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The prioritization and categorization method (PCM) process evaluation at Ericsson: a case study

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Abstract

Purpose – The purpose of this paper is to demonstrate and evaluate the prioritization and categorization method (PCM), which facilitates the active participation of process stakeholders (managers, owners, customers) in process assessments. Stakeholders evaluate processes in terms of effectiveness, efficiency and relevance against certain contextual business and industry factors. This collective evaluation serves as a foundation for the management decision-making process regarding process improvement and redesign.

Design/methodology/approach – The PCM is examined based on a case study at Ericsson. In total, 55 stakeholders, representing different organizational levels and functions, assessed eight core processes. Follow-up interviews and feedback after the evaluation sessions were collected for triangulation purpose.

Findings – The PCM helps Ericsson evaluate its processes within business context and industry environments. The results show that, to realize seamless end-to-end processes in the eight assessed processes, Ericsson has to make a greater effort to improve its process structures, governance and culture for fulfilling the needs of future business. Ericsson Steering Group is satisfied with the insights provided and has decided to train more stakeholders to use PCM.

Research limitations/implications – This research is based on a single case within a specific organizational setting. The results may not be necessary generalizable to other business and industry settings. Organizations need to configure PCM in consideration of their own processes and business contingencies to explore and fulfil their process improvement purposes.

Originality/value – This paper presents a new context-aware, easy-to-use and holistic method for business process management (BPM), the PCM. The method requires the active engagement of stakeholders, it focusses on developing dynamic BPM capabilities and fully embeds organizational contingencies and contextual factors in the decision-making regarding BPM. This paper contributes a novel method to explorative BPM.

Keywords Evaluation, Business process management, Case study, Contextual awareness, Explorative, Prioritization and categorization method

Paper type Research paper

1. Introduction

Business process management (BPM) is a key priority of practitioners, CIOs, BPM managers and researchers. In recent years, more and more IS researchers have begun exploring new thinking and principles for managing business processes and challenge the traditional exploitative BPM paradigm (Kohlborn *et al.*, 2014; vom Brocke *et al.*, 2014; Rosemann, 2014), which BPM paradigm focusses on methodological challenges related to how to model, analyse, simulate, automate and mine business processes, and the development of tools, systems, and techniques that can be implemented by firms to achieve operational excellence. However, exploitative BPM fails to address more strategic or cultural challenges facing BPM managers, in addition to ignoring contextual, industrial and institutional factors that play a role in innovating business processes, as well as the capability required. Explorative BPM is an emerging

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direction in BPM research that calls upon researchers and practitioners to pay more attention to process design that truly excites and engages stakeholders, with the aim of building new capabilities that firms need to sustain business into the future (Rosemann, 2014).

In many approaches within the exploitative BPM paradigm, starting from strategy analysis, to business/enterprise architecture thinking, the main focus is on processes. In a strategic view on operational excellence, processes are core and implementation of IT is functionally derived from strategic principals. Business process improvements or (re) design has, therefore, been on the agenda for decades, and a lack of operational process rationalization is often directly related to the (lack of) productivity in organizations (Harrington, 1991; Zellner, 2011). Enterprise architecture approaches enable the functional integration of processes with the core IT. More and more studies focus on the relationship between strategic thinking, business models and business architecture, and process and IT implementation (Versteeg and Bouwman, 2006; Al-Debei and Avison, 2010; Lankhorst *et al.*, 2009; Solaimani and Bouwman, 2012). More holistic approaches are proposed in BPM research, for example Archimate (Lankhorst *et al.*, 2009) or ARIS (Scheer, 1998), or various maturity models (e.g. Dijkman *et al.*, 2016; Röglinger *et al.*, 2012; Rosemann and de Bruin, 2005; Weber *et al.*, 2004). However, these approaches are often too complex to be applied or too detailed to provide deeper insight into the problems at hand (e.g. Tarhan *et al.*, 2016). Moreover, the motivation for more strategic decisions and arguments behind the choices being made are poorly motivated and documented (e.g. de Lacerda *et al.*, 2016), and often, only visualization of as-is and to-be processes are available.

In this paper, we therefore propose a process improvement and decision-making method that focusses on the prioritization and categorization of business processes. This prioritization and categorization method (PCM) is innovative, because it actively engages stakeholders, focusses on developing dynamic BPM capabilities and embeds organizational contingencies and contextual factors in the decision-making regarding BPM, process assessments, and at the same time enables research. PCM was first proposed by Ohlsson, Han, Johannesson and Rusu, 2014; Ohlsson, Han, Johannesson, Carpenhall and Rusu, 2014 and has been tested and piloted in two big companies in Sweden, i.e. Ohlsson, Han, Johannesson and Rusu, 2014; Ohlsson, Han, Johannesson, Carpenhall and Rusu, 2014. This paper discusses the large-scale evaluation at Ericsson.

In this paper, we adopt a case study approach, with analyses directly related to the explorative use of the PCM in a real business context. The aim of this paper is to demonstrate how PCM works and to show how it take the contingencies and contextual factors into account in process assessment decision-making processes. To that end, we will first discuss *ex ante* literature. Next, based on our literature review, we position the PCM approach and discuss the proposed method in detail, after which we present our approach in the methodology section, followed by the results of the Ericsson case. Finally, we discuss insights in relation to existing research and present our conclusions. As in every research project, our approach has both limitations and avenues for future research.

2. Literature review

In a literature review on business process, Solaimani and Bouwman (2012) provide an overview of research areas that are generally speaking related to business process modelling (e.g. Giaglis, 2001; Yu and Wright, 1997; Lin *et al.*, 2002; Recker and Rosemann, 2009), business process re-engineering (e.g. O'Neill and Sohal, 1999; Yu and Wright, 1997; Lin *et al.*, 2002), BPM (e.g. Lee and Dale, 1998; Van der Aalst *et al.*, 2003; Duffy, 1994) or business process automation (Kirchmer and Pantaleo, 2005; Watson and Holmes, 2009). Some other, less extensive, business process areas are discussed by O'Neill and Sohal (1999), including business process improvement, core process redesign, process innovation, business process transformation, breakpoint business process design and business scope redefinition. In this paper, we focus on BPM. In the last two decades, BPM research has advanced knowledge on process innovations and process improvements (Van der Aalst, 2013).

