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Path to Improved Firm Performance with Business Process Management (BPM) and BPM Systems

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Abstract

Business Process Management (BPM) has become a widely adopted management approach, prompting significant investments by private and public companies since 2000. BPM has its roots in various process improvement methods such as Business Process Re-engineering, Lean, Total Quality Management, and Six Sigma. In addition, the technological developments of Enterprise Resource Planning, Customer Relationship Management, and Workflow Management Systems have evolved into what can now be called Business Process Management Systems (BPMS), which are enablers of modern BPM.

Business analysts and researchers have published positive forecasts about the prospects of BPMS adoption. In addition, BPM researchers have claimed that there is a linear and one-directional path to more mature BPM, which in turn leads to improved firm performance outcomes. However, neither the concept of BPM nor the factors leading to successful BPM initiatives are grounded in theory, and they also lack empirical support. Consequently, fundamental problems have remained unsolved in current BPM approaches; in particular, what business value BPMS can bring has remained largely unexplored. Therefore, this research answers the question of "What constitutes a path to improved firm performance with BPM and BPM Systems?"

This study uses the Systematic Literature Review method as an exploratory tool for empirical support about BPM initiatives that include BPM Systems, as well as about the adoption of BPM Maturity (BPMM) models to achieve improved firm performance. The literature review covers the major sources in the BPM community, including the BPM Journal and central scientific journal/conference databases. Additional backward searches based on the relevance to the subject deepen the analysis. The theoretical basis of this research is socio-technical systems theory. The empirical part of this study includes a case study and an action research.

Accordingly, this study emphasizes a goal-driven philosophy and is grounded in the mainstream world-view of science.

On the one hand, my literature reviews reveal both a very low number of scientific empirical studies about the benefits of BPM initiatives using BPMS, and contradictions to the unidirectional, sequential, and deterministic progress implied by BPM maturity models. On the other hand, my case study and action research provide empirical evidence how to improve firm performance with BPM and its Systems. Based on these results, I suggest an alternative path to improved firm performance derived from the principles of socio-technical systems theory and driven by the empirically supported approach of customer-centricity. As the main result of this study, I have constructed a model for achieving organizational process change aided by BPM and its Systems. The success factors for this change are explained within a socio-technical system context. The empirical results of my research provide novel insights into technology-enabled change, information technology flexibility, and customer-centric business processes.

Tiivistelmä

Liiketoimintaprosessien hallinta (engl. Business Process Management) on laajasti omaksuttu johtamisen lähestymistapa, joka on saanut sekä yksityiset että julkiset yritykset tekemään suuria investointeja 2000-luvun alusta lähtien. Liiketoimintaprosessien hallinnan juuret ovat useissa prosessien parantamismetodeissa kuten liiketoimintaprosessien uudelleenjärjestely (engl. Business Process Re-engineering), suoraviivaistaminen (engl. Lean), kokonaisvaltainen laatujohtaminen (engl. Total Quality Management) ja Six Sigma. Myös tekninen kehitys yritysten resurssien, asiakkuuksien ja työnkulun järjestelmissä on johtanut siihen, mitä nykyään kutsutaan liiketoimintaprosessien hallintajärjestelmiksi (engl. Business Process Management Systems).

Liiketoiminnan analyytikot ja tutkijat ovat julkaisseet positiivisia ennusteita liiketoimintaprosessien hallintajärjestelmien mahdollisuuksista. Liiketoimintaprosessien hallinnan tutkijat ovat myös väittäneet, että on olemassa lineaarisia ja yksisuuntaisia kehityspolkuja kohti kypsempää liiketoimintaprosessien hallintaa, joka vuorostaan johtaa liiketoiminnan tehostumiseen. Näistä väitteistä huolimatta sekä liiketoiminnan prosessien hallinta käsitteenä että ne tekijät, jotka johtavat näihin väitettyihin parannuksiin, ovat olleet teoreettisesti heikosti perusteltuja ja vailla empiiristä tukea. Liiketoiminnan prosessien hallinnan lähestymistapoihin onkin jäänyt perustavanlaatuisia ongelmia, erityisesti: mikä on se liiketoiminnan arvo, jonka liiketoimintaprosessien hallintajärjestelmät voivat tuottaa?

Tämä tutkimus pyrkii vastaamaan kysymykseen: Mistä muodostuu polku kohti parantunutta liiketoimintaa, kun käytetään liiketoimintaprosessien hallintatapoja ja –järjestelmiä? Käytän systemaattista kirjallisuuskatsausmetodia tutkiessani, mitä empiiristä tukea on liiketoimintaprosessien hallintajärjestelmiä ja hallinnan kypsyysmalleja käyttävillä hankkeilla; onko raportoitu tavoiteltua tehostumista. Kirjallisuuskatsaus kattaa liiketoimintaprosessien hallinnan yhteisöjen tärkeimmät lähteet ja sisältää Business Process Management -lehden sekä keskeiset tieteelliset lehti- ja konferenssijulkaisutietokannat. Myös taaksepäin tehdyt aiheeseen liittyvät

haut syventävät analyysiä. Tutkimuksen teoreettinen pohja perustuu sosioteknisten systeemien teoriaan. Empiirinen osa sisältää tapaus- ja toimintatutkimuksen. Tämä tutkimus korostaa tavoiteohjautunutta filosofiaa ja perustuu tieteen valtavirran käsityksiin maailmasta.

Kirjallisuuskatsaukseni paljastaa toisaalta hyvin pienen määrän empiirisiä tutkimuksia liiketoimintaprosessien hallintajärjestelmien eduista. Tutkimukseni tuo esiin myös niitä ristiriitoja, jotka liittyvät kypsyysmallien esittämiin yhdensuuntaisiin, peräkkäisiin ja deterministisiin kehityspolkuihin. Toisaalta tapaus- ja toimintatutkimukseni tuottavat empiiristä tukea sille, kuinka yrityksen liiketoimintaa voidaan parantaa liiketoimintaprosessien hallintatavoilla ja –järjestelmillä. Näiden tulosten perusteella olen esittänyt liiketoiminnan parantamiseen vaihtoehtoisen polun, joka perustuu sosioteknisten systeemien teoreettisiin periaatteisiin ja jota ohjaa empiirisesti tuettu asiakaskeskeisyys. Tutkimukseni päätuloksena olen esittänyt mallin, jota voidaan käyttää organisatorisen muutoksen aikaansaamiseen ja jossa hyödynnetään liiketoimintaprosessien hallintatapoja ja –järjestelmiä. Tämän muutoksen onnistumistekijät on selitetty sosioteknisten systeemien kontekstissa. Tutkimuksen empiiriset tulokset tuovat uusia näkemyksiä teknologiavetoiseen muutokseen, informaatioteknologian joustavuuteen ja asiakaskeskeisiin prosesseihin.

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This dissertation is based on my experience and research while working for almost 15 years in a company currently known as Nokia Solutions and Networks (NSN). Therefore, this work has been influenced by the professionalism and insights of my colleagues, managers, and various collaborators from different networks of NSN, to whom I owe much gratitude. I want to especially thank Jorma Hietala and Pekka Kekolahti for allowing me to conduct this research and to take the necessary study leave during my time at NSN, as well as Merja Kalttonen and Nick Deacon and their teams for their comments, insights, and valuable support.

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List of Acronyms:

B2Bi	Business to Business integration
BAM	Business Activity Monitoring
BP	Business Process
BPA	Business Process Architecture
BPC	Business Process Choreography
BPCM	Business Process Change Model
BPEL	Business Process Execution Language
BPI	Business Process Improvement
BPM	Business Process Management
BPMM	Business Process Management Maturity
BPMN	Business Process Modeling Notation
BPMS	Business Process Management Systems
BPO	Business Process Orientation
BPR	Business Process Re-engineering
BSC	Balanced Scorecard
CBN	Compelling Business Need
CCBP	Customer Centric Business Processing
CEM	Customer Expectation Management
CIP	Customer Interaction Points
CLI	Customer Loyalty Index
CMM	Capability Maturity Model
CoE	Center of Excellence
CP	Critical Practices
CRM	Customer Relationship Management
CS	Customer Satisfaction
CSCW	Computer-supported Cooperative Work
CSF	Critical Success Factor
CVM	Customer Value Management
DC	Dynamic Capabilities
DCT	Defect Cycle Time
DSP	Demand-Supply Planning
E2E	End-to-End
EAI	Enterprise Application Integration
EPC	Event-driven Process Chains
ERP	Enterprise Resource Planning
ESB	Enterprise Service Bus
GUI	Graphical User Interface
HW	Hardware
IA	Information Architecture
IS	Information Systems
ISO	International Organization for Standardization
IT	Information Technology
KM	Knowledge Management
KPI	Key Performance Indicator
MPE	Management of Process Excellence

PD	Participatory Design
PDCA	Plan-Do-Check-Act
PEMM	Process and Enterprise Maturity Model
PMO	Project Management Office
PoC	Proof-of-Concept
RBV	Resource-based view
RCM	Revenue, Cost, and Margin
RfX	Request for X (Quote, Information, Proposal)
ROI	Return of Investment
SCM	Supply Chain Management
SERP	Services Enterprise Resource Planning
SLR	Systematic Literature Review
SOA	Service Oriented Architecture
SPI	Software Process Improvement
STSD	Socio-Technical Systems Design
SW	Software
TAT	Turn Around Time
TQM	Total Quality Management
TTF	Task-Technology Fit
UML	Unified Modeling Language
WfMS	Workflow Management Systems
WTR	Work Time Record

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1. Introduction

"Recently, business process management (BPM) is among the most important managerial topics because it allows companies an agile adaptation to changing business requirements. Consultants and researchers are regularly proposing new methods and concepts based on BPM for further increasing the efficiency of corporate processes" (Neubauer 2009, p. 166).

My personal motivation for conducting this research has been pragmatic. I worked as a solution, process and information architect, and as a consultant for a large communications technology and service provider. Along with developing process architecture and models, my duties often included evaluating vendor offerings for various Information Technology (IT) initiatives. During the period 2005-2012, I was specifically assigned to work on initiatives related to achieving firm performance improvement through BPM-related approaches and technologies. In this dissertation, I have focused on gathering empirical support for BPM initiatives employing BPM-related technologies, specifically, Business Process Management Systems (BPMS), and also initiatives that use BPM maturity models as decision making tools for indicating directions or paths to achieve improved firm performance.

This dissertation reflects the chronological order in which I proceeded to investigate the state of empirical support for BPMS use, and how these results led me to contribute to the identified gaps of prior empirical research with my own BPMS case study. Finally, in one of the companies where I was working both as a researcher and a practitioner, I focused on overcoming what was considered to be one of the key challenges of BPM: the lack of customer-centric BPM methods. As a result of my journey, this study describes the importance of taking social and technical aspects of organizational change into account with the emphasis on

customer-centricity as a path to improved firm performance with BPM and its Systems.

In Section 1.1, I describe my research domains and proceed to identify gaps and conflicts in prior research. I also present my research questions and their importance to science and practice. The presentation of my own research approach is given in Section 1.2. Finally, I will present an overview of the research results and the structure of the remaining parts of this dissertation in following Sections 1.3 and 1.4 respectively.

1.1 Background and motivation of the research

In this section, I present the background and the problem domain needed for understanding of the subject of this dissertation. I start by describing the observations from practice that led me to studying Business Process Management and its Systems and show how the same observations have appeared as themes in related scientific literature.

During the past decade, I have participated in various process change initiatives of a large-scale telecommunication and service company, and the similar initiatives of its customers. I was often faced with challenges in presenting convincing arguments for the potential positive impacts of BPM on firm performance. According to Hung's (2006) definition, BPM is a management principle that companies apply to sustain their competitive advantage. BPM focuses on business processes. Van der Aalst (2003) provided another definition according to which BPM includes methods, techniques and tools to analyze, improve, innovate, design, enact, and control business processes involving customers, humans, organizations,

applications, documents, and other sources of information. Clearly, these two BPM definitions differ significantly from each other. The first one considers BPM as a management principle, whereas the second one takes a more methodological and technological point of view. The more familiar I became with the BPM literature, the greater a variety of definitions with different core ideas emerged. I quickly encountered the same ambiguity of BPM concepts as is expressed in the BPM literature (e.g., Trkman 2010; Palmberg 2009; Snabe et al., 2009).

In order to differentiate BPM from its predecessors, one must understand the process management approaches that lead to BPM. From a historical perspective, BPM has its roots in Taylor's principles of scientific management but it has evolved through the principles of Just-in-time Production, Continuous Improvement, and automation developed in the Toyota Production System, Total Quality Management (TQM), Lean Manufacturing, Business Excellence, Six Sigma, and especially Business Process Re-engineering (BPR) (Paim et al., 2008; Harmon 2007; Chang 2005). According to Chang (2005), process management is a theme shared with the predecessors of BPM, but it differs in the phases and scope of how process changes were managed: "BPR is a leap approach toward improving business processes or creating new business processes, TQM, and Six Sigma are incremental approaches toward improving business processes" (ibid., p. 30).

From the aforementioned predecessors of BPM, BPR took a radical approach to process management. "It is time to stop paving the cow paths", declared Hammer (1990) in his well known and, for some, notorious article "Reengineering work: Don't automate, Obliterate." BPR, originally introduced by Hammer and Champy (1993), entails a radical process redesign aimed at achieving a large-scale improvement in business performance (see also Siha and Saad 2008). According to Hammer and Champy (2001), BPR is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures such as cost, quality, service, and speed. A key enabler for BPR was seen to be Information Technology (IT), and BPR played a key role in Enterprise Resource Planning (ERP) systems implementations (Martin and Cheung 2005; Sumner 2005; Hammer and Champy 2001; Sandoe et al., 2001).

According to Nah et al. (2001, p. 285), “An enterprise resource planning (ERP) system is a packaged business software system that enables a company to manage the efficient and effective use of resources (materials, human resources, finance, etc.) by providing a total, integrated solution for the organization's information-processing needs. It supports a process-oriented view of the business as well as business processes standardized across the enterprise.” Evidence of the demand for ERP systems could be seen when one ERP vendor, SAP, increased its revenue from € 255 million in 1990 to € 7.3 billion in 2001 (Chang 2005). Unfortunately, BPR’s focus on dramatic improvements in performance ultimately paved the way for the failures of hundreds of companies as they abandoned their legacy IT and processes and started over from scratch. According to a report by the consulting house Accenture, “less than half of all large-scale enterprise software projects achieve even half of their business benefits they aimed for” (as cited in Martin and Cheung 2005, p. 186). Marnewick and Labuschagne (2005) reported that 25 percent of ERP installations exceed the initial cost and about 20 percent cannot be completed. Moreover, ERP systems often fail to meet organizational goals soon after their implementation.

Recently, BPR has yielded to its successor BPM. Smith and Fingar (2007, p. 111) criticized BPR for being “a design philosophy that lacked a concrete plan for execution”, but praised BPM: “unlike total quality management, continuous improvement and radical engineering, third wave BPM is an engineering based formalism, embodied technologically in the form of a process architecture and management system.” However, BPM is still much grounded in the principles of the traditional division of labor and new generations of work design have subsequently emerged.

The stakeholders of the BPM initiatives in which I participated remembered well their failed IT undertakings of the past. Also, because the economic and market climate for communication business was not conducive to risky IT projects through the years 2005-2012, more attention was paid to keeping IT costs at a competitive level. Therefore, these companies were seeking easy-to-understand artifacts and methods that would ensure a high confidence level for success, and provide enough

flexibility to change the course of the BPM project if needed. Shaw et al. (2007) defined this business process flexibility as the ability to change organizational capabilities repeatedly, economically, and in a timely way.

According to Antonucci and Goeke (2011), successful BPM initiatives require both broad BPM knowledge and firm-specific business expertise, combined with solid IT skills. To build such expertise a firm may need to adopt a specific approach to process management. For example, Kirchmer (2010) defined the concept of Management of Process Excellence (MPE) as a holistic BPM approach that applies the newest developments in methods, approaches, and IT, and uses them consistently in a business-driven manner. Other similar approaches have been suggested in research and I discuss them later in this dissertation.

During my evaluation and assessment assignments, I noticed that the reasons invoked in arguing for or against adopting BPM and related technology included only BPMS vendor case studies or other commercial material. Objective, unbiased, and convincing evidence was rarely presented or then completely lacking. Weber et al. (2010) came to the similar conclusion, reporting that enterprises typically have to rely on vendor promises or qualitative reports. Since the lack of information was a key concern for the business executives I was working for, I started searching academic literature for evidence of BPM initiative successes that had used BPMS.

Even though BPM has gained much of its support due to the comparison with the shortcomings of BPR, the similarities inspired me to explore what, if anything would prevent BPM from having the same pitfalls as BPR. Baskerville and Myers (2009) demonstrated that information systems research and practice, just like in management research and practice, are characterized by "IS fashion waves". These fashion waves are a "relatively transitory burst of interest in particular topics by IS researchers and practitioners" (ibid., p. 648). Their findings included BPR as one of the IS fashion waves characterized by an upsurge of interest which later waned as critical assessments arose (e.g., Deakins and Makgill 1997). Westrub (2003) also considered ERP belonging to an IS fashion wave. This begs the question: is BPM just another IS fashion wave?

Recent studies (e.g., Trkman 2010; Vergidis et al., 2008) have started to view BPM critically, claiming that no comprehensive and substantial benefits justify the hype around BPM. For instance, Landry and Banville suggested that IS researchers were overly driven by new technological opportunities and research fads (Landry and Banville 1992; Banville and Landry 1989). Currie (1999) suggested that one explanation for the subsequent waning interest in such an IS fashion is that they fail to provide sustainable and workable solutions to the problems of a complex international business environment. Could this be true for BPM and its technologies?

From a historical point of view, the predecessors of BPM technologies generated various discussions particularly in the forum of computer-supported cooperative work (CSCW) during the 1990s (see for instance, Schmidt and Bannon 1992), which eventually lead to the development of workflow engine software and tools. A workflow management system (WfMS) is defined as a software system that supports the management of processes in an organization, particularly business processes (van der Aalst and van Hee 2001; Conery et al., 2005). According to Casati (2005), the actual benefits of the earliest generations of WfMS differed from the expected benefits. Reijers (2006, p. 390) stated, "A BPMS extends the capabilities of the earliest generations of WfMS's by offering more sophisticated build-time and run-time diagnostic capabilities and wider capabilities for enterprise application integration and business-to-business integration (B2Bi)."

Despite the failures of the predecessors of BPM and BPMS, the BPMS market reached nearly USD 1.7 billion in 2006, and the market was expected to grow 24 per cent from 2006 to 2011 (Ko et al., 2009). More than half of the companies that responded to a survey by AIIM (AIIM 2007) reported that they had implemented BPM projects ranging from departmental to enterprise, and most of the remaining companies were planning to do so in the future.

So far, only the success factors of business process improvement methodologies (see e.g., Houy et al., 2010; Neubauer 2009) and workflow management systems (Lin and Cornford 2000; Karsten 1999; Orlikowski 1992) have been empirically

studied, but for BPMS, an up-to-date literature review of empirical support is lacking. Prior research has claimed that BPMS may result in considerable rewards for the companies adopting them. Typical advantages cited are reduced lead times, fewer hand-off errors, and greater flexibility to change the structure of supported business processes (Reijers 2006, p. 389). BPMInstitute.org, a source of information and education on BPM, asserted that BPMS is even required in fulfilling the promises of BPM implementation: "But BPM promises more, including faster cycle times, lower costs, improved compliance with policies and best practices, and more agile response to change. BPM cannot achieve those benefits, however, by modeling and monitoring alone. A technology platform that can transform process models and metrics into executable implementations - without writing code - is required. In short, a BPM suite (BPMS)" (Silver 2007, p. 1). However, these claims have not been accompanied by empirical support through scientific studies. Accordingly, my first research question is:

(RQ1): What empirical support exists concerning improving firm performance using BPMS?

Since the necessary investments are significant on both the part of the enterprise and the BPMS vendor, meticulous research is required to demonstrate how the expectations of BPMS have been realized so far. Earlier empirical literature reviews of the effects of BPM have focused on the method, or more widely, on the effects of Business Process Orientation (BPO) (Kohlbacher 2010). For example, Reijers (2006) cautiously concluded that there is a relationship between process orientation and the success of BPMS implementation. This relationship means that the more mature a company is in terms of process orientation, the better the success rate is in BPMS implementations.

In order to achieve corporate business objectives, a strong coherence between business and IT has been recognized as an important factor of competition on all markets and in nearly all industries (Kersten and Verhoef 2003). Davenport (1993) and Henderson and Venkatraman (1993) were among the first to suggest that IT had the capability of creating major improvements in business processes. Field research,

such as that of Jarvenpaa and Stoddard (1998), provided evidence that when radical business re-engineering designs are combined with evolutionary implementation plans, and often compromising between these two, organizations can achieve positive results. Markus (2004) pointed out that the use of IT is in some cases a mandatory requirement to stimulate business changes, and additionally: companies could not have achieved radical improvements without the use of IT. Moreover, Markus differentiated traditional IT and organizational change initiatives from what she called *technochange management,* meaning the use of IT to strategically drive organizational performance improvements. Markus noted that when organizations fail to make complementary organizational changes, they often lose business value from their IT investments.

In my own experience, decision makers were less focused on the level of IT investments and more concerned about organizational ownership and crossing internal boundaries, as well as the maturity levels of the current (business) processes. As Palmberg stated (2010, p. 94), "… few empirically based articles have been found on the organizational issues of implementing process management, how to handle the relationship between the functional organization and a process perspective, and on the roles of managers, teams, and individuals." In addition, there is a scarcity of research systematically examining the implications of business processes for BPM (Niehaves and Plattfaut 2011).

Many Business Process Management Maturity (BPMM) models have suggested "pathways" for an organization to improve performance. For instance, Jeston and Nelis (2008a, p. 314) stated "a BPMM model is a tool that can assist organizations in becoming more successful with BPM, resulting in the achievement of greater operational and business performance benefits." It is also claimed that a company has to progress through all the levels (phases) of BPMM to develop a culture of excellence in BPM (Lockamy and McCormack 2004). Hammer (2007) coined the term "Process Enterprise". Hammer stated that there is a path to becoming a process enterprise, one that allays people's anxieties and eliminates confusion. Moreover, skipping any of the maturity levels is counter-productive because each level forms the foundation for the subsequent one (Sentanin et al., 2008). According to Gartner research (as cited in Snabe et al., 2009, p. 49), "An important message of the

maturity model is that it is highly impractical to jump ahead in maturity or to essentially skip phases to reach an advanced stage for better results. Generally this fails, and if attempted usually damages the ability to go back to a sound effective sequence and gain the required participant support yet again, to do the right. Following the pragmatic pattern is smart."

A recent BPTrend report stated, "We have no detailed evidence, but we have worked with lots of companies undertaking enterprise and process redesign work and we have the strong impression that organizations at different levels of maturity use different software tools" (Harmon 2010, p. 15). In general, the report states that while companies progress towards the higher levels of BPMM they begin to more seriously consider how they could use a BPMS for day-to-day management and monitoring of processes. However, similarly to organizational growth stage models (Phelps et al., 2007), the BPMM models seem to be more conceptually and intuitively appealing than empirically validated (Klievnik and Janssen 2009).

Therefore, my second research question focuses on the review of empirical evidence of the BPMM models:

(RQ2). What steps in the suggested pathways of BPMM models are empirically supported?

The need for this research has been demonstrated in prior research reports. Most studies report as many as 50-80% of BPM initiatives as unsuccessful (Abdolvand et al., 2008; AIIM 2007; Karim et al., 2007). Very recent studies suggest that the BPM success rate (i.e., the frequency with which BPM initiatives achieve, sustain, and continuously exceed performance targets) could be as low as 20% (Towers 2010). In addition, the benefits of process improvement initiatives show a high variance (Herbsleb and Goldenson 1996), and more recent evidence confirms that organizations initiating such undertakings cannot predict the results with any certainty (SEI 2008). High uncertainty has chipped away industries' confidence in process management approaches (Vergidis et al., 2008). In addition, the lack of frameworks available to support research projects has resulted in labeling BPM as

lacking a theoretical basis, or as being merely a repackaging of previous process-oriented management theories (Grisdale and Seymor 2011; Trkman 2010). Consequently, many of the BPM studies have focused on identifying critical success factors (CSFs) for BPM initiatives. CSFs are defined as those few key areas where things must go right for business to prosper (Škrinjar and Trkman 2013; Dubelaar et al., 2005; Rockart 1979). However, the CSFs for BPM are rarely theoretically grounded (Škrinjar and Trkman 2013, p. 50). Therefore, I explore various theoretical approaches and historical development paths for BPM and its Systems that might be considered as providing grounding of these success factors.

Even though the key literature on the concept of BPM suggests that BPO has a positive impact on business performance (McCormack et al., 2009; Škerlavaj et al., 2007; McCormack and Johnson 2000), competing journey like approaches emerged during the 2000s. In their book, *The Future of Competition,* Prahalad and Ramaswamy (2004) presented the idea that companies should shift their strategic focus from managing resources and capabilities to managing the customer experience as the primary source of value creation. A few years later, Prahalad and Krishnan (2008) suggested that the dynamics of markets are affected by pervasive connectivity, technology, convergence of industries, and the invigoration and participation of consumers. According to them, these market dynamics require continuous changes, not temporary breakthroughs. In addition, Gulati sees “the move toward customer-centricity as a journey" (Gulati and Gilbert 2010, p. 1). Gulati has posited a map of four levels that exemplify distinct stages through which companies may evolve on the journey toward customer-centricity (Gulati and Gilbert 2010, p. 1; Gulati 2009). According to Gulati (2009), the customer-centric companies tracked in his research from 2001 to 2007 delivered shareholder returns of 150 percent, while the Standard & Poor’s 500 delivered only 14 percent. Also, research by Cai (2009, p. 369) that covered 143,000 Chinese companies, each with revenue of more than 5 million RMB (this corresponds to about 0.7 million euro in February 2013), presented findings which suggest that organizational customer orientation affects customer relationship practices, which subsequently influences production performance and customer satisfaction, which in turn lead to financial performance. Ulrich et al. (2009, p. 20) also concluded that “in a volatile world of speed and change, organizations build winning cultures when their culture efforts

begin with customers, then shift to employee behaviors and organizational processes." A key characteristic of a customer-centric company is the co-creation of value together with the customer. Coincidentally, this characteristic is often positioned on the highest levels of BPMM models. The difference is that customer-centric approaches call for companies to start with such efforts together with a customer and then proceed to change organizational processes, not the other way around.

Gersch et al. (2011) claimed that established BPM approaches and process modeling tools do not sufficiently take the customer's expectations and perceptions into account because of their focus on the company's internal perspective. In particular, they saw that "value creation processes with a high level of customer involvement require a process management and modeling approach that integrates the customer's and company's perspectives" (ibid., p. 733). Their research demonstrates a need for further development in this area. In addition, Shaw et al. (2007, pp. 104-105) called for more research on using BPMS to manage the main direct (e.g., customer relationship management, supply chain management) and indirect (e.g., human capital management) organizational and inter-organizational process classes in a value chain. Therefore, my dissertation focuses finally on the following research question:

(RQ3). How can BPM and BPMS support a customer-centric approach?

In summary, the purpose of this dissertation is to investigate the relationship between BPM and firm performance as mediated by the adoption of BPMS, the steps suggested by selected major BPMM models and their possible theoretical underpinnings, and how to realize the most prominent steps using BPM and BPMS.

1.2 Research approach

Starbuck (2009a, p. 108) wrote "Behavioral and social researchers have consistently pursued conceptual and methodological fads." He claimed that even though some devotees remain to support such fads, a majority of the researchers move on. Baskerville and Myers (2009) showed that Business Process Re-engineering, a forerunner of Business Process Management (BPM), has the characteristics of "Information Systems (IS) management fashion". For management fashions, it has been argued that they will only diffuse if they offer solutions to real or perceived efficiency gaps (see Scarbrough and Swan 2001, p. 9). However, such solutions cannot be justified only by the logic the approach entails, but must also have justifications through empirical proof of added value and sustainability. In my research approach, I consider BPMS as the core IT artifact of BPM. Orlikowski and Iacono (2001) suggested that IS researchers should begin to theorize specifically about IT artifacts, and then incorporate these theories explicitly into their studies. They believed that such a research direction "is critical if IS research is to make a significant contribution to the understanding of a world increasingly suffused with ubiquitous, interdependent, and emergent information technologies" (ibid., p. 121).

In this dissertation, I use the Systematic Literature Review (SLR) method to explore the empirical support of the benefits of BPMS and major BPMM models. The SLR is a research methodology, which was developed to gather, evaluate, and analyze all the available research relevant to a particular research question or area of interest (Kitchenham and Charters 2007). Kitchenham et al. (2009) claim that instead of ad hoc literature reviews, SLR is a methodologically rigorous review of research results. SLR has gained popularity in the field of software engineering since the late 2000. Moreover, Kitchenham et al. (ibid.) claim that the SLR is useful for the development of evidence-based guidelines for its practitioners. Recently, SLR has been applied to the field of BPM (see e.g., vom Brocke and Sinnl 2011; González et al., 2010).

In seeking for empirical support for BPMS benefits, my SLR covered five major digital scientific journal databases, and six databases when searching for the benefits

of BPMM models. I also carried out a backward search as suggested by Webster and Watson (2002). This means that in addition to the papers found in the journal databases listed above, every relevant reference listed in these papers was investigated. All papers identified through this backward search were read and evaluated. After collecting the relevant literature, I explored how each source reported on the use of BPMS and BPMM models, and their association with firm performance.

Trkman (2010) argued that most BPM papers fail to put their research within a theoretical framework, which has led BPM to remaining largely atheoretical. Some of the researchers have even claimed that BPM was merely a repackaging of old ideas to drive growth in the consulting industry (Trkman 2010; Terziovski et al., 2003; Newell et al., 2000). Schwaninger (2000) argued that "mixing and matching" different methodologies to varieties of pragmatic recipes have led management books and consultancy markets to thrive on buzzwords, fads, and even outright charlatanism. He argued that the systems approach, which is based on systems theory and cybernetics, refrains from riding fashion waves besieging management theory today, and provides a formal apparatus for dealing with complex systems of all kinds: it is therefore being adopted increasingly in many fields of inquiry. In addition, the systems approach has become the scientific basis for a management science that strives for an integrative, holistic effort to the design, control, and further development of organizations and social systems in general (Ulrich 1984). I consider that the socio-technical systems approach serves as an integrative and holistic theoretical framework for my research.

The SLR results lead me to construct a socio-technical work systems model both to create an understanding of how work systems are affected by BPM and its Systems, and in particular, to theorize how these work systems can be changed. My theoretical approach in constructing such a model is largely based on applying Davison et al. (2012) definition of a *focal theory* that provides the intellectual basis for action-oriented change, and in my chosen terms, *describing theories* that are instrumental for diagnosis of work settings. Davison et al. (2012) considered Alter's (2008) framework of work systems to be such a theory. Also, Grisdale and

Seymour (2011) found Alter's framework of work systems to be useful in understanding what factors influenced a BPM adoption. Therefore, I selected Alter's framework of work systems (2008, 2006, 2003) as the primary describing theory to address the initial state of a work system that uses BPM and its Systems. Davison et al. (2012, p. 766) also noted "A focal theory alone is unlikely to remedy an organizational problem completely." Therefore, I have used my SLR results and other relevant literature to identify what steps as *complementary focal theories* help in explaining and realizing desired changes with BPM and its Systems in organizations.

My research approach is not to pursue generalizations based on large samples, but to provide empirically supported insights and guidance for BPM science and practice using my chosen research approach. On the one hand, Lee and Baskerville (2003, p. 240) claimed, "A theory may never be scientifically generalized to a setting where it has not yet been empirically tested and confirmed." On the other hand, according to Seddon and Scheepers (2012), Yin (2003), Walsham (1995), Lee (1989) and many others, sound generalizations – providing useful insights to guide future practice – can be based even on claims from a single case study. I consider the type of generalizability in this research to concern what Lee and Baskerville (2003, p. 237) defined as generalizing from empirical statements to theoretical statements. In my case study, I investigate how my describing and focal theories can serve as a model to explain BPM initiative and its success in a global technology product and service provider. In addition, I compare the BPM initiative with a large ERP initiative that was started and implemented in the company at the same time. Lee and Baskerville (ibid.) also considered that if the case study is performed according to rigor case study procedures, then the resulting empirical statements could be considered valid, but the validity and generalizability of the new theory would need to be established perhaps yet in another study. Therefore, an action research was carried out. The limitations regarding generalizability to other settings are further discussed in Chapter 8.

In the final part of this study, I used action research to develop a business process modeling and improvement methodology, and to test its utility to increase customer-centricity in companies. Mumford (2001) traced the origins of both the socio-

technical approach and action research to the London Tavistock Institute in the early 1950s. The Tavistock pioneers attempted in their research project not only to increase knowledge but also to improve working conditions. This approach resulted in an approach and methodology, which they called 'socio-technical'. The term 'socio-technical' meant that equal attention must be paid both to social and technical aspects of work in providing a high quality and satisfying work environment for employees. According to Mumford (2001), action research usually involves not only gaining an understanding of the problem and generating ideas for improvement but also the practical application of these ideas in the real world situation. My use of the action research method aims to construct an action-oriented change process as a practical application of BPM.

Action research was carried out in a global communications product, solution, and service provider company where I, as a researcher, participated in identifying the customer interfacing processes of the company together with a team from the management of process excellence function. During that initiative, we created methods for systematic process modeling and improvement to drive customer-centricity within that particular company. Customer-centricity and its relation to BPM, as presented in our developed methodologies, are new to empirical research, and therefore, the utility of the method is being evaluated in a specific real-life work situation. In general, the research approach chosen in this study has been motivated by prior research where, for instance, Houy et al. (2010) described the need of empirical BPM research to support how to apply existing methods, best practice process models, and BPM tools (BPMS) in an effective and efficient way. In addition, they considered that theories can support further development of useful IT artifacts, for example, modeling methods, reference models, and BPM tools on the basis of approved and reliable methods.

The scope of this dissertation is limited to the management of business processes. As such, for instance, all Software Process Improvement (SPI) and management related studies and considerations are excluded from this dissertation. Moreover, the empirical investigation of BPM predecessors is not in the scope of this research. For an empirical assessment of BPM predecessors, refer to Siha and Saad (2008).

1.3 Results

To address my first research question (RQ1), I have collected and summarized the empirical support resulting from my SLR. The results provide a summary of the empirical BPMS studies and imply more focused research topics for the association between business and information system outcomes and the use of BPMS. The SLR search for the benefits of BPMS use resulted in a very limited body of empirical support, though the results covered a wide range of businesses and industries. In light of the results, claims about BPMS benefits do not appear to be strongly supported in scientific literature, and the manners in which the benefits are presented have significant shortcomings. I also compared the overall number of scientific articles written about BPMS to the number of articles containing empirical support, and found that even though a sharp rise has occurred in the number BPMS articles in general, the number of empirical studies has remained static and low. Reflecting with the results of a similar study by Baskerville and Myers (2009), I argue that the whole BPM is in a danger of falling into the category of yet-another "IS management fashion" wave. I consider one probable cause for these results to be the immaturity and blurriness of the BPM field as a knowledge domain. However, my SLR findings also provided support for a positive influence of BPMS use on changing business processes and thus increasing the flexibility of information technology in the organizations studied.

The second SLR focused on finding empirical support for major BPMM models and addressed my second research question (RQ2). The results show that the step-wise and sequential progress suggested by BPMM models has limited and contradicting empirical support. In particular, the unidirectional, sequential, and deterministic approach of BPMM models is challenged and alternative directions have been suggested. However, both the BPMS and BPMM SLR results reveal the following steps to be the ones with the most empirical support: identifying process owners and governance structure, establishing process performance metrics,

defining process measurement and management, consistent use of process metrics, and standardizing business processes.

As the main result of this study, the conceptual model I constructed is used to theorize how BPM and its Systems can aid organizational process change and maintain the resulting state. In contrast with the former collections of '*Critical Success Factor*s', which try to address the success of BPM initiatives, my conceptual model identifies a set of steps as complementary focal theories for explaining and predicting a success of socio-technical work systems that use BPM and its Systems. The conceptual model can therefore be used both as a tool for descriptive and prescriptive methods to achieve and maintain a desired change in these work systems. Even though the concept of work system has been presented together with BPM in earlier research (e.g., Bucher and Winter 2009), none of these studies have taken the step of building a conceptual model with sound theoretical basis that could serve as a method for pursuing improvements through BPM initiatives, especially those using BPMS.

In the case study, the use of the conceptual model is demonstrated in real-life business context. To emphasize the difference between BPM and other similar initiatives, I compared a BPM initiative with a long-haul ERP systems implementation both within the same company, which was a global communication product and service provider. In contrast to usual one-time projects or even sets of discrete projects, the BPM initiative was continuous and targeted for agile and iterative changes to the way business was carried out through employing the features of BPMS. I reason that in the case of the BPM initiative, the need for BPMS was determined by the weaknesses in the existing tools for supporting business in day-to-day activities. These weaknesses led to questioning the existing work practices and tools, which ultimately led to the discovery of BPMS as a potential technology to improve work performance. The focal theory for realizing change was the iterative, agile, and participative development style for introducing BPMS applications to improve firm performance. The success of the BPM initiative is also explained using my set of complementary focal theories: participation of internal customers, managers, and employees in using mature BPMS in the work

system, ability to see contradictions with strategies as opportunities for change, and how the managers selected leadership styles to increase the fit of the work system with its volatile environment. Pertinent for these results is the importance of both social and technical aspects. The BPM initiative resulted in benchmarked €6 million in annual productivity savings.

The ERP initiative chose a more traditional approach. The drivers for the ERP initiative were not so much about the work transformation but about implementing a long-term strategy. Even though the ERP initiative was well-aligned and supported by both business and IT strategy, it was exposed to threats in terms of changes not only in economic enablers but also in the company's strategy, especially due to the volatile business setting in which the company was operating. The lack of capabilities to rapidly adjust to these changes had an impact on the success of the ERP initiative during the long-haul project. Moreover, I also argue that the loss of "commonality" can be considered as a complementary focal theory for explaining the failure of projects characterized by long development periods, as opposed to the agile and iterative build system of the BPM initiative. I consider the case study as providing empirical answers to both research questions 1 and 2 (RQ1 & RQ2).

Whereas the results of my case study focused on the company's internal aspects, the answer to my third research question (RQ3) is given in a form of presenting a specific business process modeling and improvement methodology to analyze and improve business processes from the customer point of view, in other terms, "outside-in". This methodology was developed through carrying out action research case for improving customer-centricity. The methodology suggests a more holistic approach that binds BPM around socio-technical system theory and customer value engineering rather than focusing on an organization's functional process decomposition, maturity analysis, and optimization of operational efficiency. The context for the action research was a large-scale communications product, solution, and service provider company with global business operations. The utility of the methodology was tested with their customer in East Asia. The findings provided empirical support for the utility of the presented methodology, and resulted in the simplification of the service encounter interface, improved product quality, and

performance of the action research organization's maintenance process for their customer.

Because earlier research has indicated that the business processes are too narrowly defined – "ending" at the organizational boundaries – and relevant stakeholders (Freeman 1984) are not included in BPM projects (Ahmad et al., 2007; Rosemann et al., 2006), I claim that the business process modeling and improvement method presented in this dissertation contributes to the goals of (re-) aligning a company's business processes and information flow with the customer's processes for joint value creation. This method stems from the work of Thompson (2000) who presented the Customer Value Management (CVM) framework developed in IBM. Moreover, my contribution supports the call for methods that take customer's expectations and perceptions into account (Gersh et al., 2011).

As a conclusion of the results, this research contributes both to science and practice by laying out a path with BPM and BPMS that is multidirectional, gives equal emphasis on social and technological elements in work settings, and presents both a conceptual model and a practical application of BPM to increase the likelihood of achieving improved firm performance.

1.4 Structure of the dissertation

For the sake of maintaining the focus on empirical results, the structure of the dissertation, as shown in Figure 1, was designed so that it first reports earlier empirical research findings, then builds theoretical understanding based on the empirical body of knowledge, and finally seeks to clarify concepts that appeared as empirically supported. Readers wishing further elaboration of the key concepts underlying this research are referred to Chapter 7.

The remaining chapters of this dissertation are organized as follows: in Chapter 2, I use the SLR method to explore the empirical evidence related to benefits of BPMS use; also the analysis of the resulting studies is presented. In Chapter 3, the empirical support related to BPMM models is explored using the SLR, and an analysis is presented accordingly. In Chapter 4, the findings from both the SLRs and other relevant literature are used to theorize and construct a conceptual model. This new conceptual model is empirically tested using the case study method in Chapter 5. In Chapter 6, action research method was used in a large-scale organization to answer my third research question. In Chapter 7, I apply the results of my research to analyze the key concepts of the BPM field. Finally in Chapter 8, the results, implications, and suggestions to both science and practice are presented, as well as the limitations of the research are evaluated.

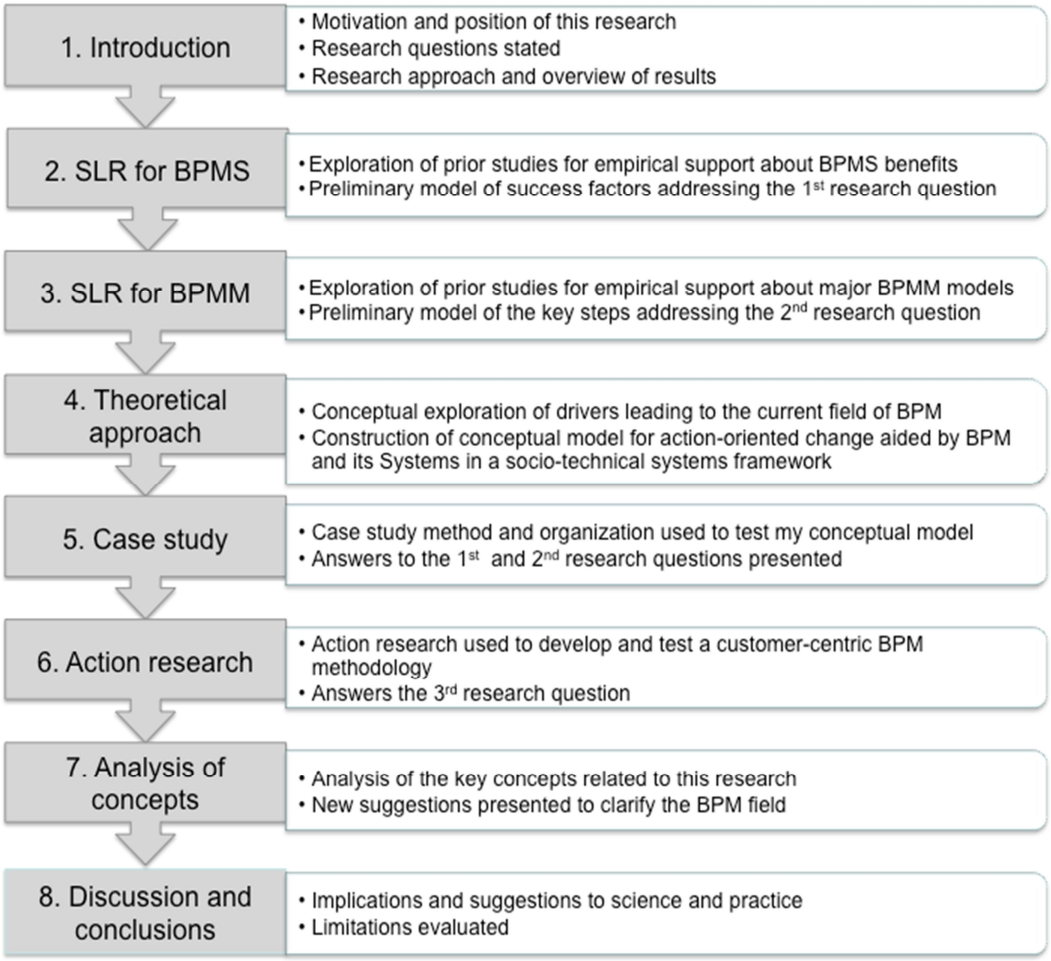

Figure 1. The structure of the dissertation

2. Systematic Literature Review of Empirical Support Regarding BPMS

"But BPM promises more, including faster cycle times, lower costs, improved compliance with policies and best practices, and more agile response to change. BPM cannot achieve those benefits, however, by modeling and monitoring alone. A technology platform that can transform process models and metrics into executable implementations - without writing code - is required. In short, a BPM suite (BPMS)" (Silver 2007, p. 1).

In this chapter, I focus on evaluating the claims of the benefits of using Business Process Management Systems (BPM Systems, Suite or Software) to achieve operational and business performance. At this point of my research, I intentionally leave the literature review of prior conceptual studies around BPM and BPMS to the later parts of my report and instead focus on using Systematic Literature Review (SLR) as an exploratory tool to find empirical studies. I aim to provide insights into the role of BPMS in real-life situations by using the SLR as a kind of a theory landscaping for identifying those concepts and relationships that rise directly from the empirical studies and either support or negate the claimed benefits. According to Okoli (2012, p. 41), "Theory landscaping reviews do not aim to make definite theoretical arguments, but they do point to the theoretical relationships that the literature reveals or suggests."

Since process management is recognized to be a common theme for the various predecessors of BPM, I demand the presence of BPMS in the results, which according to many prior definitions are considered to be instrumental and even required for achieving the claimed benefits. Therefore, the purpose of this chapter is to answer my first research question.

(RQ1): What empirical support exists concerning improving firm performance using BPMS?

BPM and BPM Systems/Suites/Software (for simplification only Systems is used later in this study and it should be noted that BPM Suites and Software are considered as synonyms though seldom used in the literature) are often mixed. Unfortunately, I have been unable to find definitions for BPM and BPMS that would clearly disclose all its key elements - not even from major influences. Thus, I present the following working definitions based on often-cited publications that is consistent with the most adopted views of interests in BPM field.

- "BPM is a field of knowledge at the intersection between Business and Information technology, encompassing methods, techniques and tools to analyze, improve, innovate, design, enact and control business processes involving customers, humans, organizations, applications, documents and other sources of information" (van der Aalst et al., 2003, p. 1).
- BPMS is "A complete set of integrated composition technologies for managing all aspects of process — people, machines, information, business rules and policies supporting a full process discovery, analysis, design, development, execution, monitoring and optimization cycle, in which business professionals and IT collaborate as peers" (Sinur and Hill 2009, p. 3).

In addition, I use Davenport's (1993, p. 5) definition of business process as "a structured, measured set of activities designed to produce a specified output for a particular customer or market."

Even though I do not presuppose any criteria of measures for operational and business performance, my implicit assumption is that, in general, the operational benefits are measured using two dimensions; effectiveness and efficiency (DeToro and McCabe 1997), and business performance in terms of direct impact to financial and non-financial performance with quantitative and qualitative indicators.

First, I introduce the SLR method design and then resulting data, and finally conduct a review of the results and my conclusions.

2.1 Design of SLR

The SLR consists of three phases: planning, conducting the review, and reporting the review. First, I present the research method and the resulting data, and then present my analysis of that data. The SLR design consisted of an automated search of the following digital libraries:

1. EBSCO Host – Business Source Elite databases
2. Association for Computing Machinery (ACM)
3. IEEE/IET Electronic Library (IEL)
4. Emerald
5. Science Direct

In addition, I manually searched all the issues of the following journals: Academy of Management Journal, Academy of Management Review, and *Business Process Management Journal*, from 2000 until 2010.

Synonyms and abbreviations for the main terms were identified. I executed automated search attempts to all five before mentioned digital databases for articles for peer-reviewed scholarly articles, proceedings, or case studies published since 2000. Search terms used were the exact matches of Business Process Management System/s, Business Process Management Suite/s, Business Process Management Software, and the most common acronyms; BPMS, BPM System/s, BPM Suite/s, and BPM software. I searched separately the document title, keywords, and abstract to cover studies dealing with empirical topics.

From the retrieved articles I excluded the rhetorical, opinion-based, theoretical articles, and studies that focused on evaluating academic or experimental BPM implementations through a prototype rather than a real-life application in industries or businesses. Only the empirical studies and surveys were retained. The selection was based on reviewing the abstract and conclusions of the research article and irrelevant articles were rejected. These articles were supplemented by another set that were handpicked based on my search from *Business Process Management Journal,* and from the reference lists of all considered articles – these articles where subject to the same criteria defined above.

2.2 Data gathering

By extracting and categorizing relevant research, I aim to provide a quantitative overview of the empirical research of BPMS. The results of the search are presented in Appendix Table 16. In categorizing the studies: methodology, source of subject sample, and process domain where BPMS has been applied, are shown as initial characteristics. Additionally, the goals of the initiative, the BPMS features that could be recognized in the case description, as well as additional technologies reported to have significance are addressed. Finally, a quality appraisal about each study is presented.

I conducted the search during 19.01.-10.2.2010 focusing on the scholarly literature that consists of academic journals and conference proceedings where the articles are normally peer-reviewed. The authors are usually academics but practitioners are also well represented in the case study type of articles.

All articles found by the automated search were counted and complemented with articles from my manual search. From the resulting set I extracted the articles that matched the criteria defined before. Out of all search results, 100 articles were identified to concern BPMS features. Out of this 100 BPMS related articles, 10 fit the designated criteria, and from these 10 articles, the automated search had found 8 and 2 by the manual search.

To illustrate the upsurgence of interest in BPMS, I sorted the full set of relevant publications by year, and present the results in Figure 2.

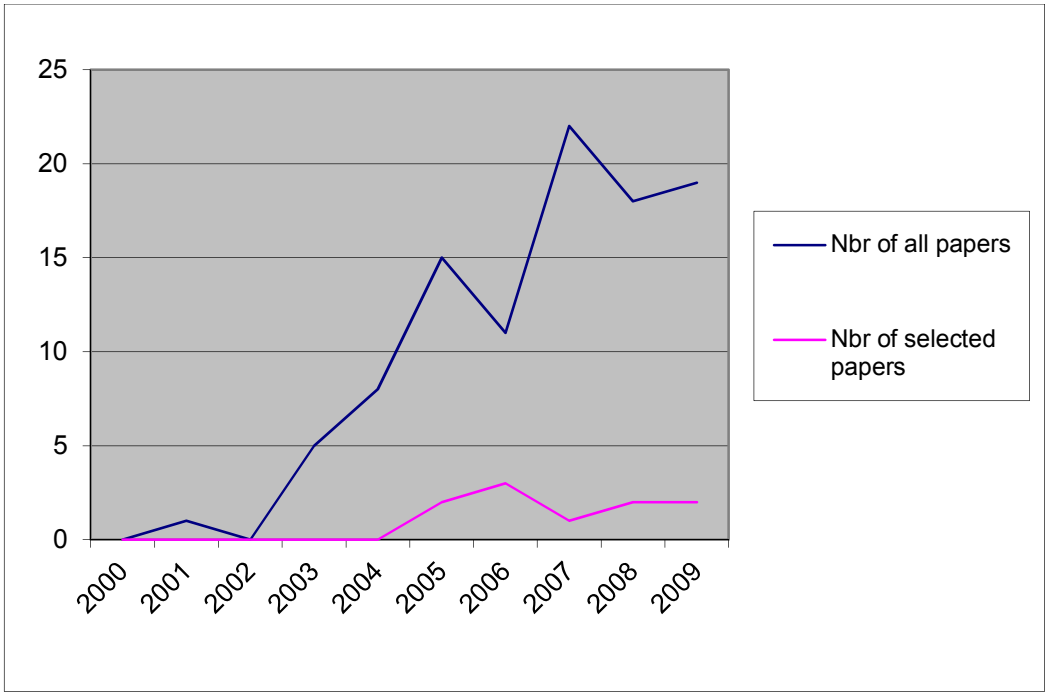

Figure 2. Comparison of annual volume of discourse compared to my resulting set of publications covering empirical evidence about BPMS

Using a similar approach as Baskerville and Myers (2009), I have considered whether BPMS is just another IS fad. They used a bibliographical review to investigate IS fashion waves by measuring the volume of discourse about a particular fashion. They defined an IS fashion as a phenomenon that gained substantial interest in both academic and practitioner literature at one time but is at present considered to be a thing of the past. Their resulting list of IS fashion waves included BPR, however, they also noted that for BPR, the scholarly interest was still ongoing after its peaking in 1994.

I chose to search for articles as far back as 2000 to allow a big enough time interval to identify when the first BPMS related articles started to occur. My manual

search of Business Process Management Journal issues of 2000-2003 were all related to BPR and ERP and thus were excluded from all counts. First occurrence related to BPMS is from 2001 (Debenham 2001), though it did not contain any empirical support, and therefore the first occurrence that matched the criteria is from 2005 (Zimmerman et al., 2005).

The number of BPMS related articles started to grow after year 2003 and peaked in 2007 with 22 occurrences, and that level of occurrences has remained until the end of 2009 with 19 occurrences. However, the number of articles that matched the criteria, on other words, included empirical knowledge, has the average of 2 occurrences per year during 2005-2009. The manual search of Academy of Management Journal and Academy of Management Review did not result to any occurrence, which could imply that BPM had not yet reached attention as a considerable management practice. Whereas the overall number of articles has remained close to the peak of 2007, the level of empirical evidence has so far remained low. This presents the support that BPMS have been empirically under-researched in the BPM community before 2010. Even though the resulted evidence is scarce, I continue in the following to explore the key concepts and relationships from the resulted studies.

2.3 Review of the Findings for BPMS Empirical Evidence

Based on my systematic review, the quality of empirical support varied significantly. Only two studies (Küng and Hagen 2007; Zimmerman et. al, 2005) out of ten provided information to identify what BPMS features were used and what support was given to support the benefits. In the following, I present a summary of the relevant studies. Following Webster and Watson's (2002) instructions, I have collected identified concepts into Appendix Table 17.

In the first of the two most relevant articles, Zimmerman et al. (2005) described the Service Oriented Architecture (SOA) initiative of a large telecommunication wholesaler in a very detailed way, where Business Process Choreography (BPC) played a major role in automating the order management process. The BPC included process design and enactment based on a Business Process Execution Language (BPEL) connected to underlying infrastructure through SOA-based services. The case study covered the project and technological approach, and presented the benefits gained and lessons learned. Even though this study could be considered rather a SOA study than BPMS, the main findings supported the SOA-enabled BPMS. However, the process design and enactment based on BPEL was seen to be immature in that it required semi-manual or manual steps between business analysis and development. While many aspects of case studies dating from 2005 might not hold today, this issue of navigation and synchronization between the business analyst's process design and the developer's enactment is a well-recognized issue still today.

The second most relevant article is a case study performed by Küng and Hagen (2007), which covered three process domains with various improvement goals. The study describes the business objectives of the process improvement and technological solution in detail, and merits especially in its clear description of the business benefits. The main finding was that through the combination of process restructuring and the application of modern IT, and specifically when process design and enactment is connected to SOA infrastructure, processes can be improved significantly.

The other end of the quality spectrum was demonstrated in studies that were closer to commercial product descriptions and marketing material, for instance, Callas (2006) and Miers (2006). Such studies either did not give the details of implemented BPMS features or were very broad in their description of the benefits gained. None of these studies provided any evaluation of the validity of their own results.

BPMS has been applied to a variety of businesses and process domains. The case studies presented in Appendix Table 16, show that out of 12 case studies (note that Reijers 2006, included 3 cases in his study), 2 cases were from telecommunication, 2 cases from banking, and the one each from the following business domains: energy, mortgage, insurance, asset management, industrial manufacturing, forestry, educational, and contract manufacturing. Consequently, the coverage of process domains was equally extensive and divergent. Most cases concentrated on human-centric processes, in other words, the improvement and optimization of processes that involved human participation.

Beyond the variety in business domains and types of the processes, the BPMS features also varied widely. Surprisingly, business rule repository and design were not mentioned explicitly in any of the case studies. When investigating the technological success factors of using BPMS features, I identified the following issues. The maturity of BPEL capabilities for process design and enactment stage was criticized by Zimmerman et al. (2005). Despite this, the BPEL was also used as a process design tool, though according to Ko et al. (2009), it belongs more to the process enactment stage. Moreover, Zimmerman et al. (2005) considered the extensions to the pure BPEL, and the introduction of many technology stacks to be success factors for the BPMS implementation. Therefore, these findings could suggest that the immaturity and the misuse of BPMS features in the course of the implementation may be the true source of these risks. In addition, what processes to expose, as well as the careful architectural positioning of process enactment in existing infrastructure, may increase the risks. When considering the relationship between the process modeling capabilities of BPMS and information modeling, the finding confirms the Seethamraju and Marjanovic's (2009) results indicating that business processes incorporate textualized and often emergent knowledge, and it is not sufficient to prescribe such emergent knowledge with a process model. In addition, the relationship of static information models to the success of Business Process Improvement (BPI) is not supported. This finding suggests that the dynamic and emergent nature of managing business process improvement may necessitate new approaches for information modeling, information sharing, coordination, and exchange.

Only one of the studies (Chalaris and Vlachopoulos 2009) defined their BPM implementation approach, otherwise none of the studies described their BPM method. This finding coincides with the empirical survey conducted already in 1995 by Elzinga et al. (1995). They found out through a survey of major US companies that in spite of the interest to BPM, the approaches for implementing BPM varies per company to company. Also Neubaeur (2009, p. 166) reports in an empirical study conducted during 2006 that, "although the majority of the participating companies are involved with BPM initiatives, only a very small number of companies follows holistic approaches." I argue that this finding sheds more light on the relationship between BPM and BPMS. If the approaches of implementing BPM vary widely and do not follow nor share holistic methods, can the success of BPM be attributed only to technological capabilities employed in BPMS?

The resulting, even though a very limited body of support suggests, that the use of BPMS has a positive influence on the ability to change business process structures, and that the use of BPMS is positively associated with BPI success and firm performance. Even though no kind of management of process excellence teams were explicitly mentioned in any of the cases, many human resource development concerns were raised. For instance, Reijers (2006) pointed out that the introduction of both new work procedures and a new support system was considered by some end-users as too much change at one time. He also noticed that the end user acceptance for BPMS grew when they got more involved in updates and improvements. Also, the following critical success factors (CSFs) were identified by Zimmerman et al. (2005): scheduling proof-of-concept (PoC) early in the project along with the high-level outlining of the solution, iterative and incremental style based on agile development, e.g., continuous delivery and collaboration, investment in an analysis phase involving several fact-to-face workshops within the architecture, and with the development and system administration teams, the early identification of the possible areas of concerns, and the definition for appropriate risk mitigation strategies before initiating any premature implementation work.

In summary, the results of systematic literature review shed light on the technology-driven changes and implications that are enabled by BPMS capabilities. As a conclusion of the review, there does exist, albeit very limited empirical support of BPMS benefits for a variety of business and process domains, the choice of BPMS features used, and the level of automation achieved. Interestingly, instead of mere automation of business processes, the tendency in the cases was toward optimizing human centric processes. My SLR results have similarities with Ravesteyn and Batenburg's (2010) survey to identify the CSFs of BPMS implementation answered by 39 Dutch consultants. Their results revealed that "developers and consultants with a specific BPM experience more strongly believe that applying BPM enables organizations to improve processes and IS/IT in a more flexible and adaptive way" (ibid., p. 504). They also concluded that the most prominently supported CSFs were communication, involvement of stakeholders, and governance. In addition, they argued that BPMS implementations should not be seen merely as IT projects but should be advocated with a top-down approach by top management (ibid., p. 504).

Okoli (2012) recommended that the synthesis stage of a theory landscaping review should focus on building a nomological network. He explained that the nomological network should include, for example, the relationships between various stakeholders, technologies, and environmental impacts. Benbasat and Zmud (2003) recommended that for constructing the nomological network, the constructs involved should be intimately related to the IT artifact. However, Agarwal and Lucas (2005) criticized Benbasat and Zmud for focusing only on micro-level research and argued for the need to conduct research that has a macro-level perspective instead. Accordingly, with so many business process concepts and cases to consider, I have illustrated a nomological network that would be useful for understanding the concepts and relationships as shown in Figure 3. I have emphasized BPMS as the core IT artifact and its impact on micro- and macro-level outcomes and consequences. I also consider it to be of importance how the impact of BPMS use further effects the redefinition of the enterprise-level goal function on the macro level. The goal function can be understood as a collection of various financial and non-financial interests. The dotted lines in the figure imply low support apparent in the SLR findings.

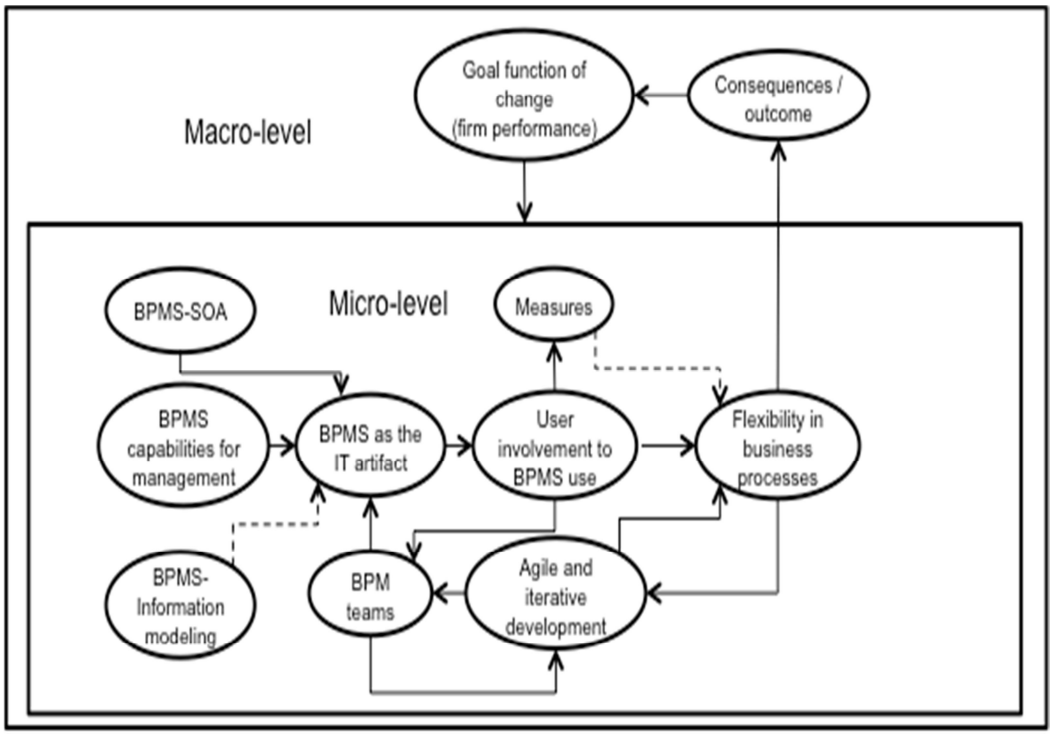

Figure 3. The nomological network of BPMS

It has been suggested that three critical elements: people, process, and technology need to be kept in balance (e.g., Alter 2006; Mangan and Christopher 2005; Quinn 2004). I have categorized the identified factors to influence BPMS success according to these broad elements as presented in Table 1.

Table 1. The resulted success factors identified from the empirical studies

People	Process	Technology
• Scheduling proof-of-concept (PoC) early in the project • The early identification of possible areas of concerns • Investment in an analysis phase involving several fact-to-face workshops within the architecture	• Careful selection of which processes to expose for improvement / change • Careful architectural positioning of process enactment in existing infrastructure • Iterative and incremental style based on agile development	• Avoiding misuse and immature BPMS features in the course of the implementation • Link process model and rule to execution directly • Connecting process design and enactment to SOA infrastructure improves processes significantly • Avoiding extensions to the pure BPM standards (BPEL) • Limiting the introduction of many technology stacks

3. Systematic Literature Review of Empirical Support Regarding BPM Maturity Models

In the previous chapter, I presented some empirical support, though very limited, for the claims attributed to Business Process Management Systems (BPMS) benefits. My results supported also prior views showing that companies do not follow any generally established BPM implementation approach or method. However, Agarwal and Lucas (2005) called for a research that has a greater macro focus than those concerning constructs involved intimately related to the IT artifact. Reijers (2006) cautiously argued that there is a relationship between how 'mature' a company is in terms of business process orientation (BPO), and with the success rate of their BPMS implementations. Coincidently, in the IS discipline, 'maturity' is regarded as "a measure to evaluate the capabilities of an organization" (Rosemann and de Bruin 2005a, p. 1). Therefore, in this chapter, I investigate what steps lead to increased BPM maturity, on other words: organizational capabilities for BPM, that lead to improved firm performance. BPMM models are considered to consist of stages or levels that an organization must go through.

The purpose of my research is to answer my second research question.

