success factors and their associated dimensions.

Success factors	Subcategories
Project scope	Realistic expectations
	Clear vision and goals
Top-level management commitment	
Resources	BPR know-how
	IT (use, role and adoption of IT)
	Other
Project management	Process analysis
	Implementation concept
	Flexible and adaptive methodology
	Plan execution
	Continuous control
	Handling of barriers and risks
Change management	Organizational readiness for change
	Motivation / resistance to change
	Training / new skills
	Cooperation and communication

Table 13: Classification of success factors in subcategories

3. Analysis of Results

When analyzed separately, the success factors in the public sector largely conform to the ones in the private sector. This is surprising, considering the assumed differences between public and private organizations. Further, it does not yield an explanation for the continuing issues encountered by BPR projects in the public sector (McQueen & Baker, 1996; Scholl, 2004). It stands to reason that while the relevant success factors are similar in both domains; different approaches are required to fully realize them.

The concept of BPR originated in the private sector and almost 70 percent of all private businesses in the US and Europe have been involved in some sort of a reengineering project (McQueen & Baker, 1996). Correspondingly, the majority of pertinent literature focuses on BPR in the private sector. The bulk of process designs and frameworks were developed for the private sector, tailored to its special circumstances and characteristics (Eskildsen, Kristensen, & Juhl, 2004). In contrast, the adoption of the BPR concept in the public sector is partly uncovered by the literature (McAdam & Corrigan, 2001).

When trying to transfer existent methodologies from private businesses to public administrations, practitioners encounter difficulties since the premises affecting reengineering projects in both environments vary significantly. This is highlighted by existing literature, which assesses success rates of BPR projects in public administrations as considerably lower than in the private sector (Scholl, 2004).

As a first step to exploring the underlying differences, we will take a closer look at the special characteristics of public administrations. We will split this analysis into six subsections. Each subsection starts out in highlighting a related group of peculiarities of the public sector necessitating a dedicated approach to process reengineering for public administrations. Following these assessments, we analyze the resulting challenges for practitioners as mentioned in the literature regarding each subsection.

3.1. Functions and Intention

Owing to their distinct purpose, public organizations differ from their private counterparts in regard to their functions and intentions. While the public sector is characterized by stability and risk aversion, entities in the private sector are prepared to take risks in order to ensure their competitiveness (Otenyo & Lind, 2006). Private businesses represent independent entities, acting according to their own, internally developed strategy. In contrast, public administrations do not formulate a strategy of their own. Rather, they aim to execute existing laws and policies (Corby, 2005). This is exacerbated by public administrations being subject to bureaucratic principles (O. E. Hughes, 2003), which require all functional departments and process owners to be predefined and transparent.

The obligation to strictly adhere to existent legislation restricts process change in the public sector (Feltz & Hitzelberger, 2004). Consequently, reengineering efforts in the private sector often assume a much more radical character than those in public organizations. In addition, all efforts made in public BPR projects need to be verified for their compliance with laws and legal regulations.

3.2. Processes

The characteristics of processes in public administrations differ heavily from their counterparts in the private sector. As a result of the aforementioned differences in purpose and function, public entities wield far less control over their processes (Dennis, Carte, & Kelly, 2003), rendering radical change problematic. It is often not at the discretion of a public entity to freely modify the way it delivers its services. This circumstance is further illustrated in the way processes originate in each sector. Businesses in the private sector are guided by the effort to achieve client satisfaction (Hammer & Champy, 1993). Each process serves an internal or external customer, for whom it creates value, fulfilling his needs and requirements. A process is ultimately rooted in the customer's requirements. Internal processes to achieve these goals are designed under the direction of the management. Hence, a private business is

to independently develop its own process model (Lenk, 2006). Processes in public administration are ultimately motivated by the duty to conform to and implement legal guidelines (Grimmer, 2004). In general, customers do not approach public entities as a means of fulfilling their needs and demands as they do in the private sector. Instead, they are compelled to get in touch with public administration on the grounds of laws and legal regulations. When filing out a visa application, for instance, a citizen does not strive to fulfill any of his personal needs but rather to fulfill legal requirements. In spite of these restrictions, it is to be noted that the concept of customer orientation is gaining increasing attention in the domain of public administration (MacIntosh, 2003). As compliance to laws and regulations is still obligatory, these efforts primarily pertain to the citizen-friendly provision of services and do not necessarily entail considerable changes within internal processes.

Consequently, process changes need to be approved by all relevant stakeholders as well as to comply with pertinent legal regulations (Halachmi, 1995). A rigid process structure may prohibit large-scale change endeavors.

3.3. Organizational Structure

Every organization's structure consists of various aspects, such as values, traditions, philosophies, hierarchies, authorities and rules (Gatewood, D.R., Robert, & Ferrell, 1995). Public administrations are organized according to bureaucratic paradigms. This entails the distribution of responsibilities among different departments as well as complex links to other organizations (Parys & Thijs, 2003). Each process is associated with multiple stakeholders and strictly monitored, controlled and documented.

Both in the private and the public sector, process reengineering holds significant potential to change such organizational structures (Sims, 1998). This may include the establishment of new function-oriented teams or the integration of BPR experts (Sutcliffe, 1999). Due to the more rigid nature of public organizations, these measures may easily transcend their respective capabilities for change (Sims, 1998). In addition, being bound by legal regulations and bureaucratic principles, management in the public sector exerts far less power over their organization's structure. Therefore, organizational changes in the public sector may only be achieved within certain limits (Stemberger et al., 2007). In particular, support by top decision-makers may be regarded a prerequisite for wide-reaching change efforts. As an additional impediment to BPR in the public sector we perceived the lack of intraorganizational knowledge transfer. Instead of building upon experiences made in past BPR projects by other administrations, public institutions tend to start from scratch and consequently forfeit any potential advantages offered by a common knowledge database.

3.4. Economic Feasibility

Assuming a healthy economic foundation, private entities are at liberty to initiate investments and conduct business effort since their management wields full control over their resources. In

contrast, public organizations are frequently not entitled to decide on significant political and financial matters (Eskildsen et al., 2004).

Representing a costly and complex undertaking (Otenyo & Lind, 2006), BPR projects require significant financial investments. These efforts include the implementation of training programs for stakeholders and the upgrade of the IT environment. Additionally, resources are often spent on the recruitment of consultants and the analysis of processes and data collection efforts (Halachmi, 1995). The limited means available for BPR efforts in the public sector may significantly restrict personnel, know-how and IT resources. Owing to these economic constraints, BPR projects in the public sector frequently fail at the decision and planning stage (Halachmi, 1995).

While public administrations must fulfill their tasks economically and adhering to the given resources (Grimmer, 2004), they do not necessarily strive to maximize their economic efficiency or minimize costs. Rather, they aim to stay within their allocated budgets. This fact may lower the acceptance of BPR efforts in public administration as soon as budget targets are achieved and cost pressures lifted.

3.5. Political Feasibility

Bound by various political guidelines, bureaucratic principles, and organizational affiliations with related entities, public administrations need to adhere to a wide range of restrictions and conditions. In addition, rigid internal hierarchies (McAdam & Donaghy, 1999b) and the concept of legalism (Otenyo & Lind, 2006) take away from public institutions' capability for change. In contrast, aside from the legal restrictions all legal entities are bound to observe, private businesses may freely and independently modify their own strategies and processes as they deem fit (Eskildsen et al., 2004).

The radical changes entailed by BPR activities work against the political feasibility of this concept in the public sector (Halachmi, 1995). As BPR may require the merging, automation and elimination of processes (Stemberger et al., 2007), the nature of public administration requires the surrounding political conditions to be considered before applying any modifications (Halachmi, 1995). Existing structures and hierarchies may have been in place for decades and have not faced any pressure to change in the past. It is crucial to detect reservations borne by stakeholders and decision-makers early in the process and subsequently ensure their compliance and support.

3.6. Expectations from BPR

In the private sector, most activities are ultimately aimed at satisfying the customers' needs and expectations (Goldkuhl & Lind, 2008). Lacking such a concise concept of "value" (Otenyo & Lind, 2006), public administrations are primarily guided by their mission to execute laws and legal ordinance (Grimmer, 2004). Hence, public institutions entertain different internal strategies and goals.

The main expectations associated with reengineering projects relate to improvements in regard to performance, costs, quality, service, customer relationships and delivery times (Hammer & Champy, 1993). According to their deviating goal structure, the motivations of public administrations to conduct BPR projects do not line up with the corresponding motivations of private businesses. While many private businesses may benefit from intangible knowledge and gradually developed internal procedures, clear and well-documented processes are fundamental to a functioning public organization. This also applies to BPR projects, where process transparency as well as the proper documentation of associated stakeholders and responsibilities is crucial in order to ensure compliance with legal regulations. Increased transparency, achieving more efficient and effective processes (Hesson et al., 2007) as well as reducing “red tape” phenomena represent the core potential BPR in the public sector has to offer.

Comparatively static in nature, the bureaucratic frameworks surrounding public organizations are usually not immediately affected by emerging technologies and new process models (Thong et al., 2000). In technological terms, public organizations tend to be followers instead of leaders (Heeks, 2003), frequently adopting technologies after their benefit and application has been thoroughly established in the private sector (Chamberlin, 2010).

Yet, as citizens and businesses put certain demands on the service quality delivered by administrations, these advancements have a bearing on the public sector as well (such as the necessity to interact with citizens via online communication channels).

Table 14 illustrates the results of this section. Listing relevant differentiating factors between public and private organizations, it highlights the need for the different implementation of BPR in the public administration and in private companies.

Dimensions	Situation in the private sector	Situation in the public sector	Consequences for public BPR initiatives
<i>Functions and Intentions</i>	<ul style="list-style-type: none"> - Pursuit of profit and business growth - Aligned IT and business strategy - Part of a mostly vertical supply chain 	<ul style="list-style-type: none"> - Execution of laws and policies - Stability and risk aversion - Controlling of compliance with laws - Concept of legalism - Part of a mostly horizontal supply chain 	<ul style="list-style-type: none"> - Radical changes frequently unfeasible - BPR must be verified for legal compliance
<i>Processes</i>	<ul style="list-style-type: none"> - Process initiated by customer - Customer-supplier relationship - Profit-driven processes - Full control over own process structure 	<ul style="list-style-type: none"> - Processes based on legal regulations, laws and policies - Little control over process structure 	<ul style="list-style-type: none"> - BPR as a top-down process - Radical changes frequently unfeasible - BPR must be verified for legal compliance
<i>Organizational Structure</i>	<ul style="list-style-type: none"> - Company sizes and structures highly variable - Affinity to recruiting - Different authority and autonomy levels 	<ul style="list-style-type: none"> - Mandatory tasks and responsibilities - Management under political observation - Rigid hierarchies 	<ul style="list-style-type: none"> - Formal decision-making - Top-down support as a prerequisite - Need for approval by all stakeholders involved - Involvement of internal experts across departments is challenging - Insufficient exchange of experiences regarding past BPR projects between administrations (ample potential for transinstitutional knowledge management platforms)
<i>Economic Feasibility</i>	<ul style="list-style-type: none"> - Freedom in allocating funds and controlling investments - Accountable to shareholders - Motivation to minimize costs 	<ul style="list-style-type: none"> - Fiscal limitations - Pre-defined resources - Governmental authorization - Actions are subject to public scrutiny (public accountability) - Motivation to keep costs within budget (budget functions as a threshold value) 	<ul style="list-style-type: none"> - Inflexible financial budgets - Resources (know-how, IT etc.) tend to be limited and may cause failure during early stages of the project - Acceptance of BPR efforts questionable once budgets are met and cost pressures decrease
<i>Political Feasibility</i>	<ul style="list-style-type: none"> - No dependencies - Internal financing - Consultation and agreement with cost centers (internal prices) 	<ul style="list-style-type: none"> - Strict governmental and political restrictions - Feasibility of changes and amendments to laws and guidelines 	<ul style="list-style-type: none"> - Proposed changes might face resistance by decision-makers and other stakeholders (especially when cross-functional departments are involved) - Political feasibility should be ensured early in the process as laws and regulations may prohibit planned measures
<i>Expectations from BPR</i>	<ul style="list-style-type: none"> - Increase business volume - Obtain market leadership - Cost savings 	<ul style="list-style-type: none"> - Efficient use of resources - Identify redundancies in order to unify and automate processes - Alleviate costs of bureaucracy and cut down red tape - Improve service accessibility and usability 	<ul style="list-style-type: none"> - Customer perspective matters, yet it does not represent the primary concern

Table 14: Illustration of the identified differences between public & private organizations

4. Five Propositions for Public Sector BPR

Within this chapter, we synthesize our literature review results into five propositions for successful BPR implementations in the public sector. For each proposition, we introduce shortly our underpinning reasoning.

Proposition 1: Public organizations are less likely to initiate BPR efforts.

Lacking competition, public administrations may tend to retain their current structure instead of initiating change. We propose that public administrations often lack the necessary motives for change, forfeiting any potential benefits of BPR in the public sector (see Proposition 5). While public organizations frequently face budget pressures (Roy, 2006), they do not necessarily aim for further savings once their budget is met. Further, citizens are obliged to interact with their respective administrations instead of choosing to be “customers”.

Proposition 2: Public and private organizations derive differing benefits from BPR projects.

Due to their difference in purpose, function, and structure, public organizations focus on different goals when initiating BPR projects. Especially when facing budget cuts, public administrations aim to increase their internal efficiency and save resources (Hans Jochen Scholl, 2004). Their focus is not on increasing the nature or scope of the services provided but rather on performing the existing tasks in the most efficient way possible (O. E. Hughes, 2003). Moreover, public administrations do not aim to attract new customers, maximize profits or adjust their structure to market requirements. As a result, many of the potential benefits entailed by radical process changes transcend their agenda.

The primary objective for most public administrations engaging in BPR efforts is often just to automate existing processes through the use of IT (Scholl, 2004). Most documents are still exchanged in paper based formats and then organized, stored, and archived in file cabinets (Fountain, 2003). However, also in the public sphere, information is increasingly exchanged and stored in digital formats. In fact, various public service organizations are currently in the stage of transforming into virtual organizations through the use of networked computing (Fountain, 2007). Therefore, they also need to examine their underpinning processes.

Proposition 3: BPR efforts need to be initiated top-down in order to guarantee economic as well as political support and feasibility.

Even in private organizations, the commitment of superordinate decision makers greatly facilitates the successful implementation of changes (Abdolvand et al., 2008). It stands to reason that this is even more applicable to public administrations, for they lack essential freedom in economic and political terms. Once the appropriate financial, human and technological resources are ensured, success rates for BPR projects in the public sector will rise significantly. Scholl (Hans Jochen Scholl, 2004) argues that the support of senior executives is a vital point, particularly with the crossing of departmental and other organizational boundaries in BPR projects. Political and legal requirements may still act as constraints but may be reduced once a higher-level authority coordinates the change efforts of various agencies sharing a common hierarchy level.

Not only a top-down initiation is needed but the actual selection of the processes should also follow a top-down approach. This is achieved by a thorough top-down study of the respective domain and a subsequent selection of relevant processes (Sharafi et al., 2011). In order to obtain a comprehensive knowledge of existing process landscape in a public administration, large numbers of potential reengineering candidates have to be analyzed. The bottom-up process analysis employed by many BPR-related approaches (Rosenkranz & Holten, 2010) is very expensive and time-consuming. Hence, we posit that a top-down approach (Chourabi, Mellouli, & Bouslama, 2009; Sharafi et al., 2011) is needed in order to account for the special needs of the domain of public administration.

Proposition 4: A small-scale approach to BPR will increase success rates of BPR endeavors in the public sector.

The various functional, hierarchical and bureaucratic restrictions placed on public administrations challenge the transfer of methodology from the private sector. Public managers do not command sufficient authority to initiate the changes commonplace in private BPR efforts. This disparity may easily thwart proposed changes and result in failed BPR projects. Even when political support from superordinate levels is ensured, many legal restrictions and principles hinder BPR success. Further, media attention and the liability to public accountability increase with project size.

The inclusion of all relevant stakeholders in public BPR project is crucial (Jörg Becker, Niehaves, & Plattfaut, 2010). However, a larger scope of a BPR initiative often results in bigger actor networks which exhibit even more diverse interests, goals and strategies (Hanf & O'Toole, 1992). Consequently, with every new stakeholder, the governance of such multi-actor networks becomes more difficult. Halachmi (1995) argues that successful process-related change cannot occur without the consent of all the affected stakeholders. Thus, a small-scale BPR approach with fewer stakeholders involved may render more fruitful in the public sphere because it will ease coordination and communication efforts.

We propose that a dedicated approach in combination with a smaller project scope will ensure a higher success rate of BPR in the public sector.

Proposition 5: Sharing of knowledge and experiences via transinstitutional knowledge management platforms would positively impact the implementation of BPR in public administrations.

By benefitting from documented past experiences with BPR in other institutions, public entities would be able to achieve higher success rates in their own projects. This includes better anticipation of risks, lower costs incurred due to reusable artifacts, and more effective implementations based on documented best practices.

Constituting complex endeavors, BPR projects bear many potential barriers and risks capable of impacting project success or even halting a project altogether. This is especially true for the public sector, as illustrated by BPR success rates in the literature (McQueen & Baker, 1996; Hans Jochen Scholl, 2004). In contrast to the private sector, among public administrations accumulated knowledge is usually kept within the respective organization and not shared for the benefit of interested parties. Yet, the sheer number of merely horizontally separated – and thus similarly structured – public institutions demonstrates the potential of an integrated knowledge management platform documenting BPR experiences in the public sector. This platform may serve to document common risks, outline best practices, share reusable documents, and assist in the formation of realistic expectations regarding the benefits of BPR. As this calls for additional effort on part of the documenting institutions, the support and involvement of superordinate entities may be necessary. It needs to be noted that not only the limited availability of such information needs to be improved. In parallel, it is crucial to

ensure the willingness of following BPR implementers to utilize this information in order to benefit from the experiences made by their predecessors. By building on the fundamentals provided by past projects, subsequent BPR projects in the public sector may achieve higher success rates with similar or even reduced resource expenditures.