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The BPM community has produced mature knowledge regarding process modelling and information technologies that support process efficiency and performance. Methods for continuous process improvements and prioritization have traditionally been designed based on exploitative BPM (Rosemann, 2014; Kohlborn *et al.*, 2014). Porter (1980) defines an organization as a combination of primary and supporting processes. The primary processes consist of the processes of inbound logistics, operations, outbound logistics, marketing and sales and services; and the supporting processes include firm infrastructure, human resource management, technology development and procurement. Davenport (1993) makes a distinction between operational (marketing and intelligence processes, design and development processes, procurement and logistics processes, production processes and product/service delivery processes) and management (information handling processes, coordination, control, and communication processes, and knowledge processes) processes. Hammer (1990), Hammer and Champy (1993) and Davenport (1993) argue the import role of information technology played in re-engineering work and process in order to increase value creation and achieve competitive advantage. These classical researches claim that organizations need to make consistent efforts for process improvement in order to maintain the alignment of the processes with the business strategy, goal and value, which ultimately generate competitive advantage (e.g. Harrington, 1991; Davenport, 1993; Trkman, 2010; Dumas *et al.*, 2013). The fundamental activity of process improvement is prioritization (which process to be improved first) (Burlton, 2010).The maturity level of processes and BPM is often considered as an indicator of improvement. However, the models lack applicability and configurability to practitioners (Röglinger *et al.*, 2012), and most of the maturity models lack validation of empirical evidences (Tarhan *et al.*, 2016). Previous research has introduced a few methods specifically for the purpose of prioritizing process improvement initiatives, for example, the business value scoring method (Bandara *et al.*, 2010), the process performance scoring method (Huxley, 2003) and the value matrix of process and strategy alignment (Burlton, 2010). Although there is no standardized methodology regarding process prioritization yet, the literature shows that the prioritization criteria focus on: the strategic importance of the process; the performance of the process; and organizational readiness for process improvement, i.e. culture, people and governance for implementing a new redesigned or improved process. Previous research shares certain agreements with regards to how process can be analysed and understood (e.g. Harrington, 1991; Davenport, 1993; Dumas *et al.*, 2013). Accordingly, quantitative and formal methods are recommended. So the measurements for assessing the process performance in the terms of time, quality, flexibility and cost, are mostly adopted in research (e.g. Dijkman *et al.*, 2016). However, these methods only describe the process performance and indicate what to prioritize; the information on how to improve is mostly lacking. Bandara *et al.* (2010) conclude that the prioritization "remains as a 'mystery phase' in most available guidelines" (idem, p. 178).

In addition, exploitative BPM tools, methods and IT-related software have become a commodity, which means that companies cannot depend on them to create a competitive advantage. Rosemann (2014) further points out that the weaknesses of exploitative BPM have negative impacts on industries exposed to disruptive digital technologies and emerging new class of competitors. As a result, explorative BPM has been put on the research agenda as a new direction for BPM development and application in organizations (Rosemann, 2014; Kohlborn *et al.*, 2014). Explorative BPM research goes back to the core of BPM that is proposed by the classical strategic management approaches to promote the uptake of BPM in business (not only in IT), for examples, Hammer (1990) and Davenport (1993). Explorative BPM research and practice should facilitate process innovation and design new processes "capitalizing on emerging technical solutions and satisfying a consumer base with increased digital literacy" (Rosemann, 2014, p. 7). Rosemann (2014) defines the two key capabilities of explorative BPM. The first is to craft process visions "that are compelling and transformational that they motivate

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staff, and customers, involved to explore how to make a desired future state […]" (Rosemann, 2014, p. 7). And the second is to identify the opportunity points in processes that can create new business and revenue opportunities. Organizations need new explorative BPM capabilities for value creation to meet the demands of their customers better in the new business environment (e.g. Lindman *et al.*, 2016). vom Brocke *et al.* (2016) challenge the one-size-fits-all methods used in BPM and instead propose a framework for context-sensitive BPM. The BPM body of knowledge is enriched by examining and assessing a broader variety of business contexts and helps practitioners better understand the specific business context in which BPM initiatives are applied (Niehaves *et al.*, 2014). Niehaves *et al.* further explicitly comment on the negative effects of BPM maturity models on business practice and argue that dynamic capabilities related to embedding contingencies in developing BPM are needed. Obviously, this new explorative approach and thinking has impact on how prioritization as a mystery phase can be tackled in BPM research.

To ensure the correct scope of BPM and foster a common understanding of the research area, Rosemann and vom Brocke (2010) have defined the six core elements of strategic BPM: strategic alignment, governance, method, information technology, people and culture. They claim that these six elements, and the corresponding capabilities, increase our understanding of BPM as a holistic management discipline. The six elements "make the holistic view on BPM more tangible" (Rosemann and vom Brocke, 2010, p. 120). This framework "has the potential to become an essential tool for such strategy and road-mapping exercises as it facilitates the task of allocating priorities and timeframes to the progression of the various BPM elements" (Rosemann and vom Brocke, 2010, p. 119).

vom Brocke *et al.* (2014) propose the ten principles of good BPM practice and further articulate the importance of BPM research becoming more explorative and holistic in nature. The ten principles (vom Brocke *et al.*, 2014) are principle of organizational context-awareness; of continuity: BPM should be a continues and permanent practice; of enablement: BPM should build new capabilities; of holism: BPM should be inclusive in scope; of institutionalization: BPM should be embedded in the organizational structure; of involvement of all stakeholders groups; of joint understanding; of purpose, i.e. contributing to strategic value creation; of simplicity: BPM should be economical; and of technology appropriation: BPM should make opportune use of technology.

Although the researches by Rosemann (2014), and vom Brocke *et al.* (2016) provide some directions for explorative BPM research and suggest extending our understanding of BPM in a more holistic and context-sensitive way, no enabling and implementable method has yet been developed. Such a method should demonstrate that an explorative approach is feasible, while at the same time providing the empirical evidence, based on real business settings, that such a method creates more values for BPM practice and research. In this paper, we therefore discuss the PCM as proposed by Ohlsson, Han, Johannesson and Rusu, 2014; Ohlsson, Han, Johannesson, Carpenhall and Rusu, 2014. A core aspect of the method is that it was developed as a collaborative design project involving IS researchers and a group of practitioners in BPM and IT active in large Swedish organizations.

3. PCM

PCM consists of two models, a process assessment heat map (PAHM) and a process categorization map (CM). The design rationale of PCM is to embrace a BPM life-cycle view, which implies that a continuous assessment of process characteristics is made at different stages of the process lifecycle. Next, the six core elements of BPM, as discussed above, are used in the assessment. In this way, the method is grounded in theory. In addition to the theoretical grounding, the method is empirically grounded, eliciting the tactical knowledge and practical experience from the BPM managers and stakeholders involved by using the business concepts that managers use in everyday practice.