(RQ2). What steps in the suggested pathways of BPMM models are empirically supported?

I first elaborate the concept: BPM Maturity model, and then introduce a set of well-known BPMM models, which serve as a theoretical background for subsequent literature review of empirical evidence of the relationship between BPM maturity and firm performance. Second, the design of my SLR is illustrated and the research

results are presented and discussed. Finally, the review and analysis of the results are presented.

Similarly to my first SLR for BPMS influence on firm performance in the previous chapter, I do not define any predetermined criteria of measures for operational and business performance, but generally expect that effectiveness and efficiency (DeToro and McCabe 1997) measures are used for operational performance, and that business performance is measured in terms of financial and non-financial performance with quantitative and qualitative indicators. I assume more variety of the used measures to be given in the resulting studies.

3.1 Introduction to Business Process Management Maturity Models

The basis of BPMM models is the stage model, which was originally suggested by Nolan (1979). He said that the stage models could be viewed as learning models to help organizations move from one stage to the next. Key characteristics for the models are that:

1. Stages are sequential in nature, and
2. Stages occur within a hierarchical, and often irreversible, progression (ibid.).

Later, the concept of the maturity model has emerged to facilitate the evaluation of organizational capabilities by outlining anticipated, typical, logical, and desired evolution paths (Becker et al., 2009). In addition, Paulk et al. (1993) stressed that improved maturity yields an increase in the process capability of the organization.

Maturity models have been subject to criticism. Existing maturity models are said to lack a sound theoretical foundation or are derived on the basis of an arbitrary design method (Röglinger et al., 2012; Lahrmann et al., 2010; Biberoglu and Haddad 2002). Also, they are claimed to oversimplify reality and lack empirical foundation (McCormack et al., 2009; de Bruin et al., 2005; Benbasat et al., 1984; King and Kraemer 1984). In particular, maturity models neglect the potential multiple and equifinal paths for maturity (Teo and King 1997). According to King

and Kraemer (1984), most maturity models focus on the sequence of levels or stages toward a predefined "end state" instead of the factors that actually influence evolution and change.

When investigating BPMM models in particular, Jeston and Nelis (2008a, p. 314) argued that a "BPMM model is a tool that can assist organizations in becoming more successful with BPM, resulting in the achievement of greater operational and business performance benefits." McCormack and Johnson (2001) defined process orientation as an organization that, in all its thinking, emphasizes process with a special emphasis on outcomes and customer satisfaction. Therefore, the highest process capability would be when the organization has a special emphasis on outcomes and customer satisfaction. Moreover, it is important to note that the maturity of the management of business processes is measured – not the maturity of the business processes. Barney and Wright (1998) argued that to realize the full competitive potential of its resources and capabilities, a firm must organize its business processes efficiently and effectively. Process orientation has not yet been recognized as an independent discipline but rather as a representation of various management philosophies, which use process perspective to improve business performance (Škrinjar et al., 2008; Lindfors 2003).

Since hundreds of maturity models exist, I have chosen to present the following models from the BPM literature for the following reasons:

- Capability Maturity Model (CMM) is considered to be the origin of the process maturity thinking and therefore provides a good comparison for the other models.
- Business Process Maturity Model from Object Management Group (OMG) was developed directly from CMM and reflects the business process views, in contrast with the software basis of CMM.
- Business Process Maturity Model from Gartner includes a path orientation and addresses Critical Success Factors (CSFs) for each level of maturity.
- Process and Enterprise Maturity Model (PEMM) from Michael Hammer, a co-founder of Business Process Re-engineering (BPR), was presented in the

influential journal Harvard Business Review, and also includes a strong stepwise path orientation.

- McCormack and Lockamy's BPM Maturity Model is supported by global quantitative evidence of the critical components associated at each level of maturity (McCormack et al., 2009, p. 792; see also Lockamy and McCormack 2004).

In the following subsections, I outline each maturity model.

3.1.1 Capability Maturity Model

Process maturity model thinking is considered to have begun at the U.S. Department of Defense and Software Engineering Institute (SEI) through the development of Capability Maturity Model (CMM) at Carnegie Mellon University in the late 80s. CMM was primarily intended for assessing contractor's ability to deliver contracted software. It also describes a stepwise improvement path for software organizations from an ad hoc to a mature level. SEI created a five-step model that describes the levels that an organization moves through as it evolves from an immature organization to a mature organization where all processes are measured, managed, and consistently performed. Figure 4 illustrates the five CMM levels.

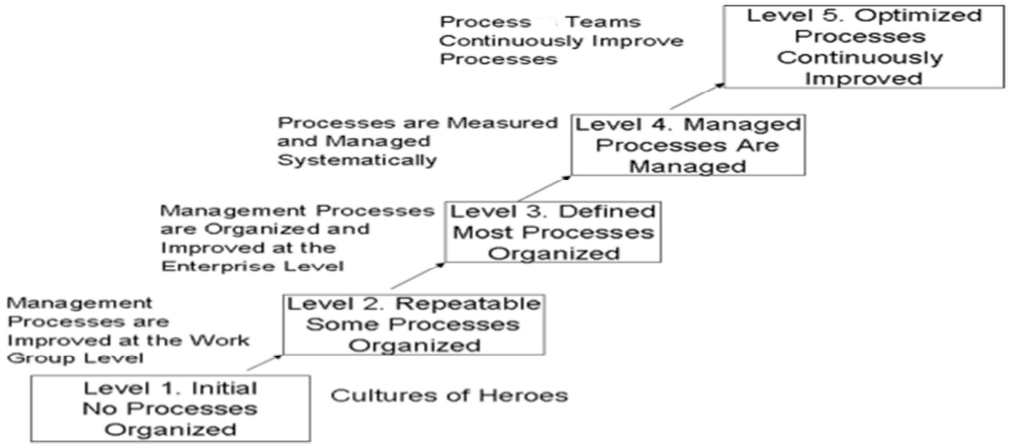

Figure 4. The CMM five levels of maturity (adapted from Harmon 2009, p.1)

According to SEI's (2007) statistics, Critical Success Factors (CSFs) for CMM-based process improvements are the commitment of management and staff at all levels, strong enterprise process infrastructure, supporting tools, training and communications, and sufficient enterprise function and program resources.

3.1.2 The Business Process Maturity Model by OMG

The Business Process Maturity Model (BPMM) standardized by Object Management Group, is an adaption of the CMM. The evolution from CMM to BPMM can be traced to Nedbank Limited in South Africa where it was discovered that the benefits gained with CMM for software development could also be achieved in the rest of their banking operations (OMG 2008). Nedbank developed a Services Operations CMM and made it available for the international community, and finally it evolved into BPMM. OMG's BPMM focused on the improvement of the business processes that takes a form of cross-functional workflows.

OMG described BPMM as "an evolutionary improvement path that guides organizations in moving from immature, inconsistent processes to mature, disciplined processes. The BPMM guides these stages so that improvements at each stage provide a foundation on which to build improvements undertaken at the next stage. An improvement strategy drawn from the BPMM provides a roadmap for continuous process improvement. It helps to identify process deficiencies in the organization and guides the improvements in logical, incremental steps" (OMG 2008, p. 66). Figure 5 illustrates the five levels of process maturity.

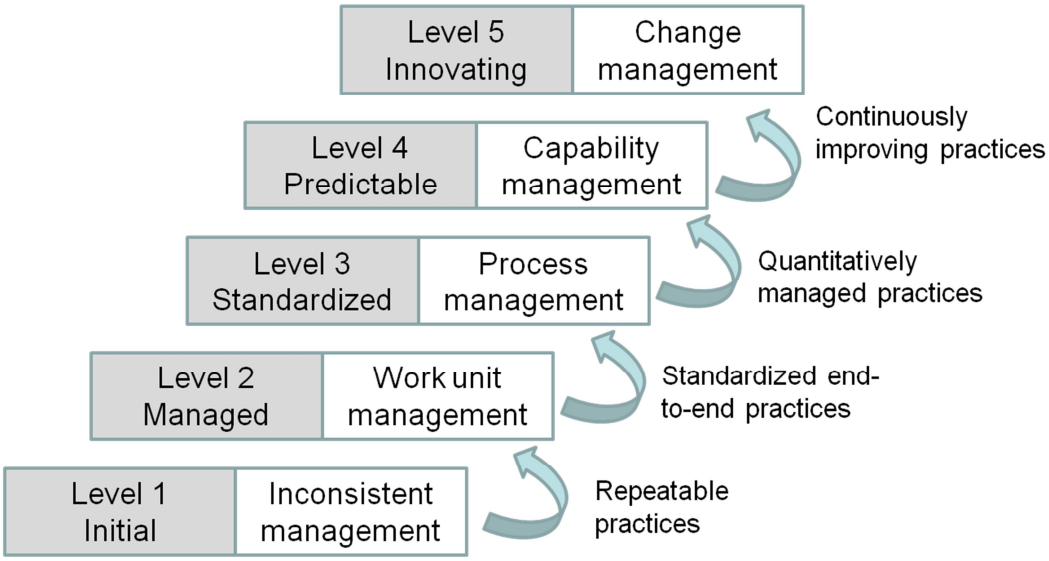

Figure 5. The five levels of process maturity of BPMM (adapted from OMG 2008, p. 66)

3.1.3 The Business Process Management Maturity Model by Gartner

Gartner, a major information technology research and advisory company, constructed a six-phase BPM maturity model and defined critical success factors for their BPM maturity framework. Gartner claim that their BPM maturity model provides guidance for how "organizations can more easily navigate the challenges of becoming process managed" (Melenowski and Sinur 2006, p. 1). Figure 6 illustrates the six phases of the process maturity.

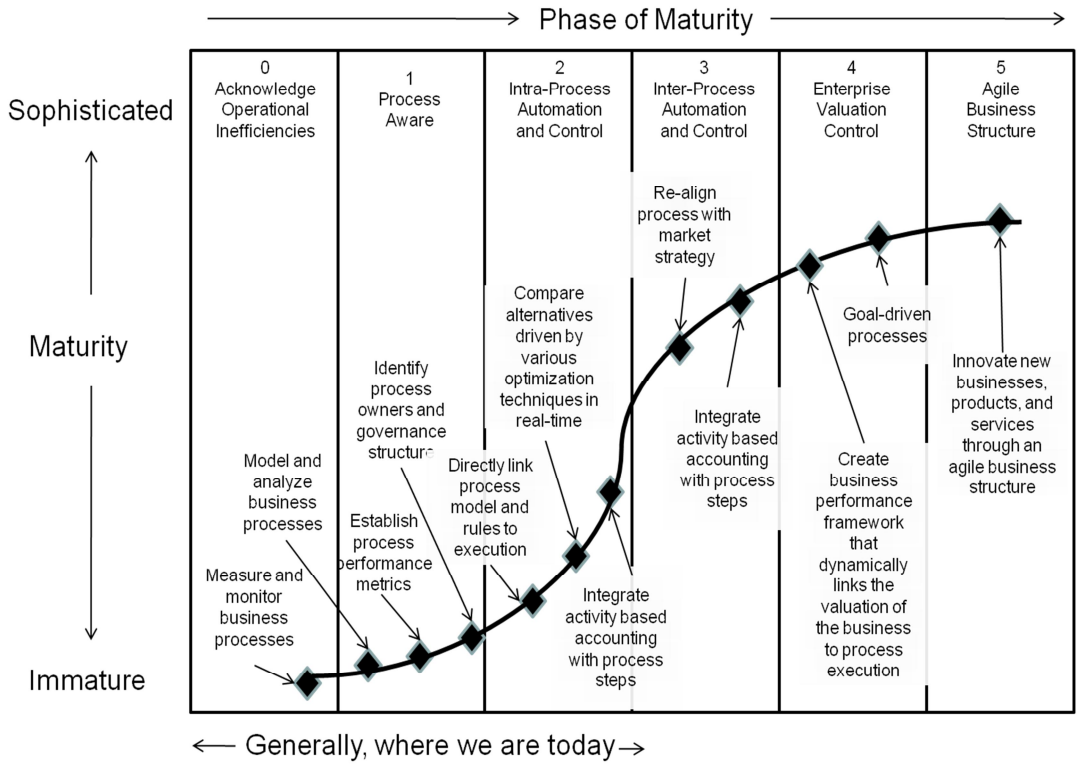

Figure 6. The six-phase model of process maturity (adapted from Melenowski and Sinur 2006, p. 1)

Gartner's concept of BPM maturity is based on the belief that superior process management leads to a truly agile business structure. Each phase in the maturity model builds on the previous phases. The path from Phase 0 towards more mature phases starts when conventional approaches do not provide solutions for business process improvement opportunities. Companies become "process aware" in Phase 1 when fundamental operational changes are introduced, processes are modeled and governance structures established. In Phase 2, process modeling and governance may enable process automation and better control. In Phase 3, the boundaries of processes are expanded and integrated with each other as well as with customers and partners. In Phase 4, process execution and strategic goals are linked when competencies have achieved in managing the major business processes, which ultimately leads to an agile business structure. In Phase 5, new products and services are created through innovative and agile business structures.

3.1.4 Process and Enterprise Maturity Model

Hammer, the co-founder of the Business Process Re-engineering (BPR), developed a process maturity model called Process and Enterprise Maturity Model (PEMM) that "centers on five characteristics that enable any process to perform well on a sustained basis and four enterprise capabilities that allow processes to take root in organizations" (Hammer 2007, p. 112). The five process enablers are (ibid., p. 113):

- Design: Comprehensive specification of how the process is to be executed.
- Performers: Skilled and knowledgeable people who execute the process.
- Owner: A senior executive who has responsibility for the process and its results.
- Infrastructure: Information and management systems that support the process.
- Metrics: The measures the company uses to track the process's performance.

The four enterprise capabilities are:

- Leadership: Senior executives who support the creation of processes.
- Culture: The values of customer focus, teamwork, personal accountability, and willingness to change.
- Expertise: Skills and methodology for process redesign.
- Governance: Mechanisms for managing complex projects and change initiatives.

These process enablers and enterprise capabilities are each broken down into four levels of maturity. A company progresses a stepwise path in the beginning with the basics in enterprise capabilities, which form the foundation for the first changes in process enablers. This progress allows then a further advancement in enterprise capabilities as illustrated in Figure 7. This alternating progress between enterprise capabilities and process enablers continues until the company reaches the highest level of maturity. Hammer (2007, p. 118) claims, "Stronger organizational capabilities make for stronger enablers, which allow for better process performance." The enterprise must have E-1 capabilities, that is; some teamwork experience within company must be present in the enterprise's leadership, culture, expertise, and governance to pull its processes into the P-1 level; processes are reliable and predictable, they are thus stable. Accordingly, when all four capabilities reach E-2, the processes can proceed on P-2 and so forth.

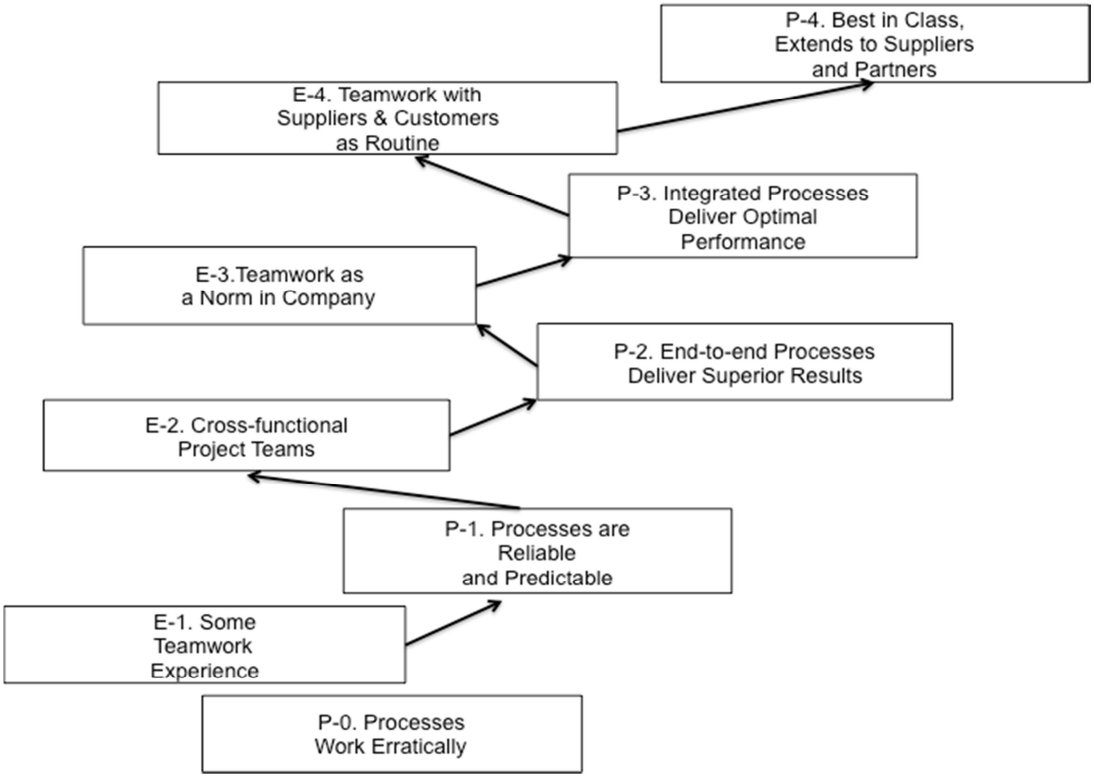

Figure 7. A stepwise path towards higher level maturity builds on precedent levels within the enterprise capabilities (derived from Hammer 2007)

3.1.5 The Business Process Management Maturity Model by McCormack and Lockamy

McCormack and Lockamy's maturity model describes a four-step path to process maturity (McCormack 2007; Lockamy and McCormack 2004; McCormack and Johnson 2001). As with the other selected maturity models, the levels of their model build on the work of the previous steps. The levels are described as follows:

> "(1) *Ad hoc*. The processes are unstructured and ill-defined. Process measures are not in place and the jobs and organizational structures are based upon the traditional functions, not horizontal processes.
>
> (2) *Defined*. The basic processes are defined, documented and available in flow charts. Changes to these processes must now go through a formal procedure. Jobs and organizational structures include a process aspect, but remain basically functional. Representatives from functional areas (sales,

manufacturing, etc.) meet regularly to coordinate with each other, but only as representatives of their traditional functions.

(3) *Linked*. The breakthrough level where managers employ process management with strategic intent and results. Broad process jobs and structures are put in place outside of traditional functions.

(4) *Integrated*. The company, its vendors and suppliers, take cooperation to the process level. Organizational structures and jobs are based on processes, and traditional functions begin to be equal or sometimes subordinate to process. Process measures and management systems are deeply embedded in the organization" (McCormack et al., 2009, p. 794).

McCormack et al.'s (2009) global research collected several years of data from over 1,000 companies in the USA, Europe, China, and Brazil. Their results identified the elements of BPM that stabilizes at the different levels of their maturity model. Based on their analysis of the maturity assessment data, certain BPM elements become evident at specific levels while others are barely registered. This suggests that the BPM journey from one maturity level to another goes through these "Turning points". The levels and turning points that are necessary conditions to progress to the next level are as follows:

Turning points from Level 1 to Level 2:

- Process language
- Focus on documentation
- Knowing the customer's needs and preferences
- Process measurement and management
- Endorsing teamwork and multi-skilling

Turning points from Level 2 to 3:

- Process measurement and management defined
- Consistent use of process metrics
- Realizing how employee performance is linked into process performance
- Employee training in adapting to process changes
- Process culture manifests itself in the regular use of process language

Turning points towards Level 4

- Process analytics and automated processes

3.1.6 Synthesis of the Steps of BPMM Models and Hypotheses

A summary of the BPMM models presented above is shown in Figure 8.

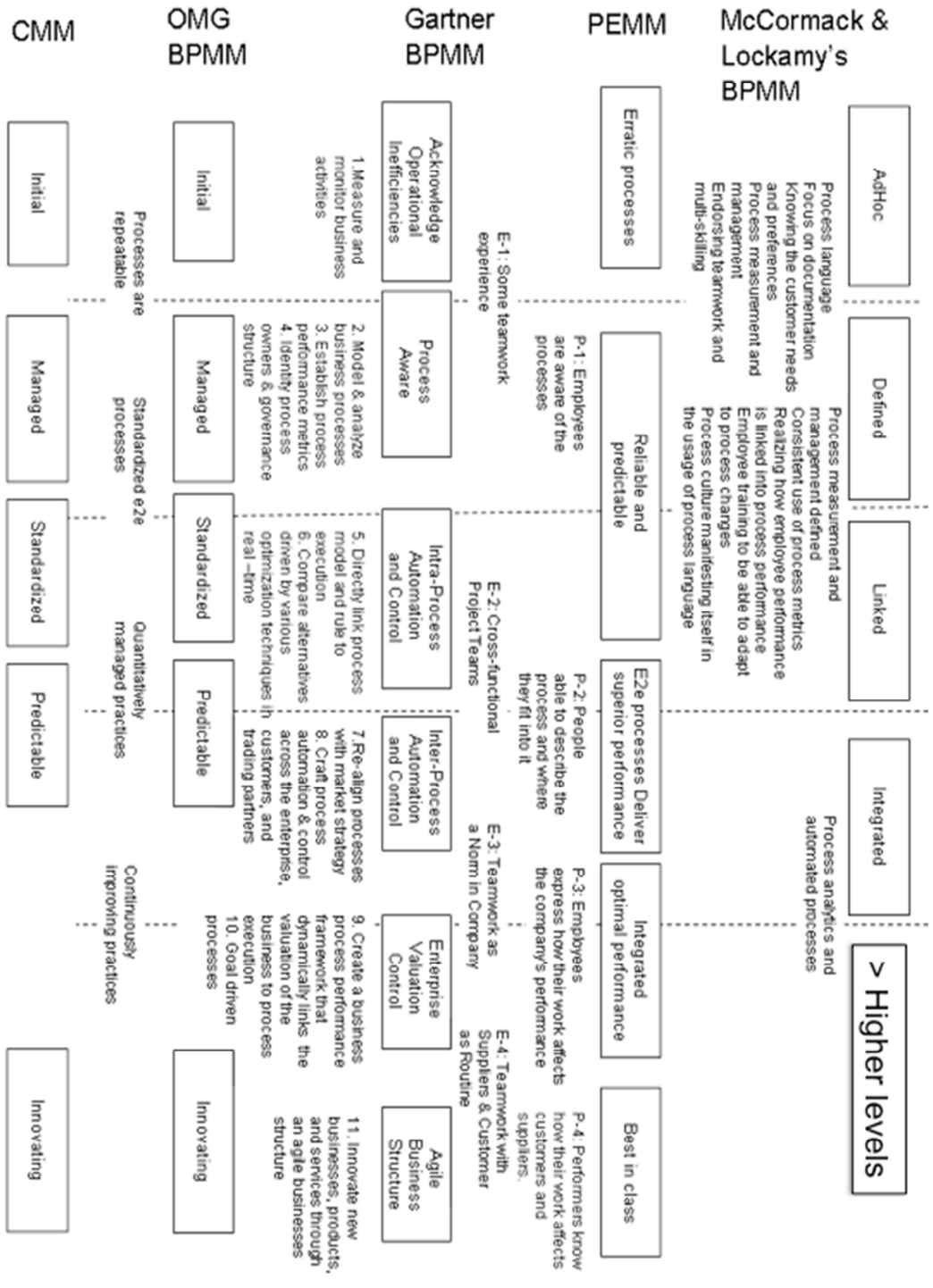

Figure 8. BPMM models (derived from McCormack et al., 2009; Harmon 2009; OMG 2008; Hammer 2007; Melenowski and Sinur 2006)

Many of the elements of these models have overlapping characteristics, such as turning points and process enablers, so I have synthesized a sequence of steps towards maturity for each level using the borders from McCormack and Lockamy's model as delimiters shown in Table 2. My purpose is not to create a new maturity model but to derive a model for linking empirical support to the steps suggested by the selected BPMM models. Empirical support hopefully should reveal which steps are relevant and if their order of completion is important. The steps under each level are listed in order of progress, for instance, where teamwork and multi-skilling are the first steps to realize in the company, and the next step is the measuring and monitoring of the business activities, and so forth. I acknowledge that the list of the steps is not exhaustive, and some steps can be taken at the same time, or the order is not absolutely definitive.

Table 2. The suggested sequence of steps towards increased maturity

Step nbr:	Step source	Step
		Level 1
1	McCormack et al., Hammer's PEMM	Teamwork and multi-skilling
2	Gartner BPMM, McCormack & Lockamy BPMM	Measure and monitor business activities
3	McCormack & Lockamy BPMM	Use process language
4	McCormack & Lockamy BPMM	Focus on documentation
5	McCormack & Lockamy BPMM	Know the customer's needs and preferences
6	OMG BPMM	Establish repeatable processes
		Level 2
7	Gartner BPMM	Model and analyze business processes
8	Gartner BPMM, McCormack & Lockamy BPMM	Establish process performance metrics
9	Gartner BPMM, McCormack & Lockamy BPMM	Define process measurement and management
10	McCormack & Lockamy BPMM	Use of process metrics consistently
11	Gartner BPMM	Identify process owners & governance structure
12	McCormack & Lockamy BPMM	Train employees in adapting to process changes
13	McCormack & Lockamy BPMM	Realize how employee performance is linked into process performance
14	Hammer's PEMM	Establish cross-functional project teams
15	OMG BPMM	Standardize business processes
		Level 3
16	Gartner BPMM	Link process model and rule to execution directly
17	Gartner BPMM	Compare alternatives, driven by various optimization techniques, in real –time
		Level 4
18	Hammer's PEMM	Teamwork is a company norm
19	Hammer's PEMM	Employees express how their work affects the company's performance
20	Gartner BPMM	Re-align processes with market strategy
21	Gartner BPMM	Craft process automation & control across the enterprise, customers, and trading partners
		Higher levels
22	Gartner BPMM	Create a business process performance framework that dynamically links the valuation of the business to process execution
23	Gartner BPMM	Teamwork with suppliers & customer is routine
24	Hammer's PEMM	Performers know how their work affects customers and suppliers
25	Gartner BPMM	Create new innovative businesses, products, and services through an agile business structure

3.2 Design of Systematic Literature Review for Steps in BPMM Models

My review protocol consisted of an automated search of the following digital libraries:

a. EBSCO Host – Business Source Elite databases
b. Association for Computing Machinery (ACM)
c. IEEE/IET Electronic Library (IEL)
d. Emerald database
e. Science direct
f. Springer

Automated search attempts were made for within all six digital databases listed above peer reviewed scholarly articles. The search criteria were exact matches of "Business Process Management" and ([AND]) "Maturity Model[s]" targeted to the full text of the articles. Even though I selected only a few maturity models for detailed inspection, the search attempts were aimed to discover other potentially relevant maturity models of BPM. In case such models would be found, I would briefly inspect the descriptions of their influence on firm performance accordingly.

From the retrieved articles, I excluded the rhetorical, opinion-based, theoretical articles, and studies that focused on validating academic or scientific BPMM models through hypothetical research settings. Only case studies, surveys, and interviews were kept. Selection was based on reviewing at least the abstract and conclusions of the research article, irrelevant articles were rejected. The selected articles were thoroughly read. These articles were supplemented with a case study from the book "Management By Process: A Roadmap to Sustainable Business Process Management" by Jeston and Nelis (2008b), which I handpicked due to its in-depth coverage of a BPM maturity journey.

The studies were categorized according to methodology, company or business unit, and size. From there, I focused on identifying the business objectives of the organizations, BPMM models used, and the path that was taken in the organizations to increase their maturity. Finally, the summary of the results is presented highlighting what kind of successes or benefits were measured or experienced as outcomes.

The search was executed during July and August 2010. Articles published since then are not included. The results of the automated search were as follows:

- ACM Digital Library: 6 matches from which 0 was selected
- EBSCO Host (Academic Search Primer and Business Source Elite): 1 match from which 0 were selected
- Emerald: 65 matches from which 9 were selected
- IEEE Xplore: 62 matches from which 4 were selected
- Science Direct: 26 matches from which 3 were selected
- Springer: 9 matches from which 0 were selected

Altogether 170 non-redundant studies (169 from an automated search and one case study from the book) were explored for empirical support of BPM maturity models, and 17 studies out of 170 were finally relevant.

3.3 Data gathering

By extracting and categorizing relevant research, I aim to provide a quantitative overview of the empirical research of selected BPMM models. In general, I grouped the selected studies into three categories that are analyzed in the following sub sections accordingly:

1. Large sample based surveys that supported the progress in BPM maturity stages and are supplemented with multiple case studies of similar confirming results. These studies are presented in the Appendix Table 18.
2. Multiple and single case studies that confirmed the increased effectiveness and efficiency or business performance when a company takes one or more steps described in the maturity models. These studies are presented in the Appendix Table 19.
3. Empirical research that results in conflicting or negating evidence of the need to progress along the steps of the maturity models in the prescribed order. These studies are presented in the Appendix Table 20.

3.3.1 Findings that support the progress along BPMM

McCormack and Lockamy's model is a result of collecting data from over 1,000 companies in several industries and countries over several years. Their research has

mainly been about Supply Chain Management (SCM), though McCormack et al. (2009, p. 812) also comment about BPO, "The results from different continents, cultures and industries confirm the applicability of BPO concepts to a wide range of companies."

This study from McCormack et al. (2009) summarized many of their previous studies. Their studies provide the following empirical contributions: firms with BPO achieved better overall performance, and companies with strong measures displayed better group spirit with less internal conflict (McCormack 2001), process measures and process-oriented values and beliefs are critical ingredients of SCM systems, corporate survival in the internet economy will depend both on the effectiveness of internal processes and the integration of those processes with the SCM of their partners and customers (McCormack and Johnson 2001), and finally, a strong and positive association exists between supply chain process maturity and firm performance (McCormack et al., 2008; Lockamy and McCormack 2004).

Three of the selected studies reported positive results about progressing from one level to another with regards to BPMM models. Palmberg's (2010) study presented positive results for three companies that progressed towards a process-oriented organization and achieved the "Linked" stage of the McCormack and Lockamy's BPMM model. Also, Sentanin et al. (2008) confirmed positive effects of the BPM efforts on non-financial performance; however, they called for more research about the effects on financial performance. In addition, Škrinjar et al. (2008) confirmed positive impact on non-financial performance, but surprisingly found no direct impact of BPO to financial performance.

Time period required to achieve a certain level of maturity was difficult to extract. However, the case study of Sentanin et al. (2008) described an effort that enabled the organization to progress into the "Defined processes" level within 33 months. Palmberg (2010) described how three case study organizations progressed to the "Integrated" level within 3 to 8 years. Even though the starting level was not clearly defined, the results suggest that progressing one or two (of the lowest) levels takes years, while no support to progress two levels within less than one year was found.

The aforementioned studies were all the empirical studies I could find at the time of the SLR, despite the fact that other BPMM models do exist. The empirical studies of Rosemann and de Bruin (2005a and 2005b) were found through the backward search from the selected studies. Their CMM based maturity model was tested in two Australian organizations by conducting both case studies and surveys. They claimed, "The findings confirm the model as having the potential to be very beneficial to organizations wishing to progress BPM initiatives" (2005b, p. 20). However, they (2005a, p. 11) also report "Second, at this stage we do not have empirical evidence for the correlation between the factors of the BPMM model and BPM success."

3.3.2 Findings that support one or multiple steps

None of the studies confirms an overall stepwise approach from lower to higher levels as suggested in the selected BPMM models. Only study by Palmberg (2010) described how three companies reached the "Integrated" level of McCormack and Lockamy's BPMM model but the stepwise approach to get there was not defined. The studies that confirmed either one or multiple steps in the sequence consistent with Table 2 were typically the case studies of specific BPM initiatives, projects with predefined business goals, or the studies of specific improvement initiatives over a longer period of time.

Based on my analysis, the most often realized steps were the following:

- Step 11 & Level 2. Identify process owners & governance structure, 5 cases
- Step 8 & Level 2. Establish process performance metrics, 3 cases
- Step 9 & Level 2. Define process measurement and management, 3 cases
- Step 10 & Level 2. Use of process metrics consistently, 3 cases
- Step 14 & Level 2. Establish cross-functional project teams, 3 cases

- Step 15 & Level 2. Standardize business processes, 2 cases
- Step 16 & Level 3. Link process model and rule to execution directly, 1 case
- Step 13 & Level 2. Realize how employee performance is linked into process performance, 1 case
- Step 19 & Level 4. Employees express how their work affects on the company's performance, 1 case
- Step 20 & Level 4. Re-align processes with market strategy, 1 case
- Step 12 & Level 2. Train employees in adapting to process changes, 1 case
- Step 21 & Level 4. Craft process automation & control across the enterprise, customers, and trading partners, 1 case

This analysis is based on my interpretation of the explicit support from the case study findings and does not exclude the possibility of other steps being realized if more data had been reported in the selected studies. Also, Okoli (2012) suggested avoiding quantizing qualitative data in theory landscaping literature reviews because one might lose some potential insights.

These empirical studies covered a broad range of sectors with a slight concentration on process standardization initiatives. The project and single initiative case studies varied in study time periods from 6 to 30 months, while the longitudinal studies varied from 3 to 10 years. The only case study that faced a substantial delay compared to the initial goal was a low maturity organization that experienced a delay of 9 months, which yielded to a total of 12 months for the entire process (Reijers 2006).

The measures of firm performance used in the case studies include customer facing and financial key measures such as: share price, revenue, market share, supply chain measures, process benchmarks, order management and delivery measures, productivity, operations costs, customer service, and retention (McAdam 2001). Internal and non-financial measures include: higher availability of the systems due to modular architecture, increased level of security, quality

improvements due to better change management, more timely Human Resource (HR) reporting and data correctness and completeness, and learning and growth aspects (van Wessel et al., 2007). In addition, combinations of Balanced Scorecards, Business Excellence models, and various ISO standards (International Organization for Standardization) were used extensively.

A multiple case study by van Wessel et al. (2007) is a good representative of the results above. They described the selection, implementation and usage of company IT standards for process performance and showed that the "service quality and flexibility increased when using standardized products or processes, and simultaneously costs went down. Customer satisfaction depended on the level of business participation" (ibid., p. 190).

The level of BPM maturity was partially confirmed to be a possible cause for the negative impact on process automation. Reijers (2006) presented a BPMS initiative carried out in three case study organizations: the one with having a "red" maturity, where the lack of business process orientation was assumed to seriously jeopardize a successful implementation, was indeed faced with the most problems, whereas the other more BPM mature organizations succeeded smoothly.

The steps belonging to the higher maturity level were well presented in the case study by MacKay et al. (2008), who described a high performing business unit of a company that emphasized on "change management exercises being clearly linked to delivery of the CBN [Compelling Business Need] and receiving high levels of buy-in from all levels of the organization" (ibid., p. 32). This CBN was created every three years in collaboration with business partners and customers. Such an approach confirms the significance of continuously realigning strategies with processes.

3.3.3 Findings that conflict or deviate from BPMM

Some of the articles deviated from the view that business performance increases only as a company progresses along the business process maturity levels. The survey by Trkman et al. (2010) suggests one alternative explanation for such deviation to be that the use of business analytics has a strong impact on the performance of critical supply chain processes regardless of the BPO. Moreover, Trkman et al. (2010, p. 324) also state that "companies may use other ways to cooperate without necessarily increasing their BPO at least in the short term" (ibid., p. 324) and that “It is quite possible that BPO is critical only in certain processes, depending on the focus of the company.”

These results are partially supported by the case study of Jeston and Nelis (2008b) where South African bank first successfully continued along the stages of CMM, but due to the negative impacts of macroeconomics and acquisition discontinued the process management function, yet they still revived remarkably. This revival was a result of focusing on a plan to “fix the business, consolidate and growth” plan (ibid., p. 60). This case study demonstrates that in certain circumstances it is not necessary to increase BPM maturity to improve firm performance. Other paths, even disruptive to BPM maturity, may turn out to be more successful.

The case study by Boersma and Kingma (2005) described how an organization was forced to shut down a sophisticated ERP system in order to recover from a production crisis, and needed to start over from a less mature stage to understand both the process and the ERP in a new way. This demonstrates that success with BPM can be achieved without unidirectional movement through BPMM stages. In addition, Seethamraju and Seethamraju (2009) not only confirmed a positive impact of integration and standardization of processes, but also noticed that the technical tight coupling of enterprise system infrastructure may limit the firm’s agility of creating new processes.

Also, the step (14) of establishing a cross-functional team is contradicted in one of the case studies where "the idea has been to mix employees from different market areas, and thereby have them work in the same way. However, this idea turned out to be difficult to realize, and therefore the organizational structure went back to specialized teams" (Palmberg 2010, p. 106). This finding confirms what Newell et al. (2001) addressed when they attempted to dispel the myth of the 'boundaryless' organization, and argued against technologically deterministic approaches to organizational change. Also, Niehaves and Plattfaut (2011) recently noted that collaborative BPM is a growing trend in information systems research, but that there is still significant gap in research.

3.3.4 Summary of the findings for BPMM Empirical Evidence

The results of the SLR confirm that the importance of progressing along stages of a specific BPM maturity model is widely underinvestigated, with the exception of studies made by McCormack et al. (2009). Consequently, being the only model with empirical support, the McCormack and Lockamy's BPMM model was also the most applied. From the reviewed studies, four papers either used or referred to the McCormack and Lockamy's model. The CMM model was also referred to in four papers, however, only two studies addressed the sequential progress of moving from one stage to another in CMM, and the other two only had a reference to the CMM model. The OMG BPMM was mentioned only in one paper, but that case study did not address or apply the model. Gartner's BPMM and Hammer's PEMM were not mentioned in any of the reviewed studies, though Hammer's primary study (2007) presents a collection of anecdotes about applying PEMM in the subject companies that increased business performance. Therefore, the only sign of credibility for this study is that it was published in an established and peer-reviewed journal. This leaves that the validity of the PEMM as open.

Based on my qualitative review, there is only partial support for the claim that progressing along the stages of BPMM models would yield to improved firm performance. The least supported areas emerge for the highest levels or turning points. From empirical research setting point of view, I argue that the most problematic aspect for the highest levels is in showing determinism. For example; the characteristic like process culture or agility in innovating with the customer, is difficult to associate with concrete steps along upward path. Even the most confirmed support related to BPMM turning points given by McCormack et al. (2009) acknowledged that the relationship between the elements (dependencies) was only suggested and not statistically supported.

Consequently, most evidence is inclusive and a few studies actually contradict with the claimed benefits of unidirectional and sequential progress along these stage models. My discussion is aligned with the conclusion of Phelps et al. (2007), who posited that there is little consistency either in the number of elements that define these models or in their constitutive components, and that they suffer from being linear, unidirectional, sequenced, and deterministic.

Therefore, I consider BPMM models to be useful instead as a measurement system to identify the level of BPO, rather than a prescriptive model for gaining firm performance. BPO can have different levels of maturity that can be identified with various BPMM models. However, the findings did not support that BPMM models can provide prescriptive methods to achieve these levels. Röglinger et al. (2012, p. 341) also concluded, “As for the prescriptive purpose of use, however, little concrete and documented guidance could be identified.” Actually, to reach a certain level many routes can be taken though certain steps may indeed be necessary somewhere along the way. I have illustrated this conclusion in Figure 9.

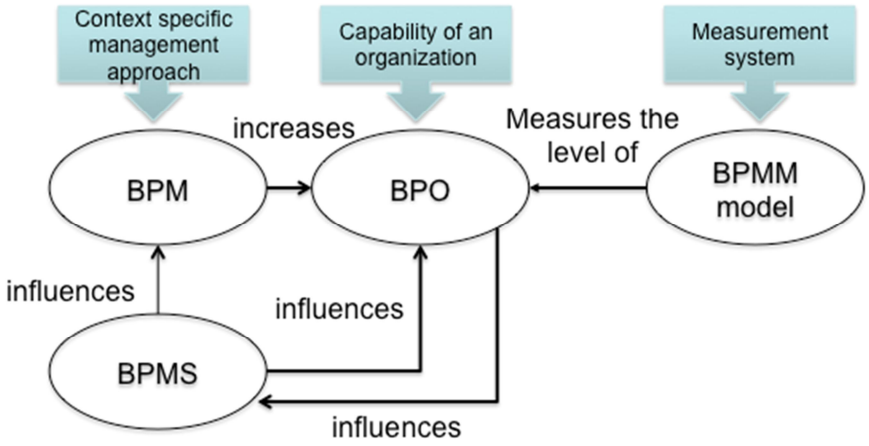

Figure 9. Model of the relationships between BPM, BPMS, BPO, and BPMM

I have collected steps that were most realized in the resulting support into categorized by people, process, and technological resource development dimensions.

*Table 3.*The most realized steps in resulting studies

People	Process	Technology
• Identify process owners and governance structure • Establish cross-functional project teams • Realize how employee performance is linked to process performance • Employees express how their work affects the company's performance • Train employees in adapting to process changes	• Establish process performance metrics • Define process measurement and management • Use of process metrics consistently • Standardize business processes • Re-align processes with market strategy	• Link process model and rule to execution directly • Craft process automation & control across the enterprise, customers, and trading partners

4. Theoretical approach

"While the concepts of BPM have been in existence for some time, the application and operations of BPM practices have evolved from functional division of work (Taylor 1911) and BPR (Davenport and Short 1990; Davenport 1993; Hammer 1990; Hammer and Champy 1993), to complex practices of holistic end-to-end business processes involving the integration of business and IT (Fingar 2006; Smith and Fingar 2007). BPM incorporates components of TQM, the value chain, Six Sigma, Lean and ERP (Paim et al., 2008)" (Antonucci and Goeke 2011).

In Chapters 2 and 3, I carried out an exploratory literature review of how the concepts closely related to Business Process Management and its Systems, including maturity models, are represented in prior empirical studies. The results imply that BPMS adoption yields a positive influence on firm performance, because BPMS includes features that enable flexibility for changes in business process structures. However, the lack of commonality between BPM implementation approaches poses challenges in providing prescriptive guidance how to achieve this flexibility. Moreover, the achievement of claimed BPM benefits turned out not to always be a result of following a predetermined and unidirectional path as suggested by various BPM Maturity models (BPMM). The findings unveiled a complex phenomenon that binds organizational and technological changes into a dynamic movement that, instead of being a linear progression of some prescriptive one-directional path, may require reverting back to previous stages to achieve firm performance. In particular, the idea of progressing toward higher levels of maturity, which are characterized by flexibility (or agility), innovation, and customer orientation, has very limited empirical support. In addition, the significance of BPMS in achieving these higher levels of maturity had very little support in the selected studies.

The summary of steps that have been identified as having influence on BPM initiative success is presented in Table 4.

*Table 4.*The steps identified from the SLRs of BPMS and BPMM models that influence the success of BPM initiatives

	People	Process	Technology
From BPMS SLR	• Scheduling proof-of-concept (PoC) early in the project • The early identification of the possible areas of concerns • Investment in an analysis phase involving several fact-to-face workshops within the architecture	• Careful selection of which processes to expose for improvement / change • Careful architectural positioning of process enactment in existing infrastructure • Iterative and incremental style based on agile development	• Avoiding misuse and immature BPMS features in the course of the implementation • Link process model and rule to execution directly • When process design and enactment is connected to SOA infrastructure, processes can be improved significantly. • Avoiding extensions to the pure BPM standards (BPEL) • Limiting the introduction of many technology stacks
From BPMM SLR	• Identify process owners and governance structure • Establish cross-functional project teams • Realize how employee performance is linked to process performance • Employees express how their work affects the company's performance • Train employees in adapting to process changes	• Establish process performance metrics • Define process measurement and management • Use of process metrics consistently • Standardize business processes • Re-align processes with market strategy	• Link process model and rule to execution directly • Craft process automation & control across the enterprise, customers, and trading partners

Rockart (1979) defined that critical success factors (CSFs) are those performance factors that must receive the on-going attention of management if the company is to remain competitive. However, the identified steps from prior empirical literature in Table 4 seem to be wide descriptions rather than mere factors or variables of performance. In addition, Škrinjar and Trkman (2013) considered that CSFs rarely provide empirically proven actionable points for companies on their journey towards a higher BPO maturity. Consequently, both BPM (e.g., Trkman 2010; Karim et al., 2007; Melão and Pidd 2000) and its CSFs are considered to be lacking

theoretical grounding (Škrinjar and Trkman 2013), and from the academic point of view blurry and less established (Snabe et al., 2009).

I have earlier described that BPM is a successor movement of Business Process Re-engineering (BPR) focusing on gradual rather than radical process improvement, in which technology still plays an influential role. However, aside from technological considerations, investigating the characteristics of internal concerns of an organization has been given less attention in BPM research (Palmberg 2010), and even less attention has been given to approaches that combine both the external and internal factors of the organization. According to Seethamraju (2012), many organizations have now shifted their focus toward business processes that are cross-functional and customer-focused, and have shifted their management development emphasis away from functional specialization and towards the integration of different functional departments (Welke 2005; McCormack and Johnson 2000; Malekzadeh 1998). In order to better understand the drivers for this shift in focus, I trace other historical paths of development toward BPM, as opposed to only looking at the path originating from Taylor's scientific management. I see these paths of development as having a combination of technology and social dimensions at their core, and that they expand also to non-manufacturing settings like the services industry.

In this chapter, my aim is to explore drivers of organizational process change, which might be aided by BPM and its Systems in contemporary organizations. My exploration serves as a theoretical basis for my own conceptual model of BPM and its Systems presented in a socio-technical systems context. First, in Section 4.1, I introduce three world-views to science to address different beliefs about social and technological settings apparent in the covered theories. Then I continue to trace the historical evolution of various organizational efficiency, management, and leadership movements preceding BPM to understand potential gaps that have remained in modern BPM. In Sections 4.2 and 4.3, I construct my own conceptual model of socio-technical work system that considers the aforementioned theoretical foundations as *describing theories* for explaining the key drivers for BPM. In Section 4.4, I address what kinds of changes there are, and what could be the *focal theory* for achieving such changes with a new construct called a *build system*. The

resulting model considers steps identified in Table 4 and other studies as *complementary focal theories* to aid realizing change with BPM and its Systems. Finally, I compare my theoretical considerations with rival approaches and provide a summary respectively in Sections 4.5 and 4.6.

4.1 Historical paths to BPM

4.1.1 The nature of a theory according to three world-views

Pursuing both technical and social theories within one study can be problematic. In order to address the possible limitations for such an approach, I present Chua's (1986) categorization of alternative world-views. He argues that the mainstream world-view to science has, despite its benefits, resulted also in limitations in many aspects: the problems studied, the use of research methods, and the possible research insights that could be obtained. He argued that these limitations only become clear when they are challenged by alternative world-views. To illustrate this, Chua offered the following three world-views: mainstream, interpretative, and critical. Chua argued that these views enrich and extend our understanding of how a particular field of science operates in practice. Each of the three world-views can be described based how they see and define three key concepts:

A. Knowledge: epistemological and methodological
B. Physical and social reality: ontological, human intention and rationality, societal order / conflict
C. Relationship between theory and practice

The way these concepts are defined forms the collection of assumptions underlying any theory arising from the given world-view. In the first concept, (A) epistemological assumptions determine what is to count as truth, and what are those methods considered to be appropriate for gathering valid evidence. The second concept (B) is about the object of study and concerns of ontology, human purpose, and societal relations. For example, assumptions about physical and societal reality may determine the people as physical objects and thus that is the way they should be

studied. Social science is mostly about human relations and rationality, which considers all knowledge as primarily purposive, including human needs and objectives. In addition, assumptions about relations between humans and society as a whole, influence every social theory in the way that they consider society - as full of conflict or essentially stable and orderly (Burrell and Morgan 1979). The third concept (C) includes assumptions about knowledge and the empirical world. Below I summarize the key differences in the way these three concepts are defined in the mainstream, interpretative, and critical world-views:

A. Beliefs about knowledge

The mainstream view considers theory as separate from observations that may be used to either verify or falsify a theory; the favored methods are quantitative. The interpretative view seeks for scientific explanations assessed via logical consistency, subjective interpretation, and agreement with researchers' common-sense interpretation of ethnographic work and case studies. The critical view sees theories as temporal and context bound, and suggests that historical explanations are of importance, given the belief that the identity of an object/event can be grasped only through an analysis of its history – what it has been, what it is becoming, and what it is not (Chua 1986, p. 621).

B. Beliefs about physical and social reality

The mainstream view considers empirical reality to be objective and external to the subject. Human beings are characterized as passive objects, not as makers of social reality. Societies and organizations are essentially stable. According to the interpretative view, social reality is emergent, subjectively created, and objectified through human interaction. The critical view considers human beings to have inner potentialities, which are alienated (prevented from full emergence) through restrictive mechanisms.

C. The relationship between theory and practice

In the mainstream view, researchers should only deal with the most efficient and effective means of meeting the needs of a decision maker. The interpretative view seeks to explain actions and to understand how social order is produced and

reproduced. Theories in critical view have a critical imperative: the identification and removal of domination and ideological practices.

In the following subsections, I introduce various theories from different fields of science that have preceded BPM over the past century. Each theory (or approach) can be considered as representing at least one of the three world-views Chua described. These views and their beliefs lead to a different emphasis of what is essential in the object of study and how the means and ends are appreciated. For example, in the mainstream view, researchers are means-to-end driven and they do not themselves consider as influencing the end state of the study object. Whereas the interpretative view posits that potential conflicts within the object of study can be solved through a common interpretative system. The critical view goes even further by recognizing that the discourse itself is actively involved in social control and conflicts between different classes of people. Chua argues that in the critical view, the most important assumption is that in any given state of either the individual or the society, there exists inner potential that is oppressed by the dominant system. Critical researchers do not evaluate end states; rather their moral is that such domination must be changed.

My approach in the following consideration tends towards the mainstream world-view as I have been searching for theoretical foundations to explain the success factors of BPM that arise from real-life situations where organizations set goals to achieve measurable results. I argue that as a practitioner working in the field of BPM, I have been able to get close to the phenomenon studied and therefore obtain first-hand knowledge of BPM.

4.1.2 From Taylorism to Business Process Re-engineering

The principles of BPM are deeply rooted in Taylor's principles of Scientific Management (aka Taylorism). Taylor (1911, p. 4) described his Scientific Management in terms of four principles:

1. Develop a science for every job, which replaces the old rule-of-thumb method.
2. Systematically select workers so that they fit the job, and train them effectively.
3. Offer incentives so that workers behave in accordance with the principles of the science that has been developed.
4. Support workers by carefully planning their work and smoothing the way as they do their jobs.

Gilbreth (1914), who invented the system of time-and-motion study, later developed Taylor's ideas further to discover the best method of doing a job. In addition to the physical aspects of reducing unnecessary motions and wasteful actions, Gilbreth also considered the social perspective of reducing the fatigue of the workers (Gilbreth and Gilbreth 1916). They thought that individual work performance depended on attitudes, needs, and the physical environment, as well as correct work methods and suitable equipment (ibid.). However, it was not until Gantt's (1919) efforts to humanize Taylorism that workers were recognized as human beings who deserve consideration by management. Since then, many other approaches have been introduced to mitigate the problems caused by Taylor's scientific management.

Prior researchers of BPM history have identified three waves after the Taylorism in the 1950s. The first wave included two consecutive phases: first the statistical approach with the works of Shewhart, Juran and Deming addressing quality management (Sidorova and Isik 2010; McManus 2001; Flynn et al., 1994), and second, lean management (Ohno 1988) based on the flexible and continuous improvement of processes and the elimination of waste. The first of the two phases, the quality management approach, focused almost exclusively on the production and manufacturing processes, whereas lean management had its most important innovations created when Toyota started automobile manufacturing (ibid.) and focused on flexible and continuous process improvement.

The second wave following these phases established the process view as a widely adopted approach for improving organizational effectiveness through BPR

initiatives during the 1980s (Sidorova and Isik 2010). The third wave appeared in the 1990s, as advances in information and communication technologies became used by businesses.

Sanchez and Heene (1997) investigated the development of strategic management theories since the 1940s and found two parallel traditions: (1) the general management tradition, which largely concerned improving organization designs and employee motivation as a core of management research, and the evolution of internal perspectives about what effects firms' performance, and (2) the development of industrial organization economics. Summarizing Sanchez and Heene's description of the historical development of the later (pp. 304-305): in the late 1950s and 60s industrial organization economics started to emphasize firm performance and the external perspective of competition as two characteristics of the fixed-asset structures of industries. The research focus then moved on in the 1970s to identify asset structures, shared customers, and common competitive strategies of similar companies. This movement was followed by the development of the value chain concept for describing the activities through which firms can use assets to 'add value' in an industry. Researchers suggested in the 1980s that firms must choose value chains and associated competitive strategies in accordance with their goals of achieving lower costs, superior product differentiation, or a focus on a specific niche in a product market (Porter 1980). The study by Sanchez and Heene concluded that the concepts of (business process) re-engineering could be considered as conceptual extensions of value chain analysis, with new emphasis on using information technologies in redesigning a firm's value chain activities. Biazzo (2002) noted that following the success of BPR in the first half of the 1990s, the socio-technical nature of re-engineering projects was emphasized in order to render the BPR construct more correct and acceptable at the theory level.

4.1.3 Alternative approaches towards BPM

Despite the historical transformation of work and organizations, contemporary BPM continues to resemble Taylorism in its focus on the systematic elimination of distractions and obstacles in the production. Theoretical approaches to linking, for

example, BPM and firm flexibility have remained scarce. I argue that the potential new forms of work organization have different historical development than the previous approaches of process management, where the focus has been on organizational efficiency and quality control.

During the 1960s, other alternatives to the principles of Taylor and his successors started to emerge. According to Asaro (2000), these alternatives can be divided into two traditions: the post-war work of social scientists resulting in the "socio-technical systems design" (STSD) approach, and the other that contributed to the current field of participatory design and has its roots in Scandinavia in the "collective resources" approach. Furthermore, van Einjatten (1993, pp. 17–18) has divided the development of STSD into three periods: *pioneering, classical,* and *modern.*

In the *pioneering* period of STSD from 1949–1959, Trist and his colleagues at the Tavistock Institute in London studied the British coal mining industry. They concluded that the behavior of organizational members was so tightly coupled to the way work was designed that the human system could not be understood without also understanding the technical system (Trist and Bamforth 1951). Emery (1959) expressed this dependence as a joint optimization; peak performance can be only achieved when the needs of both social and technical systems are met. The "joint optimization" of the social and technical aspects of production became a major practical and theoretical goal in the socio-technical school.

During STSD's *classical* period, the theory of organization as an open system was developed borrowing from von Bertalanffy's (1940) development of general systems theory in biology. The open systems perspective holds that every living organism depends upon its environment for inputs which allows it to survive (ibid.) An organization ensures their flow of inputs by providing goods or services that individuals or other organizations desire. In exchange, the organization obtains capital, which can be used for the acquisition of additional inputs (Pasmore 1988, p. 2). The more efficient the conversion process (the fewer inputs to produce the outputs), the healthier the organization will be (ibid.). Open systems can also reach a desired end state from a variety of initial states. This property is called 'equifinality'

and in the case of organizations it means that it is not always necessary to specify organization structure and each duty in detail. An organization that possesses this ‘equifinality’ develops its own specific mode of operation, and thus it is only necessary to detail the most important aspects. This requirement is called ’minimum critical specification’. Before proceeding in our periods of STSD, it is important to compare the open socio-technical system concept with the dynamical systems concept to elaborate more on the states of these systems.

According to Aulin (1989), a dynamical system has either nilpotent or full causal recursion. The dynamical systems with nilpotent recursion return their states from an initial stable rest state through number of finite states back to the stable state. Such systems require external stimuli to change the unit from a stable state to a perturbed state, after which the nilpotent causal recursion leads the system back to a stable state. If the same stimuli occurs again, the same shift happens, thus it is a memoryless system. A dynamical system with a full causal recursion does not have any rest state to be reached in a finite number of steps. Systems with full causal recursion can be further divided into self-steering, self-regulating, steerable from outside, and those that disintegrate after a certain disturbance. Aulin lists the examples for each category to be: the whole human thinking as a self-steering system, a periodically pulsating heart as a self-regulating system, a robot as a system steerable from outside, and a radioactive atom as a disintegrating system. Using Aulin’s classification, I consider BPMS to be a cybernetic nilpotent system.

Returning back to our historical timeline, Trist and Bamforth (1951) can be considered to be the first ones to see enterprises as open *socio-technical systems*. In their view, socio-technical systems arise from the fact that any production system requires both material technology and a social organization. I have illustrated the socio-technical system idea described by Huczynski and Buchanan (1985, p. 316) in Figure 10.

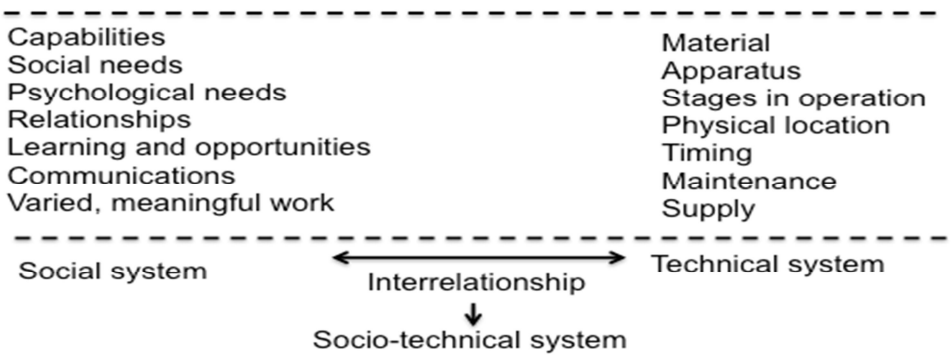

Figure 10. The idea of socio-technical systems (adapted from Huczynski and Buchanan 1985, p. 316)

Huczynski and Buchanan's idea of a socio-technical system illustrated above does not clearly distinguish between the concepts and relationships among the social and technical system components. The open systems perspective suggests an analogy between living organizations and enterprises. This begs the question: does the socio-technical system theory imply an analogy between humans and machines? Clearly, the mainstream world-view and Taylorism treated workers as kinds of machines with a rational goal function for each action, which in turn can be measured and optimized. One could argue that the workers were also steered from outside. Consequently, socio-technical systems theory considers the interrelationship of organizations and technology, but this perspective also assumes the resulting combined system to behave 'systematically', like a machine. Therefore, combining the view of an open-system organization as a self-regulating system and technology like BPMS as a cybernetic nilpotent system would still result in the dynamical cybernetic nilpotent socio-technical system, because technology sets limitations to the whole system.

According to the mainstream world-view, these systems are essentially stable and conflicts are managed with purposeful control systems. The interpretive world-view entails that goal functions given to such systems are determined by social and historical practices afterwards, and that conflicts are managed through common social interpretative systems. The critical world-view assumes such systems hold inner potential that has not been reached due to an oppressive dominant system.

STSD seeks to find the best fit between technical and social system components. According to van Einjatten (1993), the *modern* period of STSD that began after 1971 developed along four separate tracks: Participative Design, Integral Organizational Design, Democratic Dialogue, and North American Consultancy. In this dissertation, I do not introduce the three latter tracks but include only the well-recognized participatory design (PD) track, and consider its relationship with BPM.

STSD developed from the rediscovery of a flexible form of work organization in a British coalmine that was a potential alternative to Taylorism. STSD meant a radical departure from the common practice of Scientific Management, and clearly ushered in a new era of organizational design that is based on participative democracy (van Einjatten 1993, p. 128). Biazzo (2002) divided the socio-technical approach of a work system analysis to two parallel studies: (1) one aims to scrutinize "variances" – the conditions that could go awry and undermine the conversion process, (2) the other gathers all the information required in order to design and set up jobs in such a way as to encourage worker participation and commitment.

Cherns (1976) described STSD in terms of the following nine principles:

1. **Compatibility**. The process of design must be compatible with its objectives. This means that if the aim is to create democratic work structures then democratic processes must be used to create these.
2. **Minimal Critical Specification.** No more detail than necessary, but specification must express the essential requirements.
3. **The Socio-technical Criterion.** Control is local and awarded to the immediate work team.
4. **The Multi-functionality Principle.** Individuals and groups need a range of tasks to provide satisfying jobs, redundancy, and flexibility.
5. **Boundary Location.** Boundaries are political and should be managed.
6. **Information should flow where it is primarily needed** for action.
7. **Support Congruence.** Systems of social support must be designed to reinforce the desired social behavior. If employees are expected to

cooperate with each other, management must also show cooperative behavior.

8. **Design and Human Values.** Emphasis in design is placed on quality of working life.
9. **Incompletion.** The recognition that design is an iterative process.

I judge that only Principles 2 and 8 differ from the mainstream view. Principle 2 of minimal critical specification does not comply with the mainstream view, as it assumes that a human is different than a systematic machine in the sense that a human can design her own work and alter her work practices. Also, Principle 8 conforms more to the interpretive than mainstream view. But I argue that all in all these principles conform to the mainstream world-view.

In addition to Chern's principles, Pasmore (1988) compared the differences between traditional design and STSD as shown in Table 5.

Table 5. Traditional versus Socio-technical Systems Design (adapted from Pasmore 1988, p. 102)

Traditional Design	**Sociotechnical Systems Design**	
	Basic Design Features	*Broad Design Objectives*
1) Specialized, simple jobs	1) Whole, complex jobs	1) Development of commitment and energy
2) Hierarchical control	2) Worker autonomy	
3) Centralized authority	3) Delegated authority	2) Utilizing social and technical resources effectively
4) Individual rewards	4) Group/systems rewards	3) Maximizing cooperative effort
5) Segmentation of activities	5) Elimination of barriers	
6) Faith in technical solutions	6) Human and technical solutions	4) Developing human abilities
7) Human resources undervalued	7) Human resources valued	
8) Concerns with status quo	8) Concern with innovation	5) Innovation
9) Ignorance of environment	9) Attention to environment	6) Awareness of external environment

Pasmore summarized (1988, p. 101), "Social systems design allows organizations to make better use of people and machines. Lower fixed labor and less machine downtime translate into competitive advantage in manufacturing settings. In non-manufacturing settings, the same advantages accrue; while equipment's running time may not be a prominent factor in organizational effectiveness, proper equipment utilization can be. To the extent that both people and technology are important in achieving success, socio-technical systems design can lead to significant improvements in organization performance."

More recently, the variations of socio-technical approaches have appeared with emphasis either on organizational or technological change aspects. Markus (2004) presented the concept of "technochange": using IT strategically to drive organizational performance is fundamentally different from both IT projects and organizational change programs. According to Markus (ibid., p. 2), "Unlike IT projects, which focus on improving technical performance, technochange involves great potential impacts 'on the users' (people, processes, and organizational performance)." However, she also pointed out that experts have estimated that as many as 75% of organizational change efforts involving technology fail (even when the technology performs acceptably) (ibid., p. 2).

Clearly, there are critical success factors for all kinds of IT projects and change initiatives in organizations, but Markus argued that for technochange initiatives, these success factors differ from those purely related to the success of IT projects or organizational change programs. Markus saw that the benefits of technology as a change driver only come later when organizations reorganize work in new ways to take advantages of the capabilities of IT. She continued that according to recent research, when organizations fail to make complementary changes, they often lose business value from their IT investments. Markus (ibid., p. 10) listed the following complementary changes to make IT more productive:

- Changes in business processes and workflow
- New job designs
- New skills training
- Restructuring departments or business units

- Management changes
- Changing Human Resource policies such as those concerned with hiring, performance evaluation, and compensation
- New computerized or manual "management systems" to monitor performance and support taking corrective actions
- Redesigning spatial layouts
- Reallocated resources
- New metrics and incentives

Even though these complementary changes focus on reorganizing human work rather than technology, I relate these complementary changes as belonging to the concept of joint optimization (Emery 1959) defined earlier. Consequently, the fact that Markus introduces such a long list of complementary changes implies that work design has not been renewed at the same phase as new technology has been introduced in organizations.

4.1.4 History of leadership styles

Quinn (1984) reviewed the literature on how the leadership roles have changed in 25-year cycles since the early 20th century. Based on this review, he developed a framework consisting of four separate models for different leadership styles, which he called the *competing values framework*. These four separate models of the framework are as follows: (1) Rational Goal and (2) Internal Process models developed during the 1900-1925, (3) Human Relations model during 1926-1950, and (4) Open Systems model during 1951-1975. His framework stressed a basic theme of how managers need to reconcile the underlying polar opposites of stability and flexibility, and internal and external focus, to master a more complex concept of leadership that encompasses both ends of these continuums (Denison et al., 1995). Each model has specific characteristics with regard to effectiveness, goals and means, focus and emphasis, working atmosphere, and leadership styles. For each model, Quinn also specified two leadership roles and the skill sets required to perform the role. The leadership framework thus contains two of the leadership

roles and their respective characteristics for each quadrant, as shown in Figure 11. I consider these different leadership styles to be useful for understanding the managerial aspects influencing BPM initiative success.