5. Discussion & Conclusion

With this research paper we consolidated the ample literature on BPR success from the private and public sector. We identified the relevant success factors and showed that a surprising similarity exists between private and public BPR related success factors. In addition, we determined the specific characteristics and requirements of the public sector highlighting gaps in current literature. Finally, we structured the research gap in five propositions and provided directions for further research.

Our analysis shows that organizational, socio-technical and technical aspects each play a significant role in the success of BPR projects, illustrating the cross-sectional nature of the subject. Due to this extensive scope, BPR is fundamental to implementing transformational government. BPR has the potential to reform both front- and back-office service delivery, improve interorganizational communication and enhance usability for citizens and businesses.

In spite of the shared success factors, we identified differences between the two sectors regarding their structure, operation and objectives. Based on these differences, we propose that different approaches are necessary for realizing the identified success factors in public and private sector organizations. We derived five propositions aimed at encouraging future research into the subject matter. Firstly, the differing motivations of public and private entities when engaging in BPR projects need to be examined and incorporated in the design of a dedicated BPR methodology for the public sector. In order to ensure the necessary top-down commitment, the potential of BPR in the public sector needs to be validated and appropriately communicated. As a central focus, a dedicated methodology for BPR in the public sector should be derived. This methodology should account for the peculiarities in public administration, as exemplified in figure 1. Finally, in order to monitor and control the realized benefits, practical measures for efficiency and service quality need to be derived.

The established knowledge regarding success factors provides guidance to practitioners in both public and private BPR projects. Moreover, the results of our analysis regarding the specific characteristics of the public sector call attention to the need for an appropriate implementation strategy. Our findings may assist practitioners in the public sector to timely identify obstacles and impediments to their efforts and aid in the understanding of the underlying circumstances. Highlighting the need for top-down support of BPR initiatives, we encourage decision makers in the public sector to review the potentials of BPR for their organizations and initiate activities where appropriate.

Furthermore, we identify a need for practitioners to assess their organizations' fitness for BPR before launching reengineering projects. Some of the issues impeding the adoption of BPR in the public sector are rooted in the fact that public administrations are still somewhat ill-prepared for the implementation of BPR activities (Halachmi & Bovaird, 1997). This applies to both their organizational structure and their resources, such as available budgets and suitable personnel (Fountain, 2003). Qualified and experienced process managers are lacking in the public sector (O. E. Hughes, 2003; Thong et al., 2000), as do incentive structures. To a certain extent, it is even disputable whether radical BPR activities as known from the private sector are appropriate measures for the private sector (MacIntosh, 2003).

Two main limitations apply to our research. Firstly, the method used for obtaining literature was neither exhaustive nor necessarily representative of all existent literature. Secondly, the categorization used for structuring both the identified success factors (section 2.2) and the resulting challenges in section 3.2 was derived based on the subjective judgment of the authors. In general, our research was of qualitative nature and does not lend to quantitative analysis.

Publication 4

Key Differences of Private and Public Sector Business Process Change⁹

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Abstract

The public sector is subject to constant changes. In order to tackle the current financial, social, and political challenges, public sector organizations all over the world need to rethink, adapt, and change their underlying service processes. Prompted by these challenges public managers have turned to the private sector for solutions. By facilitating resource efficiency and allowing for a more straightforward way of service provision, business process change (BPC) assumes a leading role in the transformation of public administrations. Yet, in the past decades many BPC projects both in private and in public have failed to realize their objectives. However, the public sector should not only learn from its own failures, but also from the mistakes made in private sector BPC implementations. A huge amount of case studies exist on the topic of BPC which provide comprehensive reviews of past failures and successes. So far, this rich pool of knowledge has remained unexploited. This paper identifies the main differences between private and public sector BPC implementations as reported in 128 case studies. Based on this meta-case analysis, we juxtapose current consensuses as well as contentious issues.

Keywords: Business process change, meta-case analysis, sector comparison

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1. Introduction

The public sector is subject to constant changes (Sims, 2010). One only needs to consider the recent changes and efforts introduced by European governments to modernize their bureaucratic structures in order to sustain the current financial crisis. An example of tremendous changes is the United States, where Obama's administration is working on reinventing public healthcare. Public administrations all over the world are forced to transform themselves into more efficient and effective, customer-oriented service providers (Fountain, 2001). In order to tackle the current financial, social, and political challenges, public sector organizations need to rethink, adapt, and thus reengineer their underlying service processes.

The resulting pressures to cut budgets and increase efficiency while maintaining performance prompted public managers to turn to the private sector for solutions (Parys & Thijs, 2003). Originating from a business environment (Otenyo & Lind, 2006), the idea of business process change¹⁰ (BPC) found its way into the realm of public organizations (Parys & Thijs, 2003). As a means of rightsizing government, cutting red tape, and reducing bureaucracy (Otenyo & Lind, 2006), BPC promises to become a valuable and much-needed tool in public administrations. By facilitating resource efficiency and allowing for a more straightforward way of service provision, BPC assumes a leading role in the transformation of public administrations.

However, in the past decades many BPC projects have failed to realize their objectives. Past literature found that between 60 and 80 percent of all BPC efforts fail partially or even completely (Al-Mashari et al., 2001; Trkman, 2010). Thus, learning from past failures is central for future success. However, the public sector should not only learn from its own failures, but also from the mistakes made in private sector BPC implementations.

Various authors attempted to analyze and synthesize the unique characteristics of each sector and their impact on BPC implementations (Halachmi & Bovaird, 1997; Scholl, 2004; Sims, 2010). Many of these comparisons are based on the personal experiences of the authors. Other researchers summarized public and private sector BPC experiences in form of single and multiple case studies (i.e., Harrington et al. 1998; Hesson et al. 2007; Hughes et al. 2006; Thong et al. 2000). In fact, a huge amount of case studies exist on the topic of BPC implementations which provide comprehensive reviews of past failures and successes. So far, this rich pool of knowledge has remained unexploited. Yet, we posit that a structured analysis of these case studies will help in resolving, clarifying and stressing current challenges in public and private sector BPC implementations. We expect this meta-case comparison to be highly conducive to future research. Thus, the objective of this paper is to identify the main differences between private and public sector BPC implementations as reported in 128 case studies. This leads us to the formulation of the following research question:

¹⁰ The term business process change comprises radical and continues changes (V. Grover et al., 2000).

What are the key differences between public and private sector BPC implementations and what can we learn from them?

The paper is organized as follows. In chapter 2, we summarize the related work on private and public sector BPC implementations. After illustrating our methodology in chapter 3, we present and analyze our results in chapter 4. In chapter 5 we highlight the key differences of public and private sector BPC practices as identified in the 128 case studies, and discuss how both sectors could learn from each other. We conclude our research in chapter 6 by summarizing the germane implications and limitations of our work.

2. Related work on private and public sector BPC

Process scope definition. Identifying and delineating a proper scope for change projects is recognized as being of crucial importance in private sector BPC (Grover, Jeong, Kettinger, & Teng, 1995; Hall, Rosenthal, & Wade, 1993). The set of processes affected may vary according to the focus of the change and the nature of the organization. Processes may differ in several aspects, including the concerned entities, handled objects and involved activities (Davenport & Short, 1990). As many processes in the public sector involve various different functional departments and – in turn – the effects of a process are often multi-dimensional (Halachmi & Bovaird, 1997), most BPC efforts include interfunctional processes into their scope. Further, since processes in public administrations are primarily grounded in laws and legal guidelines, they tend to handle informational (rather than physical) objects. The delineation of the processes to be included into a public BPC effort may be significantly hindered as regulatory and legislative constraints and a multitude of stakeholders complicate matters. In general, public organizations wield far less control over their processes (Dennis et al., 2003) than private entities, rendering proper process scope delineation even more crucial in order to avoid project failure.

Intended vs. achieved improvements. Private BPC initiatives typically aim for improved productivity, cost reductions, customer service quality increases or decreases in cycle times (Grover et al., 1995). This is a direct result of private businesses' fate being coupled to their ability to fulfill customer needs and subsequently generate customer satisfaction. Concurrently, businesses strive to minimize the resources input required for achieving this goal. Public administrations are not primarily guided by their customers' (or citizens') wishes as they are bound to follow procedures stipulated by laws and guidelines. Also, operating within preset budgets, public administrations do not feature the same motivation for efficiency gains as do entities in the private sector, where every saved resource positively impacts the bottom line. Yet, productivity enhancement has been playing a role in public sector BPC (Halachmi & Bovaird, 1997). While Gullede & Sommer (2002) even designate "increased efficiency and effectiveness" the "primary benefit" of business process management in the public sector, BPR may oftentimes be regarded rather as a means of rightsizing government, cutting red tape, and reducing bureaucracy (Otenyo & Lind, 2006).

Decision to change. In the private sector, both senior leadership support and employee involvement are accepted as essential prerequisites for the success of BPC projects (Grover et al., 1995; Zairi & Sinclair, 1995). Work by McAdam & Donaghy (1999) suggests top management support and understanding being of similar importance in the public sector. In spite of public managers usually being much more restricted in their initiation of BPC initiatives as laws and legal guidelines do not leave a lot of creative leeway, BPC projects in the public sector still depend on strong management support. Further, the multifaceted nature of public organizations may be an indicator for employee and stakeholder influence in public BPC projects. Indeed, MacIntosh (2003) notes that “public sector BPR projects tend to be more participative in nature with greater emphasis on consultation and consensus.”

Change management. Managing change is essential for any organization striving to significantly restructure or redesign its processes (Grover, 1999; Todnem By, 2005). Established as a success factor in private sector BPC (Grover, 1999; Zairi & Sinclair, 1995), adequate change management should pay equal benefits in the public sector. Due to the processes of public organizations being prescribed in detail by binding laws and regulations, the need for accountability, transparency and the strict adherence to any given provisions is much more pressing than in the private sector. Systematic Change Management offers the tools necessary for the documentation, tracking and auditing of any changes made to the organization’s process landscape. Regarded as important in the private sector (Kennedy, 1994), management the human aspect of change is also a central element of public BPC projects, accounting for the aforementioned focus on stakeholders and employees.

Project management. For private organizations, systematic project management has been found to be crucial to BPC success (Grover et al., 1995). The narrow legal corridors in which public organizations operate when implementing change as well as the need for managing manifold stakeholder interests and subsequently achieving viable consensus (MacIntosh, 2003) make an even stronger case for formal project management measures.

Management of resources. As difficulties in securing and forecasting required resources may hinder BPC efforts (Grover et al., 1995), resource management is a key success factor in private BPC (Al-Mashari & Zairi, 1999). With control over resources in public organizations often being distributed across various stakeholders (Scholl, 2004) and flexibility in resource allocation tending to be relatively low, long-sighted resource management is at least equally necessary in order to prevent bottlenecks that could endanger the whole change effort.

Interdepartmental integration. Private businesses have a long history of interfunctional integration fostered by increasing process orientation. As processes in private organizations oftentimes cross functional boundaries, BPC projects need to do the same (Grover et al., 1995). In the public sector, the distribution of responsibilities across different departments as well as complex links between organizations (Parys & Thijs, 2003) call for an equally cooperative approach.

Volatilities. Risk factors and the effects of volatility have been thoroughly analyzed in the private sector (Gemino, Reich, & Sauer, 2007). While comprehensive insights for the public sector are lacking, it has been found that policy changes may have incisive effects (Hutton, 1996) and elections and appointments may introduce a relatively high fluctuation into management (Halachmi & Bovaird, 1997).

Performance. Cao, Clarke, & Lehaney (2001) point out the the high failure rates of BPC projects in the private sector. In contrast, Scholl (2004) finds public BPC projects to be more successful than their private counterparts. However, while being more successful, public BPC projects often also take longer. Scholl (2004) attributes this to “elements of distributed control and accountability”, rendering public sector change “intrinsically more complex than most private-sector BPC projects”. Hutton (1996) points out the danger of unrealistic expectations in public change projects. As BPC may require the merging, automation and elimination of processes (Stemberger et al., 2007), the nature of public administration requires the surrounding political conditions to be considered before applying any modifications (Halachmi, 1995). The myriad of stakeholders involved in many public projects and the scrutiny of public opinion render public projects more vulnerable to changes in their environment and expectations, potentially putting a further strain on success rates. When it comes to assessing success, Halachmi & Bovaird (1997) lament the merely “symbolic” setting of objectives in the public sector, which cloud the view on actual public BPC success rates.

In summary, findings relating to success factors, risks and best practices in BPC are much more numerous and well-supported for private sector applications. Yet, most concerns valid for BPC projects in the private sector seem to be of similar importance when dealing with their public counterparts. While there appear to be some differences in character (process scope, intended improvements), most aspects deserving attention in private sector projects also appear to play a major role when initiating change in public organizations, albeit sometimes for different reasons (change management, resource management). Certain influences, such as volatilities, still pose a relatively blank sheet to public sector BPC research.

3. Research design

We conduct a meta-case analysis (Larsson, 1993), in order to identify the key differences between public and private sector BPC implementations. This method turned out to be particularly useful for our research, because it represents a powerful technique for identifying patterns across case studies (Larsson, 1993; Lucas, 1974). Our meta-case analysis comprises the following three steps: (1) the selection of existing case studies relevant to our research question; (2) the conversion of qualitative case descriptions into quantified values; and (3) a descriptive analysis of data that emerge from the coding procedure.

3.1. Case selection

Since our research goal was the identification of the key differences between private and public BPC initiatives, we had to look closer at the empirical literature that provides details of such BPC initiatives. Thus, we applied a detailed screening of literature for case study descriptions of BPC projects. We used the key words “business process”, “business process change”, “business process reengineering” and “business process transformation” as the initial selection criteria. In addition, we combined each key word with the appendix “case study”. After the initial literature screening, we identified more than 5000 references for each combination of key words and “case study”. These were found through traditional channels (e.g., libraries), conference proceedings, online database services (e.g., Emerald, EBSCO, Science Direct and Google Scholar), consulting journals, and other web search tools. To determine the relevancy of these articles, we further explored titles, abstracts, and keywords. After this step, the sample originally aimed to include 217 articles describing BPC projects. However, making sure that apples are not compared with oranges, we excluded articles with the following attributes: (1) no or very little information about the case; (2) no or very little information about the impact factors for the success of the BPC initiative; and (3) focused on the technology, not on the BPC initiative. After eliminating these case studies, we derived at a final sample of 128 case studies comprising 86 journal articles, 22 book sections, 16 conference articles, 4 theses, 1 magazine article and 1 working paper (a full list of the 128 articles is available upon request from the authors). The final sample consists of a wide set of international BPC initiatives, 92 in private and 36 in public organizations. The articles span the years 1993 to 2012 and have an average length of 14 pages.

3.2. Case analysis

As a next step, we transferred the qualitative case descriptions into quantified values. Adapting the coding procedure used by Lacity et al. (2011), we examined the case study sample of BPC implementations in a way that was concise and meaningful. Two experienced raters conducted a frequency coding of the dimensions and related characteristics mentioned in section 2. Before they started coding the selected case studies, both raters coded several pilot cases to become familiar with the coding and compared their coding for calibration purposes. To ensure consistent coding at the outset, we established inter-coder reliability. Considering the random error of measurement the observed Krippendorff’s (1980) inter-coder reliability was acceptable ($R=70.0$). After finishing this step, we analyzed the articles by published year and the identified BPC related variables. The empirical insights and the analysis obtained from the meta-case analysis will be presented in the next section.

4. Results

In the following, we present our findings, which we derived from the analysis of 128 case studies on the topic of BPC. First, we discuss some general findings and characteristics of the publicized cases over the examined period. Second, we present our findings on the differences of process scope and improvement goals. Third, we disclose some interesting results on the differences and similarities of private and public sector change and project management capabilities in BPC projects. Furthermore, we discuss additional variables that influence BPC projects in private and public organizations. Last, we illustrate how the success rates of BPC projects differ between the two sectors.

4.1. *General findings*

Our analysis encompassed literature from 1993 to the present. The term BPC was not defined properly until 1993 (Hammer & Champy, 1993), which might explain the lack of literature matching our search before this date. Considering this groundbreaking shift and the resulting time span comprising almost two decades, we deemed this to be an appropriate cut off for the focus of our literature search.

First, we analyzed the number of publicized cases over the examined period. Regarding the private sector, our results depict a striking spike with 16 articles in 1994, which marks the maximum in the regarded time span. From this year, the number of cases – while fluctuating – declines steadily. In contrast, the results for the public sector indicate three striking spikes. In 1995 five case studies and in 1996 six case studies have been published. Additional peaks exist for the 2001 and 2007 with 4 case studies per year. More so, while the number of articles in the private sector has exceeded the ones in the public sector over almost the entire period, the public sector has not experienced the sharp decline visible in the private sector. Our results reflect that BPC in the public sector has neither received equivalent attention in the past nor reached a state of theoretical saturation. Figure 11 summarizes this comparison.

