Influential Article Review - Using BPM Capacity Preparation and Process Development in Value-Based Operations

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This paper examines operations management. We present insights from a highly influential paper. Here are the highlights from this paper: Business process management (BPM) is an important area of organizational design and an acknowledged source of corporate performance. Over the last decades, many approaches, methods, and tools have been proposed to discover, design, analyze, enact, and improve individual processes. At the same time, BPM research has been and still is paying ever more attention to BPM itself and the development of organizations' BPM capability. Little, however, is known about how to develop an organization's BPM capability and improve individual processes in an integrated manner. To address this research gap, we developed a planning model. This planning model intends to assist organizations in determining which BPM- and process-level projects they should implement in which sequence to maximize their firm value, catering for the projects' effects on process performance and for interactions among projects. We adopt the design science research (DSR) paradigm and draw from project portfolio selection as well as value-based management as justificatory knowledge. For this reason, we refer to our approach as value-based process project portfolio management. To evaluate the planning model, we validated its design specification by discussing it against theory-backed design objectives and with BPM experts from different organizations. We also compared the planning model with competing artifacts. Having instantiated the planning model as a software prototype, we validated its applicability and usefulness by conducting a case based on real-world data and by challenging the planning model against accepted evaluation criteria from the DSR literature. For our overseas readers, we then present the insights from this paper in Spanish, French, Portuguese, and German.

Keywords: Business process management, Capability development, Process decision-making, Process improvement, Project portfolio management, Value-based management

SUMMARY

- In this study, we investigated how organizations can develop their BPM capability and improve individual processes in an integrated manner. Adopting the DSR paradigm, our artifact is a planning model that assists organizations in determining which BPM- and process-level projects they should implement in which sequence to maximize their firm value, while catering for the projects' effects on process performance and for interactions among projects. With the planning model building on

PPS and VBM, we refer to our approach as value-based process project portfolio management. BPM-level projects aim at developing an organization's BPM capability. They can influence operational processes by facilitating the implementation of future process-level projects or by making processes more cost-efficient starting from the next period. Process-level projects improve the cost, quality, and time of individual processes. The planning model recommends selecting those process- and BPM-level projects that, scheduled in a particular way, create the highest value contribution, which is measured in terms of the respective project roadmap's NPV. By differentiating between multiple periods, the planning model captures the long-term effects of BPM- and process-level projects on process performance and on one another as well as interactions among projects. The planning model thereby deals with path dependencies that most likely occur when developing an organization's BPM capability and improving individual processes in an integrated manner. We evaluated the planning model by discussing its design specification against theory-backed design objectives, comparing the design specification with competing artifacts, and discussing the design specification with subject matter experts from different organizations.

- While validating the planning model's design specification, applicability, and usefulness, we identified limitations and directions in which the planning model can be further developed. Below, we present these limitations together with ideas for future research.
- Regarding its design specification, the planning model only caters for deterministic interactions among projects, captures risk and the decision-makers' risk attitude rather implicitly via a risk-adjusted interest rate, and treats the processes in focus as independent. Deterministic interactions among projects can be substituted by stochastic interactions. In this case, it would be necessary to model the effects of BPM- and process-level projects as random variables with individual probability distributions. Risk and the decision-makers' risk attitude can be addressed more explicitly by modeling the value contribution's expected value and risk separately, e.g., based on the certainty equivalent method. In this case, it would be necessary to estimate probability distributions for all periodic performance indicators. As for interactions among processes, the planning model could incorporate interactions such as typically captured in process architectures. Another extension would be explicitly differentiating multiple capability areas as included in de Bruin and Rosemann BPM capability framework and, correspondingly, modeling the effects of BPM-level projects in greater detail. For future research, we recommend deliberating which of these limitations regarding the planning model's design specification should be incorporated.

HIGHLY INFLUENTIAL ARTICLE

We used the following article as a basis of our evaluation:

Lehnert, M., Linhart, A., & Röglinger, M. (2016). Value-based process project portfolio management: integrated planning of BPM capability development and process improvement. Business Research, 9(2), 377–419.

This is the link to the publisher's website:
https://link.springer.com/article/10.1007/s40685-016-0036-5

INTRODUCTION

Process orientation is an accepted paradigm of organizational design (Kohlbacher and Reijers 2013). Due to constant attention from industry and academia, the business process management (BPM) community has developed mature approaches, methods, and tools that support process discovery, design, analysis, enactment, and improvement (van der Aalst 2013). According to the 2014 BPTrends report, process improvement has been a top priority of process decision-makers for over a decade (Harmon and Wolf 2014). At the same time, the BPM community has been and still is paying ever more attention to BPM itself and the development of organizations' BPM capability (Pöppelbuß et al. 2015; Rosemann and de Bruin 2005; Trkman 2010; Zairi 1997).

In the literature, BPM capability development and process improvement are isolated topics. Research on BPM capability development splits into three streams: The first stream focuses on identifying the constituents of BPM and developing related capability frameworks (de Bruin and Rosemann 2007; Jurisch et al. 2014; van Looy et al. 2014). The common approach is to group capabilities with similar characteristics into capability areas and eventually into factors (Rosemann and vom Brocke 2015). The second stream is concerned with describing how organizations develop their BPM capability and explaining different types of BPM capability development from a theoretical perspective (Niehaves et al. 2014; Pöppelbuß et al. 2015). The third stream related to BPM capability development takes a prescriptive perspective, providing guidance on how to develop BPM in light of different organizational contexts. BPM maturity models were long-time seen as an appropriate tool for BPM capability development (Hammer 2007; Röglinger et al. 2012). However, criticized for ignoring path dependencies and for being context-agnostic, maturity models lost popularity in BPM research (Pöppelbuß et al. 2015). Despite valuable BPM capability frameworks, there is little guidance on how to develop an organization's BPM capability.

As for process improvement, many approaches are available (Zellner 2011). These approaches can be distinguished into continuous improvement and business process reengineering as well as into model- and data-based approaches, each class featuring strengths and weaknesses (van der Aalst 2013; Vergidis et al. 2008). Most process improvement approaches share the individual process as unit of analysis. They are commonly criticized for a lack of guidance on how to put process improvement into practice (Zellner 2011). Some approaches responded to this criticism. To list some recent examples: Taking a project portfolio perspective, Linhart et al. (2015) analyze which projects to implement over time to improve an individual process along established industrialization strategies. Ohlsson et al. (2014) help categorize improvement initiatives based on a process assessment heatmap and a process categorization map. Forstner et al. (2014) provide a decision framework for determining optimal changes in process capability levels, focusing on a single process and related capability areas. Some approaches also consider multiple processes. Bandara et al. (2015), for example, compile process prioritization approaches, characterizing them as too high-level to be useful or as such detailed that the mere identification of critical processes requires significant effort. Combining a multi-process and multi-project perspective, Darmani and Hanafizadeh (2013) help select processes and best practices for process reengineering, aiming for lower risk and higher success of improvement projects. Shrestha et al. (2015) provide a selection method for IT service management processes.

In a nutshell, existing approaches to process improvement and prioritization do not entwine their results with the development of an organization's BPM capability. Vice versa, the few approaches that provide guidance on how to develop an organization's BPM capability neglect the improvement of individual processes. There is a lack of prescriptive knowledge on how to develop an organization's BPM capability and improve individual processes in an integrated manner. This is why we investigate the following research question: How can organizations develop their BPM capability and improve individual processes in an integrated manner?

This research question is not only relevant from an academic but also from an industry perspective. For example, de Bruin and Rosemann (2007) seminal BPM capability framework, whose design involved many BPM professionals, highlights "process improvement planning" as well as "process program and project planning" as important BPM constituents. This relevance was confirmed by Lohmann and zur Muehlen (2015) as well as Müller et al. (2016) who recently investigated which BPM roles and competences are demanded by industry.

To address the research question, we developed a planning model. This planning model intends to assist organizations in determining which BPM- and process-level projects they should implement in which sequence to maximize the firm value, while catering for the projects' effects on process performance and for interactions among projects. Thereby, we adopt the design science research (DSR) paradigm and draw from project portfolio selection (PPS) as well as value-based management (VBM) as justifiable knowledge (Gregor and Hevner 2013). This study design is sensible for several reasons: First, planning models are a valid DSR artifact type (March and Smith 1995). Second, processes are typically improved, and an organization's BPM capability is typically developed via projects (Dumas et al. 2013). Third, value orientation is an accepted paradigm of corporate and process decision-making (Buhl et al. 2011; vom Brocke and Sonnenberg 2015). As the planning model relies on PPS and VBM, we refer to our approach as value-based process project portfolio management. With this study, we extend our prior research on the planning of BPM capability development and process improvement (Lehnert et al. 2014). We alleviate almost all simplifying assumptions, i.e., projects can now take multiple periods, be executed in parallel subject to various interactions as well as affect process performance absolutely and relatively. Furthermore, we advanced the evaluation by validating the planning model's design specification via expert interviews, by discussing the design specification against design objectives and competing artifacts, by conducting a case based on real-world data and a software prototype, and by reasoning about the model's applicability and usefulness.

Following the DSR methodology as per Peffers et al. (2008), this study discusses the identification of and motivation for the research problem, objectives of a solution, design and development, and evaluation. In Sect. 2, we provide relevant justificatory knowledge and derive design objectives (objectives of a solution). In Sect. 3, we outline the research method and evaluation strategy. In Sect. 4, we introduce the planning model's design specification (design and development). Section 5 reports on our evaluation activities (evaluation). We conclude in Sect. 6 by pointing to limitations and future research possibilities.

CONCLUSION

Summary and Contribution

In this study, we investigated how organizations can develop their BPM capability and improve individual processes in an integrated manner. Adopting the DSR paradigm, our artifact is a planning model that assists organizations in determining which BPM- and process-level projects they should implement in which sequence to maximize their firm value, while catering for the projects' effects on process performance and for interactions among projects. With the planning model building on PPS and VBM, we refer to our approach as value-based process project portfolio management. BPM-level projects aim at developing an organization's BPM capability. They can influence operational processes by facilitating the implementation of future process-level projects or by making processes more cost-efficient starting from the next period. Process-level projects improve the cost, quality, and time of individual processes. The planning model recommends selecting those process- and BPM-level projects that, scheduled in a particular way, create the highest value contribution, which is measured in terms of the respective project roadmap's NPV. By differentiating between multiple periods, the planning model captures the long-term effects of BPM- and process-level projects on process performance and on one another as well as interactions among projects. The planning model thereby deals with path dependencies that most likely occur when developing an organization's BPM capability and improving individual processes in an integrated manner. We evaluated the planning model by discussing its design specification against theory-backed design objectives, comparing the design specification with competing artifacts, and discussing the design specification with subject matter experts from different organizations. We also validated the planning model's applicability and usefulness by conducting a case based on real-world data as well as by discussing the planning model and the software prototype against established evaluation criteria from the DSR literature.

Our planning model contributes to the prescriptive body of knowledge related to BPM capability development and process decision-making. It is the first approach to integrate the development of an organization's BPM capability with the improvement of individual processes. Competing artifacts either focus on the prioritization of multiple improvement projects for individual processes or on the prioritization of multiple processes for improvement purposes. In line with dynamic capability theory, reasoning about the development of an organization's BPM capability only makes sense when considering how BPM affects processes. The reason is that BPM is a dynamic capability, which is known to affect organizations only indirectly via operational capabilities, i.e., processes. Incorporating that and formalizing how decisions on

BPM as a dynamic capability affect (decisions on) processes as an organization's operational capabilities, the planning model applies knowledge from dynamic capability in a novel way. To the best of our knowledge, dynamic capability theory has so far only been applied to BPM-related research problems for descriptive purposes. Finally, the planning model is the first to integrate multiple processes, multiple projects, and multiple periods. It thereby links the three disciplines BPM, PPS, and VBM. Whereas research has been conducted at the intersection of any pair of these disciplines, this is not the case for the entire triad.

Limitations and Future Research

While validating the planning model's design specification, applicability, and usefulness, we identified limitations and directions in which the planning model can be further developed. Below, we present these limitations together with ideas for future research.

Regarding its design specification, the planning model only caters for deterministic interactions among projects, captures risk and the decision-makers' risk attitude rather implicitly via a risk-adjusted interest rate, and treats the processes in focus as independent. Deterministic interactions among projects can be substituted by stochastic interactions. In this case, it would be necessary to model the effects of BPM- and process-level projects as random variables with individual probability distributions. Risk and the decision-makers' risk attitude can be addressed more explicitly by modeling the value contribution's expected value and risk separately, e.g., based on the certainty equivalent method. In this case, it would be necessary to estimate probability distributions for all periodic performance indicators. As for interactions among processes, the planning model could incorporate interactions such as typically captured in process architectures. Another extension would be explicitly differentiating multiple capability areas as included in de Bruin and Rosemann (2007) BPM capability framework and, correspondingly, modeling the effects of BPM-level projects in greater detail. For future research, we recommend deliberating which of these limitations regarding the planning model's design specification should be incorporated. When extending the planning model, however, one has to keep in mind that models are purposeful abstractions from the real world that need not necessarily capture all the complexity of the real world. It is imperative to assess carefully whether the gained increase in closeness to reality outvalues the related increases in complexity and data collection effort. For example, instead of incorporating stochastic interactions, it is possible to leverage the scenario analysis functionality implemented in the prototype.