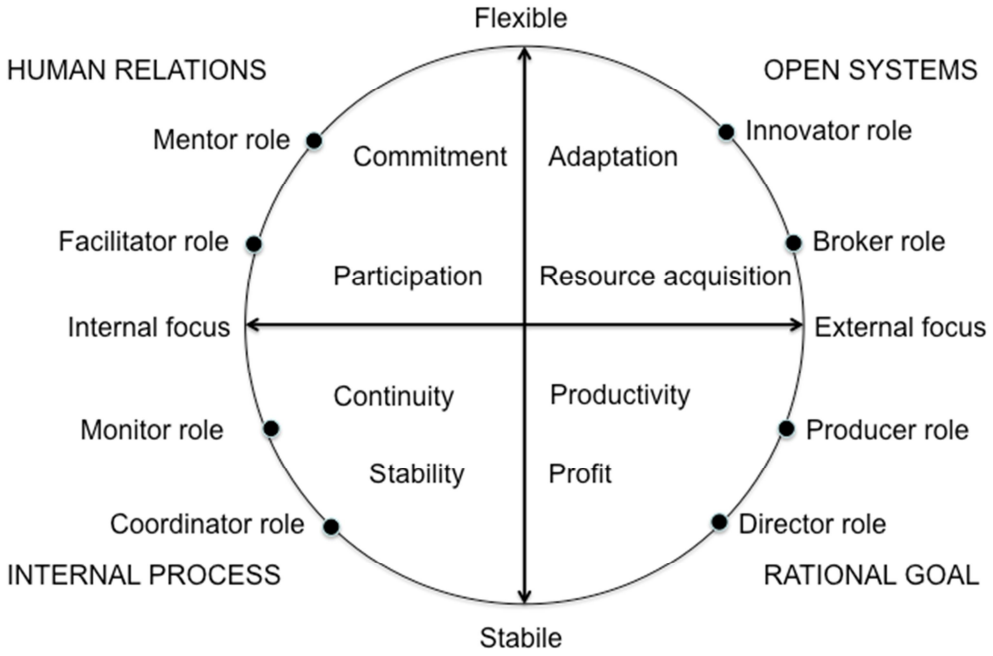

Figure 11. The Competing Values Framework (adapted from Quinn et al., 1996; Denison et al., 1995; Quinn 1988, 1984)

Starting clockwise and chronologically from the lower right quadrant of the framework, Quinn thought that the Rational Goal leadership model was built on Taylor's (1911) principles of scientific management. This model is characterized by productivity and profit, and the respective leadership roles he called the "producer" and "director". These roles emphasize the rational achievement of goals external to the group, and the leader's role is to motivate the team in pursuing these goals. The producer role is therefore task-oriented, seeks closure, and motivates the behavior of the team to complete the team's tasks. The director's emphasis is on role clarification and setting of objectives.

The lower left quadrant is referred as the Internal Process model, and places emphasis on control and stability. The two leadership roles specified are the

"coordinator" and the "monitor". A coordinator role establishes structure and scheduling, solves problems, and supervises that rules and regulations are met. The key objective is to collect and distribute information and to check the performance of the team.

Moving to the upper left quadrant, the Human Relations model is characterized by commitment and participation, and places emphasis on human interaction and process. The respective leadership roles are "facilitator" and "mentor". The facilitator encourages the expression of opinions, strives for consensus, and negotiates compromises. The mentor is a fair, good listener of individual needs, and facilitates individual development.

The fourth and the final quadrant is based on the open-systems theory presented in the previous section. Open-systems theory emphasizes adaptation to the external environment. The first of the two roles is the "innovator" role, which focuses on facilitating creativity and envisioning, and encourages change. The second is the "broker" role, which acquires resources and maintains the network of external contacts.

Quinn et al. (1996) argued that since strategies are effective in one situation but may not necessarily be effective in another, managers need to consider alternative leadership styles for a given situation. I see that this "it depends on the situation" management approach is also represented in the *contingency approach to management,* and therefore I will briefly elaborate the main idea of the contingency approach. Lupton (1971) considered the contingency approach as a successor of the classical management and human relation studies of organizational designs that began in the 1930s and were established in the 1960s. The contingency approach tries to achieve a degree of acceptable 'fit' between tasks, people, and the environment. This fit will depend on the circumstances. Lupton argued (1971, p. 121), "It is of great practical significance whether one kind of managerial 'style' or procedure for arriving at decisions, or one kind of organizational structure, is suitable for all organizations, or whether the managers in each organization need to find that expedient that will best meet particular circumstances of size, technology, product, competitive situation and so on. In practice, managers do, indeed must,

attempt to define the particular circumstances of the unit they manage, and to devise ways of dealing with these circumstances." The contingency approach to management focuses in particular on managing the interactions between a set of environmental variables and another set of technological and managerial variables, with the goal of attaining organizational objectives (Lee et al., 1982; Luthans 1976).

Brynjolfsson (2010) argued that the manner in which companies implement business processes, it is organizational change and IT-driven innovation what differentiates the leaders from the laggards. Consequently, I argue that the leadership models more characteristics to what has been traditionally considered as predecessors of BPM lack the corresponding leadership roles of, for example, innovation and thus necessary skill sets to achieve such innovations.

4.1.5 Summary of historical paths

In order to understand BPM and its Systems and make projections about the future of what could be called the "4th wave", it was important to analyze the origins and the evolution of process management. A summary of the various historical developments described in this section that I consider being relevant when analyzing the current state of BPM is illustrated in Figure 12. In addition to the "waves" introduced here, Toffler (1980) presented a theory of three waves with a broader scope for each wave than presented in Figure 12. Toffler described the societies as waves where the older society gives way to newer societies, technologies, and cultures. He divided these three societal waves into agriculturally settled societies of the Neolithic revolution, the industrial age societies based on mass production, and the post-industrial age societies characterized by the information age. I also acknowledge that various other approaches have emerged in addition to the ones presented below, but I consider these to represent the key movements covered in key literature.

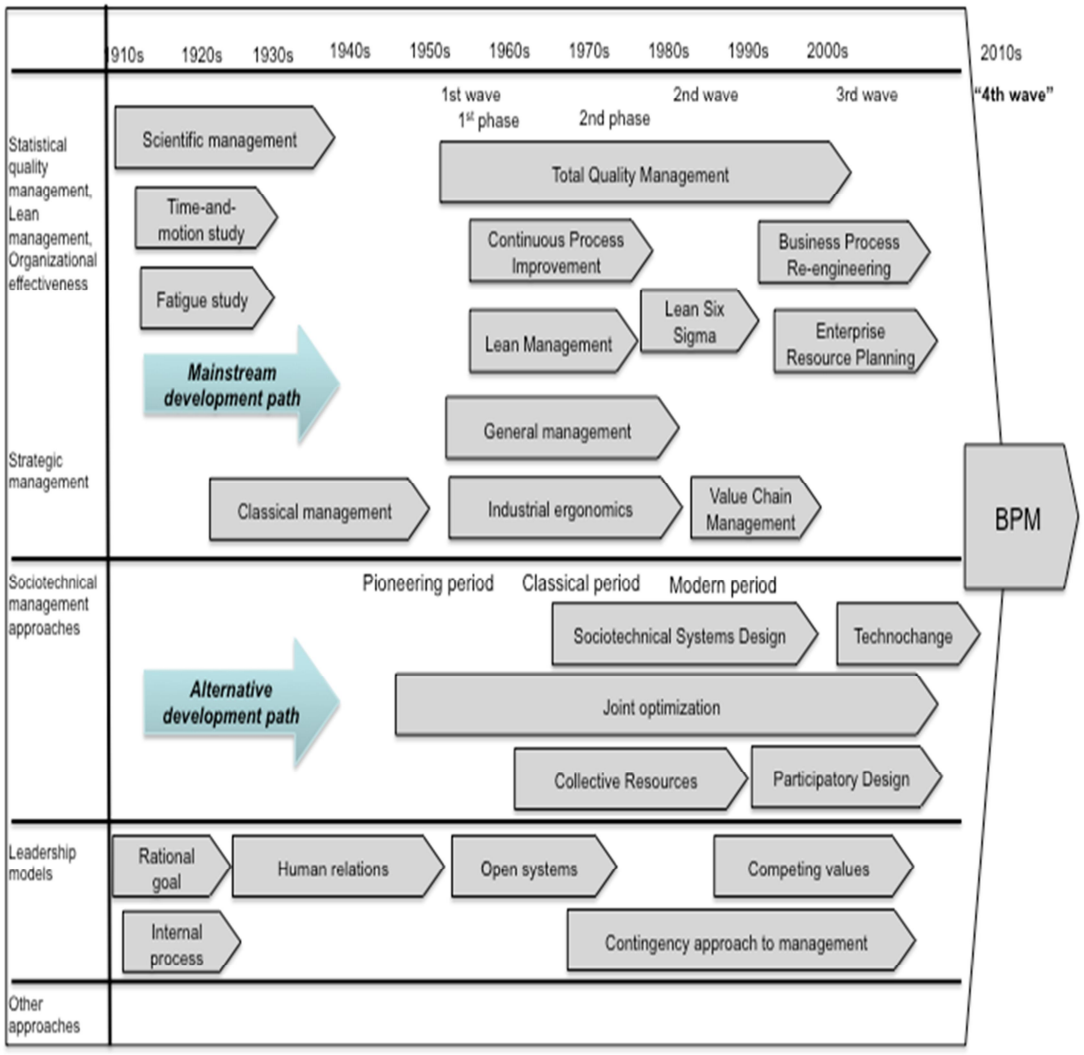

Figure 12. Summary of the parallel mainstream and alternative historical developments

Mumford (2006) argued that even though companies have recognized the need for change toward more flexible and democratic organization of work since the 1990s, they often chose other methods than socio-technical systems design, such as lean production and 'business process reengineering' that took little account of employee needs, and did not produce good human results. However, she sees that the socio-technical theory continues to be of interest to researchers, and that modern socio-technical approaches have emerged since the 1970s. These modern approaches consider that the results of interest are achieved when direct contact occurs between work groups and groups in the external market, such as customers and suppliers. She proposed that the next step for socio-technical systems theory is to develop socio-technical systems for business.

As an alternative development path to the potential "4th wave" of process management, I have introduced various approaches that do not stem from the same principles as Taylorism. My suggested approach is based on the historical and cumulative development of socio-technical systems theory, which seeks to take both social and technological progress into account. Shaw et al. (2007, p. 92) stated, "BPMS are able to support business process management because their technical systems are joined to the business processes of the organization's wider socio-technical system (Mumford 2000), which they help to manage." In effect BPMS is part of the same system. Also, a business process is a socio-technical system executed by humans and machines, whereas BPMS is considered to be purely a technical system (Shaw et al., 2007). With the lack of earlier socio-technical models that include BPM and especially BPMS, I continue to explore possible frameworks that include business aspects while focusing on BPM and IT in a STSD context.

4.2 Theorizing change with BPM and its Systems

Since the key benefits of using BPMS in my SLR resulted including flexibility for changes in business process structures, the relationship between BPMS as an IT artifact and IT flexibility needs to be explained. In the early 90s, IT was typically treated as an additional cost rather than an enabler of business value. Henderson and Venkatraman (1993) argued that this inability to realize value from IT was due to the lack of alignment between the business and IT strategies of the organizations. Various strategic alignment concepts and models have tried to develop IT and its role by considering both the fit between strategy and infrastructure as well as a functional integration between business and IT (Papp 1999).

Later, research on strategic alignment introduced a "strategic alignment paradox" (Tallon and Kraemer 2003): increases in strategic alignment also increase information systems payoff up to a certain point, but beyond that, an increase in

strategic alignment actually results in lower information system payoffs. This paradox is due to reduced strategic flexibility as a result of tying information systems and business strategy too closely. Similar findings were confirmed by Seethamraju and Seethamraju (2009), who identified that a technical tight coupling of enterprise system infrastructure might limit the firm's agility for creating new processes.

Tallon and Pinsoneault (2011) revealed that IT infrastructure flexibility has a positive and significant main effect on firm agility. Moreover, they showed that firm agility has an impact on firm performance, but mostly in volatile environments. Trkman (2010) also saw that the key challenge in the BPM field is on finding ways to increase flexibility with information systems in a way that matches the changes in turbulent environments. In prior research of information systems, flexibility has been described as the capacity of an information system to adapt and to support and enable organizational change, and has been linked to operational efficiency and to organizational nimbleness (Palanisamy and Sushil 2003; Prager 1996; Allen and Boynton 1991). The flexibility of information technology infrastructure itself has many dimensions, for example, (1) "platform technology" that enables connectivity, systems integration, and data storage, (2) knowledgeable staff and available skills, and (3) basic processes (Gebauer and Lee 2008; Kumar 2004; Byrd and Turner 2000; Ciborra 1996; Duncan 1995).

Nevo and Wade (2010, p. 163) informed the IS discipline "on the business value of information technology by conceptualizing a path from IT assets - that is, commodity-like or off-the-shelf information technologies - to sustainable competitive advantage. This path suggests that IT assets can play a strategic role when they are combined with organizational resources to create IT-enabled resources." Generally, IT is considered to be both the enabler and facilitator of changes in BPM initiatives (Trkman 2010; Groznik et al., 2008; Trkman et al., 2007; Hung 2006; Attaran 2004). Van de Ven and Poole (1995) defined *change* to be one type of event that is an empirical observation of difference in form, quality, or state over time in an organizational entity. When inspecting what flexibility means in particular in relation to business processes, Shaw et al. (2007) defined business process flexibility to be the ability to change organizational capabilities

repeatedly, economically, and in a timely way. BPM has been said to bring business and IT together and it involves both sides when considering the adoption of BPM technology. This link between business and IT can be seen as a strong coherence between business and IT, which has become an important factor of competition in all markets and in nearly all industries (Kersten and Verhoef 2003). I argue that the aforementioned concepts and relationships between IT and business lack models that are based on sound theoretical basis, not only to explain the importance of flexibility in changing business processes, but also for maintaining the goal state after the desired change. This lack of theoretically sound models is particularly apparent in the BPM field.

I argue in the following that a potential critical success factor missing from the prior studies of BPM is the understanding of interactions when including approaches to manage business process change, its technology parts (BPMS), and the other parts of larger socio-technical arrangements. This challenge can be seen as the ability to change the initial (stable) state of a system to a new (stable) state and maintain it using BPM and its Systems. Moreover, in turbulent environments the need for such ability is increased and may even become a competitive advantage of the company. According to Indulska et al. (2006), the key challenge of BPM initiatives is the initial discovery of the business operations and describing them in a manner that would be conducive to process improvement. Moreover, Biazzo (2002, p. 51) claimed, "The problem of analyzing and (re)designing business processes is, basically, a problem of understanding and changing a sociotechnical system." In order to address these problems: the problems of analyzing and (re)designing, understanding, and changing a socio-technical system, I present a set of theoretical approaches.

"A theory is a statement of relations among concepts within a set of boundary assumptions and constraints" (Bacharach 1989, p. 496). Davison et al. (2012) considered two kinds of theories: *focal* and *instrumental theories.* They defined that a focal theory provides the intellectual basis for an action-oriented change. There can be many focal theories depending on the action-oriented change that a company aims to realize, for example, improving supply-chain efficiency or

increasing customer satisfaction. Instrumental theories include any tools, models, or processes that theorize how work is done or how outcomes are achieved. According to Davison et al. (2012), one such theory that maps the organizational processes (i.e., how work is done) is Alter's (2008) theory of work systems. In addition, Grisdale and Seymour (2011) found Alter's framework of work systems to be useful in understanding BPM in their case study. Therefore, I have selected Alter's framework of work systems (2008, 2006, 2003) as what I call a *describing theory* to analyze the stable state of a work system that uses or considers using BPMS.

The work system includes both a static view of a current system in operation and a dynamic view of how a system evolves over time through planned change and unplanned adaptations (Alter 2003). My construct of a *build system* is considered as extending Alter's dynamic view to realize the change from the initial state towards the goal state. As such, it must include the focal theory. Järvinen (2004, p. 102) calls the transformation I describe as "the building process", and Niehaves and Plattfaut (2011) call it the "build system", which I choose to use hereafter. This build system is illustrated in Figure 13.

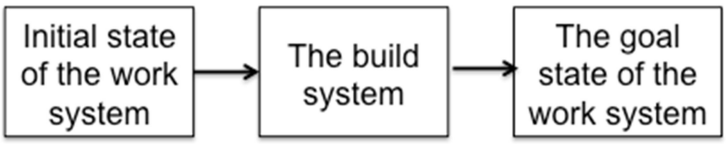

Figure 13. The build system

In the subsections that follow, I describe Alter's framework of work systems and extend and deepen it based on results from prior research. The work system includes both a static view of a current system in operation and a dynamic view of how a system evolves over time through planned change and unplanned adaptations (Alter 2003). The theoretical approach of this research is illustrated in Figure 14.

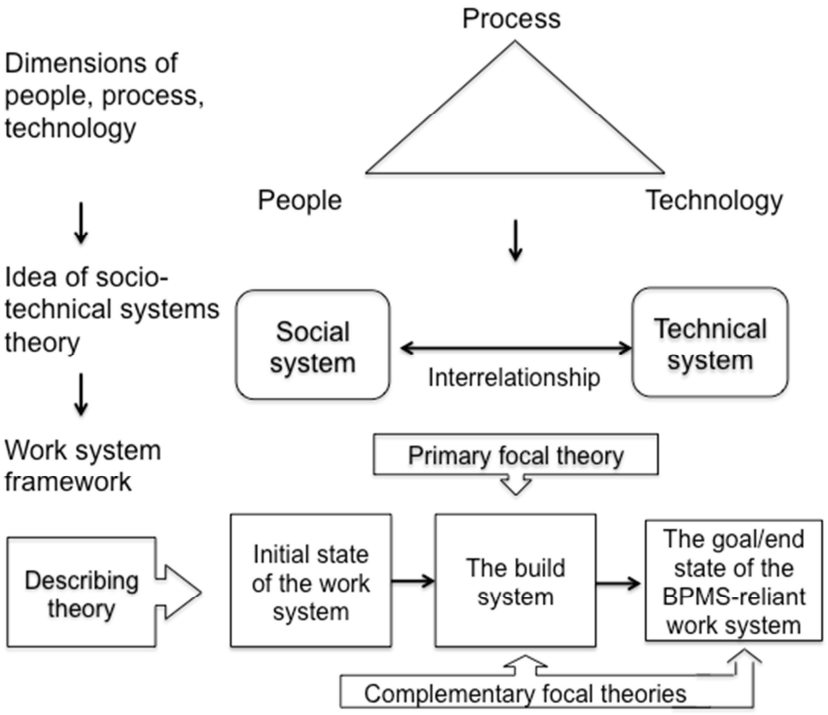

Figure 14. The theoretical approach of this research

4.3 Describing theory of the stable state work system

Alter (2008) used Wand and Weber's (1990) definition of information systems, where their view is that information systems are primarily intended to model the states and behavior of some existing or conceived real world system, and when doing so, one is less concerned about the way information systems are managed in organizations, the characteristics of its users, the way it is implemented, and the way it is used. However, Alter also argued that Wand and Weber's approach did not take into account socio-technical issues that many other researchers believe to be important.

As a proposal to address such socio-technical aspects, Alter (2008, p. 451) has suggested to use the framework of a work system defined as follows:

"A work system is a system in which human participants and/or machines perform work (processes and activities) using information, technology, and other resources to produce specific products and/or services for specific internal or external customers.

An information system is a work system whose processes and activities are devoted to processing information, that is, capturing, transmitting, storing, retrieving, manipulating, and displaying information. Thus, an information system is a system in which human participants and/or machines perform work (processes and activities) using information, technology, and other resources to produce informational products and/or services for internal or external customers."

Alter also emphasized that the work system framework makes no assumptions about whether or not IT is used. It simply reserves a location for whatever technology is used. He defined an information system as a special case of a work system among other categories of work systems such as projects, value chains, supply chains, and e-commerce web sites.

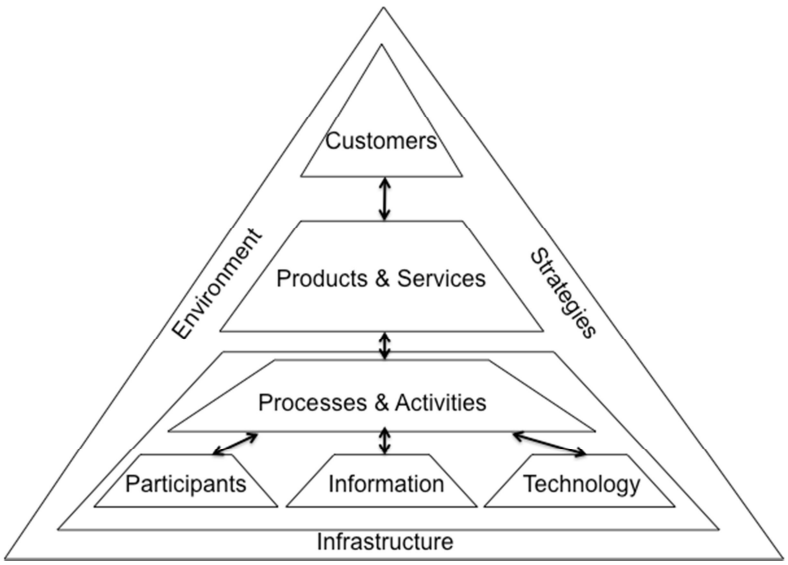

Figure 15. The work system framework (adapted from Alter 2008, 2006, and 2003)

Alter (2008, pp. 466-467) defined the elements of the work system to be as shown in Figure 15:

- *Customers* include the direct beneficiaries of whatever a work system produces, plus other customers whose interest and involvement is less direct.
- *Products and services* produced by a work system are the combination of physical things, information, and services that the work system produces for its various customers.
- *Processes and activities* in depth include workflow, decision-making, communication, coordination, control, and information processing, among others.
- *Participants* are people who perform the non-automated work in the work system.
- *Information* includes codified and non-codified information used and created as participants perform their work.
- *Technologies* may be general purpose or tailored to a specific situation.
- *Infrastructure* includes resources a work system relies on even though these resources are managed outside of it and are shared with other work systems.
- *Environment* includes organizational, cultural, competitive, technical, and regulatory environment within which the work system operates.
- *Strategies* consist of the guiding rationale and high-level choices within which a work system, organization, or firm is designed and operates.

The arrows shown in the work system framework do not represent relationships as such but indicate that the various elements of a work system should be in balance. Although Alter claims that his framework emphasizes business rather than IT concerns, and as such is extensive and useful, I contend that it does not cover all concepts and relationships that arise from a BPM point of view. In the following, I evaluate Alter's framework considering its compatibility with the definitions of BPM and BPMS given in Chapter 2, and related concepts and relationships derived from prior literature, to highlight the relationships and interactions between the elements of the work system.

BPMS has been claimed to be useful for BPM (Shaw et al., 2007; Smith and Fingar 2003). I see that this usefulness should be understood in the sense BPMS enable business process improvement or change that is not incorporated into other technological systems or solutions. Markus (2004) stated that in some cases companies could not have achieved radical improvements without the use of IT. Alter also recognized that some work systems do not just use IT but are dependent on it. So he (2003, p. 367) defined that:

"IT-reliant work systems are work systems whose efficient and/or effective operation depends on the use of IT."

Extending Alter's definition of the IT-reliant work systems presented above, I suggest the following definition for the IT and BPM arena:

BPMS-reliant work system's efficient and/or effective operation depends on the use of BPMS.

In the rest of this section, I present my model of a BPMS-reliant work system shown in Figure 16 adapted from Alter's framework. Then I explain it in detail including the results from prior relevant research to motivate my adaptations and to complement Alter's framework as the describing theory. I consider my model to serve either as elaborating more on the specific elements (1, 5, and 7) or emphasizing their relationships (2, 3, and 4) of Alter's framework.

1. *Mission, vision, and values* in accordance with strategies
2. The *value proposition* as a relationship between internal processes of the work system and its customers
3. *Alignment* between the elements of the work system and the firm's strategy
4. *Fit* with the environment as a relationship between the work system and its environment
5. *Manager roles, BPM team, and operative teams* that *participate* by using BPMS to the enactment and change of processes and activities
6. *Measures including BPMM models, and best practices* as part of information (knowledge)
7. *BPMS* as part of technology and *enablers* for *business process change*

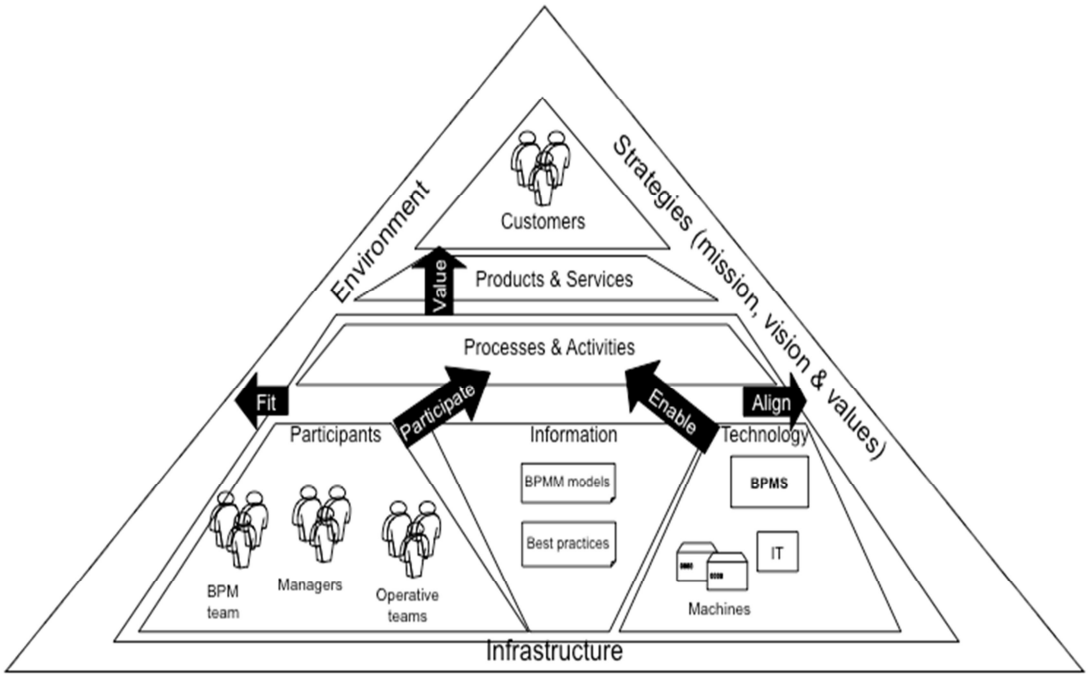

Figure 16. BPMS-reliant work system in a socio-technical work system context

4.3.1.1 Mission, vision, and values

Starting from the top of the pyramid: in addition to strategies on which company's decisions are made, a work system is also affected by a company's purpose (mission), its aspiration for future results (vision), and the internal compass that guides its actions (values) (Kaplan and Norton 2008). Also, Quesada and Gazo (2007, p. 5) found in their case study, "When a firm is missing vision or mission statements, it is imperative to define them before CSF can be identified." Hung (2006, p. 26) argued, "Strategies for end-to-end processes that sit above and cascade into functional strategies are a defining feature of the guiding principles of Business Process Management."

4.3.1.2 The value proposition to customers

The work system framework emphasizes customers. Customer-centricity has been widely encouraged in the business and IT frameworks, and prior research has shown that organizations are more successful when they embrace customer orientation

(e.g., Slater and Narver 2000; Day 1999; Han et al., 1998; Berry 1997; Deshpandé et al. 1993; Kohli and Jaworski 1990; Narver and Slater 1990). Customers are typically categorized into internal or external customers. Alter (2008) notes that customers are not part of his framework of a work system as such, but they are included because the work system exists to produce products and services for its internal or external customers. Kaplan and Norton (2004, p. 10) argued that internal processes create and deliver the *value proposition* to customers. In addition, they also argued that the customer perspective defines the specific value proposition for targeted customer segments, and choosing the customer value proposition is the central element of a company's strategy.

4.3.1.3 Alignment with strategies

Prior empirical studies (see Ravesteyn and Batenburg 2010) about the CSFs of BPM highlight the linkage of BPM goals with the strategic management of the company. Lockamy and Smith (1997, p. 142) explained, "A strategic alignment between a firm's strategy, processes and customers is essential to ensure that:

(1) Strategic objectives are driven by customer needs and expectations.
(2) Processes selected for reengineering have a strategic impact on the creation of customer value.
(3) Processes are reengineered in a manner which supports strategy achievement."

Strategic alignment has been given many definitions. Venkatraman et al. (1993) suggested that strategic alignment is a continuous and cyclic process driven by key performance indicators (*measures*), enterprise modeling, administrative governance processes, and other alignment execution mechanisms (also Henderson and Venkatraman 1989). Hung (2006) defined *process alignment* as how well an organization manages the fit between its processes and its institutional elements. Hung presented empirical evidence that process alignment and people involvement are positively associated with organizational performance. Hung also argued that (ibid., p. 22) "As concepts within BPM, the alignment of business operations with strategic priorities is seen as core to competitiveness." However, instead of Hung's

choice of term ‘fit’, I suggest the term *alignment* in the work system, as it implies parallelizing the participation of the people with processes and activities of the work system, as well as with the strategic goals of the company.

4.3.1.4 Fit with the environment

Prior research has emphasized that the use of BPMS should be advocated with a top-down approach by top management (Ravesteyn and Batenburg 2010). The design of an organization must also ‘*fit*’ with the environment, and effective organizations not only have a proper ‘fit’ with the environment but also between its internal subsystems (Iivari 1992). I see this to imply that a potential cause of BPM initiative failures is the high rate of disintegration, and ‘unfitness’ of a BPM initiative to its environment. I argue that both the participation of managers as well as their ability to select various leadership styles may increase the fit between the BPMS-reliant work system and its environment.

4.3.1.5 Manager roles

Alter’s work system framework does not include management as its own element. Considering their aforementioned significance in BPM initiatives, I add managers to the ‘Participants’ element of my BPMS-reliant work system and define the following roles as illustrated in Figure 17. Anthony (1965) defined management control in terms of assuring that organizational objectives are achieved. According to Simons (1990), since only a limited subset of organization’s formal management control can have the attention of top management, most areas are delegated to subordinates. Therefore, top management’s participation is often concentrated to strategic planning. Anthony (1965) also defined that whereas strategic planning is unsystematic and irregular, the management control is a systematic and regular process. Accordingly, I distinguish between strategic and operations manager roles.

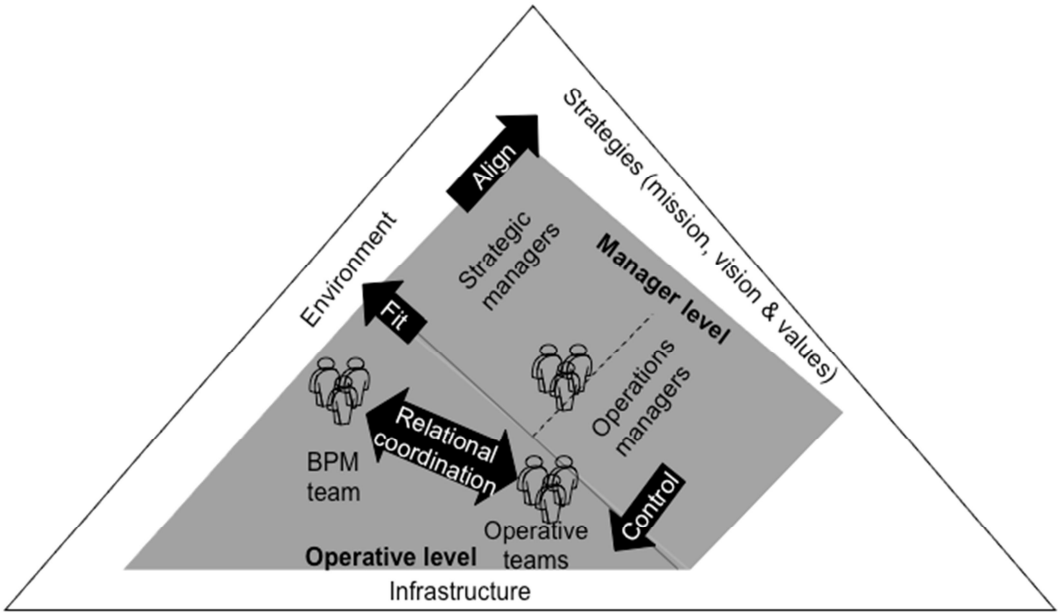

Figure 17. Roles of managers as the sub elements of 'Participants' in the BPMS-reliant work system

The role of strategic managers in this context is to design and control how the goals and respective measures of business processes are aligned with company's strategy and business objectives. The role of operations managers is to design and control how the business processes are implemented and monitored. The operative level itself includes performing known operative aspects of business processes. Niehaves and Plattfaut (2011, p. 387) suggest differentiating on the level of business processes (*work system level)* and on the level of BPM (*build system level*). In their view business activities, organizational structures, and procedures are utilized on a work system level (ibid.; Lyytinen and Newman 2008; Mumford 2003; Alter 2002; Bergman et al., 2002). However, they do not elaborate more on the structures and procedures of such a build system, which they consider as a system that commands a set of resources, enacts routines to carry out the change, and addresses the issues of uncertainty, ambiguity, and complexity (ibid.; Lyytinen and Newman 2008; Lyytinen et al., 1996). I also see this separation between build and work system levels as an argument to distinguish between the stable states (work system) and the transition (build system) toward the goal state.

4.3.1.6 BPM team role and relational coordination

BPM teams should be also considered as participants of the BPMS-reliant work system since the work system's boundaries are different than an organization or organization unit. Many studies show that BPM teams should not only include people from inside the organizations boundaries but also from outside the organization (Al-Mashari and Zairi 1999; Hammer and Champy 1993; Davenport and Short 1990). Therefore, based on the aforementioned aspects, I derive that establishing a BPM team with members inside and outside the organization is a potential success factor for BPM initiatives.

Gittel et al. (2010, p. 503) argued "Relational coordination enables employees to more effectively coordinate their work with each other, thus pushing out the production possibilities frontier to achieve higher-quality outcomes while using resources more efficiently." By the definition of the BPMS-reliant work system, the use of BPMS may influence the efficiency of relational coordination between participants.

4.3.1.7 Participation of the people

My SLR findings resulted in evidence of how BPMS use influenced effective operation (Zimmerman et al., 2005), and, for example, how the participation of business people influenced the customer satisfaction (van Wessel et al., 2007). Markus (2004) argued that among the major risks of using technology in technochange is also the misuse of technology, or that the technology is used without capturing the expected benefits. For example, Boudreau and Robey (2005) reported that while users interacted with a newly installed ERP system, they did so in a manner that reinforced the status quo, thereby preventing the organization from achieving its goals. Such findings support viewing BPMS as a participatory system, rather than just as a tool. With a tool view, the people are users of the tool, whereas the system view treats people as participants in the system (Alter 2008), where people can recognize their affect on company's performance.

The early studies of Lewin (1958, 1948) showed that participation leads to the acceptance of decisions, and effective behavioral change follows meaningful involvement in decision-making. Kanter (1983) also argued that participative decisions are less likely to produce alienation, dissatisfaction or the withholding of cooperation. The participation of managers and their selection of suitable leadership styles can be seen to improve the participation and commitment of employees to the way work is done (Quinn et al., 1996; Denison et al., 1995; Quinn 1988, 1984).

4.3.1.8 BPMM models and best practices as information

In Chapter 3, I suggested based on my SLR findings that BPMM models should be used as a measurement system to identify the level of BPO, rather than a prescriptive model for gaining firm performance. BPO can have different levels of maturity and each level can be identified with various BPMM models. Therefore, I position BPMM models as parts of 'Information' element in the work system. Reijers (2006) also questioned that should such a maturity level be determined and/or measured on a process level, a departmental level or at an organizational level? I extend this question that can maturity diffuse from, e.g., departmental to an organizational level?

When considering the fit of a given technology with other elements, it is also important to look at how it fits with the broader organizational needs. For example, Enterprise Resource Planning systems (ERP) have been considered to be one of the key influencing technological drivers for BPMS (Antonucci and Goeke 2011; Ravesteyn and Batenburg 2010; Paim et al., 2008). ERP systems are considered as providing holistic solutions to almost all aspects of information management needs in an organization. However, problems may arise because ERP, unlike BPMS, often employs an inherent business model that may not conform to the needs of the company (Olsen and Saetre 2007). The adoption of a well-understood and replicable 'best' practice is not likely to constitute a dynamic capability (Winter 2003) because it offers no competitive advantage.

However, in some cases such non-conformity may lead to constructing complementing information resources, for example, the use of informal notes for sharing information regarding the use of the ERP system (Topi et al., 2006) as a best practice to deal with particular problem situations and process innovations. For large-scale companies and businesses, a difference between the inherent business models of ERP and their own business needs might not impact the company's competitive advantage. Olsen and Saetre (2007) argue that for niche companies that are by definition idiosyncratic, large-scale, and monolithic ERP systems may far exceed their needs, whereas a proprietary IT development can fulfill their needs. They claim that IT can now be an input to the strategic decisions made in the company and be used to implement completely new ways of performing business processes. I argue that BPMS may constitute such a fit for niche companies or work systems that are not yet integrated to large ERP systems – so that after the desired change, BPMS remains as a part of the new stable work system. Complementary informational resources, such as informal notes described by Topi et al. (2006), can be developed by the participants regarding best practices of how to use BPMS.

4.3.1.9 BPMS as an enabler of 'technochange'

I argue that the way a company manages BPMS during the course of their BPMS-reliant work system has the potential to become a business capability of significance to the company. In such settings, I consider that BPMS can play the role of *enabler* for the implementation and the way the new state is being managed after the change. Support for this view can be seen in recent reports from IBM concerning the "enterprise of tomorrow", which contend that companies that are financial outperformers distinguish themselves by treating the management of change as a core competence and nurture it as a professional discipline, not as an abstract art (IBM 2008). In addition, an IBM survey (IBM 2009a) of more than 1,500 companies showed that nearly 80% of projects aimed at achieving business change do not fully meet their objectives. However, companies that IBM has termed "change masters" — those with organizational readiness capabilities in the top 20%

— had project success rates of 80%. This is a sharp contrast with those in the bottom 20%, which IBM has termed "change novices", who had project success rates of only 8%.

Ravesteyn and Batenburg (2010) also concluded that there is a consensus that for successful BPMS use the communication, involvement of stakeholders, and governance are critical success factors. Gartner forecasted that: “By 2013, dynamic BPM will be an imperative for companies seeking process efficiencies in increasingly chaotic environments” (Hill et al., 2009, p. 1). By “dynamic BPM”, Gartner referred to new BPM technologies that: “will enable the management of more unstructured and dynamic processes to deliver greater business efficiencies and competitive advantages” (ibid., p. 3).

4.4 Focal theory for BPM and its Systems

4.4.1 Build system

For a *focal theory*, I focus on BPMS helping the transformation from the initial state of a work system to the goal state. The approach is illustrated in Figure 18.

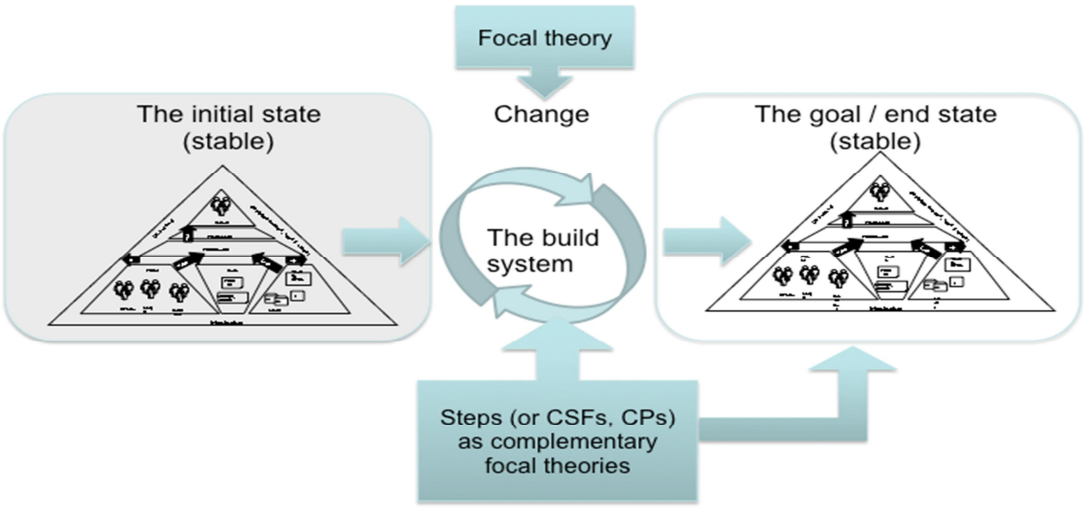

Figure 18. The build system, focal and complementary theories

Järvinen (2004) sees that the goal state can be known or unknown, and if it is known, the participants of the work system as builders try to realize the desired change from the initial state towards the goal state. Sometimes the goal state cannot be reached and the achieved final state thus differs from the goal state. Järvinen (2007) also argued that there should be a *goal function* under which all kinds of different interests can be collected. The goal function is thus to measure the difference between the initial state and the end state, for example, measuring the increase in productivity or revenue. Also, Mumford (2000) argues that in the case of socio-technical systems, it is useful to start with a design statement that provides a clear definition of the desired end state after the building process; furthermore, she reiterates that a socio-technical approach requires the social to be given equal importance to the technical.

To elaborate more on the types of changes and how to manage them, I use Orlikowski and Hofman's (1997) characterization of improvisational change management (Ciborra 1996). Orlikowski and Hofman (1997) distinguished between three kinds of change: anticipated, emergent, and opportunity-based. Anticipated change includes the planned and intended changes. Emergent change is defined as local and spontaneous changes not originally anticipated or intended; such changes do not involve deliberate actions but grow out of practice. Opportunity-based changes are introduced purposefully in a response to unexpected changes. Orlikowski and Hofman (ibid., p. 13) claimed "Over time, however, use of the new technology will typically involve a series of opportunity-based, emergent, and further anticipated changes, the order of which cannot be determined in advance because the changes interact with each other in response to outcomes, events, and conditions arising through experimentation and use."

The improvisational model for change management prescribes that in order to engage in large-scale information-systems projects, approaches will have to integrate design and development with organizational implementation. Simonsen and Hertzum (2008) adopted the aforementioned categories of change to their sustained Participatory Design (PD) approach, which was as an extension of the iterative prototyping approach. In the sustained PD approach, the emphasis is on the

evaluation of systems through exposing them to real work practices (Suchman 1987), and consists of stepwise implementation of technology-driven organizational change. Simonsen and Hertzum (2008) described their sustained PD approach, shown in Figure 19, where the starting point of iteration is the identification of anticipated or aimed changes. "The anticipated changes are further specified, for example in terms of effects of using the system. The system (or a part/prototype of it) is then implemented and tried out under conditions as close as possible to real use. Actual use of the system allows for emergent and opportunity-based changes to occur. Finally, evaluation of using the system informs subsequent iterations. This includes that selected emergent changes are turned into opportunity-based and new anticipated changes" (ibid., p. 3).

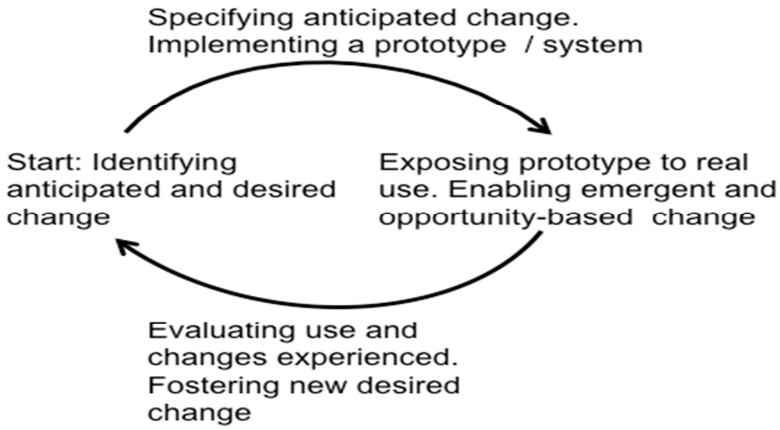

Figure 19. The outline of sustained PD approach (adapted from Simonsen and Hertzum 2008, p. 3)

4.4.2 Complementary focal theories

The Alter's framework introduced earlier can also be considered as a *big T theory*, as defined by Schneberger et al. (2009, p. 54): "A 'big T' theory is generally overarching, widely recognized and used, and has a formal name (hence, the capital T)." In addition, Schneberger et al. (2009, p. 55) defined *little t* theories "as a simple theory that provides value on its own or as a relatively immature but developing theory." As an example of such little t theory, they used Kotter's organizational transformation model (Kotter 1995), which introduced eight steps organizations should follow to successfully bring about significant organizational change.

Examples of these steps in Kotter's model were: (Step 7.) "Consolidate improvements and produce more change," and (Step 8.) "Institutionalize the new approaches." Similarly, the focal theory can be complemented with steps (or CSFs, CPs) derived from my SLRs or other relevant literature. These steps can then be used to either help in realizing the desired change or maintaining the post-state after the change. I call such a collection of steps as *complementary focal theories.*

Critical success factors are by definition the few things that must go right for a business to succeed (Škrinjar and Trkman 2013; Dubelaar et al., 2005; Rockart 1979). Škrinjar and Trkman (2013) differentiated between critical success factors and critical practices (CP) both of which they consider to have a significant positive effect on improving business process orientation (BPO). Škrinjar and Trkman (2013) noted that only a few such practices are covered in prior literature, for example, "appointing process owners" (Hammer and Stanton 1999), and that "efforts to improve business processes must shift their emphasis over time" (Klassen and Menor 2007). They also argue that these specific practices are tied to the specific levels of business process orientation maturity. However, they acknowledged that the empirical validation of many of these practices was lacking.

I argue that the difference between CSFs and CPs are not well articulated in current literature. In my Systematic Literature Review (SLR) results, I called them broadly as steps that a firm or an organization must consider in helping to achieve firm performance aided by BPM and its Systems. These steps resemble more wide descriptions of how to realize a change, for instance the aforementioned, "business processes must shift their emphasis over time", rather than factors or variables whose effect can be easily controlled. Therefore, I consider these steps that partially explain how to succeed in change to be the complementary focal theories. The complementary focal theories identified in this dissertation and other studies concern one or more elements, and their relationships of the BPMS-reliant work system in the stable and build system phase. For example, 'establishing process performance metrics' and 'defining performance management' (e.g., Nelson et al., 2010; van Wessel et al., 2007) help in achieving the change, whereas 'consistent use of process metrics' and 'employee expression of how their work affects the

company's performance' (e.g., Mackay et al., 2008) help in recognizing that the stable end state has been achieved.

Some complementary focal theories belong to both systems. For example, customer participation is important during both the build system phase and the stable state. Also, the complementary focal theory about choice of leadership styles is applicable to both phases: one leadership role can support innovation during the build system phase, and another role can support stabilization in the post-change state.

Earlier, a theory was defined as a statement of relations among concepts within a set of boundary assumptions and constraints (Bacharach 1989). I claim that each step, CSF or CP can be considered as a complementary focal theory of relations (R) among concepts, in my terms, elements (E) of the work system. Such theories may also differ in terms of what type of a theory they represent. Gregor (2006) differentiated five types of theories in IS: (1) theory for analyzing (what is), (2) theory for explaining (how and why), (3) theory for predicting (what will be but not why), (4) theory for explaining and predicting (what is, how, why, when, and what will be), and (5) theory for design and action (how to do something). Therefore, I consider, for example, that earlier described, "Strategic alignment is a continuous and cyclic process driven by key performance indicators" (see Venkatraman et al., 1993), is a theory of the first type as it concerns about "what is". Respectively, "Limiting the introduction of many technology stacks", can be seen as a theory for design and action (5). The focal theory together with complementary focal theories can be used as a part of method of action-oriented change (type 5), as one can decide what actions to take in increasing the likelihood of BPM initiative success. I have illustrated these ideas in Figure 20.

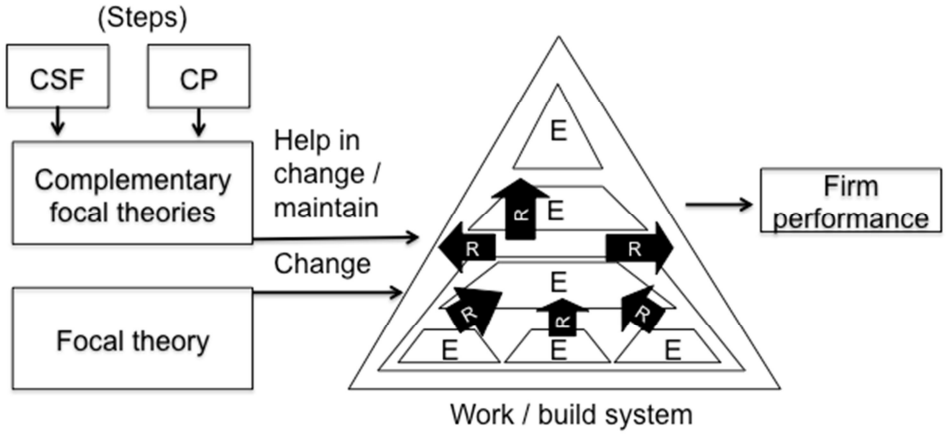

Figure 20. Relationships between complementary focal theories, focal theory, and a work/build system

Combining the findings from my SLRs with the body of knowledge introduced in this chapter, I have categorized the complementary focal theories for improving firm performance during both the build system and stable work system. This is displayed in Table 6 and Table 7 respectively. I acknowledge that my collection of complementary focal theories (steps or CSFs, CPs) is not exhaustive since there are literally hundreds of potential factors identified for the success of BPM initiatives using BPMS (see e.g., Ravesteyn and Batenburg 2010). In addition, the mapping of steps to each element is partially based on my experience and interpretation of the given source. However, I consider this approach to serve as a testable model for empirical research settings to identify what influences firm performance.

Table 6. The collection of complementary focal theories (CSF, CPs, steps) during the build system

BPMS-reliant build system (change)		
Customers	**Products & Services**	**Strategies (mission, vision, values)**
Customers as participants (Niehaves 2010; Alter 2008).		The alignment of strategic objectives with business processes (Hung 2006). The influence of management commitment and empowerment of employees (Ravesteyn and Batenburg 2010; Hung 2006).
Processes & Activities		
Standardize business processes (e.g., Seethamraju and Seethamraju 2009; van Wessel et al., 2007). Careful selection of which processes to expose for improvement / change (Zimmerman et al., 2005). Re-align processes with market strategy (MacKay et al., 2008). Strategic alignment is a continuous and cyclic process driven by key performance indicators (Lockamy and Smith 1997). Initial discovery and description of business operations in a manner that is conducive to process improvement (Indulska et al., 2006). Efforts to improve business processes must shift their emphasis over time (Klassen and Menor 2007).		
Participants	**Information**	**Technologies**
BPMS-reliant work system's efficient and/or effective operation depends on the use of BPMS (e.g., Niehaves 2010; Alter 2008; van Wessel et al., 2007; Reijers 2006).	Establish process performance metrics (e.g., Nelson et al., 2010; van Wessel et al., 2007). Define process measurement and management (e.g., Nelson et al., 2010; van Wessel et al., 2007).	Avoiding misuse and immature BPMS features in the course of the implementation (Zimmerman et al., 2005). Link process model and rule to execution directly (Nelson et al., 2010; Zimmerman et al., 2005). When process design and enactment is connected to SOA infrastructure, processes can be improved significantly (Küng and Hagen 2007). Avoiding extensions to the pure BPM standards (e.g., BPEL) (Zimmerman et al., 2005). Limiting the introduction of many technology stacks (Zimmerman et al., 2005). Craft process automation & control across the enterprise, customers, and trading partners (Reijers 2006).
Level 1.1. Strategic Managers	**Level 1.2 Operations Managers**	**2. Operative level**
Integration and application of different leadership roles (Denison et al., 1995; Quinn 1988, 1988). Establish a BPM team (Sentanin et al., 2008; Knothe et al., 2007).	Identify process owners & governance structure (van Wessel et al., 2007; Hammer and Stanton 1999). Establish cross-functional project teams (McAdam 2001). From Zimmerman et al. (2005): • Scheduling a proof-of-concept (PoC) early in the project. • Investment in an analysis phase involving several fact-to-face workshops within the architecture. • Early identification of possible areas of concerns. • Iterative and incremental style based on agile development.	
Infrastructure		
Careful architectural positioning of process enactment in existing infrastructure (Reijers 2006; Zimmerman et al., 2005).		
Environment		
The design of an organization and its subsystems must 'fit' with the environment (Iivari 1992).		

*Table 7.*The collection of complementary focal theories (CSFs, CPs, steps) for the (stable) goal/end state

BPMS-reliant work system (stable)		
Customers	**Products & Services**	**Strategies (mission, vision, values)**
Customers as participants, e.g., through self-service (Alter 2008).	BPMS-reliant work system produces *informational* products and services (Alter 2008).	
Processes & Activities		
Participants	**Information**	**Technologies**
BPMS-reliant work system's efficient and/or effective operation depends on the use of BPMS (e.g., Niehaves 2010; Alter 2008; van Wessel et al., 2007; Reijers 2006).	Use of process metrics consistently (e.g., Nelson et al., 2010; van Wessel et al., 2007).	
Level 1.1. Strategic Managers	**Level 1.2 Operations Managers**	**2. Operative level**
Integration and application of different leadership roles (Denison et al., 1995; Quinn 1988, 1988).	Train employees in adapting to process changes (Knothe et al., 2007).	Employees express how their work affects the company's performance (Mackay et al., 2008). Relational coordination among the participants enables to more effectively coordinate their work (Gittel et al., 2010).
Infrastructure		
Environment		

In order to clarify how to test causal relations of my complementary focal theories, I consider that Compeau and Higgins' study of computer self-efficacy (1995), based on Bandura's (1986) Social Cognitive Theory, provides a good example. They derived 14 hypotheses, of which, for example, hypotheses H12 was:

H12. The higher the individual's outcome expectations, the higher her use of computers.

Therefore, using my complementary focal theories descriptively would be to identify how the outcome expectations of participants increase the use of BPMS. Accordingly, used prescriptively would give us that to increase the use of BPMS,

one should consider improving the outcome expectations of the participants. The corresponding complementary focal theories as a part of prescriptive method would thus include:

Build system: *Realize how employee performance is linked into process performance.*

Stable work system: Employees express how their work affects the company's performance.

4.5 Comparison with rival approaches

In the past, much of the prior construction of BPM frameworks has focused on BPM itself, such as the BPTrends Business Process Architecture methodology (Harmon 2007), the BPM program framework (Jeston and Nelis 2008a), or BPMS frameworks such as "BPMS pyramid architecture" by Shaw et al. (2007). In addition, BPM has also been considered as one part or belonging to one or multiple parts of enterprise architecture frameworks, such as the Open Group Architecture Framework (TOGAF 2011) or Zachman Framework (Zachman 2008). However, all of the above aim either for articulated improvement in the granularity of single constructs, such as BPM and BPMS, or for a definition of their boundaries in wider architectural frameworks.

My approach in creating a model for BPMS-reliant work system to explain the success factors of BPM initiatives is more in line with the approach of Škrinjar and Trkman's (2013; Trkman 2010). They used three different theories: contingency theory, dynamic capabilities (DC) theory, and task-technology-fit (TTF) theory, to explain the success factors of BPM. Niehaves and Plattfaut (2011) also suggested

investigating whether BPM fits into the DC framework. The first of the three aforementioned theories, contingency theory, explains that the optimal organization style is contingent upon various internal and external constraints, and there is no universal or best way to manage (Fiedler 1964). I see this as being directly related to leadership styles, so I included the competing values framework (Quinn et al., 1996; Denison et al., 1995; Quinn 1988, 1984) as a model of leadership styles to help managers select a suitable style for the given circumstance to increase the fit between their BPMS-reliant work system and its environment.

The second theory, Dynamic Capability (DC) theory, is an extension of the resource-based view (RBV), which emphasizes the importance of resources that are valuable, cannot be easily purchased, or require a long learning process, as an essential way to achieve superior performance (Hamel and Prahalad 1996; Barney 1991). However, prior research has shown that while IT assets are often combined with organizational resources (Orlikowski 2000; Orlikowski and Hofman 1997; Markus and Robey 1983), the RBV does not theorize about the outcomes of such combinations since the theory treats resources as basic building blocks (Enright and Subramanian 2007; Thomas et al., 1999). DC theory addresses such shortcomings of the RBV by adopting a process view instead. Teece et al. (1997) defined Dynamic Capabilities (DC) as firm's ability to integrate, build, and reconfigure internal and external competencies to address changes in turbulent environments. According to Strnadl (2006), the process view allows analysis, design, management, and optimization of the dynamic structure of a business. Teece (2009) also emphasized that technological change is systemic in that multiple inventions must be combined to create products and/or services that address customer needs. However, some of the drawbacks of DC are still rooted in the RBV and since it focuses on competencies and capabilities but leaves unclear what role, if any, BPMS as a technology enabler combined with organizational assets would play in supporting a firm’s strategy. DC has also been criticized as having unclear value-added relative to existing concepts, weak empirical support, unclear practical implications, and lacking coherent theoretical foundation (Arend and Bromiley 2009).

Another key challenge that DC has faced is the lack of consensus about what a dynamic capability actually is. Prior literature has given many views on what constitutes a dynamic capability, varying from simply as a process (Eisenhardt and Martin 2000), or a definition of routines (Winter 2003), to "…the capacity of an organization to purposefully create, extend, or modify its resource base" (Helfat et al., 2007, p. 4). To address this issue of definitions, I suggest distinguishing between *dynamic, business,* and *core capabilities*. Amit and Schoemaker (1993) broadly define *capabilities* regarding firm's capacity to deploy *resources* using organizational processes to affect a desired end. According to Leonard-Barton (1992), capabilities are considered core if they differentiate a company strategically. Not all capabilities can be considered as sources of such strategic differentiation, yet they can still entail significant influence on firm performance. Business capabilities on the other hand "describe the ability of an organization, system or process to generate a defined output without having to define the applied technologies and resources" (Fleischer et al., 2007, p. 188). Considering Škrinjar and Trkman's (2013) definition of dynamic capabilities in the context of BPM as an ability of an organization to change its processes, I posit that business capabilities belong to the stable state of the BPMS-reliant work system, whereas dynamic capabilities are emphasized during build system phase. Both the business and dynamic capabilities can be considered as core capabilities if seen as sources of strategic differentiation to a company.

I also suggest that DC differs from my BPMS-reliant build system in its scope of what is being considered as the unit of analysis. Teece (2009, p. 48) considers "dynamic capabilities as the foundation of enterprise-level competitive advantage in regimes of rapid (technological change)", whereas my conceptual model of the BPMS-reliant build system takes into account the local-level and the organizational history as part of the entire enterprise. Engeström (1999, p. 36) argued that historical analysis needs "to be focused on units of manageable size," and he suggested focusing on a collective system as the unit to make history manageable. Consequently, the capability perspective of DC has been criticized as lacking micro-level foundations for seeing individual-level abilities are related to the collective organizational-level constructs like organizational capabilities or routines (Abell et al., 2008; Felin and Foss 2005).

The last of the three theories is Task-Technology-Fit (TTF), which states that how IT is more likely to have a positive impact on individual performance and be used if the capabilities of IT match the tasks that the user must perform (Goodhue and Thompson 1995). IT will be used if and only if the functions available to the user support (fit) his or her activities (Dishaw and Strong 1999). Trkman (2010) concluded that only IT applied in such a way that matches the current state of business processes (as stipulated by TTF theory) and enable dynamic capabilities as described in DC theory, could fully contribute to a sustainable strategic advantage. However, referring to the findings of, for example, Boudreau and Robey (2005), I argue that even though a tool fits to a task, the manner of using the tool may still have a significant effect on the achieved firm performance.

Based on my experience from practice, the BPMS-reliant work system in a modern work environment has the characteristic of being geographically distributed and often using virtual communications. In this environment, business process improvements are often complex in nature and require intensive communication during the change period of time. Distributed and virtual work requires more and more reliance on communication technology that suppresses elements natural in face-to-face communication among the participants. Theories such as media richness theory (Daft and Lengel 1986) predict that any electronic communication medium allowing for the exchange of significantly less communicative stimuli per unit of time than the face-to-face medium will pose cognitive obstacles to communication (Kock 2004). Therefore, in addition to focusing only on the TTF theory, wider contextual theories of communication should be adapted to consider joint optimization of social and technical settings in the BPMS-reliant work system. My SLR review also confirmed the importance of this dimension; in particular, fact-to-face communication was emphasized (Zimmerman et al., 2005).

As a comparison with a similar conceptual model, I consider the Thompson et al.'s (2009) BPM model based on the Rosemann and de Bruin model (2005a) presented in Figure 21. This model covers many of the same elements and relationships as my BPMS-reliant model. However, I consider that the left side of

the model describes elements belonging to a stable state of a company, whereas the right side can be seen as a set of measures for different goal functions but there is no explanation of how such a post-change goal state could be achieved.

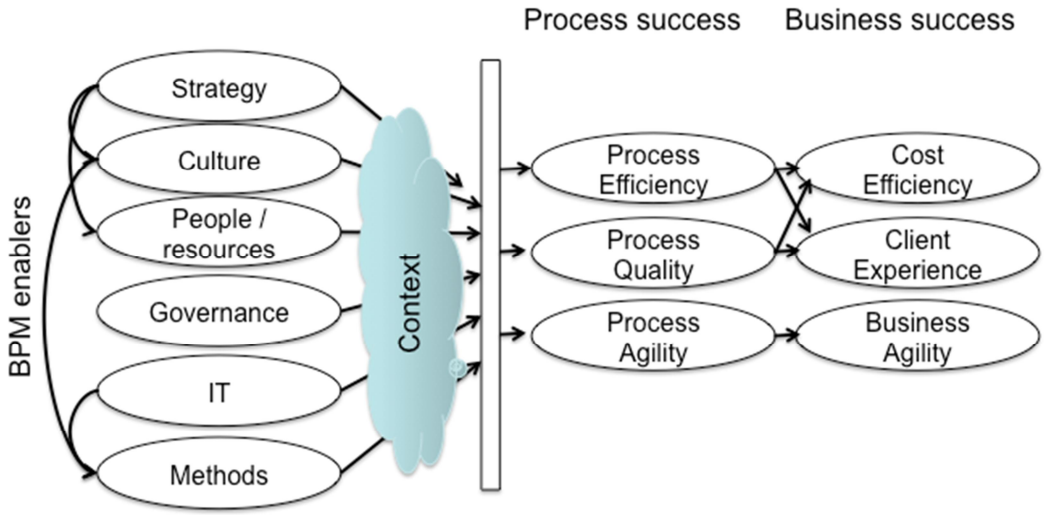

Figure 21. BPM model (adapted from Thompson et al., 2009)

Grisdale and Seymour (2011) used Thompson et al.'s BPM model in combination with the business process change model (BPCM) by Kettinger et al. (1997) and Alter's (2008, 2006, 2003) work systems framework, to identify what factors influenced BPM adoption in a leading South African supermarket retailer. Their purpose, however, was not to test or validate any of the aforementioned models, though they did conclude that all three models were useful in understanding BPM.

Ravesteyn and Batenburg (2010) presented a model of a "BPMS-implementation framework", shown in Figure 22 that resembles my model of the build system. They assumed, similarly to my build system, that an organization that wants to implement a BPM initiative using BPMS will already have a standing organizational structure with processes which will be the starting point ("as-is") for the implementation towards the "to-be" processes, or as I call it, the "goal state". They argued that the implementation of a BPM initiative is a continuous process going from the "as-is" (initial state) to the "to-be" (goal state) through different project steps.