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3.1 PAHM

PAHM has five distinct perspectives (see Table I): positioning, relating, preparing, implementing and proving perspectives. The positioning perspective is aimed at assessing the alignment of the process with the business strategy, objectives and values. Strategic positioning and value configuration are approaches (e.g. Porter, 1996; Treacy and Wiersema, 1995; Stabell and Fjeldstad, 1998) that are functional for analysing process activities and value creation. With proper positioning, companies are able to identify the degree to which the process is aligned with their business strategy, objectives and values (Hammer, 2010; Versteeg and Bouwman, 2006). We argue that a positioning perspective, with the help of PAHM, helps companies to open their employees' minds to generate critical thinking about process prioritization and to create a shared understanding of business processes and potential improvements. The relating perspective reflects the elements of culture, people and governance, and is focussed on examining opinions and roles of as well as rewards and risks for the stakeholders exposed to or involved in the process. Literature recognizes the importance of people and culture within the context of BPM (Schimiedel *et al.*, 2013). A focus on the involvement and interests of stakeholders leads to longer-lasting and stronger process improvements and improved management (Rosemann and vom Brocke, 2010). The preparing perspective implies elements of method, IT, people and culture, and is aimed at analysing the availability and quality of key resources and capabilities necessary for process improvements, as well as the commitment of stakeholders. The implementing perspective embodies elements of governance, method and IT, and is focussed on analysing the performance of the process (interfaces within the process) that is subject to analysis and change. The proving perspective mirrors the elements of method and governance, and concentrates on the degree to which processes are appropriately monitored and measured. Therefore, it is necessary to define the proper metrics and the right KPI levels.

Table I shows the working definitions of the five perspectives and sample questions, which are adapted from previous frameworks (e.g. Hammer, 2007; Rosemann and

PAHM perspectives	Sample questions
Positioning assesses the alignment of the process with the business strategy, objectives and values	How clearly has the management positioned the process role, mandate and importance in relation to the business strategy and operational business logic? Is the process well described in the management system? Are priorities and the need for improvements shared?
Relating assesses the attitudes, roles, risks and rewards of the stakeholders exposed to the process	Do stakeholders share risks and rewards among units/departments? Do stakeholders have a clear understanding of their role in the process? Are all the key stakeholders in agreement with process interfaces and improvement roadmap?
Preparing assesses the availability and quality of key capabilities for improving the process	Do people have the right skills and competence? Are the necessary resources secured? Is the process change dependent on a key person? Do people commit to the process?
Implementing assesses the performance of the process that is subject to analysis	What are stakeholders (internal, external) perceptions about the performance? How well do the interfaces work around supporting processes? How effective is the process?
Proving assesses the degree to which the process is appropriately monitored and measured	Is the business impact of the process measured in a reliable and valid way? What is the right level for process evaluation? What are the relevant KPIs? Is there a closed feedback loop?

Table I. The interactive activities with distinct perspectives and examples of questions based on the six core elements

vom Brocke, 2010). The perspectives follow a process life-cycle view, from process identification (positioning), process redesign (relating and preparing) and process implementation (implementing), to process monitoring (proving).

Because each organization has its own strategy and business processes, the model allows managers to define and refine crucial aspects and questions in each perspective relevant to the heat map (PAHM). The motivation for this design choice is two-fold. First, the questions involved should motivate and engage managers and stakeholders to provide tactical knowledge and sample experiences, which means that the questions should be directly related to their work life, experience and context. Second, the information included in the heat map should be focussed on each relevant process and perspective, so that the prioritization and decision-making match the organization in question. Relevant information to complete the heat map is collected based on interviews with managers and key process stakeholders.

We adopt Hammer's (2007) colour regimes and quantitative measurement method in the heat map. If a process according to the chosen perspective is considered by process owners and stakeholders to be eligible for improvement, red is used to indicate that the improvement potential is more than 50 per cent. If it is considered to have an improvement potential between 20 and 50 per cent, amber is used, and green is used if the process is considered to have less than 20 per cent improvement potential. The heat map offers room for comments and motivations for the assessment based on the current performance and expected improvements. The colours and comments are documented. All the assessments based on interviews are consolidated in one table (Figure 1 shows a PAHM of analysing the processes based on seven respondents' answers to positioning perspective). The process with the highest number of red assessments will then be given special attention in the decision-making process facilitated by PCM. Important complementary information for the actual decision is the qualitative data collected in conjunction with the PAHM. So the PAHM makes clear where the priorities are. In the next step, the focus is on the Process CM.

3.2 CM

CM makes it possible to position processes in a space defined by three dimensions: differentiation, formality and governance positioning (see Table II). The results are presented

Figure 1.
Process assessment heat map – PAHM

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CM dimensions	Sample questions
Differentiation assesses the degree to which a process is superior to similar processes of competitors, thereby differentiating the value proposition of the organization (scale: differentiating to common)	Does the process in scope differentiate your company from your competitors? Does the process in scope perform better or worse than your competitors?
Formality assesses the degree to which a process is repeatable, predictable and automatable, and involves applications rather than people (scale: formal to informal) and is therefore easier to manage	Does the process in scope reside on tactical knowledge? How strict is the process formalized? How much of the process is based on routine tasks? How much of the process in scope is conducted in an (un-) structured way?
Governance positioning makes it clear whether process governance is positioned at the front-end or at the back-end	Does the process under governance concern suppliers, consumers or others internal or external actors? Where is the governance of the process positioned?

Table II. Categorization map (CM) dimensions and sample questions

in what is called the CM (see Figure 2). Differentiation is the dimension to the right of the figure, formality to the left, while governance positioning is placed horizontally, A represents the current as-is position and T the to-be position. The map is constructed as a six-cell grid in two dimensions, rather than a cube in three dimensions, for the following reasons: the results are easy to communicate using two dimensional visualization and although it is assumed that a common, informal process should ideally not exist, we realize that such a process may occur in reality and A* is then used to indicate this specific instantiation.

Figure 2 shows an example of a CM generated by only one answer from one respondent.

The map is intended to obtain indicative information on how the prioritized processes resulting from the heat map can be improved, e.g. the type of process support system that should be used, the degree of change desired, i.e. incremental improvement or fundamental re-engineering, and how to build a governance mechanism designed to create and sustain value. The dimensions for selection are based on three criteria. First, the fundamental criterion for prioritizing a process is the degree to which it contributes to the business strategy.

Figure 2. The process categorization map

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Because it is important for the process to allow the company to differentiate itself from its competitors by creating added value, we define differentiation as the degree to which a process is superior to similar processes of competitors and supports the value proposition of the organization. A continuous scale is used with processes that are core for strategic differentiation *vis-à-vis* common processes.

Second, BPM systems have become the inseparable ensemble of process management. Information technology capabilities have to support process management capabilities (Van der Aalst, 2013; Mithas *et al.*, 2011). If a process is fully aligned and supported by information technology, it can become formalized and contribute to a cost-effective execution. By contrast, if a process is unpredictable and knowledge-intensive, the operational costs will increase considerably (Swenson, 2010), which means that assessing the degree of formalization is crucial for the analysis. Formality refers to the degree to which a process is repeatable, predictable and automatable, and involves applications rather than people, making it easier to manage. Formality is scored on a continuous scale, with formal and informal as the extremes.