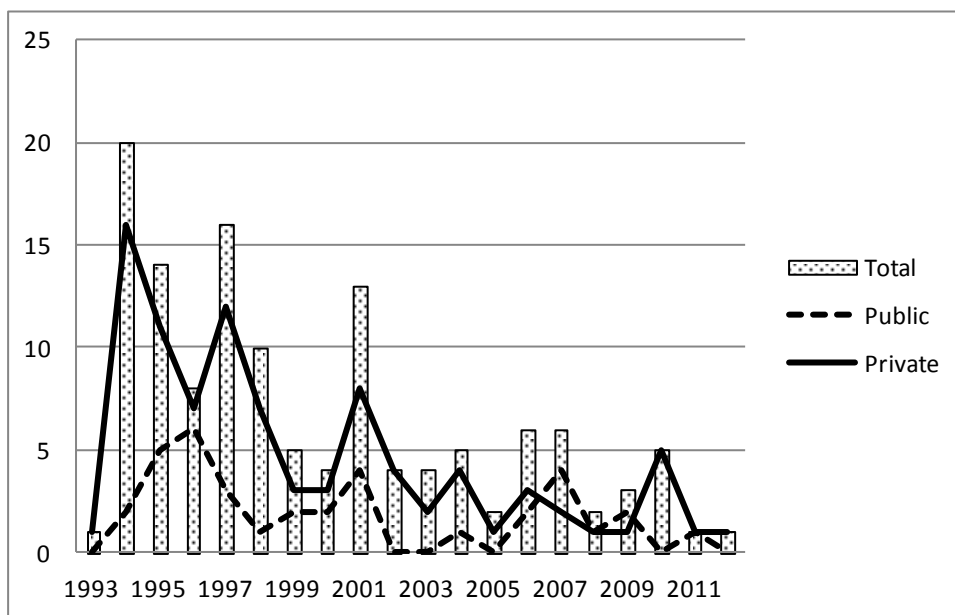


Figure 11: Number of relevant cases publicized over the examined period

4.2. Process scope definition

What differentiates BPC projects from each other is the degree of improvement sought (Kettinger & Grover, 1995). The degree of changes in BPC projects varies considerably (e.g., with respect to the number of business functions involved) (Ozcelik, 2010). However, it is important to define the change scope appropriately, because “different types of processes require different levels of management attention and ownership, need different forms of IT support, and have different business consequences when redesigned” (Davenport & Short, 1990). There are three major dimensions that can be used to define the scope of a process. These are the organizational entities or subunits involved in the process, the type of objects manipulated in the process, and the type of activities taking place in the process.

Our results show that the process scope differs considerably between the private and the public sector (see Table 15). Private organizations are more likely (27%) to engage in an interorganizational BPC project than public organizations (19%). This is surprising, because government agencies are required by law and regulations to work across boundaries, which leads to extensive interorganizational information sharing (Fountain, 2001; Jurisch, 2011). But due to the numerous stakeholders involved in such interorganizational processes, it becomes more difficult to reach a consensus between all the levels of authority and various departments and thus commit to a common interorganizational BPC project (Thong et al., 2000). This may also explain why most public (92%) BPC projects focus on interfunctional processes. Interfunctional processes are within (internal to) the organization, but cross several different functional or divisional units (Davenport & Short, 1990). In addition to being interfunctional most processes also had an interpersonal dimension (i.e., Thong et al., 2000).

Process scope		Private [% no.]	Public [% no.]
Entities	Interorganizational	27% (25)	19% (7)
	Interfunctional	84% (77)	92% (33)
	Interpersonal	66% (61)	50% (18)
Object	Physical	27% (25)	5% (2)
	Informational	55% (51)	72% (26)
Activities	Operational	53% (49)	64% (23)
	Managerial	25% (23)	28% (10)

Table 15: Process scope

Furthermore, the processes selected for change can also be categorized by the types of objects they address (Davenport & Short, 1990). Due to the nature of business in the public and the private sector it is not surprising that most processes manipulate an informational (public 72%, private 55%) instead of a physical object (public 5%, private 27%). Most public processes create or manipulate information. Some processes also require the combination of both physical and informational objects (Davenport & Short, 1990).

The types of activities a process supports can be either operational or managerial. Our findings for the public and the private sector show that most activities which are in the focus of BPC projects are operational (e.g., private (53%), public (64%). An interesting discovery was that in the public sector the change of managerial activities was rarely the sole focus of a BPC project. Instead managerial activities were usually altered as a result of operational changes (i.e., Currie & Willcocks, 1996; MacIntosh, 2003)

4.3. Intended versus achieved improvements

In the private sector, most activities are ultimately aimed at satisfying the customers' needs and expectations (Goldkuhl & Lind, 2008). Lacking such a concise concept of "value" (Otenyo & Lind, 2006), public administrations are primarily guided by their mission to execute laws and legal ordinance (Grimmer, 2004). As a result, increasing customer satisfaction is not a primary concern of public agencies (Jurisch et al. 2012). It has also been argued that public organizations have less interest in reducing costs and improve operating efficiency, because they rely more on appropriations and less on market exposure (Thong et al., 2000).

However, our results indicate that private and public organizations are guided by surprisingly similar improvement goals (see Table 16). The top three objectives of public and private organizations in BPC projects were the reduction of costs (56%), reduction of cycle times

(50%) and the improvement of product and service quality (64%). In fact, the targets of public agencies were set even higher than those of private organizations.

Another unexpected and valuable discovery in our data was the increase of employee satisfaction and morale. Even though only 26% of private and 22% of public projects intended to improve employee satisfaction, more than 30% of these projects in both sectors actually achieved this goal. This is interesting, because particularly in the public sector resistance to change is allegedly very high (Thong et al., 2000). But in the end, employees appear to be rather satisfied with the results of the BPC. Thus, the satisfaction of employees with new tasks and changed routines can be a positive side product of a BPC project.

Improvement goals	Private [% no.]		Public [% no.]	
	Intended	Achieved	Intended	Achieved
Productivity	32% (29)	33% (30)	39% (14)	19% (7)
Integration	35% (32)	38% (35)	28% (10)	17% (6)
Customer satisfaction	35% (32)	34% (31)	47% (17)	28% (10)
Delivery reliability	20% (18)	11% (10)	8% (3)	3% (1)
Complexity	20% (18)	16% (15)	31% (11)	19% (7)
Reduction of costs	51% (47)	45% (41)	56% (20)	44% (16)
Quality of products and services	53% (49)	24% (22)	64% (23)	28% (10)
Cycle time	42% (39)	43% (40)	50% (18)	53% (19)
Employee satisfaction and morale	26% (24)	32% (29)	22% (8)	31% (11)

Table 16: Intended vs. achieved improvements

The major difference between private and public BPC projects lies in the ratio of intended and achieved improvement goals. For instance, 47% of public BPC initiatives aimed at increasing the satisfaction of their customers, but only 28% of the projects achieved this goal. On the contrary, only 35% of private BPC projects intended to improve customer satisfaction, whereas 34% achieved this goal. The same holds true for other intended improvements in public BPC projects (e.g., productivity and integration of information systems). One explanation for these results may be that performance measurement and management of BPC projects is not as strongly enforced in public as in private organizations. The following example illustrates this problem:

“Due to the complex multifunctional nature of the [public] organization’s work, the reengineering team found difficulty selecting quantifiable performance

measures/outcomes whereby improvements could be measured” (McAdam & Donaghy, 1999b).

However, defining and measuring the value of public BPC projects is often harder than in the private sector. One reason for this is that public administrations produce their value for a more complex cast of actors (e.g., citizens, companies, other agencies, politicians, interest groups, etc.) and each of them has their unique interests. Public organizations have the unenviable task of having to meet a multitude of, often inconsistent, interests and aims with a very restricted budget (Llewellyn & Tappin, 2003). For instance, assuming a public agency aims to cut police-payroll days in order to reduce their costs. This agency has to keep in mind that the public is more likely to be concerned about the incidence of crime (Johnson & Scholes, 2001). Thus, measuring the performance of a public BPC project is not always a straightforward task.

4.4. Decision to change

The decision to embark on a BPC project should be strongly supported by the senior management and their employees (Grover, 1999; Jurisch et al. 2012). If senior management fails to provide the project with the necessary empowerment, the project will not produce the anticipated results (Schwarzer & Krcmar, 1995). This applies equally to private as well as public BPC projects. Senior management support is indispensable for overcoming resistance to change, maintaining stakeholder commitment and managing difficulties (Scholl, 2004). The analysis of our results disclosed that senior management support and commitment to BPC projects is higher in public (72%) than in private (58%) organizations (see Table 17). In addition, in 56% of public and 47% of private projects senior management had a clear vision and an understanding of the change initiative. These results are rather surprising since achieving commitment to a public BPC project is considered more difficult because of the often larger number of 'process- specific' stakeholders (Halachmi & Bovaird, 1997). In the public sector, process ownership is not only internal to the agency but also external. Thus, senior public managers have to achieve commitment within the public agency, within government and outside government (e.g., among its customers). Getting consent and achieving commitment to a BPC project is a difficult task, which involves the building of a winning coalition (Halachmi & Bovaird, 1997; Thong et al., 2000).

However, the high senior management support in public organizations might explain the higher numbers of employees that committed to BPC projects (19%). Whenever employees see their senior managers on board, committing both time and effort to the change, their commitment to the change and morale support will be more likely (McAdam & Donaghy, 1999b; Thong et al., 2000). The following example illustrates this effect:

“They [the senior managers] were very keen on the process right from the start and very responsive when- ever information was requested from them. This extensive

involvement contributed to the increased communication and understanding of staff at all levels” (Lai, Khoong, & Aw, 1999).

Additionally, Kelman (2005) asserts that resistance to change should not be overestimated in the public sector. A significant number of public service employees actually welcomed reforms, and their support for a BPC project only needs to be “unleashed” by their senior managers (Fernandez & Rainey, 2006).

Items	Private [% no.]	Public [% no.]
Senior management support	58% (53)	72% (26)
Senior management vision/understanding	47% (43)	56% (20)
Employee support	9% (8)	19% (7)

Table 17: Decision to change

4.5. Change management

Launching a BPC initiative is not likely to succeed if the people and the structure of the organization are unprepared for and incapable of change. Change management refers to the processes employed on a BPC project to ensure that changes are carried out in a visible, controlled and orderly way. In that sense, change management comprises communication and motivational activities, undertaken to govern the effects of BPC systematically (Kettinger & Grover, 1995). Interestingly, both public (36%) and private (31%) organizations rely on change management methods and tools to ensure the success of their BPC initiative (see Table 18). Additionally, both sectors rely on intensive training of their employees to support the change. Training is often employed to minimize resistance to change, which is allegedly higher in public organizations, and to provide psychological support (Fernandez & Rainey, 2006). Next to training, effective communication is a necessary element in getting the members of the organization to embrace change. Our findings show that private organizations (55%) invest a little more effort in communicating the need for and desirability of change to convince their employees of the necessity for change. The following statement exemplifies the positive effects of communication:

“Interviewees described various aspects of stakeholder involvement, for example, via ongoing communication and participation. Demonstrating a project’s potential benefits to stakeholders reportedly increases stakeholder support and mitigates change resistance” (Scholl, 2004).

A surprising result was that public organizations as well as their individuals have less faith in their capacity to change. Meyer and Stensaker (2006) state that organizations that have a capacity for change have the ability (resources and capabilities) to change, but also the capability to maintain daily operations and implement subsequent change processes.

However, the capacity to change can be build up by an organization through experience with BPC (Meyer & Stensaker, 2006). One explanation for the lower capacity for change in public organizations could be that they have had less experience with BPC than private organizations (see Figure 11).

Items	Private [% no.]	Public [% no.]
CM methods and tools	36% (33)	31% (11)
Training to support change	57% (52)	61% (22)
Communication	55% (51)	47% (17)
Individual capacity for change	37% (34)	19% (7)
Organizational capacity for change	25% (23)	11% (4)

Table 18: Change management and learning capacity

4.6. Project management

The quality of the project management impacts the success of a BPC project, and thus the performance of the changed business processes, which then may lead to improved organizational performance (L Crawford, 2005). Our results illustrate that private organizations rely more heavily on project management methods and tools (54%) as well as a formalized project governance structure (59%) (see Table 19). Crawford (2005) advocates that ideally the project governance and business-as-usual governance should not be identical. However, governance is a difficult issue in public administration. The numerous actors involved in public sector BPC projects often impede a clear and formal commitment to governance principles and rules (Fountain, 2007). As Gulledge & Sommer (2002) note, the presence of strict hierarchies in bureaucratic institutions presents a hindrance to project management in general. The following statement exemplifies this issue:

“While senior managers may agree in principle to collaborate, in practice middle managers from separate agencies carry out the work of integration and often have goals that are not aligned with those of the [...] project” (Fountain, 2007).

The analysis of the case studies revealed that public organizations invest more effort than private organizations in resource forecasting (17%), managing stakeholder interest (25%) and project risks (25%). Public sector BPC projects often face greater restrictions in acquiring resources and funding, particularly on a short-term notice (MacIntosh, 2003). Consequently, they have a greater need for forecasting and planning necessary resources for improvement. Often, the resources necessary for a BPC project have to be planned a year ahead of time – whenever the agency’s annual budgets are defined. A lack of adequate resources can result in implementation errors, higher levels of stress, and neglect of core activities and functions

(Fernandez & Rainey, 2006). Managing stakeholder interests and risks is even more important in the public than in the private sector due to frequent changes imposed by elections and political appointments (Thong et al., 2000).

Project management	Private [% no.]	Public [% no.]
Governance structure	59% (54)	42% (15)
PM methods & tools applied	54% (50)	31% (11)
Resource forecasting	9% (8)	17% (6)
Managing stakeholder interests	22% (20)	25% (9)
Managing project risks	17% (16)	25% (9)

Table 19: Project management

4.7. Management of resources

The resources available to a project have a direct impact on the project's success. The kind of resources (e.g., technical, human, financial or others) available to an organization for completing specific tasks often directly impacts the success of BPC initiatives (Gautam Ray et al., 2004a). The term resource is not only tied to material goods but also includes immaterial goods such as the organizations' human resources and their knowledge, skills, know-how and talent (Jay B. Barney, 1991) (Olalla, 1999). Our findings show that the employees' expertise available to the BPC project was considerably higher in the public (39%) than in the private sector (24%) (see Table 20). Existing structures and hierarchies in public organizations may have been in place for decades and have not faced any pressure to change in the past (Jurisch et al., 2012). The more rigid organizational structures of public organizations often result in less employee turn-over than in private organizations. As a result, public service employees often possess a better understanding of government culture, structures and processes than external experts (Scholl, 2004). This might also explain why public agencies are less likely to rely on the support of external consultants (42%) than their private counterparts (58%). However, what public employees often lack is BPM specific expertise, which forces them to seek external know-how on this matter (Björn Niehaves, 2010). Experiences from the private sector also show that the involvement of external consultants frequently results in knowledge transfer from external technical experts to internal experts (Markus, 2001).

Many researchers have highlighted the importance of the project manager's expertise to project success (Lynn Crawford, 2006). The lack of an experienced project manager presents a lack of knowledge resources, which poses considerable risks to a BPC project (Gemino, Reich, & Sauer, 2007). The analysis of the case studies discloses that the expertise of public project managers (11%) is marginally lower than those in private organizations (17%). One

explanation for this difference may be that public BPC projects are often more complex and riskier in nature (Cats-Baril & Thompson, 1995). The project managers of such information-rich projects need special skills in order to be effective. However, effective project management training is rare in the public sector (J. Becker et al., 2012).

Items	Private [% no.]	Public [% no.]
Employee expertise	24% (22)	39% (14)
Consulting support	58% (53)	42% (15)
Project manager expertise	17% (16)	11% (4)
IT hardware and software	34% (31)	50% (18)
Budget	8% (7)	5% (2)

Table 20: Human, IT and financial resources

An interesting result of our analysis was that public organizations (50%) experienced fewer difficulties in acquiring IT hardware and software which were necessary for the implementations of the BPC project. On the contrary, both public (5%) and private (8%) project managers rarely ever had the required financial resources available. Instead compromises had to be made. In the public sector, money is not only an economic factor but also a public power factor. Public organizations are empowered by their citizens to invest that money through political processes (Johnson & Scholes, 2001). In order to avoid misuse and abuse of public power through unreasonable spending, budgets are often scarce for risky projects such as BPC.

4.8. Interdepartmental integration

By building on the experiences of past projects, subsequent BPC projects could achieve higher success rates and even reduce resource expenditures (Jurisch et al., 2012). Therefore, it is surprising that only 39% of public case studies reported that they cooperated with other departments throughout the change project (see Table 21). In contrast to the private sector, knowledge accumulated among public managers is usually kept within the respective organization and not shared for the benefit of interested parties. Interdepartmental rivalries (at both political and administrative levels) and unintegrated information systems often hinder the cooperation and collaboration of different public departments (Bannister, 2001). In addition, public departments are often reluctant to give out data on past projects, because they are “frequently tied to funding, political agendas, legal guidance, and public demand, and the resulting data are increasingly used to justify or advocate for certain stances on policy, law, programs, and so on” (Drake et al., 2004). Furthermore, in order for public organizations to collaborate with each other requires information systems which support this exchange of ideas. Our findings show that formal integration of the information systems of different

departments throughout the BPC project was more frequent in private (26%) than in public (17%) organizations.

Interdepartmental integration	Private [% no.]		Public [% no.]	
Cooperation	46%	(42)	39%	(14)
Formal integration	26%	(24)	17%	(6)

Table 21: Interdepartmental integration throughout BPC projects

4.9. Volatilities

None of the public sector case studies reported a change of the executive sponsor throughout the BPC project (see Table 22). This a surprising finding, since other researcher have proposed that more senior management turnover happens in the public sector due to elections and changing political appointments (Halachmi & Bovaird, 1997; Thong et al., 2000). Our findings disclose that in fact executive sponsor volatility is more frequent in the private sector (8%). This discovery is probably linked to the more volatile competitive environment which private organizations are exposed to. The results show that volatilities due to changes in the competitive environment were more frequent in the private (18%) than in the public sector (8%). On the contrary, public organizations (14%) were affected more frequently by changes in the strategy. It appears that ‘no self-respecting senior figure of a public sector organization would be without a strategy, vision or mission statement’ (Newman & Clarke, 1994). Hence, frequent changes of government appointments may result in conflicting concerns and expectations and thus result in changes of a strategy.

