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Emergent risks in business process change projects

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Abstract

Purpose – Even today still many business process change (BPC) initiatives fail and cause high overruns for organizations undergoing BPC initiatives. It is therefore important that BPC practitioners and researchers understand the risks inherent in BPC projects, and that they adapt their risk management processes to account for and mitigate these risks. Thus, the purpose of this paper is to investigate which emergent risks matter in BPC project.

Design/methodology/approach – The authors adopted case survey methodology and investigated data from 130 case studies to show the nature and magnitude of relationships between organizational support risks, volatility risks, and BPC project and process performance.

Findings – The results show that organizational support risks influence both the overall BPC project performance and process performance. Whereas, volatility risks influence project performance but appear to have no direct impact on the process performance. Both organizational support risks and volatility risks show influence on project management practices.

Research limitations/implications – The study show several limitations that might be assigned to the case survey methodology, such as use of secondary data or publication bias.

Practical implications – The authors provide considerable support which emergent risks matter in BPC projects.

Originality/value – The contribution of this study takes several forms. It fills a gap in the literature concerning emergent risk factors inherent in BPC projects. The authors provided theoretical explanation of the effects of emergent risks on BPC project and process performance. And lastly, the authors have demonstrated the usefulness of case survey methodology in BPC research.

Keywords PLS, Case survey methodology, BPC performance, Business process change, Emergent risk

Paper type Research paper

1. Introduction

Despite the considerable experience gained over the last two decades, managing risks induced by improving business processes is still an on-going challenge for business process change (BPC) practitioners and researchers alike (Trkman, 2010; Cao et al., 2001; Strebel, 1996; Kliem, 2000). An example of BPC failure due to the imposed risk of client change was the initiation of implementing an ERP system by FoxMeyer Drug Company striven for a competitive advantage. FoxMeyer invested in their change project $65 million expecting a save of $40-$50 million annually, as well as to gain competitive advantage (Jesitus, 1997). However, after its major client, Phar-Mor went bankrupt FoxMeyer signed a major new client contract, which required major changes to the projects. After the costs run over $100 million the project was declared as failure and within some time FoxMeyer went bankrupt (Jesitus, 1997). The literature provides many other examples of business process change failures due to imposed risks and concludes that most companies have no longer the luxury of funding BPC projects that...
are not showing the expected performance (e.g., Hammer and Champy, 1993; Al-Mashari et al., 2001; Trkman, 2010). Delivering the expected performance from BPC initiatives thus remains a critical challenge for many organizations (Hill and McCoy, 2011).

Gemino et al. (2008) propose that project performance can be better understood by separating risks into two different categories. They suggest separating risks into earlier (a priori) risk factors, which might be estimated before a project begins, such as budget, duration, or inexperience of the team and later (emergent) risk factors, which evolve during the course of a project, such as client manager or executive sponsor change. By investigating the risks of an organizational change, Kanter et al. (1992) found two kinds of risks factors: external and/or internal, such as functional, financial, or general project risk factors. They conclude that these kinds of risk factors result in different degrees of changes, which influence the whole success of change initiative.

Several BPC researchers have focused on priori risks or critical factors influencing BPC success (e.g., Scott and Vessey, 2002; Trkman, 2010; Holland and Light, 1999; Motwani et al., 2005; Jurisch et al., 2012), whereas others have focused on design and process of risk management (Kliem, 2000). However, emergent risks and their link to BPC performance remained rather unexplored (Trkman, 2010; Jurisch et al., 2012). Moreover, improving our understanding of various emergent risks imposed in BPC projects are key to understanding how to conduct future BPC projects successfully (Olsson, 2007; Sarker et al., 2006). Adding to the complexity of such projects, the success of BPC projects should not only be measured by the actual project performance but also by the performance of the changed business process (Jurisch et al., 2014). Against this background, we aim to answer the following research question:

RQ1. Which emergent risks influence the performance of IT-enabled BPC projects and/or the performance of the changed business process?

To investigate how emergent risks affect the project and process performance of BPC initiatives, we employ a model of IT project performance proposed by Gemino et al. (2008) as our research model. We further adopted case survey methodology to investigate our research question, since it presents a powerful approach for identifying and statistically testing patterns across case studies (Larsson, 1993; Lucas, 1974). More so, case survey methodology draws on the richness of numerous case studies, which allows for wider generalization.

The paper is organized as follows. In Section 2, we describe our research model and propose our hypotheses. Section 3 describes the case survey methodology, including the literature search, coding of case studies, and data analysis. Section 4 presents the results and Section 5 discusses those results, their implications and limitations. We conclude the paper in Section 6.

2. Theoretical background and hypotheses development
In the following section we describe our research model of emergent risk and the corresponding hypotheses.