The third criterion relates to collaboration within an internal or external organizational value configuration to co-create value for consumers, as well as for organizational units, departments or external suppliers. Revenues have to be created for every actor involved (e.g. Franz *et al.*, 2012; Kothandaraman and Wilson, 2001; Rai *et al.*, 2012). The positioning and the role of a specific governance mechanism within the larger value creation network context helps companies allocate limited resources, and understand the interdependencies between internal and/or external partners (Franz *et al.*, 2012). Understanding interdependencies leads to serious (re)consideration of where and how to structure and use governance mechanism. Governance positioning can be at the back-end (cost centre) or at the front-end (profit centre), which means that back-end and front-end are opposites. This distinction makes it clear where process governance mechanisms need to be positioned. For instance, if process ownership was moved from back-end (production) to front-end (the marketing service), the governance structure and mechanism should be transferred accordingly. The marketing manager is assigned the key accountability and responsibility related to the new process. In order to ensure the fit between business process and business environment, organizations must explicitly address the need for cross-functional collaboration, internal and external supply and demand relations, and management accountability for end-to-end business processes (Markus and Jacobson, 2010).

The CM dimensions propose the most fundamental factors for creating a process vision: business process strategy (differentiation), BPMS/IT strategy (formality) and BPM governance strategy (value network governance positioning). The operationalization of the dimensions helps firms to incorporate these strategies into the future vision of a process. Now that we have explained the core tools for visualization, PAHM and CM, we discuss the way they are used in practice.

3.3 PCM way of working: activities and the web-based tool

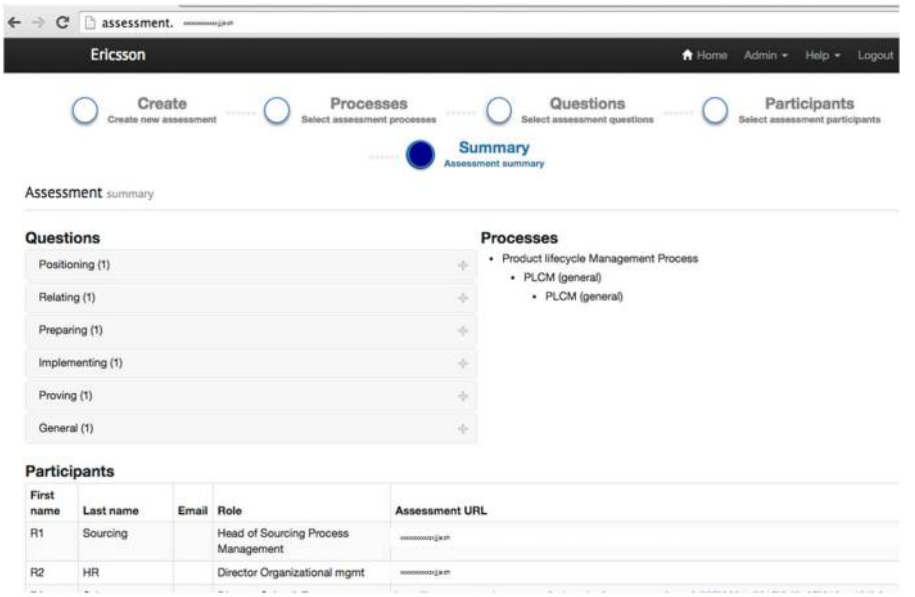
When companies use the PCM to evaluate processes, they need to: create and establish a core team that will be in the lead of the evaluation and serve as interviewers, by using the PAHM and configuring the process CM. They fine-tune and adjust the sample questions proposed in Tables I and II, in consideration of the company's business contingencies. The team is made up of CIOs, C-level managers and senior process managers; and the team determines the high level unit of analysis, "which processes within which business context need to be analysed". The questions associated with the PCM need to be specified towards the business context under analysis. Next, the team selects a group of interviewees (participants) for the evaluation, the aim being to involve more managers and process stakeholders (both formal and informal leaders) at different organizational levels and with

different functions, in order to gather a broader array of opinions, increase visibility, transparency and trustworthiness of the assessment, and create a social and learning environment for prioritizing, innovating and managing processes; to ensure quality of data, e.g. reliable and valid results from the assessment.

The interview procedure is as follows. First, the interviewees are asked to decide on a colour (green, amber or red), based on their knowledge and experience of the processes under study, by interactively discussing the key questions from each perspective with the interviewers. Interviewees are expected to provide concrete arguments for choosing a specific colour. They are also asked to provide advice on how to improve the process. Next, the interviews focus on process categorization. The interviewees perform an as-is analysis of the process by reflecting on the three dimensions and answering questions based on the current situation, after which they consider the same questions again, but with a to-be focus. The time horizon is two to three years into the future. Interviewees are asked to position the as-is dot and the to-be dot on the CM. The interactions during the PAHM help the interviewees familiarize themselves with the assessment. Their learning and reflections serve as a basis for projecting the dots in the CM and generating the final map.

The entire process of implementing PCM is supported by a cloud-based web tool (see Figure 3, showing a summary of a specific configuration of an assessment, including selected perspectives, questions, processes (unit of analysis) and participants). The tool helps initiate and create an assessment, select the processes to be assessed, prepare for the interviews adhering to the five PAHM perspectives and the three CM dimensions, select the participants, and document and analyse the interviews and evaluations, and visualize them in the PAHM (see Figure 1) and CM (see Figure 2).

Finally, top management can make a decision based on the aggregated results generated by the web-based tool. The PAHM supports the prioritization of the "red" process for improvement. The CM can help identify the gap in process performance by comparing the different projections of as-is dots and to-be dots. The results generate "coarse-grained"



Note: Manipulated screen picture

Figure 3. The prioritization and categorization method – web-based tool

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improvement heuristics for to-be processes. Management can also consider aligning the core BPM elements with associated organizational capabilities in preparing the implementation of the prioritized processes, in order to realize the required changes. In the next section, we discuss the approach that is adopted when applying the PCM in a case study.

4. Research method

Ericsson was selected for an in depth-case study to evaluate the use of PCM. Case study research is a common method for evaluating designed artefacts (Hevner *et al.*, 2004). The case is a unique case. We applied the same proposed approach also in other cases for validation purposes, but the involved organizations did not grant permission to publish the results. This study as discussed in this paper adopts a qualitative, interpretive approach (Yin, 2013; Eisenhardt, 1989). This qualitative approach is also recommended by BPM community to develop adaptable knowledge for practitioners (Roeser and Kern, 2015). Core elements in the case study are the complexities and insights gained when analysing BPM practice, and specifically the use of the PCM in a process assessment and improvement project. The timeline and major activities are shown in Table III.