As for the planning model's applicability and usefulness, we concede that—despite various simulation runs based on artificial data—we applied the planning model only once based on real-world data. While this case corroborated that relevant input data can be gathered and that the planning model offers useful guidance, we neither have substantial experience in data collection routines nor about reference data to calibrate the planning model for various application contexts. Future research should, thus, focus on conducting more real-world case studies in different organizational contexts and on setting up a respective knowledge base. Case studies will not only help gain experience regarding data collection but also identify how the planning model's design specification must be tailored to fit additional contexts. To facilitate additional case studies, we also recommend further developing the prototype, such that it can be used more conveniently in naturalistic settings, provides more sophisticated analysis functionality, and can be extended more easily for future evaluation purposes.

APPENDIX

FIGURE 1
CONCEPTUAL ARCHITECTURE OF THE PLANNING MODEL'S DESIGN SPECIFICATION

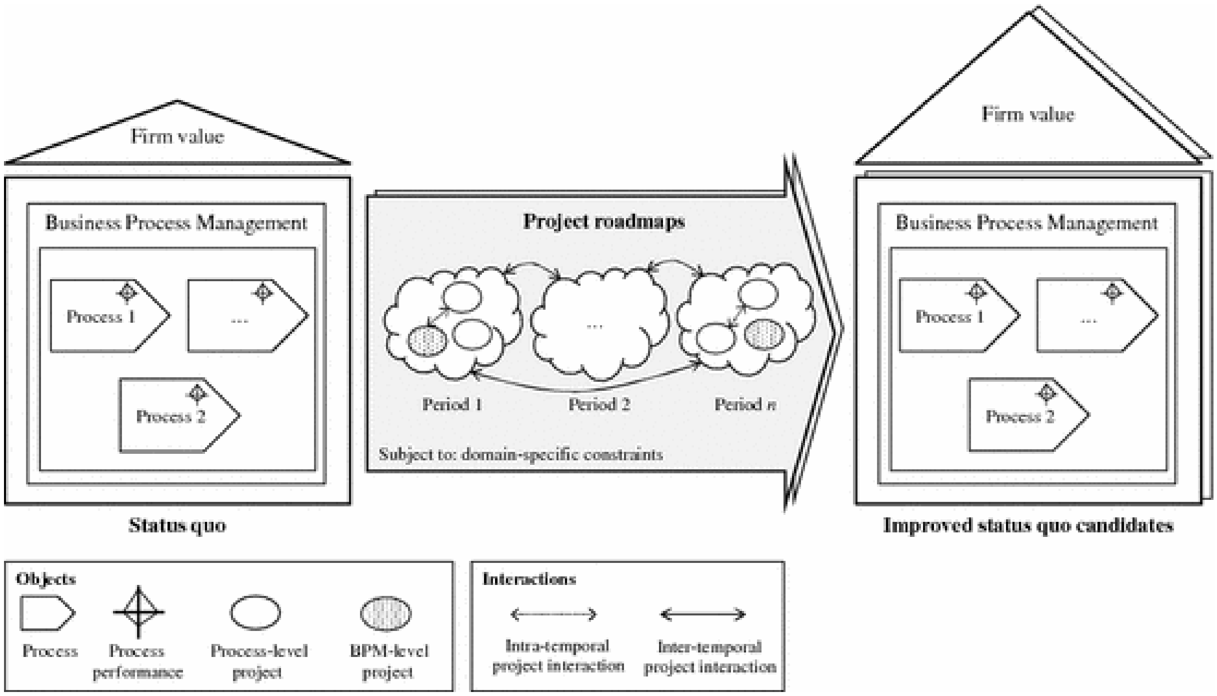

FIGURE 2
PERFORMANCE EFFECTS OF PROCESS- AND BPM-LEVEL PROJECTS (FOR A SINGLE PERIOD AND PROCESS)

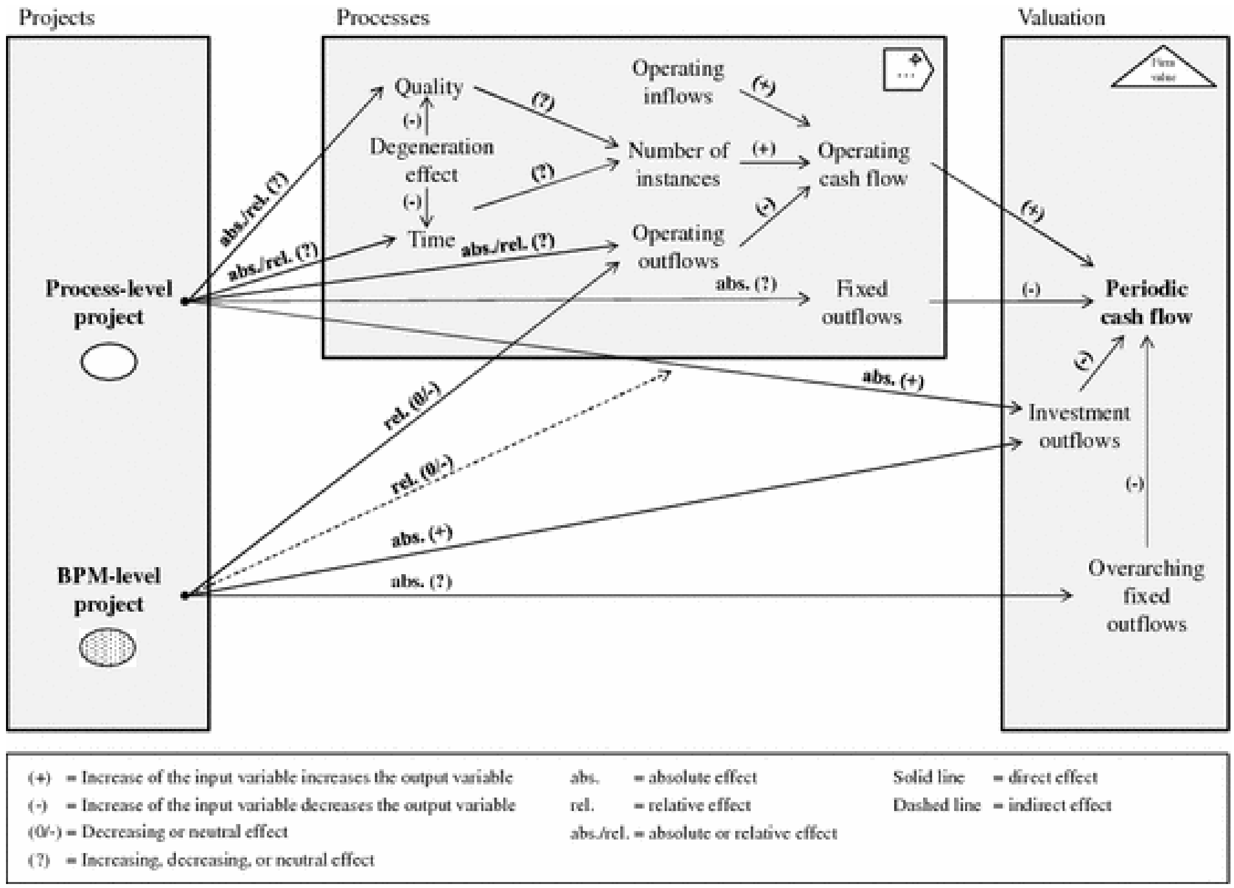

FIGURE 3
SOFTWARE PROTOTYPE—INPUT DATA SECTION

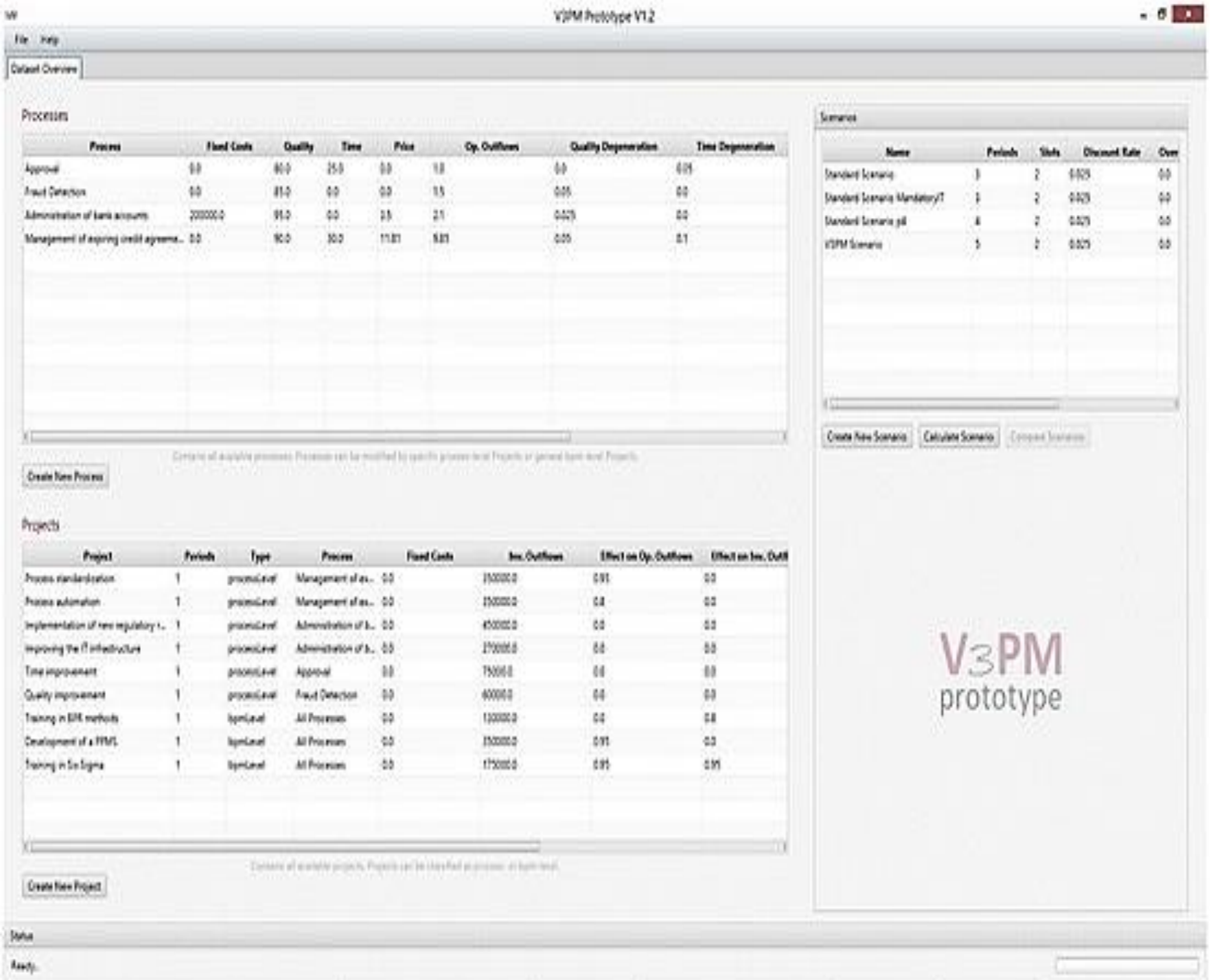

FIGURE 4
SOFTWARE PROTOTYPE—SCENARIO ANALYSIS SECTION

TABLE 1
INTERACTIONS AMONG PROJECTS AND DOMAIN-SPECIFIC CONSTRAINTS

Interactions among projects		
Local mutual exclusiveness	$LocMutEx(s, s')$	Either project s or s' can be implemented in the same period. According to assumption (A.2), all process-level projects referring to the same process are locally mutually exclusive
Global mutual exclusiveness	$GloMutEx(s, s')$	Either project s or s' can be implemented in the same project roadmap
Local mutual dependency	$LocMutDep(s, s')$	If project s or s' is included in a project roadmap, the other project must be included as well. The implementation of both projects must start in the same period
Global mutual dependency	$GloMutDep(s, s')$	If project s or s' is included in a project roadmap, the other project must be included as well
Predecessor/successor	$PreSuc(s, s')$	If included in a project roadmap, project s' must be implemented after project s has been finished
Project-specific constraints		
Earliest beginning	$Earliest(s, y)$	If included in a project roadmap, the implementation of project s must start in period y at the latest
Latest completion	$Latest(s, y)$	If included in a project roadmap, the implementation of project s must be finished in period y at the latest
Mandatory project	$Mandatory(s)$	Project s must be included in each project roadmap
Process-specific constraints		
Critical quality boundary	$QualMin(x, i, y)$	There is a critical quality boundary x, which process i must not fall short of in period y. This constraint applies particularly to support processes where the number of instances is invariant regarding quality
Critical time boundary	$TimeMax(x, i, y)$	There is a critical time boundary x, which process i must not exceed of in period y. This constraint applies particularly to support processes where the number of instances is invariant regarding time
Period-specific constraints		
Periodic process-level budget	$BudPro(x, i, y)$	In period y, there is a budget x regarding process i, which the investment outflows of the currently running process-level project must not exceed
Periodic BPM-level budget	$BudBPM(x, y)$	In period y, there is a budget x, which the investment outflows of all currently running BPM-level projects must not exceed
Overall periodic budget	$Budget(x, y)$	In period y, there is a budget x, which the investment outflows of all currently running projects must not exceed
Number of projects	$NumProj(x, y)$	In period y, the number of all currently running projects must not exceed x (e.g., due a given number of project managers)