Volatilities	Private [% no.]		Public [% no.]	
Executive sponsor volatility	8%	(7)	0%	(0)
Competitive environment volatility	18%	(17)	8%	(3)
Strategy volatility	4%	(4)	14%	(5)
Political/ governmental volatility	8%	(7)	17%	(6)

Table 22: Volatilities

One problem that every public BPC project is exposed to is the multitude of purposes that public organizations have to serve. As a consequence, political interests and visible outcomes are sometimes more important, depending on the political orientation of those involved, than measurable improvements (Kock & McQueen, 1996). Thus it is not surprising that political/ governmental volatilities are more frequent in public (17%) than in private (8%) BPC projects.

4.10. Performance of BPC projects

Our analysis discloses that 60% of public and 70% of private BPC projects were identified as successful (see Table 23). In contrast, 6% (9%) of BPC endeavors in the public (private) sector were deemed a failure. A higher percentage of public projects remained incomplete (23%) than of private projects (14%). No data on this criterion could be obtained of 11% (public) and 7% (private) of cases respectively.

Assessment	Private [% no.]	Public [% no.]
Successful	70% (67)	60% (21)
Unsuccessful	9% (9)	6% (2)
Incomplete	14% (13)	23% (8)
n.a.	7% (7)	11% (4)

Table 23: Success assessments of the examined cases

A lower percentage of public projects (60%) was assessed as successful than in the private (70%) sector. This result conflicts previous statements that public BPC projects have higher success rates due a more inclusive approach (Scholl, 2004). But while fewer projects may succeed in the public sector, our results also show that fewer projects are declared as unsuccessful (6%). This seeming contradiction is resolved by the circumstance than in the public sector many projects remained incomplete, thus never reaching the actual stage of ex-post assessment. We attribute this finding to the projects being subject to the inherently more inert nature of the public sector, causing many projects to fizzle out as legislative periods end, decision-makers are replaced, political trends change or project objectives become obsolete due to changed legislature.

5. Discussion

Past research shows there are two more or less distinct approaches to public sector BPC research. One stream of research has been arguing that the public sector should learn from the experiences made in private BPC projects (Halachmi & Bovaird, 1997; Halachmi, 1995; Scholl, 2004). Another group of researchers has argued in favor of public-sector specific models and approaches (Becker, Algermissen, & Niehaves, 2004; Sharafi, Jurisch, Ika, Wolf, & Krcmar, 2011; Stewart & Walsh, 1992). They argue that the often over-simplified private sector models disregard the distinctive purposes, conditions and tasks of the public sector. However, the situation is not that black and white. Both public and private organizations have accumulated considerable experiences with BPC in the last decades that the other sector could benefit from. Why should learning only work one-dimensional - from private to public? Our results show that there are certain factors that public administrations appear to have more

experience in, while there are others that private organizations are more accomplished in. We propose that both public and private organizations may actually learn from one another's BPC implementations. This is particularly important when considering that public and private sectors are not two distinct and internally homogenous domains. In fact, few organizations are purely public or purely private. Most organizations sit somewhere on a continuum between these two extremes (Johnson & Scholes, 2001). For instance, numerous new mixed forms of collaboration have been created between public and private organizations (e.g., private-public partnerships). The increasing investment of the private organizations into the public sector is likely to even increase this spectrum of private-public forms of cooperation. Llewellyn and Tappin (2003) assert that "private sector sponsorship is, already, a significant phenomenon across the public sector". Thus, it is important that both public and private organizations understand why they might have been historically better in certain aspects of managing change and what they can learn from the other sector. Figure 12 summarizes the unique characteristics of BPC implementations for each sector, which identified throughout our analysis.

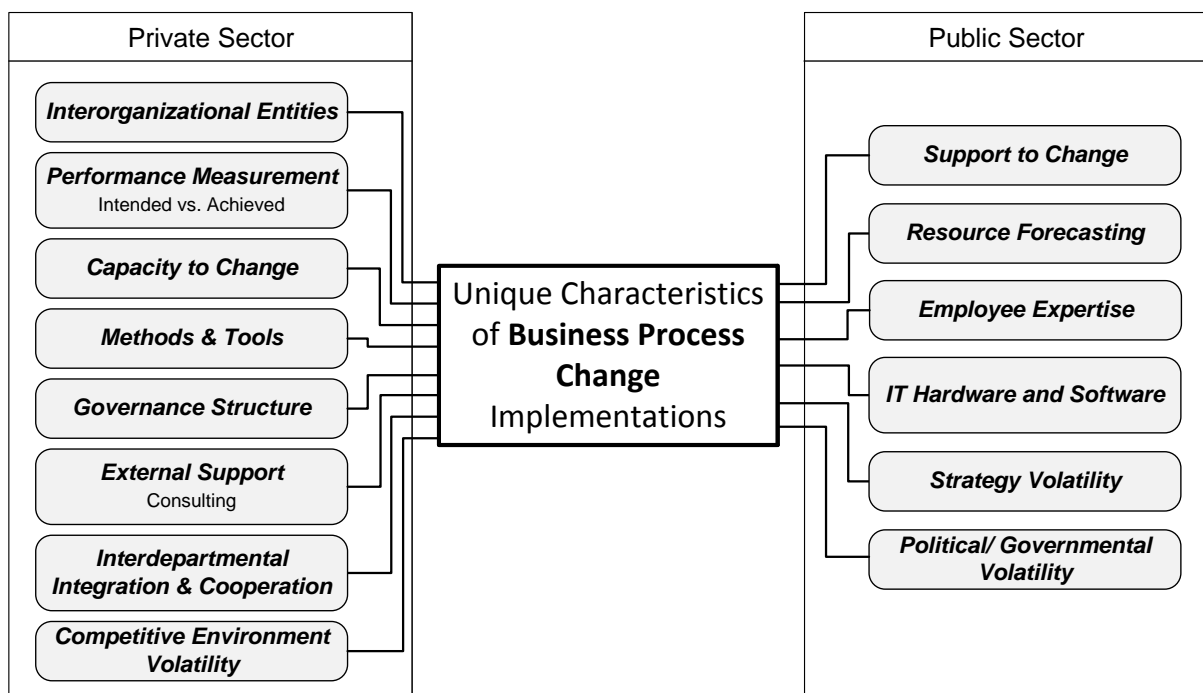


Figure 12: Unique characteristics of private and public sector BPC implementations

In the following sections we discuss the unique factors of each sector and how both sectors can learn from each other.

5.1. Unique public sector BPC characteristics

The public sector has collected experiences from BPC implementations for almost two decades. Public sector BPC projects are confronted with different organizational and environmental settings than in the private sector. As a result, certain aspects of managing

change have received more attention. For instance, public organizations have the unenviable task of having to manage a multitude of, often inconsistent, interests and aims of internal and external stakeholders when embarking on a BPC initiative (Llewellyn & Tappin, 2003). As a result, public organizations often invest considerable efforts in managing stakeholder interests and building support for change, before the start of a change project. Getting consent and achieving commitment from internal and external stakeholders is a difficult task and requires strong leadership and employee support (Halachmi & Bovaird, 1997; Thong et al., 2000). This skill set of the public sector in managing a multitude of stakeholder interests could also be beneficial to private organizations, since more and more private companies embark on business network transformations (Word, 2009) requiring a large number of external stakeholders to collaborate (e.g., suppliers, producers, etc.).

Another factor in which public organizations invest considerable effort is the resource forecasting and planning for BPC projects. Due to stringent annual budgets public agencies face extreme resource dependencies (Johnson & Scholes, 2001). Consequently, resource allocations have to be planned before BPC initiatives even commence. This includes clear budget estimates for IT hardware and software, since budget alterations throughout the project are rather difficult. This does not imply that the resources available are always sufficient (see table 6), but rather that resource planning is more essential than in private organizations.

Frequent changes of government appointments and changing political agendas result in higher strategy and political/ governmental volatility. Little is known what exactly the impact of these volatilities on the performance of BPC is. The results show that public agencies invest more efforts in managing project risks to face such volatilities (see table 5). Private organizations could benefit from these experiences. According to Baldry (1998) public projects rely on a wide range of techniques and methods for managing risks. However, risk management research for public sector projects is still rare. Further research is needed in order to clearly identify the risks imposed by strategy and political volatilities to BPC projects. Only then can the right risk management techniques and methods be adopted.

5.2. Unique private sector BPC characteristics

Within the public sector well and often standardized methods and techniques for managing change have emerged. These methods are used for the analysis of processes and workflows, for measuring the performance of projects but also for project management and change management (William J. Kettinger et al., 1997b). Public BPC projects could also benefit from the use of such standardized methods and techniques. However, our results disclose that public agencies are less likely to rely on classic project and change management methods (see table 4 and 5). Instead public projects often create “completely new methods without expending any detailed analysis” (Scholl, 2004). The use of more standardized methods and tools might, however, have a positive effect on the performance of public BPC projects.

A key factor influencing the results of a BPC initiative is the capacity to change (Halachmi & Bovaird, 1997). The perceived capacity of private organizations and their employees appears to be much higher than in public institutions (see table). Change capacity refers to the ability of an organization to undertake and survive change (Meyer & Stensaker, 2006). Frequent change experiences can create an understanding for change and thus enhance the capability for change. Private organizations face change almost on a ‘daily’ basis as a result of constantly changing customer demands, new competitors, rapid developments of new technologies as well as shortened product lifecycles (Abdolvand et al., 2008; O’Neill & Sohal, 1999; Terziovski et al., 2003). In contrast, the concept of change is still rather new to the public sector. Bevir, Rhodes and Weller (2003) stated that traditions and practices are rather fixed and static, because public agencies have not met nor faced many novel circumstances in the past. Specific methods and techniques exist in the private sector for building a capacity for change from which the public sector could benefit from. However, the development of capacity for change is closely related to the establishment of a learning organization. But this would require a cultural change, which might need a lot of time (Scholl, 2004).

The interdepartmental integration and cooperation of different departments in private BPC projects is very important since it facilitates the learning from past failures and successes (MC Jurisch et al., 2012). This includes the better anticipation of risks, lower costs due to reusable artifacts and more effective implementations based on documented best practices. In contrast to the private sector, the knowledge accumulated among public administrations is usually kept within the respective organization and not shared for the benefit of interested parties. Yet, the sheer number of merely horizontally separated – and thus similarly structured – public institutions demonstrates the potential of integrated knowledge management platforms documenting BPC experiences in the public sector. This platform could document common risks, outline best practices, share reusable documents and assist in the formation of realistic expectations regarding the benefits of BPC. By building on the fundamentals provided by past projects, subsequent BPC projects in the public sector may achieve higher success rates with similar or even reduced resource expenditures.

6. Conclusion

With this research paper we consolidated the experiences of 128 BPC related case studies from the private and public sector. We identified the relevant differences between the sectors in BPC implementations. For instance, private sector organizations are more likely to embark on interorganizational change projects. In addition, the ratio between intended versus achieved improvements appears to be lower in the private sector. On the other hand, public organizations invest more efforts in establishing commitment for their BPC projects, which results in higher senior management and employee support. However, public BPC projects are more likely to be exposed to strategy or political/ regulatory volatilities due to a highly politicized environment. We also identified some interesting differences between the sectors.

For instance, the improvement goals which guide BPC projects are rather similar between both sectors (e.g., cost cutting and quality of services/products). We synthesized the identified differences into unique characteristics of public and private sector BPC implementations. Finally, we discussed how both sectors could learn from each other.

6.1. Implications

Our paper has the following research implications. It provides the first attempt to comprehensively analyze and exploit the rich knowledge discussed in BPC case studies. So far, most reports on BPC projects were primarily case study or literature based. The use of a meta-case analysis enabled us to analyze a pool of 128 BPC projects simultaneously. The results of this meta-case analysis will expand the current knowledge and literature on the differences and challenges in public and private sector BPC implementations.

The established knowledge on the differences in public and private sector BPC implementations can also provide guidance to practitioners. We summarized the unique characteristics of private and public sector BPC implementations. The results of our analysis regarding the specific characteristics of the public sector call attention to the need for an appropriate implementation strategy. Our findings may assist practitioners in the public sector to timely identify obstacles and impediments to their efforts and aid in the understanding of the underlying circumstances. Highlighting the need for top-down support of BPC initiatives, we encourage decision makers in the public sector to review the potentials of BPC for their organizations and initiate activities where appropriate.

6.2. Limitations

We identified the following limitations for our research. First, due to restricted institutional access to some journals, we were not able to investigate all articles that appeared to be relevant for our research. Second, even though the coding and interpretation of the articles was validated by inter-coder reliability, the process is still to some extent subjective and research bias may occur. Third, another limitation of our research is that our meta-analysis is solely based on the written and published evidence. Some authors may have actually discovered additional BPC factors throughout their case studies, but did not report them in their publications. Fourth, the case studies analyzed within this paper report primarily successful BPC implementations. Consequently, our results may paint an overly positive picture of BPC implementations. Last, this research only relied on simple descriptive statistics in form of frequency counts. This statistical analysis does not allow us to make statements on relations and dependencies of the factors analyzed.

Publication 5

Toward a Formal Approach to Process Bundling in Public Administrations¹¹

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Abstract

Excessive information and data exchanges between companies and public administrations create a need for the bundling of processes. Process bundles are created whenever cross-organizational processes are combined or interlinked. While a considerable amount of literature addressing the process of reorganizing, optimizing, or reengineering processes exists, much less is known about concrete approaches which facilitate the identification of suitable process bundles. This paper presents a review of identification criteria relevant for process bundling. Our literature review is deliberately broad, encompassing work in the fields of process management, reengineering, and E-Government. The analysis discloses that the plain focus on secondary process identification criteria (e.g., inefficiencies and redundancies) neglects to assess if the processes actually fit together. Premised on these results, we synthesize the insights from the cited literature into a methodological intermediary step to support the purposeful elicitation of bundling candidates.

Keywords: process bundling, business-to-government, process identification

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1. Introduction

Municipalities are confronted with constant cost and performance pressures. More so, citizens and businesses demand increased customer orientation and an integration of their needs. This entails a change in how public administrations deliver their services and processes, e.g.: availability of services (e-services), quality of services, timeliness of service delivery, etc (Scheer, Nüttgens, et al., 1996). Nowadays, process changes triggered by cost and performance pressures are often driven by technology. Nonetheless, quality and service goals will not be achieved by the mere introduction of technology (Brüggemeier, Dovifat, & Lenk, 2006). The uninterrupted execution of public services coupled with the simultaneous increase in customer orientation, requires an automation of the underpinning public service processes. The optimization of public service processes demands an identification of suitable bundling candidates. For the bundling of processes the identification and selection of appropriate processes is particularly crucial. Yet, this identification of suitable process bundling candidates has proved to be rather complex in practice (Wolf et al., 2009). Even though most of the existing literature addresses the reorganization, optimization or the reengineering of business processes, very little work has been dedicated to the actual identification of suitable process bundles. This state of affairs led us to the following research question: What are the criteria for the identification of suitable process bundling candidates?

The question of “how” to model processes and technical procedures for implementing business process improvements in organizations has been addressed in the literature (Jörg Becker, Algermissen, & Niehaves, 2006; Seethamraju & Marjanovic, 2009). Further, several methods, techniques, and tools have been developed and implemented to support process oriented reorganizations within companies (Jörg Becker, Algermissen, & Niehaves, 2004b; Scheer, Nüttgens, et al., 1996). In recent years, process improvement efforts were also undertaken in the area of public administration. Within the context of public institutions, the discussion of public process improvement is often limited to the provision of online services and public administrations’ internet portals (Lenk, 2002). In the business domain, an abundance of different business process improvement methodologies exist but only a selected few of these focus specifically on process optimization in public institutions (Jörg Becker et al., 2004b; Scheer, Nüttgens, et al., 1996). The theoretical and practical knowledge acquired within the private sector on process improvement has been insufficiently translated and applied into the public sector. Further, the urgent practical challenges faced in the public sector with regards to process improvement have, so far, not been adequately addressed by the relevant academic disciplines. In order to identify a holistic set of criteria for the identification of public service process bundles it is necessary to review common business process improvement methodologies.

We begin this paper by delineating the term process bundling and the undergirding reasons for bundling processes in public administrations. This is followed by a presentation of the method we used for reviewing the relevant literature. We then analyze this literature and

synthesize the results into a methodological intermediary step. Finally, we discuss our findings, outline avenues for future research, and suggest implications for practice.

2. Process bundles in public administrations

2.1. *What is process bundling?*

Bureaucracies are characterized by intense flows of information. Over 90% of all administrative processes are information-processing in nature (N.A., 2009). Due to their large and often redundant number of functions and functional departments, public institutions are likely to be affected by excessive information and data exchanges across functional departments. This situation is caused by the fundamental principles of traditional public administrations: bureaucracy, hierarchical organization, bureaucratic delivery, politics/administration dichotomy, etc. (O. E. Hughes, 2003). Common business concepts such as value creation, competitive edge, or profit maximization are typically not the foci of public administrations (Porter, 1985). Rather, public administrations are concerned with the process and delivery of public services to citizens, businesses and to other governmental institutions. As a result, processes in public institutions need to be understood as reporting duties on the basis of legal requirements (Wolf et al., 2009). From the perspective of public administrations, processes are concerned with monitoring compliance to legal regulations and the execution of public services. Public service processes involve a large number of recurrent activities (Scheer, Nüttgens, et al., 1996; Wolf et al., 2010), extensive integration of customers, and numerous points of interaction (Jörg Becker et al., 2004a). The excessive information and data exchanges in the public sphere create a fertile ground for the bundling of processes.