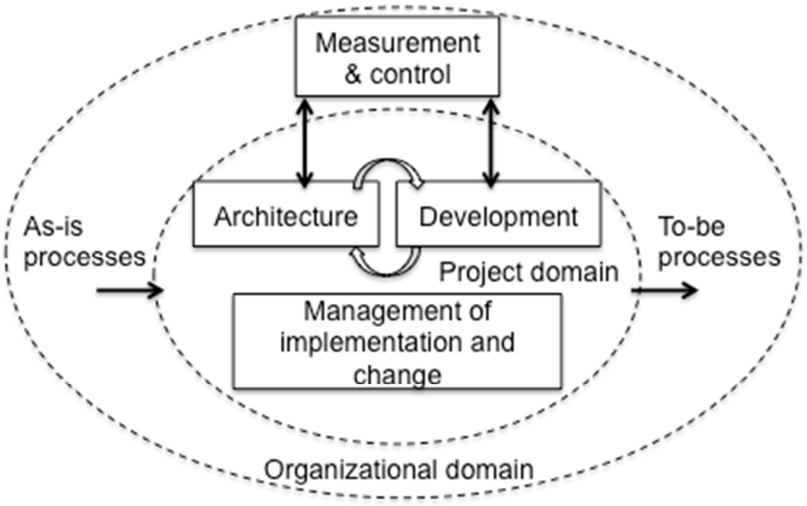

Figure 22. BPMS-implementation framework (adapted from Ravesteyn and Batenburg 2010, Figure 2., p. 500)

They separated the BPMS-implementation framework into two domains shown in figure above: organizational and project. The BPM initiative project domain consists of two phases, the "architecture design" phase and the "development phase". The first phase includes developing a process and information architecture, which they called the BPM part and which can then be used in the realization of the technical infrastructure and service-oriented applications belonging to the second phase. Project and change management supports these two phases simultaneously. They considered a BPM initiative as a project or series of small projects, while the organization, the measurement and control function are in fact just a small part of the project. My experience from practice is that setting up a project to implement a process change is not always needed because depending on the scope of the change; the participants of the work system can also realize the change. The Ravesteyn and Batenburg's BPMS-implementation framework seems to only address implementing either a single or set of BPM initiatives for an (undefined) organization, unit or system, rather than the implementation of a BPM initiative that also helps to maintain the achieved to-be (goal) state. Therefore, I consider my model to cover both the work system reflected in Thompson et al.'s BPM-model and the build system in Ravesteyn and Batenburg's BPMS-implementation framework.

4.6 Summary

In this chapter, I presented a combination of various theoretical approaches and traced parallel yet alternative historical developments to understand how to identify and explain efforts using Business Process Management and its Systems. I also extended the framework of work system to both emphasize concepts that can be considered of importance regarding BPM, and to introduce new relationships from the perspectives of various business management approaches. In addition, I have argued that various factors in pursuing the goal state of a firm can be related to the elements and their relationships of the BPMS-reliant work system. As a conclusion, I distinguished between *describing theories* that explain how work is done in a stable state of the work system, and *focal theories* that can be used to enable action-oriented change encompassed by the new construct of the *build system.* Critical success factors, practices, and steps that help in achieving and maintaining the desired state, I called *complementary focal theories*.

Niiniluoto argued (1980) that theories resemble conceptual systems as a structure. Also, a theory collects, integrates, and systematizes separate previous research results (Järvinen 2004). Respectively, I first applied and extended Alter's work system framework from the basis of socio-technical systems theory as the describing theory. Then, I identified a set of complementary focal theories through collecting, articulating, and synthesizing the most important aspects influencing the success of BPM initiatives from prior research. The complementary focal theories may relate to both build and work systems.

5. Case study

"Quite remarkable, most IT vendors and resellers seem to neglect the specific implementation aspects of BPM-systems as they tend to use existing software development methodologies and project management principles during BPM-implementations. […] Standard software development methodologies however – such as the waterfall method, rapid application development or rational unified process – ignore the business or organizational aspects" (Ravesteyn and Batenburg 2010, p. 493).

Yin (2003) considers a case-study approach to have a distinct advantage in situations when 'how' or 'why' questions are asked about a contemporary set of events over which the investigator has little or no control. The reason for selecting case-based method is that it is widely recognized as an effective means for unpacking complex concepts as a path to the development of an explanatory theory (Meredith 1998). According to Yin (1994), case studies are rich, empirical descriptions of the particular instances of a phenomenon that are typically a combination of various data sources.

Even though I present only a single case study, I argue that my selection of the case gives a concrete example for my conceptual model of the BPMS-reliant work and build system, that is, how they appear in real life, and thus makes it easier to imagine how my model can be applied to other empirical settings. According to Siggelgow (2007), even a single case can be a very powerful example because a case can help sharpen existing theory by pointing to its gaps and beginning to fill them. The way the case study is being carried out follows an intensive case research, of which goals Cunningham (1997) described to provide a history, description, or interpretation of unique and typical experiences or events. As narrative descriptions and to achieve data richness, I have used a plethora of detailed internal documentation, presentations, and training materials, as well as interviews

conducted among the BPM initiative participants. According to Cunningham (ibid., p. 404), "A narrative is intended to answer questions related to specific events or activities by integrating different types of evidence from various perspectives." The narratives in this case study seek for the truth of my conceptual model in achieving a desired change aided by BPM and its Systems.

My case study focuses on an award winning BPM initiative over the course of a 2-year period. I also follow Sidorova and Isik's (2010) suggestion from their review about cross-disciplinary business process research topics to identify synergies and potential conflicts among various approaches and organizational initiatives involving business process change, for instance, Enterprise Resource Planning (ERP). Therefore, I also compare the BPM initiative with the ERP initiative of the same organization to both emphasize their differences and also to examine whether lessons learned could be drawn from these initiatives. The main purpose is to empirically validate my conceptual model, but also to provide first-hand empirical answers for my research questions 1 and 2 using the case study method.

(RQ1): What empirical evidence exists concerning improving firm performance using BPMS?

(RQ2). What steps in the suggested pathways of BPMM models are empirically supported?

First, in Sections 5.1 and 5.2, I introduce the case study organization and the background and initial state of the BPM initiative. In Section 5.3, I present the selected BPM approach as the build system, the features of the BPMS, the respective goal state of the case study organization, and the semi-structured interview results conducted with the participants of the BPM initiative. In Section 5.4, I introduce the ERP initiative with partially overlapping goals and features to compare and discuss the influencing factors for BPM success in a wider organizational context. The analysis of the case using my conceptual model of BPMS-reliant build and resulting work system is given in Section 5.5.

5.1 Introduction of the case organization and method

The case study was conducted between June and August 2010. I hereafter refer to the company with a fictional name "ITCorp". Likewise the project, program, 3rd party vendor, organization unit, and names of the individual persons are either removed or modified to maintain anonymity, but all other information is real. ITCorp is a global product and service provider targeting primarily the communications industry. In the following case study, I investigate the IT, business, and the organizational context of the BPM initiative. In addition, I compare the BPM initiative with a large ERP initiative that was started and realized at the same time for their entire service business unit of ITCorp. In doing so, I prepared a case study protocol including research question, methods, and procedures for data collection.

The BPMS was adopted by the following ITCorp service business areas referred hereafter as:

- "Consulting & Professional Services" that provide consulting and systems integration as well as operation and business support related services. This business unit was the first one to adopt the BPMS.
- "Operating Services" in cases where part of the business operations of a given customers is managed by ITCorp.
- "Implementation Services" that provide system and solution planning and fulfillment services for their customers.

The data collection consisted of a questionnaire that was distributed to ITCorp's employees and managers participating in the BPM initiative. This semi-structured questionnaire resembled an informal interview where the purpose was to gather descriptions of the real-life world with respect to interpretation of the meaning of

the described phenomena (Kvale 1983). A case study including such a semi-structured questionnaire thus offers a deep insight into the perceptions, views, and experience of the key individuals. The responses reported herein are done so with a prior permission and are again used in my further analysis with regard to the BPMS-reliant work system model.

5.2 The initial state of the BPM initiative

Due to a recent major transformation of the company's structure, there was a need to define how business processes would be improved to achieve the business goals of the new organization. Therefore, the service business unit of ITCorp invested a considerable amount of personnel time to describe the business processes and the functional blueprint for the new mode of operation. The main objective was to have one process language that would improve the understanding of the individuals and the teams about these processes, and to increase the responsiveness and performance levels for the benefit of ITCorp's customers. One approach considered for increasing the performance level was the Process and Enterprise Maturity Model (PEMM) as defined by Hammer (2007), to find out a path from P-1: 'Reliable and Predictable results' to P-4: 'Best in Class' (refer to Subsection 3.1.4. for the detailed description of the model).

The immediate finding when starting to apply the PEMM was that myriad tools had been created to support the business activities over the history of ITCorp. Most of these tools were not integrated with IT tools causing lots of manual work and resulting in a significant cost in tracking, controlling, and reporting the process performance. Moreover, the fragmented tool landscape had led to implicit and undefined manual practices whose performance was mostly dependent on the users' skills and punctiliousness.

Using the PEMM levels, the infrastructure as a process enabler of ITCorp's Consulting and Professional Services was identified to be: "Fragmented legacy IT systems support the process" (Hammer 2007, p. 116). Since the target was to move the processes from P-1 to P-4, the corresponding infrastructure goal was described in P-4 as: "IT system with a modular architecture that adheres to industry standards for inter-enterprise communication supports the process" (ibid. p. 117). Therefore, improving the IT infrastructure was decided to be one of the most important process enabler for establishing a world class blue print for the future mode of operation.

5.3 The goal state of the BPM initiative

ITCorp's Consulting and Professional Services business area decided that BPM was a modern approach and BPMS was the corresponding technology to enable continuous process improvement. The service business managers carried out the BPMS vendor selection independently. Their decision was based on different business analysts' descriptions that positioned the BPMS vendor among the leaders of "Human-Centric BPMS", and the vendor had a strong reference base for its solutions. In addition, consultancy from that BPMS vendor was widely used in the beginning of the BPM initiative.

Business objectives for the BPM initiative that were supposed to enable the change were defined to be:

- The ability to measure process performance and enforce more automated process governance aided by the BPMS.
- Replace legacy spreadsheets with user-friendly online forms, which reduce entry errors.

Those business objectives whose purpose was to maintain the new state were:

- Provide real-time visibility in consulting and systems integrations operations.
- Reduce the "Mean Time Between Surprises", in other words, to provide the ability to track revenue, cost, margin per project, and detect problems at an early stage, before any project can go completely off track.
- Ability to connect fragmented tools and data, allowing for business process variance tracking and data accuracy.

In addition to the business objectives, special requirements were also set for the BPMS respectively to facilitate the change by:

- Replacing inflexible manual reporting with flexible, customizable reports and dashboards, thus enabling a focus on value-adding activities instead of manual report generation and mundane tasks, and removing the associated unnecessary manpower overhead.
- Integrating data from legacy and future systems.
- Enable further process optimization. Once the process is modeled then it can be monitored, measured, and improved.

Respectively, those requirements for BPMS that were expected to help in maintaining the goal state of the service business unit were:

- "Remind" the users of monthly tasks and allow for configuration of escalation actions.
- Enable greater re-use of business information to decrease time-to-market and maturity.

Hereafter, I refer to the specific implementations of BPMS business applications at ITCorp as follows:

- "BPMS Application 1" - Consulting & Professional Services
- "BPMS Application 2" – Operating Services
- "BPMS Application 3" – Implementation Services

The BPMS also included features for social computing and document management, such as wikis, blogs, and personal web portals - features which at that

time were not so typical for other commercial BPMS offerings. These features were used to implement the following applications as:

- "BPMS Application 4" for internal social collaboration and knowledge sharing
- "BPMS Application 5" as a centralized process and tools management portal with status dashboards and reports for all ITCorp's employees

ITCorp referred to the overall set of BPMS applications simply as the "BPMS framework" because applications shared a common commercial platform as illustrated in Figure 23 below. For systems integration with other IT, the BPMS included an adapter library, a development environment, and a process-modeling tool based on a Business Process Modeling Notation standard (BPMN) with proprietary extensions.

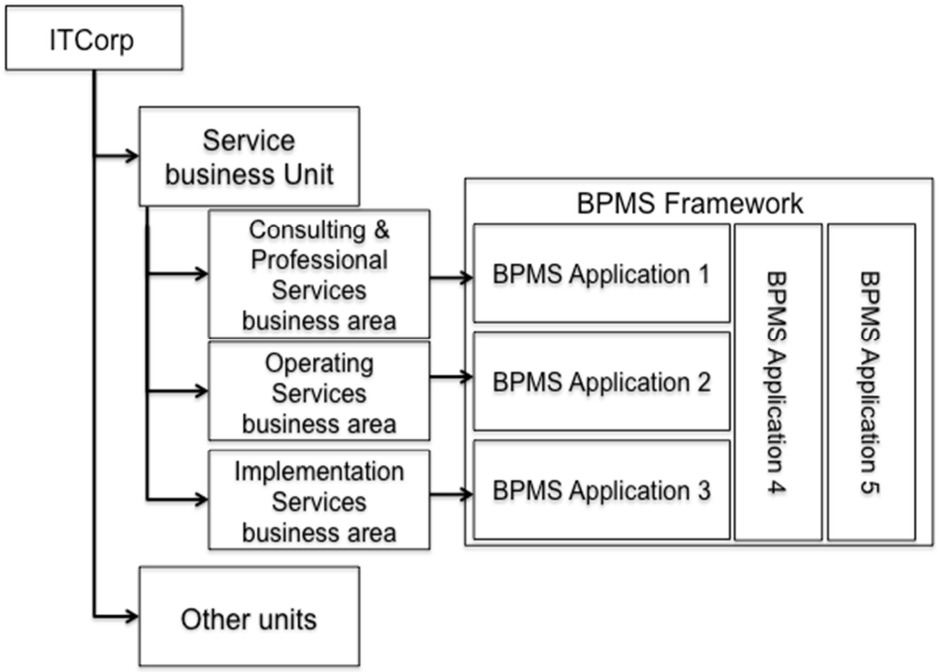

Figure 23. The BPMS framework of ITCorp

5.3.1 Components of the BPMS

This subsection describes the components of the BPMS in terms of their inputs, processes, and outputs as illustrated in Figure 24, and whether their main purpose was to enable change or maintain the new goal state of the work system.

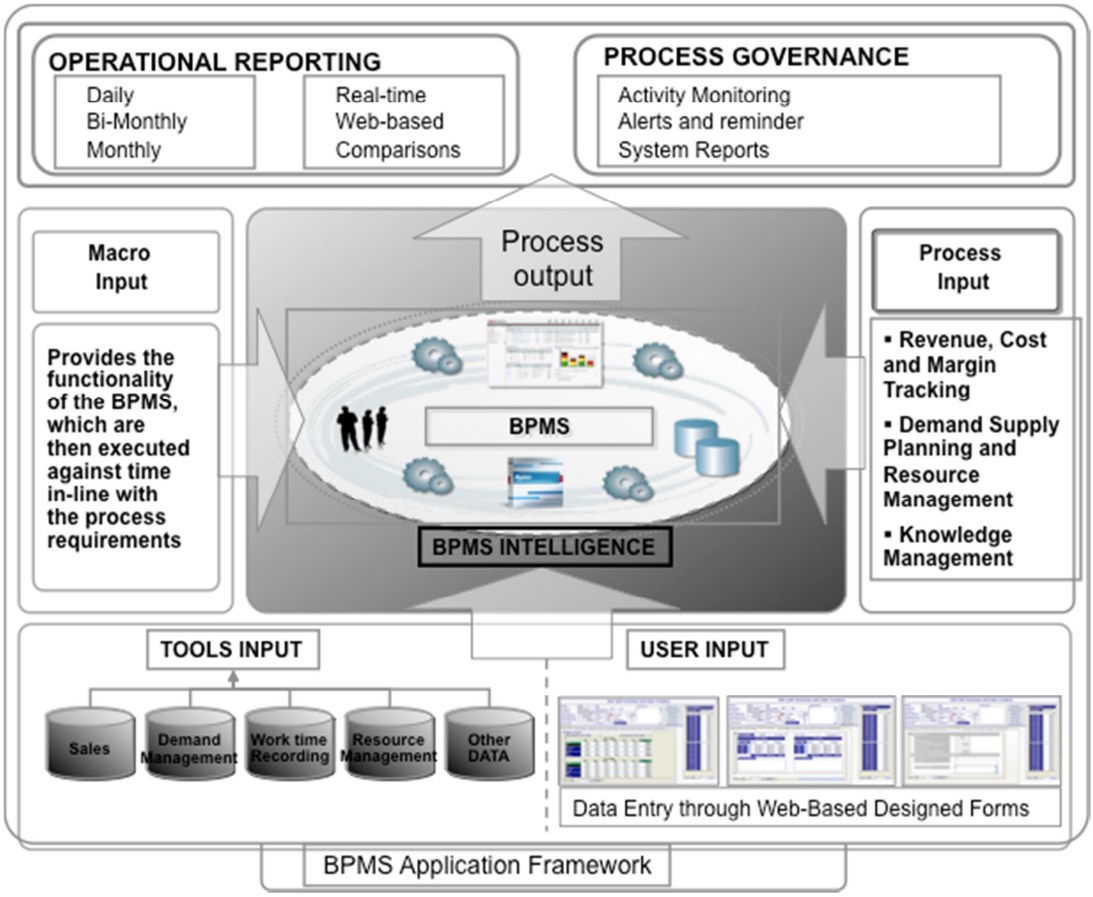

Figure 24. The components of BPMS application framework of ITCorp (adapted from the internal presentations of ITCorp)

First, I describe the BPMS components that were used to *enable change* towards the goal state of the service business areas at ITCorp.

User input

The BPMS provided a customizable Graphical User Interface (GUI) with user-friendly menus and web-based forms based on specific but not predetermined roles. The BPMS subsumed most of the existing data, which were held within current

Microsoft Excel-based tools, which provided one tool and one interface. This single interface connected fragmented legacy IT tools, such as sales workflow, work time recording, and resource management tools, thereby aiming to increase data transparency.

The users of the BPMS applications were mainly:

- Solution consultants
- Project managers
- Technical support managers
- Regional managers
- People working in the global project management office

Process Input

The processes for Revenue, Cost, and Margin (RCM) tracking, and for Demand Supply Planning (DSP) process were both modeled in the BPMS, and they provided the basis of sequences and triggers upon which the BPMS applications operated. These processes could then be enhanced and optimized using the BPMS tool to enable constant process improvement. Other processes could be modeled as additional inputs to the system, providing further automation and efficiency in the consultancy and systems integration operations.

The BPMS applications were integrated with the document and knowledge management (KM) systems of ITCorp, thus providing related documents to the users at every step of the process.

Macros input

The Intelligent Macros input provided the information from which the BPMS would generate reporting outputs. These could include:

- Comparison data reports
- Timed reporting, e.g., monthly management reports or operational daily reports
- Activity reports, alerting management to non-conformance to the processes

BPMS Intelligent Engine

The heart of the system was the BPMS Intelligent Engine that could do the following:

- Take the timing for all events from the Process Inputs.
- Trigger input from the user and from the legacy IT tools in-line with the processes.
- Utilize the Intelligent Macros to produce the desired reporting and governance.

The system enabled simple automated updates, amendments to processes, creation of new macros, and amendments and updates of user GUIs for the system administrators. In addition, the BPMS applications controlled access rights and provided limited transparency of information, based on different user role definitions.

The purpose of the following components of the BPMS applications was mainly to help *maintain* the goal state of processes, in other words, the process enactment.

BPMS output

The output of the BPMS applications would serve the two main purposes described below:

*Operational reporting**:***

The BPMS applications provided full transparency to operations through:

- Real-time reporting available on-line
- Daily and monthly reports which replaced time-consuming manual reporting such as Key Performance Indicator (KPI) scorecards
- Flexible and customizable reports and dashboards to meet the needs of the business

Governance:

The system would "alert" the user of pending tasks and allow for configurable management escalation actions. Reports could be generated to show governance conformity and exceptions, which could be used by line-management to target improvements.

5.3.2 The build system

The BPM initiative at ITCorp started as a small-scale pilot driven by a few people in the Consulting and Systems Integration Services business area at the beginning of 2008. The BPM initiative also received extensive support from the BPMS vendor's consultants. The number of participants rapidly increased after going into operation, and by the end of June 2009, the BPMS applications were deployed into all geographical regions of ITCorp's service business unit. The BPM team expanded from a few key persons to a BPM Center of Excellence (CoE) shown in Figure 25 during 2008. Simultaneously, the BPMS framework status evolved from a pilot in 2008 into an official part of the IT application landscape of ITCorp by mid-2009.

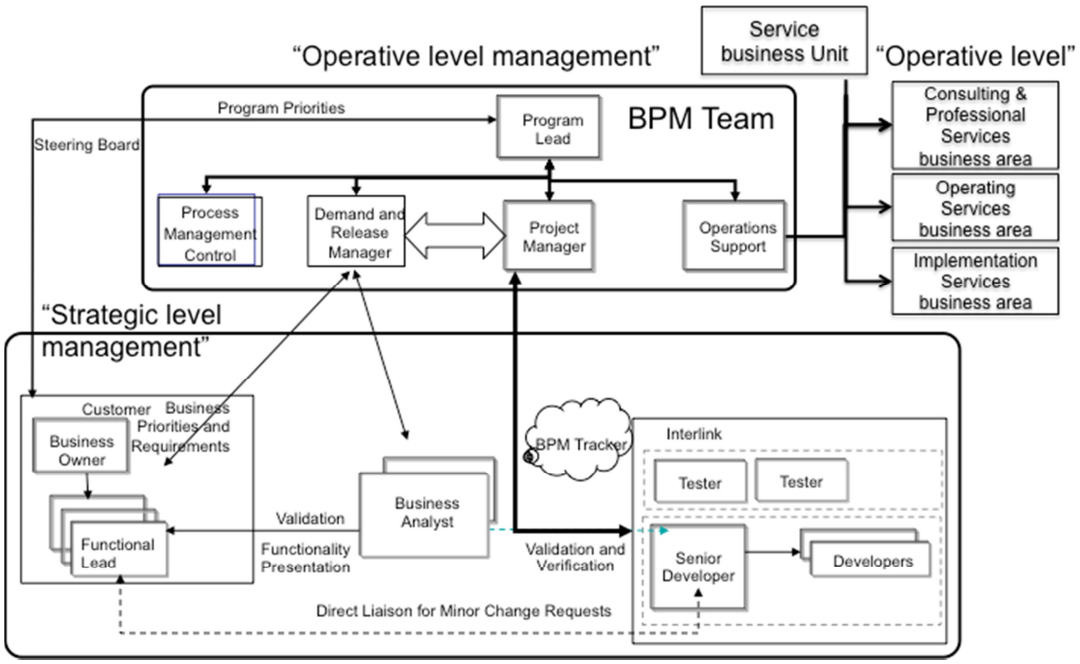

Figure 25. The organization structure of the BPM initiative (adapted from an internal presentation of ITCorp 2009)

The upper part of the BPMS governance illustrated in Figure 25 can be considered as operative level management, and it consisted of a program manager leading the various BPMS application projects, and process management controllers

together with a demand and release manager who were responsible for the process and concept development according to the change requests initiated by the business units. In addition, operations support ensured the coordination of the BPMS applications delivery into operative level, and ensured the required continuous end-user support and training, and defect and change management.

On the bottom left, the business owners of the particular service business area provided the guidance on priorities across the business units and led the overall strategic direction for the relevant BPMS applications. As such, this role was responsible for the strategic level management of the BPMS applications. The business owner role was supported by a functional lead empowered to prioritize the given change requests for any specific service business area, and also to coordinate the requirements sent to the development team. Outside of the BPMS management staff, a business analyst acted as a liaison with the BPM team by defining and documenting the requirements from the business owner and delivering them to the BPM development team. A BPMS architect role was present intermittently, but the ready-made BPMS platform structure itself determined most of the development architecture. Therefore, the BPMS vendor's consultancy was also occasionally utilized for the system architecting.

The BPM development team in the bottom right implemented, tested, and verified the BPMS applications requirements led by a project manager.

5.3.3 The BPMS system integration and information model

The first pilot included little integration with the other legacy IT tools. What system integration existed consisted mostly of data uploads that were executed periodically based on the files produced by few legacy applications. Even though the BPMS provided multiple ways of integrating with the other IT through systems adapter libraries, for example, Service Oriented Architecture (SOA) based adapters, the on-line integrations for some technologies were practically non-existent. This was partly because replacing manual tools and switching to periodic uploads of data

directly to the BPMS had improved the execution of targeted processes and therefore had already met the immediate needs of the business units.

The data model used in the BPMS to present the process flows was not formally defined or communicated to the whole organization, which is an usual path to enable the conduct of data integrity checks. Instead, the required data were defined within the process environment variables on a need basis. This was much due to the fact that development started rapidly and no formal architecture documents were created from the start. The later development of the initiative included plans to reverse-engineer data models from these process variables and to enhance the resultant data models to become the formal enterprise information models of ITCorp. Such enterprise data models would then be used to ensure corporate wide data consistency among the various service business areas. However, at the time of this report, this plan has not yet been realized.

5.3.4 The BPMS applications and fit with environment and IT strategy

The purpose of the BPM initiative was to facilitate a new strategy for Consulting and Professional Services business area within ITCorp's service business unit. The strategy was two-fold:

(1) To establish a common process language for all business processes, and create a new blueprint for the mode of operation.
(2) To increase customer satisfaction by increasing process performance.

The second part of the strategy was aligned with ITCorp's business objectives emphasizing customer-centricity. However, the first part raised conflicts with the IT strategy of ITCorp. ITCorp had not previously employed any kind of BPMS in its IT application landscape, so this was the first of its kind for ITCorp. ITCorp's enterprise level IT department had followed the BPM related technologies but

concluded that they were immature for large-scale implementations. The other major factor in considering the use of BPMS was that ITCorp suffered from thigh maintenance costs of myriad legacy IT applications. This led the IT department to choose a strategy to phase out the legacy applications and replace them with enterprise level systems provided by a few well-established applications and system vendors, based on strategic choices. In addition, the IT management considered BPMS approach to resemble the tailored legacy applications developed by the previous IT teams, which were now one of the main reasons of high maintenance cost. Subsequently, the service business unit did the selection of the BPMS without IT department's involvement, and their decision was thus in conflict with the aforementioned IT strategy.

5.3.5 Contents of the BPMS questionnaire

The case descriptions were created using internal documentation, presentations, and various other source materials. In order to obtain deep insight into the perceptions, views, and experiences of the key individuals, I carried out the following questionnaire with the people working with both the development of the BPMS applications and their use in operations. I argue the relevancy of each question within the context of my BPMS-reliant work system model and the research questions of this dissertation.

Q1: How would you describe the purpose and the value of the BPMS?

Purpose: to identify how the purpose and the value of the BPMS are understood and recognized.

Q2: Have you participated in the development of the BPMS applications? If so, then in what way?

Purpose: to identify how much separation and difference in perception exists between the developers and the users of the BPMS applications. As my model of the BPMS-reliant work system suggests, the BPMS-reliant work system considers

developers, managers, and users as participants of a larger socio-technical system where a more strict separation among members leads to less positive benefits.

Q3: Are you a user of the BPMS applications? If so, for what purpose do you use it?

Purpose: Same as for Q2.

Q4: What kind of support do you get for the BPMS applications? From whom?

Purpose: to identify how the BPM team is organized to support the BPMS application use and what is the team's impact on participant's ability to use the BPMS applications.

Q5: How are the BPMS and its applications managed?

Purpose: to identify how closely related the operative and strategic level management are to the implementation and execution of business process improvement goals.

Q6: What are the main concerns in the way the BPMS and its applications fits to the surrounding IT environment? What has been/are the main challenges?

Purpose: to confirm the significance the framework gives to recognizing the boundaries of the BPM initiative and its use in the surrounding IT environment.

Q7: How is the BPM initiative's strategy aligned with the business strategy? Have there been / are there any misalignments?

Purpose: to confirm if there exists such a strategy and the significance of the strategic alignment of the objectives of the BPM initiative with the company's strategy.

Q8: How does the BPMS operate as a whole and in a relation to other business activities in your company?

Purpose: to confirm the importance of the BPMS-reliant work system.

Q9: Has the BPMS applications impacted on how you do your work? What have been / are the main benefits and challenges?

Purpose: to analyze what kind of qualitative changes have emerged after introducing the BPM initiative.

Q10: How do you see the future of the BPM initiative? What are your main expectations?

Purpose: to analyze if BPM is considered as a short- or long-term solution.

Two responses were received and they are reported in the following subsection. The case study company, organization, internal project/system, and all individual person names are changed, but all other content is reported exactly as stated.

5.3.6 Response number 1

Please, answer with your own words into the following 10 questions:
Q1: How would you describe the purpose and the value of the BPMS?

ITCorp's initial foray into Business Process Management (BPM) was the award-winning "BPMS Application 1" project which thoroughly transformed its Consulting & Professional Services division and delivered an estimated €6 million annual productivity surplus. Based on this success, ITCorp has now deployed a sophisticated, pan-organizational BPM Program, leveraging and extending the success of "BPMS" through a mature BPM Center of Excellence (CoE) organization. The single BPM platform has been leveraged to provide a multitude of BPMS 'Applications', delivering process automation, process governance and consistency, to many areas of the ITCorp's services business, from its Consulting & Professional Services to its Operating and Implementation Services. Ultimately, through the effective use of BPMS, ITCorp now have enhanced levels of business visibility for managers and executives, supported by dedicated socio-business networking functionality (integrated collaboration within process).

Conventional BPM wisdom is to “start small and think big.” ITCorp’s Global Head of BPM defied that convention by “starting big and thinking even bigger”. Through a modular delivery approach, the Head of BPM targeted initial BPMS services rollout in 4-6 months, and complete end-to-end division operational management within one year. The resulting BPM solution has delivered a benchmarked €6 million in annual productivity surplus.

While the head of BPM started somewhat “under the radar” in one of the ITCorp’s Consulting & Professional Services division, the true vision was always to use BPMS to transform the way the ITCorp operates as a global organization. The basic tenet of this vision is that a competitive, industry-leading business needs to have full end-to-end transparency into its fundamental business components (Sales**,** Delivery, and Resources), as well as the ability to drive and maximize its business performance through effective portfolio management, knowledge management, remote capability and overall business management. These data need to be accessible in a holistic environment that supports business management but also consultants, engineers, project managers, and other employees. ITCorp’s infrastructure housed large enterprise systems such as ERP, and other rigid and disconnected sales workflow, resource, and knowledge management applications. This enterprise tools landscape did not provide the flexibility or cohesion ITCorp needed to conduct its dynamic business, placing limitations on real-time business management and future planning capabilities, while also creating data inaccuracy and redundancy, and significant overhead wasted on reporting, training, and data entry.

Timing being everything, the transformational value of “BPMS” within the Consulting and Professional Services division began gaining the attention of the larger ITCorp organization just as global economic indicators began to fall, and the world’s major economies headed into recession. In conjunction with a reorganization of ITCorp’s business units, BPMS began to flourish across the company.

Today, ITCorp's 10,000+ employees in the Consulting and Professional division are supported by an expanded version of "BPMS", managing aspects of Sales, Service Delivery, Remote Operations and Delivery, Resource & Competency Management, Solution Management, and overall Business Management. The ITCorp's BPM CoE has subsequently been able to re-use much of the BPMS functionality to deliver a fast business solution to ITCorp's Operating division. This functionality, housed again on the single platform is badged "BPMS Application 2" and delivers Project Management, Global Delivery, and Sales support. Significant cost benefits have been immediately realized through this re-use and platform sharing. The BPM CoE has recently delivered the next solution, this time for ITCorp's Implementation Services. "BPMS Application 3", is focused on the automation and management of the deployment, maintenance, and upgrading of roughly 150,000 of ITCorp's sites around the world. The original quote for a similar solution was 1.1 M Euros and a delivery time of 9-12 months. The BPM Center of Excellence delivered the initial solution in 2 months at a cost of 50K Euros.

All three of these systems are front-ended by a common, LinkedIn/MySpace-like collaborative portal known as "BPMS Application 4" that features personalized home pages, communities of interest, messaging, and more. In addition, the BPM CoE are in the final stages of delivering "BPMS Application 5", a centralized process and tools management portal with status dashboards and reports for all ITCorp employees.

The BPM CoE is now building the reputation for fast, effective delivery of customized process automation solutions, which means the demand for its services within ITCorp is growing by the day.

Q2: Have you participated in the development of the BPMS applications? If so, then in what way?

I have been the Program owner and lead from the beginning in 2007

Q3: Are you a user of the BPMS applications? If so, for what purpose do you use it?

I monitor the platform, it's usage, and make maximum use of "BPMS Application 4" for collaboration, particularly within the BPM Team and with BPM related projects

Q4: What kind of support do you get for the BPMS and its applications? From whom?

1st and 2nd line support is provided by the ITCorp Helpdesk whilst 3rd line support is provided by the operations team which consists of:

- Head of operations
- System administrator
- Senior applications support specialist
- BPMS Application 1 support specialist
- BPMS Application 2 support specialist
- BPMS Application 3 support specialist
- BPMS Application 4 & 5 support specialist

Q5: How are the BPMS and its applications managed?

Via the operations team with the following platform components:

- Production
- Training
- Development
- Reference

The full release management processes are available on the operations BPMS Application 4 Community page.

Q6: What are the main concerns in the way the BPMS and its applications fit to the surrounding IT environment? What has been/are the main challenges?

The BPMS has very limited connections to the wider IT environment which in itself is a disadvantage because this could mean that there is duplication in effort with regards data entry. That said, the main purpose of the BPMS applications are to fill gaps in the existing ITCorp's IT landscape, so this mitigates this risk to a large degree. Main challenge areas:

- Resource and competence management – the full deployment of the BPMS Application 1 resource management module has been delayed due to the impending delivery of the Enterprise Resource Planning (ERP) system. That said, the ERP system faces repeated delays, which ultimately means that either way, ITCorp looses out.
- Sales management – due to the reorganization and the lack of full understanding of the needs of the solution consultant, the sales management module has now been adopted by the business as per the plans.

Q7: How is the BPM initiative's strategy aligned with the business strategy? Have there been / are there any misalignments?

The BPMS strategy provides a fast, agile solution to meet business IT and workflow automation needs. If anything, BPMS was often ahead of the strategy for the business, i.e., delivering a complete end-to-end business solution, which has meant that some of the modules have not been utilized due to changes in business needs and business maturity.

Q8: How does the BPMS operate as a whole and in a relation to other business activities in your company?

There has been no unforced downtime on the system since January 2009. At times the platform has been quite slow but considerable time and effort has been focused at resolving this through technically delivered IT solutions.

Q9: Has the BPM initiative impacted on how you do your work? What have been / are the main benefits and challenges?

As the owner of the program this is difficult to state, as I am not a mainstream user except for the BPMS Application 4, which has simplified the way my team and myself communicate.

Q10: How do you see the future of the BPM initiative? What are your main expectations?

I believe the platform will reach steady state in mid 2011, after which time a small support team will be in place to continue its development. That said, if it is selected to provide resource and competence management for all of professional

services in the absence of ERP, if it can be used to help support the solutions business program which I've just taken over and if usage of the BPMS Application 3 expands, then the future could be very busy indeed.

5.3.7 Response number 2

Q1: How would you describe the purpose and the value of the BPMS?

Using IT to automate business critical processes to increase efficiency and productivity by globalizing, standardizing, and optimizing processes for any organization. The BPMS also plays a critical role in real time reporting enabling senior management to make business critical quick decision. In addition,

- A business/management discipline that focuses on continuous improvement of your business processes
- Set of tools that help you do this discipline more effectively
- Business friendly way to build process applications
- Technology that orchestrates and integrates end users, applications, and data for defined business processes

Q2: Have you participated in the development of the BPMS applications? If so, then in what way?

Yes, program manager for the BPMS Application 2 program.

Q3: Are you a user of the BPMS applications? If so, for what purpose do you use it?

Yes, project management, sales case management, resource management, and remote delivery management.

Q4: What kind of support do you get for the BPMS and its applications? From whom?

ITCorp's IT department has a BPMS operations team that provides tier 1- 3 support.

Q5: How are the BPMS and its applications managed?

Through ITCorp's IT [support].

Q6: What are the main concerns in the way the BPMS and its applications fit to the surrounding IT environment? What have been/are the main challenges?

[Researcher's note: This question was first left unanswered but after a clarification, the respondent was able to provide the following answer.]

Yes, we have had issues with regards to IT.

1. Getting access through firewalls
2. Updating integration on changing systems
3. Updating code to upload data from excel
4. Access to business critical and high profile data, and
5. Out of the box Java/code changes due to the limitations of the BPMS.

Q7: How is the BPM initiative's strategy aligned with the business strategy? Have there been / are there any misalignments?

No, in fact, as the tool updates are increasing, the business has started to release the value of process automation and reporting.

Q8: How does the BPMS operate as a whole and in a relation to other business activities in your company?

With operation services:

- Real time transparency on operations;
- The ability to measure process performance and enforce process governance automatically;
- Replace legacy spreadsheets with user-friendly online forms, reducing entry errors;
- Reduce the "Mean Time Between Surprises", i.e., provide the ability to track revenue, cost, margin per project, and detect problems at early stage, before a project goes completely off track; and

- Ability to connect fragmented tools & data allowing for variance tracking and data accuracy.

Q9: Has the BPM initiative impacted on how you do your work? What have been / are the main benefits and challenges?

Management benefits:

- On-line, real-time visibility of the business;
- End-to-end control;
- Portfolio and product management; and
- Governance of processes.

User benefits:

- A satisfying user experience;
- Enhanced inter-working between functions;
- Clear transparency of responsibilities and status; and
- Re-usability and repeatability of knowledge.

Business benefits:

- Reduced time to maintain project data, checking resource availability, data consolidation and reporting, Work Time Record (WTR) analysis, WTR corrections, sales data, project vs. finance & control data.
- Reduce time spent by project management office (PMO) identifying project issues and remediation/correction.
- Reduce time spent in Excel-based competence capture.

Customer benefits:

- Improved operations services response time to bids and projects; and
- Benefit from operations services global experience and knowledge.

Q10: How do you see the future of the BPM initiative? What are your main expectations?

The operations services BPMS (Application 3) can offer to the business the much-needed remedy to resolve many of its current tools issues, which impact heavily on its operational capability, and limits its ability to optimize and grow in the future. It also enables the operations services to take advantage of the latest

market technologies in order to ensure the full alignment, utilization, and governance of the full operations services process framework.

5.4 Comparison of the BPM and ERP initiatives at ITCorp's service business unit

5.4.1 The initial state of "Services ERP"

At the time that the BPM initiative was launched, ITCorp also started an enterprise system delivery program (program meaning a set of projects) for their entire service business unit. The project target was to implement a common ERP system for managing ITCorp's service product portfolio, projects, and resources hereafter referred as "*Services Enterprise Resource Planning"* (SERP). One of the intended outcomes of SERP was to ultimately cover all of the more than 20, 000 employees in the service business unit, and also to extend into managing the external work force, such as sub-contractors.

Essentially, this new enterprise system was intended to be a major supporting tool for ITCorp's decision-making about strategies of their service business unit. Previously, ITCorp's business decisions had been largely driven by product development goals, which had also dictated the majority of the past IT tool selections. Consequently, the product-driven business processes and respective IT selections were considered to be insufficient for the new goal of continuously increasing activities in the professional services market. ITCorp's fragmented legacy IT landscape and Microsoft Excel-based manual tasks were seen to reflect sub-optimized processes – a problem that included the whole service business unit and not only its consultancy and systems integration services business area. The planned SERP in accordance with the existing BPMS framework in ITCorp's organization is illustrated in Figure 26.

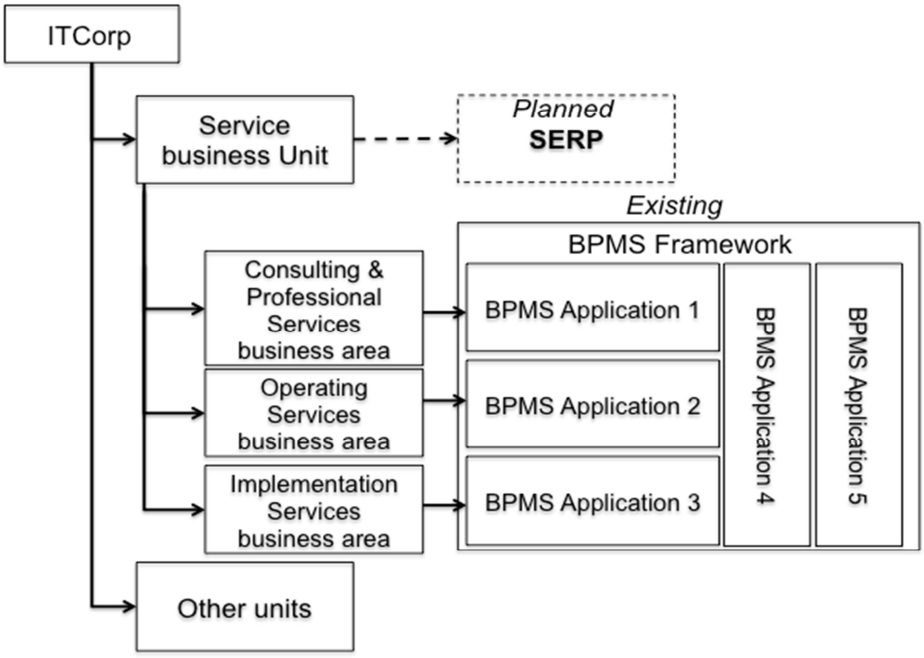

Figure 26. The SERP as an enterprise level tool compared to the service business area specific BPM initiative

5.4.2 The goal state of the SERP initiative

Business objectives for the SERP initiative can be divided into two categories: those that were meant to enable change and those that maintain the goal state. These objectives are described below:

To enable change:

- By driving change in strategy around delivery capability, from the short-term focus on reacting to captured sales demand to the longer-term focus on pro-actively building delivery capability based on strategic needs.
- By providing mechanisms to manage and optimize the service business unit resources in terms of efficiency, resource/competence contribution, timely head count, and competence investment.

To maintain the goal state:

- By enabling one consolidated cross-functional enterprise resource planning process, and a tool for enabling end-to-end enterprise resource management.
- By allowing full transparency of the current operational capability and requirements of the service business unit to decide their strategy.

The key functionalities of the SERP were defined as follows:

- Resource management, resource demand, supply, and balancing
- Time registration
- Competence structure / individuals
- Competence evaluation
- Long term capability planning based on capacity and competencies

The targeted users of the SERP were identified as the following personnel from the service business unit of ITCorp:

- Project managers
- Line and resource managers
- Employees working on customer projects
- Customer team's finance and control personnel
- The key users of work time recording
- Demand-supply planning managers

It was understood from ITCorp's past experience that the implementation of a large ERP system would be a long-haul program. However, consulting and systems integration urgently required tools to support day-to-day operations. Therefore, the business decision was made to temporarily continue with the BPMS applications until the SERP was fully functional and migration to one common tool would be possible to execute.

5.4.3 The build system for SERP

The SERP program (a set of projects) at ITCorp was launched in the October 2008. The service business unit had done preliminary studies with different ERP vendors to determine which one of the vendors could best re-engineer current processes to match their business objectives. The IT department participated only after the official program was launched, and supported mainly with the process development

and information modeling phase, along with the technical evaluation of the ERP tool vendors and implementation partners before the implementation start.

During the SERP selection process, the selected ERP vendors were provided with the process designs in Event-driven-Process-Chain (EPC) standard notation, which reflected the goal state of the processes. Vendors were also provided with information models and terminology sheets related to the current processes. The business and IT departments together defined the evaluation criteria. The IT department's focus was the architectural and technical maturity of the SERP tool, and feasibility of fitting the tool with the enterprise architecture, whereas the service business unit focused on how the tool would support the goal state process flows. The aspects related to the cost and return of investment was handled by both the business and IT department.

The selection of the candidate ERP vendors was based on the business analysts' reviews of the market leaders, and ITCorp's experience gained about the vendors in their prior projects. The selection of the implementation partner was separated from the selection of the tool provider, though some tool vendors were well established in providing the implementation services as well, and were therefore also considered during the selection round.

Since the BPMS had already been launched with a set of applications including some of the same functionalities considered for the SERP, the BPMS vendor was also considered as a candidate for the SERP. However, the BPMS had a significantly different starting point than established ERP systems. The BPMS was used as a composition tool to build and support processes from scratch. As a flexible composition tool, the BPMS provided a development environment both for modeling the processes and for automating them. However, the BPMS required building system integrations to most of the other legacy IT tools, whereas ERP tools provided ready-made integrations.

The modeling of business processes was relatively easy to accomplish by the people working in the service business unit with the help of a few consultants and

tool experts, and as such the BPMS was suitable for continuous changes and emerging business needs. However, the BPMS did not provide any ready-made processes directly addressing the needs of the service business unit. In order to meet such needs, a development of specific BPMS applications was required. The consulting and systems integration service business area had started the development of these applications earlier for their own needs, but the suitability and maturity for the whole enterprise level was uncertain.

The ERP systems, in comparison, included so-called "Best practice" processes, and the main concern of ITCorp's service business unit was to evaluate to what extent these best practice processes could be utilized with minimal adjustment. Therefore, a trade-off existed between the benefits of standard ERP systems with best practice processes, and with the dynamic and continuously changing BPMS process implementation.

In spring of 2009, the IT department was assigned to make a technical feasibility study for the BPMS platform to evaluate the BPMS as technology for the SERP. The study resulted in recognizing that, even though the BPMS tool was technically mature and did not propose any foreseeable risk, the BPMS standards were still maturing, and the scalability had not been proven to the extent for more than 20, 000 users. In addition, the BPMS approach would have required its own in-house development of the functionalities, and therefore, the functionalities related to, for instance, work force management, or enforced legislative security requirements would have required extensive development. These requirements led to the conclusion that, for example, due to the security aspect, it was better to proceed with an industry-proven ERP tool.

Moreover, the service business unit also saw that BPMS platform decision had been made at that time without IT involvement. Therefore, the BPMS lacked integrations with other IT systems, whereas some of the ERP tools could provide ready-made integrations with at least some of the key legacy tools of ITCorp. Since ITCorp's IT strategy endorsed the "off-the-shelf" and the "best of breed" packaged applications (though this statement was not officially recorded as a decision), and also the service business unit considered the already available BPMS applications to

be optimized only for the specific needs of the consulting and systems integration service business area, the final decision favored the commercial ERP tool selection, based heavily on the attitude of ITCorp's IT strategy and the perception of the service business unit.

Finally, by autumn 2009, the selection phase of the SERP program concluded in the selection of one commercial ERP tool vendor and a separate implementation partner for the entire SERP program. The SERP program proceeded with the development and pilot phase, and initiated preparations for global implementations. The SERP program also included a migration plan for shifting the users of the BPMS to the SERP system in cases where overlapping features between them were identified.

The organization as defined in April 2011 of the SERP is shown in Figure 27. The SERP was organized as a traditional business and IT program. It included program managers for business and IT who then reported to a common steering team. Change and communication management was identified to be a critical success factor to ensure a smooth transition.

Different streams for each process domain, such as competence management and demand planning had stream owners leading the core team. The core team was then extended to lead both global and regional implementation. The IT and process architecture teams participated early in the program and were responsible for enterprise-wide process, information, and IT-tool planning. Since the program had not yet launched, the IT support has only been planned, and it would cover support for system setup, portal and access, and testing. The implementation focused on end-user training, both within the global and regional scope. The responsibility for development was mostly on the side of the SERP implementation partner.

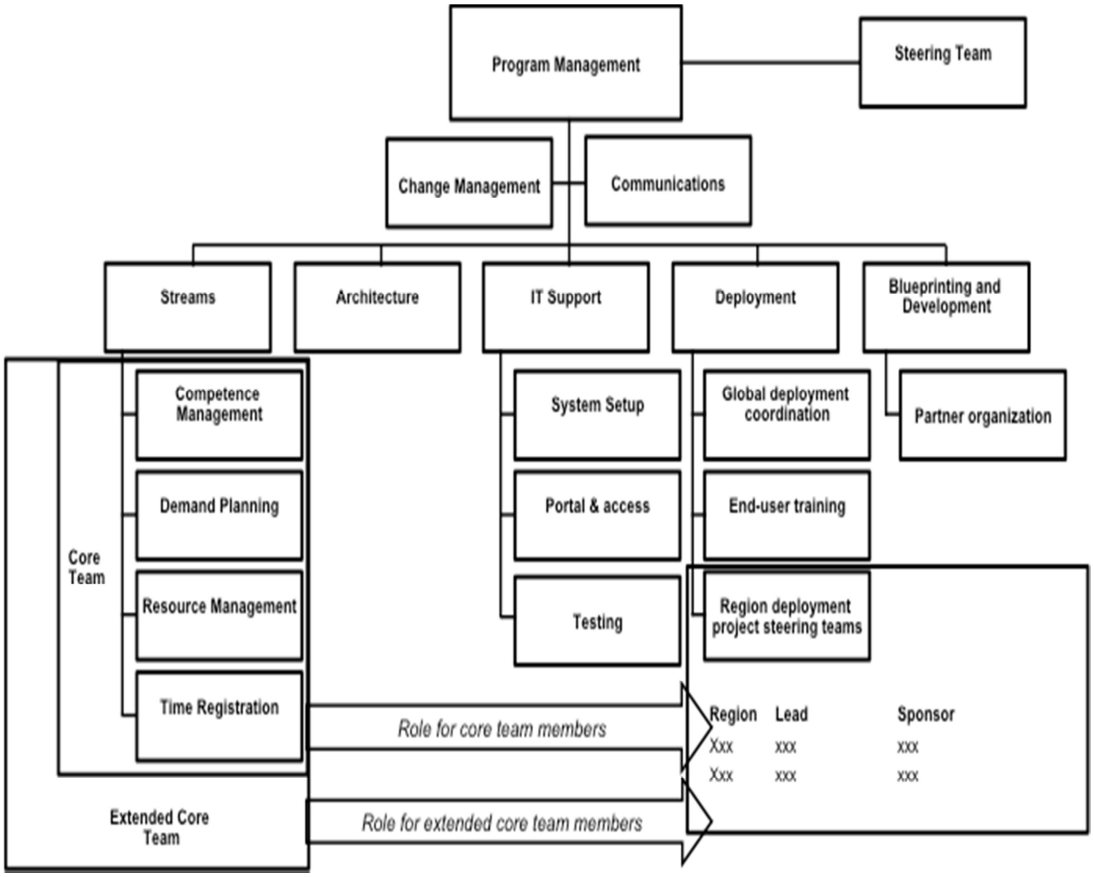

Figure 27. The SERP program organization at launch (adapted from the internal presentation of ITCorp)

A high-level timeline and key events of both the BPM initiative and SERP are illustrated in Figure 28.

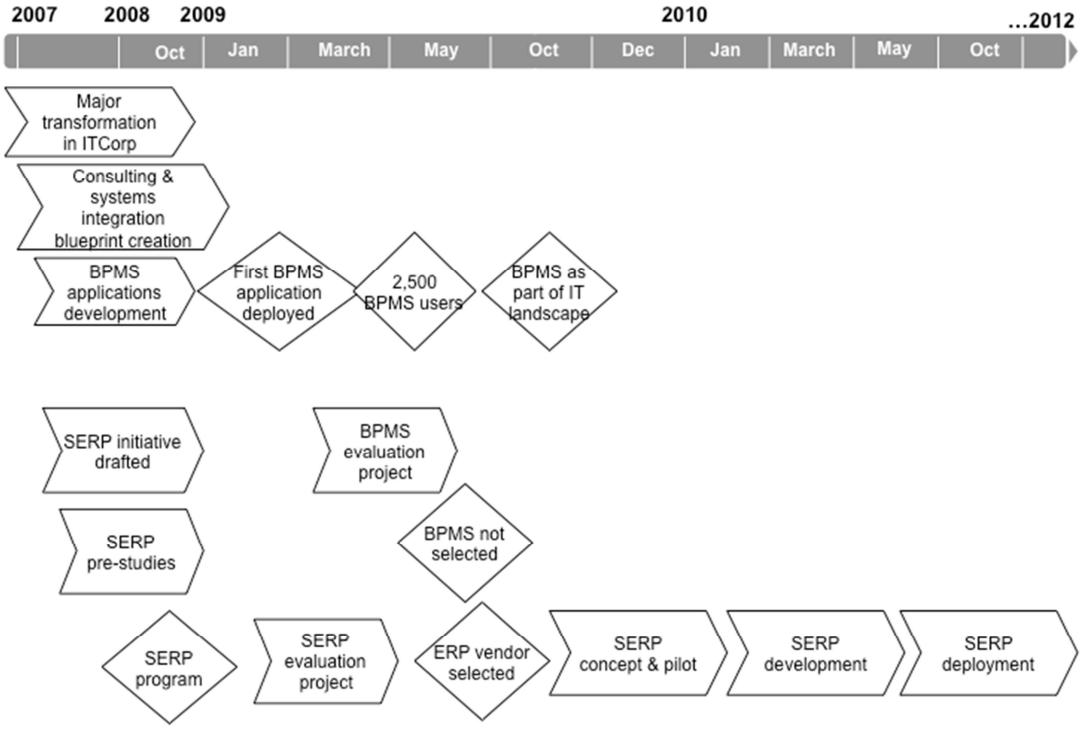

Figure 28. The BPM initiative and SERP program high level time line and key events

The BPM initiative was working on a continuous improvement mode and the program deployed new features and modules for the BPMS applications on a monthly base. Consequently, the SERP program has faced postponements due to budget issues. Moreover, the scope of the SERP has been identified to be a risk from the deployment success point of view. The initial two-phase delivery was changed to five releases to have earlier deployment for the first functionality. The plan for the SERP was to have first pilots towards the end of 2011, and the first release on early 2012.

5.5 Analysis and conclusions of the case study

The purpose for both the BPM initiative and SERP initiatives was to achieve a transition from the initial state of ITCorp's services business to the goal state. In Table 8, I have summarized the different interests for the goal function of these work systems.

Table 8. Different interests for the goal function of the work systems in ITCorp

Work system	Description of interests for the goal function
Initial state of the service business unit	Due to a recent major transformation of the company's structure, there was a need to define how business processes would be improved to achieve the business goals of the new organization.
The SERP initiative	• Increase efficiency and reduce cost by reducing administrative load for end-users and increasing span-of-control of resource managers. • Better management and optimization of the service business unit's resource efficiency such as resource/competence contribution, timely head count and competence investment. • Improving employee engagement through business success and need-driven capability building and career development.
The BPM initiative	• To increase customer satisfaction by increasing the process performance. • To drive common process language and mode of operation by introducing standardized blueprint and IT tools for the service business unit.

The goal state of the service business unit	• New business processes and the functional blueprint for the new mode of operations for services business • One process language to improve understanding by all, and to increase responsiveness and performance levels • Solution driven business growth • Service business growth • Improved customer satisfaction • Improved efficiency and profitability • Improved transparency of operations

5.5.1 The outcome of the BPM initiative

Each of ITCorp's service business unit's business areas incorporated the earlier described BPMS and its in-house built applications. I posit that the use of the BPMS applications and the achieved level of participation in the BPMS-reliant work system have been significant for gaining operational and business performance.

The initial successful BPMS and its first application spawned a number of other successful BPMS applications. They were all based on the same commercial BPMS platform, in-house built BPMS development, management structure, and each application was facilitated by the success of the first BPMS application. The development of the BPMS applications initiated a transformation of the work, first within one service business area towards the goal state of the service business unit, and transferred the success to other service business areas. This transformation did not start from the top management, in fact the approach at first contradicted the overarching IT strategy, yet the BPM initiative succeeded on releasing hands-on tools on a monthly basis and provided a center of excellence to facilitate the change in these work systems. The goal function as difference between the initial and goal state can be concretized in the benchmarked €6 million in annual productivity savings.

However, for some BPMS applications, the implemented system did not achieve such impressive results because the necessary level of participation for its use could not be achieved. As stated in the first response: “If anything, BPMS was often ahead of the strategy for the business, i.e., delivering a complete E2E business solution, which has meant that some of the modules have not been utilized due to changes in business needs and business maturity.”

5.5.2 Outcomes of the SERP

The ERP-enabled change initiative for transforming the way the service business unit managed their assets, named here as SERP, chose a more traditional approach. The SERP initiative was well aligned and supported by both the business and IT strategies at ITCorp. The technology platform was carefully evaluated and the service business unit’s goals drove the initiative. However, its shortcoming was in the scope, which covered the entire service business unit already in the beginning. The implementation was planned in two phases, but after facing delays arising from budgeting issues, the implementation plan was altered to include five smaller iterations.

5.5.3 Focal theory and complementary focal theories

The BPM team organizational structure shows a close cooperation with the business stakeholders, and a coordination of the business needs with the operations and development team. Moreover, the members of the BPM team were also participants in the goal state of the stable work system. The BPM team repeatedly released a number of iterations and applications, and rapidly increased the number of participants among ITCorp’s employees. The use of BPMS applications can be described as BPMS-enabled change, though, not as an IT project or as organizational change like SERP, but as what Markus (2004) called a “technochange”. Instead of being a onetime project or even a set of discrete projects (here a program), the mode of operation was based on agile and iterative changes to the way business processes were enacted using the BPMS applications. This agile,

iterative, and participatory implementation of changes has a close resemblance with the sustained Participatory Design introduced in Subsection 4.4.1 of Chapter 4. I consider this development style to be the *focal theory* that enabled the change assisted with complementary focal theories.

Based on the descriptions of both the BPM and SERP initiative build and goal systems given in the previous sections, I have collected the steps included in the complementary theories from Table 6 and Table 7 of Chapter 4, which turned out to be empirically supported in achieving and maintaining firm performance in this case study as follows:

*Table 9.*A summary of steps that were supported in the BPM initiative as complementary focal theories

Elements	**Build system**	**Maintaining goal state**
Customers	(Internal) customers as participants	(Internal) customers as participants
Strategy (mission, vision, values)	The alignment of strategic objectives with business processes. The influence of management commitment and empowerment of employees.	
Products & Services		BPMS-reliant work system produces informational services.
Processes & activities	Careful selection of which processes to expose for improvement / change. Re-align processes with market strategy. Strategic alignment is a continuous and cyclic process driven by key performance	

	indicators. Initial discovery and description of business operations in a manner that is conducive to process improvement.	
Participants	Integration and application of different leadership roles. Realize how employee performance is linked to process performance. Establish a BPM team. Scheduling a proof-of-concept (PoC) early in the project. Establish cross-functional project teams. Investment in an analysis phase.	Integration and application of different leadership roles. Employees express how their work affects the company's performance. Relational coordination among the participants enables to more effectively coordinate their work.
Information	Establish process performance metrics.	Use of process metrics consistently.
Technology	Avoiding misuse and immature BPMS features in the course of the implementation. Link process model and rule to execution directly. When process design and enactment is connected to SOA infrastructure, processes can be improved significantly.	
Infrastructure		
Environment	The design of an organization and its subsystems must 'fit' with the environment.	

I reason that the source of motivation for the BPM initiative was the weaknesses when using tools to support the business execution in day-to-day activities. These weaknesses were seen as opportunistic changes that led to questioning the existing work practices and tools, which ultimately led to the discovery of BPMS as a potential technology to improve business performance. Furthermore, the BPMS components enabled flexibility that further influenced the alignment with other work systems as a larger whole. The goals of BPM initiative were aligned with enterprise level strategies in terms of supporting the new mode of operations within the service business unit and customer-centricity, and even though contradictions emerged with IT strategy, those contradictions ultimately turned out to be opportunistic changes to increase flexibility until enterprise level solution would be available. I see that this finding support Tallon and Pinsonneault's (2011, p. 480) conclusion, "A combination of tight alignment and flexible IT infrastructure allows firms to use IT in ways that satisfy their short term strategic goals while developing greater knowledge and awareness of how IT can help them react faster to changing markets." I consider that the BPM initiative enabled such short-term flexibility in IT while SERP program, despite the delays, targeted developing longer-term value of IT opportunities in volatile market climate.

I also argue that it is of importance to acknowledge the BPMS-reliant work system as generator of informational services. The BPMS applications enabled transparency, tracking, problem detection, and accuracy to service business operations data. Since the participants of the build system were also participants of the stable work system, I see a close relation between the dynamic and business capabilities. The fact that the BPM CoE were considered as a reliable producer of respective customized process automation solution, implies that such build system can be regarded as possessing dynamic capability to change ITCorp's business processes (see Škrinjar and Trkman 2013).

In addition, the "BPMS application 4" provided a social collaboration tool similar to LinkedIn and MySpace or Facebook, which featured personalized home

pages, communities of interest, messaging and more. This social collaboration tool provided a common portal for all other BPMS applications and increased the feeling of community and provided means for relational coordination (Gittel et al., 2010) and media richness (Daft and Engel 1986) among the participants. The social collaboration tool can also be considered as a complementary information resource regarding business processes. According to Topi et al. (2006), it is possible that such complementary information resources, in their case, informal notes, provide a better description of key business processes than formal but not up-to-date process models.

Iveroth (2010, p. 147) concluded from a similar three-year case study of the successful IT-enabled transformation program at the international telecom company Ericsson, "Commonality is imperative for the success of leading large-scale IT-enabled change (i.e., common ground, meaning, interest, and behavior). People in a large organization more or less always have some attributes and things in common that bind them together. The different varieties of such commonality can be used as a resource in the practice of leading IT-enabled change" (ibid., p. 147). I argue that the loss of commonality was one of the challenges to influence the SERP initiative's success.

Considering both the business process and IT maturity, the head of the BPM team at ITCorp first considered the use of the PEMM model to initiate a journey from stage P-1: 'Reliable and Predictable results' to P-4: 'Best in Class'. However, my systematic literature review findings of BPM maturity models indicated that progressing from one level to another did not occur for any studied organization within less than one year. Therefore, progressing across three stages from P-1 to P-4 may imply unrealistic scope for increasing the maturity. As an outcome, the BPMS can be considered as a process enabler for the infrastructure to reach P-2 defined as "An IT system constructed from functional components supports the process" (Hammer 2007, p. 116). Since the BPMS was considered to be enough mature technology to replace many of the manual based operations on a quick delivery schedule and thus demonstrated increased maturity first in a single work system level, the same approach was later followed in other units.

I also consider that the volatile business environment, both externally and internally, had affected the success of the BPM initiative. According to questionnaire Response 1, “Timing being everything, the transformational value of BPMS within the consulting and professional service business area began gaining the attention of the larger ITCorp organization just as global economic indicators began to fall, and the world’s major economies headed into recession. In conjunction with a reorganization of ITCorp’s business units, BPMS began to flourish across the company.” Moreover, the fact that the BPMS was initially meant to only fill the gaps until the SERP was available, and as such the BPMS was not a “proper fit” with the environment or aligned with a long-term strategy, these factors actually positively affected the BPM initiative, whereas the heavier SERP program faced challenges to get further funding and was postponed temporarily. To overcome such ‘unfitness’, I argue that the managers selected different leadership styles such as *innovator* and *coordinator* (refer to Subsection 4.1.4 for the elaboration of the leadership styles). As given in Response 1, the head of BPM was managing according to the innovator style as he “started big and thought even bigger”, and envisioned using the “BPMS to transform the way the ITCorp operates as a global organization“, and when adopting in the coordinator style, he “targeted initial BPMS services rollout in 4-6 months, and complete end-to-end division operational management within one year.”

The motivation for the SERP initiative was not so much about the work transformation; instead its purpose was to implement a long-term strategy. As a long-haul project, the SERP was more exposed to threats not only in terms of changes in economic enablers but also in strategies, especially in the volatile business settings. Consequently, delays in the SERP initiative and their negative impact on the budgeting in addition to the aforementioned change in economic climate, induced the need to continue with the BPMS. I consider these factors to be opportunistic changes for the BPM initiative.

I have summarized the highlights of the outcome of this case study in Figure 29.