TABLE 2
RESULTS OF FEATURE COMPARISON INCLUDING COMPETING ARTIFACTS

	Characteristics of our planning model	Bandara et al. (2015)	Darmani and Hanafizadeh (2013)	Forstner et al. (2014)	Linhart et al. (2015)	Ohlsson et al. (2014)	Shrestha et al. (2015)
Summary	Supports the selection and scheduling of BPM- and process-level projects to develop organization's BPM capability and improve individual processes in an integrated way. Projects are compiled into project roadmaps, which are assessed via their value contribution. Our planning model takes a multi-process, multi-project, and multi-period perspective	Supports the prioritization of process improvement projects with the business value scoring (BVS) model. The BVS is a multi-dimensional, multi-level, multi-stakeholder approach in assessment. It integrates the assessment results into a single indicator to capture the business value of improvement projects	Supports the selection of processes and best practice candidates for business process reengineering. The method aims to achieve lower risk and higher probability of success for process improvement projects	Supports decisions on how to determine the optimal increase/decrease of process capability levels. The model focuses on a single core process with multiple related capability areas, which include management and support processes. The concept of projects is captured implicitly via increases/decreases of capability levels	Supports the selection and scheduling of process improvement projects along established industrialization strategies, accounting for process characteristics that reflect how work is performed and organized. Projects are compiled into improvement roadmaps, which are assessed via their value contribution	Supports the categorization of business processes and the prioritization of improvement initiatives. Central artifacts are the process assessment heatmap and the process categorization map	Supports the selection of processes for improvement in IT service management. The process selection method balances business and IT service management objectives and builds on a decision support system to recommend which processes should be considered for improvement
(O.1a)	Our planning model considers BPM- and process-level projects. These project types help develop operational capabilities (processes) and BPM as a particular dynamic capability	The focus is on an organization's individual processes. BPM is not considered	The focus is on determining best practices for selected strategic processes. BPM is not considered	Projects directly affect capability areas. The core process is affected transitively. BPM is not considered as the model builds on process maturity models	Projects can affect process performance or multiple characteristics that reflect how work is performed and organized. BPM is not considered	Projects can affect processes in terms of differentiation, formality, and value network governance such as indicated in the process categorization map. BPM is not considered	The method yields a process selection matrix without a focus on projects. It focuses on single processes. BPM is not considered
(O.1b)	Process-level projects affect individual processes. BPM-level projects affect all processes under investigation and/or facilitate the implementation of process-level projects in the future	Projects affect a distinct process. There are no projects that affect multiple processes	Projects affect a distinct process. There are no projects that affect multiple processes	Projects affect a distinct process. There are no projects that affect multiple processes	Projects affect a distinct process. There are no projects that affect multiple processes	Projects affect single processes. There are no projects that affect multiple processes	The focus is on individual processes. Projects are not considered
(O.2)	Our planning model accounts for the time, quality, and cost dimensions of process performance as well as for the trade-offs among these dimensions. The cost perspective is analyzed in great detail according to the VBM paradigm	The BVS gives a high-level overview of how to calculate the business value of improvement projects. It includes the six dimensions reputation, clients, business processes, financial opportunity, regulation and compliance, and human resources	Process performance is not quantified via performance indicators. 19 factors and 44 indicators are defined to determine the perceived degree of change in relation to corporate strategy	Process performance is measured in terms of the risk-adjusted expected NPV in line with the VBM paradigm. No operational performance indicators are considered	Process performance is operationalized in terms of time, quality, and costs, catering for trade-offs. For each dimension, several performance indicators are used. The cost perspective is analyzed in great detail according to the VBM paradigm	Process performance is assessed qualitatively via different color regimes in the process assessment heatmap. It covers five perspectives (i.e., positioning, relating, preparing, implementing, proving), which relate to de Bruin and Rosemann (2007) BPM capability framework	A perceived service gap is derived based on the SERVQUAL model. To do so, business drivers in the context of IT services are rated qualitatively

(O.3a)	Projects can affect the performance of individual or of all processes. They can also influence the investment outflows of future projects. Project effects on process performance can be absolute or relative	Each project is estimated based on the expected outcomes with respect to the dimensions mentioned above	Project effects are defined and evaluated based on the perceived degree of change, i.e., the difference between the weighted value of the conditions before and after project implementation	Effects of individual projects are measured via increases/decreases of capability levels	Projects can affect the performance of an individual processes and further characteristics that reflect how work is performed and organized. Thereby, projects can transitively (but not directly) affect the investment outflows of future projects	Projects can affect processes in terms of differentiation, formality, and value network governance such as indicated in the process categorization map	The focus is on processes, not on projects. Thus, a perceived service gap is determined. No performance effects of projects are included
(O.3b)	Our planning model considers deterministic, scheduling, and intra- as well as inter-temporal interactions among projects	No interactions among projects are considered	No interactions among projects are considered	Interactions are considered implicitly via the lifecycle logic of process maturity models. There are strict predecessor/successor interactions regarding single capability areas. No further interactions are considered	The approach considers deterministic and scheduling interactions. Inter-temporal interactions are only modeled implicitly. Intra-temporal interactions are neglected due to the focus on an individual process	No interactions among projects are considered	No interactions among projects are considered
(O.3c)	The planning model accounts for general interactions among projects and for BPM-specific interactions	No domain-specific constraints are considered	No domain-specific constraints are considered	No domain-specific constraints are considered	Domain-specific constraints are only modeled implicitly	No domain-specific constraints are considered	No domain-specific constraints are considered
(O.4a)	Our planning model ranks project roadmaps according to their value contribution, measured in terms of the project roadmaps' NPV	The BVS aggregates qualitative estimations to a single indicator reflecting the business value of an improvement project	Projects effects are determined using non-monetary measures. The model maximizes the weighted perceived degree of change using fuzzy numbers	The planning model considers the risk-adjusted expected NPV of increasing/decreasing capability levels	Project roadmaps are ranked in line with their value contribution, measured in terms of the project roadmaps' NPV	Project effects are assessed qualitatively by positioning processes within the process categorization map. Qualitative effects are not integrated into a single numeric value	The process selection matrix builds on strategic business drivers and a service gap perception. No cash flows or other monetary performance indicators are included
(O.4b)	Long-term effects are considered via the NPV. Different periods in time are considered explicitly due to inter-temporal interactions among projects	Long-term effects are not considered	Long-term effects are not considered	Long-term effects are considered via the NPV. There is no distinction between different periods in time	Long-term effects are considered via the NPV. Different periods in time are considered explicitly. Inter-temporal project interactions are only modeled implicitly	Long-term effects are not considered	Long-term effects are not considered
(O.4c)	Our planning model accounts for the decision-makers' risk attitude using a risk-adjusted interest rate	The decision-makers' risk attitude is not covered explicitly	The approach aims at maximizing the weighted perceived degree of change considering the risk of differing scenarios and the change tolerance of the company	Risk is considered using the risk-adjusted expected NPV. Expected value and risk are considered explicitly via the certainty equivalent method	The decision-makers' risk attitude is captured using a risk-adjusted interest rate	Risk is not considered	No risk attitude is included. However, in the determination of the business drivers with the balance score card, it is possible to weight dimensions differently

TABLE 3
HIGHLIGHTS FROM THE EXPERT INTERVIEWS

	PRODUCT	SERVICE
Processes	For many support processes, it was impossible to unambiguously determine the number of instances because of the high level of abstraction used for process modeling	The number of instances of most processes is driven by quality and time. Some processes are only driven by quality, others only by time
	Process quality was consistently measured in terms of maturity levels	The performance indicators used to operationalize quality and time strongly depend on the process at hand
		The company must continuously invest to keep up with its customers' increasing quality expectations (degeneration effects)
Projects	There are BPM-level projects without positive effects that must be implemented before any other BPM-level project	There are process-level projects (pioneer projects) without positive effects that must be implemented before any other process-level project related to the process in focus
	The implementation of a project takes between 3 months and 1 year.	
	Process-level projects and BPM-level projects are often implemented simultaneously (e.g., process modeling training and process analysis projects)	The implementation of a project takes either one or two periods according to the company's PPS cycle. Longer projects are not allowed
		Only one process-level project can be implemented per process and period
Interactions and constraints	There is a global budget based on which BPM-level projects are funded and several (department-) specific budgets are used to fund process-level projects	There are many regulatory projects per period. These projects must be finished in a predetermined period at the latest
	To comply with the industry's quality management standards, selected support and all core processes must not violate predetermined quality boundaries. There is no such boundary for time	There are sequences of BPM-level and process-level projects that reach up to five periods in the future
		There is one budget for process-level projects and another budget for BPM-level projects

TABLE 4
PROCESSES WITHIN THE CASE

Process	Demand logic	Price and billing	Constraints	Degeneration
(I)	Driven by quality and time	Pay per execution	–	–
(II)	Constant	Fixed price per account	$QualMin\ (80\%, II, all)$	Quality
(III)	Constant	No price, as process is integrated in core process	$TimeMax\ (60\,\text{min}, III, all)$	Time
(IV)	Constant	No price, as process is integrated in core process	$QualMin\ (70\%, IV, all)$	Quality

TABLE 5

PROCESS-LEVEL PROJECTS CONSIDERED IN THE CASE

Project	Description/effects	Affected process	Interactions/constraints
(1)	*Process standardization*	(I)	$PreSuc\ (s_1, s_2)$
	Increases quality and reduces operating outflows		
(2)	*Process automation*	(I)	$PreSuc\ (s_1, s_2)$
	Reduces time, increases quality, and reduces operating outflows		
(3)	*Implementation of new regulatory requirements*	(II)	$Latest\ (s_3, 3), Madatory\ (s_3)$
	No effects on process performance		
(4)	*Improving the IT infrastructure*	(II)	–
	Reduces fixed outflows		
(5)	*Time improvement*	(III)	–
	Reduces time		
(6)	*Quality improvement*	(IV)	–
	Increases quality		

TABLE 6

BPM-LEVEL PROJECTS CONSIDERED IN THE CASE

Project	Description/effects	Interactions/constraints
(7)	*Training in BPR methods*	$LocMutEx\ (s_7, s_8)$
	Indirect effect on operational capabilities as such training allows implementing future process-level projects more easily	
(8)	*Development of a process performance measurement system*	$LocMutEx\ (s_7, s_8)$
	Direct effects on operational capabilities reduce operating outflows of all processes under investigation	
(9)	*Training in Six Sigma*	–
	Combination of direct and indirect effects. Indirect effects affect future process-level projects, direct effects reduce operating outflows of all processes	

TABLE 7

OPTIMAL PROJECT ROADMAPS FROM THE SCENARIO ANALYSIS

		Optimal project roadmap/value contribution	Description
(A) General case	Opt.	Project roadmap: ({1, 9}, {2, 4}, {3}, {6}, {}) NPV: 2.50 million EUR Robustness: 100 %	General case About 240,000 project roadmaps meet the interactions and constraints The interactions and constraints reduce the potential project roadmaps as follows:
	Pess.	Project roadmap: ({1, 9}, {2}, {3}, {6}, {}) NPV: 1.20 million EUR Robustness: 90.8 %	*LocMutEx* (s_7, s_8): 180,000 *PreSuc* (s_1, s_2): 1,290,000 *Latest* (s_3, 3)and *Mandatory* (s_3): 650,000 *Budget* (750, 000, *ALL*): 150,000 *QualMin* (70 %, *IV*, *ALL*): 190,000
(B) Overall budget	Opt.	Project roadmap: ({1, 7}, {2}, {3}, {6}, {}) NPV: 2.23 million EUR Robustness: 98.2 %	Overall budget is reduced by one-third About 40,000 project roadmaps meet the interactions and constraints About 480,000 project roadmaps violate the constraint: *Budget* (500, 000, *ALL*)
	Pess.	Project roadmap: ({4, 9}, {1}, {3}, {6}, {}) NPV: 1.09 million EUR Robustness: 84.1 %	
(C) Latest finish	Opt.	Project roadmap: ({3, 9}, {1, 4}, {2}, {6}, {}) NPV: 1.92 million EUR Robustness: 100 %	Project (3) must be already finished period 1 About 80,000 project roadmaps meet the interactions and constraints About 1,000,000 project roadmaps violate the constraints *Latest* (s_3, 1)and *Mandatory* (s_3)
	Pess.	Project roadmap: ({3, 9}, {1}, {}, {6}, {}) NPV: 1.02 million EUR Robustness: 93.4 %	
(D) Critical quality boundary	Opt.	Project roadmap: ({1, 9}, {2, 6}, {3}, {}, {}) NPV: 2.37 million EUR Robustness: 100 %	Minimum quality of process (IV) is increased About 120,000 project roadmaps meet the interactions and constraints About 410,000 project roadmaps violate the constraint *QualMin* (80 %, IV, *ALL*)
	Pess.	Project roadmap: ({1, 9}, {2, 6}, {3}, {}, {}) NPV: 1.19 million EUR Robustness: 90.8 %	

