
Full Paper

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Abstract

Solving complex tasks by collaborative teams is an important organizational capability. Beside traditional team work, an organization’s collective intelligence can be supported by social software technologies. Within business process management (BPM), social software can be used to support the different lifecycle steps of a business process. In this paper, we introduce a framework which shows possible opportunities for social software to contribute to effective BPM. An expert workshop was conducted to receive a first evaluation of the framework. The combination of social software and BPM is supposed to improve the functional performance of IT systems for BPM and the employees’ acceptance for BPM systems.

Keywords

Business Process Management, Social Media, Social Software, BPM lifecycle, Framework

Introduction

Coping with complex tasks by forming and staffing teams has been a common approach ever since. Team-based collaboration takes place in many forms, such as in project team meetings or in brainstorming sessions (Avital and Singh 2007). Another form of using collective intelligence in organizations has appeared by the use of social software technologies such as enterprise social networks, wikis, social tagging, social bookmarking, or weblogs (O’Reilly 2014). Recent research meets this growing interest by examining the business value of social network investments (Kettles and Smith David 2008; Nath et al. 2009), general advantages of web 2.0 tools (Blinn et al. 2009; Singh et al. 2010) and by illuminating different influencing factors regarding the adoption of those tools (Kosalge and Tole 2010; Saldanha and Krishnan 2010). Frameworks for web 2.0 tool prioritization within organizations have been developed (Boateng et al. 2009), as well as enterprise concepts for using weblogs or wikis (Pereira and Soares 2007; Raeth et al. 2010). One of the recurring statements is that social networking and the usage of collective intelligence may lead to competitive advantages when it comes to dealing with complex tasks (Singh et al. 2010).

During the last decades, firms have re-organized themselves in a process oriented way. Therefore, they place the focus on business processes and their management (Business Process Management, BPM). Within this context, collaborative tools like social software can “support the design, execution, and monitoring of business processes” (vom Brocke et al. 2011, p. 397). However, there is only limited research regarding concrete application cases of social software for BPM. This might be caused by the tender age of inner-organizational social software usage, by the rapid evolution and changes of social technologies, as
well as by its complexity. Nevertheless, researchers consistently stress the linkage of BPM and social software bearing high potential (e.g., increased efficiency in knowledge transfer) (Jeppesen and Frederiksen 2006; Nurcan and Schmidt 2009; vom Brocke et al. 2011). Therefore, we want to step into this gap and address the following research question: How can social software support BPM activities in an organization?

We start by introducing basics and related research of BPM and social software. Based on the existing literature, we then develop a framework which helps identify, categorize, and highlight possible opportunities for social software to contribute to effective BPM. Based on this framework, we conducted an expert workshop where the framework was evaluated. Hence, this paper presents a framework that enables experts to identify potential application cases of social software within BPM. After presenting the workshop results, we discuss the received outcomes with existing literature. Finally, we depict implications for research and practice and conclude with an outlook.

**Basics and related research**

Business process management is “a body of methods, techniques and tools to discover, analyze, redesign, execute and monitor business processes” (Dumas et al. 2013, p. 1). Thereby, it becomes obvious that BPM consists of different phases and activities which handle the lifecycle of a business process, such as process documentation, standardization, optimization, integration, automation etc. (Dumas et al. 2013).

Recent literature distinguishes two perspectives of BPM: Business BPM and Technology BPM (Becker et al. 2009; Komus 2011; Kruppke et al. 2006). Within Business BPM, business processes are understood as a central instrument regarding a company’s strategy. Information Technology (IT) is seen as a rather inferior tool that mainly aims at supporting tasks. By contrast, the Technology BPM ranks IT superior. Automation of business processes and process integration of application systems is stated to be of utmost relevance. At the technical level, process integration becomes manifest by ‘Enterprise Application Integration’ (Becker et al. 2009; Komus 2011; Kruppke et al. 2006). However, in both perspectives BPM is conducted in a socio-technical context (vom Brocke et al. 2011) and needs not only to consider IT and the implemented business processes (vom Brocke et al. 2011) but also the affected employees and their involvement into the different BPM activities (vom Brocke et al. 2014).

One possibility to involve process employees (Ho et al. 2009) is applying social software (vom Brocke et al. 2011). Social software describes socio-technical systems that support human communication, interaction, and collaboration (Lin 2010). If social software is used within a corporate environment to collaborate, coordinate, and cooperate, literature often uses the term ‘enterprise 2.0’. This cooperative user involvement might take place within the enterprise or with external stakeholders of the organization (Bächle 2008). Within the BPM context, social software can for example be used to involve employees in discussing or commenting on process models (Silva et al. 2009).