From a customer perspective, process bundles are created whenever cross-organizational processes are combined or interlinked either organizationally or technically with the objective to create a coherent data base. Hence, a process bundle, within the remit of public administrations, constitutes the purposeful alignment of separate activities, and accordingly processes, along a well-defined value chain (Bundesministerium des Innern, 2005). Let us take the example of a real-estate loan award. Throughout this award process the bank needs to maintain contacts with numerous public institutions which do not necessarily have a technically supported infrastructure and are often dependent on manual labor (i.e., fiscal authorities, notary, land registry, bankruptcy court, etc.) (Fröschle, 2009). The bundling of these activities through technical interlinking would result in the uninterrupted and efficient execution of the loan award process. According to this understanding, process bundling is concerned with changing or redirecting the flow of information between activities without changing the actual content of the information.

2.2. Reasons for bundling

The concept of bundling processes or services is neither new nor revolutionary. Particularly in the service domain, bundling has been on the research agenda for over a decade. Streamlining public service processes also implies streamlining their output, which are in fact, the delivered services. To support our arguments presented in this paper, we would like to draw on some of the knowledge of the service domain on bundling.

Our review of the literature on the service domain disclosed that the rationale behind bundling varies in complexity. Nevertheless, two reasons prevail - increasing profits and saving costs. Due to their nature and tasks, municipalities are non-profit oriented. Hence, increasing profits does not provide an adequate reason to support process bundling in public administrations. Saving costs, on the other hand, is a persistent issue and fundamental aspect of the operation of public institutions. The omnipresent financial restrictions forces municipalities to operate cost-efficiently and customer-oriented. The German government, for instance, anticipates cutting the costs of bureaucracy by over 15% through the implementation of process bundling and the streamlining of processes is expected to result in faster through-put times of administrative procedures (Bundesministerium des Innern, 2006). It has been proposed that cost savings can occur through a joined transaction of the bundle components and their joined distribution (Geng, Stinchcombe, Whinston, & Hendershott, 2006).

Another reason for process bundling is to ease the interaction of public authorities with businesses through the synchronization and integration of processes and IT-applications. To accomplish this, legal regulations and public service processes need to be revised critically and, if necessary, adjusted (Bundesministerium des Innern, 2006). If employed successfully, process bundling yields the electronic and uninterrupted processing of public service processes. Therefore, existing bureaucratic structures need to be reassessed with the aim of creating more effective and flexible organizations via process bundling.

3. Methodology used for the literature review

The literature review comprised two phases: identification and analysis. In the identification phase we identified and selected research studies which discussed process identification criteria. We assembled a comprehensive collection of publications representing the main body of knowledge in this area. The analysis entailed a careful scrutiny of publications to unveil patterns of commonly addressed research themes.

3.1. Identification of relevant literature

Most process reorganization or optimization approaches include a phase for tackling the identification of processes (Davenport & Beers, 1995; Davenport, 1993; Gaitanides, Scholz, Vrohling, & Raster, 1994). The identification of the right bundling candidates is crucial to

the success of process-optimizations and reorganizations (Davenport & Beers, 1995). The bundling of inadequate processes could have extensive implications on the organization's operating capabilities. Frequently, process reorganization or optimization projects are burdened by a plethora of information which makes it difficult to identify suitable process bundling candidates. The potential measures are not only numerous (see Table 24), but some of them are difficult to operationalize in public administrations. Consequently, purposeful bundling requires a set of well-defined identification criteria.

The identification phase commenced with an initial search for publications relevant to process identification and several sources were consulted for this search. The most important sources were academic books, journals and conference proceedings. The search mechanism included identification of keywords such as process identification, integration, selection, and modeling. As a result, we identified an initial set of 36 relevant publications. We then screened this initial set of publications to select the most significant ones. The screening was conducted on the basis of the quality of the research studies, their relevance to process identification, and their citation frequency. The screening cycle yielded a final set of 15 key research studies which represent the basis of the literature review.

3.2. Structuring the review

Criteria for the identification of process integration candidates are both abundant and diverse. As suggested in the literature (Webster & Watson, 2002), we implemented a concept-centric literature review. Based on this review, we conceptualize that the majority of relevant process identification criteria can be categorized according to the following three identification principles: (1) performance, (2) process integration, and (3) complexity (see Table 24). These three categories are not mutually exclusive.

Principle	Criteria	Source
Performance	Through-put time, costs (of bureaucracy), quality, customer satisfaction, value proposition	(Jörg Becker et al., 2004a; Berente, Vandenbosch, & Aubert, 2009; Davenport & Beers, 1995; Gaitanides et al., 1994; Hammer & Champy, 1993; H. J. Harrington, 1991; Scheer, Kruppke, & Heib, 2003; Wolf et al., 2010)
Process integration	Information flow, degree of information integration, timeliness, access, granularity, transparency	(Aubert, Vandenbosch, & Mignerat, 2003; Berente et al., 2009; Klischewski, 2004; Shostack, 1987; Strong, Yang, & Wang, 1997)
Complexity	Number of cases, exceptions, special cases classification of actors	(Jörg Becker et al., 2004b; Gaitanides et al., 1994; Hammer & Champy, 1993; Shostack, 1987)

Table 24: Principles of process identification

4. Analysis - identification of process bundling candidates

A plethora of diverse approaches for improving processes exists in various disciplines. Information systems, industrial engineering, operations research, and management accounting are among the disciplines represented (Davenport, 1993). In the following, we present the results of the literature analysis structured according to these three categories.

4.1. Performance indicators

Parameters assessing the process' performance and efficiency were among the most frequently listed. Nearly all process reorganization and optimization approaches depict criteria influencing the performance of a process. Gaitanides (1994) asserts that optimization potentials can be identified through the analysis of simple data parameters such as throughput time, costs, and quality. Through-put time analyzes the processing time, the transfer time, and the holding time of a process. The primary goal is, of course, the frictionless organization of processes. Therefore, holding times need to be reduced, and unproductive times need to be detected and eliminated. The identification of cost intensive and "non-value" adding processes is the key objective of the cost assessment (Gaitanides, 1983). Higher costs are often caused by redundancies and inefficient workflow between activities. However, obtaining accurate data on costs is often a troublesome and enormous effort (H. J. Harrington, 1991). Various authors have discussed the importance of assessing the costs and time consumed by the execution of a process (Berente et al., 2009; Davenport, 1993; Hammer & Champy, 1993; Scheer et al., 2003). According to Wolf et al. (2010) the identification of processes in public administrations should focus on those processes which produce the highest costs. The Federal Statistical Office, for instance, assesses the expenses for the processing of businesses-to-government (B2G) contacts on the basis of the standard cost model¹². The corresponding data can be extracted from a public database. Various studies have assessed the costs of bureaucracy for specific industries (e.g., chemical industry (Schulze, 2009)).

Quality, as discussed by Gaitanides (1994), measures the error rate of products or services. Quality in this understanding is a measurement for the performance of process outputs, which are either products or services (Davenport & Beers, 1995). For tangible process outputs such as products the error rate is rather easy to assess. Gaitanides (1983) fails to explain how the error rate should be measured in regard to services. Some researchers have attempted to define specific measures of service quality, i.e.: reliability, responsiveness, empathy, assurance, and tangibles (Zeithaml, Berry, & Parasuraman, 1996). Customer satisfaction is often clearly correlated with process quality. Therefore, customer satisfaction constitutes another key indicator for process performance (Davenport & Beers, 1995).

¹² Please refer to this website for a detailed explanation of the standard cost model:

<http://www.normenkontrollrat.bund.de/Webs/NKR/DE/StandardkostenModell/standardkosten-modell.html>

Within the context of customer satisfaction Gaitanides (1983) introduces the concept of value orientation. Value orientation focuses on the affiliation of processes to value chains from the customer's perspective (Gaitanides et al., 1994; H. J. Harrington, 1991). This approach assesses the individual value proposition of each activity to the entire value chain. Thus, all activities of a process must provide value to the production and/or delivery of the product to the customer. Activities that do not support a value chain are either redundant, inefficient, not purposeful, or not profitable (Gaitanides et al., 1994). The value proposition should be defined from the customer's perspective.

4.2. Process integration indicators

As organizations look to improve business processes, an important initial step is to understand the flow of information associated with the processes. Most public service processes stretch across different functional departments. Therefore, they often split across individuals and across time (Berente et al., 2009). The flow of information is interrupted whenever information and data are not available at the required time in a sufficiently detailed manner. Consequently, information integration focuses on facilitating the seamless flow of information. The degree of information integration investigates how informational resources transfer across technical and organizational borders (Jörg Becker et al., 2004a; Klischewski, 2004). Even though information integration constitutes the basis for integrated processes, it is not the only supposition for "fully integrated business processes" (Berente et al., 2009). Other factors, such as the structure or non-ambiguity of data, can be equally influential.

The notion of timeliness in regard to information transfer becomes evident whenever one understands that process integration necessitates information integration. Timeliness assesses if the information is up to date and available at the beginning of an activity (Aubert et al., 2003). This understanding of timeliness assumes that information is accessible. Accessibility, in turn, implies that data need to be accessible from any point within the process (Aubert et al., 2003). The access to information needs to be dependable, convenient, and easily manipulated. Additionally, information needs to be available at the right level of granularity. All information exchanged within the process has to be provided at the right level of detail (Aubert et al., 2003; Berente et al., 2009). Appropriate granularity enables the elimination of extraneous activities that would be required to decompose or summarize the information. The last element concerns the transparency of information. The concept of transparency refers to the ease by which information is passed from one activity to another one (Berente et al., 2009) and implies a shared understanding of models and structure. According to Aubert et al. (2003), there are two ways to achieve transparency; first, through translation among several "languages" or, second, through standardization. Hence, in regard to the transparency of a process, the level of standardization should be analyzed as well.

4.3. Complexity indicators

At their initiation most processes are usually quite simple (Hammer & Champy, 1993) but often grow considerably more complex over time. The more cases, variants, or actors that are involved, the more complex the process grows. Complexity indicators commonly disclose processes that can be simplified through integration.

Organizational complexity is generally examined from two perspectives: the company's side or the customer's side (Shostack, 1987). The latter plays a more prominent role in public reorganizations and optimizations since public service processes are characterized by a high degree of customer integration. The number of cases also increases complexity; for every service delivered on the municipality side there is a user on the citizen side (J. Becker et al., 2012). A high number of user groups yield higher variants within and between the cases. In other words, complexity can be analyzed by the number of steps required to perform a process (Shostack, 1987). When integrating B2G processes, it appears critical to identify processes which affect the same group of users. The identification of users on the business side needs to be based on the type of business affected by the public service process and the role of the users' needs to be identified. Process bundling is generally desirable in areas distinguished by high case volumes and the same group of users. The reorganization or optimization of processes exhibiting a small number of cases, and therefore little complexity, is not desirable (Jörg Becker et al., 2006).

5. Discussion of findings

The analysis of the literature review disclosed that there are at least three major principles (e.g., performance, process integration, and complexity) which support the elicitation of process bundling candidates. As mentioned, these three categories are not mutually exclusive. For instance, if a company embarks on a process reorganization project, performance indicators might be just as important for the identification of integration candidates as complexity or process integration indicators. However, none of the process reorganization and optimization concepts discussed above provide insights on how to prioritize the various criteria. Within this study we identified approximately 16 different criteria for the elicitation of bundling candidates. The analysis of all 16 indicators will not be feasible and purposeful in practice and more criteria might exist that we did not cover in our literature review. Therefore, it is extremely important to provide practitioners with guidelines on how to purposefully identify bundling candidates.

Our literature analysis also showed that the identification of adequate candidates for purposeful process bundling is not as straightforward as it may sound. Particularly within the complex setting of public institutions the existing set of identification criteria can be rather misleading. Current approaches to process identification promote a bottom-up identification of potential bundling candidates. These approaches start the identification process by

choosing one or a selected number of processes that exhibit the greatest malfunctions. Accordingly, the improvement process always has one specific process as a starting point without providing a holistic picture of the process landscape. Process bundling is essentially concerned with changing or redirecting the flow of information between activities without changing the actual content of the information. In order to identify inefficiencies between processes one needs to study the corresponding information flow (Klischewski, 2004). But none of the previously mentioned identification criteria support the comprehensive screening of several hundred public service processes. Based on the existing approaches, screening all public processes would be extremely time consuming and cost intensive. A top-down identification approach is needed within the public sphere in order to investigate the complex information flow between functional departments and companies and to identify relevant bundling candidates. Despite the abundance of existing identification criteria, we posit that the current set of criteria does not suffice and a top-down identification approach is necessary.

6. Synthesis – introducing a methodological intermediary step

Within this section, we synthesize the analysis of the identified literature into a proposal for a methodological intermediary step in process bundling. This intermediary step addresses primarily the identification of B2G contacts. B2G contacts are commonly characterized by a higher degree of frequency and repetitions than citizen-to-government (C2G) contacts. The processing of B2G contacts requires a considerable amount of time and resource capacities in companies which in return leads to higher costs of bureaucracy. By optimizing B2G processes, monetary and efficiency benefits can be achieved for both sides: companies and public administrations.

We propose that the identification and analysis of public service processes needs to encounter a top-down perspective. Tailoring the identification of processes to a superordinate principle (e.g., content, context, or business event) would yield a more anchored approach and account for the top-down perspective. We therefore propose a methodological intermediary step that promotes first a focus on primary process bundling principles and then on the commonly known identification criteria. In this view, primary principles are to be considered before secondary ones (see Figure 13). Primary bundling principles assess the similarity or complementariness of the future process bundles in regard to their content, context, or a specific business event. It is crucial to understand that only one primary principle at a time can be pursued (Wolf et al., 2010). For instance, either the shared content or the shared context of processes can serve as the basis for further analysis. Processes with a similar or complementary content, even across departments, can then be analyzed in regard to their performance, efficiency, and complexity. The content and context based bundling principles stem from the feasibility studies (Fröschle, 2009; Wolf et al., 2009) funded by the German Federal Ministry of the Interior in 2009.

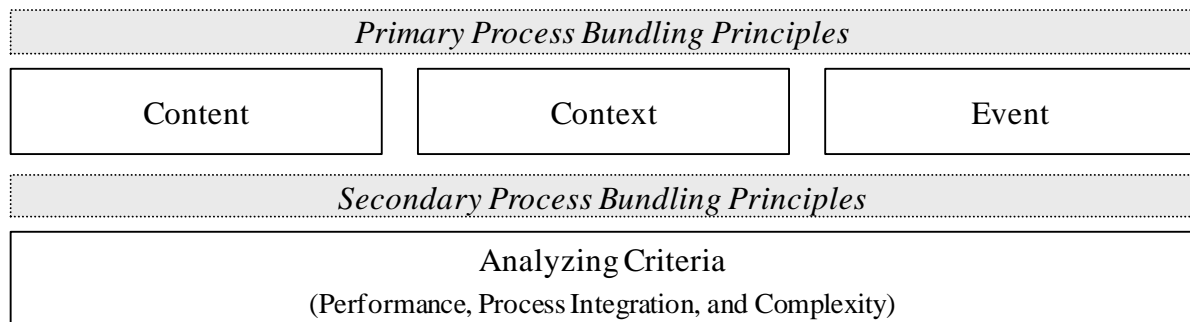


Figure 13: Primary and secondary process bundling principles

6.1. Context based bundling

Various value adding and support processes exist within companies that have multiple interfaces with public administrations. For instance, the award of a property credit exhibits contacts to the local tax office, the notary, the land registry office, and the bankruptcy court (Fröschle, 2009). The context based bundling principle aims at guarantying the seamless flow of business processes and B2G contacts are bundled along the process flow. The key integration criterion for context based bundling is the affiliation of B2G contacts to business processes or process clusters. Subsequently, the identification of processes depends on their value adding context. There are various examples on how to identify bundling candidates based on their context affiliation. For instance, Fröschle et al. (2009) examine B2G contacts of financial service providers on the basis of an industry specific process landscape. The affiliation of B2G contacts to the same process cluster within the process landscape is used as an initial identification criterion. This context based affiliation helps the researcher in the identification and selection of process bundling candidates. In short, the context based bundling aims at identifying B2G contacts on the basis of their affiliation to a business process or cluster. Hence, this bundling principle necessitates the mapping of B2G to affiliated processes.

6.2. Content-based bundling

Currently, the contacts of German companies with public administrations are characterized by a plethora of similar reporting and notification duties. The content-based bundling principle assumes that these similar reports and notifications can be bundled based on their compatible content. The content-based bundling principle aims at reducing the efforts needed to produce these reports and notifications while simultaneously guaranteeing and potentially increasing their quality. Content-based bundling focuses on exposing data and content redundancies between B2G processes. In this view, content and structural similarities of B2G processes are crucial for the purposeful identification of bundling candidates (Wolf et al., 2009). In order to efficiently bundle B2G contacts according to the content principle, the following conditions have to be fulfilled: (1) the contents of the processes exhibit a certain degree of similarity or redundancy, (2) the same user group, or companies respectively, have to be affected by the

B2G contacts, (3) the direction of the information flow has to be congruent (e.g., in all cases from businesses to public administrations) (Wolf et al., 2009). These three conditions assure that synergies are used purposefully.