TABLE 8
DISCUSSION OF USEFULNESS

Criterion	**Characteristics of the planning model and the software prototype**
Applicability (model and instantiation)	The case based on real-world data, which we presented in Sect. 5.3.1, illustrated that the planning model is applicable in naturalistic settings. As the planning model's calculation logic is complex and the number of possible project roadmaps heavily grows with the number of considered processes, projects, and planning periods, the planning model could not be applied without the software prototype. The expert interviews revealed that the planning model particularly fits organizations that aspire a well-developed BPM capability and are willing to invest accordingly. For instance, the planning model is oversized for PRODUCT, while it

	perfectly fits SERVICE. Organizations that plan to apply the planning model also require some areas of their BPM capability to be developed beforehand, including process metrics and enterprise process architecture Another issue with impact on applicability is that the planning model requires collecting and estimating input data regarding processes, projects, interactions, and constraints. According to the interviews, SERVICE disposed of most input data and only had to estimate project effects. PRODUCT's experts indicated that the required data can also be collected in non-automated environments. To cope with estimation inaccuracies, which are inevitable in naturalistic settings, the software prototype implements robustness check and analysis functionality, as discussed in Sect. 5.2. Applying the planning model should not be an one-off initiative. Rather, the planning model should be applied repeatedly. A knowledge base should be built to institutionalize data collection routines and collect best practices
Impact on the artifact environment and users (model and instantiation)	The planning model impacts how users think about how to develop their organization's BPM capability and to improve individual processes in an integrated manner. On the one hand, the planning model's formal design specification provides insights into central constructs and mechanisms of integrated BPM capability development and process improvement. On the other, the prototype's visualization and analysis functionality helps users understand the situation and possibilities for action in their organizations. The experts from SERVICE and PRODUCT agreed that the planning model enhances the organizations' process decision-making capabilities
Fidelity with the real-world phenomena (model)	Based on the covered process and project types, interactions, and constraints as well as performance dimensions, the planning model can handle many different constellations that occur in naturalistic settings. This has been confirmed by the experts from PRODUCT and SERVICE
Internal and external consistency (model)	The planning model is internally consistent as it has been designed deductively and as its components are modular such that side effects cannot occur. Further, the planning model's design specification is available in terms of mathematical formulae, a property that facilitates checking internal consistency. As for external consistency, the planning model does not contradict accepted knowledge from other disciplines, such as BPM, PPS, or VBM. Rather, the planning model was built based on knowledge from these disciplines as justificatory knowledge. These disciplines also served as foundation for deriving our design objectives
Effectiveness and efficiency (instantiation)	The experts we interviewed, particularly those from SERVICE based on whose data we applied the planning model, agreed that the software prototype can be effectively used to plan the development of an organization's BPM capability and the improvement of individual processes in an integrated manner. As for efficiency, we conducted performance tests with the prototype on regular work stations such as used in business environments. The prototype efficiently processes industry-scale problems as long as the number of planning periods, which is the

	most influential driver of problem complexity, is not too large. As the number of planning periods is rather small in naturalistic settings (i.e., between 2 and 8 according to our experiences), this limitation does not heavily restrict the prototype's efficiency. For example, the case presented in Sect. 5.3.1 required 26 s to determine admissible project roadmaps and to calculate the corresponding value contributions. The robustness check of the optimal project roadmap took about 3 min, being limited to the best 50,000 project roadmaps. Another driver of the problem complexity is the amount of available projects, which increases the amount of admissible project roadmaps over-proportionally. To reduce this complexity, it is important to include only those projects that already passed the first three stages of Archer and Ghasemzadeh's (1999) PPS process and to consider all the known constraints in the prototype, as these considerably reduce the amount of admissible project roadmaps

TABLE 9
PROCESSES

i	$O_{i,0}^{fix}$	n_i	$q_{i,0}$ (%)	$t_{i,0}$ (min)	I_i^{op}	$I_{i,0}^{op}$	η_i (%)	q_i^{max} (%)	θ_i (%)
(I)	0 €	$48,000\left(\ln q+e^{\frac{1}{i}}\right)$	90	30	11.81 €	9.85 €	5	100	10
(II)	200,000 €	200,000	95	–	3.50 €	2.10 €	2.5	100	–
(III)	0 €	300,000	80	25	–	1.00 €	–	100	5
(IV)	0 €	4,000	85	–	–	1.50 €	5	100	–

TABLE 10
PROCESS-LEVEL PROJECTS

s	O_s^{inv}	α_s		β_s		γ_s		δ_s	
		Opt.	Pess.	Opt.	Pess.	Opt.	Pess.	Opt.	Pess.
1	350,000 €	1.1	1.05	–	–	0.95	0.95	–	–
2	350,000 €	+10 %	+3 %	−10 min	−3 min	0.8	0.95	–	–
3	450,000 €	–	–	–	–	–	–	–	–
4	270,000 €	–	–	–	–	–	–	−120,000 €	−80,000 €
5	75,000 €	–	–	0.7	0.8	–	–	–	–
6	60,000 €	+30 %	+20 %	–	–	–	–	–	–

TABLE 11
BPM-LEVEL PROJECTS

s	O_s^{inv}	ε_s		ζ_s		ϵ_s	
		Opt.	Pess.	Opt.	Pess.	Opt.	Pess.
7	130,000 €	–	–	0.80	0.85	–	–
8	350,000 €	0.95	0.97	–	–	–	–
9	175,000 €	0.95	0.97	0.95	0.97	–	–

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TRANSLATED VERSION: SPANISH

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

VERSION TRADUCIDA: ESPAÑOL

A continuación se muestra una traducción aproximada de las ideas presentadas anteriormente. Esto se hizo para dar una comprensión general de las ideas presentadas en el documento. Por favor, disculpe cualquier error gramatical y no responsabilite a los autores originales de estos errores.

INTRODUCCIÓN

La orientación de procesos es un paradigma aceptado de diseño organizacional (Kohlbacher y Reijers 2013). Debido a la atención constante de la industria y la academia, la comunidad de gestión de procesos de negocio (BPM) ha desarrollado enfoques, métodos y herramientas maduras que apoyan el descubrimiento de procesos, diseño, análisis, promulgación y mejora (van der Aalst 2013). Según el informe bptrends de 2014, la mejora de los procesos ha sido una prioridad de los responsables de la toma de decisiones de procesos durante más de una década (Harmon y Wolf 2014). Al mismo tiempo, la comunidad de BPM ha estado y sigue prestando cada vez más atención a BPM y al desarrollo de la capacidad de BPM de las organizaciones (P-ppelbu y otros 2015; Rosemann y de Bruin 2005; Trkman 2010; Zairi 1997).

En la literatura, el desarrollo de la capacidad de BPM y la mejora de procesos son temas aislados. La investigación sobre el desarrollo de la capacidad de BPM se divide en tres secuencias: la primera secuencia se centra en identificar los componentes de BPM y desarrollar marcos de capacidad relacionados (de Bruin y Rosemann 2007; 2014; van Looy et al. 2014). El enfoque común es agrupar capacidades con características similares en áreas de capacidad y eventualmente en factores (Rosemann y vom Brocke 2015). La segunda secuencia se ocupa de describir cómo las organizaciones desarrollan su capacidad de BPM y explicar diferentes tipos de desarrollo de capacidades de BPM desde una perspectiva teórica (Niehaves et al. 2014; 2015). La tercera secuencia relacionada con el desarrollo de capacidades de BPM toma una perspectiva prescriptiva, proporcionando orientación sobre cómo desarrollar BPM a la luz de diferentes contextos organizativos. Los modelos de madurez de BPM fueron vistos durante mucho tiempo como una herramienta apropiada para el desarrollo de capacidades de BPM (Hammer 2007; 2012). Sin embargo, criticados por ignorar las dependencias de la ruta y por ser independientes del contexto, los modelos de madurez perdieron popularidad en la investigación de BPM (P-ppelbu y otros 2015). A pesar de los valiosos marcos de capacidad de BPM, hay poca orientación sobre cómo desarrollar la capacidad de BPM de una organización.

En cuanto a la mejora del proceso, hay muchos enfoques disponibles (Zellner 2011). Estos enfoques se pueden distinguir en la mejora continua y la reingeniería de procesos de negocio, así como en enfoques basados en modelos y datos, cada clase con fortalezas y debilidades (van der Aalst 2013; 2008). La mayoría de los enfoques de mejora de procesos comparten el proceso individual como unidad de análisis. Comúnmente son criticados por la falta de orientación sobre cómo poner en práctica la mejora de los procesos (Zellner 2011). Algunos enfoques respondieron a esta crítica. Para enumerar algunos ejemplos recientes: Tomando una perspectiva de cartera de proyectos, Linhart et al. (2015) analizan qué proyectos implementar a lo largo del tiempo para mejorar un proceso individual junto con las estrategias de industrialización establecidas. (2014) ayudan a categorizar las iniciativas de mejora basadas en un mapa térmico de evaluación de procesos y un mapa de categorización de procesos. (2014) proporcionan un marco de decisión para determinar los cambios óptimos en los niveles de capacidad del proceso, centrándose en un solo proceso y áreas de capacidad relacionadas. Algunos enfoques también consideran varios procesos. (2015), por ejemplo, compilar enfoques de priorización de procesos, caracterizarlos como demasiado de alto nivel para ser útiles o, como tal, detallados que la mera identificación de procesos críticos requiere un esfuerzo significativo. Combinando una perspectiva multiproceso y multi-proyecto, Darmani y Hanafizadeh (2013) ayudan a seleccionar procesos y mejores prácticas para la reingeniería de procesos, con el objetivo de reducir el riesgo y un mayor éxito de los proyectos de mejora. (2015) proporcionan un método de selección para los procesos de gestión de servicios de TI.

En pocas palabras, los enfoques existentes para la mejora y priorización de procesos no entrelazan sus resultados con el desarrollo de la capacidad de BPM de una organización. Al revés, los pocos enfoques que proporcionan orientación sobre cómo desarrollar la capacidad de BPM de una organización descuidan la mejora de los procesos individuales. Hay una falta de conocimiento prescriptivo sobre cómo desarrollar la capacidad de BPM de una organización y mejorar los procesos individuales de una manera integrada. Es por eso que investigamos la siguiente pregunta de investigación: ¿Cómo pueden las organizaciones desarrollar su capacidad de BPM y mejorar los procesos individuales de manera integrada?

Esta pregunta de investigación no sólo es relevante desde el punto de vista académico, sino también desde una perspectiva de la industria. Por ejemplo, el marco de capacidad de BPM seminal de Bruin y Rosemann (2007), cuyo diseño involucró a muchos profesionales de BPM, destaca la "planificación de la mejora de procesos", así como la "planificación de programas y proyectos de procesos" como componentes importantes de BPM. Esta relevancia fue confirmada por Lohmann y zur Muehlen (2015), así como por la industria, lo confirmaron la relevancia de m'ller et al. (2016).

Para abordar la cuestión de la investigación, desarrollamos un modelo de planificación. Este modelo de planificación tiene la intención de ayudar a las organizaciones a determinar qué proyectos de BPM y de nivel de proceso deben implementar en qué secuencia para maximizar el valor de la empresa, al tiempo que se atienden los efectos de los proyectos en el rendimiento de los procesos y para las interacciones entre los proyectos. De este modo, adoptamos el paradigma de la investigación en ciencia del diseño (DSR) y nos basamos en la selección de cartera de proyectos (PPS), así como la gestión basada en el valor (VBM) como conocimientos justificativos (Gregor y Hevner 2013). Este diseño de estudio es sensato por varias razones: en primer lugar, los modelos de planificación son un tipo de artefacto DSR válido (marzo y Smith 1995).

En segundo lugar, los procesos suelen mejorarse y la capacidad de BPM de una organización se desarrolla normalmente a través de proyectos (Dumas et al. 2013). En tercer lugar, la orientación al valor es un paradigma aceptado de toma de decisiones corporativas y de procesos (Buhl et al. 2011; vom Brocke y Sonnenberg 2015). Como el modelo de planificación se basa en PPS y VBM, nos referimos a nuestro enfoque como gestión de cartera de proyectos de procesos basada en el valor. Con este estudio, ampliamos nuestra investigación previa sobre la planificación del desarrollo de la capacidad de BPM y la mejora de procesos (Lehnert et al. 2014). Aliviamos casi todos los supuestos simplificados, es decir, los proyectos ahora pueden tomar varios períodos, se ejecutan en paralelo sujeto a diversas interacciones, así como afectar el rendimiento del proceso de forma absoluta y relativa. Además, avanzamos en la evaluación validando la especificación de diseño del modelo de planificación a través de entrevistas de expertos, discutiendo la especificación de diseño con respecto a los objetivos de diseño y artefactos de la competencia, realizando un caso basado en datos del mundo real y un prototipo de software, y razonando sobre la aplicabilidad y utilidad del modelo.

Siguiendo la metodología DSR según Peffers et al. (2008), este estudio analiza la identificación y motivación para el problema de la investigación, los objetivos de una solución, el diseño y desarrollo, y la evaluación. En la Sección 2, proporcionamos conocimientos justificativos relevantes y obtenemos objetivos de diseño (objetivos de una solución). En la Sección 3, delineamos el método de investigación y la estrategia de evaluación. En la sección 4, presentamos la especificación de diseño del modelo de planificación (diseño y desarrollo). La Sección 5 informa sobre nuestras actividades de evaluación (evaluación). Concluimos en la Secta 6 señalando limitaciones y futuras posibilidades de investigación.