To develop our framework, we conducted a literature review inspired by Webster and Watson (2002) and vom Brocke et al (2009). We screened 48 IS and process/operations management journals as well as the proceedings of six conferences by using the keywords ‘BPM’ paired with ‘enterprise 2.0’, ‘social software’ or ‘social media’. Taking into account that the topic is rather novel, we limited our results to the time period of the last 10 years (2004-2014) and we searched for peer-reviewed papers only. In sum, 7462 papers were found of which 101 somehow touched both topics of social software elements and BPM. Of these 101 papers, 28 were explicitly dealing with possible applications of social software within organizational environments. As stated above, these works mostly provide listings and functional descriptions of social software elements in general (e.g., Kettles and Smith David 2008; Nath et al. 2009; Singh et al. 2010), but we also found a few studies that developed concrete concepts for the exertion of social software elements within BPM. Those are briefly outlined in the following:

Koschmider et al. (2009) describe how a process modeling tool can be enhanced with various social software elements to support process modelers. They suggest a system that supports process builders with social features. Thus, process modelers become more easily aware of new related content. As a consequence, process modelers can use this new content to create, update, or enhance existing process models.

Koschmider et al. (2010) claim that business process modeling tools are mostly ‘one-person tools’ which are not supposed to support model reuse and collaboration between different users. To improve the crea-
tion of process models and to improve existing process modeling tools, they conducted a process modeling
experiment with students and showed that social-media supported recommendations from other process
modelers during the process of modeling a new process lead to higher semantic quality of the generated
process models. In addition, the authors showed that modelers are more likely to follow recommendations
that refer to previously used model parts by well-known people over those that refer to people that
they do not know well (Koschmider et al. 2010).

Vanderhaeghen et al. (2010) provide a sophisticated model of a process management platform that applies ‘tagging’. Occurring problems within BPM, the location of those problems, problem solutions as well as responsible persons can be tagged on this platform. Due to these tags, problems, solutions, and experts can be linked together and thus allow for fast problem solutions (Vanderhaeghen et al. 2010).

Filipowska et al. (2011) claim that BPM has several shortcomings, such as limited or no collaboration during process design, which can be addressed by combining BPM with social software. They made several concrete suggestions how the combination of semantics and social software can support BPM in an organization.

Bögel et al. (2013) introduce a holistic model that deals with the general architecture of social BPM linked to a role model. However, the model remains conceptual and does not reveal any concrete social software application cases (Bögel et al. 2013).

Overall, these works provide first insights into how social software could support BPM, but do not fulfill the various demands of detailed research concerning social software within the BPM context. These demands, also resulting from the literature review, show that this combination might hold great potential: Kettles and David recommend that “future research should include studies to validate the situations in which SNT [social network technologies] do support organizational processes” (Kettles and Smith David 2008, p. 7). Blinn et al. (2009) suggest to focus future research on “How do individuals accept or decline the Web 2.0 artifacts?” (p. 9). Boateng et al. (2009) investigate the effectiveness of Web 2.0 tools in combination with organizational learning and refer to Child and Heavens (2001) by stating that “[it is] required to explore the effectiveness of Web 2.0 [tools] at other levels and domains” (Child and Heavens 2001, p. 9). Bente et al. (2009) demand concrete suggestions of approaches, to “integrate the social network functionality seamlessly into the user’s normal workflow” (Bente and Karla 2009, p. 10). Emphasizing this request, Saldanha and Krishnan (2010) claim future research to “investigate the business benefits of Web 2.0” (Saldanha and Krishnan 2010, p. 7). For the purpose of examining business benefits of Web 2.0 tools it is necessary to integrate these tools into an organization’s regular workflows (Bente and Karla 2009), what in turn requires to identify concrete use cases for social software in BPM.

**Framework development**

Our framework is supposed to close this gap of anticipated potentials of social software in BPM by developing concrete recommendations for applying specific social software elements in different phases of a BPM lifecycle. From the BPM perspective, social software aims to enhance sharing information by communities within an organization as well as fostering collaboration among them (Filipowska et al. 2011). This approach seems promising, since Schmidt and Nurcan (2009) already stated that social software might be helpful within almost every step of BPM lifecycles. However, they referred to social software elements in general, and did not specify the different technologies. Hence, the main contribution of this paper is the specification of social software elements and their potential value within BPM.