2.1 Research model of emergent risks
Gemino et al. (2008) propose a temporal model of IT project performance, which can be used to suggest a different categorization of IT project risk factors. They classify risks into risks factors that are present when a project is defined (a priori) and risk factors that either emerge or are revealed as the project is executed (emergent) (Gemino et al., 2008). In general, they suggest that risks factors such as budget,
duration, technical complexity, or inexperience of the team can be estimated at the beginning of the project and therefore refer to them as a priori risk factors. Emergent risk factors refer to the new risks that emerge during the course of a project and to the actions of project managers to deal with the risk and progress of the project (Gemino et al., 2008). They identified two categories of emergent risks: first, organizational support risks; and second, project volatility risks. Organizational support risks involve executive sponsor support and user support (Gemino et al., 2008). Depending on the circumstances, organizational support can be seen both as a risk (e.g. lack of management support) or as an important resource for project managers (e.g. high management support). For the purposes of our case survey, organizational support risks present “an aggregate measure of the lack of support that the project and the project manager […] were given by the base organization” (Gemino et al., 2008). The second category of emergent risks includes volatilities in project targets (e.g. budget, schedule, etc.), key personnel, and external conditions (Sharma and Yetton, 2007; Gemino et al., 2008). While such volatilities can have a strong impact on the performance of a BPC project, they are also frequently outside the direct influence of the project team. Given that BPC projects may plausibly fail as a result of problems concerning any one or any combination of these two emergent risk categories, we included both of them in the model to account better for variance in performance and to investigate their relative importance (see Figure 1). Since, we are interested on the direct

![Research model and corresponding hypotheses](793)
effect of emergent risks on the BPC project and process performance, we excluded a
priori risk factors from our research model.

2.2 Hypotheses development

User participation. Following Gemino et al. (2008) we define user participation as three
item construct: to what extent user could make changes in the project management
process, the degree users were informed about the progress, and problems and the
possibility to evaluate the work of the project management team. A number of BPC
authors highlight the importance of user participation and empowerment in BPC
project initiatives (e.g. Leverment et al., 1998; Al-Mashari and Zairi, 2000; Newman et al.,
1998). For example a major UK health service provider notices that user participation is
one of the most important factors for BPC project success (Leverment et al., 1998).
Providing appropriate information about the progress and status of the change project
should be an essential part of the employee communication. Al-Mashari and Zairi
(2000) found in the case of the SAP implementation at Manco there was almost
no formal communication strategy and no possibility for the users to evaluate and
get involved. This means virtually no user participation was given, which is one
reason why the implementation was considered as failure. Newman et al. (1998)
considered the change project at a large UK bank as success because of the active user
participation and excellent training provided for the employees. Hence, a lack of
user participation can result in failure of BPC project. Thus, we hypothesize:

H1. The higher the user participation the higher the BPC project performance.

User involvement is not only a major facilitator of the overall project success,
but particularly important for the enhancement of the business process performance
(Newman et al., 1998; Lee and Chuah, 2001; Proctor and Gray, 2006; Paper et al., 2001;
Kemppainen, 2004). Empowering the users during a change program creates
awareness for the value-creating core processes and thus helps to enhance the process
quality (Newman et al., 1998). A major industrial manufacturer in Hongkong notices
that “worker’s perception and understanding about their job” is essential for the
quality of the products and services provided (Lee and Chuah, 2001). User participation
is also crucial for customer understanding to enhance the customer satisfaction
(Newman et al., 1998; Proctor and Gray, 2006). During a large change project at
Honeywell a new training philosophy was started with the result of educating
employees about customer satisfaction and its importance for the value-creation
(Paper et al., 2001). Thus, we expect:

H2. The higher the user participation the higher the business process performance.

Harvey (1994) highlighted the importance of user participation as an important factor
influencing project management practices. He reported an example from Lucas
Industries, who conducted a large change project to get profitable again. The results
were an agreement on the resources needed for the project, a detailed project plan and
an agreement on the communication plan for the change project, which would not have
been created without high user participation involvement (Harvey, 1994).

Hence, a lack of user participation can result in a weak project management
practices. Thus, we expect:

H3. The higher the user participation the better the project management practices.
**Top management support.** Top management support in BPC projects means that the decision to change was supported by the top management of the respective organization at the project beginning, so the project was planned from the beginning on with the top management’s involvement (Teng et al., 1998). The necessity of top management in BPC projects was first mentioned by Hammer and Champy’s (1993) work, who propose a steering committee of senior managers to initiate and lead the change project. The senior management of Contributions Agency had a lack of commitment to the project goals which caused that the organization failed to achieve all project goals (Harrington et al., 1998). In contrast, Reuters started a major change project to create an effective customer service company. According to the CEO, top management support was vital for the whole project to transform the company (Harvey, 1994). The Western Provident Association believed that change must be driven top-down and noticed that top management sponsorship “ensured that the major changes in the organization were pushed through at each stage of the project” (Harvey, 1994). Similar experiences were established at CIGNA Corporation (Caron et al., 1994) and Mobil Oil Australia, where the visible top management commitment was seen as key to the achievement of the radical changes (Martin and Cheung, 2002). Considering the high variance in the project performance between a lack of support and high top management support, we hypothesize:

**H4.** The higher the top management support the higher the BPC project performance.

Top management of American Express initiated a quality leadership program which helped them to increase efficiency, enhance effectiveness, and reduce the cost base (Ballou, 1995). According to Neely et al. (1995) business process performance can be measured through criteria such as efficiency and effectiveness. Another example of the change program at IBM in the early 1990s allowed them to achieve high improvements regarding the efficiency of the business processes, particularly in their cost structure (Weiler, 1995). A number of authors consider top management as essential success factor in achieving improvements in efficiency and effectiveness (Al-Mashari and Zairi, 1999; Dale, 1994; Weiler, 1995). Therefore, we hypothesize:

**H5.** The higher the top management support the higher the business process performance.

The linkage between top management support and project management practices has been discussed in BPC literature (e.g. Harvey, 1994; McAdam and Corrigan, 2001). If top management fails to provide the project management with the necessary empowerment, the project will not produce the anticipated results and project managers would not employ and use the appropriate methods and tools (Harvey, 1994). Thus, we hypothesize:

**H6.** The higher the top management support the better the project management practices.

**Governance volatility.** Governance volatility refers to the number of changes of the project manager, client manager, and executive sponsor during the project (Gemino et al., 2008). A number of BPC authors (Newman et al., 1998; Shin and Jemella, 2002; Hammer and Champy, 1993; Harvey, 1994) reported in their research that BPC initiatives with continuity in the project management, client management, and...
executive sponsorship personnel were smoothly accomplished and celebrated as success. Huq and Martin (2006) observed in a large US hospital a replacement of top and second-level management due to a pending merger (Huq and Martin, 2006). After the completion of the merger the interims management left the company and new appointed management continued the on-going BPC project with less expertise so that the final result was just a moderate success (Huq and Martin, 2006). Hence, if there is high volatility in governance, the BPC project will likely not meet its performance goals. Thus, we hypothesize:

**H7.** The lower the governance volatility the higher the BPC project performance.

Many BPC authors (e.g. Newman *et al.*, 1998; Shin and Jemella, 2002; Hammer and Champy, 1993; Harvey, 1994) reported that BPC projects with low governance volatility achieve cost savings, increase productivity, or improve the customer satisfaction. Other researchers (e.g. Huq and Martin, 2006; Kemppainen, 2004; Sarker and Lee, 2000) reported that the change of executive sponsors, project managers, or client managers is often connected with a delay in the schedule, increase of costs, or decrease of productivity. Regarding the change of the executive board in the implementation of an ERP system, governance volatility was both delaying the schedule and of high cost (Kemppainen, 2004). Similarly, Huq and Martin (2006) reported a delay in the schedule as consequence of high governance volatility. Therefore, we expect:

**H8.** The lower the governance volatility the higher the business process performance.

Kemppainen (2004) reported results from implementing a new ERP system in a global operating organization, where the initially sponsoring top management moved away from the project when the first problems regarding the high complexity of the change project were discovered. As a consequence, new board of executives including CEO was announced (Kemppainen, 2004). The new executive sponsors first initiate the change of the project management practices, especially the implementation plan and the project management tools and methods applied which took some time to get accepted (Kemppainen, 2004). Thus, the identified relation between governance volatility and project management practices leads to the following hypothesis:

**H9.** The lower the governance volatility the better the project management practices.

**External volatility risks.** External volatility is defined as a change in external factors, which are affecting the project (Gemino *et al.*, 2008). According to Gemino *et al.* (2008) these factors refer to the changes in the competitive environment, business strategy, supplier/vendor relationship, or a regulatory or governmental change. Several BPC researchers (e.g. Newman *et al.*, 1998; Shin and Jemella, 2002; Anderson and Woolley, 2004) reported that BPC projects with a consistent business strategy, well-defined supplier or vendor relationships and no or only few regulatory changes could successfully reach the planned improvements. Anderson and Woolley (2004) analyzed the reorganization and efficiency program of the suppliers of Unilever and measured improved product and service quality with a positive effect on customer satisfaction due to the reduction of external volatility. Hence, if there are only minor volatilities in external risks, the BPC project will likely meet its performance goals. Thus, we hypothesize:

**H10.** The lower the external volatility the higher the BPC project performance.
A number of authors (Currie and Willcocks, 1996; Kock and McQueen, 1996; Stemberger et al., 2007; Palmberg, 2010) showed the difficulty of reaching improvements at the business process level in case of a high external volatility such as competition, regulation, strategy, or relationships. Declining results and pressure to improve profitability as new business strategy made it difficult to create employee commitment for the BPC project in a large logistic company (Palmberg, 2010). The result was a reduction in employee morale and satisfaction, and service quality (Palmberg, 2010). Knock and McQueen (1996) and Currie and Willcocks (1996) reported that some companies facing additional environmental changes during their BPC projects are forced to reduce the initial planned process improvement goals. Due to the increasing competition from insurance companies, Royal Bank only had the opportunity to increase profit by job reduction (Currie and Willcocks, 1996). Hence, high external volatility can impede the achievement of BPC goals. We therefore hypothesize:

**H11.** The lower the external volatility the higher the business process performance.

Organizations with high pressure coming from external factors have serious problems in establishing a continuous and consistent project management philosophy, as the BPC projects have to face and incorporate new changes (Currie and Willcocks, 1996; Kock and McQueen, 1996). For example, a large public sector organization in Brazil operating in construction industry changed its strategy due to the competitive pressure and established new project management tools to achieve the new goals (Currie and Willcocks, 1996; Kock and McQueen, 1996). However, due to the short development schedule, these new project management tools lacked the appropriate scope and functionality to generate sustainable results (Currie and Willcocks, 1996; Kock and McQueen, 1996). Hence, the identified relation between external volatility and project management practices leads to the following hypothesis:

**H12.** The lower the external volatility the better the project management practices.

**Target volatility risks.** Target volatility, in contrast to external volatility measures the changes in internal factors affecting the project (Gemino et al., 2008). These internal factors are the number of project schedule changes, budget changes, or project scope changes (Gemino et al., 2008). A number of BPC authors (Jackson, 1995; Huq and Martin, 2006; Al-Mashari and Zairi, 2000; Brown and Riley, 2000; Kemppainen, 2004) show the negative effect of high target volatility in terms of changes in schedule, budget, or scope on the overall project performance. Huq and Martin (2006) reported a delay in the project schedule of 6 months that caused the BPC benefits being not apparent for several years. Another example of TELECO (a pseudonym for a large US telecommunication company) showed that the BPC project was changed in scope and ultimately the CEO in favor of the project retired and was replaced by a new executive with the opposite opinion about it (Sarker and Lee, 2008). Finally, the new CEO stopped the project and declared it as failure since the anticipated targets could not be reached (Sarker and Lee, 2008). Therefore, we hypothesize:

**H13.** The lower the target volatility the higher the BPC project performance.

Several BPC authors (Newman et al., 1998; Shin and Jemella, 2002; Hammer and Champy, 1993; Harvey, 1994) reported that BPC projects with low target volatility could achieve dramatic improvements in productivity, cost savings, and customer and...
employee satisfaction. High target volatility typically affects the business process performance of an organization (Huq and Martin, 2006; Jackson, 1995; Al-Mashari and Zairi, 2000). Exceeding the project budget increases the costs of a BPC project and can even result in a loss (Huq and Martin, 2006; Al-Mashari and Zairi, 2000). For example, Manco Group could not achieve many improvements due to the exceeding costs in the investment of $2.8 million for their BPC project (Al-Mashari and Zairi, 2000). Thus, we expect:

\[ H14. \] The lower the target volatility the higher the business process performance.

Huq and Martin (2006) reported from a BPC project of a large US hospital, 14 gaps identified by the implementation team, which caused a delay of six months of the go-live date. Since new processes had to be developed, this change in schedule caused to update the project plan, adapt the project management practices for the new configuration of the software, testing, and documentation (Huq and Martin, 2006). Hence, the identified relation between external volatility and project management practices leads to the following hypothesis:

\[ H15. \] The lower the target volatility the better the project management practices.

*Project management practices.* Previous research also suggests that the impact of these emergent risks can be managed and mitigated through project management practices (Barki *et al.*, 2001; Nidumolu, 1995; Wallace *et al.*, 2004; Gemino *et al.*, 2008). Project managers can take an active part throughout the course of a BPC project in counteracting these risks. Thus, emergent risks and project management practices are expected to be related to each other but also to influence project and process performance (Kettinger and Grover, 1995; Gemino *et al.*, 2008; Wallace *et al.*, 2004). Therefore, we hypothesize:

\[ H16. \] The better the project management practices the higher the BPC project performance.

\[ H17. \] The better the project management practices the higher the business process performance.

Lastly, previous research disclosed that in BPC projects the project performance strongly influences the performance of the changed business process (Jurisch *et al.*, 2014). Thus, we hypothesize:

\[ H18. \] The higher the BPC project performance, the higher the business process performance.

Figure 1 summarizes our research model with the corresponding hypotheses.