CONCLUSIÓN

Resumen de unand Contribución

En este estudio, investigamos cómo las organizaciones pueden desarrollar su capacidad de BPM y mejorar los procesos individuales de manera integrada. Adoptando el paradigma DSR, nuestro artefacto es un modelo de planificación que ayuda a las organizaciones a determinar qué proyectos de BPM y de nivel de proceso deben implementar en qué secuencia para maximizar su valor firme, al tiempo que atienden los efectos de los proyectos en el rendimiento de los procesos y para las interacciones entre los proyectos. Con el modelo de planificación basado en PPS y VBM, nos referimos a nuestro enfoque como gestión de cartera de proyectos de procesos basada en el valor. Los proyectos a nivel de BPM tienen como objetivo desarrollar la capacidad de BPM de una organización. Pueden influir en los procesos operativos facilitando la implementación de futuros proyectos a nivel de proceso o haciendo que los procesos sean más rentables a partir del próximo período. Los proyectos a nivel de proceso mejoran el costo, la calidad y el tiempo de los procesos individuales. El modelo de planificación recomienda seleccionar aquellos proyectos de nivel de proceso y BPM que, programados de una manera determinada, crean la contribución de mayor valor, que se mide en términos del NPV de la hoja de ruta del proyecto respectivo. Al diferenciar entre varios períodos, el modelo de planificación captura los efectos a largo plazo de los proyectos de NIVEL de proceso y BPM en el rendimiento de los procesos y entre sí, así como las interacciones entre proyectos. De este modo, el modelo de planificación se ocupa de las dependencias de ruta de acceso que probablemente se producen al desarrollar la capacidad de BPM de una organización y al mejorar los procesos individuales de forma integrada. Evaluamos el modelo de planificación discutiendo su especificación de diseño con respecto a los objetivos de diseño respaldados por la teoría, comparando la especificación de diseño con artefactos de la competencia y discutiendo la especificación de diseño con expertos en la materia de diferentes organizaciones. También validamos la aplicabilidad y utilidad del modelo de planificación mediante la realización de un caso basado en datos del mundo real, así como discutiendo el modelo de planificación y el prototipo de software con respecto a los criterios de evaluación establecidos de la literatura DSR.

Nuestro modelo de planificación contribuye al cuerpo prescriptivo de conocimientos relacionados con el desarrollo de capacidades de BPM y la toma de decisiones de procesos. Es el primer enfoque para integrar el desarrollo de la capacidad de BPM de una organización con la mejora de los procesos individuales. Los artefactos de la competencia se centran en la priorización de múltiples proyectos de mejora para procesos individuales o en la priorización de múltiples procesos con fines de mejora. En línea con la teoría de capacidades dinámicas, el razonamiento sobre el desarrollo de la capacidad de BPM de una organización solo tiene sentido cuando se considera cómo BPM afecta a los procesos. La razón es que BPM es una capacidad dinámica, que se sabe que afecta a las organizaciones sólo indirectamente a través de capacidades operativas, es decir, procesos. Incorporando eso y formalizando cómo las decisiones sobre BPM como capacidad dinámica afectan a los procesos (decisiones sobre) como capacidades operativas de una organización, el modelo de planificación aplica el conocimiento de la capacidad dinámica de una manera novedosa. Hasta el punto de vista de nuestro conocimiento, la teoría dinámica de la capacidad sólo se ha aplicado hasta ahora a los problemas de investigación relacionados con BPM con fines descriptivos. Por último, el modelo de planificación es el primero en integrar varios procesos, varios proyectos y varios períodos. De este modo, vincula las tres disciplinas BPM, PPS y VBM. Mientras que la investigación se ha llevado a cabo en la intersección de cualquier par de estas disciplinas, este no es el caso de toda la tríada.

Limitaciones de unainvestigación futura

Al validar la especificación de diseño, la aplicabilidad y la utilidad del modelo de planificación, identificamos las limitaciones y direcciones en las que se puede desarrollar aún más el modelo de planificación. A continuación, presentamos estas limitaciones junto con ideas para futuras investigaciones.

En cuanto a su especificación de diseño, el modelo de planificación sólo atiende a interacciones deterministas entre proyectos, captura el riesgo y la actitud de riesgo de los responsables de la toma de decisiones de forma bastante implícita a través de una tasa de interés ajustada al riesgo, y trata los procesos enfocados como independientes. Las interacciones deterministas entre proyectos pueden sustituirse por interacciones estocásticas. En este caso, sería necesario modelar los efectos de los proyectos de nivel de proceso y BPM como variables aleatorias con distribuciones de probabilidad individuales. El riesgo y la actitud de riesgo de los responsables de la toma de decisiones pueden abordarse de manera más explícita modelando el valor esperado y el riesgo de la contribución al valor por separado, por ejemplo, sobre la base del método equivalente a la certeza. En este caso, sería necesario estimar las distribuciones de probabilidad para todos los indicadores de rendimiento periódicos. En cuanto a las interacciones entre procesos, el modelo de planificación podría incorporar interacciones como las que normalmente se capturan en arquitecturas de procesos. Otra extensión sería diferenciar explícitamente múltiples áreas de capacidad como se incluye en el marco de capacidad de BPM de Bruin y Rosemann (2007) y, en consecuencia, modelar los efectos de los proyectos a nivel de BPM con mayor detalle. Para futuras investigaciones, recomendamos deliberar cuáles de estas limitaciones con respecto a la especificación de diseño del modelo de planificación deben incorporarse. Al ampliar el modelo de planificación, sin embargo, hay que tener en cuenta que los modelos son abstracciones intencionados del mundo real que no tienen por qué capturar necesariamente toda la complejidad del mundo real. Es imperativo evaluar cuidadosamente si el aumento obtenido en la cercanía a la realidad supera los aumentos relacionados en la complejidad y el esfuerzo de recopilación de datos. Por ejemplo, en lugar de incorporar interacciones estocásticas, es posible aprovechar la funcionalidad de análisis de escenarios implementada en el prototipo.

En cuanto a la aplicabilidad y utilidad del modelo de planificación, reconocemos que, a pesar de varias ejecuciones de simulación basadas en datos artificiales, aplicamos el modelo de planificación solo una vez basado en datos del mundo real. Si bien este caso corroboró que se pueden recopilar datos de entrada relevantes y que el modelo de planificación ofrece orientaciones útiles, no tenemos experiencia sustancial en rutinas de recopilación de datos ni sobre datos de referencia para calibrar el modelo de planificación para varios contextos de aplicación. Por lo tanto, la investigación futura debería centrarse en la realización de estudios de casos más reales en diferentes contextos organizativos y en la creación de una base de conocimientos respectiva. Los estudios de caso no solo ayudarán a adquirir experiencia en cuanto a la recopilación de datos, sino que también identificarán cómo se debe adaptar la especificación de diseño del modelo de planificación para adaptarse a contextos adicionales. Para facilitar estudios de caso adicionales, también recomendamos seguir desarrollando el prototipo, de modo que se pueda utilizar más cómodamente en entornos naturalistas, proporcione una funcionalidad de análisis más sofisticada y se pueda ampliar más fácilmente para fines de evaluación futuras.

TRANSLATED VERSION: FRENCH

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

VERSION TRADUITE: FRANÇAIS

Voici une traduction approximative des idées présentées ci-dessus. Cela a été fait pour donner une compréhension générale des idées présentées dans le document. Veuillez excuser toutes les erreurs grammaticales et ne pas tenir les auteurs originaux responsables de ces erreurs.

INTRODUCTION

L'orientation des processus est un paradigme accepté de la conception organisationnelle (Kohlbacher et Reijers 2013). Grâce à l'attention constante de l'industrie et du milieu universitaire, la communauté de gestion des processus d'affaires (BPM) a développé des approches, des méthodes et des outils matures qui soutiennent la découverte, la conception, l'analyse, la promulgation et l'amélioration des processus (van der Aalst 2013). Selon le rapport bptrends 2014, l'amélioration des processus est une priorité absolue des décideurs des processus depuis plus d'une décennie (Harmon et Wolf, 2014). Dans le même temps, la communauté BPM a été et prête toujours plus d'attention à BPM elle-même et au développement de la capacité bpm des organisations (Pöppelbuß et al., 2015; Rosemann et de Bruin 2005; Trkman 2010; Zairi, 1997).

Dans la littérature, le développement des capacités BPM et l'amélioration des processus sont des sujets isolés. La recherche sur le développement des capacités bpm se divise en trois volets : Le premier volet se concentre sur l'identification des constituants du BPM et l'élaboration de cadres de capacité connexes (de Bruin et Rosemann, 2007; Jurisch et coll. 2014; van Looy et coll. 2014). L'approche commune est de regrouper les capacités ayant des caractéristiques similaires dans les domaines de capacité et éventuellement dans les facteurs (Rosemann et vom Brocke, 2015). Le deuxième volet s'intéresse à la description de la façon dont les organisations développent leur capacité de BPM et à expliquer différents types de développement des capacités bpm d'un point de vue théorique (Niehaves et al., 2014; Pöppelbuß et coll. 2015). Le troisième volet lié au développement des capacités bpm adopte une perspective normative, fournissant des conseils sur la façon de développer bpm à la lumière de différents contextes organisationnels. Les modèles de maturité bpm ont été considérés de longue date comme un outil approprié pour le développement des capacités BPM (Hammer, 2007; Röglinger et coll. 2012). Cependant, critiqués pour ignorer les dépendances de chemin et pour être context-agnostiques, les modèles de maturité ont perdu la popularité dans la recherche de BPM (Pöppelbuß et autres 2015). Malgré de précieux cadres de capacité bpm, il y a peu de conseils sur la façon de développer la capacité bpm d'une organisation.

En ce qui concerne l'amélioration des processus, de nombreuses approches sont disponibles (Zellner, 2011). Ces approches peuvent être distinguées dans l'amélioration continue et la réingénierie des processus d'affaires ainsi que dans les approches basées sur des modèles et des données, chaque classe présentant des forces et des faiblesses (van der Aalst 2013; Vergidis et coll. 2008). La plupart des approches d'amélioration des processus partagent le processus individuel en tant qu'unité d'analyse. Ils sont souvent critiqués pour leur manque de directives sur la façon de mettre en pratique l'amélioration des processus (Zellner, 2011). Certaines approches ont répondu à cette critique. Pour énumérer quelques exemples récents : En tenant compte du portefeuille de projets, Linhart et coll. (2015) analysent les projets à mettre en œuvre au fil du temps afin d'améliorer un processus individuel selon les stratégies d'industrialisation établies. Ohlsson et coll. (2014) aident à catégoriser les initiatives d'amélioration à partir d'une carte thermique d'évaluation des processus et d'une carte de catégorisation des processus. Forstner et coll. (2014) fournissent un cadre décisionnel pour déterminer les changements optimaux dans les niveaux de capacité des processus, en mettant l'accent sur un processus unique et les domaines de capacité connexes. Certaines approches considèrent également de multiples processus. Bandara et coll. (2015), par exemple, compilent les approches de hiérarchisation des processus, les caractérisant comme étant trop haut niveau pour être utiles ou, à ce titre, détaillées que la simple identification des processus critiques exige des efforts considérables. Combinant une perspective multi-processus et multi-projets, Darmani et Hanafizadeh (2013) aident à sélectionner les processus et les meilleures pratiques pour la réingénierie des processus, dans le but de réduire le risque et de réussir plus haut des projets d'amélioration. Shrestha et coll. (2015) fournissent une méthode de sélection pour les processus de gestion des services de SERVICES EN.

En un mot, les approches existantes en matière d'amélioration des processus et de hiérarchisation n'enlacent pas leurs résultats avec le développement de la capacité BPM d'une organisation. Vice versa, les quelques approches qui fournissent des conseils sur la façon de développer la capacité bpm d'une organisation négligent l'amélioration des processus individuels. Il y a un manque de connaissances normatives sur la façon de développer la capacité bpm d'une organisation et d'améliorer les processus individuels d'une manière intégrée. C'est pourquoi nous étudions la question de recherche suivante : comment les organisations peuvent-elles développer leur capacité de BPM et améliorer les processus individuels de manière intégrée?

Cette question de recherche n'est pas seulement pertinente du point de vue universitaire, mais aussi du point de vue de l'industrie. Par exemple, de Bruin et Rosemann (2007) cadre de capacité BPM séminal, dont la conception a impliqué de nombreux professionnels BPM, met en évidence la « planification de l'amélioration des processus » ainsi que « programme de processus et de planification de projet » en tant que constituants importants BPM. Cette pertinence a été confirmée par Lohmann et zur Muehlen (2015) ainsi que Müller et coll. (2016) qui ont récemment étudié quels rôles et compétences bpm sont exigés par l'industrie.

Pour répondre à la question de la recherche, nous avons élaboré un modèle de planification. Ce modèle de planification vise à aider les organisations à déterminer quels projets au niveau du BPM et des processus ils devraient mettre en œuvre dans quelle séquence afin de maximiser la valeur de l'entreprise, tout en répondant aux effets des projets sur le rendement des processus et les interactions entre les projets. Ainsi, nous adoptons le paradigme de la recherche scientifique de conception (DSR) et puisons dans la sélection du portefeuille de projets (PPS) ainsi que la gestion basée sur la valeur (VBM) comme connaissance justificative (Gregor et Hevner 2013). Cette conception d'étude est sensée pour plusieurs raisons : premièrement, les modèles de planification sont un type valide d'artefact de DSR (mars et Smith, 1995). Deuxièmement, les processus sont généralement améliorés, et la capacité bpm d'une organisation est généralement développée par le biais de projets (Dumas et al., 2013). Troisièmement, l'orientation de la valeur est un paradigme accepté de la prise de décisions d'entreprise et de processus (Buhl et coll. 2011; vom Brocke et Sonnenberg, 2015). Comme le modèle de planification repose sur PPS et VBM, nous appelons notre approche la gestion de portefeuille de projets de processus fondée sur la valeur. Avec cette étude, nous étendons nos recherches antérieures sur la planification du développement des capacités bpm et de l'amélioration des processus (Lehnert et coll. 2014). Nous atténuons presque toutes les hypothèses simplificifiantes, c'est-à-dire que les projets peuvent maintenant prendre plusieurs périodes, être exécutés en parallèle sous réserve de diverses interactions et affecter le rendement du processus absolument et relativement. De plus, nous avons fait progresser l'évaluation en validant les spécifications de conception du modèle de planification au moyen d'entrevues avec des experts, en discutant des spécifications de conception par rapport aux objectifs de conception et aux artefacts concurrents, en effectuant un cas basé sur des données réelles et un prototype de logiciel, et en raisonnant l'applicabilité et l'utilité du modèle.