In our work, we limit the set of social software elements to wikis, online social networks (OSN), social social tagging, and blogs. This limitation is chosen due to the fact that these social software tools are recurrently dealt with in recent literature and therefore can be seen as (most) mature concepts (Filipowska et al. 2011; Houy et al. 2010; Hussein et al. 2009; Lin 2010). The subsequent list highlights the main aspects of each element (Bächle 2008; Lin 2010):

- Online social networks support interaction and goal-oriented relation setting.
- Blogs enable chronological publications of users.
- Wikis allow to structure company-internal knowledge and to harvest collective intelligence.
- Social tagging enriches information with key words by users.
Speaking of social software, the potential value of each element has to be identified. The literature provides different frameworks for analyzing and evaluating collaborative technologies (such as social software technologies) in the context of organizational usage, such as the 8C model by Williams (2011) or the 4C model (Arazy and Gellatly 2013)). All of these models are based on communication, cooperation, and coordination which are represented by the 3C model (Ellis et al. 1991). Communication and cooperation are people-oriented and refer to the interaction between persons. Coordination is information-oriented and refers to the interdependences of workflows and presentation of information (Ellis et al. 1991; Williams 2011). Especially the usage of social software in an organizational context is influenced by these three dimensions. Therefore, we adopt the 3C model to structure the considerations regarding the linkage between BPM and social software.

To examine the potential value of specific social software elements within BPM, we also clarify for which concrete BPM activity such social software elements will be supportive and efficient. Therefore, we link social software elements not only to the 3C model, but also to a BPM lifecycle model. In the BPM literature, various lifecycles exist, e.g. by Deming (Deming 1982), Scheer and Jost (2006) or Dumas et al. (2013). We decided to base our research on a very detailed lifecycle model. So, we chose to use the lifecycle model proposed by Schmidt (2009), which consists, compared to most of the other models, of more than four steps (i.e. nine steps, cf. Figure 1). This allows us to gather very specific results for every BPM stage (Schmidt 2009).

To answer our research question, we need to identify which social software elements bear potentials to support which BPM lifecycle step. Therefore, we use a matrix in which we can link the respective BPM lifecycle steps to certain social software technologies. Since we want to identify how and to what extent social software might support BPM, it needs to be examined which part of collaboration the social software supports in every step. Hence, we do not just link the different social software elements (SSE) to the BPM lifecycle steps, but also to the potential value dimensions in terms of supporting communication, coordination, or cooperation.

Our research proceeds with filling this framework (see Figure 2). We conducted a series of industry workshops to define use cases and concrete application opportunities in cooperation with researchers and practitioners. Therefore, the next section describes the procedure of this workshop and its results.

**Workshop approach and results**

**Workshop approach**

The workshop aims at developing concrete recommendations for applications of social software elements within an organization’s BPM. Goal of the workshop participants, who stem from different organizations and industries, is to improve the functional performance of their BPM tools. All workshop participants are senior BPM managers in their firms and use any form of software tools (‘BPM systems’) that support the
documentation of their companies' processes and organizational structures. Processes are mapped, for example, in swimming lane process models where activities within a swimming lane are performed by a certain role. These roles are performed by the employees who are bound to work in accordance to the defined processes. In all of the workshop participants' BPM systems, the role 'process owner' is accountable for the definition of the process and the coordination of its operations. Thereby, the process owner is bound to consider various guidelines (e.g., work rule, environment protection or particular industry regulations).

Seven practitioners out of five different companies participated and contributed their knowledge during our workshop. Due to their detailed knowledge of their firms’ BPM systems and their daily BPM tasks, they have a deep understanding of how social software elements could improve or change the way how BPM is conducted in their organization. A team of four researchers, all being authors of this paper, moderated the workshop, contributed scientific background knowledge, and served as observers. The researcher team has knowledge in the domain of BPM but also in the domain of social software elements. Providing knowledge in these two domains is crucial to derive appropriate assumptions regarding the usage of social software in the context of BPM.