3. **Research method**

We investigated these hypotheses using case survey methodology, which is a suite of quantitative techniques to synthesize research findings across multiple case studies (Glass, 1976; Hunter and Schmidt, 2004; King and He, 2005). Case survey methodology, also known as meta case analysis or content analysis is a widely accepted methodology in related research domains such as management, IT outsourcing, or recently in IS research (Jurisch *et al.*, 2013). According to several authors (Glass *et al.*, 1981; Hunter and Schmidt, 2004; Rosenthal and DiMatteo, 2001) case survey methodology enable researchers to estimate more reliable effect sizes than traditional review
procedures, such as narrative or descriptive reviews. Furthermore, the results from case survey methodology are often treated as reliable, replicable and therefore suitable for theory development and hypotheses testing (Bullock and Tubbs, 1990; Rosenthal and DiMatteo, 2001). The choice of case survey methodology for our research satisfies four criteria proposed by Larsson (1993). First, the research domain produces a vast number of case studies (Yin and Heald, 1975), in our case BPC research field provides a large number of case studies reporting successes and failures of BPC initiatives. Second, this method is helpful if the unit of analysis is the organization (Larsson, 1993), i.e. the organization performing the BPC project. Third, if a number of impact factors is of interest (Jauch et al., 1980). Fourth, if it is difficult to obtain primary data in the research domain. Following the recommendation by Larsson (1993), the process of our case survey analysis was performed in three major steps: literature search, coding, and analysis.

3.1 Literature search
Our sample consists of case studies reported in journals, conference proceedings, dissertations, working papers, book sections, and magazine articles. We included conference proceedings, dissertations, working papers, and magazine articles in our literature search to address the "file-drawer problem." The file-drawer problem refers to the observation that results of published studies may report overestimate effect sizes compared to unpublished studies (Rosenthal, 1979).

First, we conducted a systematic keyword search including keywords “business process reengineering,” “business process transformation,” “business process innovation,” “continuous process improvement,” “six sigma,” and variants with the keyword “case study.” We searched databases such as Emerald, EBSCO, ScienceDirect, JSTOR, ACM Digital Library. These databases included the major journals and conference proceedings in the business process management area, such as Business Process Management Journal, Business Change and Reengineering, International Journal of Operations & Production Management, or Journal of Management Information Systems. Dissertations and theses were found in the databases such as ProQuest and WorldCat. Book sections were found through traditional channels, i.e. libraries. Second, following recommendations by Webster and Watson (2002), we performed forward and backward searches. Working papers were found by screening the websites of key authors identified by forward and backward search and conducting keyword searches in Google Scholar. In a third step, we explored titles, abstracts, and keywords. We further included a study in the case survey analysis if it satisfies three criteria. First, the study investigates project and process performance. Second, the study reports information on the emergent risks. Third, the study provided a rich description of the events.

The resultant case survey analysis sample included 130 case studies published between 1992 and 2013. The resultant distribution across publication type was as follows: journals (86), conference proceedings (16), dissertations (4), book sections (22), magazine article (1), and working paper (1). Of these cases 93 were in private and 37 in public organizations. The cases varied in terms of sectors (e.g. finance, health, education, and manufacturing) and types of BPC projects (e.g. business process reengineering, business process transformation, business process innovation, continuous process improvement, and six sigma).

3.2 Coding
Our coding scheme consisted of variables representing aspects of the study design and several control variables (e.g. research designs, publication outlet, and time frames of
the case studies). We relied on multi-item scales (at least two items) for each latent variable and five-point Likert scales to code each variable. This is consistent with theoretical reasoning of Srnka and Koeszegi (2007), who state that the coding of the case studies refers to the systematic assignment of codes (numbers) to units based on the coding scheme. Besides the eight variables discussed in this paper (e.g. emergent risks, project management practices, project, and process performance, etc.), our coding scheme included several additional variables. In total, our coding scheme comprised 44 variables and 137 items. This broader coding scheme allowed us to not only collect information on the variables analyzed within this article (e.g. risks, project performance, process performance, etc.), but also to gather information of other factors influencing BPC project success. Moreover, the broader coding scheme permitted us to spread some of the risks involved in case survey research.

The coding procedure was performed in three steps. In the first steps, two experienced raters coded several pilot case studies with the list of codes to become familiar with the coding scheme. Afterwards, they met personally and compared their coding results for calibration purposes. In the second step, the raters independently coded each case study. In the second, we established weekly meetings and discussed any discrepancies until we had reached a consensus. According to Bullock and Tubbs (1990) this procedure helps to eliminate individual disparities. Resolving discrepancies in this way is said to be a “superior way to correct coding mistakes” (Larsson, 1993). In the third step, after both raters completed the coding, we established inter-rater reliability using Krippendorf’s (1980) α. At the outset the results of Krippendorf’s ρ was 0.77, which indicates a substantial agreement between the raters.

3.3 Analysis
The hypotheses are tested using the partial least squares (PLS) procedure. PLS is suitable to analyze the data due to the following criteria proposed by Chin and Newsted (1998) and (Chin, 1998): first, the hypotheses are grounded in specified impact factors; second, handles both formative and reflective epistemic relationships between the latent variables and its measures; and third, avoids the problems with small sample size. Diamantopoulos (2006) argue that PLS provides more accurate estimates of the paths among constructs, which are usually biased by measurement error when using techniques such as multiple regressions (Diamantopoulos, 2006). Furthermore, PLS procedure uses component-based estimation and facilitates the exploration of two models of a structural equation model, the measurement (outer) model, examining the relations of measurement variables and their latent variables, and the structural (inner) model examining the latent variables to each other (Diamantopoulos, 2006).