6.3. *Event-based bundling*

The event-based bundling principle assumes that certain business events recur in the life cycle of a company. These specific business events determine when companies need to get in touch with public administrations (von Lucke, 2008). Examples of such events in the life cycle of a company are the registration of a business or the merger with another company. Both events force the company to get in touch with multiple functional departments in the public administration. The idea is to streamline these event-based B2G contacts in order to reduce processing errors and efforts on the side of the company. The bundling of business event contacts could potentially result in one government point of contact for the company. Event-based bundling is also discussed within the service domain where components are bundled based on their affiliation to a specific event. The event-based bundling principle has its theoretical foundations in the concept of one-stop government. One-stop government also assumes that information can and should be structured according to certain life events (Lebenslage).

7. Conclusion

From our research we have determined that the combination of primary and secondary process bundling principles posits a collectively exhaustive lens for the purposeful identification of B2G processes. We employed a rigorous procedure that generated the identification and analysis of 36 scholarly articles and books. These literature sources provided evidence that secondary identification principles are commonly comprised of performance, process integration, and complexity indicators. The mere employment of secondary identification criteria does not yield purposeful bundles of public service processes. The proposed methodological intermediary step which introduces content, context, and events as primary process bundling criteria fills this gap in current process identification research.

As practitioners look to improve public service processes, our research suggests that they should first focus on primary process bundling principles (e.g., content, context, and event). These principles would enable them to identify which processes can be bundled together while simultaneously providing insight on potential areas for improvement. Secondary process bundling principles support the elicitation of concrete weaknesses and discontinuities within and between processes. The introduction of public service process bundling is expected to reduce the amount of recurrent activities within public administrations. We suspect that the bundling of service processes will lead to fewer points of contact between businesses and public administrations which would in turn lead to cost reductions for both involved parties.

Multiple directions for further research exist. First, the purposeful identification of process bundling candidates remains ill-defined and should be exposed to more structured scrutiny. Second, the newly developed primary bundling principles need to be analyzed and further validated. Third, the transferability of bundling principles for the analysis of C2G contacts needs to be investigated.

Publication 6

Bundling Processes between Private and Public Organizations: A Qualitative Study¹³

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Abstract

Businesses are aching under the burdens entailed by public reporting duties while public administrations are faced with rising cost pressures. Fostered by the diffusion and maturation of information technology, businesses put forth growing demands in regard to the quality, integration and usability of public services. An effective means of meeting these challenges is through the identification and bundling of processes caused by reporting duties. Incorporating corresponding concepts from the business sector, we set out to develop an approach for process bundling tailored to the peculiarities of public organizations. We demonstrate the approach on the example of waste management reporting duties. We aim to provide guidance for practitioners striving to optimize information flows and reduce redundancies within B2G contacts. As a result, both public administrations and businesses may benefit from a more straightforward and cost-efficient provision of public services.

Keywords: process bundling, public administration, e-government, waste management

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1. Introduction

E-Government aims at improving the relationships that public administrations hold with their customers by providing more efficient and effective services (Hughes, 2003). Many E-Government efforts are enabled by information technology, which provides the possibility to automate public service processes. It allows for the uninterrupted execution of public services and processes, accompanied by a simultaneous increase in customer orientation.

As citizens and businesses are demanding greater customer orientation and an integration of their needs, public administrations are forced to adjust their ways of providing services and processes. Concurrently, public institutions are faced with constant cost and performance pressures, which render swift action even more imperative. On the other hand, businesses are heavily burdened by administrative duties entailing significant expenses. Specifically, in 2008, the Federal Statistical Office in Germany identified 9,324 reporting duties between businesses and governmental institutions in Germany. Bureaucratic expenses for reporting duties on part of the German economy total approximately 47.6 billion Euros annually (Federal Statistical Office of Germany, 2009). While 22.5 billion Euros are accounted for by national legislation, 25.1 billion Euros are spent to fulfill EU- and international regulations. Consequently, businesses are growing dissatisfied, accusing their local and national governments of practicing insufficient transparency and following antiquated structures (Rodenhagen, Diekhans, & Rieckmann, 2009). These developments call for a change in how public administrations deliver value to their customers. Analyzing and optimizing the processes underlying public services can present a first step towards more customer orientation.

In the business sector, there has been significant research into process improvement, process modeling, and process-oriented reorganization (Becker, Algermissen, & Niehaves, 2004, 2006; Scheer, Nüttgens, & Zimmermann, 1996; Seethamraju & Marjanovic, 2009). This is reflected in an extensive base of knowledge and experience concerning business process reengineering (BPR) and similar measures. In contrast to the business domain, public administrations do not have a comprehensive array of methodologies for process change at its disposal (Becker, et al., 2006; Scheer, et al., 1996). Consequently, it seems reasonable to turn to the business sector for guidance on this issue. It becomes apparent, however, that BPR-related approaches do not necessarily lend themselves easily to corresponding applications in the public sector (Jurisch et al., 2010). In particular, bureaucratic principles impose unique requirements and restrictions on any potential process changes, as does the concept of federalism. Since public administrations are inherently characterized by regulations, differing jurisdictions, and multiple levels of administration, it demands for a dedicated approach to process improvement. In order to accommodate the unique needs of the public sector, we set out to derive a more targeted approach named process bundling. This leads us to our first research question: *(1) How should a purposeful approach for improving processes between public administrations and companies be structured?*

Prompted by aforementioned practical issues observed in the field of public administration, our research aims to enable practitioners to improve upon these conditions. In order to ensure the feasibility of our recommendations for practice, we complete our analysis by examining the question: *(2) How should this approach be applied to a concrete domain setting and what benefits may be expected as a result?*

We will begin by introducing and defining the term process bundling as well as the underlying motivations for process bundling in public administrations. Subsequently, we will provide theoretical background on the issue of identifying suitable processes as candidates for bundling. This step will comprise an analysis of current criteria as well as the introduction of an additional set of identification principles. Incorporating these results, an approach to process bundling in the domain of public services will be proposed and subsequently applied in the field of industrial waste disposal in Germany. We will conclude with a discussion of our findings and implications for both practice and future research.

2. Process bundling

2.1. What is process bundling?

Traditional public administrations exhibit a variety of common principles, including bureaucracy, hierarchical organization, bureaucratic delivery and the dichotomy of politics and administration (Hughes, 2003). These features result in an occasionally excessive number of functions and departments within those entities. This results in a myriad of information flows and data transactions within these institutions as well as in cooperation with business actors. Reportedly, tasks related to information-processing comprise over 90% of administrative processes (Federal Government of Germany, 2010b).

Common business concepts such as value creation, competitive edge, or profit maximization (Porter, 1980) are typically not the foci of public administrations. Legal regulations form the basis of public institutions' actions, mandating them with the delivery of public services to citizens, businesses, and other governmental institutions. Hence, public administrations create processes which aim to implement public services and monitor compliance to legal regulations. Public service processes entail a plethora of recurring activities (Scheer, et al., 1996; Wolf, Jurisch, & Krcmar, 2010), substantial user integration as well as a variety of contact points (Becker, et al., 2004). As such, they feature significant potential for improvements enabled by process bundling.

Within the context of public administrations, process bundles serve to align distinct activities and their resulting processes along a well-defined value chain (BMI, 2006a). Hence, process bundling aims to integrate cross-functional or cross-organizational processes by instituting a common data base, linking processes organizationally or technically. As an example, we may regard the process of awarding a loan. Over the course of this transaction, the bank in charge communicates with several public institutions. These institutions often lack technically

supported infrastructure, consequently depending on manual labor (i.e. fiscal authorities, notary, land registry, bankruptcy court, etc.) (Fröschle et al., 2009; Sharafi, Wolf, & Krcmar, 2010). The integration or interlinking of these processes by means of a process bundle would alter or redirect information flows without changing any of their actual content. This would facilitate a smoother and more efficient handling of the loan award process.

2.2. Reasons for bundling

The concept of bundling processes or services is neither new nor revolutionary. Particularly in the service domain, bundling has been on the research agenda for over a decade. Our review of the literature on the service domain disclosed that the rationale behind bundling varies in complexity. Nevertheless, two reasons prevail – increasing profits and saving costs (Jurisch, Wolf, & Krcmar, 2010). As they are mostly non-profit oriented, public administrations typically focus on the latter and strive to align their operations in a cost-efficient and user-oriented manner. Limited yearly budgets are presumably the most intrinsic constraint faced by public institutions. The German government puts high hopes in the effects of process bundling, expecting to cut bureaucracy costs by over 15% (BMI, 2006b). It is contended that the joined transaction of bundle components as well as their joined distribution may result in cost savings (Geng, Stinchcombe, & Whinston, 2006). Moreover, it is desired to decrease through-put times by streamlining administrative processes.

Further, process bundling may facilitate the interaction of business and public authorities by integrating and aligning processes and corresponding IT systems. This requires a purposeful overhaul of legal regulations and public service processes (BMI, 2006b) in order to achieve an IT-supported and continuous execution of these processes. The revision of current bureaucratic structures and the subsequent bundling of processes may increase organizations' effectiveness and flexibility.

3. An approach for public service process bundling

In order to provide valuable guidance for process bundling in the field public administration, we developed an approach to support the bundling of public service processes. The approach consists of four main phases, each comprising a varying number of steps: Domain Analysis, Process Analysis, Process Bundling and Multidimensional Cost-Benefit Analysis (see Figure 14). Further, it is designed to serve as a model for systematically bundling processes in order to increase their integration within the respective institution or across external value chains. Before demonstrating the approach by means of a qualitative study in the next section, we will elaborate on each of the phases in the following.

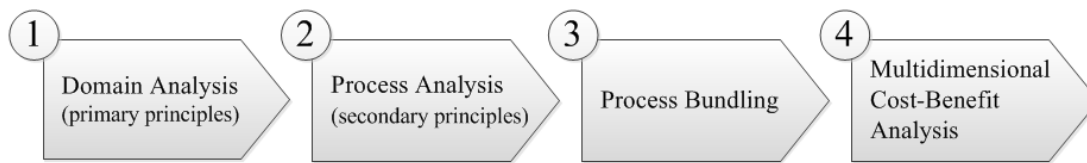


Figure 14: The four phases of public service process bundling

3.1. Domain analysis

Process bundling aims to change or redirect information flows between activities in order to increase their efficiency without changing the actual content of the information. In order to detect inefficiencies, researchers need to study the corresponding information flows (Klischewski, 2004). Obtaining a comprehensive knowledge of the interacting information flows demands for the screening of a large number of processes. The bottom-up process analysis employed by many BPR-related approaches (Bititci & Muir, 1997; O'Neill & Sohal, 1999) is very expensive and time-consuming. Hence, we posit that a top-down approach (Chourabi, Mellouli, & Bouslama, 2009) is needed in order to account for the special needs of the domain of public administration. By allowing for a bird's eye view, it enables researchers to preselect processes based on a set of primary bundling principles.

In the following, we will introduce the primary principles of content-, context- and event-based bundling. The application of these superordinate principles makes for an early structuring of the considered field. Instead of delving into detailed analysis right off the bat, researchers may save resources by delimiting the field early on and highlighting processes which warrant in-depth analysis. An essential trait of this approach is that one is limited to the use of a single primary principle, i.e., processes cannot be structured by their context- and their content-related similarities at the same time (Jurisch, et al., 2010).

We will focus on the identification of business-to-government (B2G) contacts, as they generally occur with higher frequency and repetition than citizen-to-government (C2G) contacts. Significant savings in regard to bureaucracy costs may be induced by B2G process changes, for these contacts constitute a rather time- and resource-consuming task on part of the affected companies.

3.1.1. Context-based bundling

One way of identifying suitable bundling candidates is to analyze B2G contacts according to their affiliation with a certain business process. As value adding and support processes frequently feature several points of contact with public administration, it is expedient to bundle these contacts along the process flow. When applying for a loan, for instance, a

business is bound to contact several entities of public administration: the local tax office, the notary, the land registry office, and the bankruptcy court (Fröschle, et al., 2009). By associating B2G contacts with the respective encompassing process – in this case the loan award process – it is possible to structure them in a way that is more congruent with their business context. As an example of this method, Fröschle et al. (2009) use an industry specific process landscape in order to analyze B2G contacts of financial service providers. By identifying contacts which belong to the same process cluster, they obtain a basic structure for identifying processes as bundling candidates.

In summary, the identification of bundling candidates from a context-based view is guided by their affiliation to business processes or process clusters, e.g. their value-adding context. Consequently, employing this principle entails the mapping of B2G contacts to affiliated processes.

3.1.2. Content-based bundling

The content-based bundling approach aims to bundle processes which are similar in regard to their content. Due to the large number of B2G reporting duties in Germany, many reports overlap in regard to the information they provide, exhibiting potential for the integration of information flows. By bundling processes containing similar information, it is possible to remove redundancies among these information flows (Katzenstein & Lerch, 2000). This enables businesses to lower their expenses incurred by bureaucracy. Simultaneously, the consolidated set of processes is less prone to produce incorrect information or data inconsistencies, thereby increasing information quality (Lee, 2004). In order to ensure the suitability of the bundling set, three conditions need to be met: (1) the contents of the processes exhibit a certain degree of similarity or redundancy, (2) the same user group, or companies respectively, have to be affected by the B2G contacts, (3) the direction of the information flow has to be congruent (e.g. in all cases directed from businesses to public administrations).

3.1.3. Event-based bundling

The selection of processes from an event-based point of view aims to structure public services according to typical and recurring business events. Such events may include the acquisition of a subsidiary or the application for a building permit. The occurrence and frequency of such events determine when businesses need to contact public administration (von Lucke, 2008), which often entails dealing with various functional departments or agencies. The aim is to enable public administration to provide a single point of contact (Wimmer & Tambouris, 2002) by restructuring information flows. This reduces expenses on part of the company and may increase information quality by removing any potential for redundancies and duplicate data.

Concluding the Domain Analysis, the categorized B2G contacts are filtered and selected based on the applied primary bundling principle. Thus, the selection of candidates for detailed analysis finalizes the results of the Domain Analysis phase, yielding the input for the Process Analysis phase. The B2G contacts identified by means of the process library mark a starting point for the creation of consolidated process chains.

3.2. *Process analysis*

Having delineated the field of potential bundling candidates in the preceding phase, researchers may now analyze the remaining processes in more detail from a bottom-up perspective. In contrast to the top-down criteria, the three criteria performance, integration and complexity may be evaluated side by side for each process.

The purpose of the Process Analysis is to collect detailed information on the considered B2G contacts in order to identify conditions and requirements pertaining to their bundling. Subsequently, it is possible to narrow down and further structure the field of contacts by employing process evaluation criteria. This phase is split into two steps of information collection, (1) functional analysis (Chourabi, et al., 2009; Handfield & Nichols, 2002; Harmon, 2003; Lacerda, Cassel, & Rodrigues, 2010) and (2) technological analysis (Kettinger, Teng, & Guha, 1997), and one step of information utilization, (3) selection of candidates for bundling (Schwabe & Krcmar, 1996). While the former aspect calls for analysis on the functional level, the latter deals with technological conditions and requirements, which further qualify and restrict bundling potentials. These two steps of information collection yield one as-is profile for each considered process, enabling the researchers to purposefully select a final array of processes for bundling. In the following, we will describe the three steps of this phase in more detail.

The functional analysis breaks down information flows between businesses and public administrative entities, producing a detailed description of each process. Information is collected through legal regulations and forms. Further, in order to provide a basis for the selection of processes, it is essential to collect several attributes relating to conceptual, legal and cost perspectives. In addition, process dependencies, bureaucracy costs according to the Standard Cost Model¹⁴ (Wolf et al., 2009), the number of businesses impacted by the process and further properties are recorded. In order to refine our search for suitable bundling candidates, we utilize process evaluation criteria as secondary bundling principles. These principles include the criteria performance, complexity and integration. Indicators evaluating a process' performance are frequently employed by process reorganization and optimization approaches. Opportunities for optimization may be uncovered by analyzing parameters such as through-put time, costs, and quality. Frequently, customer satisfaction is considerably correlated to process quality, representing another key indicator for process performance (Davenport & Beers, 1995). The concept of process integration may be used as another

¹⁴ For additional information visit <http://www.administrative-burdens.com> by the SCM network.

principle for prioritizing the identified bundling candidates. This approach entails the examination of information flows associated with the respective processes, highlighting criteria such as information integration, timeliness, accessibility, granularity and transparency (Berente, Vandenbosch, & Aubert, 2009). Complexity indicators serve to highlight bundling candidates by considering the number of cases, variants, and actors involved in a process. When identifying process bundles in public administration, it is desirable to select processes featuring high case volumes and the same group of users. Criteria of these three groups may be employed side-by-side and are thus not mutually exclusive.

The technological analysis serves to examine the extent to which the B2G contacts in question are currently supported by IT infrastructure, enabling researchers to deduce restrictions and possibilities for future process bundles. This includes an analysis of information systems on both the business and the government side and their interoperability (Klischewski, 2004), including interfaces for data exchange, transport protocols and data formats. The required information may be gathered by working through, among others, legal regulations, public documents, product and system descriptions, interface specifications as well as by conducting interviews.

Having compiled an as-is profile for each of the processes, the researchers may now proceed to the selection of candidates for bundling. In this step, one or multiple final sets of suitable bundling candidates are selected. Each process comprising these sets will be assigned its as-is profile, which is to be merged and transformed into a common, overarching to-be profile in the next phase. The selection of candidates is based on the secondary bundling principles introduced above. In contrast to the primary bundling principles, the secondary principles are not mutually exclusive but may be regarded side by side within a single analysis. Employing the information contained in the as-is profiles, it is now possible to assess each B2G contact in terms of performance, process integration and complexity. For instance, in order to elicit suitable sets of bundling candidates, it is advisable to select processes with a high degree of routine, a large number of affected businesses and a significant cost value as assessed by the SCM. Moreover, it should be assured that there are no other concerns prohibiting a successful bundling activity, for instance in regard to the IT infrastructure (Al-Mashari & Zairi, 1999; Broadbent, Weill, & St.Clair, 1999; Harmon, 2003). The bundling sets thusly validated will serve as input for the subsequent phase of Process Bundling.