Ericsson is a high-tech company with over 100 years in the communications business, and a pioneer in mobile technology, such as GSM, 3G, LTE and Bluetooth, with an emphasis on investment in innovations designed to enable a Networked Society. Currently, its product portfolio covers core solutions for telecom operators, public safety, medial industry, transport, utilities, products (hardware and software) and managed services (software and infrastructure in mobility, broadband and the cloud). Ericsson also provides patent and technology licensing services, and has a track record of delivering high quality, scalable communications products and services in meeting the needs of its customers. Ericsson is currently a world leader in core technologies, like mobile traffic, patents and support systems in communications. In the service market, Ericsson has 115,000 employees globally and customers in 180 countries (Ericsson, 2015). Ericsson is continuously evaluating, assessing and improving its processes. Ericsson has been working with enterprise architecture, exploitative BPM and modelling approaches since the mid-2000. The company has a tradition with these more traditional approaches, working with methods and tools

	Main activities and results
September-December 2013	Pilot study, 11 interviews Result: based on the pilot, it was decided to include PCM in Ericsson's BPM framework to analyse processes
January-September 2014	Negotiating process and configuring PCM to "fit" with Ericsson's context Results: both heat map and categorizing map were configured
October 2014-January 2015	Evaluation of eight processes using the configured PCM. Fifty-five stakeholders were interviewed and 109 process evaluations were collected. Some people were involved in the evaluation of multiple processes The core results were presented to the management board which, within Ericsson, is called the Ericsson Steering Group (ESG) in January 2015, with a result PCM was decided to train more stakeholders at Ericsson
February-June 2015	Fifteen meetings with process stakeholders to calibrate the evaluation results as well as gain more insights. Material for training more stakeholders in the use of PCM was developed
August 2015-December 2015	Training on how to use PCM was organized. Ten seminars were held involving more stakeholders/employees. Comments on PCM delivered during seminars were documented. And two additional evaluations of PCM were carried out independently by trained Ericsson employees. The results of these evaluations were included in the case data

Table III.
Timeline of major activities

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such as ARIS. Ericsson scores high on Capability Maturity Model Integration and has extensive experience with Lean and Six-Sigma approaches.

The data for the case study was collected by one of the authors over a three-year period (2013-2015). The empirical material includes 55 interviews on the use of PCM related to evaluation of eight core processes at Ericsson, field notes taken during the observations of the meetings with process owners, and follow-up interviews with a senior process manager and a process management consultant. PCM evaluation interviews were executed both by researchers and by company managers, for instance the manager for business process, corporate IT and technology. The selected processes are related to finance, IT, human resources, sales, product management, services, sourcing, and supply. The stakeholders involved in the process evaluations operate on different organizational levels, and include executives of IT, employees and process owners in operational units on group and regional levels.

Data analysis is guided by the "hermeneutics" framework proposed by Cole and Avison (2007). Through the interactive hermeneutics process, from understanding via explanation to interpretation, in which process stakeholders and researchers were collaborating, it was possible to share and create a shared understanding and know-how. These insights provided the basis for the evaluation of the processes, as supported by the PCM.

5. Results

PCM was first configured based on Ericsson's business needs and the requirements from the Ericsson Steering Group (ESG). Second, the configured PCM was used to evaluate the selection of core/primary processes, with 55 stakeholders taking part in the evaluation. Further evidence was collected during meetings with process managers, training sessions with employees, and interviews with a senior process manager and a PCM consultant.

5.1 PCM configuration at Ericsson

From the start, the researchers were engaged in a long process of negotiating and configuring the PCM to be applied at Ericsson. The researchers and process stakeholders at Ericsson went through a number of iterations justifying the PCM to fit with Ericsson's business context, internal culture and top management requirements. These requirements were formulated explicitly by one of the core managers:

> […] the current processes at Ericsson may not fulfil the demand or being relevant to future business. The team needs quantified and objective evaluation of the current processes to convince the ESG, as well to communicate with process stakeholders/owners with the organisation. Therefore, the configuration is crucial. The questions of PCM should indicate Ericsson business context, culture, and strategy.

The ESG wanted to analyse Ericsson's process capabilities in relation to its future strategy. The leaders wanted the five perspectives of the heat-map to focus on efficiency and effectiveness. From a management perspective, the focus was on improving the potential of the processes against future business requirements. Relevant criteria were end-to-end operations and process interfaces; costs and lead-time; availability of resources relate to the processes in terms of number of people involved, competencies and skills, as well as IT support, e.g. tools as well as capabilities. As a consequence, the questions being asked in relation to the heat map and categorization map were adjusted. The formulations of the questions were iterated several times between Ericsson and researchers involved, to ensure a "fit" with the focus on efficiency and effectiveness (see Figure 4). The five perspectives of heat map were configured to business terms that are used at Ericsson, which are, positioning to "alignment to strategy", relating to "relation and interface to other stakeholders", preparing to "capability to execute", implementing to "actual/required performance", and proving to "ability to monitor and measure".

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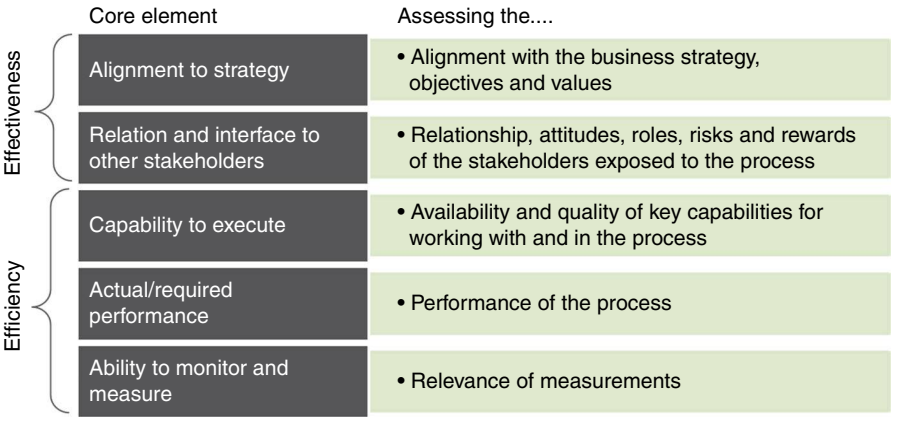


Figure 4. Specification of PCM heath map topics for Ericsson

As a next step, Ericsson's processes were evaluated using the configured PCM. The evaluation involved four senior employees, one PCM consultant and one of the researchers as the evaluation "team". The activities involved specifying the requirements from the ESG to questions to be used in the steps to generate the heat map (see Figure 5).

For every perspective, the leading principle was defined, for instance, with regard to the positioning perspective, it was important to emphasize that the process should be future-proof, for the relating perspective, the end-to-end of the process was important, for preparing, simplicity was key, with regard to implementing, the involvement of process owners was key, as well as simplicity, while, ultimately proving that the process would lead to improved performance was crucial:

> The questions we included in the evaluation are well formulated by combining both the ESG questions and PCM perspectives. The managers involved in the interviews can quickly understand what we were evaluating (Process manager at Ericsson).

Ericsson further configured CM from positioning "dots" (see Figure 2 both as-is and to-be "dots") in the map space to a scale of 1-10, since ESG expects quantified results. The questions used in CM are shown in Table IV.