To ensure validity and reliability of our results, we followed the recommendations by Hair et al. (1998) and assessed the quality of the measurement model and structural model. This assessment analysis was performed in two stages. We employed SPSS and SmartPLS 2.0 M3 to assess the measurement and the structural model.

In the first stage, we assessed the quality of the measurement model including reflective and formative indicators. We proved the four widely used and well-defined assessment criteria for the measurement models with reflective constructs: content validity, indicator reliability, composite reliability and discriminant validity (Chin, 1998). These assessment criteria were verified by adopting explorative factor analysis (Krafft et al., 2005). For the measurement models with formative constructs, we applied three assessment criteria: indicator relevance, multicollinearity, and nomological validity (Chin, 1998).
If successful and the latent constructs prove valid and reliable, stage two necessitates the assessment of the structural model. We employed three criteria recommended in PLS literature, i.e. the $R^2$-values, the effect size $f^2$, and the extent of significance and $\beta$-coefficients, to assess the explanatory and predictive power of the structural model. The central criterion for evaluating the structural model is the level of explained variance $R^2$ of the dependent constructs. $R^2$-values of 0.67, 0.33, and 0.19 for endogenous latent variables are substantial, moderate, or weak, respectively (Chin, 1998). To estimate the extent of $\beta$-coefficients, we used the PLS path algorithm procedure. For the significance of the path coefficients, we performed the bootstrapping re-sampling technique with 2,000 resamples (Efron and Tibshirani, 1993). The effect size $f^2$ investigates the substantive impact of each independent variable on the dependent variable (Cohen, 1988). Values of 0.02, 0.15, and 0.35 indicate a small, medium, or large impact, respectively (Chin, 1998). The effect size $f^2$ for the structural model was estimated by re-running several PLS estimations, excluding in each run one of the explaining latent constructs.

4. Results
The following section provides the results of the measurement model and the results of the structural model.

4.1 Measurement model
The assessment criterion content validity was verified by adopting explorative factor analysis (Krafft et al., 2005). We used direct oblimin rotations to identify the loadings and the variance. Our results show a successful verification of the content validity, since the accumulated explained variance yielded 65.75 percent and the indicators of each construct charge on one factor.

By assessing the indicator reliability, the latent variable variance should explain at least 50 percent of the indicator and the factor loadings of latent manifest variables should be above 0.70 (Carmines and Zeller, 1979). Hulland (1999) furthermore suggests to eliminate indicators with factor loadings below 0.4. Our results show that the factor loadings were mostly beyond the acceptable value of 0.70 with the exception of five indicators (see Table I). We did not eliminate any indicators, as none of them was below the limit of 0.4.

According to Fornell and Larcker (1981) the composite reliability estimates the internal consistency of the indicators measuring a particular factor. The value of the internal consistency should be at least 0.60 (Bagozzi and Yi, 1988). Our results show support for the composite reliability, as the internal consistency of the six reflective constructs was at least 0.60 (see Table I).

The last assessment criterion discriminant validity refers to the appropriate patterns of inter-indicators of a construct and other constructs (Gefen et al., 2000). The results of the average variance extracted (AVE) value is for all constructs beyond the recommended level of 0.50 (Fornell and Larcker, 1981). We further, determine the square root of the AVE values for each construct, which is seen as crucial value that should be higher than the correlations between it and all other constructs (Fornell and Larcker, 1981). Our data analysis disclosed that the squared roots were higher for all constructs thus successfully verifying discriminant validity.

Table I summarizes the results of the assessment of the quality of our measurement model and exhibits the factor loading, the AVE and the composite reliability.
The first assessment criterion for the measurement models with formative constructs represents indicator relevance that determines which indicators contribute most substantially to the construct (Sambamurthy and Chin, 1994). In order to demine the indicator relevance, we compare each indicator’s weight. We did not eliminate any indicator, as according to Bollen and Lennox (1991) in reflective measurement models,
the factor loadings can be less than 0.40. To verify multicollinearity, which indicates the indicator’s degree of linear dependency, we examined both the indicator’s correlation matrix and the variance inflation factors (VIF). The correlation coefficients were partially high (i.e. the highest correlation coefficient was 0.845). However, multicollinearity did not actually bias the results as all VIF were below the recommended level of 10 (Eckey et al., 2001). The nomological validity and relevance of indicators (Sambamurthy and Chin, 1994) were also verified using PLS software. We performed bootstrapping with 6,000 resamples for testing the statistical significance of path coefficients using t-tests.