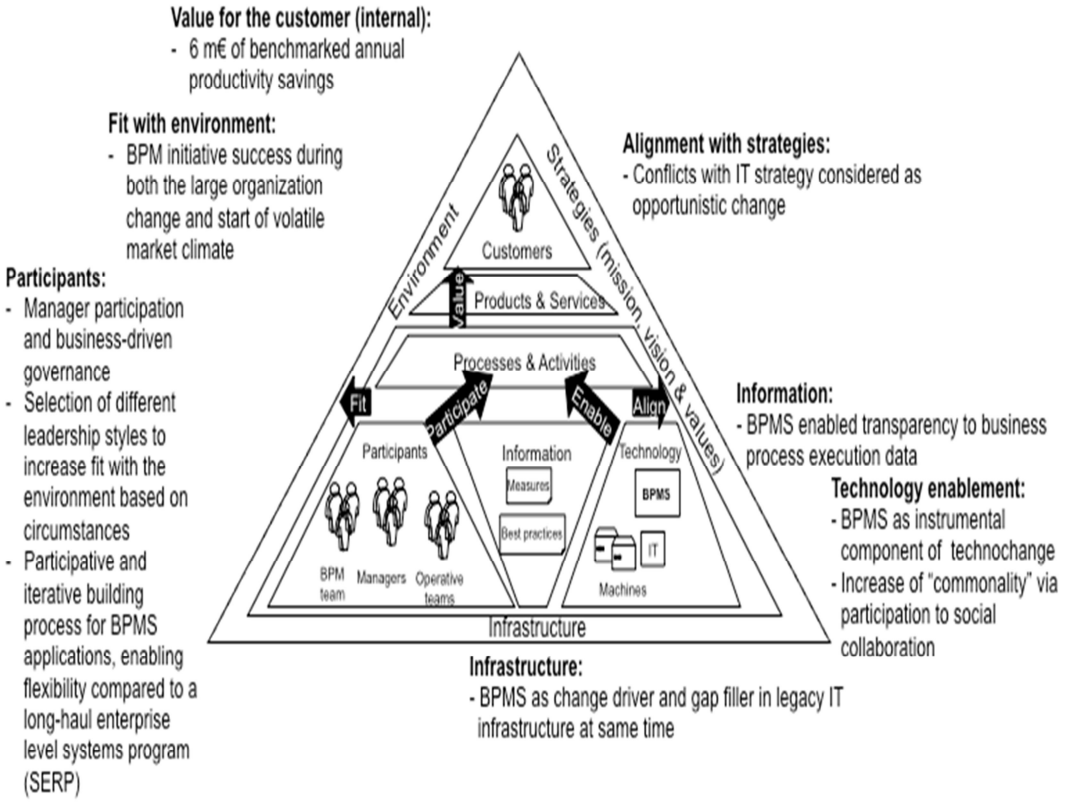

Figure 29. The highlights of the realized end state of the work system

6. Action research

"For three decades, executives have made maximizing shareholder value their top priority. But evidence suggests that shareholders actually do better when firms put the customer first" (Martin 2010, p. 58).

The motivation of emphasis on customer needs comes from the studies claiming that the most significant predictor of BPM success is the combination of a proactive implementation of BPM as part of organization's business strategy together with focused BPM efforts on core-customer business processes (Rhee and Mehra 2006). However, the recent studies also suggest that the BPM success rate, i.e., the frequency with which BPM initiatives achieve, sustain, and continuously improve on performance targets, could be as low as 20% (Towers 2010). Even though the knowledge of what influences BPM initiatives' success has been studied and acknowledged during the past decade, many executives still confirm that the promised early savings from BPM have quickly dissipated and the benefits are not sustained over the long term (ibid.). According to Towers (2010, p. 1), "A core problem is that companies often undertake BPM too narrowly, viewing the issue solely as a matter of identifying and grouping related business process activities, often defined through the short-sighted 'lens' of the internal customer. This is compounded by a focus on related information and data, which further reinforces a 'within the walls' view of process. Although some would argue this approach is core within the BPM philosophy, it is simply 'not of this time' and doesn't understand the changed needs of the 21st century customer."

Prior research has shown that organizations are more successful when they embrace customer orientation (e.g., Slater and Narver 1999; Day 1999; Han et al., 1998; Berry 1997; Deshpandé et al. 1993; Kohli and Jaworski 1990; Narver and Slater 1990). In addition, key literature on the concept of business process management suggests that business-process orientation (BPO) has a positive affect

on business performance (e.g., McCormack et al., 2009; Aysar and Johnson 2003; Harmon 2007; Seltsikas 2001; McCormack and Johnson 2001; Burlton, 2001; McCormack 2001; Hammer and Champy 1993; Davenport 1993). Surprisingly, even though customer needs and centricity are implied in the definitions of BPM and BPO, the customer-centricity as such has not often been considered as a CSF of BPM. Therefore, in this chapter, I aim to provide an answer to my third research question (RQ3):

(RQ3). How can BPM and BPMS support a customer-centric approach?

I argue that aligning a company's strategy, information, and business processes to be customer-centric is a direction that is empirically well supported, but the relationship with BPM has not yet been deeply investigated. In Chapter 4, I presented my conceptual model based on Alter's (2008, 2006, 2003) framework of work systems. Alter (2008, p. 461) claims, "The elements of a work system can be used as a basis for evaluating the customer-centricity of any work system (or IS) and for adjusting the system to attain the right degree of customer-centricity. The idea of customer-centricity has become commonplace, but is often vague." Therefore, my purpose is to contribute to the removal of such vagueness.

In Section 6.1, I continue to elaborate the concepts of customer-centricity and recently popularized "outside-in" thinking, which I consider to complement my focal theory and serve as a motivation for the goals of my own research. Then in Section 6.2, I introduce my action research method, which relates closely both to my socio-technical systems design theory (Mumford 2006) approach and model of *action-change process* (Davison et al., 2012) in terms of the build system to reach the new goal state of customer-centricity in a company. In Section 6.3, I present the company of my action research and the goals of both the research and the practical approach. In Section 6.4, I present a new process modeling method to address the shortcomings of customer-centricity in the BPM discipline. The utility of this method will be then evaluated in Section 6.5. Finally, in Section 6.6, I present the discussion and conclusions of my action research results.

6.1 Introduction to the customer-centric approach

Exploring prior literature about the significance of the customer in business strategies revealed many similar concepts and terms such as: customer orientation, customer-centric, customer-focused, and customer-driven organization. Whereas some concepts appear to be synonyms, some can be considered to be different in their meaning and scope. For example, Shapiro (1988) noted that the terms "customer oriented", "market oriented," "market driven," and "close to the customer" are so close to each other in meaning that only few important distinctions between these terms exist. Lamberg (2008) summarized that “customer orientation” has been considered to develop from the discourse around market orientation. She stated, “Marketing is generally considered as a business philosophy, when market orientation is the implementation of this philosophy to practice” (ibid., p. 30).

One of the first attempts to give importance to customer needs came from McKitterick (1957) of General Electric who extended the original development of the marketing concept by suggesting that the purpose of the organization is to respond to the customer rather than to attempt to change the customer to fit the organization's purposes. Recent definitions consider customer orientation to suggest that a firm should concentrate on providing services that meet customer needs (e.g., Noble et al., 2002). However, Jaworski and Kohli (1996) point out that reacting to customers' expressed needs is usually insufficient for the creation of competitive advantage. Instead, strong customer loyalty arises when firms have the ability to understand and satisfy customers' latent needs (Slater and Narver 1999).

Galbraith (2005) defines that a “customer-centric company” is one that is structured around customer segments, information is collected and profits measured around customer categories, management discussions are focused on customers, and there are similar constructs around processes, performance measures, human resource policies, and management and mind-sets (ibid., p. 9). Systems specialized to collect the aforementioned customer information emerged during the late 90s

were called Customer Relationship Management (CRM) systems. CRM systems were used to intensify and unify customer knowledge across the company (Goodhue et al., 2002, p. 81; Johnson et al., 2000). According to Rigby et al. (2002, pp. 101-102), “CRM allows companies to gather customer data swiftly, identify the most valuable customers over time, and increase customer loyalty by providing customized products and services.” Also, according to Osarenkhoe and Bennani (2007), CRM systems consist of a set of applications that address the needs of customer-facing functions that feed a common database, which in turn supports business analysis tools.

However, Peng et al. (2012, p. 2) argued that these customer information collection methods suffer major shortcomings. First, such methods are applied mostly in the front-end of CRM systems (i.e., customer support, marketing research, etc.), yet these methods do not directly address the decision support for the back-end product/service feature development. Second, these methods are completely data-driven (i.e., focusing on the discovery of the meaning or the underlying data structure itself via linguistic techniques), and lack the support of adding domain knowledge into the data analytical process. Third, and most importantly, understanding the relative importance of a customer’s request on certain product features is extremely critical and has a direct impact on effective prioritization in the development process.

Consequently, the risk of CRM failure has been recognized to be high. Forrester research reported that only about one-third of enterprise-class organizations and about half of midmarket ones agreed, "the [CRM] application really improved the end users' productivity" (Forrester research as cited in Band 2009, p. 12). On the other hand, over 200 problems were reported, across four categories; technology (33%), business processes (27 %), people (22 %), and strategy (18%) (ibid.). Moreover, Hertz and Vilgon (2002) indicated that up to 60 % of CRM implementation projects failed to live up to expectations.

The critical success factors related to the business processes of CRM have already been recognized in the prior studies, for instance, Goldenberger (2006, p. 16) suggested, “The right way to implement a CRM initiative is to first determine

what business functions (e.g., sales, marketing, customer service, e-customer, business analytics, or some combination of these) must be addressed. Second, a company must prioritize these functions (remembering to bite off only what it can chew, since successful CRM initiatives get rolled out in iterations). Determine how well the current business processes support or enhance them, then apply technology to optimize these enhanced business processes as appropriate, and then apply technology to optimize these processes."

CRM seems to suffer similar ambiguity as BPM. Greenberg (2001, p. 4) articulated this ambiguity ''[CRM]. . .isn't a technology. As you will see, that's true, but not strictly. I also heard that it was a 'customer-facing' system. That it is a strategy and/or a set of business processes. A methodology. It is all of the above or whichever you choose.'' Bolton argued that CRM does not go far enough in changing the underlying culture and systems of an organization. He suggested a more complete idea of Customer-Centric Business Processing (CCBP), whereby all business processes are focused on identifying and meeting the needs of the customer (Bolton 2004, p. 44). CCBP differs from CRM in recognizing that all processes have an impact on customers. However, I see that even though Bolton's CCBP addresses of being customer-centric in terms of business processing, his research did not provide any concrete method or practice to address how to identify needed processes.

Gulati (2009) elaborated more on how companies become customer-centric and described this transformation as a journey. Gulati has posited a map of four levels that exemplify distinct stages through which companies may evolve on this journey (Gulati and Gilbert 2010, p. 1, and also Gulati 2009). The four levels are as follows:

Level 1: Companies at level 1 are *product focused* and have an "if I build it, they will buy it" mindset.

Level 2: Companies at level 2 have a *basic understanding of their customers*, typically coming from some market research and segmentation studies.

Level 3: The move from level 2 to level 3 is a major shift in both mindset and actions as the *focus migrates from selling products toward solving customer problems*.

Level 4: Firms become agnostic about whether they produce all the inputs they provide to their customers are more attached to producing solutions to customers' problems than it is to the products and services it offers. The company is no longer concerned whether *the inputs* it uses to solve customers' problems are its own or *assembled through a network of partners*.

The aforementioned approaches of customer-centricity are useful but I consider them to fall short in the sense that they are all based on a one-directional understanding of value creation. An outside-in perspective means that companies aim to creatively deliver something of value to customers, rather than focus simply on products and sales. Being market oriented was recognized to be outdated already in the early 1990s (Webster 1994) and value-driven approaches thrived in the 2000s (see Ngo and O'Cass 2010). The concepts of value and value creation were seen to be the central elements of business strategy. Value creation in business has been the focus of marketing literature for the last decade (Eggert and Ulaga 2002; Flint et al., 2002). Definitions can be generally divided into monetary and various non-monetary outcomes. In addition, customer-perceived value has been conceptualized as the company's subjective perception of the trade-off between sacrifices and benefits related to the exchange and relative to the competition (Komulainen et al., 2008; Ulaga 2003; Flint et al., 2002).

Ngo and O'Cass (2010, p. 498) claimed that the extant literature has yet to address other characteristics that may enable firms to create superior value offerings for customers and thus aid firm success. Their research resulted in the identification of the "value box", which they defined as consisting of the following:

- The value offering (values built in products by the firm) and customer equity (value of customers to the firm) as key value outcomes within value-in-offering perspective (the firm view point); and
- Customer value (value perceived by customers) and brand equity (value of brands to customers) as key value outcomes within the value-in-use perspective (the customer viewpoint) (ibid., p. 509).

In addition, Pynnönen et al. (2011) argue that delivering customer value through products and services often concerns more attributes than first meets the eye. They call this emerging complexity in modern production *the systemic nature of customer value*. They define the systemic nature of customer value as "reflecting the fact that the value delivered to the customer is dependent on more than one attribute, and possibly on more than one firm. This means that companies operating in the world of systemic value find it hard to succeed with the help of traditional management theories and methods" (ibid., p. 51). Summarizing from the above, I acknowledge that customer value covers the firm-customer dyad but should not exclude attributes that emerge in the complexity of production that may include other firms.

Thompson (2000) presented a logical framework called Customer Value Management (CVM) that aligns and links a firm's infrastructure with the process capabilities necessary to attain customer-defined, measurable outcomes. The CVM framework, as shown in Figure 30, considers infrastructure as a supporting foundation, which enables business process abilities. According to Thompson, the capabilities, in turn, must be measured, aligned, and linked with the customer-envisioned outcomes that will influence on buyer behavior to attract and increase market share (ibid., p. 35). While Thompson mentions BPM as one of the business improvement approaches, he does not elaborate more about it. Thompson's work also did not present any technological solution or modeling method that would provide practical tools for increasing the customer-centricity. Therefore, I consider CVM to provide only a customer-centric "lens" to my conceptual model of stable BPMS-reliant work system. However, the build system how to change a firm to be customer-centric is not yet introduced.

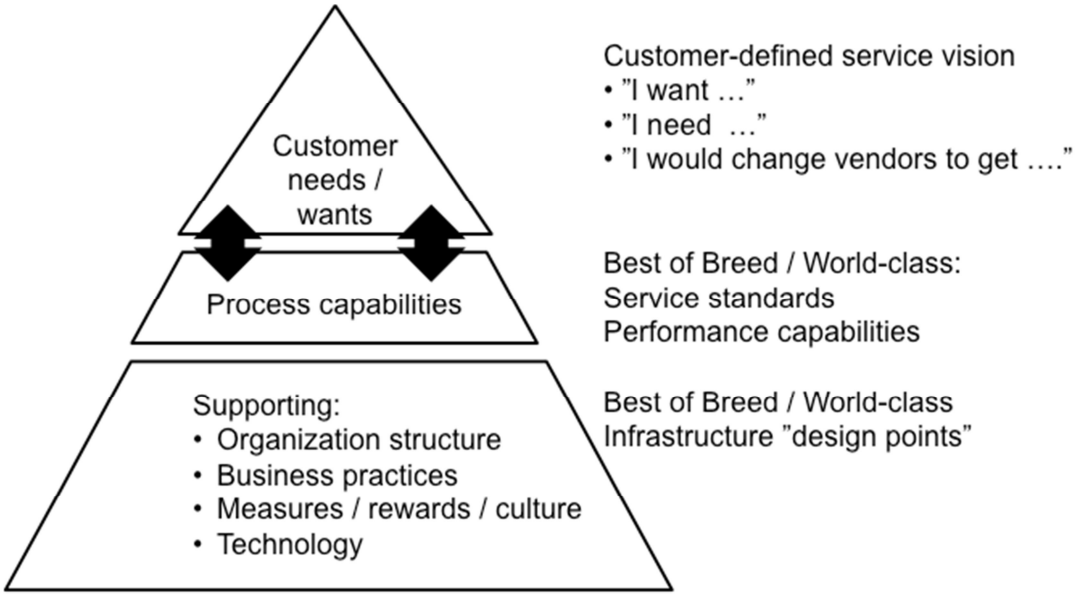

Figure 30. Customer Value Management framework (adapted from Thompson 2000, p. 36; IBM 1999)

Another approach for increasing customer-centricity comes from Alt and Puschmann (2005) who based their case study for business transformation in the Pharma Corp case on a concept of customer orientation. They argued that companies have to rethink their strategy, processes, and information systems architecture levels within the context of their business network. They further elaborated these aforementioned levels as follows (ibid., p. 300):

1. On the strategy level, customer orientation replaces product orientation as a major direction. Companies, which follow this strategy, have to clarify these main points:
    - Which customers does the company address?
    - Which processes and services have the biggest potential?
    - Which role can the company play within the business network?
2. The process level aims at developing and redesigning internal and external processes by considering the requirements from the strategic level. The function of this level is to:
    - Align the services with the customer's requirements;
    - Define how the activities among the partners have to be redistributed; and

- Integrate external (electronic) services into this architecture.

3. The system level addresses the internet-based cooperation between companies and complements the database-based integration within a company. A message-based integration infrastructure ensures this inter-organizational integration of transaction systems. This infrastructure consists of middleware, technical web services, and process specific modules.

To trace a connection between the aforementioned customer centricity approaches and BPM, I have identified a number of prior business process modeling approaches that have been focusing on goal-driven modeling as part of a holistic view to organizational knowledge. These modeling approaches aim to establish a close relationship between "whys" and "whats" (Nurcan et al., 2005; Nurcan and Rolland 2003; Rolland et al., 1998). Also McCormack and Rauseo (2005) suggested that building a business process orientation within a company requires looking at the organization in a new way – through the process lens. They (ibid., p. 64) saw that "building a common process view must be inclusive, not exclusive, involving at one time or another, all of an organization's personnel."

Recent business process modeling studies have emphasized the business value considerations. According to vom Brocke et al. (2010), even though the popular process modeling approaches, for instance, the architecture of integrated information systems (aka ARIS) (Scheer 2000), excel in describing a company's future processes, these modeling approaches reveal little about the financial implications of the operations and how changes to these operations would contribute – or not – to firm's performance. Vom Brocke et al. (2010, p. 335) contributed, especially with the BPM modeling method, by intensively considering the build-time phase of processes, that is, already during actual process (re-) design, as well as how to identify and describe the different aspects that contribute to the long-term financial value of a process design (vom Brocke et al., 2010, p. 335). In practice, they integrated financial considerations into the act of process modeling. Specifically, they used the Event-Driven Process Chain (EPC) standard process models together with value based information, and then further integrated such

models together with various financial calculation designs for presenting a stronger business case for process modeling.

Even though I appreciate the approaches described above and acknowledge their merits especially in considering the organization or company's internal view to the business process modeling and its value, I argue that customer-centricity and outside-in thinking requires yet another fundamental view: how to re-design, improve, and innovate the existing business processes from the customer point of view, and in the best case: together with the customer, to guide in recognizing what Prahalad and Ramaswamy (2004) called the "co-creation value". Especially for the service industry, the notion of customers as active participants in the co-production of service as a means to co-create value, has been considered to be a fundamental requirement (Grönroos 2006; Vargo and Lusch 2004).

According to Prahalad and Ramaswamy (2004, p. 10), the co-creation of value is when "The consumer and the firm are intimately involved in jointly creating value that is unique to the individual consumer and sustainable to the firm." Also, Victor and Boynton (1998, pp. 198-199) emphasized the co-creation of value as a result of interactions between a company and its customer in their concept of co-configuration as follows: "The application of configuration intelligence to the product creates a system of customers, product or service, and company. The complex of interactions among all three, as product or service adapts and responds to the changing needs of the customer, is the underlying, dynamic source of value… With the organization of work under co-configuration, the customer becomes, in a sense, a real partner with the producer."

In below, I list what I consider as the complementing focal theories and their primary sources of customer-centricity allocated to the build and goal work system. Some theories can belong to both systems.

Build system:

Customers:

- Understanding the customer value creation mechanism (Ngo and O'Cass 2010; Pynnönen et al., 2011)
- Deep understanding of the customer's challenges (Gulati 2009)
- Performance targets shared with customers (Thompson 2000)

Processes and activities:

- Co-creation of value (Ngo and O'Cass 2010; Prahalad and Ramaswamy 2004)
- Customers as a source of identifying the specific process performance criteria that influence their buying decisions (Thompson 2000)
- Identification and analysis of how all business processes match to customer's needs (Bolton 2004)

Maintaining the goal/end state work system:

Customers:

- Customers as participants in the work system, for instance, in self-service systems (Alter 2008; Simonsen and Hertzum 2008; Grönroos 2006; Vargo and Lusch 2004)

6.2 Action research approach

Action research "aims to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science" (Rapoport 1970, p. 499). Oquist (1978) defined that action research is the production of knowledge to guide practice, with the modification of a given reality occurring as part of the research process itself. Kalleberg (1995) presented three research designs for initiating action research, all of them primarily focusing on an existing system:

1. Inspection
2. Imagination
3. Intervention

My approach best fits into the third category, as I was invited to improve and study the unit at the same time. The customer-centricity thinking as a basic mindset was shared with the others in the research organization. McKay and Marshall (2001) differentiated both the research cycle in action research and the problem-solving cycle. For the action research cycle, I have also considered the principles of cyclical process model (Davison et al., 2004), which includes one or more cycles of (1) diagnosing (identifying or defining a problem), (2) action planning (considering alternative courses of action for problem solving), (3) action taking (selecting and executing a course of action), (4) evaluating (studying the consequences of the action), and (5) specifying learning (identifying general learning). The model of initial, build system, and goal work systems is considered as the *problem solving model*. The aforementioned research processes are illustrated in Figure 31.

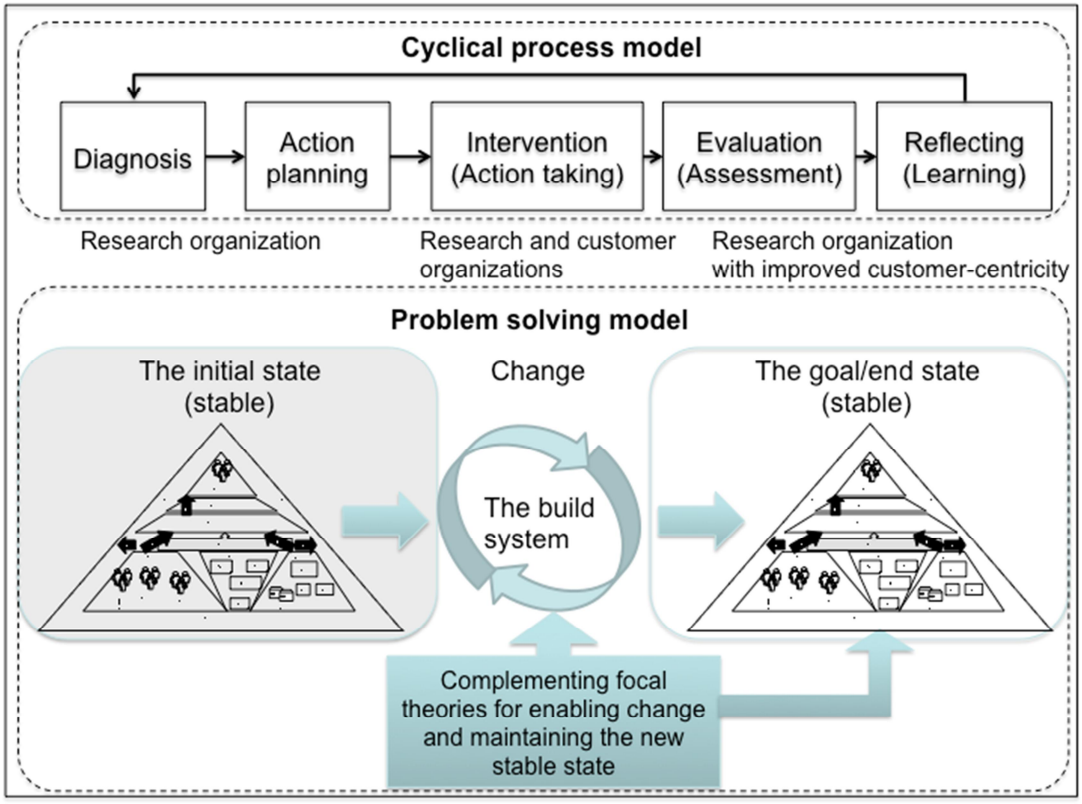

Figure 31. Research process (cyclical process model derived from Davison et al., 2004)

According to Avison et al. (2001), action research differs from case study research in that the action researcher is directly involved in planned organizational change. I also see that my action research initiation to be of type *collaborative initiation* (ibid.), where action research has evolved from the interaction between researchers and client. In my action research, the research organization representatives and I as a researcher were originally engaged in the development of management of process excellence, and although not unrelated to the improving customer-centricity, both the problem and the research seemed to be interactively discovered and agreed by both the research organization representatives and myself.

I have organized my action research report according to Järvinen's recommendation (2012) as follows:

- Introduction (given in Section 6.1)
- Description of the research organization (Section 6.3)
- Description of research process (Section 6.4 and 6.5)
- Collecting and presentation of findings (Sections 6.5 and 6.6)
- Discussion and conclusions (Section 6.6)

6.3 Description of the initial and goal state of the research organization

The organization where the action research was carried out is a large-scale communications product, solution, and service provider with global business operations. The company hereafter referred to as CommsCare disaggregates its value chain into independent yet largely intertwined business operations. Due to changes in CommsCare's organizational structure, mergers, and acquisitions, the process architecture required continuous maintenance and development effort. Meanwhile, anecdotal evidence started to emerge that customer feedback indicated that customer-centricity was not reflected in CommsCare's process architecture. CommsCare pursued a strategy of strong growth and claimed to be a customer-centric in their business processes, service mindset, corporate values, and mission.

This led the process management function of CommsCare to consider whether they should focus their improvement efforts on conducting maturity assessments and deciding on further actions suggested by maturity models such as Process Enterprise Maturity Model (PEMM) and Business Process Management Maturity model (BPMM), or increasing their customer-centricity. Even though these approaches were not mutually exclusive, resources and time were limited and thus the decision was made to take up the customer-centric approach rather than the approach of generally increasing their business process orientation.

The business process architecture information was very sensitive and close to CommsCare's competitive advantage, therefore, rather than presenting it as such, all the names of specific business process, organization, and functions are slightly modified. Their disaggregated value chain is illustrated in Figure 32. CommsCare's primary business processes are as follows:

- Development
- Marketing & Sales
- Operations
- Logistics and Procurement
- Services

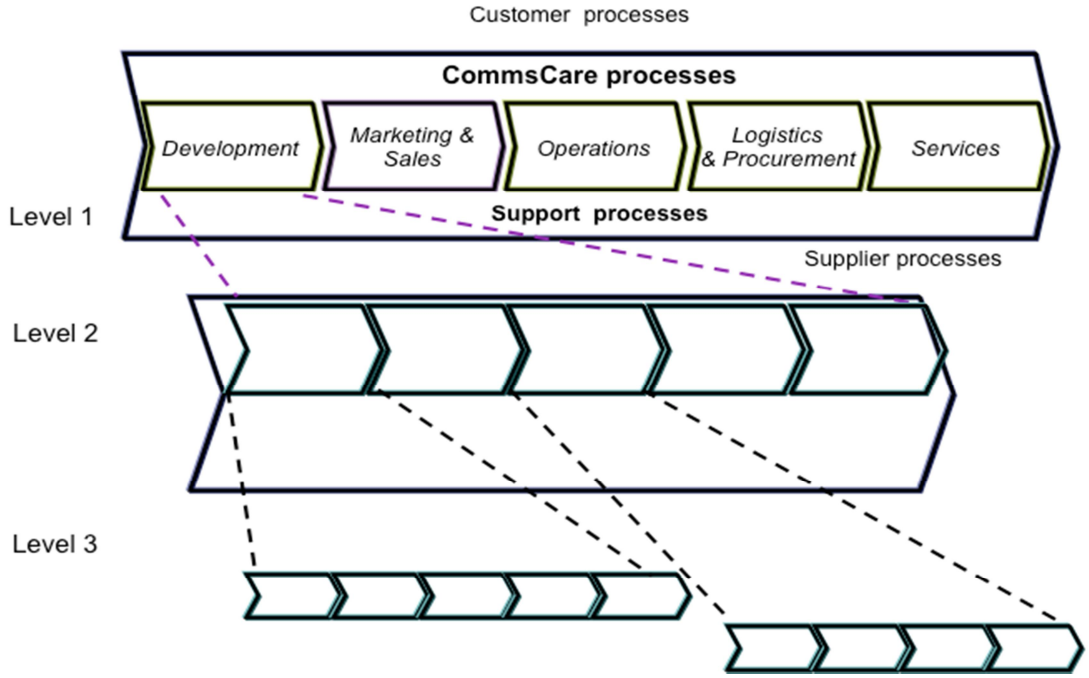

Figure 32. CommsCare generic value chain (modified from CommsCare's internal descriptions)

The modular process architecture of CommsCare described above was defined in terms of process modules, and each module had documented inputs, outputs, and measures. So-called process integration models were used to describe how the modules integrated with each other through such inputs and outputs. At more detailed levels, the Event-driven-Process-Chain (EPC) models were used to describe the process flows. The granularity of levels, meaning how elaborate the process models were, varied according to business process and business need.

The essential elements of the modular architecture were defined as shown in Figure 33.

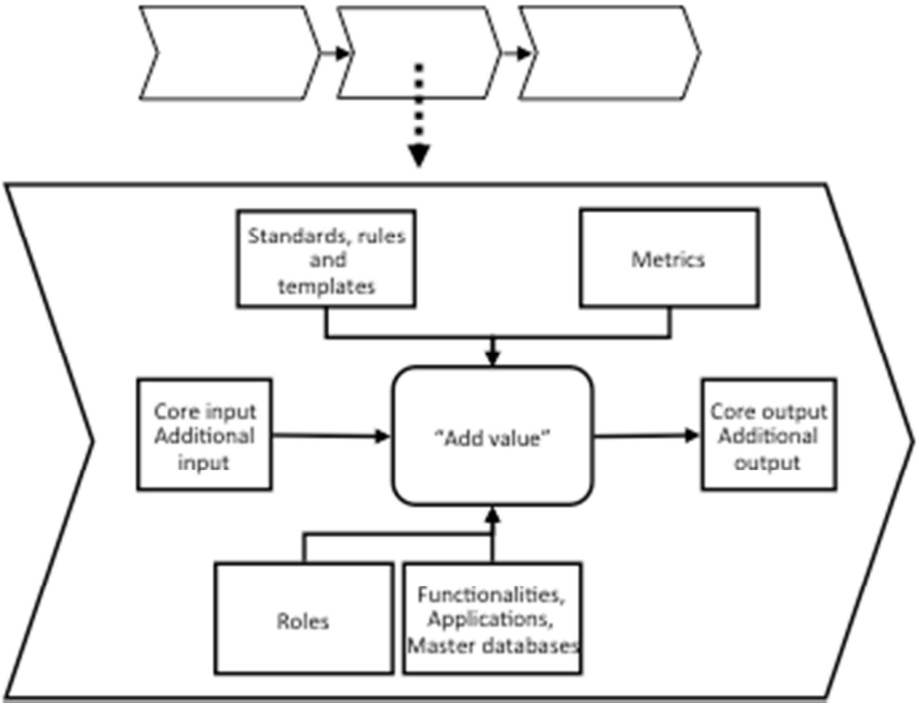

Figure 33. Essential information of the environment of a process (adapted from a proprietary documentation of CommsCare)

The most essential thing for any process to exist was the "added value" it was expected to create. Processes were required to be named in a way that intuitively indicates its value-add. The second most important thing was to define the core input it receives from a preceding process, and the output it gives to the next process in the flow, eventually leading to a delivery to a customer. In addition, the implementation of these processes was affected by standards, rules, and templates,

as well as the metrics defined for each process. Processes are executed by individuals, teams or organizations playing specific roles, and assisted or fully performed by a set of functionalities, applications, and databases.

One way to measure a firm's operational performance is to observe each interaction point with a customer, and the way each internal process impacts on the outputs provided to the next customer interaction point (CIP). This measurement can be done by looking at individual interaction points, but typically these interaction points are collected into groups, and those groups are evaluated, for example, with the following metrics:

- Cycle time
    - The time it takes from the triggering event to produce the final output
- Throughput (Volume)
    - The maximum number of outputs in a given time unit
- Efficiency
    - The cost of the process execution per one complete output, excluding the cost of inputs
- Failure rate
    - Ratio of process and output product defects

Typically, companies use Key Performance Indicators (KPIs), such as Customer Loyalty Index (CLI) and Customer Satisfaction (CS), to measure the effectiveness of their operations as perceived by the customers. However, prior studies has found that when examining the direct effects between satisfaction and loyalty intentions, the two constructs do not always correlate positively with financial performance (Williams and Naumann 2011; Silvestro and Cross 2000; Loveman 1998). One potential cause for such finding may be that most marketing researchers have tended to focus on studies that measure attitudes, perceptions, and opinions of customers without necessarily linking these to actual customer behaviors and subsequent financial outcomes (Webster 2005). Therefore, we suggested the following performance measurement framework, as shown in Figure 34, to emphasize the difference between outputs and outcomes. The key roles specific to CommsCare related to both measuring and achieving customer perceived value are also defined

in the framework. In Figure 34, I have illustrated the customer's processes in the top lane and CommsCare's processes in the bottom lanes.

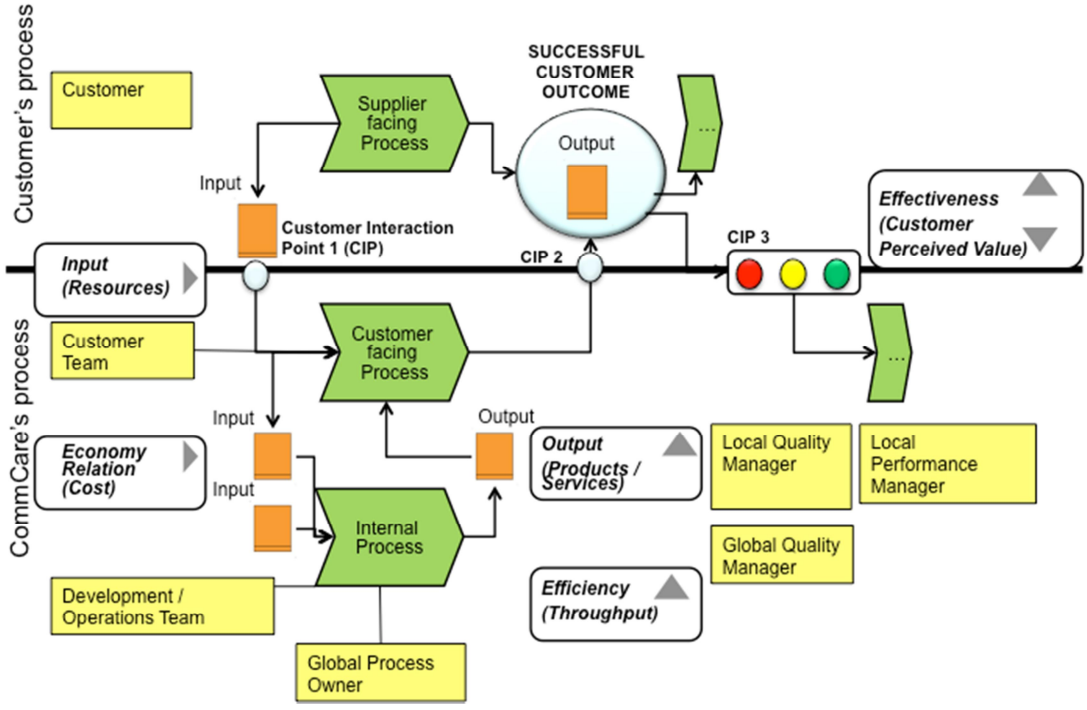

Figure 34. Performance measurement framework for the outside-in thinking at CommsCare (influenced by Saxena 2011)

In addition, CommsCare also defined specific end-to-end (E2E) scenarios that were defined to be cross-functional and cross-process-area descriptions of a process flow from input to output, in other words: from a need to its fulfillment. According to Frye and Gulledge (2007, p. 751), "E2E scenarios help answer three key questions for an enterprise in transition: Where am I? Where do I want to go? How do I go about getting there? In enterprise architecture terms, E2E scenarios help define the "As-Is" the "To-Be" and the migration path from one to the other. At its most basic level, an E2E scenario shows the high-level functions to be executed in realizing a complex-business process flowing across organization boundaries as enabled by multiple-information systems."

However, these E2E process scenarios lacked attention and development effort due to the difficulty of capturing cross-functional information. Typically the information was better defined on the either side of the function - so the independent and holistic views were rarely produced or agreed upon. In addition, even though the process architecture was decoupled from the organization structures, the historical and political reasons often dictated the decision-making and led to silos in process thinking. Eikebrokk et al. (2011) also concluded that process modeling "is a complex activity mandated by management, but influenced by individual and socio-political factors" (ibid., p. 639).

The goal state was driven by a need to develop a systematic business process modeling and improvement method to drive the customer-centricity. These methods were used in CommsCare's long-term strategic planning as well as in continuous process improvement. Simultaneously, these methods were evaluated and tested with CommsCare's own customers.

6.4 The build system and developed methods

Business operations, services, products, and production can be distinguished into two levels: (1) their functional parts, and (2) the architecture of whole based on the principle that the parts are integrated (Henderson and Clark 1990). The Customer Interaction Point (CIP) method was developed to guide building such an architecture of the whole, which in contrast to the processes of improving value chains, aimed to change the business processes focused on customer needs. A customer need was not understood only as a set of requirements, but as the desired flow of interactions of all participants that leads to successful customer outcomes.

The customer-centric approach and the CIP modeling design build upon the notion of customer perception. Together with CommsCare management of process excellence team, we defined that the customer perception points are moments in which the customer observes and perceives the company's business activities

directly or indirectly. Of particular interest are the indirect perception points where the company may have a limited control over the resulting perceptions, for example, the perceptions of the company from public media, discussion forums in the internet, and when sharing experiences with other customers of the company. Since the boundaries of such perception points are vague and subject to contingency and emergent factors, we decided to focus on concrete interactions between CommsCare and their customers. We defined that a customer interaction point is a moment when a customer interacts with partners, suppliers, or providers of products and services. These points are categorized according to situations that link persons, products, systems, services, and content which each other, for example: person-to-person, system-to-system, person-to-system, person-to-product, and person-to-service.

According to Thompson (1990, p. 66), the interactions between customers and the company's processes and services that create satisfaction or dissatisfaction, are viewed as "Moments of truth", which can be managed and leveraged to directly affect customer acquisition, retention, loyalty, and in turn, growth. Thompson also suggested that when a company wishes to compete via something other than product or price, it may aim for an enterprise analysis of their business processes to identify possible "moments of truth" with key processes that could be leveraged to create customer value and differentiate itself in process or service value (ibid.). Prior research has emphasized these moments of truth in the service business industry, originally introduced by Normann (1984), where the quality of the service is determined in the service encounter itself, when the service is delivered or "co-produced" (Glushko and Tabas 2009; Zeithaml et al., 1998). Moreover, it has been argued that these encounters themselves are the actual service (Bitner et al., 2000), as opposed to actions that the customer does not perceive.

At CommsCare, we recognized that the results of the efficiency and even the quality of the products and services did not directly correlate with customer satisfaction, or more specifically, the results of customer perceived value, measured with various methods. Even though the results of CommsCare's efficiency KPIs would show a good performance, the measured customer perception might indicate an opposite trend in the related customer interaction points. Therefore, it became

evident that the efficiency of the processes and the quality of the outputs did not guarantee a successful customer outcome. Our conclusion was that a more elaborate method to improve the intended outcome than mere process optimization or quality control would be required, which would need to be realized in each of the chains of customer interaction points.

In order to build a foundation for a new process modeling and improvement methodology, which I consider to be the *focal theory* in this action research, CommsCare first conducted a customer satisfaction survey that focused on customer perception domains. These domains were broadly mapped to their key business processes. The customer feedback was then analyzed in more detail and mapped to specific business processes. For each feedback, which identified a shortcoming, a root cause analysis was conducted to identify potential causes. Independently of this analysis, a survey was conducted asking employees about their satisfaction and perception of, for example, the simplicity of CommsCare's business processes to evaluate the both sides of an interaction point – customers and CommsCare's. Each of the customer interaction point was then categorized into one of three levels: frustrating, basic, or expected level. This illustrated the current level of customer perception, and also additional benchmark information was added to indicate how CommsCare was positioned in regards to competitors. CommsCare's high-level management then set the improvement of these selected customer interaction points to be the targets for short and long-term improvements according to their priorities derived from strategic goals. These improvements in turn were parts of the process improvement cycle described in Figure 35.

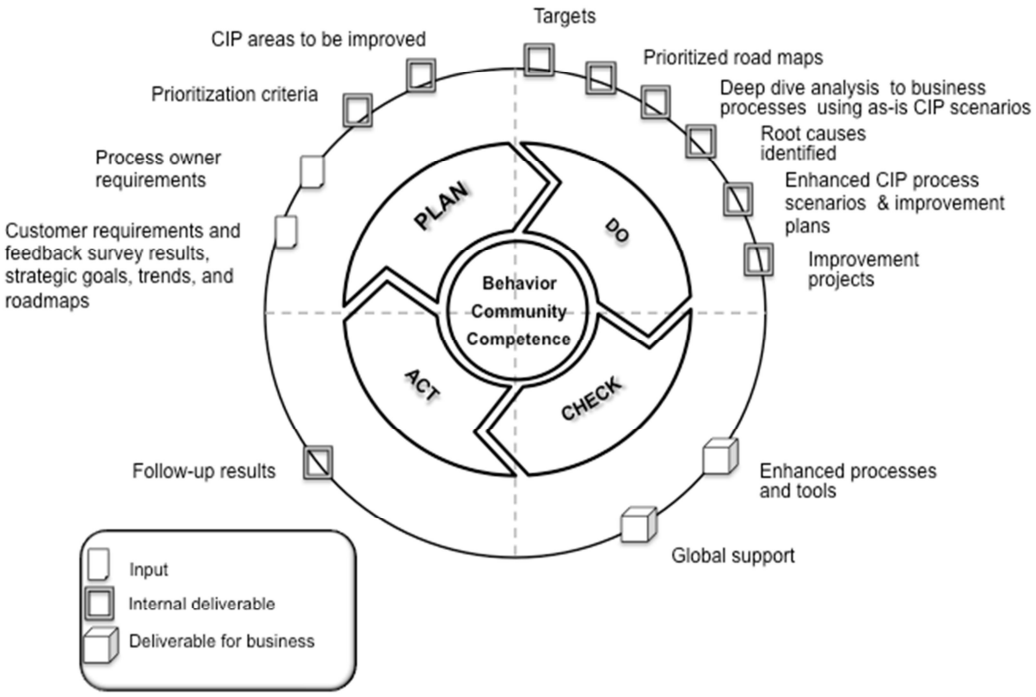

Figure 35. CommsCare's business process improvement cycle (adapted from a proprietary document of CommsCare) as the focal theory

CommsCare's business process improvement cycle above was based on a well-established Plan-Do-Check-Act (PDCA) framework that focuses on continuous learning and knowledge creation (Deming 1993). It also incorporated the well-known Six Sigma approach defined to be a business improvement strategy that tries to improve the effectiveness and efficiency of all those operations (or processes) that deal with customer needs and expectations (Antony and Bañuelas 2002, p. 21). Six Sigma is both a continuous improvement strategy for (business) processes (Bañuelas and Antony 2003, p. 334), and a supportive method for the improvement part of BPM (Johannsen et al., 2010). However, the Six Sigma based approaches had not previously been used at CommsCare as horizontal approaches to process improvement, but only as quality improvement projects for the selected (business) process areas where problems occurred.

Since the goal of the management of process excellence team was to increase both the customer satisfaction and the competitiveness of the company through its business processes, we selected the enterprise wide process improvement to be the

primary scope. Thompson (2000, p. 67) defined that there are three levels or scopes for business process analysis and business improvement of which the second (2.) was selected from below:

1. A single business process scope improving a process, such as billing.
2. An enterprise wide scope improving a company across multiple processes, such as order process through manufacturing, delivery, billing, and post sales service.
3. An extended –enterprise scope improving a multi company value chain, such as the linkages from the company's external materials suppliers, through the company's internal order-through-invoice processes, and on through an external channel of distribution to the end customer.

The enterprise wide business process analysis started with the identification of customer-facing processes in the current situation. Then the analysis focused on understanding the starting point of the customer's own processes, as far as it was known to CommsCare, and the path that led through CommsCare's internal processes to the next point in customer's processes as illustrated in Figure 36.

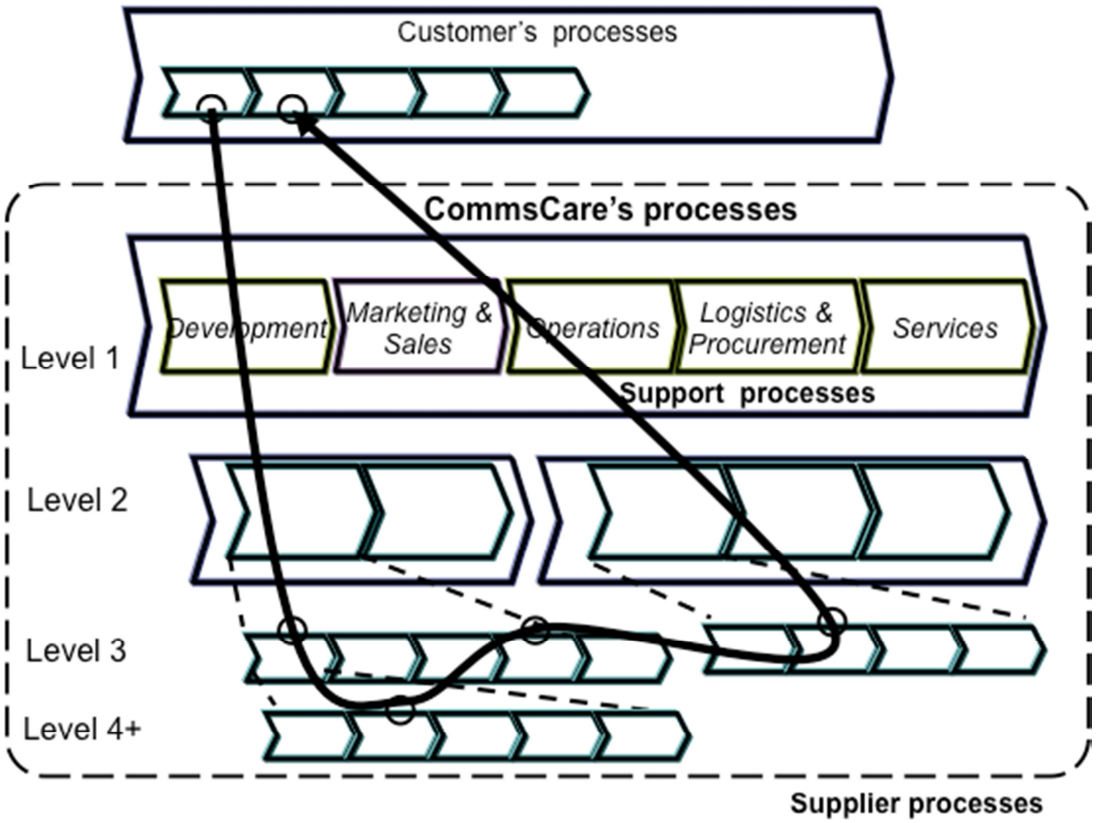

Figure 36. Customer-centric end-to-end path through internal processes

We considered prior business process improvement methods to be lacking the focus on modeling of customer interactions. Therefore, we chose to extend the PDCA framework to include the customer-centricity of business process management as follows:

CommsCare's customer driven adaptation of PDCA started with the "Plan" phase, which included the understanding of customer perceptions and how to combine that understanding with the latest industry thinking, CommsCare's priorities, and the perspectives of the employees to create further knowledge about the strong and weak points. In the "Plan" phase CommsCare used the customer feedback survey results and the company's strategy, roadmaps, and priorities as inputs for gaining a deep understanding of the challenges. This phase delivered prioritization criteria linked to those customer interaction points (CIPs) that were seen to be the most problematic.

The insights provided from the analysis in the "Plan" phase enabled CommsCare to focus on the competence and behavior of the employees, resources, and budget to overcome the problems that were having the most negative impact on CommsCare's ability to meet the needs of the customer. These insights were then used as parts of the strategy, roadmaps, deep dives to the customer interaction points, and execution plans. In the "Do" phase the execution plans were implemented by the respective functions to deliver improved processes and applications, and to enable business to improve their performance in the identified process areas, for example, using Six Sigma projects. During the "Check" phase, the performance and affect on the customer satisfaction of the new processes were measured and compared to the planned results. The process improvement cycle ends with the "Act" phase, where deliverables from the execution are analyzed against the initial and updated deliverables to understand whether the planned activities had achieved the required outcomes. A core part of the process improvement cycle was the analysis of customer interaction points as the key determinants of customer satisfaction, but also to create understanding of how all of the company's processes were aligned to contribute to the value created for the customer at each CIP.

The primary target was not to explore the depths of each internal process along the customer path, but to understand which internal processes were directly interfacing with the customer, and which non-interfacing processes were required either to be 'invoked' or 'triggered' along the value chain to reach the next customer-facing process. Invoking a process with an input returned the control back to the point where invoking happens, for example, information request, whereas triggering a process (chain) initiates a potential sequence of processes whose output may occur in a very different point in the overall value chain than were triggered, for example, a product delivery to the customer. Please, refer to Appendix Figure 48 for illustrations of invoking and triggering a process. A key part of the analysis was also to record those processes that were not part of the path or not reached. Then the necessity of having such processes at all was left for process owners to evaluate. Finally, the end-to-end path was modeled as a basis for analyzing the gaps and shortcomings not only in the customer-facing parts, but also considering how the whole work and information flow was serving the customer's needs. In addition, the models were used to envision potential improvement plans, targets, and

measurements together with the customer, and how to validate the achievements on both sides.

The CIP modeling method as described above is shown in Figure 37.

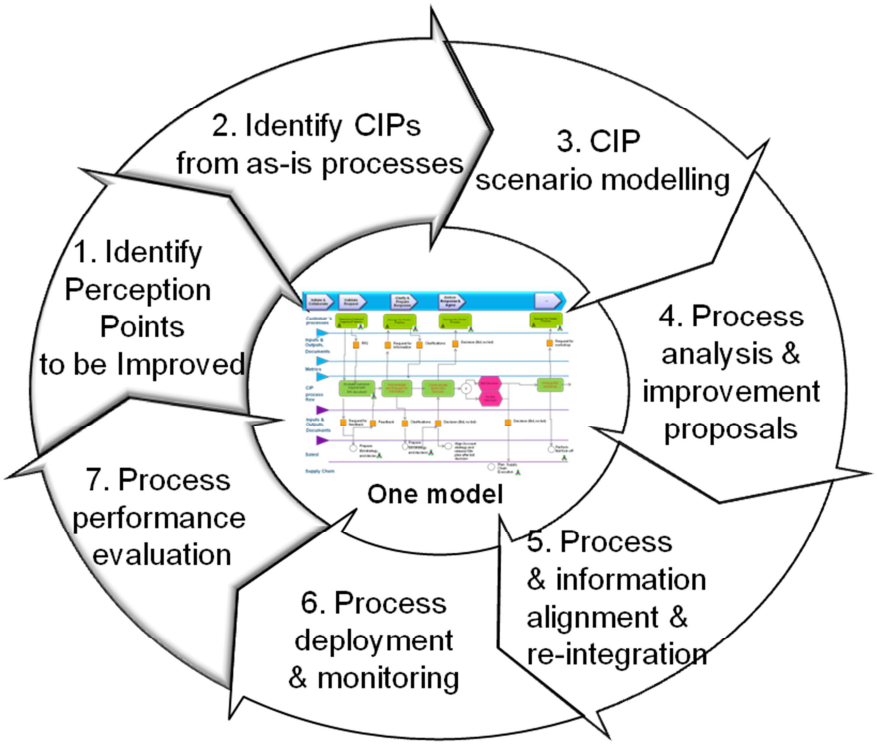

Figure 37. CIP modeling method (adapted from a proprietary document of CommsCare)

Such detailed analysis required new modeling tools that would emphasize customer-centricity. CommsCare had already deployed an organization wide process modeling tool and centralized repository based on the customized EPC standard, and also a company specific configuration of the business process diagnosis tool. Instead of starting an extensive redesign effort, the existing process modules were reused from CommsCare's process repository. In particular, the customer facing processes were "lifted" into a specific lane, which detailed the customer-facing process flow from customer start to end. Internal processes were then either invoked or triggered along this path. In case when the internal process was already refined in the CommsCare's process repository or somewhere else, only the navigation point to the process module's refinement was shown. It was then

possible to unpack the navigation point, for instance through a hyperlink, to open a more elaborate description of the internal process when necessary.

We created two templates for the CIP-driven models: a simple template to focus on the interactions, and an extended template to address all essential components of the process, covering measurements, applications, tools, and milestones or decision points. The simple template is shown in Figure 38. Please, find the description of the key modeling elements and extended template respectively in Appendix Figure 46 and Figure 47.

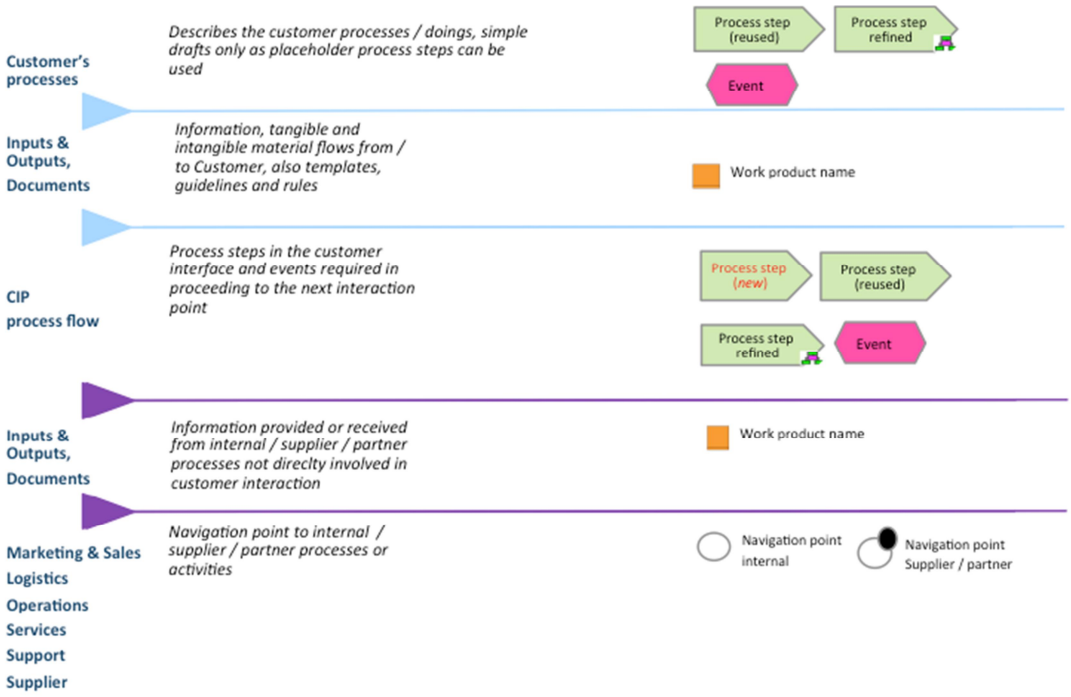

Figure 38. Lanes for modeling a CIP scenario, simple version (adapted from a proprietary document of CommsCare)

In order to better support the analysis of gaps and potential improvement points, we derived a generic process pattern from the maintenance and support services of CommsCare. The maintenance and support services and respective business unit had successfully modified their business processes and deliverables to be aligned with customer expectations. During the workshops and interviews with business representatives, we recognized this approach to involve characteristics that could be

a potential pattern useful across all the company's business processes. Even though it was acknowledged that typically "one size does not fit all", the derived process pattern could be related to the problems reported by the customers, such as insufficient reporting of the progress and responsiveness in the customer interaction points. The CIP pattern as it was named, consisted of eight steps that were applied in every end-to-end path, was it then a single process, enterprise-wide or extended-enterprise-wide in scope. The purpose was to identify whether the current end-to-end flows would include customer interaction points as parts of the natural flow of desired events.

The CIP pattern was not intended to be formal and prescriptive but to be used as a heuristic tool for filling the potential gaps in the current processes. The pattern starts with the *"Initiate & Collaborate"* step, where multiple channels and collaboration approaches are exploited to achieve a better understanding of the customer's needs. Such collaboration should lead to receiving a more structured and formal request or expression of the need from the customer. A customer need or request should be evaluated and a prompt first answer should be given as soon as possible. As part of fulfilling the need or request, a more binding answer and agreement should be negotiated from the customer, and then report of the progress of fulfilling this need is provided. Fulfillment of the need in terms of, for example, service or product delivery to the customer, should follow a confirmation with the customer, and finally, as the saying goes, "walking the extra mile" meaning that keeping the customer satisfied goes beyond the fulfillment and confirmation.

In addition, we considered the quality assurance and continuous improvement to be ingrained to the whole pattern but also to be explicitly present in the *"Ensure the Satisfaction"* step - for instance, to verify that quality improvement actions are confirmed with the customer, their efficiency is measured and evaluated, and the customer satisfaction is continuously measured with a feedback loop to the process improvement cycle.

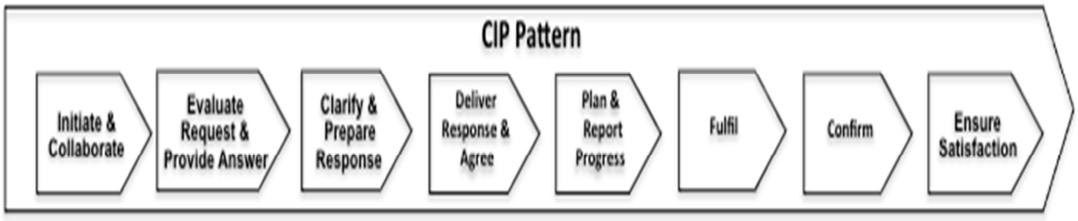

Figure 39. CIP pattern (adapted from a proprietary document of CommsCare)

Though the CIP pattern shown in Figure 39 appears to be simplistic and broad, the full use comes when it is combined with the detailed analysis of the customer interactions and feedback from the customer perceptions. An illustrative example of using the CIP pattern as a part of the CIP modeling and analysis is illustrated in Figure 40.

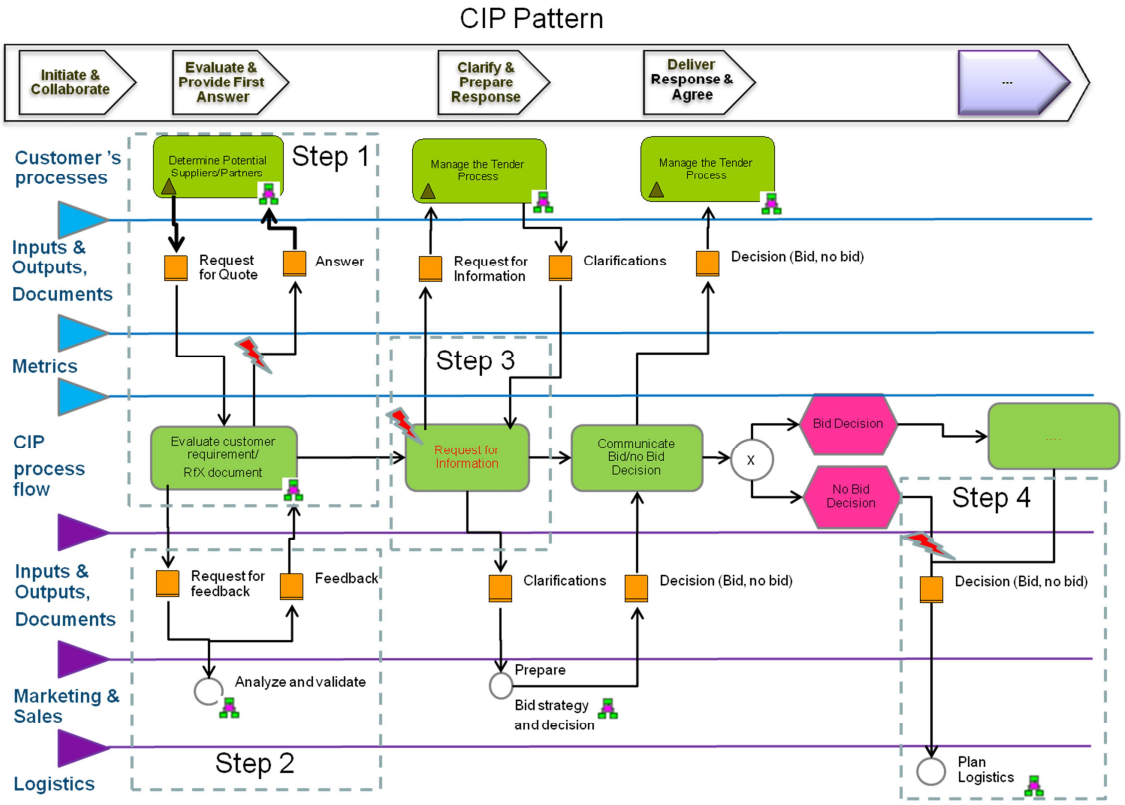

Figure 40. Example of using the CIP pattern to identify gaps in the current business process situation (adapted from proprietary document of CommsCare)

The example shown in Figure 40 considers the identification of gaps in the early parts of the tendering process between a customer and a potential supplier (e.g., CommsCare). We start the example by assuming that the first CIP step, "Initiate and Collaborate", has resulted in the customer sending a Request for Quote (RfQ) to the supplier, and the supplier's process now enters the domain of CIP analysis.

Step 1. Start the process scenario considering a known customer process initiating an event or input information from a customer need or a request, and then reusing as-is process steps that are customer-facing, place and connect them in the *"CIP process flow"* lane. For instance, customer sends a request for a quotation as part of their process of determining potential suppliers. The corresponding customer-facing process is then searched from the supplier's process repository. When the matching process is found, for example, "Evaluate customer requirement / Rfx document" (Request for x meaning Quote, Information, Proposal, or corresponding artifact), then this process is "lifted" into the CIP process flow lane.

Step 2. Identify what internal processes are either invoked or triggered as a result of the customer facing process. Place such processes as navigation points in a lower lane. Describe also the inputs and outputs between customer-facing processes and triggered or invoked internal processes, for instance, internal evaluation and analysis of the request (customer needs). The CIP pattern now suggests that also first answer should be given as soon as possible for any request. In such a case where answer or prompt acknowledgement is missing, it may be a potential gap or shortcoming of the process, and should be compared with the customer feedback to evaluate if the improvement of such process is required.

Step 3. Use the CIP pattern to identify the next interaction point. If there is no such process step in the current processes, create a new one and mark it with an indicator like red color to identify a potential gap in the overall flow.

Step 4. Check also if the information flow towards the internal processes is sufficient and enables reaching the next customer interaction point in the required manner. For instance, in the example above, ensuring that the bid decision is

communicated not only to the customer, but also that both positive and negative decisions (go or no go) are communicated to the logistics department for initiating required preparations, for example, to carry out required clean ups of the customer master data to maintain better data quality. These actions must be verified against all business processes of the company that participate in the value chain.

Steps are repeated accordingly until the customer confirms the need is fulfilled, and then further steps are taken to ensure the customer satisfaction. Even though this method seems to be focusing on analyzing the gaps in the customer facing interactions, it is equally important to analyze the path(s) through the internal processes, including interfacing with partners and other supplier processes to produce a required outcome for the customer. Aside from these steps, various known business process optimization and financial calculation methods can be utilized. Our extended template for CIP method includes lanes for linking measures, milestones, decision points, IT and other tools to the processes, and is presented in Appendix Figure 47.

Identifying business processes with customer-interfacing parts, and how the existing IT supports these interactions infrastructure, may reveal shortcomings in the customer-centricity of a company. According to IBM research (IBM 2009b), over 70% of the typical IT budget is spent on overcoming the limitations of existing systems, while less than 30% is spent on acquiring new capabilities that can provide a competitive edge to the business. Similarly, in CommsCare, we identified how much IT budget was allocated to the improvements in the customer-facing business processes and used the results on later IT investment planning.

As summary, the principles of a customer-centric business process improvement and modeling approach were defined. Then the significance of the customer perception point analysis as a key input to create more customer-centric strategy and mission for CommsCare's management was defined. In addition, a specific BPM cycle, aka, business process improvement cycle, was created in CommsCare to address the customer value creation mechanism, and how to adopt a CIP modeling method to analyze and improve the company's existing processes from the customer's point of view.

6.5 Evaluation with the customer

6.5.1 Initial state

CommsCare had established a business relationship with a customer in East Asia. A part of their business covered maintenance and support services for CommsCare's products. The product contained software and hardware parts, and the maintenance services covered both aspects. At that time, the provision of hardware and software services was to a large extent separated. There was also a separation of customer-facing elements, which often led to situations where a customer had to choose different contact channels according to whether it was a hardware or software problem.

On the one hand the software maintenance and related support services had taken significant steps in aligning the processes according to customer deliverables, but on the other hand, these changes had not yet extended to the hardware services side. Moreover, the customer had insisted on much higher standards in turnaround time (TAT) and defect cycle time (DCT), meaning the time from receiving a problem report to providing either a workaround or a permanent solution. Requirements for corrective, preventive, and follow-up actions for solving the problems were considered as a key part of the whole services process.