Concluding, the Process Analysis provides a final list of bundling candidates selected by means of the secondary bundling principles as well as an as-is profile illustrating further details about each of the candidates' properties, inner workings and implications.

3.3. Process bundling

The Process Bundling phase is concerned with combining the selected bundling candidates into appropriately structured process bundles. These bundles need to fulfill all functionalities

encompassed by the present process landscape. The phase comprises the three steps of requirements specification, functional conception and technological conception.

This phase is inspired by the DeMarco's (1978) "Structured Analysis". Similar approaches have been introduced by Ross and Schomann (1977) and Mac Menamin (1988). According to their propositions, a system is to be assessed first by an analysis of its processes. Subsequently, changes are proposed and integrated into the target model (DeMarco, 1978).

Especially from a functional point of view, the as-is profiles created in the previous phase serve as a basis for the step of requirements specification. It is advisable for the researchers to enhance this foundation by incorporating additional expert opinions (e.g. through interviews), thereby acquiring supplemental insight. Also, data security and data protection issues require thorough consideration (Garcia, Maciel, & Pinto, 2005). Requirements specification occurs on several levels, setting demands for the to-be profile by incorporating process-related, technology-related, legal and actor-related aspects. Finally, it is crucial to involve representatives of all affected processes in order to obtain an aligned set of requirements as well as to ensure actor commitment (Janssen & Cresswell, 2005). Based on this information, it is possible to create a first draft for the to-be profile of the emerging process bundle. This to-be profile may be presented to the previously consulted experts in order to obtain their judgment and possibly initiate any necessary adjustments.

Oftentimes, a process bundle comprises one or multiple processes which serve to accumulate data and one or multiple other processes which combine, filter or aggregate these data. The functional conception aims to coordinate and align these data flows while adhering to legal regulations and time dependencies. Thus, it is possible to obtain a process chain illustrating all requirements collected up to this point.

The technological conception strives to create an additional perspective by describing the technological workings and implications of the proposed process bundle. This description is based on the data collected in the second phase, Process Analysis. In order to automate any points of contact between the processes, it is necessary to integrate the respective information systems, aligning any relevant interfaces and data formats (Lam & Shankararaman, 2004; Vernadat, 2002). Within this step, an assessment can be made about the current situation pertaining to systems integration, possibly highlighting issues which need to be addressed on either side in order to implement such integration. Further, the technological conception acts as a valuable tool of visualizing information flows by representing message and information transfers between different actors and systems, for instance by means of the Business Process Modeling Notation (BPMN). These efforts yield a comprehensive specification of the to-be profile, providing a foundation for the Multidimensional Cost-Benefit Analysis in the last phase.

3.4. Multidimensional cost-benefit analysis

Our original intent for creating a structured approach for process bundling was rooted in the aim of cutting costs and reducing redundancies in the public sector. In order to assess the degree to which the proposed to-be profile will presumably be able to meet these and other notable criteria, it is advisable to examine its potential by means of a Multidimensional Cost-Benefit Analysis. The purpose of this analysis is to evaluate and prioritize any proposed bundling scenarios in regard to their potential benefit. Benefits as well as restrictions may be derived in several areas, including economic, organizational and process-related, technological and legal aspects.

As our efforts were initiated with the focus on reducing bureaucracy costs, we will heavily emphasize economic aspects when assessing a proposed process bundle. Hence, prospective cost savings play a crucial role in rating and prioritizing bundling endeavors. It is feasible to deduce the savings potential by identifying the relevant processes in an SCM database and cumulating the corresponding costs of dispensable processes. Yet, estimates collected in this manner will likely represent an approximation rather than a precise measurement (Nijsen, 2009) and may not be accurate in some cases (den Butter, de Graaf, & Nijsen, 2009). If such numbers are not available, they may be obtained by interviews with affected companies or similar techniques.

From the organizational and process-related point of view it is relevant to evaluate the degree to which processes are covered by IT as well as to assess the extent of data reuse. Other points of evaluation are the reduction of errors, the increase in interconnectedness, and the quality of the data (Andersen, 2004) on part of the public service provider. Further important benefits from this perspective include more transparent information flows and a quicker handling of transactions (Andersen, 2004) and decisions by the public institution.

The last two perspectives mainly deal with potential restrictions rather than benefits. These restrictions need to be evaluated as to whether they conflict with the proposed process bundle. From a technological perspective, it is necessary to analyze whether the to-be profile may be realistically created from the current IT situation, regarding both cost and time issues. Finally, legal restrictions may hinder the implementation of the to-be profile (Alpar & Olbrich, 2005). For instance, privacy and data security concerns may prohibit the sharing and reuse of certain information across different public institutions.

Generally, the criteria evaluated in the benefit analysis should be kept on a medium level of detail since in-depth data is often not obtainable in the planning phase. The benefit analysis does not synthesize all evaluation perspectives into one final rating, enabling the participating actors to weigh each dimension according to the demands of the specific environment. Concluding, the benefit analysis serves as a final assessment of the to-be profile. As a result, non-lucrative bundling scenarios may be abandoned, whereas a suitable order of implementation may be determined for the ones remaining.

4. Application – Process bundling in industrial waste disposal

In order to illustrate the preceding theoretical observations and the proposed process model, we conducted a case study on environmental reporting duties of businesses in Germany. The specific aim in this case study is to design a more efficient way of reporting a specific type of environmental data to governmental institutions.

4.1. Research design

Glaser and Strauss (1967) encourage researchers to incorporate multiple data collection techniques to ensure for data triangulation. More so, multiple sources allow for the consideration of multiple viewpoints from which a phenomena can be analyzed, substantiated, and its properties be developed (Glaser & Strauss, 1967). Our data collection strategy encompassed semi- structured interviews, process modeling, and document analysis.

We conducted a series of 18 semi-structured interviews with 15 experts over a 24 months-timeframe. Here, qualitative expert interviews allowed for the gathering of rich data and the construction of a deeper understanding of the phenomenon under investigation. The participating experts were identified through a convenience sampling procedure. The European Pollutant Release and Transfer Register formed the basis for our sampling selection. It enabled us to narrow down the population to a total of 36 companies, all involved in the industrial disposal of hazardous and non-hazardous waste. We contacted senior-management and other personal responsible for issuing reporting duties in each company. Out of the initial set of 36 companies, we were able to conduct semi-structured telephone interviews with 11 of them. In addition to private companies we also held 6 interviews with 3 public administrations on the national and state level. Furthermore, we conducted 1 interview with a state-level Chamber of Commerce. Each interview lasted approximately 45 minutes. The interviews began by asking broad questions about the required waste disposal reporting duties, before proceeding to ask more specific questions about the time and resources needed to administer them. Based on the specialization of the expert the interview focused on a certain aspect of the process bundling approach (see Table 25). All interviews were tape-recorded and transcribed. The transcripts were then analyzed and coded.

Expert ID	Affiliation	Interview Background	Interview Rounds	Primary Interview Content
Expert 1	Private Company	Telephone	1	Process Analysis
Expert 2	Private Company	Telephone	1	Process Analysis
Expert 3	Private Company	Telephone	1	Process Analysis
Expert 4	Public Administration	Face-to-face	2	Domain Analysis Process Bundling
Expert 5	Public Administration	Face-to-face	2	Domain Analysis Process Bundling
Expert 6	Public Administration	Face-to-face	2	Domain Analysis Process Bundling
Expert 7	Private Company	Telephone	1	Process Bundling
Expert 8	Chamber of Commerce	Face-to-face	1	Domain Analysis
Expert 9	Private Company	Telephone	1	Benefit Analysis
Expert 10	Private Company	Telephone	1	Process Analysis Benefit Analysis
Expert 11	Private Company	Telephone	1	Benefit Analysis
Expert 12	Private Company	Telephone	1	Benefit Analysis
Expert 13	Private Company	Telephone	1	Process Analysis Benefit Analysis
Expert 14	Private Company	Telephone	1	Benefit Analysis
Expert 15	Private Company	Telephone	1	Benefit Analysis

Table 25: Summary details of the sample interviewed

4.2. Application domain environment

Today, the waste disposal sector in Germany comprises more than 160,000 employees as well as a turnover of about 40 billion Euro (German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, 2009). Since the year 2000, the quantity of dangerous waste

has risen from 15 to 20 million tons a year. Therefore, 250,000 companies and 320 authorities create and deal with approximately 10,000 records of proper waste management, 3 million data sheets and 14 million dock receipts concerning the waste notification system (Schwarz & Hoffmann, 2009). According to the Federal Statistical Office, 214 reporting duties were identified concerning the industrial sector “wastewater, waste and miscellaneous waste disposal” (Federal Statistical Office of Germany, 2008). Through a detailed consideration of each duty regarding corresponding bureaucracy, it is possible to allocate specific costs to 177 reporting duties. In total, these processes cause bureaucracy costs of 176.9 million Euro (Federal Statistical Office of Germany, 2008), demonstrating the relevance of achieving and measuring cost reductions. After a brief explanation of 3 processes analyzed in our case study, the applied Process Analysis explores the listed processes in more detail. The goal is to identify concrete links between these processes which enable the creation of integrated process bundles.

4.3. Application of the analysis approach

Having established the conceptual groundwork, we will now move on to apply our analysis approach in the industry sector of waste disposal in Germany. For our concrete domain, this will entail a domain analysis in the field of environment and the creation of three as-is profiles, one for each of the processes selected for the proposed process bundle. This is followed by the creation of one to-be profile for the process bundle and a concluding benefit analysis (see Figure 15).

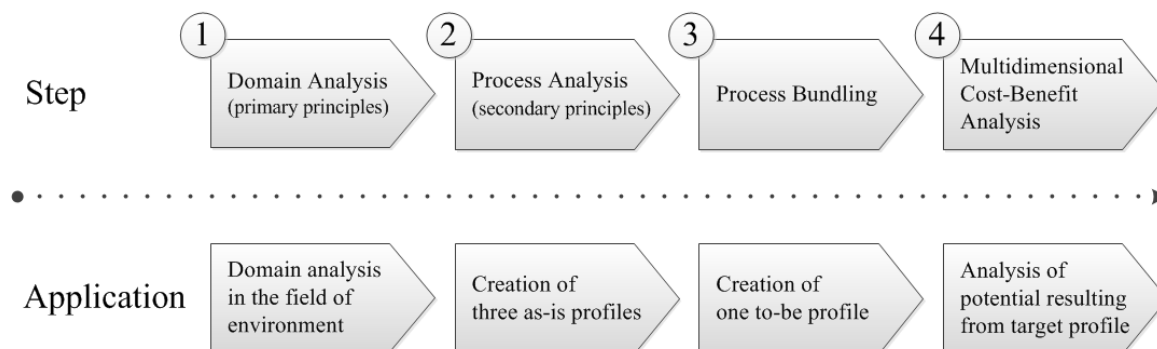


Figure 15: Process bundling applied to the domain of waste disposal in Germany

4.3.1. Domain Analysis

As elaborated above, the concept of primary bundling principles requires us to regard the respective processes from a content-related, a context-related, or an event-related perspective. Assuming many of the considered environmental reporting duties to be similar, we decided in favor of the content-related perspective in order to select bundling candidates most effectively. Thus, by measuring similarity of reporting duties, including their structure and

data content, we were able to uncover redundancies and other inadequacies. This provided us with the opportunity to create a more efficient design for these reporting duties.

Marking the start of our investigation, the task analysis served to delineate the scope and type of tasks to be considered. As part of our information search we examined legislative specifications and statutes in the field of environmental protection and environmental agencies. We used various types of documents as sources for our document analysis, among them process descriptions, legal documents and regulations, organization and task plans, workflow diagrams, descriptions of the IT architecture, and reports concerning the fulfillment of the designated reporting duties. Based on this analysis, we identified typical mandatory reporting duties relating to waste disposal and environmental concerns, which resulted in a list of B2G processes.

During the general work process analysis, we discerned between different types of reporting duties, such as reports, applications and notices. Further, we considered content-related similarities of the processes, employing content as the primary bundling principle. Based on a domain model for environment compliance (Krcmar, Dold, Fischer, Strobel, & Seifert, 2000), we first categorized processes by the type of substance they reported on (e.g. waste, wastewater) and subsequently by their object of reporting (e.g. quantity, pollutants). As a result, we received a table with all remaining relevant processes as well as additional information for each process (such as type of report, type of substance, legal basis etc.).

We completed the Domain Analysis phase by assigning relevant actors to each analyzed B2G contact in the step of interaction analysis. The interaction analysis was mainly based on knowledge gathered during document analysis, especially from legislative specifications and forms used in the domain.

Throughout the course of the Domain Analysis, we managed to identify 339 processes between businesses and public entities. We collected these processes in a data library, enabling us to analyze and select processes based on certain attributes (e.g. common legislative basis, involved actors). Part of the library is shown in Figure 16.

No.	Processes domain environment	Classification			Involved actors (business)			Involved actors (government)			Legislative basis
		type (request/ report/ notification)	type of substance	object	producer	transporter	waste disposal contractor	Licensing authority waste	Licensing authority facility	State Office for Statistics	
34	waste report to PRTR (Pollutant Release and Transfer Register)	report	waste	quantity, type of waste	x		x		x		European PRTR Regulation (E-PRTR-VO VO 166/2006 EU)
89	environmental statistic report waste disposal	report	waste	quantity, type of waste			x			x	German Environmental Statistical Law (UStatG)
239	verification about the disposal of (dangerous) waste	notification	waste	quantity, type of waste	x	x	x	x			Ordinance on Waste Recovery and Disposal Records (Nachweisverordnung - NachwV)

Figure 16: Process data library – part of the resulting list through the domain analysis

The resulting compilation of processes formed a basis for the subsequent selection of candidates for detailed analysis. By applying filters to our process library created in the previous steps, we were able to cluster processes with a similar structure and content (e.g. type of concerned substance, involved actors, reporting period). In regard to the type of substance to be reported on, we encountered the largest grouping within the field of reporting duties concerning the waste disposal management sector. Three of them were strikingly similar in their content, for they all dealt with type and quantity of waste. These three reporting duties included eANV, PRTR and the environmental statistic report, which we introduce in the following.

4.3.2. German Electronic Waste Notification System (eANV)

All involved actors (producer and transporter of waste, waste disposal contractor, public authority) are obliged to complete a so-called “waste data sheet”. Besides information about type and quantity of waste, it also contains information about the participating waste disposal partners and the actual transaction (Federal State Office for Nature, the Environment and Consumer Protection in North Rhine Westphalia, 2009). Hence, every involved actor is bound to adhere to certain regulations which mandate the creation, completion, or storage of corresponding waste data sheets (Federal State Office for Nature, the Environment and Consumer Protection in North Rhine Westphalia, 2009). Consequently, many procedures with almost identical task structures seem to appear regularly. While the content of the forms is quite similar, there are different formats (paper based forms etc.), varying levels of detail and partially different addressees. The electronic waste notification system (eANV) was introduced in Germany in April 2010 (legislative basis § 45 Abs. 2 KrW-/AbfG). The previous non-automated waste notification system frequently caused redundancies as well as inconsistencies concerning the data collection, resulting in avoidable administrative costs.

4.3.3. E-PRTR

The aim of the introduction of the European Pollutant Release and Transfer Register (E-PRTR) was to contribute to transparency and public participation in environmental decision-making. The E-PRTR contains important environmental data about industrial facilities within the EU. It replaces and improves upon the previous European Pollutant Emission Register (EPER). The new register contains data, annually reported by some 24,000 industrial facilities covering 65 economic activities across Europe, including several industry sectors like waste and waste water management. Each facility which fulfils certain criteria (e.g. exceedance of determined threshold values) has to report to E-PRTR including data about the amounts of pollutant released to air, water and land as well as off-site transfers of waste and of pollutants in waste water from a list of 91 key pollutants. Data are mostly reported annually by the respective facility to responsible authorities. The technical support is provided by a national data acquisition software (BUBE), which is used by the operator to transfer reportable data online to PRTR, followed by an automated transmission (German Federal Environment Agency & Regional Office for Environment, 2010). This reporting duty is important for our

considerations as waste producers and waste disposal contractors have to transmit data regarding the type and amount of waste.

4.3.4. Environmental Statistic Report Waste Disposal

According to the German environmental law (UStatG § 1), statistics have to be collected for purposes of environmental policies and fulfilling European and international reporting duties. UStatG § 2 demands for statistics which include inquiries about waste disposal, waste which has to be proved for disposal and disposal of special waste (UStatG § 5). Especially concerning waste disposal, § 3 paragraph 1 (UStatG) registers data from involved facilities requiring admissions for disposing waste. As a result, among other information, type, amount, nature and origin of the handled waste have to be reported every year. Number, type and location of the respective facility have to be reported every two years to the responsible authority by the same companies (waste producers and waste disposal contractors). This is only a small excerpt of the UStatG to display the content of the considered law and its resulting reporting duties. In order to enable electronic processing of reporting duties, the need for an online-available reporting system arose.

4.4. Process Analysis

During Process Analysis, we investigated the processes further in order to reveal their suitability for bundling. Our main goal was to further limit as well as to structure the field of potential bundling candidates by considering secondary bundling principles. This perspective was amended by technical aspects, yielding one as-is profile for each process. The results of this analysis determined which processes were chosen to enter the phase of Process Bundling.