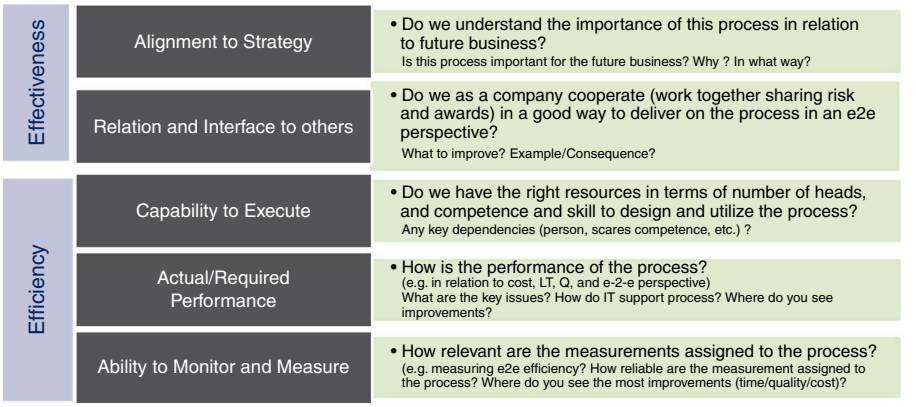


Figure 5. Mapping ESG questions to heat map perspectives

5.2 *Configured PCM in process evaluation at Ericsson*

Questions were formulated and focussed on assessing of the existing (as-is) as well as the future situation (To-Be). The selected processes were assessed based on the heat map regarding how they contribute to efficiency and effectiveness of the company (see Figure 6). The processes were labelled "a" through "h". For reasons of confidentiality, the selected processes were not further specified.

The results show that processes are functional in nature and that they are weakly integrated with other processes. Thus, no coordination processes across the functional domains are in place to help the company achieve end-to-end process integration.

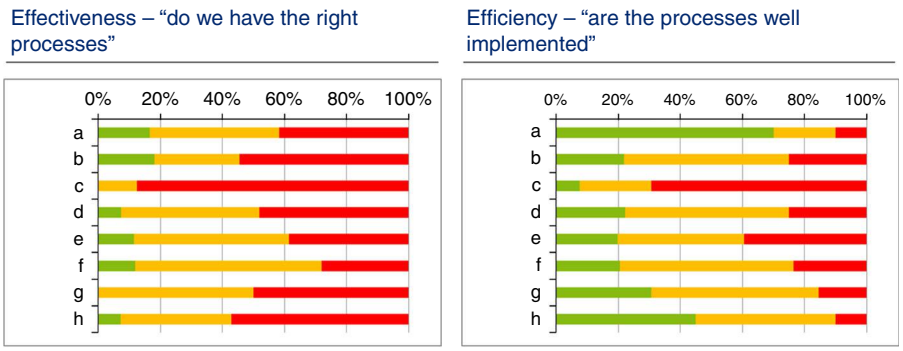
The process manager further commented that:

> The current process activities are controlled by each function. In order to develop new business areas (Ericsson networked society), processes across different functions should be built and implemented in order to meet customers' need effectively and efficiently.

Inefficient IT investment in supporting the cross-functional processes was also identified as a main concern during the evaluation. Most of the interviewees think that the processes are not supporting the effectiveness of the organization, especially processes "c" and "g". However, despite the lack of effectiveness, most of the processes are implemented efficiently, for example processes "a", "g" and "h".

Questions per process	
Is the process customer facing or an internal process, 1-10	Current
Is the process structured or semi structured, 1-10	Current
Is the process differentiating or a commodity process, 1-10	Current
Is the process customer facing or an internal process, 1-10	Future
Is the process structured or semi-structured, 1-10	Future
Is the process differentiating or a commodity process, 1-10	Future

Table IV. The questions for categorization map



- Functionally focused – main issues in the e2e perspective
- In general processes are built to support current business

- In general processes are better implemented than designed
- Non coordinated functional processes lead to e2e efficiencies and inefficient/inefficient IT investments

Note: e2e, end-to-end

Figure 6. Evaluation results: aggregated results from the heat map (PAHM)

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As a next step, the CM for process evaluation was made, see Figure 7, for examples of a more detailed analysis of one of the processes – the process "a". The process was more relate to the customer (front-back). The as-is score is 4.0, to-be score 6.7 on a scale of 1-10. Formal control over the process seems to be sufficiently established, e.g. the as-is score is 7.0, to-be score 6.7 (formal-informal). While this process is highly relevant to stay competitive in the future, e.g. the as-is score is 5.5, to-be score 7.3 (common-competitive).

Although we present the quantitative results as an example, insights gained during the evaluation process were more qualitative in nature. Like in any organization, process "a" is one of the core and fundamental processes at Ericsson. The owner of the process is considered to be one of the most influential leaders within Ericsson. Process "a" was interacting with other processes, for example process "e". Process "a" usually touched upon process "e" 30-40 times, mainly to execute managerial control before process "e" could be completed. For example, a stakeholder of process "a" argued that:

> We can live with a more flexible way of working in new targeted business areas – but we have to have control. We need to know what model we use in what type of business / contract.

However, he also admitted that:

> We kill good initiatives because we feel that we do not have control.

As a result, the lead time of process "e" was seriously affected, leading to low customer satisfaction and a negative impact on the overall performance of the company. Most of the interviewed managers expected that process "a" can be more customer-oriented. For instance, by reducing the number of control moments in process "e" and enable more flexibility for process "e" owners to complete the process efficiently and in time. Another stakeholder of process "a" suggested that:

> Make it more flexible to form cross functional teams that work to develop how we support new targeted areas.

As a result, process "e" could be more competitive, customer services could be improved and customer satisfaction was expected to increase. A manager from process "e" commented that:

> Traditional business works pretty well - but we need to really re-think when it comes to new types of business.

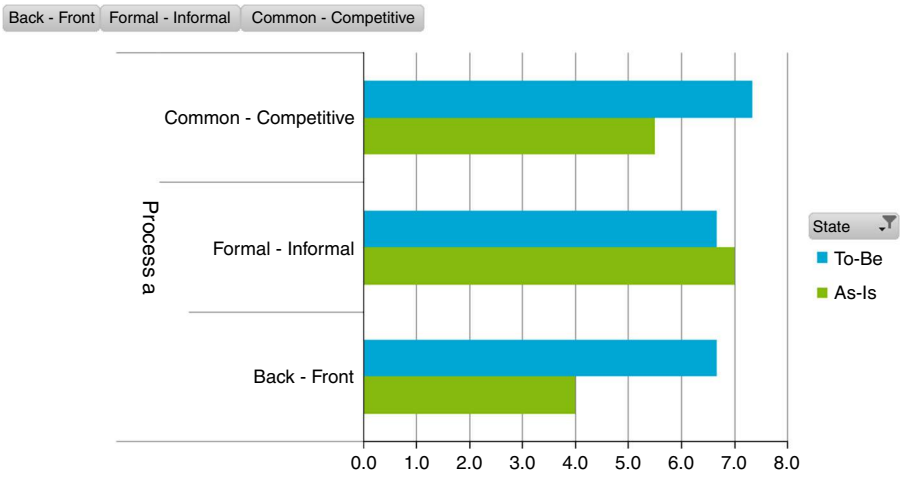

Figure 7.
Evaluation result: categorization analysis of the process "a"

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Although process "a" is one of the most fundamental processes at Ericsson, and formalization of this process is a must, flexibility and customer-orientation needed to be improved to better serve the company future business. A manager from process "a" gave solutions that:

> We should develop three different ways of handling to support our core business, targeted business, and potential new business at Ericsson.