6.5.2 Desired change

The customer was very active in pursuing continuous process improvement and follow-up of the key performance indicators they had defined. The quality status reporting was carried out first on a daily basis, and later on a weekly basis. In

addition to the quality reports, the cooperation included reviews of the current process models and mode of operation documentation. Based on the feedback from these quality reports and identified gaps in the mode of operation documentation, the customer's goals were on a high level as follows:

- Improve the product quality.
- Improve the maintenance and support process to meet the TAT and DCT requirements.
- Improve the whole service process documentation in terms of how the software and hardware processes are addressed to further improve the level of service.
- Improve the link of quality analysis and resultant actions with the whole value chain.

The management of process development team and I in the role of a researcher, were invited to participate in the process improvement initiative, and our key responsibilities were to consult with both the global and local product lines and customer teams about the process documentation for identifying improvement initiatives to meet the aforementioned customer needs. The environment was complex due to the fact that, even though the global processes were defined for the provided services, CommsCare's local team was inexperienced with adopting these global processes. Due to the customer's challenging and urgent needs, the local team had started to create their own processes and mode of operations specific for this customer. Such an approach would eventually result in unnecessary variation and maintenance cost within CommsCare. It was therefore acknowledged that the global process management team needed to provide more support.

Together with the global and local teams, we defined our objectives to be two-fold:

1. Provide the required process documentation baseline reusing the global standard process models and presenting them with CIP models. By using the CIP pattern combined with the customer feedback, we would do the first round of gap analysis and drive "quick wins" to improve the customer satisfaction.

2. Use the CIP models as a concept document to improve both the local and global teams' mode of operation to be more customer-centric.

The goal functions would then be to measure how much the TAT, DCT, and customer satisfaction would be improved between the initial and goal states.

6.5.3 Build system

The process improvement initiative adopted the business process improvement cycle presented earlier in Figure 35. The process improvement was done in an intensive round of face-to-face workshops, interviews, reviews, and follow-up meetings starting in June 2011. The work started with the analysis of the initial state, and emphasized iterating the customer feedback with the local service teams. This analysis provided insights to focus on the most important aspects from the customer point of view. These insights were then analyzed and presented in a concept document including the enterprise level and cross-functional CIP models that reflected the desired changes.

This concept document was then used as an input to drive the desired changes into the local mode of operation, deriving requirements for detailed working instructions, and potential improvements in related IT and tooling infrastructure. In addition, "deep dives" as detailed investigations were executed using the extended CIP template to address the particular hardware problem management and prioritization process. The detailed "to-be" process was developed together with the local and global team, and reviewed with the customer. Documentation and training material were used to implement the needed changes and follow up the practice. In addition, the practice of process change assessment was established and agreed with the local and global teams.

6.5.4 Goal state and outcome

The work resulted in establishing a combined process scenario for both the software and hardware maintenance and support processes. The scenario was used as a main tool when discussing the process improvement initiatives with the customer. Using the customer-centered principles, the local service team's activity in the problem categorizing and solving was increased, which had a positive impact on the TAT and DCT. The CIP concept was used as a requirement specification to enforce a common tool for recording both the hardware and software related problems, and to harmonize the tracing of the progress across different teams and toward the customer. Using the CIP patterns and learning from the software services' respective processes, we were able to capture gaps, for example, in the customer reporting interaction points. One of the key results was the way the systematic and detailed problem analysis of product quality was integrated to enforce and follow-up the process improvement led by the quality team, as well as how it was communicated towards the customer.

In case of urgent and complex problems, a cross-functional competence team of multiple skills was formed to provide a detailed analysis, and to drive corrective and preventive actions to solve these problems. In addition, a consolidated quality report including the list and status of these corrective and preventive actions would be reported to the customer for their approval and potential changes on their side. Along with these actions, the detailed analysis process resulted in the need for changes to the product design, which was communicated to the product development teams for increasing the product quality.

6.6 Discussion and conclusions from the action research

The goal of this action research was to solve the problem of improving customer-centricity of the host organization (CommsCare). The focal theory as a part of the

developed methodologies addressed this problem. According to Davison et al. (2012, p. 771), ”Such a theory should tackle the organizational problem situation rigorously and also enable valuable scholarly knowledge to emerge from the research.” In addition, the complementary focal theories that turned out to influence the success of the problem solving process are displayed in Table 10.

Table 10. The empirically supported complementary focal theories

Elements	**Build system**	**Maintaining goal state**
Customers	External customers as participants.	External customers as participants.
Strategy (mission, vision, values)	The alignment of strategic objectives with business processes. The influence of management commitment and empowerment of employees.	
Products & Services		BPMS-reliant work system produces informational services.
Processes & activities	Standardize business processes. Careful selection of which processes to expose for improvement / change. Re-align processes with market strategy. Strategic alignment is a continuous and cyclic process driven by key performance indicators. Initial discovery and description of business	

	operations in a manner that is conducive to process improvement.	
Participants	Establish cross-functional project teams. Investment in an analysis phase.	Employees express how their work affects the company's performance.
Information	Establish process performance metrics. Define process measurement and management.	Use of process metrics consistently.
Technology	Link process model and rule to execution directly.	
Infrastructure	Careful architectural positioning of process enactment in existing infrastructure.	
Environment	The design of an organization and its subsystems must 'fit' with the environment.	

The answer to the third research question (RQ3): *How can BPM and BPMS support a customer-centric approach,* has been given in terms of the resulting customer-centric business process modeling method and improvement cycle. The modeling method was tested with CommsCare's customer, and focused on the business process improvement of maintenance and support services of HW and SW based products. The management of process excellence team at CommsCare facilitated the customer-centric BPM cycle as an intervention method to drive process improvements based on "moments of truth" that were called customer interactions points. Moreover, we found the following factors for each element in build and work system being helpful in improving customer-centricity:

The build system

Customer:

- Understanding the customer value creation mechanism
- Deep understanding of customer's challenges, and
- Performance targets shared with customers

Processes and activities:

- Co-creation of value;
- Customers as a source of identifying the specific process performance criteria that influence their buying decisions, and
- Identification and analysis of how all business processes match to customer's needs

Goal state of the work system

Customer:

- Performance targets shared with customers

I consider that the complementary focal theories identified from prior literature were particularly valuable because they supported identifying and applying the focal theory, and ultimately helped in realizing the action planning, and change process. The highlights of the realized end state as an outcome of the problem solving process is presented in Figure 41.

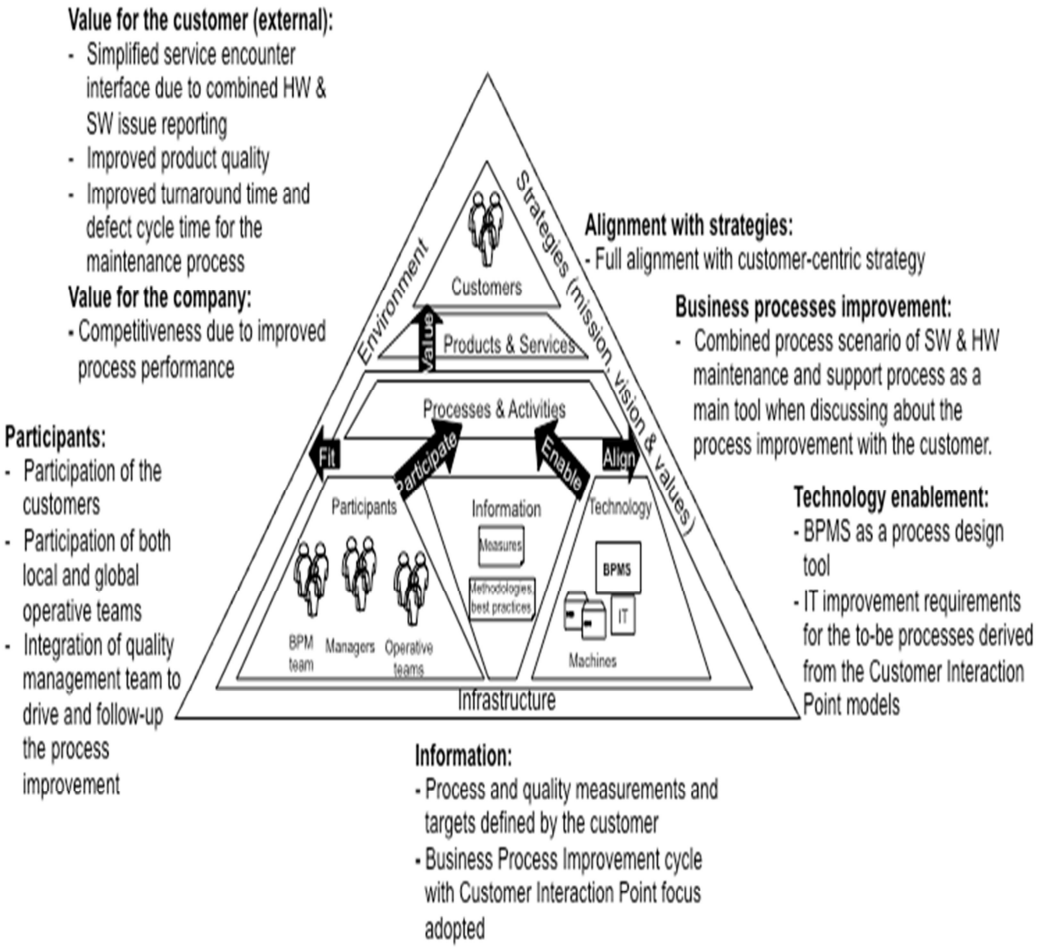

Figure 41. The highlights of the realized end state work system

7. Analysis of BPM Related Concepts

"Although BPM has roots in some of the earliest industrial management techniques, the meaning and content of BPM is evolving quickly. This has led to varying interpretations of BPM overtime, from being defined as system (technology) oriented, to a management practice, and most recently a separate discipline dealing with organizational and technological aspects equally (IDSScheerAG, 2004; Melenovsky, 2005; Hill et al., 2006; Smith and Fingar, 2003)" (Antonucci and Goeke 2011, pp. 128-129).

The previous chapters focused on studying BPM and its Systems in a socio-technical systems context. The deeper analysis of key concepts was left with less attention, as the main focus was first to identify what concepts truly appear in real-life business settings and what influence they have on firm performance. In this chapter, I focus on those identified concepts of Business Process Management and its Systems, methodology, and technology parts to address the reported blurriness of the BPM field. Using my Systematic Literature Review (SLR), case study, and action research results, these key concepts are analyzed and new definitions are suggested.

In Sections 7.1 and 7.2, I analyze alternative definitions of a business process and how business processes are measured. In Sections 7.3 and 7.4, I analyze the alternative definitions of BPM and BPM teams. Finally, in Section 7.5, I investigate the concept of BPMS and other technologically influential factors identified in this dissertation. A summary of the suggestions is given in Section 7.6.

7.1 Business process

Business process as a concept has been given many definitions. Some of the alternative definitions of business process are shown in Table 11:

Table 11. Alternative definitions of business processes

Source	Definition
Davenport (1993, p. 5)	"a structured, measured set of activities designed to produce a specified output for a particular customer or market."
Laudon and Laudon (2000)	The manner in which work is organized, coordinated, and focused to produce a valuable product or service.
Hammer and Champy (1993)	A collection of activities that takes one or more kinds of inputs and creates an output that is of value to the customer.
Ray et al. (2004, p. 24)	"'Business processes' are actions that firms engage in to accomplish some business purpose or objective."

The common factor of the definitions of the business process is the connection between the coordinated set of activities and adding value to the customer to achieve business objectives. Processes and activities that do not add value to the customer should not be considered as business processes. It is of importance to differentiate, for example, between IT processes with IT specific objectives and those business processes with business objectives.

I suggest that:

> *A business process is a coordinated and measurable set of activities whose purpose is to produce a product or service that is of value to the customer.*

On the one hand, I acknowledge that the definition given here is only slightly better than the prior ones, but on the other hand, the emphasis on measurability and customer value is significant for my later definitions.

7.2 Business Process Measurement

Companies establish various measurements to evaluate their performance. Performance measurement is “the periodic measurement of progress toward explicit short and long run objectives and the reporting of the results to decision makers in an attempt to improve program performance” (Neely et al., 1995). Scientific literature about process performance measurement is extensive but the specific characteristics of business process measurement are seldom elaborated. For instance, Harmon (2007) defines that a measurement is a specific goal that an organization must create after setting down their strategic goals. Adding this formulation to the aforementioned definition of a business process implies that a business process must have specific goals, and that those goals must add value to the customer. The most important measurements are called Key Performance Indicators (KPI). Prior studies (Harmon 2007; Robson 2004; Olve et al., 1999) support to focus on strategy first – rather than on the actual output of the process. Therefore, the selection of KPIs should arise from company's strategic goals for adding customer value.

Harmon (2007) emphasized the differentiation between internal and external measures. External measures tell about the results achieved by a process or value chain, whereas internal measures are the results of sub processes within the value chain. Harmon considered that external measures might include, for example, income measures, the measures of customer satisfaction, and shareholder satisfaction. For internal measures, Harmon suggested to include the efficiency and effectiveness of a specific function or sub process, the costs of producing the product or service, and the quality of internal outputs. Harmon considered that to effectively evaluate the performance of an organization, one must first focus on the external measurements. Harmon (ibid., p. 143) concludes that “Once you ‘lock down’ the external measures, then you can begin to focus on improving your internal measures, confident that any efficiency you achieve will result in a real benefit to the organization.” The performance of internal processes is the leading indicator of subsequent improvements in customer and financial outcomes.

However, this can only be consistent with Harmon's view of focusing on external measures if we assume that internal processes inherently focus on external measures – that is, their goals are derived from the company's strategy. In Figure 42, I have illustrated the aforementioned process performance concepts.

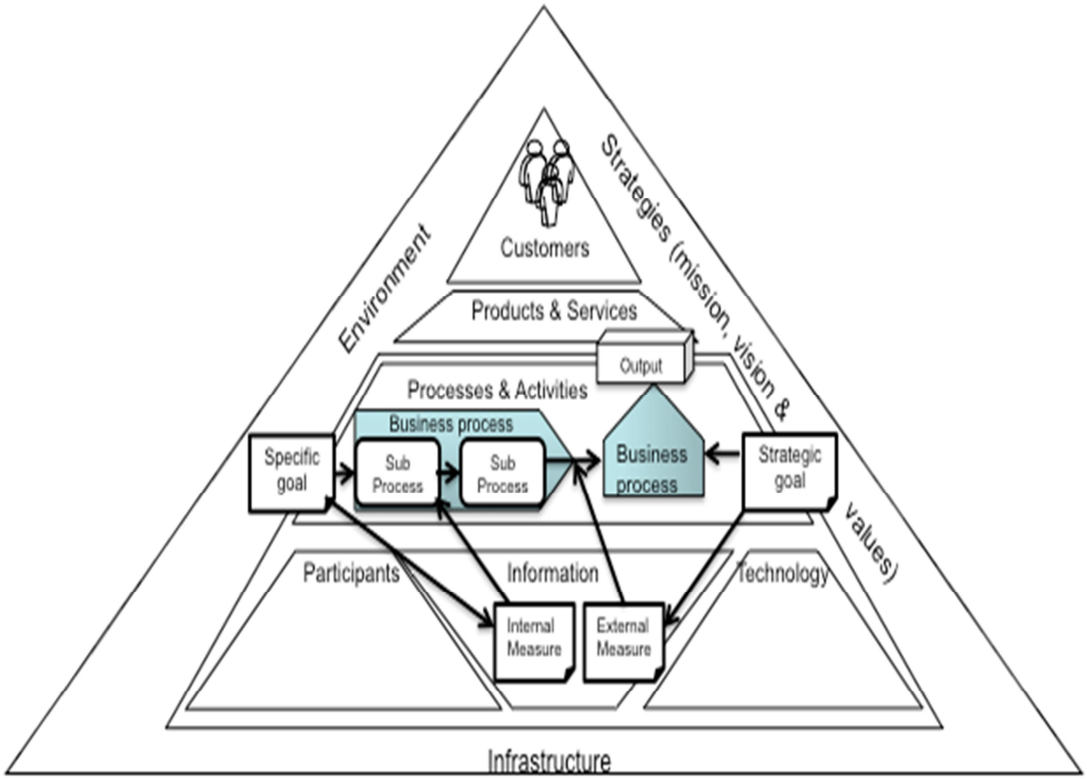

Figure 42. Internal and external process performance measurement

Parker (2000) argued that traditional business performance measures have been financial – measuring such ratios as the rate of return, cash flow, and profit margins – measures that belong more to the internal measures. Parker saw that even though these measures are often precise and objective, there are also significant arguments against such measures. For example, they tend to be very inward looking, they fail to address less tangible factors such as customer satisfaction, and they are lagging indicators – they show what has happened in the past but are poor predictions of the future performance. According to Robson (2004), measurement systems that are not contributing to an overall improvement in performance need to be urgently reassessed.

One of the most used performance measurement framework that overcomes such shortcomings is the balanced scorecard (BSC) by Kaplan and Norton (1992). BSC is a multi-criteria measurement framework that includes financial and non-financial factors. BSC organizes performance objectives and measures into four perspectives (ibid.; also Kaplan 2005) as follows:

1. The financial perspective concentrates on how a company performs from a shareholder point of view. Measures include traditional financial terms, such as return on investment (ROI), shareholder value, profitability, revenue growth, and declining unit costs.
2. The customer perspective covers measures for customer satisfaction, acquisition, retention, and growth, as well as the differentiating value proposition the organization intends to offer to generate sales and loyalty from targeted customers.
3. The internal business perspective identifies the operating, customer management, innovation, and regulatory and social process objectives for creating and delivering the customer value proposition and improving the quality and productivity of operating processes.
4. The learning and growth perspective identifies the intangible assets that are most important to the strategy. The objective of this perspective is to identify which jobs (human capital), which systems (information capital), and what kind of climate (organization capital) are required to support the value creating internal processes.

Managers use the BSC to describe and communicate their strategy, to align business units and shared services to create synergies, to set priorities for strategic initiatives, and to report on and guide the implementation of the strategy. Nørreklit (2003) considered that the BSC integrates financial and non-financial strategic measure variables in a cause-and-effect relationship, which assumes the following: measures of organizational learning and growth -> measures of internal business processes -> measures of the customer perspective -> financial measures. However, she (ibid., p. 592; 2000) argued, “There is no cause-and-effect relationship between

some of the suggested areas of measurements in the BSC." Some of the problematic areas in BSC she considered to be interaction, employee empowerment, and organizational learning in a control system, which is based on top-down hierarchical measurements. I consider my model of BPMS-reliant work system to emphasize manager participation but give less importance on top-down hierarchical performance control due to relational coordination among the participants. De Geuser et al. (2009, p. 93) empirically found that the sources of performance derived from the BSC are primarily of three types: "(1) a better translation of the strategy into operational terms, (2) the fact that strategizing becomes a continuous process, and (3) the greater alignment of various processes, services, competencies and units of an organization." I consider my complementary focal theories, given in Table 6 and Table 7 of Chapter 4, to resemble many of the same findings, such as: (1) the alignment of strategic objectives with business processes, (2) strategic alignment is a continuous and cyclic process driven by key performance indicators, and that (3) the design of an organization and its subsystems must 'fit' with the environment.

According to Yen (2009, p. 866), when evaluating the contribution of any new business process, internal or external, the general procedure includes two critical tasks:

1. Deciding what business process outcome to measure; and
2. Comparing the results of these measures between the old process and the new process.

Robson (2004) also saw that the adage "What gets measured gets done" is valid only if it is expanded to "what gets measured gets done by the person doing the measuring." He explained that when there is this type of closed loop, it could create what is termed as intrinsic motivation to take control and eliminate the perceived deficiency. Therefore, Yen's procedure could be extended with a third critical task:

3. Deciding who does the measuring.

There have been increasing signs that performance measures are being built into business process modeling languages (Korherr and List 2007) and to business

process models (González et al., 2010). However, González et al.'s (2010) systematic review results indicated that most of the initiatives concerning business measurement have been adapted from the software engineering field due to similarity between software applications and business processes, and only a small percentage of the existing business process measures has been empirically validated. They conclude (p. 125), "there is no real use of the measures in organizations, since most of the initiatives are theoretical and have never been used in a real environment."

7.3 BPM

Some of the alternative definitions of BPM are presented below:

Table 12. Alternative definitions of Business Processes Management

Source	Definition
Elzinga et al. (1995, p. 119)	"Any structured approach used to analyze and continually improve fundamental activities, such as manufacturing, marketing, communications, and other major elements of a company's operation."
Smith and Fingar (2003)	The executive, administrative and supervisory control in order to ensure compliancy with business objectives for the delight of customers.
van der Aalst et al. (2003, p. 1)	"BPM is a field of knowledge at the intersection between Business and Information technology, encompassing methods, techniques and tools to analyze, improve, innovate, design, enact and control business processes involving customers, humans, organizations, applications, documents and other sources of information."
Hung (2006, p. 24)	"BPM is defined as an integrated management philosophy and set of practices that includes incremental change and radical change in business process, and emphasizes continuous improvement, customer satisfaction, and employee involvement (Ross, 1995)."
Jeston and Nelis (2008a, p. 11)	"The achievement of an organization's objectives through the improvement, management and control of essential business processes."

Snabe et al. (2009, p. 1)	"Pragmatically speaking, BPM can be defined as the continuous improvement of practices within the company and of the interactions with other organizations and customers."

The definitions given above raise concerns about what BPM is: is it an approach, a method, a supporting process, field of knowledge, meta-process for the actual business processes, way of comprehension, or an achievement of an organization? Most researchers and analysts tend to agree that BPM is not a technology. However, the definition from van der Aalst et al. (2003) conflicts with this understanding and states that BPM covers also technology aspect. Jeston and Nelis (2008a) focus on the objectives of an organization but do not give a measurement of when these objectives are achieved. In addition, BPM standards can be seen as distinct characteristics that differentiate BPM from its predecessors, especially standards for diagnosis (Ko et al., 2009).

The commonality among theses definitions is that BPM is a collection of 'something'. As a collection it cannot be a single method but rather a set of methods. Prior research indicates that there is a lack of holistic methodology for BPM (Bandara et al., 2007). However, Filipowska et al. (2009) list the following methodologies as examples of BPM: ARIS methodology, IBM web sphere methodology, Ultimus BPM suite methodology, and Savvion business manager methodology (SUPER 2007). It is also important to note that the before mentioned methodologies often depend on a specific tool.

Terms like philosophy, field of knowledge, achievement, and approach are ambiguous and broad, and do not imply any formal method of recognizing what can or cannot be considered as a part of BPM. Finally, BPM as a control is limiting the BPM scope to management, excluding creative and productive activities.

Only the definitions from Smith and Fingar, and Jeston and Nelis mention business/organizational objectives. None of the definitions include a way of measuring how business objectives are met. Moreover, the scope of BPM varies

significantly in all of the definitions. In general, BPM is considered to touch processes. Finally, any distinct characteristics that would separate BPM from its predecessors are not clearly stated. Since BPM clearly lacks comprehensive and organized methods as reported in my SLR results and prior literature (e.g., Trkman 2010; Neubauer 2009; Elzinga et al., 1995), it cannot be categorized to be a method or even methodology but rather an approach.

In order to overcome the shortcomings mentioned above, I suggest:

BPM is a voluntary organizational management approach that strives to improve business processes according to specific criteria for the purpose of creating customer value, with or without a certain information technology.

Since BPM is a part of management but voluntary in terms that other means than initiating a BPM initiative can lead to improved customer value. BPM strives for improving business processes and is therefore targeted to process innovations rather than improving functions. These improvements and innovations can be produced with or without suitable information technology, such as BPMS, and can pursue one or more goals at the same time. The goals are defined when starting the BPM initiative, and emergent and opportunistic changes can be introduced during the initiative. Multiple goals can be combined as *the goal function* of the initiative.

According to van der Aalst (2003), the BPM cycle consists of various phases in the support of operational business processes, as shown in Figure 43. In the design phase, the processes are (re)designed. In the configuration phase, designs are implemented by configuring a process-aware information system (e.g., a workflow management system). After configuration, the enactment phase starts, where the operational business processes are executed. In the diagnosis phase, the operational processes are analyzed to identify problems and to find things that can be improved.

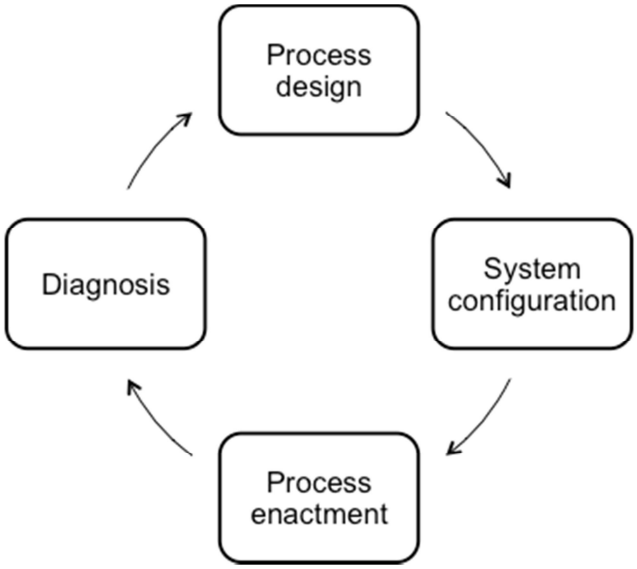

Figure 43. BPM cycle (adapted from van der Aalst 2003)

I argue that this often-used BPM cycle does not cover emergent and opportunistic changes, and the customer perspective is not represented. In Chapter 4, I suggested the sustained Participatory Design (PD) approach to cover various types of changes occurring during both the implementation of BPM, and BPMS use. Moreover, in Chapter 6, I presented a specific BPM cycle based on Deming's Plan-Do-Check-Act (PDCA) framework that focuses on increasing the customer-centricity of the business processes of a company. In doing so, I consider the BPM cycle to be 'open' referring to Kirchmer's (2010) definition of high flexibility around the process cycle due to integration of various other process management phases.

7.4 BPM team

Establishing a BPM team (or Center of Excellence, Management of Process Excellence (MPE) team) has been indicated to be one of the key success factors for BPM initiatives. Existing literature does not provide many well-formed definitions of what a BPM team is or how it differs from other kinds of teams in organizations; only a list of the responsibilities and activities of such team is given. In a survey of

large organizations about their approach to process management, the main finding was that none of the companies presented a clear, consistent proposal for structuring such a unit or governance (Paim et al., 2009). Until now, the relevant definitions in the published literature are mainly regarding BPM Centers of Excellence or key positions in the BPM teams. To address the lack of consistent definitions for a BPM team, I aim to synthesize a new definition combining the existing related definitions with the findings from my case study and action research.

Harmon (2007) contributed to our understanding of BPM teams with his description of the different forms BPM units might take: a BPM Center of Excellence (CoE) reflects an emphasis on management; a management team for process excellence suggests process redesign and improvement projects; and a business process automation group suggests an IT emphasis. In my case study in Chapter 5, I introduced a BPM initiative that incorporated a BPM CoE with an emphasis on the management and governance of the initiative, whereas my action research in Chapter 6 presented a management of process excellence (MPE) team with objectives for redesigning the company's enterprise-level business processes to be more customer-centric.

The only other definitions I was able to find related to BPM teams were two alternative definitions of a BPM CoE as follows:

Table 13. The alternative definitions of BPM CoE (team)

Source	Definition
Jeston and Nelis (2008a, p. 336)	"A Center of Business Process Excellence brings together people with different skills and experiences to solve complex business problems."
Jesus et al. (2009, p. 1)	"A BPM Center of Excellence (BPM CoE, aka BPM Group, Process Team or BPM [Support] Office) is an important organizational mechanism that has been widely adopted by enterprises aiming at institutionalizing BPM initiatives and perpetuating their benefits throughout the organization in a more centralized approach."

Jeston and Nelis (2008a) saw that the existence of BPM CoE in a company is associated with a high maturity level of how BPM initiatives are incorporated. Having only a BPM project is the lowest maturity level followed by expansion to a BPM program on next maturity level, and having a BPM CoE is characteristic of the level when repeatability is established. The BPM CoE is also perceived as a driver to "evangelize" and establish a management of process excellence as a form of a sustained competitive advantage of the company. I see that this view to be supported by my case study findings.

In terms of defining the key positions within a BPM team, Melenowski and Hill (2006) introduced their framework for Business Process (BP) positions and responsibilities. Antonucci and Goecke (2011) subjected this framework to scrutiny by the larger BPM community and found it to have satisfactory construct validity and reliability. The framework included four BP positions: a BP Director who builds and sustains a process-managed organization; a BP Consultant who helps process owners to better understand opportunities for process improvement; a BP Architect who develops principals and descriptions for creating business processes; and a BP analyst who deals with the day-to-day tactical aspects of business processes. In addition, in order to specify a business process improvement method, a description of participant "roles" is needed, meaning, who carries out the activities and is responsible for them (Zellner 2011).

Considering the definitions above, I suggest a new definition of a BPM team:

A BPM team is a team that establishes the operational aspects of BPM initiatives - the method, standards, governance, Business Process positions, participant roles, and training - to enable repeatability and create a sustained competitive advantage for the organization.

7.5 BPMS

Business Process Management Systems (or Suites, Software, Solutions) evolved from features previously contained in workflow and document management systems, enterprise application integration tools, and process management tools. BPMS continue to integrate new features derived from the new technologies of the Internet (Harmon 2007), such as social computing and business intelligence.

Some of the alternative definitions of BPMS are given in below:

Table 14. Alternative definitions of BPMS

Source	Definition
Sinur and Hill (2009, p. 3)	"A complete set of integrated composition technologies for managing all aspects of process — people, machines, information, business rules and policies supporting a full process discovery, analysis, design, development, execution, monitoring and optimization cycle, in which business professionals and IT collaborate as peers."
Ravesteyn and Versendaal (2007)	A (suite of) software application(s) that enable the modeling, execution, technical and operational monitoring, and user representation of business processes and rules, based on integration of both existing and new information systems functionality that is orchestrated and integrated via services.
Shaw et al. (2007, p. 92)	"Information systems technologies to improve organizations' abilities to better manage the process of changing their internal and external processes."
Harmon (2007, p. 449)	"BPMS is a software tool that one can use to develop one or more BPMS applications. BPMS application describes a business process and incorporates a BPMS engine that will execute the business process in real time. […] In essence, a BPMS product is a software package that allows a business manager or business analyst to describe a process and, later, as needed, to modify the process."

What is common to the BPMS definitions in Table 14 is the consensus that BPMS is a composition tool. In my case study in Chapter 5, I provided the specifications of one BPMS. Since the BPMS turned out to be an integrated composition technology in my case study, its boundaries are hard to define. Many

studies have addressed this difficulty by specifying what BPMS should minimally include (e.g., Harmon 2007; Shaw et al., 2007; Smith and Fingar 2003). Also, Gartner has defined a list of 10 capabilities for BPMS (Sinur and Hill 2009).

Therefore, I suggest BPMS to be defined as:

A set of integrated composition technologies for the continuous management of known aspects of a process, and characterized by the support for BPM modeling language and execution standards.

BPMS has been attributed historically to a workflow management system (WfMS) (van der Aalst et al. 2003, p. 4). According to Caro et al. (2003, p. 209), "Workflow is a concept closely related to both re-engineering and automating businesses and the information processes within a given organization." They also saw "Thus, workflows can describe business process tasks at the conceptual level needed for the evaluation, understanding, and design of such business processes, as well as information acquisition process tasks at a level that describes such process requirements for ISs [information systems] and human skills" (ibid., pp. 209-210). Ko et al. (2009) saw that many BPMS are still very much considered as workflow management systems and have not yet matured to support the BPM diagnosis phase in the BPM cycle.

Some BPMS vendors focus on offering their features that are human-, system- or document-centric, or combination of the three. Human-centric BPMS are meant for situations that require a high degree of interaction among people. Integration-centric BPMS incorporates people, applications, back-end systems, and external business partners. Document-centric BPMS are for the handling of large numbers of documents, images, and forms.

I propose BPMS core features to be based on the list above and grouped according to the related BPM cycle phases (van der Aalst et al. 2003) as presented in Figure 44. In addition, BPMS may include information architecture, service oriented architecture, and reporting technologies.

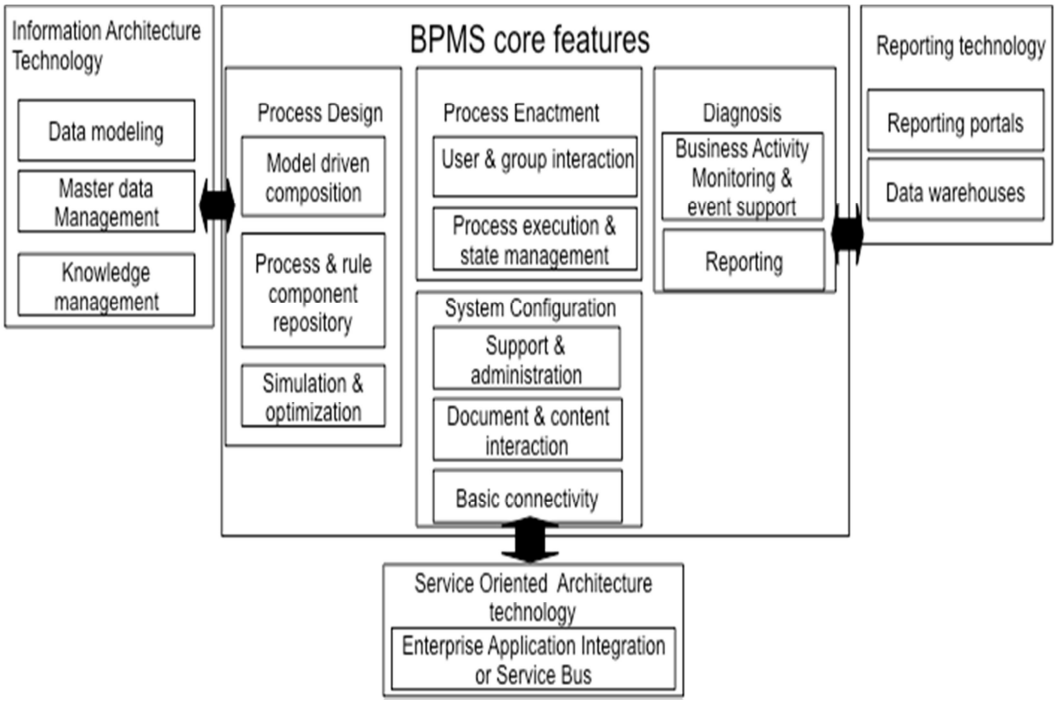

Figure 44. BPMS core and additional features

The BPMS core features enable functionalities for each phase of the BPM cycle as follows (van der Aalst et al., 2003):

- *Process design.* As-is manual or semi-automated processes utilizing emails, faxes or document management systems are modeled into BPMS. Graphical process modeling standards are the main focus.
- *System configuration.* In this phase, BPMS and underlying system infrastructure are configured. Various integration approaches, such as a file based directory and database access, as well as Service Oriented Architecture (SOA) infrastructure play important roles.
- *Process enactment.* Electronically modeled business processes are implemented into BPMS. Process execution standards dominate this phase.
- *Diagnosis.* Given appropriate analysis and monitoring tools, a BPM analyst can identify and improve on bottlenecks and potential loopholes for fraud in the business processes. The tools to do this are embodied in diagnosis standards.

Each core feature in Figure 44 is defined and grouped with a corresponding phase of the BPM cycle phase as follows:

Process design:

Model driven composition. Typically the graphical composition tools of BPMS enable business analysts to model as-is business processes and further design optimized or automated to-be processes and business rules. Compared to Gartner's list, the design and management of business rules is considered as a part of composition tools due to simplification, and due to the fact that business rules can also be embedded in the process models. Business rules are defined as the declarations of policy or conditions that must be satisfied (Martin and Odell 1998). Business rule design is typically purchased separately from the process modeling. The modeling of process information in a detailed form, such as in Unified Modeling Language (UML) classes, varies per BPMS vendor offering.

Process and Rule component repository. Avoiding the creation of waste by reusing is one of the main targets in lean and agile process management. Reuse can be achieved by utilizing common repositories for process and business rule modeling elements. The difference with Gartner's list is that the business rule repository is considered together with the process repository due to a close functional relationship and for simplicity. The component repository serves at the same time as storage for process models and business rules, and also as the facilitator and enabler of their reuse.

Simulation and optimization. Once the models are ready, it is possible to do a further analysis of bottlenecks and pain points, or run simulations of the process. A set of simulation variables can be defined, such as input data or event information that triggers the process, process variables, and the probabilities of process execution that determines, for instance, the branching of routes to an end state. During and after the simulation, the business analyst can monitor the behavior of the process execution through the simulation variables and find the bottlenecks or optimal conditions for the process enactment.

System Configuration:

Basic connectivity. BPMS provide or subscribe to the services of existing and underlying IT infrastructure. For this purpose, BPMS provide tools to configure such connectivity, or so-called extension points, for software developers to build the connectivity for using these services. Since some of the BPM standards, such as Business Process Execution Language (BPEL) (see Ko et al., 2009), enable exposing the processes as "SOA services", I will discuss the difference between SOA and BPMS further on in this section.

Document and content interaction. Processes often deal with managing documents and other digitalized content that is of importance for the goals of the process or its execution. For this purpose BPMS provide tools for building the interaction with document and content management systems. Some BPMS vendors provide document and content management as a feature along with the BPMS "core" functionalities.

In addition, **Support and administration** enable the implementation, daily maintenance, monitoring, and configuration of the BPMS itself by the system administrators and IT service managers.

Process Enactment:

User and group interaction. Business analysts can already interact with the other group or team members and stakeholders of the BPMS during the process design phase. Additionally, the user and group interaction may involve people participating in the process enactment. Typically, this participation is done through mock-ups, webpage forms, or portals. Collaboration tools play an essential role in BPM team communication as described in my case study in Chapter 5.

Process execution and state management. Process models are implemented from the design phase to the run-time execution environment, and the models include programmatic extensions with enough detail to enable run-time execution. Process execution often includes persistent storage to maintain the process state for long-lasting processes.

Diagnosis:

Monitoring. During the process execution, the data about the state, success, and failure can be followed up using a web based user interface or standalone client application called Business Activity Monitoring (BAM). BAM provides various levels of process information and different views to monitor and alert the stakeholders.

Reporting. For most business executives, the process models and execution details are of less or no importance. Instead, the consolidated data and Key Performance Indicators (KPI) about the processes in the form of reports carry far greater importance. BPMS often provide their own reporting tools for process performance. However, many enterprises have already invested in reporting systems, and thus executives may be reluctant to invest in or even implement additional reporting solutions.

In the following subsections, I address the additional features that can either be included in BPMS, and some features that have been claimed to have an important role in achieving the success with BPMS. First, I address is the Information Architecture (IA) in Subsection 7.5.1, and second, the Service Oriented Architecture (SOA) technologies in Subsection 7.5.2.

7.5.1 BPMS and Information Architecture

Traditionally, the analysis phase of software and IT systems development includes a conceptual schema of the application domain to define the information structures and business rules in a way that can be validated by domain experts. After the validation, the schema can be mapped and transformed from high-level conceptual designs employing business level concepts into the logical and physical schemas of the application domain. Before the Unified Modeling Language (UML) gained its lead as a higher-level data modeling method, the world of systems development was dominated by structured analysis. Object-oriented software concepts, as the primary modeling approach instead of business-oriented concepts, have been a challenge for BPM and the BPMS because these software concepts entertain a more structured methodology. The empirical research by Seethamraju and Marjanovic (2009) indicated that business process improvement is a complex, knowledge intensive, and collaborative process. They also argued that business processes incorporate textualized and often emergent knowledge, and it is not sufficient to prescribe this knowledge with a process model. Their conclusion was that any process improvement methodology should focus on knowledge management strategies and processes, rather than emphasizing business process models.

Groznik and Kovacic (2002) defined Information Architecture (IA) as the planning, designing, and constructing of an information blueprint, which can satisfy the informational needs of business processes and decision-making (2002, p. 406). According to their view, “The main results of the IA development process are a company's information system (workflow) model, global data model, and organizational/ technological foundations or platform referring to the computer hardware, software, communications network and programming tools by which computing and information resources are run, developed and delivered to users in a company” (ibid., p. 406).

Consequently, the importance of combining the information models with business process models, and the utilization of these same data in BPMS and SOA implementation, has been increased also in business analysts' reports (see Thompson 2009). Gartner forecasted that business drivers, such as the importance of speed-to-market and flexibility for changing business processes and models, are forcing organizations to manage their data assets differently (Friedman et al., 2009). In addition, Gartner reported, "BPI [Business Process Improvement] requirements and models can be linked into data modeling/database design tools for leveraged reuse, compliancy and consistency" (Blechar 2009, p. 10). However, based on my SLR and case study results that implied very limited support for the benefits of such link, the integration of information models with business process models seems to require more studies of information architecture approaches.

In my case study presented in Chapter 5, the organization had plans to reverse-engineer information models from run-time process models to be used in the future development of enterprise level information models. To the best of my knowledge, these plans have not yet been realized. I suggest the following definitions for Information Architecture in relation to BPMS (BPMS-IA):

The planning, designing, and constructing of information models in a manner that they can be integrated with the business process models used by BPMS.

7.5.2 Business Process Management Systems and SOA technology

One definition of SOA is: "a paradigm for organizing and utilizing distributed capabilities that may be under the control of different ownership domains" (OASIS 2006, p. 8). Gartner research stated that BPMS benefits are increased with the presence of SOA (Thompson 2009). However, Gartner research also added that the relationship between the BPMS and SOA is often confusing to vendors and end users. Gartner recommended that end users should evaluate BPMSs separately from the enterprise application integration technologies, and single-source their investments only when their application infrastructure stack vendor offers a BPMS

that is consistent with the end user's process requirements and intended composition roles (Hill et al., 2009). In order to study how SOA influences the BPMS implementation success, the clarification of the difference of these two concepts must be made. Moreover, the conceptualization of "SOA-enabled BPMS" is presented. Since SOA itself is not the primary focus of this study, the details and additional discussion of SOA is left for other studies.

The relationship between *business processes* and *services* is described, for example, by Rosen (2006, p. 1) "Business Process Management (BPM) empowers a business analyst to align IT systems with strategic goals by creating well defined enterprise business processes, monitoring their performance, and optimizing for greater operational efficiencies. Each business process is modeled as a set of individual processing tasks. These tasks are typically implemented as *services* within the enterprise." In this context, service is a more business and operational concept than technological, and it encompasses business value, integration approach, and an independent set of functionality.

Figure 45 illustrates an example organization of a SOA environment. It is divided into four layers:

- The top layer contains the *business processes* modeled as a set of individual processing tasks.
- The second layer contains *business services* that are implementations for the aforementioned set of individual processing tasks.
- The third level contains Information Systems that link business services to enterprise-level and shared resources through *integration services*.
- The lowest level contains mainframe applications, servers, and databases that are called by various Integration Services.

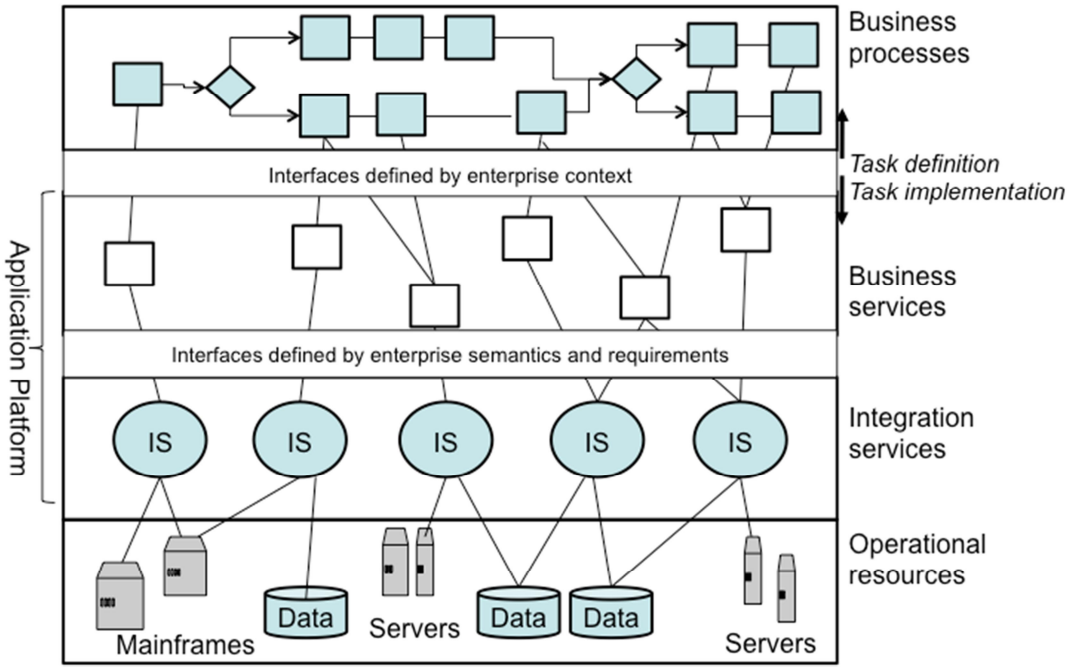

Figure 45. Service Oriented Architecture (adapted from Rosen 2006)

According to Harmon (2007, p. 460): "The BPMS does not require SOA but SOA certainly requires BPMS. Services do not make any sense without the context that business processes provide. Conversely, the runtime automation of business processes assumes an underlying layer of services, middleware and, ultimately, software components, and SOA currently provides the most cost effective way to organize that infrastructure." In addition, according to Legner and Heutschi (2007), SOA provides the solution to fully adapt, develop, and improve supportive IT systems to enhance business process performance. Blanton et al. (2009) identified that the orchestration of services would allow business agility and faster time to market in their lessons learned from SOA initiative for a healthcare company. In addition, my first SLR results supported that when SOA infrastructure is available, the business processes can be improved significantly. Also, in my case study, even though the BPMS provided multiple ways of integrating with the other IT through SOA-based technologies, the lack of on-line integrations in the underlying IT infrastructure was considered as a challenge for the BPM initiative success.

Therefore, based on the views presented above, I suggest that the SOA-enabled BPMS (BPMS-SOA) to be conceptualized as:

SOA is a cost-effective way of organizing the underlying IT infrastructure assumed by BPMS.

7.6 Summary

A summary of the resulting suggestions for concept definitions is given in Table 15.

Table 15. Summary of the suggested key concept definitions of BPM

Business process				
A business process is a coordinated and measurable set of activities whose purpose is to produce a product or service that is of value to the customer.				
BPM	**BPMS**	**BPM Team**	**BPMS-IA**	**BPMS-SOA**
BPM is a voluntary organizational management approach that strives to improve business processes according to specific criteria for the purpose of creating customer value, with or without a certain information technology.	A set of integrated composition technologies for the continuous management of known aspects of a process, characterized by the support for BPM modeling language and execution standards.	A BPM team is a team that establishes the operational aspects of BPM initiatives - the method, standards, governance, Business Process positions, participant roles, and training - to enable repeatability and create a sustained competitive advantage for the organization.	The planning, designing, and constructing of information models such that they can be integrated to business process models used by BPMS.	A cost-effective way of organizing the underlying infrastructure assumed by the BPMS process enactment.

8. Discussion and conclusions

There are several fundamental problems that have remained unsolved by current BPM approaches (Mendling 2009). Houy et al. (2010) suggested that future research should address how empirical contributions can be condensed in order to support and to expedite the construction of theories in BPM. In addition, the questions of how BPM Systems (BPMS) can be implemented and what business value they can bring are recurring white-spots (Ravesteyn and Batenburg 2010). In my research, I have considered these problems in answering my main research question: "What constitutes a path to improved firm performance with Business Process Management and BPM Systems?" The main question was addressed with three specific research questions:

(RQ1): What empirical support exists concerning improving firm performance using BPMS?

(RQ2). What steps in the suggested pathways of BPMM models are empirically supported?

(RQ3). How can BPM and BPMS support a customer-centric approach?

The rest of this chapter is organized as follows. In Section 8.1, I will discuss the implications of my results to science by differentiating whether my results are novel, or how my results either support or contrast with outcomes achieved by other researchers. In Section 8.2, I present the implications of the results to practice. In Section 8.3, I discuss the limitations of my findings and argue why those limitations are acceptable. Finally, in Section 8.4, I provide recommendations for further research in terms of my observations of what needs to be studied more.

8.1 Implications of the results to science

8.1.1 Novel findings

According to Corley and Gioia (2011, p. 15), "the idea of contribution rests largely on the ability to provide *original insight* into a phenomenon by advancing knowledge in a way that is deemed to have *utility* or usefulness for some purpose." Through my own process of accumulating knowledge and synthesizing the more recent theories of socio-technical systems design, I developed a conceptual model to help academics to analyze these influencing factors of BPM in a socio-technical systems context. New constructs and relationships are provided in what I call the *BPMS-reliant work system* that both extends and deepens Alter's (2008, 2006, 2003) framework of work systems as a *describing theory* of how work is done. As I see it, socio-technical systems design, despite its varying popularity, is an approach that has been shown to be a robust theoretical framework (Pasmore 1995) and includes empirical research of success in organizations over several decades (e.g., Mumford 2006; Pasmore 1988; Pasmore et al., 1982).

Waterman et al. (1988, p. 273) argued, "Do you want to understand how an organization really does (or doesn't) get things done? Look at the systems. Do you want to change an organization without disruptive restructuring? Try changing the systems." As a model for achievement of the desired changes, I described a *build system* (Niehaves and Plattfaut 2011; Järvinen 2004) to include *a focal theory* of change from the initial state into the goal/end state in Chapter 4. The identified critical success factors and critical practices were then considered as *complementary focal theories* of different types (see Gregor 2006) and were categorized either to help in achieving the desired change or maintaining the goal/end state. This categorization, as displayed respectively in Table 6 and Table 7 of Chapter 4, is new to science and improves the knowledge regarding to what resources or elements,

and their relationships these complementary focal theories should be targeted to increase the likelihood of BPM initiative success.

I argue that my case study and action research results provide insights into the strategic role of BPMS when social elements are taken into account. The findings imply that in successful BPM initiatives, contradictions are seen not as problems but as an opportunity for change. In addition, the case study findings emphasize the significance of various leadership styles of the managers to increase both the fit with the environment and alignment with the strategies. The importance of BPMS was in the flexibility in facilitating the participation and relational coordination of employees through its collaboration tools alike to wikis, blogs, and Facebook. The BPM initiative resulted on 6 million € annual productivity savings.

In order to identify what could be considered as most significant in predicting firm performance, I suggested customer-centricity as emphasized in the definitions of BPM and Business Process Orientation (BPO). According to prior definitions of BPM (for instance, Hung 2006; Smith and Fingar 2003; van der Aalst et al., 2003) and BPO (McCormack et al., 2009), they both emphasize customer needs and customer involvement. Surprisingly, none of the prior studies concerning BPM and BPMS CSFs (see e.g., Trkman 2010; Ravesteyn and Batenburg 2010) emphasized customer-centricity as a prominent CSF. However, the concept of customer-centricity in relation to BPM has remained vague, and prior literature has rarely provided empirically proven actionable points for companies to improve their customer-centricity with BPM and its Systems. In particular, practical methods of modeling customer-centric processes have not been covered in the prior academic literature. Therefore, my approach has implications to science as I focused on creating a new business process modeling and improvement methodology based on customer interaction points that stem from relevant literature of customer-centricity. Similar approaches have been introduced in the practitioners' side, such as the Customer Expectation Management method (CEM) by BPGroup (2009; see also Schurter and Towers 2006). However, academic and empirical research for these kinds of methods has been lacking. In addition, Zellner (2011) found that most business process improvement approaches concentrate on what needs to be done

before and after the improvement act, but the act of improving itself still has remained to be a black box.

My resulting methodology, as described in Section 6.4 of Chapter 6, was developed through action research in a real-life business situation. The context for the action research was a large-scale communications product, solution, and service provider company with global business operations. The utility of the methodology was tested with their customer in East Asia. The findings provided empirical support for the utility of the presented methodology including the focal theory, and provided empirical evidence for the complementary focal theories that were useful in solving the customer's problem. Use of this methodology resulted in the simplification of the service encounter interface, improved product quality, and performance of the company's maintenance process of their particular product offering.

Finally, as defined earlier in this research, the lack of theoretical grounding and ambiguous concepts has made it difficult to create focused designs for BPMS and its experiments. To address this problem, I suggested clarifications for concepts close to BPM in Chapter 7.

8.1.2 Results supporting earlier findings

My theoretical contribution was based on exploring potential historical development paths of process management, which has led to the current state of the BPM field. Starbuck has noted that results from using theories that contain conceptual or methodological fads often present little cumulative knowledge. In particular, Webster and Starbuck (1988; also Starbuck 2009b, 2006) proposed that researchers could aid knowledge accumulation by creating baseline propositions, which researchers and editors could treat as established ''truths''. In order to create a baseline of a descriptive theory for change with BPM and its Systems, I have turned the focus on the empirical research of BPM, and on the fundamentals of existing theories of business and IS in relation to the socio-technical systems approach (see

e.g., Pasmore 1988; Trist 1981; Cherns 1976). Therefore, referring to the suggestions by Starbuck and Webster given before, I argue that my approach aids knowledge accumulation better than adopting a set of discrete and potentially faddish theories.

Instead of adopting any of the recent potentially faddish theories, I searched for the characteristics of BPM that might be empirically and positively associated to flexibility, customer-centricity, and innovation – all of which are considered to belong to the highest levels of BPO maturity. Engeström (2007) agreed that process management has progressive potential but it is not the core coordinating mechanism of historically new forms of work. He stated (ibid., p. 46):

> *"Process management is foundationally a linear view of work and production. In its linearity, it follows, albeit in expanded and more sophisticated forms, the same basic logic that was the core of standardized industrial mass production. Mastering and updating this logic may be a necessary precondition for successful introduction of more interactive and flexible forms of production, such as process enhancements, mass customization and co-configuration. But particularly in conditions of innovation – and knowledge driven production that involves customers as co-producers and co-innovators, the linear logic of process management is simply not enough."*

I claim that this shortcoming in the logic of process management has remained, much due to neglecting the socio-technical aspects of work organization and leaving many of the practical approaches vague. Also, Škrinjar and Trkman (2013, p. 56) stated, "Further research is thus needed to show how a higher BPO influences both technology-driven and other innovations in the organization."

The main finding from prior empirical research is that the amount and quality of scientific support for the benefits of using BPMS does not match with the prospects forecasted by the business analysts. Only a few case studies provided enough information to recognize what empirical support was included in the reported benefits. A number of theoretical articles showed a rapid increase during 2005-2009 in the interest about BPMS similarly to an IS fashion wave; however, such an

increase in the empirical support did not occur. However, Wang and Swanson (2007) contended that a new information technology requires that interested actors must launch the technology through talking and writing about the technology. A complete lack of BPM (and BPMS) handling in the Academy of Management and Review Journals suggested that the significance of BPM had not yet risen to the level that it would be recognized in management research. Houy et al. (2010, p. 638) also concluded, "The biggest part of empirical articles in BPM has appeared in unranked journals. Empirical research in BPM has reached top-class journals only to a moderate extent so far." My SLR findings also support Ravesteyn and Batenburg's (2010) survey of Critical Success Factors of BPMS implementation, where they concluded that the positive predictions of BPMS's ability to improve processes and IS/IT in more flexible and adaptive may have originated from developers and consultants – people who Baskerville and Myers (2009) considered to be IS fashion creators.

In this research, I considered the approach of maturity models due to claims that they could predict how a company can achieve firm performance. Using the Systematic Literature Review (SLR) method, I explored BPMM models, which are stage models suggesting a step-wise pathway of systematically advancing business processes along the maturity continuum, with results of increased firm performance (see e.g., McCormack et al., 2009). I was able to find a large number of peer reviewed empirical studies of the BPMM models. My selection of the included studies was in principle random, even though the selection of the case organizations in some of the articles appeared to be biased towards reporting the positive impacts of BPMM.

The key implication to science is that the results from the selection of the empirical support given in these articles confirm much of the same results as reported in the study of Phelps et al. (2007). Phelps et al. (2007) reviewed a large body of literature related to the organizational life cycles assuming a passage through predictable stages. They (ibid., p. 17) found out that "there is little consistency of either in the number of elements that define these models or in their

constitutive components, and that they suffer from being linear, unidirectional, sequenced and deterministic."

My results support the earlier results of BPR maturity studies. Maull et al. (2003) conducted a fieldwork study in 33 organizations drawn from a range of sectors. Their (ibid., p. 618) conclusion was as follows:

> *"Organizations appeared to follow the particular path outlined implicitly, learning as they went, focusing initially on taking a cost reduction/process orientation and only later 'discovering' the importance of the more strategic implications of their undertaking. Having 'discovered' this, then they often dropped their initial emphasis on cost reduction as they uncovered a more complete understanding of the strategic significance of the changes envisaged. "*

I argue that even though BPMM models can be used as a tool to identify beneficial directions to increase firm performance, there is a gap in both predicting and explaining how BPM maturity leads to aligned and agile ways of working. Moreover, Röglinger et al. (2012, p. 328) reported, "BPM maturity models provide limited guidance for identifying desirable maturity levels and for implementing improvement measures."

Smith and Fingar (2004, p. 1) criticized the use of Capability Maturity Model (CMM) as a BPM maturity model, "Although the first principles of CMM are immensely helpful, business innovation requires stepping out of the CMM box." Moreover, Power (2007, p. 4) criticized Hammer's Process and Enterprise Maturity Model (PEMM) because of its "potential complexity for a business audience, no known connection between maturity levels and business performance, and some missing critical success factors of process management, such as strategic alignment." In general, the connection between maturity levels and firm performance was difficult to discover in my research findings. Even though the benefits were reported on a range of business domains, the main concentration was in the processes of Supply Chain Management (SCM) and Information Technology (IT) standardization. Little support was found for the maturity stages and steps

enabling business flexibility and innovation. One of the reasons may be that none of the studies presented clear measures of flexibility and innovation.

As a conclusion, my results support Phelps et al.'s (2007, p. 17) findings that "There is no standard linear sequence of stages or problems, but there is a basic set of key issues that all growing firms can expect to encounter at some point. These are the tipping points, and the key to growth is seen as the absorption of knowledge and solutions to navigate the tipping points successfully." From my SLRs, I collected the resulting and empirically supported "tipping points", or steps, success factors, and critical practices defined in this study as *complementary focal theories.* These complementary focal theories were divided between those that have significance either in the build system or in the new stable state of the BPMS-reliant work system.

I suggest that my collection of complementary focal theories can be useful both for descriptive and prescriptive methods. Used descriptively, the complementary focal theories can help structure the analysis of BPM initiative projects and the end-state stable work systems they achieve. Therefore, it could be a useful research instrument. Academic researchers could use my collection to analyze the complementary focal theories selected for organizational change projects and structure their findings in a way that allows ready cross-case comparisons. I argue that this approach could lead to a more detailed understanding of the theories explaining and predicting BPM initiative success.

The difference between approaches for organizational change following BPMM models and my theory concerning work and build systems can be summarized using van de Ven and Poole's (1995) definitions of life-cycle and teleology theories for social change. They (ibid., p. 515) described "The typical progression of change events in a *life-cycle model* is a unitary sequence (it follows a single sequence of stages or phases), which is cumulative (characteristics acquired in earlier stages are retained in later stages) and conjunctive (the stages are related such that they derive from a common underlying process)." Respectively, they (ibid., p. 516) defined "According to *teleology*, development of and organizational entity proceeds towards

a goal or an end state. It is assumed that the entity is purposeful and adaptive; by itself or in interaction with others, the entity constructs an envisioned end state, takes action to reach it, and monitors the progress."

The case study findings provided empirical evidence for BPMS having an instrumental role in a technology driven change, which requires taking both the social and technological aspects into account. I claim that this evidence supports what Markus (2004) called *technochange,* which I see to belong to the concept of *joint optimization* introduced in the open systems model (Emery 1959).

Škrinjar and Trkman (2013) argued that dynamic capabilities are in fact not processes, but rather the ability of an organization to change its processes, and that process owners and proper organizational culture can enhance such ability. However, they left the detailed examination of the factors influencing such ability to further research. Ravesteyn and Batenburg (2010) presented a similar approach to my build system with their BPMS-implementation framework. They derived a long list of CSFs from prior literature and reduced the total number of factors to 55 prominent CSFs for BPMS implementations. Based on their results, the most prominently supported CSFs in achieving the "to-be" were regarding communication, involvement of stakeholders, and governance. In contrast to my theoretical foundations, they considered that these CSFs could be derived from two evolutionary drivers behind BPMSs, such as (1): Total Quality Management (TQM), Business Process Re-engineering (BPR), Workflow Management (WfM), and (2): Enterprise Application Integration (EAI), Business Activity Monitoring (BAM), and others. However, I consider Ravesteyn and Batenburg's model to describe only the build system but leave unexplained how their model addressed the maintenance of the "to-be" state.

8.1.3 Results contradicting earlier findings

My key finding from reviewing the empirical research on BPMM models was that the linear, unidirectional, sequential, and deterministic nature of these models was

sometimes contradicted. This finding is also supported by my own empirical research. For example, Reijers (2006, p. 401) cautiously concluded, "there is a relation between process orientation and BPMS implementation success." However, in my case study, the organization identified their maturity to be on the lowest level (P-1) according to PEMM, yet they achieved benchmarked €6 million in annual productivity savings with the BPMS.

The findings show that in some cases firm performance is improved without progressing through the levels of BPMM models or taking a set of sequential steps as prescribed by these models. On the contrary, in some cases it is more appropriate to consider other means than increasing the Business Process Orientation (BPO), and even revert back to the preceding levels to develop the capabilities required for matching the needs of the organization, customers and markets, and the sensitivity required to identify emerging opportunities for change. Trkman et al. (2010) reasoned that companies may have "other means" to cooperate without increasing their BPO. Also, the earlier research shows that building better relations with primary stakeholders like employees, customers, and suppliers could lead to increased shareholder's wealth (Škrinjar et al., 2008); that tacit assets for developing relationships with key stakeholders (Hillman and Keim 2001) can lead to a sustainable advantage; and that fostering positive connections with key stakeholders (customers and employees) can promote a firm's profitability (Berman et al., 1999).

I also argue that business model innovation may be an example of "other means" of achieving firm performance. This view is supported by IBM's global CEO report of 2006 stating, "Companies whose operating margins have grown faster than their competitors' over the past five years were twice as likely as their lower performing peers to emphasize business model innovation" (Pohle and Chapman 2006, p. 35). Moreover, in their research sample, business model innovators were growing operating margins faster than those concentrating on other types of innovation, such as product/service/markets and operations. Both business model and technology innovation require a change of existing business processes or the development of new business processes (Kirchmer 2008), but improper BPM may impede the implementation of innovations (Škerlavaj et al., 2007).

Cohen and Levinthal (1990) argued that the sensitivity and aspiration level is not determined by past performance of a firm or the performance of reference organizations. They claimed that organizations with the higher levels of absorptive capacity, defined as a firm's ability to recognize the value of new information, assimilate it, and apply it to commercial ends (ibid.), would tend to be more proactive, exploiting opportunities present in the environment and independent of current performance.

My results also have implications for science in showing that business agility and innovation are not a direct result of unidirectional progress along the levels of BPMM models. Victor and Boynton (1998) presented a model of work types and the concept of the *right path*. Their empirical results showed that any work type is reached by going through and acquiring knowledge capabilities from the preceding work type, for example, mass production can be reached only through some form of craft, mass customization can only be reached through some form of process enhancement and so forth. They claimed that companies succeed on creating market value by transforming their capabilities and by following the "right path". What was pertinent in their results was that the strategic destination of such companies was not evidently towards the more "mature" types of work, for example, from mass production to process enhancements. Actually, to learn new capabilities companies must sometimes visit the preceding types of work such as craft.

8.1.4 Main conclusion of these results

This research's main implication to science is that it informs the IS and management discipline of the design and action of how to increase the probability of success with BPM and its Systems. This research also increases understanding on how to increase customer-centricity – an empirically supported yet less studied direction of BPM.

The answer to the main question: what constitutes a path toward firm performance with BPM and BPM Systems, I conclude to be the sustained capability to use BPMS to enable change towards the goal state of a company and maintain the new (successful) state. The empirical evidence in this study support (RQ1) that mature BPMS can be considered as an enabler and sometimes a required element to achieve and maintain those states. My empirical evidence also support (RQ2) that in order to reach such a goal state, a company should consider various, and in some cases, multidirectional paths. However, achieving the desired change requires complementary changes to the social and technical elements and relationships among them, depending on company-specific circumstances. This study provided empirical evidence for a set of focal and complementary focal theories that can be used for prescriptive methods to both analyze and achieve these changes. From this set, the most empirically supported (RQ3) theory is to increase the customer-centricity of a company. For this purpose, a novel business process modeling and improvement methodology was provided.