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

### 4.2 Structural model

The results of the evaluation of the structural model are presented in Table II. The results of $R^2$ of our structural values represent moderate values with 0.477 (project performance), 0.423 (process performance), and 0.332 (project management practices). The results of the effect sizes $f^2$ show a small, medium, and large impact of the independent variables on the dependent variables (ranging from −0.310 to 0.530) (see Table II). Thus, our results show support for hypotheses $H1$, $H3$-$H7$, $H13$, and $H15$-$H18$. Hypotheses $H2$, $H8$-$H12$, and $H14$ were not supported in our study.

More specifically, our results show that organizational support risks have a stronger influence on the overall BPC project performance. In detail, user participation impacts BPC project performance ($H1$) and project management practices ($H3$). Top management support has a critical influence on project management practices ($H6$), BPC project performance ($H4$) and process performance ($H5$). The external volatility shows a significant impact on BPC projects ($H10$). On the contrary, target volatility has

<table>
<thead>
<tr>
<th>Correlation</th>
<th>$\beta$</th>
<th>t-value</th>
<th>Significance</th>
<th>$f^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$H1$: user participation $\rightarrow$ BPC project performance</td>
<td>0.053</td>
<td>2.813</td>
<td>**</td>
<td>0.110</td>
</tr>
<tr>
<td>$H2$: user participation $\rightarrow$ Business process performance</td>
<td>0.011</td>
<td>0.285</td>
<td>ns</td>
<td>−0.006</td>
</tr>
<tr>
<td>$H3$: user participation $\rightarrow$ Project management practices</td>
<td>0.310</td>
<td>13.544</td>
<td>***</td>
<td>0.310</td>
</tr>
<tr>
<td>$H4$: top management support $\rightarrow$ BPC project performance</td>
<td>0.501</td>
<td>9.562</td>
<td>***</td>
<td>0.532</td>
</tr>
<tr>
<td>$H5$: top management support $\rightarrow$ business process performance</td>
<td>0.256</td>
<td>6.790</td>
<td>***</td>
<td>0.509</td>
</tr>
<tr>
<td>$H6$: top management support $\rightarrow$ Project management practices</td>
<td>0.178</td>
<td>8.456</td>
<td>***</td>
<td>0.172</td>
</tr>
<tr>
<td>$H7$: governance volatility $\rightarrow$ BPC project performance</td>
<td>0.170</td>
<td>3.670</td>
<td>***</td>
<td>0.061</td>
</tr>
<tr>
<td>$H8$: governance volatility $\rightarrow$ business process performance</td>
<td>0.025</td>
<td>1.275</td>
<td>ns</td>
<td>0.066</td>
</tr>
<tr>
<td>$H9$: governance volatility $\rightarrow$ project management practices</td>
<td>−0.051</td>
<td>1.725</td>
<td>ns</td>
<td>−0.051</td>
</tr>
<tr>
<td>$H10$: external volatility $\rightarrow$ BPC project performance</td>
<td>0.045</td>
<td>1.759</td>
<td>ns</td>
<td>0.037</td>
</tr>
<tr>
<td>$H11$: external volatility $\rightarrow$ business process performance</td>
<td>0.033</td>
<td>1.685</td>
<td>ns</td>
<td>0.059</td>
</tr>
<tr>
<td>$H12$: external volatility $\rightarrow$ project management practices</td>
<td>−0.044</td>
<td>1.740</td>
<td>ns</td>
<td>−0.043</td>
</tr>
<tr>
<td>$H13$: target volatility $\rightarrow$ BPC project performance</td>
<td>−0.313</td>
<td>11.557</td>
<td>***</td>
<td>−0.110</td>
</tr>
<tr>
<td>$H14$: target volatility $\rightarrow$ business process performance</td>
<td>0.013</td>
<td>0.542</td>
<td>ns</td>
<td>−0.006</td>
</tr>
<tr>
<td>$H15$: target volatility $\rightarrow$ project management practices</td>
<td>−0.311</td>
<td>12.196</td>
<td>***</td>
<td>−0.310</td>
</tr>
<tr>
<td>$H16$: project management practices $\rightarrow$ BPC project performance</td>
<td>0.283</td>
<td>6.653</td>
<td>***</td>
<td>0.183</td>
</tr>
<tr>
<td>$H17$: project management practices $\rightarrow$ business process performance</td>
<td>0.173</td>
<td>5.486</td>
<td>***</td>
<td>0.076</td>
</tr>
<tr>
<td>$H18$: BPC project performance $\rightarrow$ business process performance</td>
<td>0.580</td>
<td>15.442</td>
<td>***</td>
<td>0.530</td>
</tr>
</tbody>
</table>

**Notes:** ns, not significant. $\beta$, PLS algorithm path weighting scheme; t-value, bootstrapping with 130 cases, 2,000 subsamples. **$p < 0.01 \rightarrow$ t-value 2.576, ***$p < 0.001 \rightarrow$ t-value 3.291

Table II. Path coefficients, t-values, and effect sizes
strong influence on project management practices (H15) and BPC project performance (H13). Governance volatility only has a significant influence on BPC project performance (H7). Hence, volatility risks influence project management practices and project performance but appear to have no direct impact on the process performance. Furthermore, our results also support the findings of Gemino et al. (2008) that project management practices have direct influence on BPC project performance (H16) and the changed process performance (H17). Lastly, our results also showed support for Jurisch et al.’s (2014) finding that the project performance has strong impact on the performance of the changed business process (H18). Hence, measuring BPC project success at the process level appears to be highly recommendable.