Suivant la méthodologie de la DSR selon Peffers et coll. (2008), cette étude traite de l'identification et de la motivation du problème de recherche, des objectifs d'une solution, de la conception et du développement et de l'évaluation. Dans l'article 2, nous fournissons des connaissances justificatives pertinentes et nous tirons des objectifs de conception (objectifs d'une solution). Dans l'article 3, nous décrivons la méthode de recherche et la stratégie d'évaluation. Dans l'article 4, nous introduisons les spécifications de conception du modèle de planification (conception et développement). La section 5 rend compte de nos activités d'évaluation (évaluation). Nous concluons dans l'article 6 en soulignant les limites et les possibilités de recherche futures.

CONCLUSION

Résumé d'unecontribution nd

Dans cette étude, nous avons étudié comment les organisations peuvent développer leur capacité bpm et améliorer les processus individuels d'une manière intégrée. En adoptant le paradigme de la DSR, notre artefact est un modèle de planification qui aide les organisations à déterminer quels projets au niveau du BPM et des processus ils devraient mettre en œuvre dans quelle séquence maximiser leur valeur ferme, tout en répondant aux effets des projets sur le rendement des processus et les interactions entre les projets. Avec le modèle de planification s'appuyant sur PPS et VBM, nous nous référons à notre approche comme gestion de portefeuille de processus basée sur la valeur. Les projets de niveau BPM visent à développer la capacité BPM d'une organisation. Ils peuvent influencer les processus opérationnels en facilitant la mise en œuvre de futurs projets au niveau des processus ou en rendant les processus plus rentables à partir de la prochaine période. Les projets au niveau des processus améliorent le coût, la qualité et le temps des processus individuels. Le modèle de planification recommande de sélectionner les projets de niveau processus et BPM qui, programmés d'une manière particulière, créent la contribution la plus élevée en valeur, qui est mesurée en fonction de la VAN de la feuille de route du projet respectif. En différeciant entre plusieurs périodes, le modèle de planification saisit les effets à long terme des projets de type BPM et process sur le rendement des processus et les uns sur les autres, ainsi que sur les interactions entre les projets. Le modèle de planification traite ainsi des dépendances de chemin qui se produisent très probablement lors de l'élaboration de la capacité bpm d'une organisation et l'amélioration des processus individuels d'une manière intégrée. Nous avons évalué le modèle de planification en discutant de sa spécification de conception par rapport aux objectifs de conception soutenus par la théorie, en comparant la spécification de conception avec des artefacts concurrents, et en discutant de la spécification de conception avec des experts en la matière de différentes organisations. Nous avons également validé l'applicabilité et l'utilité du modèle de planification en effectuant un cas basé sur des données réelles ainsi qu'en discutant du modèle de planification et du prototype du logiciel par rapport aux critères d'évaluation établis de la littérature DSR.

Notre modèle de planification contribue à l'ensemble prescriptif des connaissances liées à l'élaboration des capacités bpm et à la prise de décisions en matière de processus. Il s'agit de la première approche pour intégrer le développement de la capacité bpm d'une organisation à l'amélioration des processus individuels. Les artefacts concurrents se concentrent soit sur la priorisation de projets d'amélioration multiples pour les processus individuels, soit sur la hiérarchisation de processus multiples à des fins d'amélioration. Conformément à la théorie des capacités dynamiques, le raisonnement sur le développement de la capacité BPM d'une organisation n'a de sens que lorsqu'on examine comment le BPM affecte les processus. La raison en est que BPM est une capacité dynamique, qui n'affecte les organisations qu'indirectement par le biais de capacités opérationnelles, c'est-à-dire de processus. En intégrant cela et en formalisant la façon dont les décisions sur bpm en tant que capacité dynamique affectent (décisions sur) les processus en tant que capacités opérationnelles d'une organisation, le modèle de planification applique les connaissances de la capacité dynamique d'une manière nouvelle. Au meilleur de notre connaissance, la théorie dynamique des capacités n'a jusqu'à présent été appliquée qu'aux problèmes de recherche liés à la BPM à des fins descriptives. Enfin, le modèle de planification est le premier à intégrer plusieurs processus, plusieurs projets et plusieurs périodes. Il relie ainsi les trois disciplines BPM, PPS et VBM. Alors que la recherche a été menée à l'intersection de n'importe quelle paire de ces disciplines, ce n'est pas le cas pour l'ensemble de la triade.

Limitations and Future Research

Tout en validant les spécifications de conception, l'applicabilité et l'utilité du modèle de planification, nous avons identifié les limites et les orientations dans lesquelles le modèle de planification peut être développé davantage. Ci-dessous, nous présentons ces limites ainsi que des idées pour la recherche future.

En ce qui concerne sa spécification de conception, le modèle de planification ne répond qu'aux interactions déterministes entre les projets, saisit les risques et l'attitude de risque des décideurs de façon plutôt implicite par le biais d’un taux d’intérêt ajusté au risque, et traite les processus en ligne de mire comme indépendants. Les interactions déterministes entre les projets peuvent être remplacées par des interactions stochastiques. Dans ce cas, il serait nécessaire de modéliser les effets des projets de type BPM et process comme des variables aléatoires avec des distributions de probabilités individuelles. Le risque et l’attitude des décideurs en ce qui a rien à voir avec le risque peuvent être abordés plus explicitement en modélisant séparément la valeur et le risque attendus de la contribution à la valeur, par exemple en fonction de la méthode équivalente à la certitude. Dans ce cas, il serait nécessaire d’estimer les distributions de probabilités pour tous les indicateurs de rendement périodiques. En ce qui concerne les interactions entre les processus, le modèle de planification pourrait intégrer des interactions telles que généralement capturées dans les architectures de processus. Une autre extension serait de différecier explicitement les multiples domaines de capacité inclus dans le cadre de capacité bpm de Bruin et Rosemann (2007) et, par conséquent, de modéliser plus en détail les effets des projets au niveau du BPM. Pour les recherches futures, nous recommandons de délibérer sur les limites relatives aux spécifications de conception du modèle de planification. Lors de l’extension du modèle de planification, cependant, il faut garder à l’esprit que les modèles sont des abstractions délibérées du monde réel qui n’ont pas nécessairement besoin de capturer toute la complexité du monde réel. Il est impératif d’évaluer soigneusement si l’augmentation acquise de la proximité avec la réalité survalue les augmentations connexes de la complexité et de l’effort de collecte de données. Par exemple, au lieu d’intégrer des interactions stochastiques, il est possible de tirer parti des fonctionnalités d’analyse de scénario implémentées dans le prototype.

En ce qui concerne l’applicabilité et l’utilité du modèle de planification, nous admettons que, malgré diverses simulations basées sur des données artificielles, nous n’avons appliqué le modèle de planification qu’une seule fois sur la base de données réelles. Bien que ce cas ait corroboré que des données pertinentes sur les entrées peuvent être recueillies et que le modèle de planification offre des conseils utiles, nous n’avons ni une expérience substantielle dans les routines de collecte de données ni sur les données de référence pour calibrer le modèle de planification pour divers contextes d’application. Les recherches futures devraient donc se concentrer sur la réalisation d’études de cas plus réelles dans différents contextes organisationnels et sur la mise en place d’une base de connaissances respective. Les études de cas aideront non seulement à acquérir de l’expérience en matière de collecte de données, mais aussi à déterminer comment les spécifications de conception du modèle de planification doivent être adaptées à des contextes supplémentaires. Pour faciliter d’autres études de cas, nous recommandons également de développer davantage le prototype, de sorte qu’il puisse être utilisé plus commodément dans les milieux naturalistes, offre des fonctionnalités d’analyse plus sophistiquées, et peut être étendu plus facilement à des fins d’évaluation future.

TRANSLATED VERSION: GERMAN

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

ÜBERSETZTE VERSION: DEUTSCH

Hier ist eine ungefähre Übersetzung der oben vorgestellten Ideen. Dies wurde getan, um ein allgemeines Verständnis der in dem Dokument vorgestellten Ideen zu vermitteln. Bitte entschuldigen Sie alle grammatikalischen Fehler und machen Sie die ursprünglichen Autoren nicht für diese Fehler verantwortlich.

EINLEITUNG

Prozessorientierung ist ein akzeptiertes Paradigma der Organisationsgestaltung (Kohlbacher und Reijers 2013). Aufgrund der ständigen Aufmerksamkeit von Industrie und Wissenschaft hat die Business Process Management (BPM)-Community ausgereifte Ansätze, Methoden und Tools entwickelt, die Prozessermittlung, -design, -analyse, -verabschiedung und -verbesserung unterstützen (van der Aalst 2013). Laut dem bptrends-Bericht 2014 hat die Prozessverbesserung seit über einem Jahrzehnt oberste Priorität bei prozessorientierten Entscheidungsträgern (Harmon und Wolf 2014). Gleichzeitig hat die BPM-Community der BPM selbst und der Entwicklung der BPM-Fähigkeit von Organisationen immer mehr Aufmerksamkeit geschenkt (Pöppelbuß et al. 2015; Rosemann und de Bruin 2005; Trkman 2010; Zairi 1997).

In der Literatur sind BPM-Fähigkeitsentwicklung und Prozessverbesserung isolierte Themen. Die Forschung zur Entwicklung von BPM-Fähigkeiten gliedert sich in drei Ströme: Der erste Stream konzentriert sich auf die Identifizierung der Bestandteile von BPM und die Entwicklung verwandter Fähigkeitsrahmen (de Bruin und Rosemann 2007; Jurisch et al. 2014; van Looy et al. 2014). Der gemeinsame Ansatz besteht darin, Fähigkeiten mit ähnlichen Eigenschaften in Fähigkeitsbereiche und schließlich in Faktoren zu gruppieren (Rosemann und vom Brocke 2015). Der zweite Stream befasst sich mit der Beschreibung, wie Organisationen ihre BPM-Fähigkeit entwickeln, und um die Erklärung verschiedener Arten der BPM-Fähigkeitsentwicklung aus theoretischer Perspektive (Niehaves et al. 2014; Pöppelbuß et al. 2015). Der dritte Stream im Zusammenhang mit der Entwicklung von BPM-Fähigkeiten nimmt eine präskriptive Perspektive ein und gibt Anleitungen zur Entwicklung von BPM im Lichte verschiedener organisatorischer Kontexte. BPM-Reifemodelle wurden lange Zeit als geeignetes Werkzeug für die Entwicklung von BPM-Fähigkeiten angesehen (Hammer 2007; Röglinger et al. 2012). Allerdings verloren Reifemodelle in der BPM-Forschung an Popularität (Pöppelbuß et al. 2015). Trotz wertvoller BPM-Fähigkeitsframeworks gibt es wenig Anleitungen zur Entwicklung der BPM-Fähigkeit einer Organisation.

Was die Prozessverbesserung betrifft, so stehen viele Ansätze zur Verfügung (Zellner 2011). Diese Ansätze lassen sich in kontinuierliche Verbesserung und Reengineering von Geschäftsprozessen sowie in modell- und datenbasierten Ansätzen mit Stärken und Schwächen unterscheiden (van der Aalst 2013; Vergidis et al. 2008). Die meisten Prozessverbesserungsansätze teilen sich den einzelnen Prozess als Analyseeinheit. Sie werden häufig dafür kritisiert, dass sie keine Anleitung enden, wie prozessverbessernd in die Praxis umgesetzt werden kann (Zellner 2011). Einige Ansätze reagierten auf diese Kritik. Um einige aktuelle Beispiele aufzulisten: Linhart et al. (2015) analysieren anhand einer Projektportfolioperspektive, welche Projekte im Laufe der Zeit umgesetzt werden sollen, um einen individuellen Prozess entlang etablierter Industrialisierungsstrategien zu verbessern. Ohlsson et al. (2014) helfen bei der Kategorisierung von Verbesserungsinitiativen auf der Grundlage einer Heatmap zur Prozessbewertung und einer Prozesskategorisierungskarte. Forstner et al. (2014) bieten einen Entscheidungsrahmen für die Bestimmung optimaler Veränderungen der Prozessfähigkeitsstufen, wobei der Schwerpunkt auf einem einzigen Prozess und verwandten Fähigkeitsbereichen liegt. Einige Ansätze berücksichtigen auch mehrere Prozesse. Bandara et al. (2015) z.B. Kompilieren Prozesspriorisierungsansätze, die sie als zu hoch wertsindd bezeichnen, um nützlich zu sein oder als solche detailliert, dass die bloße Identifizierung kritischer Prozesse erheblichen Aufwand erfordert. Darmani und Hanafizadeh (2013) kombinieren eine Multiprozess- und Multiprojektperspektive und helfen bei der Auswahl von Prozessen und Best Practices für Prozessreengineering, mit dem Ziel, ein geringeres Risiko und einen höheren Erfolg von Verbesserungsprojekten zu erreichen. Shrestha et al. (2015) bieten eine Auswahlmethode für IT-Service-Management-Prozesse an.

Kurz gesagt, bestehende Ansätze zur Prozessverbesserung und Priorisierung verflechten ihre Ergebnisse nicht mit der Entwicklung der BPM-Fähigkeit einer Organisation. Umgekehrt vernachlässigen die wenigen Ansätze, die Anleitungen zur Entwicklung der BPM-Fähigkeit einer Organisation bieten, die Verbesserung einzelner Prozesse. Es mangelt an präskriptiven Kenntnissen darüber, wie die BPM-Fähigkeit einer Organisation entwickelt und individuelle Prozesse integriert verbessert werden können. Aus diesem Grund Wir untersuchen folgende Forschungsfrage: Wie können Organisationen ihre BPM-Fähigkeit entwickeln und individuelle Prozesse auf integrierte Weise verbessern?