We only present one example of the eight processes that were analysed. The more detailed results were discussed with the ESG, which was satisfied with the insights generated through PCM, and by the results generated through applying the method, and they decided to implement the approach within the organization.

An important insight gained during the evaluation of the PCM method within Ericsson was that power struggles became explicit, and at the same time managers are looking for solutions to problems that can be implemented quickly. While using the "categorization map", it became clear that possible changes would influence the managers' future position and/or decision-making power, which means that, although visionary "design thinking" is beneficial to the company as a whole (find a path to move towards the desired future), individual managers felt threatened by future changes in the governance structure, which implies a new distribution of accountability (or power) within the organization.

Power "politics" will make it more difficult for a company to implement new "process structures". In practice, most problems are related to the "governance" and organizational accountability of processes, which are reinforced by Ericsson's complex process structure, with regions, market and product areas. Existing processes have a substantial potential for future business to enable the strategic changes envisaged by Ericsson's management, e.g. "networked society", changes are demanded, however. Ericsson is initiating changes after the PCM evaluation:

> A new governance is in design and planning (Personal communication from an Ericsson top-manager in June 2016).

5.3 Evaluation of the PCM approach

During the process of implementing PCM at Ericsson, evaluations were conducted on a continuous basis. The results of those evaluations show that, in general, the participants respond positively. Although academic in nature, the theoretical background supporting PCM is acknowledged:

> I find it interesting that it has its source in the academic world (Participant in a training session).

However, justification of theories is needed for them to be understood in practice:

> How to judge differentiation and also what consequences that "value creation position" would have […]- what would that mean in practice? (Participant in a session).

These points to the fact that PCM has to be adjusted to the specific business context and the context of the organization in which PCM is used:

> I think that more focus is needed for how to perform the PCM activities, for example, how to choose the scope, from what perspective the scope should be chosen, do we do this on processes or could it be also made on capabilities or other elements? (Participant in a training session).

> PCM introduces a structured way to collect information regarding what are the processes today, and helps to find improvement of those processes within a specific context. It is important to evaluate a process in relationships to company's strategy, culture, people, IT and governance. A process must fulfil its aim which require it to operate as a whole (Process manager at Ericsson).

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On the other hand, the merits of PCM are also acknowledged:

> In most cases the method is very efficient if you talk about "man time"/hours. You can set up a structure e.g. processes to level 2-3 (PCM consultant).

> Although you need a couple of minutes to introduce the method in the beginning, explaining the principles behind the Heat-Map and the Categorization Map, the method is "self-explanatory" in the interview (Process stakeholder at Ericsson).

> In general, PCM is easy to use, simple to understand, and we can get sufficient data and information and make decisions in a short period of time (Process manager at Ericsson).

The process manager further pointed out the holistic view that PCM can bring to the understanding of process improvements:

> The evaluation gave us a clear result regarding the processes in focus. We know which processes are not relevant for the future business, and which processes we should build/improve in order to be successful in the future[…] (Process manager at Ericsson).

> The evaluation has made all managers involved to be aware and think more holistically of processes as a whole, not focusing on only one process that a manager owns. They start to think and understand that processes should service for all kinds of businesses that Ericsson aims for, not only one business area (Process manager at Ericsson).

The method also has "implementation" challenges:

> The most difficult challenge in using PCM is to convince the steering group (ESG) that the method can bring information to make decisions regarding what should be prioritized, what are the important processes, and what should be focused upon for improvements/changes (Process manager at Ericsson).

To conclude, we can state that PCM has served its purpose in helping practitioners evaluate organizational processes. The results indicate that PCM can be configured to embrace the contextual factors of an organization, for example its business context, structure, governance and culture.

6. Discussion

The aim of this paper has been to demonstrate and evaluate the PCM at Ericsson. The results of the case study show that the method allowed us to assess processes in an explorative way, given the consideration of company's organizational characteristics and industrial environment, allowing companies to improve or (re)design processes that match their business development. The PCM is a novel method of implementing explorative BPM. This paper adds new knowledge and empirical evidences to apply explorative BPM in business.

6.1 Contributions to BPM research

The PCM is not IT-driven but business-driven, in contrast to, for instance, enterprise architecture (e.g Lankhorst *et al.*, 2009; Versteeg and Bouwman, 2006) and many business process modelling approaches (e.g. Ami and Sommer, 2007; Andersson and Johannesson, 2009; Curtis *et al.*, 1992; Kettinger *et al.*, 1997; Recker and Rosemann, 2009). The case study at Ericsson clearly showed that "processes that match future business" were crucial reasons for using PCM in the processes evaluation.

Moreover, PCM can be viewed as a kind of co-creation effort, in which business plays a more important role than IT. This solves one of the problems in business IT alignment research, were commitment from business in practice is often poor (e.g. Gerow *et al.*, 2014). In the Ericsson case, 55 processes managers, process owners or process stakeholders were involved in the evaluation. As "future business" was the main concern in driving the

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evaluation, commitment from business was high. Process management is a "business" and "management" practice, which cannot be only dedicated to IT.

PCM also distinguishes itself from the top-down business architecture approach proposed by Versteeg and Bouwman (2006). Where strategy serves as a driver for business architecture and is based on information from top-level management, a blueprint for the business architecture is made. In addition to considering top-management's requirements, PCM is able to involve the managers/owners of processes from different levels within an organization in defining their process domain as well as the alignment between processes, business and strategy. The results of PCM are aggregated by collecting opinions and tactic knowledge from stakeholders and process owners, in other words, the people who know the operation and performance of a process. As a result, decisions are made based on this "collective intelligence", which can be called a "bottom-up" approach to managing processes. This intelligence provides direct indications for redistributing resources and acquisition of dynamic BPM capabilities for business purposes. As such, PCM introduces a transparent and democratic procedure for process management decision-making, provides evidence of why the decisions were made, motivates why such a decision is chosen.