As elaborated on in previous sections, all secondary bundling principles may be regarded side by side within a single analysis. For practical reasons, we mainly focused on the complexity principle but also considered bureaucracy costs as included in the performance principle. In regard to complexity, we put emphasis on the degree of routine of a process, favoring processes which occur with high frequency. Further, we investigated possible variants of the respective processes and their duration. In order to identify the bundling candidates most promising in regard to cost reductions, we also analyzed the costs associated with them by means of the SCM model.

During the analysis of used tools, we examined how the B2G contacts in question were currently supported by IT infrastructure, deducing restrictions and possibilities for future process bundles. This included an analysis of information systems on both the business and the government side, interfaces for data exchange, transport protocols, and data formats. We gathered this information by working through legal regulations, public documents, product and system descriptions, interface specifications, and by conducting interviews.

The detailed process left us with three as-is profiles, describing each of the processes in detail. These profiles comprise the joint output of the Domain Analysis and the Process Analysis and serve as input for the next phase: Process Bundling.

4.5. Process Bundling

In the Process Bundling phase, we developed a functional concept in order to integrate the selected bundling candidates based on the information gathered in the preceding phases, and subsequently designed a to-be profile. This target profile was based on the as-is profiles of the respective processes which were chosen to be bundled and was designed in order to increase their efficiency and possibly enhance their quality. However, we applied no actual changes to the nature of these processes, such as their actors, purpose and function, or outputs. Any changes solely result from removing redundancies, uniting related information flows, and similar measures.

Figure 17 illustrates the reporting duties of industrial waste disposal contractors pertaining to eANV, PRTR and the environmental statistic report waste disposal, respectively. Regarded from a functional perspective, we aimed to purposefully bundle these processes by aggregating and reusing data between these processes. Specifically, in our proposed process bundle we used the data collected within the context of eANV to cover the reporting duties incurred by PRTR. Simultaneously, the same data also suffices to meet the information needs put forth by the environmental statistic report waste disposal. All three processes feature the same involved actors on the business side, the same direction of information flow and a significant overlap in the information content. These conditions allowed for the described bundling of these B2G contacts.

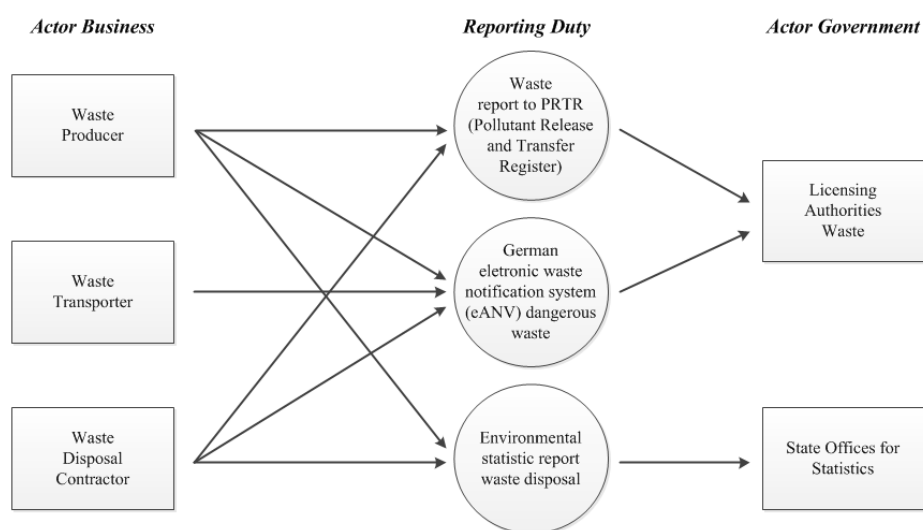


Figure 17: Three reporting duties of companies

In order to demonstrate the concrete workings of the integrated process bundle, we created a BPMN model, depicting the involved documents and actors as well as communication flows between these actors (see Figure 18).

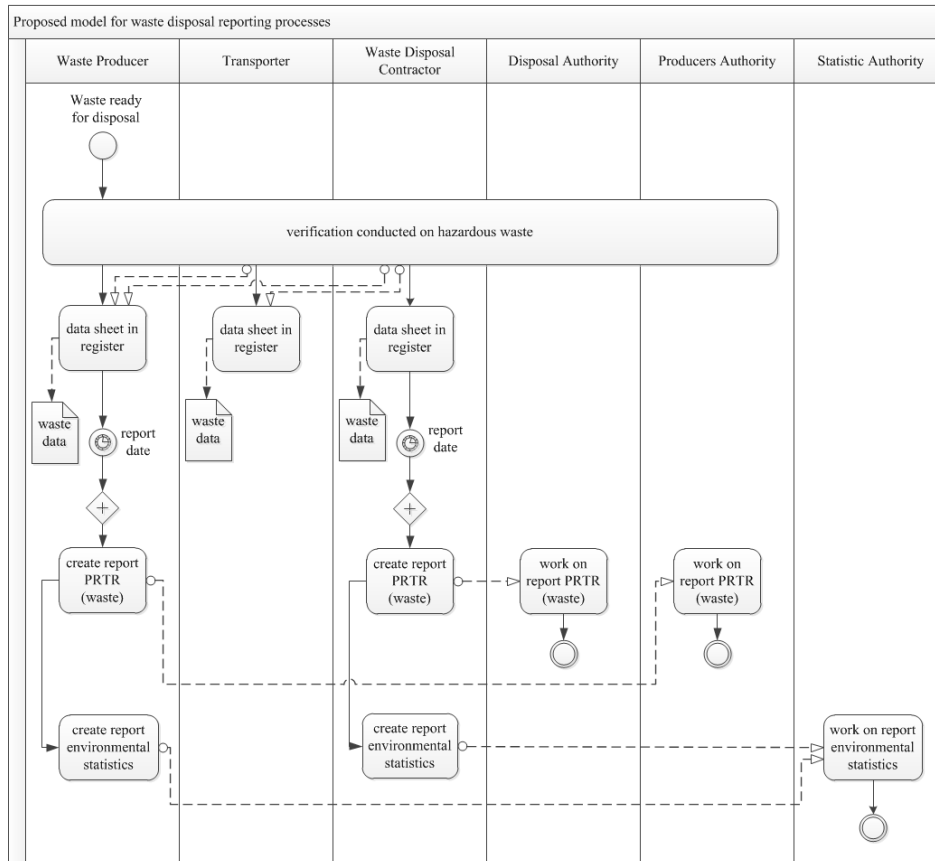


Figure 18: Target process bundle PRTR – eANV – environmental statistic report

Firstly, relevant data is gathered for the eANV report by the involved actors on the business side: waste producer, waste transporter and waste disposal contractor. Once the respective reports are verified, they can be aggregated for future reuse in the context of PRTR and the environmental statistic report. The interaction is closed for the waste transporter, for it is not subject to these obligations. Once the reporting dates approach, the stored data will be used to automatically create the PRTR and environmental statistic reports of both the waste producer and the waste disposal contractor. Finally, the information is transmitted to and checked by the respective authorities on the government side: disposal authority, producers' authority and statistic authority.

By purposefully reusing information as well as linking relevant information flows, this process model aims to provide a more efficient way for businesses to fulfill their reporting duties to government entities.

4.6. Multidimensional Cost-Benefit Analysis

In order to identify the benefits of the proposed bundling activity, we determined the bureaucracy costs entailed by both the E-PRTR and the environmental statistic reporting duties. The exclusive focus on monetary benefits was assumed for practical reasons.

According to the Federal Statistical Office of Germany, the costs incurred for businesses by the environmental statistic report total 479,000 Euro each year. Since no information was available on the bureaucratic efforts induced by reporting duties relating to PRTR, we conducted qualitative interviews among German waste disposal companies. We asked each company to provide information about their yearly effort required to fulfill the PRTR reporting duties. In order to ensure consistency, we calculated the resulting costs according to the Standard Cost Model. Consequently, we gathered information on the frequency and the duration of these activities as well as the corresponding hourly rate. The average yearly cost incurred by the PRTR reporting duties across all companies amounted to approximately 400 Euro each year. In 2008, 4,590 businesses reported PRTR data. Due to several limitations which apply to our interview series, an extrapolation of our results is not possible. These limitations include the limited number of surveyed businesses as well as the fact that no distinction between hazardous and non-hazardous waste was made. Yet, it is apparent that the costs incurred by the regarded reporting duties are significant. In light of other benefits not included in our analysis, for instance data quality and increased transparency, we posit that there is considerable potential in implementing the proposed process bundle.

5. Discussion and conclusion

As a response to the current cost and performance pressures in the sector of public administration, we established the potential of process bundling in public services. We set out to derive an approach specifically tailored to the distinct characteristics exhibited by the domain of public administration. In particular, this was motivated by the goal of achieving cost savings as well as facilitating the interaction between businesses and public administration.

This paper introduced an approach for public service process bundling, consisting of the four phases of Domain Analysis, Process Analysis, Process Bundling and Multidimensional Cost-Benefit Analysis. The aim of this approach is to design and evaluate process bundles in the domain of B2G contacts. This is achieved by a thorough top-down study of the respective domain and a subsequent selection of relevant processes. After undergoing further analysis from a top-down perspective, each of these processes is depicted in an as-is profile and potentially assigned to a process bundle before being merged into a to-be profile. Finally, a multidimensional benefit analysis assesses the proposals' potential as well as its feasibility, providing assistance in selecting and prioritizing process bundles for final implementation.

We demonstrated our approach by applying it in the domain of waste disposal reporting duties in Germany. The field of processes to be considered was delineated from a content-related perspective. After identifying three processes as candidates for bundling, we created a to-be profile for the proposed bundle. By reusing previously recorded information in a purposeful manner, this proposed process bundle removes redundancies in the information flow and reduces the administrative burden on part of the affected companies. We concluded by establishing that the bundling activity features significant potential benefit.

The proposed approach for public service process bundling is to serve as a guideline for practitioners, aimed at reducing costs and improving process quality. By means of the derived approach, actors in public institutions will be able to analyze their processes in regard to overlapping content, recurring information and related redundancies. Further, the integration of processes with similar structure, for instance in terms of identical actors or overlapping flows of information, will be facilitated. As a result of these measures, we expect significant cost savings for the sector of public administration, taking the pressure off of heavily strained public budgets. In addition, process quality may rise and error rates decrease as redundancies and duplicate data are removed. This will aid public administrations in their quest to provide effective, well-structured and user friendly services. By offering single points of contact for frequently recurring concerns and requests, public service providers will be able to significantly enhance their E-Government capabilities. This is crucial for meeting the demands posed by the evolving information society. The affected businesses will encounter more streamlined public administrative processes, enabling them to save significant costs. Businesses would also benefit from shorter response times on part of administrative entities.

In spite of these contributions, our research is subject to significant limitations. Firstly, we applied the proposed approach only in one domain as well as with a limited set of processes. Further, the sample size used for the benefit analysis is not representative for the potentially affected population.

There are various opportunities for future research to build on these findings. In particular, it is indispensable to systematically examine the suitability of the proposed bundling principles. In addition to their validation for the application at hand, it would be advisable to investigate their transferability to the analysis of C2G contacts. Furthermore, the applicability of the approach in other domains as well as the feasibility of the resulting process bundles should be analyzed.

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Appendix A – List of Author’s Publications

1. **Rosenberg, Z.; Jurisch, M.; Schermann, M.; Krcmar, H.** (2014): Using Case Survey Methodology to Extract Variables and Causal Links: An Example from Studying Business Process Change. In: *The 32nd International Conference of the System Dynamics Society*. Delft, Netherlands. Accepted for publication.
2. **Scholl, J.; Jurisch, M.; Scholl, M.; Krcmar, H.** (2014): Building Sound Foundations for Smart City Government: The Case of Munich, Germany. In: *International Journal of E-Planning Research (IJEPR)*. Accepted for publication.
3. **Jurisch, M.; Ikas, C.; Wolf, P.; Krcmar, H.** (2014): Key Differences of Private and Public Sector Business Process Change. In: *e-Service Journal (eSJ)*, Vol. 9, Iss. 1.
4. **Jurisch, M.; Krcmar, H.; Scholl, H.J.; Wang, K.; Wang, Y.; Woods, G.; Xu, D.; Yao, Y.** (2014): Digital and Social Media in Pro Sports: Analysis of the 2013 UEFA Top Four. In: *Proceedings of 47th Hawaii International Conference on Systems Science (HICSS)*. Maui, USA.
5. **Jurisch, M.; Palka, W.; Wolf, P.; Krcmar, H.** (2014): Which Capabilities Matter For Successful Business Process Change?. In: *Business Process Management Journal*, Vol. 20, Iss. 1.
6. **Jurisch, M.; Wolf, P.; Krcmar, H.** (2013): Using the Case Survey Method for Synthesizing Case Study Evidence in Information Systems Research. In: *19th Americas Conference on Information Systems (AMCIS)*. Chicago, USA.
7. **Palka, W.; Yigitel, G.; Jurisch, M.; Wolf, P.; Krcmar, H.** (2013): Basic Approaches for the Evaluation of IT-Investments in E-Government: A Literature Review. In: *IFIP EGOV 2013*. Koblenz, Germany.
8. **Palka, W.; Jurisch, M.; Schreiber, V.; Wolf, P.; Krcmar, H.** (2013): Mobile Government, quo vadis? – Opportunities and Risks of Mobile E-Government Services. In: *International Conference on Mobile Business*. Berlin, Germany.
9. **Palka, W.; Jurisch, M.; Leicht, M.; Wolf, P.; Krcmar, H.** (2013): Classification Schemes for Open Government Data Provision. In: *13th European Conference on eGovernment (ECEG)*. Como, Italy.
10. **Kristekova, Z.; Jurisch, M.; Schermann, M.; Krcmar, H.** (2012): Consolidating Findings from Business Process Change Case Studies Using System Dynamics: The Example of Employee Morale. In: *Knowledge Management & E-Learning: An International Journal (KM&EL)*. Vol 4, Iss. 4, pp. 455-480.
11. **Jurisch, M.; Greger, V.; Wolf, P.; Krcmar, H.** (2012): Entwicklung eines Domänenmodells zur Identifikation und Analyse von Prozessketten. In: *Proceedings Fachtagung Verwaltungsinformatik (FTVI)*. Friedrichshafen, Germany.

12. **Becker, J.; Hofmann, S.; Jurisch, M. ; Knackstedt, R.; Krcmar, H.; Räckers, M.; Thome, I.; Wolf, P.** (2012): Prozessorientierte Verwaltung – Status quo und Forschungslücken. In: *Proceedings Fachtagung Verwaltungsinformatik (FTVI)*. Friedrichshafen, Germany.
13. **Ley, T.; Jurisch, M.; Wolf, P.; Krcmar, H.** (2012): Kriterien zur Leistungsbeurteilung von Prozessen: Ein State-of-the-Art. In: *Proceedings of Multikonferenz Wirtschaftsinformatik (MKWI)*. Braunschweig, Germany.
14. **Jurisch, M.; Cuno, J.; Palka, W.; Wolf, P.; Krcmar, H.** (2012): An Integrative Model of IT-Enabled Business Process Change: Causal Structures in Theory, Research and Practice. In: *Proceedings of 45th Hawaii International Conference on Systems Science (HICSS)*. Maui, USA.
15. **Jurisch, M.; Ikas, C.; Palka, W.; Wolf, P.; Krcmar, H.** (2012): A Review of Success Factors and Challenges of Public Sector BPR Implementations. In: *Proceedings of 45th Hawaii International Conference on Systems Science (HICSS)*. Maui, USA.
16. **Hofmann, S.; Jurisch, M.; Thome, I.; Knackstedt, R.; Räckers, M.; Wolf, P.; Heide, T.; Becker, J.; Krcmar, H.** (2012): Forschung zur prozessorientierten Verwaltung: Forschungsportalbasierte Status quo Analyse. In: *Proceedings of Internationale Rechtsinformatik Symposium (IRIS)*. Salzburg, Austria.
17. **Becker, J.; Heide, T.; Hofmann, S.; Jurisch, M. ; Knackstedt, R.; Krcmar, H.; Ley, T.; Räckers, M.; Thome, I.; Wolf, P.** (2011): Forschungslandkarte "Prozessorientierte Verwaltung". In: *Studie im Auftrag des Bundesministeriums des Innern (BMI)*. Berlin, Germany.
18. **Jurisch, M.** (2011): Transforming Interorganizational Processes in Public Service Networks. In: *Doctoral Colloquium at the 12th Annual International Conference on Digital Government Research (dg.o)*. College Park, Maryland, USA.
19. **Sharafi, A.; Jurisch, M. ; Ikas, C.; Wolf, P.; Krcmar, H.** (2011): Bundling Processes between Private and Public Organizations: A Qualitative Study. In: *Information Resources Management Journal (IRMJ)*. Vol. 24, Iss. 2, pp. 28-45.
20. **Jurisch, M. ; Wolf, P.; Krcmar, H.** (2010): Toward a formal approach to process bundling. In: *Proceedings of Conference on Electronic Government (EGOV)*. Lausanne, Switzerland.
21. **Wolf, P.; Jurisch, M. ; Krcmar, H.** (2010): Analyse und Design von Prozessketten. In: *Proceedings Fachtagung Verwaltungsinformatik (FTVI)*. Koblenz, Germany.
22. **Riss, U.; Jurisch, M. ; Kaufman, V.** (2009): Email in Semantic Task Management. In: *Proceedings of 2009 IEEE Conference on Commerce and Enterprise Computing (CEC)*. Vienna, Austria.