Diese Forschungsfrage ist nicht nur aus wissenschaftlicher, sondern auch aus Branchensicht relevant. Zum Beispiel de Bruin und Rosemann (2007) wegweisendes BPM-Fähigkeitsframework, an dessen Design viele BPM-Profis beteiligt waren, hebt "Prozessverbesserungsplanung" sowie "Prozessprogramm- und Projektplanung" als wichtige BPM-Komponenten hervor. Diese Relevanz wurde von Lohmann und zur Muehlen (2015) sowie Müller et al. (2016), die kürzlich untersuchthaben, welche BPM-Rollen und Kompetenzen von der Industrie gefordert werden.

Um die Forschungsfrage zu beantworten, haben wir ein Planungsmodell entwickelt. Dieses Planungsmodell soll Organisationen dabei unterstützen, zu bestimmen, welche BPM- und Prozessprojekte sie in welcher Reihenfolge umsetzen sollten, um den Unternehmenswert zu maximieren, während die Auswirkungen der Projekte auf die Prozessleistung und die Interaktionen zwischen Projekten abfließen. Dabei übernehmen wir das Paradigma der Design Science Research (DSR) und schöpfen aus der Projektportfolioauswahl (PPS) sowie dem wertbasierten Management (VBM) als Avengers Dieses Studiendesign ist aus mehreren Gründen sinnvoll: Erstens sind Planungsmodelle ein gültiger DSR-Artefakttyp (März und Smith 1995). Zweitens werden Prozesse in der Regel verbessert, und die BPM-Fähigkeit einer Organisation wird in der Regel über Projekte entwickelt (Dumas et al. 2013). Drittens ist die Wertorientierung ein akzeptiertes Paradigma der unternehmens- und prozessorientierten Entscheidungsfindung (Buhl et al. 2011; vom Brocke Sonnenberg 2015). Da das Planungsmodell auf PPS und VBM basiert, bezeichnen wir unseren Ansatz als wertbasiertes Prozessprojektportfoliomanagement. Mit dieser Studie erweitern wir unsere bisherigen Forschungsarbeiten zur Planung der BPM-Fähigkeitsentwicklung und Prozessverbesserung (Lehnert et al. 2014). Wir lindern fast alle vereinfachenden Annahmen, d.h. Projekte können nun mehrere Perioden in Anspruch nehmen, parallel durchgeführt werden, je nach Interaktion enden und die Prozessleistung absolut und relativ beeinflussen. Darüber hinaus haben wir die Bewertung durch die Validierung der Entwurfsspezifikation des Planungsmodells durch Experteninterviews, durch die Erörterung der Entwurfsspezifikation anhand von Entwurfszielen und konkurrierenden Artefakten, durch die Durchführung eines Falles auf der Grundlage von Daten aus der Praxis und eines Software-Prototyps und durch Überlegungen zur Anwendbarkeit und Nützlichkeit des Modells vorangetrieben.

Nach der DSR-Methodik gemäß Peffers et al. (2008) befasst sich diese Studie mit der Identifizierung und Motivation für das Forschungsproblem, den Zielen einer Lösung, dem Design und der Entwicklung sowie der Bewertung. In Abschnitt 2 vermitteln wir relevantes, objektives Wissen und leiten Designziele ab (Ziele einer Lösung). In Abschnitt 3 skizzieren wir die Forschungsmethode und die Bewertungsstrategie. In Abschnitt 4 stellen wir die Entwurfsspezifikation des Planungsmodells (Design und Entwicklung) vor. Abschnitt 5 berichtet über unsere Evaluierungsaktivitäten (Evaluierung). Wir schließen in Abschnitt 6 mit dem Hinweis auf Grenzen und zukünftige Forschungsmöglichkeiten.

SCHLUSSFOLGERUNG

Zusammenfassung einesnd-Beitrags

In dieser Studie untersuchten wir, wie Unternehmen ihre BPM-Fähigkeit entwickeln und individuelle Prozesse auf integrierte Weise verbessern können. Unser Artefakt ist ein Planungsmodell, das Organisationen dabei unterstützt, zu bestimmen, welche BPM- und Prozessprojekte sie in welcher Reihenfolge implementieren sollten, um ihren Unternehmenswert zu maximieren, während sie die Auswirkungen der Projekte auf die Prozessleistung und interaktionen zwischen Projekten abschwirre. Mit dem auf PPS und VBM aufbauenden Planungsmodell bezeichnen wir unseren Ansatz als wertbasiertes Prozessprojektportfoliomanagement. Projekte auf BPM-Ebene zielen auf die Entwicklung der BPM-Fähigkeit einer Organisation ab. Sie können operative Prozesse beeinflussen, indem sie die Umsetzung zukünftiger Projekte auf Prozessebene erleichtern oder Prozesse ab der nächsten Periode kostengünstiger gestalten. Projekte auf Prozessebene verbessern kosten-, qualitativ und zeitlich von einzelnen Prozessen. Das Planungsmodell empfiehlt die Auswahl der Prozess- und BPM-Projekte, die, in einer bestimmten Weise geplant, den höchsten Wertbeitrag schaffen, der anhand des NPV der jeweiligen Projekt-Roadmap gemessen wird. Durch die Differenzierung zwischen mehreren Perioden erfasst das Planungsmodell die langfristigen Auswirkungen von BPM- und Prozessprojekten auf die Prozessleistung und aufeinander sowie Interaktionen zwischen Projekten. Das Planungsmodell befasst sich dabei mit Pfadabhängigkeiten, die höchstwahrscheinlich bei der Entwicklung der BPM-Fähigkeit einer Organisation und der integrierten Verbesserung einzelner Prozesse auftreten. Wir haben das Planungsmodell bewertet, indem wir seine Entwurfsspezifikation anhand von theoretisch unterstützten Entwurfszielen diskutierten, die Entwurfsspezifikation mit konkurrierenden Artefakten verglichen und die Entwurfsspezifikation mit Fachexperten aus verschiedenen Organisationen diskutierten. Darüber hinaus haben wir die Anwendbarkeit und Nützlichkeit des Planungsmodells validiert, indem wir einen Fall auf der Grundlage realer Daten durchführten und das Planungsmodell und den Software-Prototyp anhand etablierter Bewertungskriterien aus der DSR-Literatur diskutierten.

Unser Planungsmodell trägt zum normativen Wissensstand im Zusammenhang mit der Entwicklung von BPM-Fähigkeiten und der Prozessentscheidung bei. Es ist der erste Ansatz, um die Entwicklung der BPM-Fähigkeit einer Organisation mit der Verbesserung einzelner Prozesse zu integrieren. Konkurrierende Artefakte konzentrieren sich entweder auf die Priorisierung mehrerer Verbesserungsprojekte für einzelne Prozesse oder auf die Priorisierung mehrerer Prozesse zu Verbesserungszwecken. Im Einklang mit der Theorie der dynamischen Fähigkeiten ist eine Argumentation über die Entwicklung der BPM-Fähigkeit einer Organisation nur dann sinnvoll, wenn sie berücksichtigt, wie sich BPM auf Prozesse auswirkt. Der Grund dafür ist, dass BPM eine dynamische Fähigkeit ist, die bekanntermaßen Organisationen nur indirekt über betriebliche Fähigkeiten, d. H. Prozesse, betrifft. Unter Einbeziehung dessen und formalisierend, wie Entscheidungen über BPM als dynamische Fähigkeit Prozesse als betriebliche Fähigkeiten einer Organisation beeinflussen, wendet das Planungsmodell Wissen aus dynamischen Fähigkeiten auf neuartige Weise an. Nach bestem Wissen und Gewissen wurde die Theorie der dynamischen Fähigkeiten bisher nur zu beschreibenden Zwecken auf BPM-bezogene Forschungsprobleme angewendet. Schließlich ist das Planungsmodell das erste, das mehrere Prozesse, mehrere Projekte und mehrere Perioden integriert. Sie verbindet damit die drei Disziplinen BPM, PPS und VBM. Während an der Schnittmenge eines jeden Paars dieser Disziplinen geforscht wurde, ist dies nicht für die gesamte Triade der Fall.

Einschränkungen einernd-Zukunftsforschung

Bei der Validierung der Entwurfsspezifikation, Anwendbarkeit und Nützlichkeit des Planungsmodells wurden Einschränkungen und Richtungen identifiziert, in denen das Planungsmodell weiterentwickelt werden kann. Im Folgenden stellen wir diese Grenzen zusammen mit Ideen für zukünftige Forschung vor.

Das Planungsmodell berücksichtigt in Bezug auf seine Designspezifikation nur deterministische Interaktionen zwischen Projekten, erfasst Risiken und die Risikohaltung der Entscheider eher implizit über einen risikobereinigten Zinssatz und behandelt die im Fokus stehenden Prozesse als unabhängig. Deterministische Interaktionen zwischen Projekten können durch stochastische Interaktionen ersetzt werden. In diesem Fall wäre es notwendig, die Auswirkungen von BPM- und Prozessprojekten als Zufallsvariablen mit individuellen Wahrscheinlichkeitsverteilungen zu modellieren. Das Risiko und die Risikohaltung der Entscheidungsträger können expliziter angegangen werden, indem der erwartete Wert und das Risiko des Wertbeitrags getrennt modelliert werden, z. B. Auf der Grundlage der gewissheitsäquivalenten Methode. In diesem Fall wäre es notwendig, die Wahrscheinlichkeitsverteilungen für alle periodischen Leistungsindikatoren zu schätzen. Was die Interaktionen zwischen Prozessen betrifft, so kann das Planungsmodell Interaktionen enthalten, wie sie in der Regel in Prozessarchitekturen erfasst werden. Eine weitere Erweiterung wäre die explizite Differenzierung mehrerer Fähigkeitsbereiche, wie sie in de Bruin und Rosemann (2007) BPM-Fähigkeitsframework enthalten sind, und dementsprechend die Auswirkungen von BPM-Projekten detaillierter zu modellieren. Für zukünftige Forschungen empfehlen wir zu überlegen, welche dieser Einschränkungen hinsichtlich der Entwurfsspezifikation des Planungsmodells berücksichtigt werden sollten. Bei der Erweiterung des Planungsmodells muss man jedoch bedenken, dass Modelle zielgerichtete Abstraktionen aus der realen Welt sind, die nicht unbedingt die ganze Komplexität der realen Welt erfassen müssen. Es ist unbedingt zu prüfen, ob die gewonnene Erhöhung der Realitätsnähe die damit verbundenen Steigerungen der Komplexität und des Datenerhebungsaufwands übertrifft. Anstatt z. B. Stochastische Interaktionen zu integrieren, ist es möglich, die im Prototyp implementierte Szenarioanalysefunktionalität zu nutzen.

Was die Anwendbarkeit und Nützlichkeit des Planungsmodells betrifft, räumen wir ein, dass wir das Planungsmodell trotz verschiedener Simulationsläufe auf der Grundlage künstlicher Daten nur einmal auf der Grundlage realer Daten angewendet haben. Obwohl dieser Fall bestätigte, dass relevante Eingabedaten gesammelt werden können und dass das Planungsmodell nützliche Anleitungen bietet, verfügen wir weder über umfangreiche Erfahrung in Datenerfassungsroutinen noch über Referenzdaten, um das Planungsmodell für verschiedene Anwendungskontexte zu kalibrieren. Die zukünftige Forschung sollte sich daher auf die Durchführung von mehr realen Fallstudien in unterschiedlichen organisatorischen Kontexten und auf die Einrichtung einer entsprechenden Wissensbasis konzentrieren. Fallstudien helfen nicht nur, Erfahrungen in der Datenerfassung zu sammeln, sondern auch zu ermitteln, wie die Entwurfsspezifikation des Planungsmodells an zusätzliche Kontexte angepasst werden muss. Um zusätzliche Fallstudien zu erleichtern, empfehlen wir auch die Weiterentwicklung des Prototyps, so dass er in naturalistischen Umgebungen bequemer eingesetzt werden kann, anspruchsvollere Analysefunktionen bietet und für zukünftige Auswertungszwecke einfacher erweitert werden kann.

TRANSLATED VERSION: PORTUGUESE

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VERSÃO TRADUZIDA: PORTUGUÊS

Aqui está uma tradução aproximada das ideias acima apresentadas. Isto foi feito para dar uma compreensão geral das ideias apresentadas no documento. Por favor, desculpe todos os erros gramaticais e não responsacule os autores originais responsáveis por estes erros.

INTRODUÇÃO

A orientação do processo é um paradigma aceito do design organizacional (Kohlbacher e Reijers 2013). Devido à atenção constante da indústria e da academia, a comunidade de gestão de processos de negócios (BPM) desenvolveu abordagens, métodos e ferramentas maduras que suportam a descoberta, o projeto, a análise, a promulgação e a melhoria dos processos (van der Aalst 2013). De acordo com o relatório bptrends de 2014, a melhoria dos processos tem sido uma prioridade dos tomadores de decisão de processos há mais de uma década (Harmon e Wolf 2014). Ao mesmo tempo, a comunidade do BPM tem sido e ainda está prestando cada vez mais atenção ao próprio BPM e ao desenvolvimento da capacidade de BPM das organizações (Pöppelbuß et al. 2015; Rosemann e de Bruin 2005; Trkman 2010; Zairi 1997).