Table 1 shows the basic characteristics of the companies represented in the workshop:

<table>
<thead>
<tr>
<th>Company</th>
<th>Country of ownership</th>
<th>Scope of organization</th>
<th>Industry</th>
<th>Number of employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Germany</td>
<td>Multi-National</td>
<td>Aviation</td>
<td>26,000</td>
</tr>
<tr>
<td>B</td>
<td>Germany</td>
<td>Multi-National</td>
<td>Banking</td>
<td>28,000</td>
</tr>
<tr>
<td>C</td>
<td>Germany</td>
<td>National</td>
<td>Public Sector</td>
<td>900</td>
</tr>
<tr>
<td>D</td>
<td>France</td>
<td>Multi-National</td>
<td>Aerospace Engineering</td>
<td>18,000</td>
</tr>
<tr>
<td>E</td>
<td>Germany</td>
<td>Multi-National</td>
<td>Defense and Security</td>
<td>21,000</td>
</tr>
</tbody>
</table>

Table 1. Participant companies

The two-days workshop started by an introduction of the social software elements and their potential advantages raised by recent literature (Nath et al. 2009) as well as by the threats they might bear (Kosalge and Tole 2010). After an explanation of our framework (which we call BPM-SSE-3C framework because it combines BPM, social software elements (SSE) and the 3C model) (see section ‘Framework development’ and Figure 2) and the meaning of each of its dimensions, the experts started discussing the potentials of social software within intra-organizational contexts in general. Afterwards, the experts’ task was to identify which BPM lifecycle step could be supported by which social software element in which way. Additionally, the workshop participants assigned social software elements to the 3C model elements. Accordingly, concrete ideas and use cases were collected and linked to our BPM-SSE-3C framework.

To answer our research question, it has to be ascertained which combination of social software, BPM activity, and 3C dimension would be beneficial to the organization and the management of business processes. Therefore, the participants evaluated their answers and specified the concrete benefits of each social software element (wikis, online social networks (OSN), social tagging, and blogs) for BPM. The results of this first iteration step were reconsidered within a next brainstorming session. Thereby, the experts focused on those social software tools which are most likely to augment the benefit of the BPM systems’ end users by concrete scenarios. Finally, these scenarios were prioritized by the workshop participants to identify the most beneficial usage of each social software element in the context of BPM.

**Workshop results**

Within those scenarios, the following main potential applications of social software elements in BPM were eventually identified:

- In order to improve the algorithms of a BPM tool’s search function, search results could be tagged with keywords by the searcher and thus can be shared with other users. For instance, one work-
shop participant reported that mechanics in his company often search for the keyword ‘screwdriver’ to find a certain process. But some of the employees use the term ‘turnscrew’ intending to find the same process. But they obviously do not find the process which they were looking for. In this case, employees can tag processes with different search terms which they might also use. And so, tagging could be helpful to find the needed information more easily. This social tagging was evaluated to be particularly helpful within the BPM lifecycle steps of Optimization and in Operating and Monitoring. In terms of the 3C, it can be classified as supportive in terms of communication of employees.

- In addition, process experts can be tagged to processes (e.g., based on comments to the process models). Tagging process experts can be useful for identifying managers in charge or experts that help clarify problems and questions directly and fast. Hence, the employees are independent from one specific process owner who might own many processes and therefore is not able to answer as quickly as a range of experts who are tagged to the process. The generation of this expert list might take place by evaluating the comments of the processes and determining the ones with the highest ranked comments, or by a voting of employees. Expert tagging might be useful when it comes to Optimization, Organizational Implementation, and Operating and Monitoring. Within this classification we can further assign tagging of experts within Optimization as holding potential value concerning communication. Since employees will easily be able to identify whom to talk to most efficiently. Additionally, the tagging of experts seems promising in order to coordinate tasks within Organizational Implementation and Operating and Monitoring.

- A blog (which is, e.g., written by the process owner) serves to give more detailed information about the process and its execution (e.g. information about process changes and training content). In addition, it gives the participants who execute different tasks within the processes the opportunity to discuss problems and ideas regarding their particular process. So, this blog might be used by employees to communicate and collaborate more efficiently. This can be used within the lifecycle by Operating and Monitoring and Organizational Implementation in terms of cooperation between different employees and roles as well as to communicate within the lifecycle step of Operating and Monitoring.

Interestingly, wikis and online social networks were not considered to be useful in BPM by the experts. The fact that wikis and online social networks were not considered as being helpful needs to be discussed in the light of the literature (see next section).

The integrated BPM-SSE-3C framework can now serve to structure the presented use cases and findings (Figure 2).
Discussion

Throughout a workshop series, two social software elements were identified to remarkably augment the functionality of BPM tools in certain ways and in particular steps of the BPM cycle. In the following, these social software elements and their fields of application will be evaluated and discussed based on the literature.