Figure 2 summarizes the results of the analysis with estimated path coefficients and associated t-values of the paths (Chin, 1998).

5. Discussion
Our results reported above make a number of contributions to research on emergent risks in BPC projects. First, our results suggest that organizational support risks have direct impact on BPC project performance, which indicate that higher user participation and higher top management support substantially improve BPC project performance. Furthermore, our results suggest that organizational support risks positively influence project management practices. These results thus partially confirm the findings reported by Gemino et al. (2008), who reported that organizational risks positively influences the project management practices, but on the other side do not have a direct impact on project product performance, which is in contrast to our findings.
Second, our results indicate that top management support positively influences business process performance, which is in line with Gemino et al. (2008). On the other hand, we could not support the hypothesis that also user participation directly influences business process performance, which is in contrast to findings of Gemino et al. (2008). The relationship between user participation and business process performance can be better explained by considering the mediating role of project management practices.

Third, our results indicate that there is no direct relationship between volatility risks and business process performance. However, this is also in contrast to findings of Gemino et al. (2008) who found that volatility risks have a direct impact on project process performance. Our results suggest that the relationship between volatility risks and business process performance can be similarly to previous point better explained by considering the mediating role of project management practices.

Fourth, our results show support for Jurisch et al.’s (2014) finding that the project performance has strong impact on the performance of the changed business process. Hence, measuring BPC project success at the process level appears to be highly recommendable.

With these results we established a more nuanced understanding of the emergent risks in BPC projects as well as empirically explained several relationships between emergent risks and business process performance and project performance. Furthermore, our study highlights the importance of studying moderating and mediating factors in BPC research to reconcile the magnitude of failure rates in BPC projects.

In interpreting the findings of this study, several limitations of case survey methodology need to be acknowledged. However, these limitations are very similar to those of other review methods. First, even we conducted an extensive literature search, we cannot guarantee that we identified all case studies. Furthermore, some case studies did not report the necessary information and thus, were not included in the case survey analysis. However, we are confident that any other case studies would not significantly affect our results. Second limitation refers to the publication bias, which means that significant results are more likely to be published than non-significant results (King and He, 2005). However, these published and significant results may not always be representative for the entire research population. Third, even though our coding results showed high inter-coder reliability, the process of designing scheme is bound to a certain degree of subjectivity. Any doubts in coding assignments were resolved by reaching a consensus. The fourth limitation refers to the sample size included in a case survey. According to King and He (2005) the statistical power of detecting a genuine effect size depends on the number of case studies included in a case survey. However, no information exists on the minimum sample size of a case survey. The last limitation of the case survey methodology is that it can be very time-consuming and cost-intensive to conduct. Even though Larsson (1993) argues that it is an inexpensive method, our own experiences suggest that the sampling and coding of case studies are rather resource-intensive stages.

6. Conclusion
This study was motivated by the insufficient understanding of emergent risks as one of the major cause for the high failure rates in BPC projects (Trkman, 2010; Cao et al., 2001; Strebel, 1996; Kliem, 2000). The findings reported above make four main contributions to research in BPC domain. First, we extended the theory of BPC by identifying emergent...
risks impacting BPC project and process performance. More specifically, our results suggest that user participation, top management support, governance volatility, and target volatility are critical emergent risks in BPC projects.

Second, we provided a theoretical explanation of the effects of emergent risks on the BPC project and process performance. Since, this study empirically examined the nature and magnitude of relationships between organizational support risks, volatility risks, and BPC project and process performance. This is a useful beginning in helping practitioners to obtain a better understanding of emergent risks when planning and performing BPC initiatives.

Third, our research makes a methodological contribution. More specifically, we have demonstrated the usefulness of including case survey methodology in BPC research, as a promising approach to the development or extension of theories in BPC research. This is in line with other authors (Glass et al., 1981; Hunter and Schmidt, 2004) who argue that case survey methodology enable researchers to estimate more reliable effect sizes than traditional review procedures, which in turn might increase summative validity of theories developed or extended in case studies. We thus posit that the case survey methodology can help BPC researchers to: first, establish summative validity for the theories developed in case studies; second, make these theories accessible to a wider BPC audience and thus increase their relevance; and third, enrich and strengthen the theoretical core of the BPC research community.

Last, by replicating the study of Gemino et al. (2008) in different domain, we further highlight the importance of replication studies in BPC research area. The need for replication has become apparent within medical science, where the reproducibility of the results have overturned their key results. Thus, reproducibility of results lies at the core of modern science.

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