8.2 Implications of the results for practice

It has been previously shown that business process improvement initiatives in general are large and costly undertakings. The results of such initiatives are uncertain and the BPMM models do not provide specific roadmaps for the implementation. My results challenge the simplistic use of BPMM models and suggest considering also other means, at least as a short-term solution.

In terms of investing in BPMS use, on the one hand, the implication for practitioners is to beware that the claims of the benefits have been mostly based on either business analyst research or the case studies of consultants, who are usually considered to be the creators of IS and management fashion waves (Baskerville and Myers 2009). On the other hand, my case study results inform practice about improving firm performance with BPMS, even in work settings characterized by low BPO maturity. Therefore, the use of BPMM models should be less than obvious choice - especially when thriving for flexibility and innovation with BPM and its

Systems. As an alternative, my collection of complementary focal theories can serve prescriptive methods to increase the likelihood of BPM initiative success. In this sense it can be used to guide management and BPM teams in pursuing and maintaining benefits with the use of BPMS, whether as part of BPM initiative or not. In addition, as a practical application of BPM, I presented a business process modeling and improvement methodology constructed within a communications service provider company, both which were tested with their customer.

8.3 Limitations

In this section, I evaluate the limitations of my research in terms of its validity. Validity in quantitative research refers to the legitimacy of the findings, i.e., how accurately the findings represent the truth in the objective world (Venkatesh et al., 2013, p. 32). In particular, the reliability as repeatability or consistency is emphasized in quantitative research. However, in qualitative research there are different views on how validity can be evaluated. Without elaborating more on such discourse, I use Venkatesh et al.'s definition (ibid., p. 34) of validity in qualitative research as "the extent to which data are plausible, credible, and trustworthy, and thus can be defended when challenged."

Many of the findings made in this study are based on my systematic literature review. However, a literature review can hardly ever be called "fully exhaustive" (vom Brocke et al., 2009). The SLRs conducted in Chapter 2 and Chapter 3 satisfy the criteria of a valid search as suggested by Kitchenham et al. (2009), who stipulated that a SLR should cover at least four major digital scientific journal databases. In addition, I also conducted a backward search as suggested by Webster and Watson (2002), but I did not perform a forward search as also suggested by them. Therefore, I may have overlooked newly published articles on the topics.

The first SLR included quantitative results and covered only scientific articles and those that included explicitly the term "Business Process Management System"

with most known synonyms and abbreviations. Using the same protocol, the SLR can be easily repeated. Empirical research done by practitioners outside peer reviewed proceedings and journals are not covered at all, and therefore this study is only a summary of research present in the five established digital scientific database during a period of 2000 until April 2010. The selection of research terms leaves out possible other variations of BPM technology that could be considered relevant but are not reached with my search terms. However, it can be argued that if the title, abstract, or keywords of the study do not cover any of the relevant search terms, the focus of such studies are misplaced, or the field of discipline lacks clarity on the key concepts. Later mentioned is already an acknowledged gap of BPM (see e.g., Trkman 2010; Palmberg 2010). One reason for the lack of empirical studies can also be considered to result from the difficulties that academics have in defining and completing such experiments in co-operation with practitioners (Bider 2005). Considering Kitchenham et al.'s (2009) criteria for a valid SLR supplemented with a backward search as suggested by Webster and Watson (2002), I feel confident that my search process provides a solid foundation of the relevant body of prior empirical knowledge.

The second SLR focused on qualitative research of empirical support related to major BPMM models. Even though my data set of the SLRs is large, it is not potentially exhaustive. Moreover, the articles may not be the best representatives of the specific domains they address. The collection of resulting empirical studies is still too small a set for making broad generalizations in such a large and complex domain. Also, on the one hand, my selection of BPMM models is not exhaustive due to the ever-increasing number of maturity models, but on the other hand, Curtis and Alden (2007) argued that only a small set of core maturity models would be needed for organizational change. In addition, some of the selected BPMM models are used for measuring BPM maturity even though their scope is wider and they are not originally meant for the BPM domain, such as CMM and PEMM. Rosemann and vom Brocke (2010, p. 111) called for "a clear distinction [. . .] between process maturity models and [BPM] maturity models."

The resulted list of CSFs and CPs in this research is not exhaustive as there is no shortage of influencing factors for BPM success in prior literature. Ravesteyn and Batenburg (2010) were able to identify 337 CSFs, which they narrowed to 55 most prominent CSFs. Instead of exhaustiveness for identifying CSFs, my goal was to create understanding for such CSFs due to gaps in prior research (Škrinjar and Trkman 2013).

I do not claim that the results of my single case study and action research can be broadly generalized to other settings. First, these results may be specific to the services sector even though both companies participated also manufacturing. I also recommend caution in trying to generalize about the specific complementary focal theories (e.g., steps, CSFs, CPs) described in this research, primarily because of the sample is small and not a representative of other types of industries. As such, these complementary focal theories may not apply to all companies because contingencies, such as the industry in question or a turbulent market environment, may have varying importance due to, for example, the company's strategic focus. Specific contingencies as potential limitations in my case study, I consider to be the selection of BPMS, which provided the required capabilities not available in all corresponding solutions. In addition, the BPMS vendor provided extensive support for setting up the BPMS in a necessary manner, a service that may not always be available in all situations. Respectively for my action research, the customer was very proactive since the beginning of the BPM initiative, and the relationship between the customer and the case organization was already established.

I do not claim to have introduced empirical support for all aspects of my resulting conceptual model and methodologies; rather my claim is to have given empirical evidence for their usefulness. According to Whetten (1989, p. 491), "If the theoretical model is a useful guide for research, by definition, all the relationships in the model have not been tested. If all links have been empirically verified, the model is ready for the classroom and is of little value in the laboratory." I suggest future research to address the remaining gaps in the empirical parts of my theoretical approach and model.

I consider that the case study and action research results are trustworthy and possibility of errors is unlikely. First, the case study and action research organization, their customer, and I as researcher and practitioner share the same language and concepts. Second, this dissertation has been reviewed and evaluated by the responsible managers of the case study and action research organizations, my work colleagues, as well as both within the peer groups of academic doctor schools and seminars.

8.4 Further research

This study revealed that there were very few high quality empirical research and case studies available for BPMS implying that BPM and its technological applications have not proven to be sustainable solutions for complex problems of practice; this puts BPM danger of falling into the category of another management fad. The previously existing case studies lacked the detailed presentation of distinct features and their benefits. These previous findings provided very limited support for the general impressions given by the forecasts of business analysts and consultants. There is also a gap in research around measures of success for BPM initiatives. González et al.'s (2010) systematic review results indicated that only a small percentage of the existing business process measures has been empirically validated in a real environment.

Also, the unidirectional path-dependency suggested by various BPMM models appears to be contradicting among empirical findings. However, the success factors and practices derived from these models do seem to have some validity as they have been shown to have influence on firm performance. My research thus informs both science and practice on alternative theoretical foundations to understand these factors as opposed to traditionally understanding of the evolutionary drivers behind BPM. These alternative foundations include an emphasis on innovation, communication, and collaboration with customers. However, both the practical approaches and measurement systems for these levels should be studied more.

My SLR for the BPMM models also identified gaps in showing the relationship between the use of BPMM models and firm performance. I agree with Škrinjar and Trkman (2013), who also saw that further research is needed to show that a higher BPO influences both technology-driven and other innovations in the organization. My suggestion for future research is therefore to focus on the higher levels of maturity and the factors that influence firm performance. As a specific topic related to the higher maturity levels, I encourage investigating more the relationship between BPM and customer-centric approaches.

Based on my case study results, I suggest pursuing empirical studies that concentrate on identifying those BPM initiatives that face conflicts with business or IT strategies, and to conduct surveys on the success rates and factors under such circumstances. Moreover, more insight may be gained from looking at the level of incorporation of BPM teams within BPM initiatives, and the roles and leadership styles of the managers in such teams. Also, one potential research idea is to extend the notion of BPMS-reliant work systems to settings of BPM outsourcing and strategic partnering (see e.g., Saxena and Bharadwaj 2009) to consider the influence of networked work systems. It has also been suggested that managing BPM networks is an integral part of the maturation of an organization in its BPM activities (Rosemann et al., 2006; Fisher 2004).

For researchers focusing on the technology dimension of BPM, I would encourage pursuing further clarification of BPMS-related concepts, for instance, SOA and Information Architecture. Based on my case study results, I also support the findings of Niehaves and Plattfaut (2011, p. 384) in their systematic literature review that "collaborative BPM is a growing trend in information systems research, but that there still exist significant research gaps."

For the people dimension, it has been increasingly considered that employee training and learning is a prerequisite for the success of BPM (Trkman 2010; Pritchard and Armistead 1999). Therefore, I see that for organizational learning research it would be of importance to study what learning approaches most benefit BPM initiatives.

References

Abdolvand, N., Albadvi, A., and Ferdowsi, Z. (2008). Assessing readiness for business process reengineering. *Business Process Management Journal*, *Vol. 14 No. 4*, pp. 497–511.

Abell, P., Felin, T., and Foss, N. (2008). Building micro foundations for the routines, capabilities, and performance links. *Managerial and Decision Economics, Vol. 29 No. 6,* pp. 489-502.

Agarwal R., and Lucas, H. C. Jr. (2005). The Information Systems Identity Crisis: Focusing on High-Visibility and High-Impact Research. *MIS Quarterly, Vol. 29 No. 3,* pp. 381-398.

Ahmad, H., Francis, A., and Zairi, M. (2007). Business process reengineering: critical success factors in higher education. *Business Process Management Journal*, *Vol. 13 No. 3*, pp. 451-69.

AIIM (2007). BPM – Not Just Workflow Anymore. AIIM Industry Watch Survey. Available at: http://www.aiim.org/pdfdocuments/33353.pdf, accessed April 2013.

Allen, B., and Boynton, A. (1991). Information architecture: In search of efficient flexibility. *MIS Quarterly*, *Vol. 15 No. 4*, pp. 435–445.

Al-Mashari, M., and Zairi, M. (1999). BPR implementation process: an analysis of key success and failure factors. *Business Process Management Journal, Vol. 5 No. 1,* pp. 87-112.

Alt, R., and Puschman, T. (2005). Developing customer process orientation: the case of Pharma Corp. *Business Process Management Journal*, *Vol. 11 No. 4*, pp. 297-314.

Alter, S. (2002). The work system method for understanding information systems and information system research. *Communications of the AIS, Vol. 9 No. 6*, pp. 90-104.

Alter, S. (2003). 18 Reasons Why IT-Reliant Work Systems Should Replace "The IT Artefact" as the Core Subject Matter of the IS Field. *Communications of the Association for Information Systems*, *Vol. 12 No. 23*, pp. 364-396.

Alter, S. (2006). *The Work System Method – Connecting People, Processes, and IT for Business Results.* Work Systems Press, Larkspur, CA.

Alter, S. (2008). Defining information systems as work systems: implications for the IS field. *European Journal of Information Systems, Vol. 17 No. 5*, pp. 448–469.

Amit, R., and Shoemaker, P. J. H. (1993). Specialized assets and organizational rent. *Strategic Management Journal. Vol. 14 No. 1*, pp. 33–47.

Anthony, R. (1965). *Planning and control systems: A framework for analysis*. Harvard University, Cambridge, USA.

Antonucci, Y. L., and Goeke, R. J. (2011). Identification of appropriate responsibilities and positions for business process management success: Seeking a valid and reliable framework. *Business Process Management Journal*, *Vol. 17 No. 1*, pp. 127 – 146.

Antony, J., and Bañuelas, R. (2002). Key ingredients for the effective implementation of six sigma program. *Measuring Business Excellence, Vol. 6 No. 4*, pp. 20–27.

Ao, Y., Xiao, X., and Song, B. (2009). A Unified Configurable Architecture for Human-Centric Business Process Management Application in SMEs. In *IEEE Asia-Pacific Services Computing Conference (IEEE APSCC),* pp. 287-292.

Arend, R. J., and Bromiley, P. (2009). Assessing the dynamic capabilities view: spare change, everyone? *Strategic Organization, Vol. 7 No. 1,* pp. 75–90.

Asaro, P. M. (2000). Transforming society by transforming technology: the science and politics of participatory design. *Accounting Management and Information Technologies, Vol. 10*, pp. 257-290.

Attaran, M. (2004). Exploring the relationship between information technology and business process reengineering. *Information & Management*, *Vol. 41 No. 5,* pp. 585–596.

Aulin, A. (1989). *Foundations of mathematical system dynamics: The fundamental theory of causal recursion and its application to social science and economics*. Pergamon Press, Oxford.

Avison, D., Baskerville, R., and Myers, M. (2001). Controlling action research projects. *Information Technology & People, Vol. 14 No. 1,* pp. 28 – 45.

Aysar, P. S., and Johnson, W. C. (2003). Strategic capabilities of business process: looking for competitive advantage. *Competitiveness Review, Vol. 13 No. 2*, pp. 46-52.

Bacharach, S. (1989). Organizational theories: Some criteria for evaluation. *The Academy of Management Review*, *Vol. 14 No. 4*, pp. 496–515.

Band, W. (2009). Risk-Proofing Your CRM Initiative. *CRM Magazine, Vol. 13 No. 3*, pp. 12-12.

Bandara, W., Indulska, M., Sadiq, S., Chong, S., Rosemann, M., and Green, P. (2007). *Major issues in business process management: an expert perspective*. Report, School of Information Technology and Electrical Engineering, The University of Queensland.

Bandura, A. (1986). *Social Foundations of Thought and Action*. Prentice-Hall, Englewood Cliffs, NJ.

Bañuelas, R., and Antony, J. (2003). Going from six sigma to design for six sigma: an exploratory study using analytic hierarchy process. *The TQM Magazine, Vol. 15 No. 5,* pp. 334–344.

Banville, C., and Landry, M. (1989). Can the Field of MIS Be Disciplined? *Communications of the ACM, Vol. 32 No. 1,* pp. 48-61.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *Vol. 17 No. 1,* pp. 99-120.

Barney, J. B., and Wright, P. M. (1998). On becoming a strategic partner: the role of human resource in gaining competitive advantage. *Human Resource Management*, *Vol. 37*, pp. 31-46.

Baskerville, R., and Myers, M. (2009). Fashion waves in Information Systems research and practice. *MIS Quarterly*, *Vol. 33 No. 4*, pp. 647-662.

Becker, J., Knackstedt, R., and Pöppelbuß, J. (2009). Developing maturity models for IT management – a procedure model and its application. *Business & Information Systems Engineering, Vol. 1 No. 3*, pp. 213–222.

Benbasat, I., Dexter, A. S., Drury, D. H., and Goldstein, R. C. (1984). A critique of the stage hypothesis: theory and empirical evidence. *Communications of the ACM, Vol. 27 No. 5*, pp. 476-85.

Benbasat, I., and Zmud, R. W. (2003). The Identity Crisis within the IS Discipline: Defining and Communicating the Discipline's Core Properties. *MIS Quarterly, Vol. 27 No. 2*, pp. 183-194.

Bergman, M., King, J. L., and Lyytinen, K. (2002). Large-scale requirements analysis revisited: the need for understanding the political ecology of requirements engineering. *Requirements Engineering, Vol. 7 No. 3*, pp. 152-71.

Berman, S. L., Wicks, A. C., Kotha, S., and Jones, T. M. (1999). Does stakeholder orientation matter? The relationship between stakeholder management models and a firm financial performance. *Academy of Management Journal*, *Vol. 42*, pp. 488-506.

Berry, L. (1997). The service nightmare: Can we sustain success? *Marketing Management. Vol. 6 No. 3,* pp. 10-13.

Biazzo, S. (2002). Process mapping techniques and organisational analysis: Lessons from socio-technical system theory. *Business Process Management Journal*, *Vol. 8 No. 1*, pp. 42-52.

Bider, I. (2005). On the role of experiment in BPM research. *Business Process Management Journal*, *Vol. 11 No. 4,* pp. 1-1.

Biberoglu E, and Haddad, H. (2002). A survey of industrial experiences with CMM and the teaching of CMM practices. *Journal of Computing Sciences in Colleges, Vol. 18 No. 2,* pp. 143–15.

Bitner, M. J., Brown, S. W., and Meuter M. L. (2000). Technology infusion in service encounters. *Journal of the Academy of Marketing Science, Vol. 28 No. 1,* pp. 138-149.

Blanton, J., Leski, S., Nicks, B., and Tirzaman, T. (2009). Making SOA Work in a Healthcare Company. In *OOPSLA 2009: Proceeding of the 24th ACM SIGPLAN conference companion on Object oriented programming systems languages and applications in Orlando, USA*, ACM, New York, pp. 579-587.

Blechar, M. (2009). A Reference Architecture for Collaborative Enterprise Business Process Improvement Technologies. *Vol. ID Number: G00169319*, Gartner Research, Stamford, CT.

Boersma, K., and Kingma, S. (2005). From means to ends: The transformation of ERP in a manufacturing company. *The Journal of Strategic Information Systems*, *Vol. 14 No. 2***,** pp. 197-219.

Bolton, M. (2004). Customer centric business processing. *International Journal of Productivity and Performance Management, Vol. 53 No. 1*, pp. 44-51.

Boudreau, M.C., and Robey, D. (2005). Enacting Integrated Information Technology: A Human Agency Perspective. *Organization Science, Vol. 16 No. 1*, pp. 3-18.

BPGroup (2009). CEMMethod. Available at: http://www.cemmethod.com/, accessed April 2013.

Brynjolfsson, E. (2010). The four ways IT is revolutionizing innovation. *MIT Sloan Management Review*, *Vol. 51 No. 3*, pp. 51–56.

Bucher, T., and Winter, R. (2009). Project types of business process management: Towards a scenario structure to enable situational method engineering for business process management. *Business Process Management Journal*, *Vol. 15 No. 4*, pp. 548-568.

Burlton, R. T. (2001). *Business Process Management: Profiting from Process.* Sams, Indianapolis, IN.

Burrell, G., and Morgan, G. (1979). *Sociological Paradigms and Organizational Analysis, Elements of the Sociology of Corporate Life.* Heinemann Educational Books Ltd, London.

Byrd, T. A., and Turner, D. E. (2000). Measuring the flexibility of information technology infrastructure: Exploratory analysis of a construct. *Journal of Management Information Systems, Vol. 17 No. 1*, pp. 167–208.

Cai, S. (2009). The importance of customer focus for organizational performance: a study of Chinese companies. *International Journal of Quality & Reliability Management*, *Vol. 26 No. 4*, pp. 369-379.

Callas, G. (2006). Process Based Enterprise Architecture Building, Information and Communication Technologies. In *International Conference on Information & communication Technologies: From Theory to Applications, Damascus, Syria*, IEEE, pp. 239-244.

Caro, J. L., Guevara, A., and Aguayo, A. (2003). Workflow: a solution for cooperative information system development. *Business Process Management Journal, Vol. 9 No. 2*, pp. 208-220.

Casati, F. (2005). Industry Trends in Business Process Management: Getting Ready for Prime Time. In *Proceedings of the 16th International Workshop on Database and Expert Systems Applications (DEXA'05)*, *Copenhagen, Denmark, IEEE*, pp. 903 – 907.

Chalaris, I. E., and Vlachopoulos, S. (2009). Business Process Reengineering as a Modernizing Tool for the Public Administration – From Theory to Reality. In *Fourth Balkan Conference in Informatics,* pp. 64-69.

Chang, J. F. (2005). *Business Process Management Systems.* Auerbach Publications, Taylor & Francis Group, Boca Raton, New York.

Cherns, A. (1976). Principles of socio-technical design. *Human Relations*, *Vol. 2*, pp. 783–792.

Chua, W. F. (1986). Radical developments in accounting thought. *The Accounting Review, Vol. LXI No. 4*, pp. 601 - 632.

Ciborra, C. U. (1996) Improvisation and Information Technology. In *Organizations, in Proceedings of ICIS'96, (Cleveland, Ohio, December 1996)*, pp. 369- 380.

Cohen, W. M., and Levinthal, D. A. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation. *Administrative Science Quarterly, Vol. 35 No. 1,* pp. 128-152.

Compeau, D. R., and Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly, Vol. 19 No. 2,* pp. 1989-21.

Conery, J. C., Catchen, J. M., and Lynch, M. (2005). Rule-Based Workflow Management for Bioinformatics. *International Journal on Very Large Data Bases*, *Vol. 13 No. 3*, pp. 318-329.

Corley, K. G., and Gioia, D. A. (2011). Building Theory About Theory Building: What Constitutes a Theoretical Contribution? *The Academy of Management Review (AMR), Vol. 36 No. 1*, pp. 12–32.

Cunningham, J .B. (1997). Case study principles for different types of cases. *Quality and Quantity, Vol. 31*, pp. 401-423.

Currie, W. L. (1999). Revisiting Management Innovation and Change Programmes: Strategic Vision or Tunnel Vision? *Omega, Vol. 27 No. 6*, pp. 647-660.

Curtis, B., and Alden, J. (2007). Maturity Model du Jour: A Recipe for Side Dishes. Available at: www.bptrends.com/publicationfiles/10-07-COL-maturitymodeldujour-CurtisAlden-final.pdf, accessed May 2011.

Daft, R. L., and Lengel, R. H. (1986). Organizational information requirements, media richness and structural design. *Management Science, Vol. 32 No. 5,* pp. 554-571.

Davenport, T. (1993). *Process Innovation: Reengineering Work through Information Technology*. Harvard Business School Press, Boston, MA, USA.

Davenport, T. H., and Short, J. (1990). The new industrial engineering: information technology and business process redesign. *Sloan Management Review, Vol. 31 No. 4,* pp. 11-27.

Davison, R. M., Martinsons, M. G., and Kock, N. (2004). Principles of Canonical Action Research. *Information Systems Journal, Vol. 14 No. 1,* pp. 65-86.

Davison R. M., Martinsons, M. G., and Ou, C. X. J. (2012). The roles of theory in Canonical Action Research. *MIS Quarterly, Vol. 36 No. 3,* pp. 763-786.

Day, G. S. (1999). *The market driven organizations: Understanding, attracting, and keeping valuable customers*. The Free Press, Simon & Schuster Inc., New York.

Deakins, E., and Makgill, H. (1997). What killed BPR? Some evidence from the literature. *Business Process Management Journal*, *Vol. 3 No. 1*, pp. 81-107.

Debenham, J. (2001). An agent for web-based process management. In *Proceedings of Eighth Annual IEEE International Conference and Workshop on the Engineering of Computer Based Systems, Washington, DC, USA, IEEE,* pp. 62 – 67.

de Bruin, T., Rosemann, M., Freeze, R., and Kulkarni, U. (2005). Understanding the main phases of developing a maturity assessment model. Paper presented at *Australasian Conference on Information Systems (ACIS)*, Sydney.

de Geuser, F., Mooraj, S., and Oyon, D. (2009). Does the Balanced Scorecard Add Value? Empirical Evidence on its Effect on Performance. *European Accounting Review, Vol. 18 No. 1*, pp. 93-122.

Deming, W. E. (1993). *The new economics, for industry, government, education*. MIT Press , Cambridge, MA.

Denison, D. R., Hooijberg, R., and Quinn, R. E. (1995). Paradox and Performance: Toward a Theory of Behavioral Complexity in Managerial Leadership. *Organizational Science, Vol. 6 No. 5,* pp. 524-540.

Deshpandé, R., Farley, J. U., and Webster, F. E. Jr. (1993). Corporate culture, customer orientation, and innovativeness in Japanese firms: A quadrad analysis. *Journal of Marketing, Vol. 57 No. 1*, pp. 23-27.

DeToro, I., and McCabe, T. (1997). How to stay flexible and elude fads. *Quality Progress*, *Vol. 30 No. 3*, pp. 55-60.

Dishaw, M. T., and Strong, D. M. (1999). Extending the technology acceptance model with task–technology fit constructs. *Information & Management, Vol. 36 No. 1*, pp. 9–21.

Dubelaar, C., Sohal, A., and Savic, V. (2005). Benefits, impediments and critical success factors in B2C E-business adoption. *Technovation, Vol. 25 No. 11,* pp. 1251–1262.

Duncan, N. B. (1995). Capturing flexibility of information technology infrastructure: A study of resource characteristics and their measure. *Journal of Management Information Systems, Vol. 12 No. 2*, pp. 37–57.

Eggert, A., and Ulaga, W. (2002). Customer perceived value: a substitute for satisfaction in business markets? *Journal of Business & Industrial Marketing, Vol. 17 No. 2/3*, pp. 107-18.

Eikebrokk, T. R., Iden, J., Olsen, D. H., and Opdahl, A. L. (2011). Understanding the determinants of business process modeling in organizations. *Business Process Management Journal*, *Vol. 17 No. 4*, pp. 639-662.

Eisenhardt, K. M., and Martin, J. A. (2000). Dynamic capabilities: what are they? *Strategy Management Journal, Vol. 21*, pp. 1105–1121.

Elzinga, J. D, Horak, T., Lee, C-Y., and Bruner, C. (1995). Business Process Management: Survey and Methodology. *IEEE Transactions on Engineering Management, Vol. 42 No. 2*, pp. 119-128.

Emery, F. (1959). Characteristics of socio-technical systems. *Document No. 527*, London, Tavistock Institute.

Engeström, Y. (1999). Activity theory and individual and social transformation. In *Perspectives on activity theory*. Y. Engeström, R. Miettinen, and R.-L. Punamäki (Eds). Cambridge: Cambridge University Press, pp. 19-38.

Engeström, Y. (2007). From communities of practice to mycorrhizae. In *J. Hughes, N. Jewson & L. Unwin (Eds.), Communities of practice: Critical perspectives*, London: Routledge, pp. 41–54.

Enright, M. J., and Subramanian, V. (2007). An Organizing Framework for MNC Subsidiary Typologies. *Management International Review*, *Vol. 47 No. 6*, pp. 895-924.

Felin, T., and Foss, N. (2005). Strategic organization: A field in search for micro-foundations. *Strategic Organization, Vol. 3 No. 4,* pp. 441-455.

Fiedler, F. (1964). A contingency model of leadership effectiveness. In *Advances in experimental social psychology, Vol. 1.*, New York: Academic Press, pp. 149–190.

Filipowska, A., Kaczmarek, M., Kowalkiewicz, M., Zhou, X., and Born, M. (2009). Procedure and guidelines for evaluation of BPM methodologies. *Business Process Management Journal*, *Vol. 15 No. 3*, pp. 336-357.

Fingar, P. (2006). The MBA is dead, long live the MBI. *BPTrends,* available at: www.bptrends.com/publicationfiles/12-06-COL-ExtCompetition-MBI-Fingar.pdf, accessed April 2013.

Fisher, D. M. (2004). The business process maturity model: a practical approach for identifying opportunities for optimization. *BPTrends, Vol. 9 No. 4*, available at http://www.bptrends.com/publicationfiles/10-04%20ART%20BP%20Maturity%20Model%20-%20Fisher.pdf, accessed April 2013.

Fleischer, J., Herm, M., and Ude, J. (2007). Business Capabilities as configuration elements of value added networks. *Production Engineering, Vol. 1 No. 2,* pp. 187-192.

Flint, D. J., Woodruff, R. B., and Gardial, F. S. (2002). Exploring the phenomenon of customers' desired value change in a business-to-business context. *Journal of Marketing, Vol. 66 No. 4*, pp. 102-17.

Flynn, B. B., Schroeder, R. G., and Sakakibara, S. (1994). A framework for quality management research and an associated measurement instrument. *Journal of Operations Management, Vol. 11 No. 4*, pp. 339-66.

Freeman, R. E. (1984). *Strategic Management: A Stakeholder Approach*. Pitman, Boston, MA.

Friedman, T., Beyer, M. A., and Thoo, E. (2009). Magic Quadrant for Data Integration Tools. *Gartner Research, Vol. ID Number: G00171986*, Stamford, CT.

Frye, D. W., and Gulledge, T. R. (2007). End-to-end business process scenarios. *Industrial Management & Data Systems, Vol. 107 No. 6*, pp. 749-761.

Galbraith, J. R. (2005). *Designing the Customer Centric Organization: A Guide to Strategy, Structure, and Process*. Jossey-Bass, A Wiley Imprint, San Francisco.

Gantt, H. (1919). *Organizing for Work*. Harcourt, Brace & Hove, New York.

Gebauer, J., and Lee, F. (2008). Enterprise System Flexibility and Implementation Strategies: Aligning Theory with Evidence from a Case Study. *Information Systems Management, Vol. 25 No. 1*, pp. 71–82.

Gersh, M., Hewing, M., and Schöler, B. (2011). Business Process Blueprinting – an enhanced view on process performance. *Business Process Management Journal, Vol. 17 No. 5*, pp. 732-747.

Gilbreth, F. B. (1914). *Primer of scientific management*. Van Nostrand, New York.

Gilbreth, F. B., and Gilbreth, L. (1916). *Fatigue Study*. Sturgis and Walton, New York.

Gittel, J. H., Seidner, R., and Wimbush, J. (2010). A Relational Model of How High-Performance Work System Work. *Organizational Science, Vol. 21 No. 2,* pp. 490-506.

Glushko, R. J., and Tabas, L. (2009). Designing service systems by bridging the "front stage" and "back stage". *Information Systems and e-Business Management, Vol. 7 No. 4,* pp. 407-427.

Goldenberger, B. (2006). Business Processes Must Precede Technology. *CRM Magazine, Vol. 10 No. 10*, pp. 16-16.

Goncalves, J. E. L. (2000). Processo, que processo? *Revista de Administracao de Empresas*, *Vol. 40*, pp. 8-19.

González, L., S., Rubio, F., G., González, F., R., and Velthuis, P., V. (2010). Measurement in business processes: a systematic review. *Business Process Management Journal*, *Vol. 16 No. 1*, pp. 114 – 134.

Goodhue, D., and Thompson, R. (1995). Task–technology fit and individual performance. *MIS Quarterly, Vol. 19 No. 2*, pp. 213–236.

Goodhue, D. L., Wixom, B. H., and Watson, H. J. (2002). Realizing business benefits through CRM: hitting the right target in the right way. *MIS Quarterly Executive, Vol. 1 No. 2*, pp. 79-94.

Greenberg, P. (2001). *CRM at the speed of light.* McGraw-Hill , Berkeley, USA.

Gregor, S. (2006). The Nature of Theory in Information Systems, *MIS Quarterly*, *Vol. 30 No. 3*, pp. 611-642.

Grisdale, W., and Seymour, L. F. (2011). Business Process Management Adoption: A Case Study of a South African Supermarket Retailer. *In: SAICSIT '11, October 3–5*, Cape Town, South Africa.

Groznik, A., and Kovacic, A. (2002). Business Renovation: From Business Process Modelling to Information System Modelling. In *24th Int. Conf. Information Technology Interfaces IT1 2002*, June 24-27, Cavtat, Croatia, pp. 405-409.

Groznik, A., Kovacic, A., and Trkman, P. (2008). The role of business renovation and informatization in E-government. *Journal of Computer Information Systems*, *Vol. 49 No. 1,* pp. 80–88.

Grönroos, C. (2006). Adopting a service logic for marketing. *Marketing Theory, Vol. 6 No. 3*, pp. 1–16.

Gulati, R. (2009). *Re-organize for Resilience: Putting Customers at the Center of Your Business*. Harvard Business Press, USA.

Gulati, R., and Gilbert, S. J. (2010). The Outside-In Approach to Customer Service, Q&A with Ranjai Gulait. *Harvard Business School*, available at: http://hbswk.hbs.edu/item/6201.html, accessed July 2011.

Guo-shuang, T., and Liang, Q. (2008). An improved framework of business process management system which integrating the strategy management. In *15th Annual Conference Proceedings of Management Science and Engineering, Long Beach, USA,* IEEE, pp. 256 – 261.

Hamel, G., and Prahalad, C. (1996). *Competing for the Future*. Paperback ed., Harvard Business School Press, Boston, MA.

Hammer, M. (1990). Reengineering Work - Don't Automate, Obliterate. *Harvard Business Review*, *Vol. 68*, pp. 104-112.

Hammer, M. (2007). The Process Audit. *Harvard Business Review*, April 2007, pp. 111-123.

Hammer, M., and Champy, J. (1993). *Reengineering the Corporation: A Manifesto for Business Revolution*. Harper Business Press, New York, NY.

Hammer, M., and Champy, J. (2001), *Reengineering the corporation: A manifesto for business revolution*. Nicholas Brealy Publishing, London.

Hammer, M., and Stanton, S. (1999). How process enterprises really work. *Harvard Business Review*, *No. 77 Vol. 6*, pp. 108–118.

Han, J. K., Namwoon, K., and Srivastava, R. K. (1998). Market orientation and organizational performance: Is innovation a missing link? *Journal of Marketing, Vol. 62 No. 4,* pp. 30-45.

Harmon, P. (2007). *Business Process Change: A Guide for Business Managers and BPM and Six Sigma Professionals*. Second edition, Morgan Kaufmann publishers, USA.

Harmon, P. (2009). Process Maturity Models. *BPTrends*, available at http://www.businessprocesstrends.com/publicationfiles/spotlight%5F051909%2Epdf, accessed August 2010.

Harmon, P. (2010). BPM Product Report Introduction and Overview. *BPTrends*, available at: www.bptrends.com, accessed February 2012.

Helfat, C., Finkelstein, S., Mitchell, W., Peteraf, M., Singh, H., Teece, D. J., and Winter, S. (2007). *Dynamic capabilities: Understanding strategic change in organizations.* London: Blackwell.

Henderson, J. C., and Venkatraman, N. (1989). Strategic alignment: a process model for integrating information technology and business strategies. *Sloan working paper*, Massachusetts Institute of Technology, Cambridge, MA.

Henderson, J. C., and Venkatraman, N. (1993). Strategic alignment: Leveraging information technology for transforming organizations. *IBM Systems Journal*, *Vol. 32 No. 1*, pp. 4-16.

Henderson, R. M., and Clark, K. B. (1990). Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms. *Administrative Science Quarterly, Vol. 35 No. 1*, pp. 9-30.

Herbsleb, J. D., and Goldenson, D. R. (1996). A Systematic survey of CMM experience and results. *ICSE-18*, pp. 323-330.

Hertz, S., and Vilgon, M. (2002). The 'Burden' of key customer relationships. In *Proceedings Business to Business Symposium organised by Australian and New Zealand Marketing Academy.*

Hill, J., Lhereux, B., Olding, E., Plummer, D., Rosser, B., and Sinur, J. (2009). Predicts 2010: Business Process Management Will Expand Beyond Traditional Boundaries. *Gartner Research Number G00172856*, Stamford, CT.

Hill, J. B., Sinur, J., Flint, D. and Melenovsky, M. J. (2006). Gartner's position on business process management. *ID Number: G00136533*.

Hillman, A. J., and Keim, G. D. (2001). Shareholder value, stakeholder management, and social issues: What's the bottom line? *Strategic Management Journal*, *Vol. 22*, pp. 125-139.

Holland, C. P., and Light, B. (2001). A stage maturity model for enterprise resource planning systems use. *The DATA BASE for Advances in Information Systems*, *Vol. 32*, pp. 34–45.

Houy, C., Fettke, P., and Loos, P. (2010). Empirical research in business process management – analysis of an emerging field of research. *Business Process Management Journal, Vol. 16 No. 4*, pp. 619-661.

Huczynski, A. A., and Buchanan, D. A. (1985). *Organizational Behaviour: An Introductory Text (2nd edition).* Prentice Hall International Ltd., 1985, 1991, UK.

Hung, R. (2006). Business process management as competitive advantage: A review and empirical study. *Total Quality Management & Business Excellence*, *Vol. 17 No. 1*, pp. 21–40.

IBM (1999). The journey begins: Developing a customer-envisioned, ideal business. IBM.

IBM (2008). The Enterprise of the Future: The IBM Global CEO Study, IBM Global Business Services, 2008; *IBM, Making Change Work. Continuing the Enterprise of the Future Conversation*, IBM Global Business Services.

IBM (2009a). *Making Change Work*. IBM, available at: http://www-935.ibm.com/services/us/gbs/bus/pdf/gbe03100-usen-03-making-change-work.pdf, accessed April 2010.

IBM (2009b). Aligning Business Process Management, Service-Oriented Architecture, and Lean Six Sigma for Real Business Results. *IBM Business Papers: Business Process Management Series, IBM Redbooks publications,* available at: http://www.redbooks.ibm.com/redpapers/pdfs/redp4447.pdf, accessed August 2011.

IDSScheerAG (2004). *Whitepaper: ARIS Value Engineering Concept*. IDS Scheer AG, Saarbruchen, Germany.

Iivari, J. (1992). The organizational fit of information systems. *Information Systems Journal, Vol. 2 No. 1*, pp. 3–29.

Indulska, M., Chong, S., Bandara, W., Sadiq, S., and Rosemann, M. (2006). Major issues in Business Process Management: An Australian Perspective. In *17th Australasian Conference on Information, Spencer, S., Jenkins, A. (Eds.), paper presented at 17th Australasian Conference on Information Systems, Australasian Association for Information Systems, Adelaide.*

Iveroth, E. (2010). A Framework for the Practice of Leading Global IT-Enabled Change. *California Management Review*, *Vol. 53 No. 1*, pp. 136-153.

Jarvenpaa, S., and Stoddard, D. (1998). Business process redesign: Radical and evolutionary change. *Journal of Business Research*, *Vol. 41 No. 1*, pp. 15-27.

Jaworski, B. J., and Kohli, A. K. (1996). Market orientation: review, refinement and roadmap. *Journal of Market Focused Management, Vol. 1 No. 2*, pp. 119-35.

Jeston, J., and Nelis, J. (2008a). *Business Process Management: Practical Guidelines to Successful Implementation*. Elsevier Ltd, NY.

Jeston, J., and Nelis, J. (2008b). *Management By Process: A Roadmap to Sustainable Business Process Management*, Elsevier Ltd, NY.

Jesus, L., Maciera, A., Karrer, D., and Rosemann, M. (2009). A Framework for a BPM Centre of Excellence. BPTrends, September 2009, available at: http://www.bptrends.com/publicationfiles/FOUR%2009-09-ART-Framework%20for%20BPM%20Ctr%20Excellence-Jesus%20et%20al.pdf, accessed March 2010.

Johannsen, F., Leist, S., and Zellner, G. (2010). Six sigma as a business process management method in services: analysis of the key application problems. *Information Systems and e-Business Management, Vol. 9 No. 3,* pp. 307-332.

Johnson, G., Kuman, A., and Ramaprasad, A. (2000). Technology-based marketing in the healthcare industry: implications for relationships between players in the industry. In *Eder, L.B. (Eds), Managing Healthcare Information Systems with Web-Enabled Technologies*, Idea Group Publishing, Hershey, London, pp. 30-44.

Järvinen, P. (2004). *On research methods*. Opinpajan kirja, Tampere, Finland.

Järvinen, P. (2007). On Reviewing of Results in Design Research (2007*). ECIS 2007 Proceedings, Paper 72*, available at: http://aisel.aisnet.org/ecis2007/72/, accessed April 2013.

Järvinen P. (2012). *On Research Methods*. Tampere: Opinpajan kirja, Tampere, Finland.

Kalleberg, R. (1995) Action research as science and profession in the discipline of sociology, draft.

Kanter, R. (1983) *Change Masters*. Simon and Schuster, New York.

Kaplan, R. S., and Norton, D. P. (1992). The Balanced Scorecard – Measures that Drive Performance. *Harvard Business Review, Vol. 70,* pp. 71-90.

Kaplan, R. S., and Norton, D. P. (2004). The strategy map: guide to aligning intangible assets. *Strategy & Leadership, Vol. 32 No. 5*, pp. 10-17.

Kaplan, R. S. (2005). How the balanced scorecard complements the McKinsey 7-S model. *Strategy & Leadership, Vol. 33 No. 3*, pp. 41 – 46.

Kaplan, R. S., and Norton, D. P. (2008). Mastering the Management System. *Harvard Business Review, Vol. 86 No. 1,* pp. 62-77.

Karim, J., Somers, T., and Bhattacherjee, A. (2007). The impact of ERP implementation on business process outcomes: A factor-based study. *Journal of Management Information Systems*, *Vol. 24 No. 1*, pp. 101–134.

Karsten, H. (1999) Collaboration and collaborative information technologies: a review of the evidence. *ACM SIGMIS Database - Special issue on information systems: current issues and future changes Homepage archive, Vol. 30 No. 2*, pp. 44-65.

Kersten, B., and Verhoef, C. (2003). IT portfolio management: a banker's perspective on IT. *Cutter IT Journal*, *Vol. 16 No. 4*, pp. 34-40.

Kettinger, W. J., Teng, J. T. C., and Guha, S. (1997). Business Process Change: A Study of Methodologies, Techniques, and Tools. *MIS Quarterly*, *Vol. 21 No. 1*, pp. 55-80.

King, J. L., and Kraemer, K. L. (1984). Evolution and organizational information systems: an assessment of Nolan's stage model. *Communications of the ACM, Vol. 27 No. 5,* pp. 466-75.

Kirchmer, M. (2010). *High Performance Through Process Excellence*. Springer-Verlag, Berlin, Heidelberg.

Kitchenham, B., Brereton, O. P., Budgen, D., Turner, M., Bailey, J., and Linkman, S. (2009). Systematic literature reviews in software engineering – A systematic literature review. *Information and Software Technology, Vol. 51 No. 1,* pp. 7-15.

Kitchenham, B., and Charters, S. (2007). *Guidelines for Performing Systematic Literature Reviews in Software Engineering*. Keele University and University of Durham, Keele, Technical Report.

Klassen, R. D., and Menor, L. J. (2007). The process management triangle: An empirical investigation of process trade-offs. *Journal of Operations Management, Vol. 25 No. 5,* pp. 1015–1034.

Klievnik, B., and Janssen, M. (2009). Realizing joined-up government — Dynamic capabilities and stage models for transformation. *Government Information Quarterly, Vol. 26 No. 2*, pp. 275–284.

Knothe, T., Kahl, T., Boell, D., and Schneider, K. (2007). Framework for Establishing Enterprise Modeling in the Context of Collaborative Enterprises. In *Proceedings of the 43rd Hawaii International Conference on System Sciences – 2007*, IEEE, pp. 1-10.

Ko, R., Lee, S., and Lee, E. (2009). Business process management (BPM) standards: a survey. *Business Process Management Journal*, *Vol. 15 No. 5*, pp. 744-791.

Kock, N. (2004). The psychobiological model: Towards a new theory of computer-mediated communication based on Darwinian evolution. *Organization Science, Vol. 15 No. 3*, pp. 327-348.

Kohlbacher, M. (2010). The effects of process orientation: a literature review. *Business Process Management Journal*, *Vol. 16 No. 1*, pp. 135-152.

Kohli, A. K., and Jaworski, B. J. (1990). Market orientation: The construct, research propositions and managerial implications. *Journal of Marketing*, *Vol. 54 No. 2*, pp. 1-18.

Komulainen, H., Mainela, T., Tähtinen, J., and Ulkuniemi, P. (2008). Retailer's different value perceptions of mobile advertising service. *International Journal of Service Industry Management, Vol. 18 No. 4*, pp. 368-93.

Korherr, B., and List, B. (2007). *Extending the EPC with performance measures*. Paper presented at the ACM Symposium on Allied Computing.

Kotter, J. (1995). Leading change: Why transformation efforts fail. *Harvard Business Review*, *Vol. 73 No. 2,* pp. 59–67.

Kumar, R. L. (2004). A framework for assessing the business value of information technology infrastructures. *Journal of Management Information Systems, Vol. 21 No. 2,* pp. 11–32.

Küng, P., and Hagen, C. (2007). The fruits of Business Process Management: an experience report from a Swiss bank. *Business Process Management Journal*, *Vol. 13 No. 4*, pp. 477 – 487.

Kvale, S. (1983). The qualitative research interview – A phenomenological and a hermeneutical mode of understanding. *Journal of Phenomenological Psychology, Vol. 14 No. 2*, pp. 171-196.

Lahrmann, G., Marx, F., Winter, R., and Wortmann, F. (2010). Business intelligence maturity models: an overview. In*: D'Atri A, Ferrara M, George JF, Spagnoletti P (eds) VII conference of the Italian chapter of AIS (itAIS 2010*), Italian chapter of AIS, Naples.

Lamberg, H. (2008). *Creating Relational Customer Orientation: Analyzing change process within a professional high-tech organization.* Academic dissertation, University of Tampere, Department of Management Studies, Finland, http://granum.uta.fi/granum/index.php.

Landry, M., and Banville, C. (1992). A Disciplined Methodological Pluralism for MIS Research. *Accounting, Management and Information Technologies*, *Vol. 2 No. 2*, pp. 77-97.

Laudon, K., and Laudon, J. (Eds.) (2000). *Management Information Systems: Organization and Technology in the Networked Enterprise*. 6th Edition, Englewood Cliffs, Prentice Hall, New Jersey.

Lee, A. L. (1989). A Scientific Methodology for MIS Case Studies. *MIS Quarterly, Vol. 13 No. 1,* pp. 33-50.

Lee, A. L., and Baskerville, R. L. (2003). Generalizing Generalizability in Information Systems Research. *Information Systems Research, Vol. 14 No. 3,* pp. 221-243.

Lee, S. M., Luthans, F., and Olson, D. L. (1982). A management science approach to contingency models of organizational structure. *Academy of Management Journal, Vol. 25 No. 3*, pp. 553-66.

Legner, C., and Heutschi, R. (2007). SOA adoptions in practice: findings from early SOA implementations. In *Proceedings of European Conference on Information Systems (ECIS)*, St Gallen, Switzerland, June, pp. 1643-54.

Leonard-Barton, D. (1992). Core capabilities and core rigidities: a paradox in managing new product development. *Strategic Management Journal*, *Vol. 13 No. 11*, pp. 111-125.

Lewin, K. (1948). *Resolving Social Conflicts.* Harper & Brothers, New York.

Lewin, K. (1958). Group decision and social change. In *Readings in Social Psychology.* Maccoby, E., Newcomb, T., and Hartley, E*.,* New York, Holt, Rinehart and Winston.

Lin, A., and Cornford, T. (2000). Framing Implementation Management. *Proceedings of the Twentyfirst International Conference on Information Systems – ICIS 2000 (Dec. 10-13, Brisbane, Australia)*, pp. 197-205.

Lindfors, C. (2003). Process orientation: an approach for organizations to function effectively. Available at: cic.vtt.fi/lean/singapore/LindforsFinal.pdf, accessed April 2013.

Lockamy, A., and McCormack, K. (2004). The development of a supply chain management process maturity model using the concepts of business process orientation. *Supply Chain Management: An International Journal*, *Vol. 9 No. 4*, pp. 272–8.

Lockamy, A., and Smith, W. (1997). A strategic alignment approach for effective business process reengineering: linking strategy, processes and customers for competitive advantage. *International Journal of Production Economics, Vol. 50 No. 2–3,* pp. 141-153.

Loveman, G. W. (1998). Employee satisfaction, customer loyalty, and financial performance: an empirical examination of the service profit chain in retail banking. *Journal of Service Research, Vol. 1 No. August*, pp. 18-31.

Lupton, T. (1971). *Management and the Social Sciences (second edition).* Penguin books, Harmondsworth.

Luthans, F. (1976). *Introduction to Management: A Contingency Approach*. McGraw-Hill, New York, NY.

Lyytinen, K., and Newman, M. (2008). Explaining information systems change: a punctuated socio-technical change model. European Journal of Information Systems, *Vol. 17 No. 4*, pp. 589-613.

Lyytinen, K., Mathiassen, L., and Ropponen, J. (1996). A framework for software risk management. *Journal of Information Technology, Vol. 11 No. 4*, pp. 275-87.

Mackay, D., Bititci, U., and Ates, A. (2008). Delivering sustained performance through a structured business process approach to management. *Measuring Business Excellence*, *Vol. 12 No. 4*, pp. 22-37.

Malekzadeh, A. R. (1998). Diversity, integration, globalization and critical thinking in the upper division. *Journal of Management Education, Vol. 22 No. 5*, pp. 590-603.

Mangan, J., and Christopher, M. (2005). Management development and the supply chain manager of the future. *International Journal of Logistics Management*, *Vol. 16 No. 2*, pp. 178 - 191.

Markus, M. L. (2004). Technochange management: using IT to drive organizational change. *Journal of Information Technology, Vol. 19 No. 1*, pp. 4-20.

Markus, M. L., and Robey, D. (1983). The Organizational Validity of Management Information Systems. *Human Relations, Vol. 36 No. 3*, pp. 203-225.

Marnewick, C., and Labuschagne, L. (2005). A conceptual model for enterprise resource planning (ERP). *Information Management & Computer Security*, *Vol. 13 No. 2*, pp. 144-55.

Martin, I., and Cheung, Y. (2005). Business process re-engineering pays after enterprise resource planning. *Business Process Management Journal, Vol. 11 No. 2*, pp. 185 – 197.

Martin, J., and Odell, J. (1998). *Object-Oriented Methods: A Foundation – UML Edition*, Prentice-Hall, Englewood Cliffs, NJ.

Martin, R. (2010). The Age of Customer Capitalism. *Harvard Business Review, Vol. 88 No. 1/2*, pp. 58-65.

Maull, R. S., Tranfield, D. R., and Maull, W. (2003). Factors characterizing the maturity of BPR programmes. *International Journal of Operations and Production Management*, *Vol. 26 No. 6*, pp. 596-624.

McAdam, R. (2001). Fragmenting the function-process interface: The role of process benchmarking. *Benchmarking: An International Journal*, *Vol*. *8 No. 4*, pp. 332-348.

McCormack, K. (2001). Business process orientation: do you have it? *Quality Progress*, *Vol. 34*, pp. 51-58.

McCormack, K. (2007). *Business Process Maturity: Theory and Application*. DRK Research, Raleich, NC.

McCormack, K., and Johnson, W. (2000). *Business Process Orientation: Gaining the E-business Competitive Advantage.* St. Lucie Press, Delray Beach, FL.

McCormack, K., and Johnson, B. (2001). Business process orientation: supply chain management, and the e-corporation. *IIE Solutions*, *Vol. 33 No. 10*, pp. 33-37.

McCormack, K., and Rauseo, N. (2005). Building an enterprise process view using cognitive mapping. *Business Process Management Journal*, *Vol. 11 No. 1*, pp. 63-74.

McCormack, K., Ladeira, M. B., and deOliveira, M. P. V. (2008). Supply chain maturity and performance in Brazil. *Supply Chain Management: An International Journal*, *Vol. 13*, pp. 272-282.

McCormack, K., Willems, J., van den Bergh, J., Deschoolmeester, D., Willaert, P., Štemberg, M., Škrinjar, R., Trkman, P., Ladeira, B., de Oliveira, M., Vuksic, V., and Vlahovic, N. (2009). A global investigation of key turning points in business process maturity. *Business Process Management Journal*, *Vol. 15 No. 5*, pp. 792-815.

McKay, J., and Marshall, P. (2001). The dual imperatives of action research. *Information Technology & People*, *Vol. 14 No. 1*, pp. 46-59.

McKitterick, J. (1957). *What is the marketing thought and action?* American Marketing Association, Chicago, IL, pp. 71-82.

McManus, J. (2001). Risk in software projects. *Management Services, Vol. 45 No. 10,* pp. 6-10.

Melão, N., and Pidd, M. (2000). A conceptual framework for understanding business processes and business process modeling. *Information Systems Journal*, *Vol. 10*, pp. 105–129.

Melenovsky, M. J. (2005). Align roles and responsibilities to make BPM work. *Gartner Research, Report number G00127680,* Stamford, CT.

Melenovsky, M. J., and Hill, J. B. (2006). Role definition and organizational structure: business process improvement. Gartner Research, *Report Number G00141487*, Stamford, CT.

Melenowski, M., and Sinur, J. (2006). Having a BPM Maturity Model is Important for Long Lasting BPM Success. *Business Rules Journal*, *Vol. 7*, available at: http://www.BRCommunity.com/a2006/b325.html, accessed June 2010.

Mendling, J. (2009). B*usiness process management metrics for process models*. *Springer, Vol. 6,* Berlin, Heidelberg, pp. 1–15.

Meredith, J. (1998). Building operations management theory through case and field research. *Journal of Operations Management, Vol. 16*, pp. 441–454.

Miers, D. (2006). Best Practice BPM. *ACM Queue, Vol. 4 No. 2*, pp. 41-48.

Mumford, E. (2000). A socio-technical approach to systems design. *Requirements Engineering, Vol. 5*, *Springer, London*, pp. 125-133.

Mumford, E. (2001). Advice for an action researcher. *Information Technology & People, Vol. 14 No. 1*, pp. 12 – 27.

Mumford, E. (2003). *Redesigning Human Systems*. Idea Group, New York, NY.

Mumford, E. (2006). The story of socio-technical design: Reflections on its successes, failures and potential. *Information Systems Journal, Vol. 16 No. 4, pp.* 317-342.

Nah, F-H. F., Lau, J. L-S., and Kuan, J. (2001). Critical factors for successful implementation of enterprise systems. *Business Process Management Journal*, *Vol. 7 No. 3*, pp. 285-296.

Narver, J. C., and Slater, S. F. (1990). The effect of market orientation on business profitability. *Journal of Marketing, Vol. 54 No. 4*, pp. 20-35.

Neely, A., Mike, G., and Platts, K. (1995). Performance measurement system design: a literature review and research agenda. *International Journal of Operations & Production Management, Vol. 15 No. 4*, pp. 80-116.

Nelson, M. L., Peterson, J., Rariden, R. L., and Sen, R. (2010). Transitioning to a business rule management service model: Case studies from the property and casualty insurance industry. *Information Management, Vol. 47,* pp. 30-41.

Neubauer, T. (2009). An empirical study about the status of business process management. *Business Process Management Journal*, *Vol. 15 No. 2*, pp. 166-183.

Nevo, S., and Wade, M. R. (2010). The formation and value of IT-enabled resources: antecedents and consequences of synergistic relationships. *MIS Quarterly, Vol. 34 No. 1,* pp. 163-183.

Newell, S., Pan, S. L, Galliers, R. D., and Huang, J. C. (2001). The Myth of the Boundaryless Organization. *Communications of the ACM, Vol. 44 No. 12*, pp. 74-76.

Newell, S., Swan, J. A., and Galliers, R. D. (2000). A knowledge-focused perspective on the diffusion and adoption of complex information technologies: The BPR example. *Information Systems Journal, Vol. 10 No. 3*, pp. 239–259.

Ngo, L. V., and O'Cass, A. (2010). Value creation architecture and engineering: A business model encompassing the firm-customer dyad. *European Business Review, Vol. 22 No. 5*, pp. 496-514.

Niehaves, B. (2010). Open process innovation: The impact of personnel resource scarcity on the involvement of customers and consultants in public sector BPM. *Business Process Management Journal*, *Vol. 16 No. 3*, pp. 377-393.

Niehaves, B., and Plattfaut, R. (2011). Collaborative business process management: status quo and quo vadis. *Business Process Management Journal, Vol. 17 No. 3*, pp. 384-402.

Niiniluoto, I. (1980). *Johdatus tieteenfilosofiaan – käsitteen ja teorianmuodostus*. Otava, Helsinki (in Finnish).

Noble, C. H. and Rajiv, K. S., and Kumar, A. (2002). Market orientation and alternative strategic orientations: A longitudinal assessment of performance implications. *Journal of Marketing, Vol. 66 No. 4,* pp. 25-40.

Nolan, R. L. (1979). Managing the crises in data processing. *Harvard Business Review, Vol. 57,* pp. 115–126.

Normann, R. (1984). *Service Management.* John Wiley & Sons, New York.

Nørreklit, H. (2000). The Balanced Scorecard a critical analysis of some of its assumptions. *Management Accounting Research, Vol. 11 No. 1*, pp. 65-88.

Nørreklit H. (2003). The Balanced Scorecard: what is the score? A rhetorical analysis of the Balanced Scorecard. *Accounting, Organizations and Society*, *Vol. 28 No. 6*, pp. 591-619.

Nurcan, S., and Rolland, C. (2003). A multi-method for defining the organisational change. *Information and Software Technology, Vol. 45 No. 2*, pp. 61-82.

Nurcan, S., Etien, A., Kaabi, R., Zoukar, I., and Rolland, C. (2005). A strategy driven business process modelling approach. *Business Process Management Journal*, *Vol. 11 No. 6*, pp. 628-649.

OASIS (2006). Reference Model for Service Oriented Architecture 1.0. *OASIS Standard*, available at: http://docs.oasis-open.org/soa-rm/v1.0/soa-rm.html, accessed February 2010.

Ohno, T. (1988). *Toyota Production System: Beyond Large-scale Production*. Productivity Press Inc., Portland.

Okoli, C. (2012). A Critical Realist Guide to Developing Theory with Systematic Literature Reviews, John Molson School of Business, Concordia University; Montreal, Canada, *Working Paper,* August 2012.

Olsen, K., and Saetre, P. (2007). IT for niche companies: is an ERP system the solution? *Information Systems Journal, Vol. 17 No. 1*, pp. 317-342.

Olve, N., Roy, J., and Wetter, M. (1999). *Performance Drivers: A Practical Guide to Using the Balanced Scorecard.* John Wiley & Sons, Chichester.

OMG (2008). Business Process Maturity Model. *Version 1.0, OMG standard*, available at: http://www.omg.org/spec/BPMM/1.0/PDF, accessed June 2010.

Oquist, P. (1978). The epistemology of action research. *Acta Sociologica*, *Vol. 21*, pp. 143-165.

Orlikowski, W. J. (1992). Learning from Notes: Organizational Issues in Groupware Implementation. *Proceedings of the Conference on Computer-Supported Cooperative Work – CSCW'92 (Oct. 31- Nov. 4, Toronto, Canada). ACM, N. Y.,* pp. 362-369.

Orlikowski, W. J. (2000). Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations. *Organization Science, Vol. 11 No. 4,* pp. 404-428.

Orlikowski, W. J., and Hofman, D. (1997). An improvisational model for change management: The case of Groupware technologies. *Sloan Management Review, Vol. 38 No. 2*, pp. 11-22.

Orlikowski, W. J., and Iacono, C. S. (2001). Research Commentary: Desperately Seeking the "IT" in IT Research - A Call to Theorizing the IT Artifact? *Information Systems Research, Vol. 12 No. 2*, pp. 121-134.

Osarenkhoe, A., and Bennani, A-E. (2007). An exploratory study of implementation of customer relationship management strategy. *Business Process Management Journal, Vol. 13 No. 1*, pp. 139-164.

Paim, R., Caulliraux, H. M., and Cardoso, R. (2008). Process management tasks: a conceptual and practical view. *Business Process Management Journal*, *Vol. 14 No. 5*, pp. 694-723.

Paim, R., Nunes, V., Pinho, B., Santoro, F., Cappelli, C., and Baino, F. (2009). Structuring a process management centre of excellence. In *SAC '09: Proceedings of the 2009 ACM symposium on Applied Computing, Honolulu, Hawai,* ACM, New York, USA, pp. 281- 282.

Palanisamy, R., and Sushil (2003). Measurement and enablement of information systems for organizational flexibility: An empirical study. *Journal of Services Research*, *Vol. 3 No. 2*, pp. 82–103.

Palmberg, K. (2009). Exploring process management: are there any widespread models and definitions? *The TQM Journal*, *Vol. 21 No. 2*, pp. 203-15.

Palmberg, K. (2010). Experiences on implementing process management: a multiple-case study. *Business Process Management Journal*, *Vol. 16 No. 1*, pp. 93-113.

Papp, R. (1999). Business-IT alignment: productivity paradox payoff? *Industrial Management & Data Systems, Vol. 99 No. 8*, pp. 367 – 373.

Parker, C. (2000). Performance measurement. *Work Study, Vol. 49 No. 2*, pp. 63 – 66.

Pasmore, W. A. (1988). *Designing Effective Organizations: The Socio-technical Systems Perspective.* John Wiley & Sons, USA.

Pasmore, W. A. (1995). Social science transformed: The socio-technical perspective. *Human Relations, Vol. 48 No. 1,* pp. 1–21.

Pasmore, W. A, Francis, C., Haldeman, J., and Shani, A. (1982). A North American reflection on empirical studies of the seventies. *Human Relations, Vol. 35 No. 12,* pp. 1179-1204.

Paulk, M. C., Curtis, B., Chrissis, M. B., and Weber, C. V. (1993). *The Capability Maturity for Software. Version 1.1 (No. CMU / SEI.93-TR-24)*. Software Engineering Institute.

Peng, W., Sun, T., Revankar, S., and Li, T. (2012). Mining the "voice of the customer" for business prioritization. *ACM Transactions on Intelligent Systems and Technology (TIST), Vol. 3 No. 2, Article 38 (February 2012),* 17 pages.

Phelps, R., Adams, R., and Bessant, J. (2007). Life cycles of growing organizations: A review with implications for knowledge and learning. *International Journal of Management Reviews*, *Vol. 9 No. 1*, pp. 1-30.

Pohle, G., and Chapman, M. (2006). IBM's global CEO report 2006: business model innovation matters. *Strategy and Leadership*, *Vol. 34*, pp. 34-40.

Porter, M. (1980). *Competitive Strategy*. Free Press, New York.

Power, B. (2007). Michael Hammer's Process and Enterprise Maturity Model. *BPTrends,* available at: http://www.bptrends.com/publicationfiles/07-07-ART-HammersPEMM-Power-final1.pdf, accessed August 2010.

Prager, K. P. (1996). Managing for flexibility. *Information Systems Management, Vol. 13 No. 4*, pp. 41–47.

Prahalad, C. K., and Krishnan, M. S. (2008). *The New Age of Innovation- Driving Co-Created Value Through Global Networks.* The MacGraw-Hill Companies, Inc., USA.

Prahalad, C. K., and Ramaswamy, V. (2004). *The Future of Competition.* Harvard Business School Publishing, Boston, Massachusetts.

Pritchard, J-P., and Armistead, C. (1999). Business process management - lessons from European business. *Business Process Management Journal, Vol. 5 No. 1*, pp. 10-32.

Pynnönen, M., Ritala, P., and Hallikas, J. (2011). The new meaning of customer value: a systemic perspective. *Journal of Business Strategy, Vol. 32 No. 1*, pp. 51-57.

Quesada, H., and Gazo, R. (2007). Methodology for determining key internal business processes based on critical success factors: A case study in furniture industry. *Business Process Management Journal, Vol. 13 No. 1,* pp. 5-20.

Quinn, F. (2004). People, process, technology. *Supply Chain Management Review*, January/February, pp. 3-3.

Quinn, R. E. (1984). Applying the Competing Values Approach to Leadership: Toward and Integrative Model. In J. G. Hunt, R. Stewart, C. Schiersheim, and D. Hosking (Eds.), *Managers and Leaders: An Internal Perspective*, Pergamon, New York.

Quinn, R. E. (1988). *Beyond Rational Management: Mastering the Paradoxes and Competing Demands of High Performance*. Jossey-Bass Inc., San Francisco, CA.

Quinn, R. E., Faerman, S. R., Thompson, M. P., and Grath, M. R. (1996). *Becoming a master manager - A competency framework.* (2nd edition), Wiley, New York.

Rapoport, R. (1970). Three Dilemmas in Action Research. *Human Relations, Vol. 23 No. 6*, pp. 499-513.

Ravesteyn, P., and Batenburg, R. (2010). Surveying the critical success factors of BPM-systems implementation. *Business Process Management Journal*, *Vol. 16 No. 3*, pp. 492-507.

Ravesteyn, P., and Versendaal, J. (2007). Success factors of business process management systems implementation. Paper presented at *Australasian Conference on Information Systems*, Toowoomba, December.

Ray, G., Barney, J., and Muhanna, W. (2004). Capabilities, business processes, and competitive advantage: choosing the dependent variable in empirical tests of the resource-based view. *Strategic Management Journal*, *Vol. 25 No. 1*, pp. 23–37.

Reijers, H. A. (2006). Implementing BPM systems: the role of process orientation. *Business Process Management Journal*, *Vol. 12 No. 4*, pp. 389 – 409.

Rhee, M., and Mehra, S. (2006). Aligning operations, marketing, and competitive strategies to enhance performance: An empirical test in the retail banking industry. *Omega, Vol. 34 No. 5*, pp. 505–515.

Rigby, D. K., Reichheld, F. F., and Schefter, P. (2002). Avoid the four perils of CRM. *Harvard Business Review*, *Vol. February,* pp. 101– 109.

Robson, I. (2004). From process measurement to performance improvement. *Business Process Management Journal, Vol. 10 No. 5*, pp. 510-521.

Rockart, J. F. (1979). Chief executives define their own data needs. *Harvard Business Review, Vol. 57 No. 2*, pp. 81–93.