Na literatura, o desenvolvimento de capacidades de BPM e a melhoria dos processos são temas isolados. A pesquisa sobre o desenvolvimento de capacidades de BPM se divide em três fluxos: O primeiro fluxo se concentra na identificação dos constituintes do BPM e no desenvolvimento de estruturas de capacidade relacionadas (de Bruin e Rosemann 2007; Jurisch et al. 2014; van Looy et al. 2014). A abordagem comum é agrupar capacidades com características semelhantes em áreas de capacidade e, eventualmente, em fatores (Rosemann e vom Brocke 2015). O segundo fluxo se preocupa em descrever como as organizações desenvolvem sua capacidade de BPM e explicar diferentes tipos de desenvolvimento de capacidade de BPM a partir de uma perspectiva teórica (Niehaves et al. 2014; Pöppelbuß et al. 2015). O terceiro fluxo relacionado ao desenvolvimento de capacidades de BPM tem uma perspectiva prescritiva, fornecendo orientações sobre como desenvolver o BPM à luz de diferentes contextos organizacionais. Os modelos de maturidade de BPM foram vistos há muito tempo como uma ferramenta apropriada para o desenvolvimento de capacidades de BPM (Hammer 2007; Röglinger et al. 2012). No entanto, criticados por ignorar as dependências de caminhos e por serem contextos-agnósticos, os modelos de maturidade perderam popularidade na pesquisa de BPM (Pöppelbuß et al. 2015). Apesar das valiosas estruturas de capacidade de BPM, há pouca orientação sobre como desenvolver a capacidade de BPM de uma organização.

Quanto à melhoria do processo, muitas abordagens estão disponíveis (Zellner 2011). Essas abordagens podem ser distinguidas em melhoria contínua e reengenharia de processos de negócios, bem como em abordagens baseadas em modelos e dados, cada classe com pontos fortes e fracos (van der Aalst 2013; Vergidis et al. 2008). A maioria das abordagens de melhoria de processos compartilha o processo individual como unidade de análise. Eles são comumente criticados pela falta de orientação sobre como colocar em prática a melhoria do processo (Zellner 2011). Algumas abordagens responderam a essa crítica. Para listar alguns exemplos recentes: Tendo uma perspectiva de portfólio de projetos, Linhart et al. (2015) analisam quais projetos implementar ao longo do tempo para melhorar um processo individual ao longo de estratégias de industrialização estabelecidas. Ohlsson et al. (2014) ajudam a categorizar iniciativas de melhoria com base em um mapa de aquecimento de avaliação de processos e um mapa de categorização de processos. O Forstner et al. (2014) fornecem um quadro de decisão para determinar mudanças ideais nos níveis de capacidade do processo, com foco em um único processo e áreas de capacidade relacionadas. Algumas abordagens também consideram múltiplos processos. Bandara et al. (2015), por exemplo, compilam abordagens de priorização de processos, caracterizando-as como de alto nível para serem úteis ou como tal detalhadas que a mera identificação de processos críticos requer esforço significativo. Combinando uma perspectiva multiprocesso e multiprojeta, Darmani e Hanafizadeh (2013) ajudam a selecionar processos e melhores práticas para a reengenharia de processos, visando menor risco e maior sucesso de projetos de melhoria. Shrestha et al. (2015) fornecem um método de seleção para processos de gerenciamento de serviços de TI.

Em poucas palavras, as abordagens existentes para a melhoria e priorização de processos não entrelaçam seus resultados com o desenvolvimento da capacidade de BPM de uma organização. Vice-versa, as poucas abordagens que fornecem orientação sobre como desenvolver a capacidade de BPM de uma organização negligenciam a melhoria dos processos individuais. Há falta de conhecimento prescritivo sobre como desenvolver a capacidade de BPM de uma organização e melhorar os processos individuais de forma integrada. É por isso que investigamos a seguinte questão de pesquisa: Como as organizações podem desenvolver sua capacidade de BPM e melhorar os processos individuais de forma integrada?

Esta questão da pesquisa não é apenas relevante de um acadêmico, mas também do ponto de vista da indústria. Por exemplo, a estrutura de capacidade de BPM seminal de Bruin e Rosemann (2007), cujo desenho envolveu muitos profissionais do BPM, destaca o "planejamento de melhoria de processos", bem como o "programa de processo e planejamento de projetos" como importantes constituintes do BPM. Essa relevância foi confirmada por Lohmann e zur Muehlen (2015), bem como Müller et al. (2016), que recentemente investigaram quais funções e competências do BPM são exigidas pela indústria.

Para abordar a questão da pesquisa, desenvolvemos um modelo de planejamento. Esse modelo de planejamento pretende auxiliar as organizações na determinação de quais projetos de BPM e de nível de processo devem implementar em qual sequência maximizar o valor da empresa, ao mesmo tempo em que atende aos efeitos dos projetos no desempenho dos processos e nas interações entre os projetos. Assim, adotamos o paradigma de pesquisa em ciência do design (DSR) e nos retiramos da seleção de portfólio de projetos (PPS), bem como da gestão baseada em valor (VBM) como conhecimento justificativo (Gregor e Hevner 2013). Este projeto de estudo é sensato por várias razões: Primeiro, os modelos de planejamento são um tipo de artefato DSR válido (Março e Smith 1995). Em segundo lugar, os processos são tipicamente melhorados, e a capacidade de BPM de uma organização é tipicamente desenvolvida através de projetos (Dumas et al. 2013). Em terceiro lugar, a orientação de valor é um paradigma aceito da tomada de decisões corporativas e processas (Buhl et al. 2011; vom Brocke e Sonnenberg 2015). Como o modelo de planejamento depende do PPS e do VBM, nos referimos à nossa abordagem como gerenciamento de portfólio de projetos de processo baseado em valor. Com este estudo, estendemos nossa pesquisa prévia sobre o planejamento do desenvolvimento de capacidades de BPM e melhoria de processos (Lehnert et al. 2014). Aliviamos quase todas as suposições simplificadoras, ou seja, os projetos agora podem levar vários períodos, ser executados em paralelo sujeitos a várias interações, bem como afetar o desempenho do processo de forma absoluta e relativamente. Além disso, avançamos na avaliação validando a especificação de design do modelo de planejamento por meio de entrevistas especializadas, discutindo a especificação do design contra objetivos de design e artefatos concorrentes, conduzindo um caso baseado em dados do mundo real e um protótipo de software, e por raciocínio sobre a aplicabilidade e utilidade do modelo.

Seguindo a metodologia DSR conforme Peffers et al. (2008), este estudo discute a identificação e motivação para o problema da pesquisa, objetivos de uma solução, design e desenvolvimento e avaliação. Na Seita 2, fornecemos conhecimentos justificativos relevantes e derivamos objetivos de desenho (objetivos de uma solução). Na Seita 3, delineamos o método de pesquisa e a estratégia de avaliação. Na Seita 4, introduzimos a especificação de design do modelo de planejamento (design e desenvolvimento). Seção 5 relatórios sobre nossas atividades de avaliação (avaliação). Concluímos na Seita 6 apontando para limitações e possibilidades futuras de pesquisa.

CONCLUSÃO

Resumo de umand Contribuição

Neste estudo, investigamos como as organizações podem desenvolver sua capacidade de BPM e melhorar os processos individuais de forma integrada. Adotando o paradigma DSR, nosso artefato é um modelo de planejamento que auxilia as organizações na determinação de quais projetos de BPM e de nível de processo devem implementar em qual sequência para maximizar seu valor firme, ao mesmo tempo em que atende aos efeitos dos projetos no desempenho do processo e nas interações entre os projetos. Com o modelo de planejamento baseado em PPS e VBM, nos referimos à nossa abordagem como gerenciamento de portfólio de projetos de processo baseado em valor. Os projetos de nível BPM visam desenvolver a capacidade de BPM de uma organização. Eles podem influenciar os processos operacionais facilitando a implementação de projetos futuros em nível de processo ou tornando os processos mais econômicos a partir do próximo período. Projetos em nível de processo melhoram o custo, a qualidade e o tempo dos processos individuais. O modelo de planejamento recomenda selecionar aqueles projetos de nível de processo e BPM que, programados de forma particular, criem a contribuição de maior valor, medida em termos do NPV do respectivo roteiro do projeto. Ao diferenciar entre múltiplos períodos, o modelo de planejamento captura os efeitos de longo prazo de projetos de BPM e de nível de processo no desempenho do processo e uns nos outros, bem como interações entre projetos. O modelo de planejamento trata, assim, de dependências de caminhos que provavelmente ocorrem ao desenvolver a capacidade de BPM de uma organização e melhorar os processos individuais de forma integrada. Avaliamos o modelo de planejamento discutindo sua especificação de design contra objetivos de design apoiados pela teoria, comparando a especificação do design com artefatos concorrentes e discutindo a especificação do design com especialistas em assuntos de diferentes organizações. Também validamos a aplicabilidade e a utilidade do modelo de planejamento, conduzindo um caso baseado em dados do mundo real, bem como discutindo o modelo de planejamento e o protótipo de software contra critérios de avaliação estabelecidos da literatura DSR.

Nosso modelo de planejamento contribui para o corpo prescritivo de conhecimento relacionado ao desenvolvimento de capacidades de BPM e à tomada de decisões de processos. É a primeira abordagem para integrar o desenvolvimento da capacidade de BPM de uma organização com a melhoria dos processos individuais. Os artefatos concorrentes ou focam na priorização de múltiplos projetos de melhoria para processos individuais ou na priorização de múltiplos processos para fins de melhoria. Em consonância com a teoria da capacidade dinâmica, o raciocínio sobre o desenvolvimento da capacidade de BPM de uma organização só faz sentido quando se considera como o BPM afeta os processos. A razão é que o BPM é uma capacidade dinâmica, que é conhecida por afetar as organizações apenas indiretamente através de recursos operacionais, ou seja, processos. Incorporando isso e formalizando como as decisões sobre o BPM como capacidade dinâmica afetam os processos (decisões sobre) como capacidade operacional de uma organização, o modelo de planejamento aplica o conhecimento da capacidade dinâmica de forma nova. Até o momento, a teoria da capacidade dinâmica só foi aplicada a problemas de pesquisa relacionados ao BPM para fins descritivos. Finalmente, o modelo de planejamento é o primeiro a integrar múltiplos processos, múltiplos projetos e múltiplos períodos. Ele liga, assim, as três disciplinas BPM, PPS e VBM. Considerando que a pesquisa foi conduzida na intersecção de qualquer par dessas disciplinas, este não é o caso de toda a tríade.

Limitações and Future Research

Ao validar a especificação, aplicabilidade e utilidade do modelo de planejamento, identificamos limitações e direções nas quais o modelo de planejamento pode ser desenvolvido. Abaixo, apresentamos essas limitações juntamente com ideias para pesquisas futuras.

Em relação à sua especificação de design, o modelo de planejamento atende apenas a interações determinísticas entre os projetos, captura o risco e a atitude de risco dos tomadores de decisão de forma implícita por meio de uma taxa de juros ajustada ao risco, e trata os processos em foco como independentes. As interações determinísticas entre os projetos podem ser substituídas por interações estocásticas. Neste caso, seria necessário modelar os efeitos dos projetos de BPM e de nível de processo como variáveis aleatórias com distribuições de probabilidades individuais. O risco e a atitude de risco dos tomadores de decisão podem ser abordados de forma mais explícita, modelando o valor e o risco esperados da contribuição de valor separadamente, por exemplo, com base no método equivalente à certeza. Neste caso, seria necessário estimar distribuições de probabilidade para todos os indicadores periódicos de desempenho. Quanto às interações entre os processos, o modelo de planejamento poderia incorporar interações como tipicamente capturadas em arquiteturas de processos. Outra extensão seria diferenciar explicitamente múltiplas áreas de capacidade, conforme incluído na estrutura de capacidade de BPM de Bruin e Rosemann (2007) e, correspondentemente, modelar os efeitos dos projetos de nível BPM em maior detalhe. Para futuras pesquisas, recomendamos a deliberação de quais dessas limitações em relação à especificação de design do modelo de planejamento devem ser incorporadas. Ao estender o modelo de planejamento, no entanto, é preciso ter em mente que os modelos são abstrações propositais do mundo real que não precisam necessariamente capturar toda a complexidade do mundo real. É imprescindível avaliar cuidadosamente se o aumento da proximidade com a realidade supera os aumentos relacionados na complexidade e no esforço de coleta de dados. Por exemplo, em vez de incorporar interações estocásticas, é possível aproveitar a funcionalidade de análise de cenário implementada no protótipo.

Quanto à aplicabilidade e utilidade do modelo de planejamento, admitimos que, apesar de várias simulações baseadas em dados artificiais, aplicamos o modelo de planejamento apenas uma vez com base em dados do mundo real. Embora este caso tenha corroborado que dados de entrada relevantes podem ser coletados e que o modelo de planejamento oferece orientação útil, não temos experiência substancial em rotinas de coleta de dados nem sobre dados de referência para calibrar o modelo de planejamento para vários contextos de aplicação. Pesquisas futuras devem, assim, focar na realização de estudos de caso mais reais em diferentes contextos organizacionais e na criação de uma respectiva base de conhecimento. Estudos de caso não só ajudarão a ganhar experiência em relação à coleta de dados, mas também identificarão como a especificação do design do modelo de planejamento deve ser adaptada para se adequar a contextos adicionais. Para facilitar estudos de caso adicionais, também recomendamos o desenvolvimento do protótipo, de forma que ele possa ser usado de forma mais conveniente em ambientes naturalistas, fornece funcionalidade de análise mais sofisticada e pode ser estendido mais facilmente para fins de avaliação futuras.