Moreover, the evaluation of processes by using PCM has raised awareness among managers about what to think, what to do and how to understand processes in their entirety, and not as "separate" processes that they owned. As a result, awareness of the implications of Ericsson's strategy as well as a supportive culture for new business process modelling is cultivated. People are more prepared for possible changes due to changes in strategy. People are one of the key elements of strategic BPM (Rosemann and vom Brocke, 2010), in that "people" do, implement and invoke in each other's presence to promote a particular action to achieve a strategic purpose, which means that it is important to fully consider people's role played in strategic planning for BPM (e.g. MacLean and MacIntosh, 2015).

Compared to other holistic approaches, e.g. Archimate (Lankhorst *et al.*, 2009) or ARIS (Scheer, 1998), and various maturity models (e.g. Röglinger *et al.*, 2012; Rosemann and de Bruin, 2005; Weber *et al.*, 2004), PCM is easy to use, simple and can yield results within a short time. After configuring the questions and focussing on the most important aspects that interested Ericsson, the evaluation of the eight core processes was completed in three months, which would not be possible by, for example, applying maturity models to determine where to improve process capabilities. Speed and timing of decision-making are becoming increasingly important in a digital world (Bharadwaj *et al.*, 2013). Faster and more effective decisions are needed to survive in the turbulent economic environments that companies face nowadays.

To conclude, PCM provides a more explorative approach to BPM, taking into account business processes in business context, business culture, governance and governance mechanisms, related to the availability of resources and capabilities, or the need to make the latter available.

Because no comparison is conducted between PCM and possible other methods of process prioritization in this empirical research. This paper lacks of empirical evidences to claim that PCM is more appropriate than other BPM methods that serve for the same purpose, i.e. prioritizing and categorizing business processes. Nonetheless, the results show that by implementing PCM in business settings, the company is able to involve more stakeholders in evaluation of processes with the aim to create a common vision and to identify potential opportunities that matter to future success. The approach supports the organization to build up key capabilities for explorative BPM. The evidences also reveal that PCM is a tool that supports the ten principals of good BPM as discussed in the literature section. PCM helps solve problems, offers high quality results in a simple and efficient way, and it is appreciated by practitioners and can be applied in real business practices. The method is easy to configure, flexible and adaptable. PCM contributes to "good BPM

practice" in that it helps companies explore BPM in a holistic, but easy and flexible way. In Table V, we further articulate the contribution of the PCM to practice, based on the ten principles of good BPM practice (vom Brocke *et al.*, 2014).

6.2 Implications for practice

This case study also has implications for practitioners. First of all, PCM supports a co-creation process to improve understanding of processes and their relation to strategy, and to improve governance making it possible to provide and manage resources and capabilities. In light of the many issues with existing methods being IT-driven, either top-down or bottom-up, this approach provides an elegant middle way by involving relevant stakeholders in a co-creation process.

Second, in the fast changing and turbulent business environments, organizations should aim at implementing changes based on faster and more effective decision-making. PCM can provide a transparent and democratic decision-making procedure and yields high-quality results within a short period of time, generating a shared understanding of processes improvements and potential changes. Investment in processes improvement or re-design should not only focus on process models or IT, but also on cultivating supportive culture and motivated employees who are keen to change and adapt.

Third, the evaluation of processes should include organizational factors and environmental variables that organizations are most interested in understanding, especially to improve current business and create future business. There is no "one-size-fits all model" that can be applied here. Each company should configure PCM to fit its business contingencies and contexts, which means PCM should not be seen as a method to solve all process improvement problems, but as an inspiration for determining an appropriate evaluation for a company's business needs.

Principles of good BPM	Contributions of PCM
Principle of context-awareness	PCM is easy to configure to fit into an organizational context. Thus, business contingencies and environmental factors can be considered in process evaluation and process improvement or redesign
Principle of continuity	PCM facilitates continuous process evaluation based on an organization's needs
Principle of enablement	PCM helps companies create capabilities for improving processes, and categorize resources and capabilities that companies may need to realize future as well as current business
Principle of holism	PCM is theoretically built upon a holistic approach, and does not focus only on IT, process modelling or methods. Strategy, governance, people and culture, together with IT and models are considered
Principle of institutionalization	PCM is flexible to configure to analyse "which processes within which context". As a result, organizational structure is embedded in PCM
Principle of involvement	Using PCM requires all process stakeholders to actively participate in process evaluation, resulting in a democratic and transparent evaluation that can benefit all
Principle of joint understanding	PCM creates a shared understanding among these key stakeholders who participate in processes evaluation. In interactive evaluation sessions, common understanding of processes are generated naturally
Principle of purpose	The results of PCM serves as the foundation for top-management decision-making regarding companies' process improvement, strategic movement towards the to-be situation
Principle of simplicity	PCM is easy to use. High-quality results can be obtained in a relatively short time
Principle of technology appropriation	The use of PCM in process evaluation is supported by a web-based tool in the cloud. The tool can document all evaluation interactions, comments, and aggregate/visualize the results. Although for security reasons, companies, like Ericsson would develop their own tool for supporting the use of PCM

Table V.
Contributions of PCM to good BPM practice

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Finally, PCM leads to potential changes in process governance, both internally and externally, especially if company operates in a dynamic environment like Ericsson does. PCM may make the internal "power politics" explicitly, which leaders can find where is resistance coming from and deal with change resistance efficiently. Moreover, PCM can help companies identify a strong governance position of those processes in their value network in order to create, deliver and capture business values.

7. Conclusion

This paper contributes to existing BPM research by presenting a new method that can be configured to fit a specific business or industry context and to support BPM contingencies. It is an explorative approach, focussing on innovation, capability development, alignment to business, and it is focussed less on modelling, architecture and IT systems. We advance BPM by proposing a collective design approach that is inspired less by architectures, modelling approaches and IT systems, as-is common in most business process modelling and management projects.

This research has certain limitations, some of which are related to the fact that we needed to find a balance regarding what we could and could not reveal about the case, and not all data could be disclosed. In our description of empirical parts, we were limited by non-disclosure agreements, which meant that we could only present some of the results regarding one of the eight processes that were actually analysed. Moreover, Ericsson is driven by efficiency and effectiveness, which are typically attributes of an operational excellence strategy. The insights as provided in this paper on the Ericsson case are largely confirmed by the cases that we have no permission to publish. Nevertheless, it would be interesting to explore alternative cases. In these cases we would look for companies where other strategies are in place, for instance customer intimacy or a blue ocean approach. Finally, we cannot provide data on improved performance at Ericsson due to the usage of PCM, yet.

These limitations can be translated into future research directions, including more detailed studies of individual single alternative cases in different industry settings, in different cultures, with different sizes, and implementing alternative strategies. More quantitative evaluations need to be initiated, both on a single-case level and on a multiple-case level. Cross case-analyses also may provide more in-depth insights. In addition, we would propose developing the PCM tool further, focussing not only on the processes themselves, but also on the creation and capturing value between organization units, to gain more insight into internal supply and demand, as well as process communication and control for explorative purpose.

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