Rolland, C., Souveyet, C., and Achour, C. B. (1998). Guiding goal modelling using scenarios. *IEEE Transactions on Software Engineering, Vol. 24 No. 12*, pp. 1055-71.

Rosemann, M., and vom Brocke, J. (2010). The six core elements of business process management. In *vom Brocke, J., and Rosemann, M. (Eds), Handbook on Business Process Management, Vol. 1,* Springer, New York, NY.

Rosemann, M., and de Bruin, T. (2005a). Towards a Business Process Management Maturity Model. *Proceedings of the 13th European Conference on Information Systems (ECIS 2005)*, Regensburg, Germany, 26 May 2005.

Rosemann, M., and de Bruin, T. (2005b). Application of a Holistic Model for determining BPM Maturity. *BPTrends*, available at: http://bpm-training.com/wp-content/uploads/2010/04/applicationholistic.pdf, accessed August 2010.

Rosemann, M., de Bruin, T., and Power, B. (2006). A model to measure business process management maturity and improve performance. In Jeston, J. and Nelis, J. (Eds.), *Business Process Management: Practical Guidelines to Successful Implementations*, Butterwoth Heinemann, Burlington, pp. 299-315.

Rosen, M. (2006). Where Does One End and the Other Begin. *BPTrends, January,* available at: http://www.bptrends.com/publicationfiles/01-06%20COL%20SOA%20-Where%20Does%20One%20End%20-%20Rosen.pdf, accessed August 2011.

Ross, J. E. (1995). *Total Quality Management: Text, Cases and Readings*. St. Lucie Press, Delray Beach.

Röglinger, M., Pöppelbuß, J., and Becker, J. (2012). Maturity models in business process management. *Business Process Management Journal, Vol. 18 No. 2*, pp. 328 – 346.

Sanchez, R., and Heene, A. (1997). Reinventing strategic management: New theory and practice for competence-based competition. *European Management Journal, Vol. 15 No. 3*, pp. 303-317.

Sandoe, K., Corbitt, G., and Boykin, R. (2001). *Enterprise Integration*. Wiley, New York, NY

Saxena, K. B. C. (2011). Business Process Management in a Smart Business Environment. Seminar presentation on 26.-29.9.2011, University of Tampere.

Saxena, K. B. C., and Bharadwaj, S. S. (2009). Managing business processes through outsourcing: a strategic partnering perspective. *Business Process Management Journal, Vol. 15 No. 5*, pp. 687-715.

Scarbrough, H., and Swan, J. (2001). Explaining the Diffusion of Knowledge Management: The Role of Fashion. *British Journal of Management, Vol. 12 No. 1*, pp. 3-12.

Scheer, A.-W. (2000). *ARIS - Business Process Modeling*. 3rd edition, Springer, Berlin, Germany.

Schimdt, K., and Bannon, L. (1992). Taking CSCW Seriously: Supporting Articulation Work. *Computer Supported Cooperative Work: The Journal of Collaborative Computing, Vol. 1 No. 1*, pp. 7-40.

Schneberger, S., Pollard, C., and Watson, H. (2009). Theories: For academics and practitioners. *Information Systems Management, Vol. 26 No. 1,* pp. 52-60.

Schurter, T., and Towers, S. (2006). *Customer Expectation Management: Success Without Exception.* Meghan-Kiffer Press, Tampa, Florida, USA.

Schwaninger, M. (2000). Managing Complexity—The Path Toward Intelligent Organizations. *Systemic Practice and Action Research, Vol. 13 No. 2*, pp. 207-241.

Schäfermeyer, M., Grgecic, D., and Rosenkranz, C. (2010). Factors Influencing Business Process Standardization: A Multiple Case Study. *Proceedings of the 43rd Hawaii International Conference on System Sciences – 2010*, IEEE, pp. 1-10.

Seddon, P. B., and Scheepers, R. (2012). Towards the improved treatment of generalizations of knowledge claims in IS research: drawing general conclusions from samples. *European Journal of Information Systems, Vol. 21 No. 1*, pp. 6-21.

Seethamraju, R. (2012). Business process management: a missing link in business education. *Business Process Management Journal, Vol. 18 No. 3,* pp. 532 – 547.

Seethamraju, R., and Marjanovic, O. (2009). Role of process knowledge in business process improvement methodology: a case study. *Business Process Management Journal*, *Vol. 15 No. 6*, pp. 920-936.

Seethamraju, R., and Seethamraju, J. (2009). Enterprise Systems and Business Process Agility - A Case Study. *Proceedings of the 43rd Hawaii International Conference on System Sciences – 2007*, pp. 1-12.

SEI (2007). Performance Results from Process Improvement. *SoftwareTech News*, *Vol. 10*, available at: http://www.softwaretechnews.com, accessed June 2010.

SEI (2008). *CMMI performance results.* Available at: http://www.sei.cmu.edu/cmmi/results.html, accessed August 2008, data reported as at December 15, 2005.

Seltsikas, P. (2001). Organizing the information management process in process-based organizations. *Proceedings of the 34th Hawaii International Conference on System Sciences, Maui, Vol. 8*, p. 8066.

Sentanin, O. F., Santos, F. C. A., and Jabbour, C. J. C. (2008). Business process management in a Brazilian public research centre. *Business Process Management Journal*, *Vol. 14 No. 4*, pp. 483-496.

Shapiro, B. P. (1988). What the hell is 'market oriented'? *Harvard Business Review, Vol. 66 No. 6,* pp. 119-125.

Shaw, D., Holland, C., Kawalek, P., Snowdon, B., and Warboys, B. (2007). Elements of a business process management system: theory and practice. *Business Process Management Journal*, *Vol. 13 No. 1,* pp. 91-107.

Sidorova, A., and Isik, O. (2010). Business process research: a cross-disciplinary review. *Business Process Management Journal, Vol. 16 No. 4*, pp. 566-597.

Siggelgow, N. (2007). Persuasion with case studies. *Academy of Management Journal, Vol. 50*, pp. 20-24.

Siha, S. M., and Saad, G. H. (2008). Business process improvement: empirical assessment and extensions. *Business Process Management Journal*, *Vol. 14 No. 6,* pp. 29-56.

Silvestro, R., and Cross, S. (2000). Applying the service profit chain in a retail environment. *International Journal of Service Industry Management, Vol. 11 No. 3*, pp. 244-68.

Silver, B. (2007). BPM Requires the Right BPMS. *BPMInstitute.org*, available at: http://www.bpminstitute.org/articles/article/article/bpm-requires-the-right-bpms.html, accessed July 2011.

Simons, R. (1990). The role of management control systems in creating competitive advantage: new perspectives. *Accounting, Organizations and Society, Vol. 15 No. 1*, pp. 127-143.

Simonsen, J., and Hertzum, M. (2008). Participative design and the challenges of large-scale systems: extending the iterative PD approach. *Proceedings of the Tenth Anniversary Conference on Participatory Design 2008, October 01-04, 2008, Bloomington, Indiana,* pp. 1-10.

Sinur, J., and Hill, J. (2009). Selection Criteria Details for Business Process Management Suites, 2009. *Gartner Research Number: G00163654*, Stamford, CT.

Škerlavaj, M., Indihar-Štemberger, M., Škrinjar, R., and Dimovski, V. (2007). Organizational learning culture—The missing link between business process change and organizational performance. *International Journal of Production Economics*, *Vol. 106 No. 2,* pp. 346–367.

Škrinjar, R., VukŠic-Bosilj, V., and Inidihar-Štemberger, M. (2008). The impact of business process orientation on financial and non-financial performance. *Business Process Management Journal*, *Vol. 14 No. 5***,** pp. 738-754.

Škrinjar, R., and Trkman, P. (2013). Increasing process orientation with business process management: Critical practices'. *International Journal of Information Management, Vol. 33 No. 1,* pp. 48–60.

Slater, S. F., and Narver, J. C. (1999). Market-oriented is more than being customer-led. *Strategic Management Journal, Vol. 20 No. 12,* pp. 1165-8.

Slater, S. F., and Narver, J. C. (2000). The positive effect of a market orientation on business profitability: A balanced replication. *Journal of Business Research*, *Vol. 48. No. 1*, pp. 69-73.

Smith, H., and Fingar, P. (2003). *Business Process Management – The Third Wave*. Meghan-Kiffer Press, Tampa.

Smith, H., and Fingar, P. (2004). The Third Wave: Process Management Maturity Models. *BPTrends*, available at: http://www.bptrends.com/publicationfiles/07%2D04%20COL%20Maturity%20Models%2D%20Smith%2DFingar%2Epdf, accessed August 2010.

Smith, H., and Fingar, P. (2007). *Business Process Management – The Third Wave*. Meghan-Kiffer Press, Tampa.

Snabe, J., Rosenberg, A., Møller, C., and Scavillo, M. (2009). *Business Process Management – The SAP Roadmap*. Galileo Press, Boston, MA.

Starbuck, W. H. (2006). *The production of knowledge*. Oxford University Press, Oxford.

Starbuck, W. H. (2009a). The constant causes of never-ending faddishness in the behavioral and social sciences. *Scandinavian Journal of Management, Vol. 25*, pp. 108-116.

Starbuck, W. H. (2009b). Unlearning what I knew and rediscovering what I could have known. *Scandinavian Journal of Management, Vol. 25,* pp. 240—242.

Stoitsev, T., and Scheidl, S. (2008). An Architecture for End-User Driven Business Process Management. In *Proceedings of the 2008 12th International IEEE Enterprise Distributed Object Computing Conference*, *Munich, Germany,* pp. 53-62.

Strnadl, C. F. (2006). Aligning business and it: The process-driven architecture model. *Information Systems Management, Vol. 23 No. 4,* pp. 67–77.

Suchman, L. A. (1987). *Plans and Situated Actions: The Problem of Human-Machine Communication.* Cambridge University Press, Cambridge, New York.

Sumner, M. (2005). *Enterprise Resource Planning*. Pearson Prentice-Hall, Upper Saddle River, NJ.

SUPER (2007). D.2.1 preliminary studies on SUPER methodology. *SUPER Deliverable TOGAF, the Open Group,* available at: http://www.opengroup.com, accessed April 2010.

Tallon, P. P., and Kraemer, K. L. (2003). Investigating the relationship between strategic alignment and IT business value: the discovery of a paradox. In Namchul Shin (Ed.), *Creating Business Value with IT: Challenges and Solutions, Idea Group Publishing, Hershey, PA.*

Tallon, P. P., and Pinsonneault, A. (2011). The Link Between Strategic IT Alignment and Organizational Agility. *MIS Quarterly, Vol. 35 No. 2,* pp. 463-486.

Taylor, F. W. (1911). The Principles of Scientific Management. Norton & Company, New York.

Teece, D. J., Pisano, G., and Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, Vol. 18 No. 7*, pp. 509-33.

Teece, D. J. (2009). *Dynamic Capabilities & Strategic Management.* Oxford University Press, Inc., New York.

Teo, T. S. H., and King, W. R. (1997). Integration between business planning and information systems planning: an evolutionary-contingency perspective. *Journal of Management Information Systems, Vol. 14 No. 1*, pp. 185-214.

Terziovski, M., Fitzpatrick, P., and O'Neill, P. (2003). Successful predictors of business process reengineering (BPR) in financial services. *International Journal of Production Economics, Vol. 84 No. 1,* pp. 35–50.

Thomas, H., Pollock, T., and Gorman, P. (1999). Global Strategic Analyses: Frameworks and Approaches. *Academy Management Executive, Vol. 13 No. 1,* pp. 70-82.

Thompson, G., Seymour, L. F., and O'Donovan, B. (2009). Towards a BPM Success Model: An Analysis in South African Financial Services Organisation. In: *BPMDS 2009 and EMMSAD 2009*, pp. 1-13.

Thompson, H. (2000). *The Customer Centered Enterprise*. McGraw-Hill, New York, NY.

Thompson, J. (2009). Federating BPM, Application Integration and SOA Initiatives Will Increase the Benefits of Each. *Gartner research, Vol. ID Number: G00169038*, Stamford, CT.

Toffler, A. (1980). *The Third Wave.* A Bantam Book / William Morrow & Co., Inc., USA.

TOGAF (2011). TOGAF® Version 9.1. Available at: http://www.opengroup.org/togaf/, accessed April 2013.

Topi, H., Lucas, W., and Babaian, T. (2006). Using informal notes for sharing corporate technology know-how. *European Journal of Information Systems, Vol. 5 No. 15,* pp. 486–499.

Towers, S. (2010a). Customer Orientation: The Overlooked Driver of Sustained BPM Success. Available at: http://www.successfulcustomeroutcomes.net/2010_06_01_archive.html, accessed August 2011.

Trist, E. L., and Bamforth, K. W. (1951). Some Social and Psychological consequences of the long-wall method of coal-getting. *Human relations*, *Vol. 4 No. 1*, pp. 3-38.

Trist, E. L. (1981). The socio-technical perspective. In A. H. Van de Ven, W. F. Joyce, (Eds.) *Perspectives on Organizational Behavior*. John Wiley and Sons, New York.

Trkman, P. (2010). The critical success factors of business process management. *International Journal of Information Management*, *Vol. 30 No. 2*, pp. 125–134.

Trkman, P., Indihar Štemberger, M., Jaklic, J., and Groznik, A. (2007). Process approach to supply chain integration. *Supply Chain Management—An International Journal*, *Vol. 12 No. 2*, pp. 116–128.

Trkman, P., McCormack, K., de Oliveira, M. P. V., and Ladeira, M. B. (2010). The impact of business analytics on supply chain performance. *Decision Support Systems*, *Vol. 49*, pp. 318-327.

Ulaga, W. (2003). Capturing value creation in business relationships: a customer perspective*. Industrial Marketing Management, Vol. 32 No. 8*, pp. 677-93.

Ulrich, H. (1984). *Management*. Campus, Bern/Stuttgart.

Ulrich, D., Allen, J., Smallwood, N., Brockbank, W., and Younger, J. (2009). Building culture from the outside in. *Strategic HR Review, Vol. 8 No. 6*, pp. 20 – 27.

van de Ven, A., and Poole, M. S. (1995). Explaining development and change in organizations. *Academy of Management Review, Vol. 20 No. 3*, pp. 510-540.

van der Aalst, W. M. P., and van Hee, K. (2001). *Workflow Management: Models, Methods, and Systems.* MIT Press, Cambridge, MA.

van der Aalst, W. M. P. (2003). Business process management: a personal view. *Business Process Management Journal*, *Vol. 10 No. 2*, pp. 1-1.

van der Aalst, W. M. P., ter Hofstede, A. H. M., and Weske, M. (2003). Business process management: a survey. In *Proceedings of the International Conference on Business Process Management, Eindhoven, The Netherlands,* pp. 1-12.

van Einjatten, F. M. (1993). *The paradigm that changed the work place*. Swedish Center for Working Life, Stockholm.

van Wessel, R., Ribbers, P., and de Vries, H. (2007). Towards a comprehensive model to master company IT standards. *Proceeding of the SIIT 2007*, *IEEE*, pp. 181-191.

Vargo, S. L., and Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing, Vol. 68 No. 1, pp. 1–17.*

Venkatesh, V., Brown, S. A., and Bala, H. (2013). Bridging the qualitative-quantitative divide: guidelines for conducting mixed methods research in information systems. *MIS Quarterly, Vol. 37 No. 1, pp. 21-54*.

Venkatraman, N., Henderson, J. C., and Oldach, S. (1993). Continuous strategic alignment: exploiting information technology capabilities for competitive success. *European Management Journal, Vol. 11 No. 2*, pp. 139-49.

Vergidis, K., Tiwari, A., and Majeed, B. (2008). Business process analysis and optimization: Beyond reengineering. *IEEE Transactions on Systems, Man, and Cybernetics, Part C: Applications and Reviews, Vol. 38 No. 1*, pp. 69–82.

Victor, B., and Boynton, A. (1998). *Invented Here: Maximizing Your Organization's Internal Growth and Profitability*. Harvard Business School Press, Boston, Massachusetts.

vom Brocke, J., Simons, A., Niehaves, B., Riemer, K., Plattfaut, R., and Cleven, A. (2009). Reconstructing the giant: on the importance of rigor in documenting the literature search process. *Proceedings of the European Conference on Information Systems (ECIS)*, Verona, Italy.

vom Brocke, J., Recker, J., and Mendling, J. (2010). Value-oriented process modeling: integrating financial perspectives into business process re-design. *Business Process Management Journal, Vol. 16 No. 2*, pp. 333-356.

vom Brocke, J., and Sinnl, T. (2011). Culture in business process management: a literature review. *Business Process Management Journal*, *Vol. 17 No. 2*, pp. 357-378.

von Bertalanffy, L. (1940). Der Organismus als physikalisches System betrachet. *Die Naturwissenschaften*, *Vol. 28*, pp. 521-531.

Walsham, G. (1995). Interpretetive case studies in IS Research: nature and method. *European Journal of Information Systems*, *Vol. 4 No. 2*, pp. 74-81.

Wand, Y. and Weber, R. (1990). Toward a theory of the deep structure of information systems. In *Proceedings of the Eleventh International Conference on Information Systems* (Degross, J., Alavi, M., and Oppelland, H., Eds.), pp. 61–71.

Wang, P., and Swanson, E. B. (2007). Launching professional services automation: institutional entrepreneurship for information technology innovations. *Information and Organization, Vol. 17 No. 2*, pp. 59-88.

Waterman, R. H. Jr., Peters, J. T., and Philips, J. R. (1988). 7-S Framework. In: *The Strategy Process: Concepts, Contexts, and Cases.* Eds. Quinn, J. B., Mintzberg, H., and James, R. M., Prentice Hall, New Jersey, pp. 271-276.

Weber, B., Mutschler, B., and Reichert, M. (2010). Investigating the effort of using business process management technology: Results from a controlled experiment. *Science of Computer Programming*, *Vol. 75 No. 5*, pp. 292-310.

Webster, F. E. (1994). Defining the new marketing concept. *Marketing Management, Vol. 2 No. 4,* pp. 23-31.

Webster, F. E. (2005). Back to the future: integrating marketing as tactics, strategy, and organizational culture. *Journal of Marketing, Vol. 69 No. October*, pp. 4-6.

Webster, E. J., and Starbuck, W. H. (1988). Theory building in industrial and organizational psychology. In C. L. Cooper & I. Robertson (Eds.), *International review of industrial and organizational psychology, London: Wiley,* pp. 93—138.

Webster, J., and Watson, R. T. (2002). Analyzing the past to prepare for the future: writing a literature review. *MIS Quarterly, Vol. 26 No. 2*, pp. xiii-xxiii.

Welke, R. W. (2005). *Think Service, Act Process: Meeting Today's Demand for Innovation and Agility*. Delft University of Technology, Delft.

Westrup, C. (2003). Discourse, Management Fashions, and ERP Systems. In *Global and Organizational Discourse About Information Technology*, E. H. Wynn, E. A. Whitley, M. D. Myers, and J. I. DeGross (eds.), Norwell, MA: Kluwer Academic Publishers, pp. 401-418.

Whetten, D., A. (1989). What constitutes a theoretical contribution? *Academy of Management Review*, *Vol. 14 No. 4*, pp. 490–495.

Williams, P., and Naumann, E. (2011). Customer satisfaction and business performance: a firm-level analysis. *Journal of Services Marketing, Vol. 25 No. 1*, pp. 20 – 32.

Winter, S. G. (2003). Understanding dynamic capabilities. *Strategic Management Journal, Vol. 24 No. 10*, pp. 991–995.

Yen, V. C. (2009). An integrated model for business process measurement. *Business Process Management Journal, Vol. 15 No. 6*, pp. 865 – 875.

Yin, R. K. (1994). *Case study research: Design and methods*. (2nd ed.), Sage, Newbury Park, CA.

Yin, R. K. (2003). *Case study research: Design and methods*. (3nd ed.), Sage, Newbury Park, CA.

Zachman, J. A. (2008). The Zachman Framework. Available at: http://www.zachman.com/about-the-zachman-framework, accessed April 2013.

Zeithaml, V. A., Berry, L. L., and Parasuraman, A. (1998). Communication and control processes in delivery of service quality. *Journal of Marketing, Vol. 52 No. 2*, pp. 35–48.

Zellner, G. (2011). A structured evaluation of business process improvement approaches. *Business Process Management Journal, Vol. 17 No. 2*, pp. 203 – 237.

Zimmerman, O., Doubrovski, V., Grundler, J., and Hogg, K. (2005) Service-Oriented Architecture and Business Process Choreography in an Order Management Scenario: Rationale, Concepts, Lessons Learned. *OOPSLA'05, October,* pp. 16–20.

Appendix

Table 16. Selected articles resulted from the SLR for BPMS empirical support

Cite	Method	Sample source	Process domain	Goals of initiatives	BPMS functionalities described	Related functionalities	Results	Quality appraisal
Zimmermann et al. (2005)	Case study	A large telecommunications wholesaler with more than 150 customers.	Order management	Deeper integration and flexibility of the process chains, cost savings from increased automation, business rule validation, and service reuse.	Process design expressed with BPEL using WebSphere Application Developer Integration Edition (WSADIE), IBM WebSphere Business Integration Server Foundation (WBISF) capabilities were used for process enactment, Eclipse based solution for system configuration.	Commercial J2EE application server used in addition to Process enactment, also for EAI and SOA platform.	Successful in all functional and nonfunctional requirements, exceeded response time and reliability targets, improved performance compared to non-SOA releases. Step from a business analysis to development is semi-manual or manual. Cross-discipline model exchange and code generation capabilities needed to align business and IT more closely. IDE and J2EE container hosting a BPEL engine alone are not enough to modify business process execution on the fly.	Detailed and valid study.
Holland et al. (2005)	Case study, semi structured interviews with executives, company reports and company business process models.	BP, one of the largest energy companies in the world with revenues of $233 billion in 2003. The UKCS is one of BP's main existing profit centers and contains many offshore platforms, oil and gas fields, reservoirs, pipelines, and other assets.	Work management, requisitions, data reporting / analysis, stock management, financials, and other supply chain processes.	Connect BPs business processes to co-ordinate the mainterance, operation, and repair of specialized exploration and production equipment with over 1500 suppliers.	Maximo BPMS for asset management functions. The BPMS creates and manipulates business processes (Process enactment). Processes are modeled with 'MaxiKnowHow' (Process design). BPMS is a shared solution with suppliers	None disclosed.	Lower staff headcounts for managing the supply base, reduced stock levels, fewer stock-outs, and more effective maintenance and repair services from contractors. Common system enables BP to change and adapt more easily, and to change business processes and business relationships quickly, a common organization of activities through a common information system.	Use of BPMS specifically tailored to be an asset management application puts it into a very specific context and thus difficult to generalize. Distinct features of BPMS were not described.
Miers (2006)	Case study	Pulte Mortgage	Customer service	Proactive customer service concluding tasks before customers would expect completion through the implementation of an automated case-tracking application.	Business Activity Monitoring and dashboarding.	No information provided.	Process metrics from case-tracking application (BAM) made it possible to identify service improvements. Managers had better visibility to the process, they were enabled to influence the overall performance, understand the business dynamics, and further embed that understanding to business rules.	Case study description was very scarce on the BPMS implementation details and tools used, only features distinct to BAM were possible to be identified.

Table continued

Cite	Method	Sample source	Process domain	Goals of initiatives	BPMS functionalities described	Related functionalities	Results	Quality appraisal
Reijers (2006)	Checklist to determine "*process orientation*" based on experience of one of the leading BPMS vendors. Checklist as instrument was validated in BPMS vendor's client sites.	1st case: Service provider for mobile telecommunications and mobile internet solutions. 700 employees, 1.4 million customers, a turnover of € 520 million in 2002. 2nd case: Dutch asset management group, a business unit of a multinational financial concern. Conducts independent research for financial advisors and private investors, resulting in reports in various forms, increasingly in a digital format. In 2002, employed 60 people, budget of € 12 million. Serves some 4 million end-users with investment advice. 3rd case: A major retail bank for the private and business markets in the Netherlands. Operates ~ 350 local bank offices. In 2002, 50,000 employees, a net profit of ~ € 1.4 billion.	1st case: Customer service. 2nd case: Document management especially in electronic delivery. 3rd case: Service delivery	1st case: support of customer loyalty process, to deliver personalized discount offerings to new and existing customers. Drastic reduction of the lead time of bringing out "loyalty offers" thus reducing "customer churn". 2nd case: to reap more benefits from their earlier document management system, handle a growing number of electronic deliveries. 3rd case: centralize the service deliveries through new customer channels (e.g., the internet).	Undefined for the cases with exception in the 2nd case that implied having document management interactions.	No other identified but 2nd case suggests on earlier investment of document management system.	Conclusion about relation between process orientation and BPMS implementation success. 1st case results: System development and user acceptance were main problems, some delay in planning, budget slightly delayed, implementation course and results in average good. 2nd case results: Major problems with system integration, substantial delay in planning, budget exceeded, implementation course poor but results achieved and positive side effects. 3rd case results: Main problem with process design - difficulties in defining new process models for the new situation, planned delay realized, implementation course and results in average good with positive side effects.	Main objective of the study was to test the process orientation theory on BPMS success not the impact on BPMS itself. All cases were selected together with the BPMS vendor instead of independent selection. BPMS distinct features were not listed and the infrastructure where applied was not defined for any of the cases.
Callas (2006)	Case study	A leading French insurer	Policy administration process	Transformation of its policy administration process supporting 600,000 policies.	Not explicitly disclosed, CSC e4sM (www.csm.com) framework was used but no details about what functionalities used in the case.	Web-based portal	Administering new business and processing policies for 30 products, which shifted 80% of servicing activities from the company's home office to its 3,500 agents and substantially reduced core processing costs.	The study was mainly a product promotion material. The case study was one paragraph broad description that was exactly the same in the BPM vendor's marketing material found from a web site (www.csm.com). From the authors opinion, validity equals to BPM vendor marketing material.

Table continued

Cite	Method	Sample source	Process domain	Goals of initiatives	BPMS functionalities described	Related functionalities	Results	Quality appraisal
Küng and Hagen (2007)	Case study	Crédit Suisse global bank, operating in over 50 countries. Includes global private, corporate and retail banking in Switzerland, global investment banking and global asset management. At Crédit Suisse, more than 1,000 software applications are in place, supporting more than 60,000 employees in performing their tasks.	Four processes. 1st: direct trade finance. 2nd: closing accounts. 3rd: settlement of securities. 4th: special orders.	1. Direct trade finance: reduction of manual steps, optimization of paper-based and time-consuming communication with customers and reduce customers' dependency on the availability of the office hours of the bank. 2. The closing accounts: simplification and optimization of old error-prone, slow, and inefficient account closing process. 3. The settlement of securities: improvement of old PL/1 programs modularity, maintenance cost, flexibility to adapt to new demands, decrease modification time, monitoring facilities, process of checking adherence to service level agreements. 4. The management of special orders (i.e., orders that cannot be processed via standard procedures): reduce the number of people required for the process execution, improve order state tracing, and reduce the cycle time of order handling.	BPMS functionalities varied per process. 1. Direct trade finance: (IBM) MQS workflow BPMS for process enactment. Not explicitly said but possibly MQS used also for monitoring. 2. Closing accounts: (IBM) MQ workflow for process enactment and automation involving human interaction and back office application interaction. 3. The Settlement of securities: ARIS Toolset for process design, EPC as graphical notation, tailor-made process enactment and monitoring application that could interpret EPC models read from a DB2 database. 4. Special orders: process engine ActionWorksMetro for process enactment.	In the settlement of securities the underlying application infrastructure was modularized as services implying SOA. A process engine called these services.	1. Direct trade finance: restructuring and partial automation (e.g., quality checking) increased productivity and shortened cycle time. 2. Closing accounts: major increase in performance of the new process. Workflow-supported process reduced cycle time by 50 percent. The number of errors reduced to a rate of 1 in 10,000 cases. Process execution automated carrying out of new rules and instructions. Large majority (80-85 percent) of the "closing accounts" cases handled without manual intervention from back office staff. The cycle time for these orders was reduced to one day. 3. The settlement of securities: production-style process with high predictability established, close to a fully automated process. Manual efforts decreased and led to lower overall costs. The process' cycle time has shortened massively. Careful monitoring of cycle time of critical processes enabled. 4. Special orders: cycle time reduced by 30 percent; response time sped up by a factor of 10.	Not all four process cases defined the distinct BPMS features explicitly, which makes hard to extract what affected the final results. Moreover, some of the process execution engines were tailor-made for the purpose.
Stoitsev and Scheidl (2008)	Case study	An industrial manufacturing company	Consignation sales	Involving end users in business process composition by providing added value on personal task management, leveraging their experience with standard tools for task management (to-do lists), and collaboration (email) towards the definition of process models.	JBoss Business Process Management (jBPM) solution. Process designs modeled in a graph-oriented language – the jBPM Process Definition Language (JPDL) with JPDL designer that was provided as an Eclipse plug-in. Participant interaction was provided over web front-end. jBPM web front-end was used for business activity monitoring. In addition to JPDL models, also BPMN was used.	Microsoft Outlook add-in as front end to transform tasks to formal Workflows. All services implemented as Web Services. Centralized Java Application Server.	A tight integration of process development environment with end users' personal task management and email infrastructure involved end users in process composition efficiently. Shared repositories for ad-hoc and structured workflows fostered data reuse and facilitated the transition from user-defined to formal workflow models.	Case was an 8 week trial and was not extended to larger use.

Table continued

Cite	Method	Sample source	Process domain	Goals of initiatives	BPMS functionalities described	Related functionalities	Results	Quality appraisal
Guo-shuang and Liang (2008)	Case study	Suiyang forestry bureau in China, a large forestry enterprise with over one hundred forest management areas, wood processing factories, and other forestry product processing factories.	Not disclosed, only broadly mentioned to mainly concern business processes of green food production.	Improve old workflow engine based process management based system to be more dynamic and meet new demands by introducing more standard BPMS.	Vendor names not disclosed but process designer with UML notation, process and rule engine, and process monitoring (BAM) are described.	None defined.	Compared to old WfMS, the dynamic capability of changing business process without additional system development was achieved. Significant (on average >25%) improvements in performance and cost. New process change costs were only 2.4% from the old system process change costs.	Information disclosed about the BPMS technologies used in the case example was scarce.
Chalaris and Vlachopoulos (2009)	Case study	NSPA Educational Institute.	Planning, implementation, and management processes of training courses.	Identify and pin point errors and bottlenecks in as-is processes.	BPMS Paradigm ADONIS tool for Process Management, developed by BOC, in cooperation with Vienna University. The tool was mostly used for analysis, simulation, and optimization in the described case.	None defined.	Modeling, analysis, and simulation revealed the functional problems and pathologies of the case organization, namely the detection of time-wasting processes, bottlenecks, and personnel allocation problems.	Case study is limited to process diagnosis and design phase of BPM cycle and uses process re-engineering method.
Ao et al. (2009)	Case study	Contract manufacturing company in Singapore.	From customer purchase order to manufacturing and invoicing.	Not defined in the study.	Proprietary Unified Configurable Architecture framework consisting of process (module) design tools, participant interaction, even processing engine, process monitoring and dashboarding, and system configuration tools. No commercial BPMS vendor information disclosed	Web based application portal.	Full integration of engineering processes throughout the entire lifecycle, authorized customers were enabled to access the web based application portal to monitor their own order progress and exchange views with the company, process adjustments could be made without affecting the system operation.	Defined system seems to include lots of proprietary implementation and thus results are difficult to be generalized to any other context not using exactly the same system set up.

Table 17. Concepts related to BPMS

Cite	BPMS-SOA	BPMS-Information Models	BPMS	BPM teams	BPM method
Zimmermann et al. (2005)	Positive experience about the maturity of the core Web services stack consisting of XML, SOAP, and WSDL. Also, mentioned to be an early adopter of SOA and BPMS.	No specific attention to information modeling but considerations about business process data. Recommends limiting the data held within business processes to a minimum.	Careful evaluation of what processes to be considered as BPEL process. Recommends to follow a pure BPEL approach, multiple technology stacks increase risk	Development was project based but following success factors were identified; scheduling a Proof-of-Concept (PoC) early in the project along with the high-level solution outline work, iterative and incremental style based on agile development, for example continuous delivery and collaboration, investment in an analysis phase involving several fact-to-face workshops within the architecture, development and system administration team, identification of possible areas of concerns early, and to define appropriate risk mitigation strategies before kicking off any premature implementation work.	Though business process method was not explicitly mentioned, main phases of BPM cycle were part of the described SOA project.
Holland et al. (2005)	No SOA defined.	No information modeling practices defined.	No distinct BPMS features disclosed.	No information disclosed.	Business process method not described.
Miers (2006)	No SOA defined.	No information modeling practices defined.	Business Activity Monitoring (BAM) was the key feature used, other features not described.	No information disclosed.	Business process management method not described.
Reijers (2006)	SOA approach was not described.	No information modeling practices defined.	The use of distinct BPMS features not disclosed but gives the impression of a wide adoption of all features. The first case faced problems with fitting BPMS to existing features. Also, end-users initially expressed to be seriously impaired by the BPMS. End-user acceptance grew when they became more involved in updates and improvements.	Third case had difficulties to comprehensively define the new process models for the new situation. Also, the combined introduction of new work procedures with a new support system was considered by some end-users as too much of a change at one time.	Business process management method not described.

Table continued

Cite	BPMS-SOA	BPMS-Information Models	BPMS	BPM teams	BPM method
Callas (2006)	No information disclosed, however used BPMS framework included system configuration that exposed existing applications as service through connectors.	No information modeling practices defined.	No distinct BPMS features disclosed for the case study but used commercial BPMS includes process design, enactment, system configuration, and diagnosis tools.	No information disclosed.	Business process management method not described but the tool supported BPM cycle phases.
Küng and Hagen (2007)	One case modularized the existing infrastructure to "Services".	No information modeling practices defined.	Wide coverage of BPMS features used.	No information disclosed.	Business process management method not described.
Stoitsev and Scheidl (2008)	BPMS integrated to other application through Web Services.	No information modeling practices defined.	Process design, enactment, and diagnosis (monitoring) were used.	No information disclosed. However, positive experience on tight integration between process modeling environment and personal task and email infrastructure to involve people more with process composition.	Business process management method not described.
Guo-shuang and Liang (2008)	No information disclosed.	UML notation mentioned.	Process designer with Unified Modeling Language (UML) notation, process and rule engine, and process monitoring (BAM) are described.	No information disclosed.	Business process management method not described.
Chalaris and Vlachopoulos (2009)	Not applied.	No information modeling practices defined.	Process designer and simulation as diagnosis tool were used.	No information disclosed.	BPMS Paradigm ADONIS tool for Process Management developed by BOC in cooperation with Vienna University.
Ao et al. (2009)	Not described.	No information modeling practices defined.	Process (module) design tools, participant interaction, event processing engine, process monitoring and dashboarding, and system configuration tools were used. No commercial BPMS vendor information disclosed.	No information disclosed.	Business process management method not described.

Table 18. Results supporting the progress along the stages of maturity levels

Cite	Method	Sample source	Purpose of the research / business objectives of the cases	BPMM	Path	Results
Sentanin et al. (2008)	Case Study	Embrapa Agricultural Instrumentation Research Centre (2005), 59 employees, of which 22 were researchers. Develops pioneering methods and innovative equipment for rural laboratories, companies, and producers.	"The aim of this corporation is to establish effective mechanisms to stimulate: BPM in its units, units sharing experiences, rationalization of resources and efforts, concentration of the teams responsible for analysis and improvement of processes on core processes which are relevant to the research corporation and its centres" (p. 492).	McCormack & Lockamy model, Goncalves (2000) also used.	The BPM relies on employees that support the teams responsible for process analysis and improvement. Top management focus shifted from formalization of BPM to encouraging units to have vision based processes. Competence development for BPM requires enhancing knowledge and visions by adding managerial concepts to their jobs.	Case study organization progressed to McCormack & Lockamy's model level "Defined processes". "There is a strong trend in working in a traditional and functional way which is reinforced by its organizational culture. Although there are efforts to work using processes, a cultural change is needed if this organization intends to attain enough maturity to progress towards the next levels and stages of the aforementioned models" (p. 494). "The change in the organization chart of the unit, eliminating some managerial and supervision positions, caused a strong resistance of these managers to the new organizational design" (p. 494).
Skrinjar et al. (2008)	Survey	Slovenian and Croatian companies with more than 50 employees. In the Slovenian case, 203 completed questionnaires were returned ,and 202 in Croatia.	Testing of the following hypotheses: "H1. The higher level of business process orientation a firm achieves the better it performs financially. H2. The higher the level of business process orientation a firm achieves, the better it performs non-financially in terms of more satisfied employees, customers and suppliers. H3. Better non-financial performance leads to better financial performance" (pp. 743-744).	McCormack & Lockamy model	In general confirms the McCormack & Lockamy model but especially the progress along BPO maturity benefits on non-financial performance.	"There is a strong direct impact of BPO on non-financial performance.", "no such impact has been found between BPO and financial performance", "BPO has a strong indirect impact on financial performance through non-financial performance" (p. 750).

Table continued

Cite	Method	Sample source	Purpose of the research / business objectives of the cases	BPMM	Path	Results
Palmberg (2010)	Multiple case study	Case 1: A logistic company, in 2003, the turnaround was nearly 1,700€ million, about 400 employees in Sweden. Case 2: An energy producer. In 2003, the turnover was 200€ million, about 100 employees. Case 3: Subsidiary of a larger Swedish insurance organization, about 150 employees, who serve 360,000 customers. The turnover in 2003 about 90€ million.	Case 1: Initiated by declining results and demands for improved results from the new owner. Case 2: Wanting to develop the organization, not because of (external) pressure or crisis. Case 3: Aiming for 25 percent growth and 25 percent saving on total cost.	McCormack & Lockamy model used in the analysis, also Goncalves (2000).	Study focused on the path of case study organizations progressing from function based structures to process structures. "Model of Lockamy and McCormack (2004) places all three organizations into the third "Linked" stage, where process management is employed with strategic intent, and process structures are put into place outside the traditional functions. None of the three organizations reaches the higher levels" (p. 108).	Case 1: Increased strategic understanding, a shared responsibility, sharper economic control, increased understanding between coworkers from different departments, easier to drive improvement, clarification of responsibilities, employees found the work with process management positive. Case 2: A more effective use of employees, a better general picture, difficulties to find relationships between positions, a raise in the wellbeing but also frustrations and increase in sick leaves. Case 3: A unified way of working between market areas, standardization of work procedures enabled the targeted cost savings, increased customer focus – clear what should be delivered to the customer, complexity between the process and function matrix, risk of allocating too much responsibility to certain individuals.
McCormack et al. (2009)	Survey	Several years of data from over 1,000 companies in the USA, Europe, China, and Brazil.	Results of research into the precedence of the maturity factors, or key turning points in business process maturity (BPM) implementation efforts.	McCormack & Lockamy model	Study collected empirical evidence of what turning points emerge in the each maturity level of their model.	Global, quantitative evidence of the critical maturity components associated at each level of maturity.

Table 19. Results supporting a single or a set of steps along the stages of BPM maturity

Cite	Method	Sample source	Purpose of the research / business objectives of the cases	BPMM	Steps taken	Results
Schäfermeyer et al. (2010)	Multiple case study	1st Case: Process and software development department of a large German telecommunications service provider (TCSP). 2007/08 annual sales 2,308 billion Euros, EBITDA of 456 million Euros. Operates in Germany and has 3,800 employees. 2nd Case: a German IT service provider (ITSP). ITSP operates an own data-processing center and employs approximately 3,000 persons.	TCSP: 1. Integrated processes and data 2. Cost Savings 3. Quality Improvements 4. Customer Satisfaction ITSP: 1. Quality Improvements 2. Cost Savings 3. Quality Measurement	OMG BPMM referenced in the study, not explicitly used.	TCSP progressed through deploying an "IDEFOX" as a central software application, which enabled performance improvements in terms of better information exchange, improved collaboration, efficiency enhancements to integrate and combine the divisions in one organization-wide accepted application. Established standard procedures were agreed upon by all involved stakeholders. (steps 7-11, and 14 & 15 taken) "Since ITSP installed several new branches all over the world, they experienced severe problems with overall business execution and quality. According to our interviews, these problems mostly arose due to different organizational cultures and differing process definitions" (p. 7).	TCSP: Standardization of core processes resulted in shorter processing times and better information flow. ITSP: Dissatisfied. Tried to standardize almost all processes, ITSP's computer-aided modeling tool has not evolved to a company-wide accepted standard like the IDEFOX application.
Knothe et al. (2007)	Case study	Independent subsidiary of a world wide automotive supplier, produces single parts as well as complete components for the car. The capacity of 100.000 units per day with more than 800 employees.	Manage the complexity of serving different Original Equipment Manufacturers (OEMs) at the same time, to achieve more transparency of changes by introducing an enterprise model that employees should use in daily work.	CMM inspired Enterprise Interoperability Maturity Model (EIMM) used.	Step 14 "A core team according to the Role & Involvement Concept with participants related to all main processes and enterprise assets was established" (p. 8). Step 12 "the employees were trained in using the methodology and the tool step by step" (p. 8).	"Three years after project start the enterprise is still working with the model because it supports a lot of people (not only planning people) in their strategic and daily work. The company is now able to support different OEM with alternative approaches for product development and supply chain concepts" (p. 8).
Seethamraju and Seethamraju (2009)	Case study	Continuous process manufacturing company that makes chemical products. Employs about 400 persons. Organization has SAP for the past ten years starting from the earlier versions and is now running on ECC 5.0.	The case study considered how integration, standardization, best practices and process orientation influences on business agility in a case study organization. Business process agility is "expected to improve a company's ability to exploit opportunities for innovation and competitive action" (p. 9).	CMM mentioned, not applied.	Step 15 "organization has standardized and integrated all the major processes and information across the major enterprise functions" (p. 8).	"While the technical tight-coupling of the enterprise system infrastructure may limit the firm's ability to build agile processes, both vertical and horizontal integration, and standardization of the processes and information appears to be contributing positively" (p. 10).

Table continued. Results supporting a single or a set of steps along the stages of BPM maturity

Cite	Method	Sample source	Purpose of the research / business objectives of the cases	BPMM	Steps taken	Results
van Wessel et al. (2007)	Multiple case study	Case 1: Client/Server (C/S) standardization project carried out within a 2-year timeframe, affecting 10.000 end users of a business unit. Case 2: Standardization initiative at the main Software Development department. Case 3: Standardization of a complete set of core HR processes, as part of an ERP HR suite selected by the Business as company standard, based on its Best-in-Class rating by the HR profession.	Case 1: 1) Reduce costs of development, 2) Facilitate change flexibility. Case 2: 1) Improve quality; 2) Increase productivity & reduce costs; 3) Respond more rapidly to change; 4) Improve co-operation between Business and IT; 5) Increase job satisfaction and attractiveness to staff. Case 3: 1) Cost savings through empowerment of employees (self service), a reduction of HR headcount and reduced HR IS costs; 2) Provision of quality services to improve HR function; 3) Comply globally with legal and fiscal requirements.	Case 1: None defined. Case 2: CMM and Dynamic System Development Method (DSDM) Case 3: None defined.	Case 1: Steps 7-11 "Strict conformity to the related service and project management processes were key elements in the successful usage of the set of IT standards" (p. 184). Case 2: Evidence for Steps 7-11 "These process standards were implemented accompanied with an organizational change process, which proved to be important for its success" (p. 184). Case 3: Evidence for the Step 11; First the project did not get a buy-in from business. Then through establishing a clear project scope, getting endorsement from senior management for the implementation, and changing from a system to process focus resulted in positive impact.	Overall assessment of all cases: Financial: Overall drop in development and support costs. Customer: Customer satisfaction increases when using appropriate IT standards, dependent on the level of business participation. Internal: Overall quality improvement Learning & Growth: Overall increase in flexibility. Standardization resulted in staff redundancies. Key learning: Case 1: Some failure due to issues of decision rights and responsibilities. Case 2: End user participation in projects almost non-existent, business people's participation in the project addressed late. Case 3: Roles and responsibilities between stakeholders not effectively assigned; the majority of data semantics was not standardized; the decentralized organizational structure identified as a key determinant that influences business process performance.
Nelson et al. (2010)	Multiple case study	Five case study organizations were US-based firms of property and casualty (P&C) insurance, value added travel assistance, and financial services businesses. Case 1: Size (sales) >7$ billion Case 2: Size (sales) >1$ billion Case 3: Size (sales) >2$ billion Case 4: Size (sales) >9$ billion Case 5: Size (sales) >100$ million	Case 1: Cost savings and coupled Business Rule deployment w/YK remediation. Case 2: Compatibility w/new parent corporation buyout. Case 3: Combat false and misleading price quotes on Internet. Case 4: Rule consistency in managing multi-channel strategy. Case 5: Better management of rapid growth.	Business Rule Maturity Model described.	Steps 11-14 :"Several of the techniques used by respondent firms were anticipated as enablers for firms to move from one level to the next in the model, such as increased communications, competency of IT, and the renewed partnership between IT and the Business representatives" (p. 37). Step 16: Study concerned about linking business rule and service execution.	Case 1: Improved rule consistency, enhanced flexibility, reduced new system development. costs/time, improved web-based systems readiness. Case 2: Improved multi-channel management, improved readiness for corporate merger, enabled rapid rule updates. Case 3: Enhanced competitiveness, improved web price quote accuracy, improved data leverage across the firm. Case 4: Improved multi-channel management, improved regulatory rule enforcement, tracking, reporting. Case 5: Improved rule consistency across the product lines, improved growth potential, improved enterprise wide agility.
Reijers (2006)	Multiple case study	Case 1: A Dutch branch of a fully independent service provider for mobile telecommunications and mobile internet solutions, approximately 700 employees, 1.4 million customers, a turnover of 520€ million in 2002. Case 2: A Dutch business unit of a multinational financial concern, in 2002 employed 60 people, budget of 12€ million, serves 4 million end-users with investment advice. Case 3: A major retail bank for the private and business markets in the Netherlands, operates some 350 local bank offices, active in areas such as insurance, investment, asset management, and real estate. In 2002 employed over 50,000 people, a net profit of approximately 1.4€ billion.	Case 1: Drastically reduce the lead time of bringing out "loyalty offers" in this way reducing "customer churn". Case 2: Reap more benefits from their earlier investment in setting up a document management system, in particular to be able to handle the growing number of electronic deliveries. Case 3: Centralize the service deliveries taking place through new customer channels (e.g., the internet).	"Green" shows a sufficient level of process orientation, "yellow" a level where implementation problems may be expected, and "red" where the lack of process orientation would seriously jeopardize a successful implementation.	Step 21: Process automation through implementation of BPMS	Case 2 organization with Red - Level 1 process orientation / maturity faced most difficulties due to the poor fit of BPMS into existing systems due to system integration, other two organization with Yellow - Level 2 organizations faced no significant problems. All organizations gained business performance benefits finally.

Table continued. Results supporting a single or a set of steps along the stages of BPM maturity

Cite	Method	Sample source	Purpose of the research / business objectives of the cases	BPMM	Steps taken	Results
Mackay et al. (2008)	Case study	A business unit in an established Fortune 500 multi-national and fast-moving consumer goods supplier, manufacturing "beauty care" consumer goods, approximately 500 employees.	A three year future vision for a 50 per cent reduction in NPI lead time (First to market), a 50 per cent reduction in inventory (Fast to the customer), and a 50 per cent reduction in operating cost (Built to last – a profitable, sustainable operation).	None mentioned.	Support for: - Step 18: clear data requirements from groups and individuals resulting in infrastructure and staffing allocated appropriately; and clear role definitions with responsibilities for actions rarely being in dispute despite the cross-functional nature of much of the work; - Step 13 & 19: a high level of awareness in all members of the organization as to the current business reality and future expectations/ requirements - Step 14: consistency of approach between sites resulting in efficient and effective collaboration, improvements in performance and sharing of resources. - Step 20: change management exercises being clearly linked with the strategy and receiving high levels of buy-in from all levels of the organization.	The case study presented a business process architecture that included: - Operate Processes create competitive advantage by delivering products or services of value to external customers; - Manage Processes sustain competitive advantage by providing valuable and appropriate direction to the Operate Processes (internal customer); and - Support Processes enable competitive advantage by creating an environment in which the Operate Processes can exist – this is achieved through supplying valuable indirect expertise and resources to the Operate Processes (internal customer). Moreover, the case study suggested that a specific hierarchy of their *Manage processes* was the cause for the excellent business performance.
McAdam (2001)	Multiple case study	15 organizations in the manufacturing and services sectors, all having more than 500 employees.	All case organizations were in expanding markets and faced challenges of: - increased market share - increased customer expectations - competitiveness - lower cost - technology development and capital expenditure. Research proposes a phase model that starts with function structures developing to function-process, then further to process-interface, and finally to process-network structures.	None defined.	As summary, maturization can be considered of cross-functional teams (Step 14), process ownership and governance (Step 11) aided by process benchmarking.	"A fully incorporated system of processes with defined approached for ownership, roles and responsibilities and rapid large-scale change, ensures that organizational consensus is achieved in dynamic changing conditions. Process benchmarking is a continuous large-scale change process in these organizations, using well-defined process and outcome performance measures and thus helping to develop a climate for change" (p. 345).

Table 20. Results conflicting or deviating with the progress along the maturity levels

Cite	Method	Sample source	Purpose of the research / business objectives of the	BPMM	Deviation / negation	Results
Trkman et al. (2010)	Survey	310 different companies of different industries with headquarters in the USA, Europe, Canada, Brazil and China, whose functions are directly related to SCM processes.	Survey investigated the relationship between analytical capabilities in the plan, source, make and deliver area of the supply chain, and its performance using information system support and business process orientation as moderators.	The dataset used was collected from research on the SCMMM — Supply Chain Management Maturity Model that can be traced back to McCormack & Lockamy model.	"The findings suggest the existence of a statistically significant relationship between analytical capabilities and performance. The moderation effect of information systems support is considerably stronger than the effect of business process orientation" (p. 318); "Lastly, companies may use other ways to cooperate without necessarily increasing their BPO at least in the short term" (p. 324).	Business Analytics (BA) on critical process areas influences positively on a SC's performance. Limited support of BA use in the delivery area and the moderating effect of a business process orientation. BPO is possibly not a precondition to BA and investment on both may bring better performance.
Boersma and Kingma (2005)	Case study	Redesign of an ERP system during 2001–2003 in a complex vehicle manufacturing company with the aid of a multinational ICT service provider. In 2002 over 500 employees, of whom 450 work in the factory. Became a part of a holding consisting over 40 business units in seven countries with almost 4000 employees in May 2003.	Case study described an undertaking to develop a new logistical system that would resolve the production crisis caused by the introduction of new product and ERP that conflicted with the prior processes and practices.	A stage maturity model for enterprise resource planning systems use (Holland and Light 2001) was mentioned.	A sophisticated part of ERP was taken into a use in a low process maturity organization with a culture of "heroes". This lead to a production crisis that was solved only after the MRP was shut down and organizational teams understood both the logistic system and ERP part in a new way.	The case study described how an organization needs sometimes to go back to the previous steps of maturity in order to create new capabilities to achieve business performance. Adoption of an IT tool with embedded practices does not ensure success.

Table continued

Cite	Method	Sample source	Purpose of the research / business objectives of the	BPMM	Deviation / negation	Results
Chapman et al. (2001)	Multiple case study	70 companies from Australia, Sweden, Norway, Italy, Ireland, Netherlands, and UK.	Empirical research investigated the impact of continuous improvement in Product Innovation Process.	None defined.	Continuous Product Innovation (CPI) process is influenced by contingencies implying that there is no single way to manage and improve organizational performance.	A successful knowledge management is a key success factor to develop a continuous product innovation process though significant differences exist between studied organizations in the way they understand and measure CPI.
Jeston and Nelis (2008b)	Case study	Nedbank Group Limited, fourth largest banking group in South Africa. In 2006 had 24,034 employees.	To overcame challenges of: - many different ways of doing things - set up & improve the measurement - frustrating hand-offs - set up & improve planning and prioritization.	Started with CMM and CMM Integration and resulted in the development of OMG BPMM.	Journey through CMMI and later SO-CMMI to BPMM enabled significant improvements in business performance. However, during 2003 due to cumulative results of many economical challenges, the BPMM journey was stopped and the plan was instead to "fix the business, consolidate, and grow".	After three years the bank has recovered regardless of the lack of process maturity progress. However, they have returned back to the maturity improvement plan.
Niehaves (2010)	Multimethod approach with 16 semi-structured expert interviews and survey	Qualitative method: Interviews with public officials responsible for BPM-related reforms in German local governments. Quantitative method: Covers 357 cases of German local governments (2008).	Investigated if personnel resource scarcity impacts on the involvement of: customers (citizens and local companies); and consultants (management and software consultants) in a public sector BPM.	None defined.	Assumes from prior research that heavy reliance on external expertise is a characteristic of early maturity stages whereas involvement of stakeholder, especially customers, is characteristic of high maturity.	The involvement of customers in process innovation, and thus the maturization of BPM initiatives, is hindered by personnel resource scarcity.

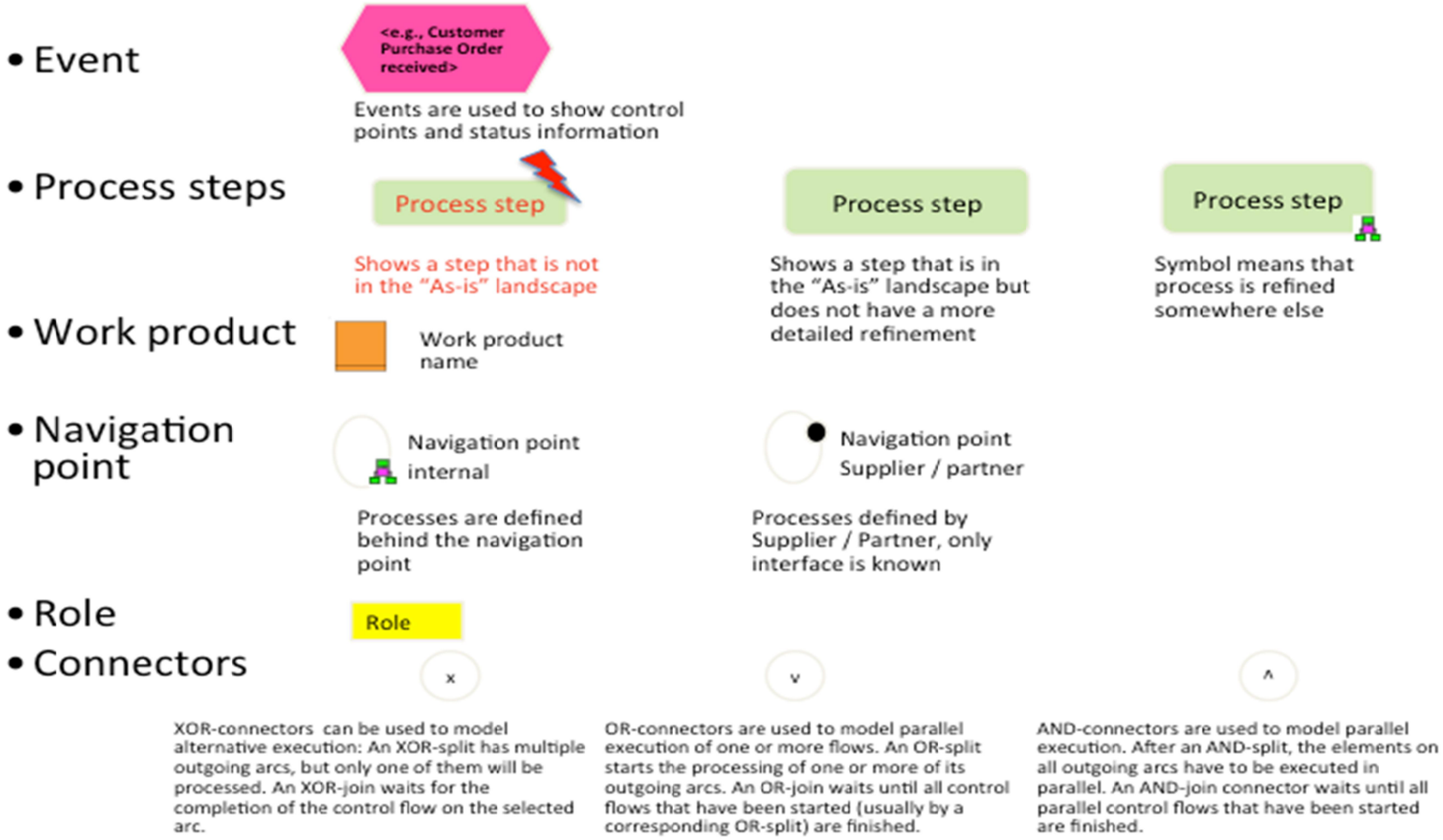

Figure 46. Key modeling elements of CIP models customized from EPC standard (adapted from the presentation of CommsCare)

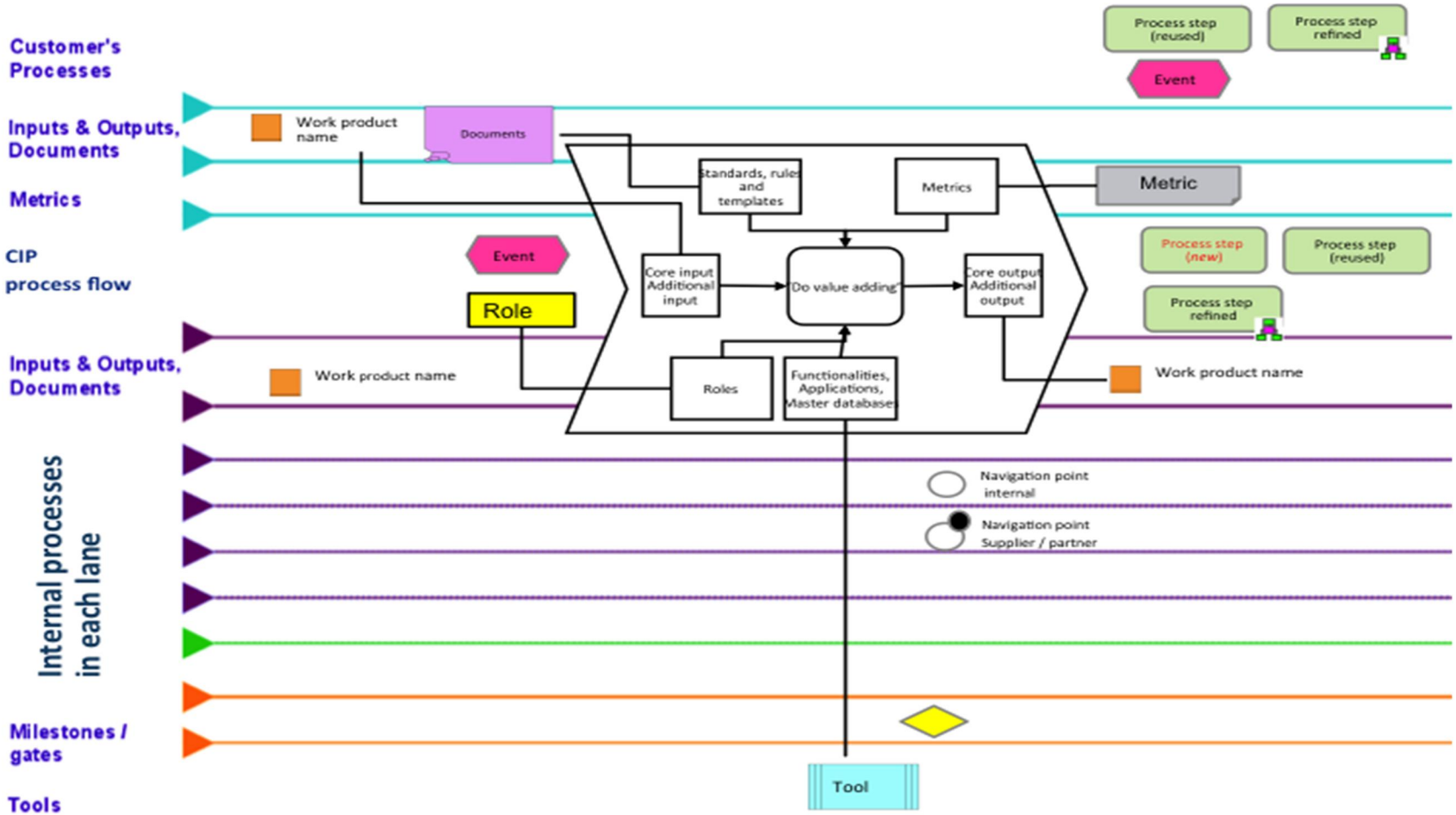

Figure 47. CIP extended template with essential modeling elements, illustration (adapted from proprietary documentation of CommsCare)

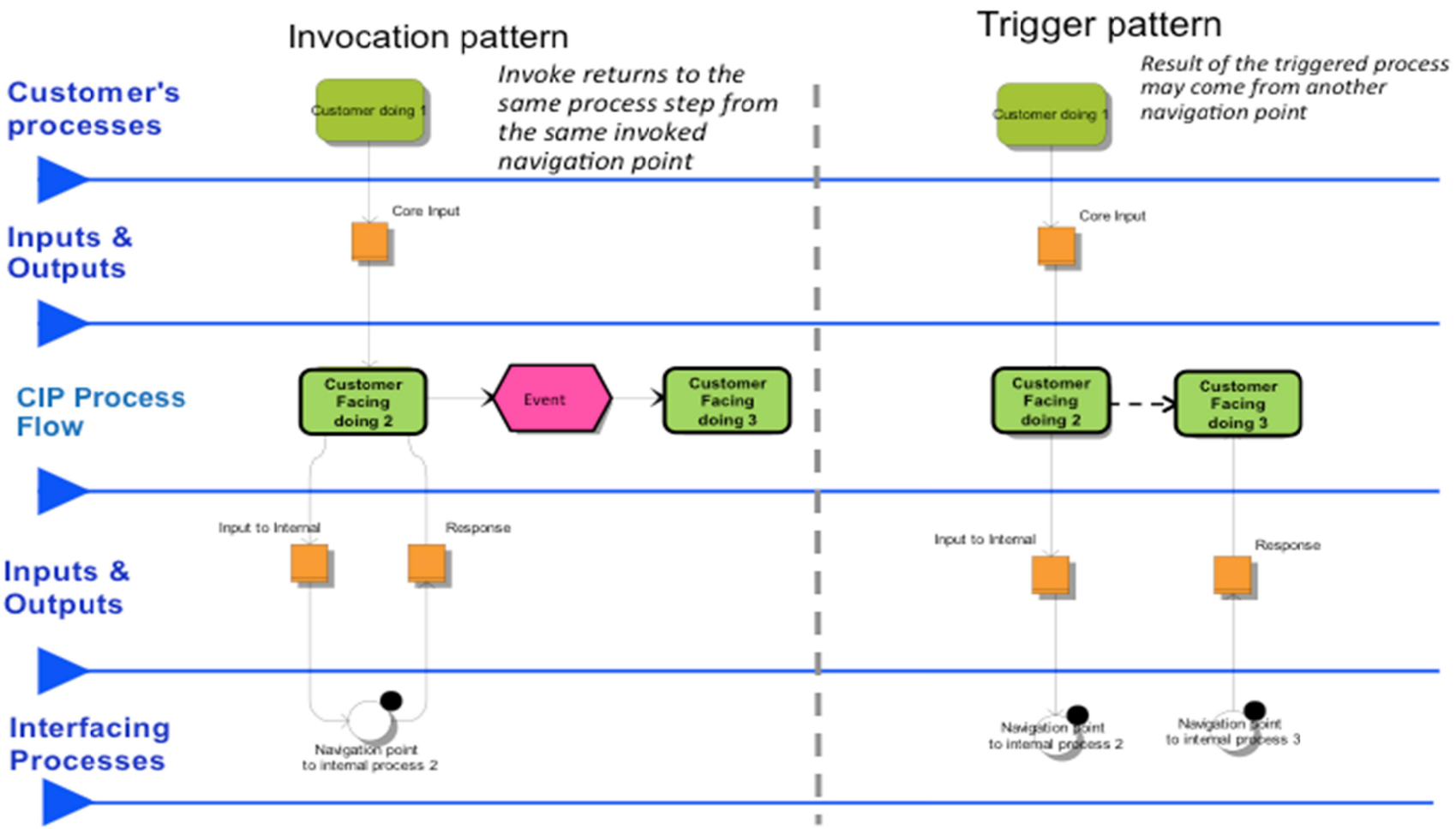

Figure 48. Examples of invocation vs. trigger in CIP models (adapted from proprietary documentation of CommsCare)