The importance of social tagging was presented in a very detailed manner by Vanderhaegen et al. (2010). Other researchers have also emphasized the benefits of social tagging and have identified several benefits of this tool such as clearness, selective push information, and the structuring of this information (Pahlke and Wolf 2010; Raisinghani 2012). In addition, tagging could help to annotate business processes with process policies (Filipowska et al. 2011) or to integrate process models into knowledge management (Prill-la 2009). So, tags can be used to extract the essence of policies which are defined in different languages (Filipowska et al. 2011). A critical aspect of the specific application case ‘expert tagging’ might be the experts’ personal attitudes towards their role as expert and also to social software elements in general. Such problems might be prevented by education and trainings on how to handle social software elements correctly and how to behave (netiquette etc.). Experts need to be asked before they get tagged (Richter et al. 2011).

As another social software, blogs were found to be important concerning communication within the daily workflow. Referring to this consideration, Kim et al. (2009) already stated that blogs might be useful when it comes to coordination within companies. Harnessing collective intelligence might be secured by granting access to blogs where employees might discuss improvements. So, discrepancies between the formally defined process model and the really executed instances become visible. Consequently, information about the process execution is delivered to process owners without additional effort. And, the participation of employees in the design of process models is fostered (Filipowska et al. 2011).

Private abuse of blogs and discussions of needless content is one of the fears of management. However, practical experiences have shown that these concerns are rather causeless since the community generates some kind of self-regulation (Ehms 2009). Again, a netiquette should be implemented when it comes to the usage of blogs (Richter et al. 2011).

Wikis hold great potential when it comes to knowledge management and organizational learning (Wallace et al. 2011). For instance, wikis can be used to comment and discuss process models (Silva et al. 2009)
and thus foster collaboration (Khalaf et al. 2009). Besides discussing and commenting, wikis facilitate the description of services (Paoli et al. 2007) or process modeling (Dengler et al. 2009). However, to realize the above mentioned benefits of wikis, Arazy and Gellatly (2013) mention that an organization needs to provide a certain culture in order to use wikis in an effective way. Interestingly, wikis were not considered to be useful in BPM by the experts. Wikis were dismissed because of the effort they require (which has led to many negative experiences in the different organizations (“yes we have a wiki, but nobody uses it, or even contributes to it”), and the unclear structure of ‘who is allowed to write what’. They were also afraid of the cultural bias if an employee has to reject a change of his/her supervisor.

Online social networks hold great potential when it comes to managing social contacts and fast interaction (Riemer et al. 2010), but they also bear risks, such as privacy issues (Kettes and Smith David 2008). The experts of our workshop classified online social networks as mash-up platforms that mainly serve to combine the other examined social software elements. The functionality of network building per se was ranked as inferior by the experts, since most of them have a general (i.e. not BPM-specific) intranet to provide this functionality.

Our framework has important implications for both research and practice. The linkage of social software and the BPM lifecycle has already been shown to hold potential (Nurcan and Schmidt 2009). Our combination of social software elements and the BPM lifecycle enables the clear linkage of when to use which element. In summary, the fact that the experts were able to develop concrete application cases by the means of our framework shows its value in terms of applicability. Hence, our framework is useful to approach solutions regarding the implementation of social software within organizations in order to support BPM activities.

Besides the contribution, our research has several limitations. Our results are mainly based on previous literature and a workshop with practitioners. The presented evaluation sessions with experts are limited to seven practitioners and – until now – merely three iteration steps. So, our results can be biased by the opinion and the experience of these experts. To evaluate the framework’s consistency, further empirical analyses have to be made.

Conclusion

In this paper, we developed the BPM-SSE-3C model, a three-dimensional framework that combines the different steps of BPM, social software elements, and the 3C model. Such a framework by which concrete application cases for social software elements within the context of BPM could be generated is – as far as we know – new. Based on this conceptual contribution we presented results of a workshop which revealed various application cases that precisely show where and how social technologies should be included in BPM to create value.

Our future research will proceed with a qualitative analysis of the concrete benefits of the particular application concepts. By this evaluation we want to generate a detailed understanding of the significance of the benefits realizable in the concrete application cases. In addition, we will reevaluate why the experts of our workshop did not assign certain social software elements to specific BPM lifecycle phases. So, we will check whether this assignment is also valid for other organizations. Further, we will validate the results on a larger level by conducting interviews within the BPM function of several organizations. In addition, we will examine employees’ acceptance for social software elements in the context of BPM. Summarizing, social elements have a lot of potential to support process management but the corresponding benefits can only be achieved if the employees accept and use the implemented social software.

References


How Social Software Can Support Business Process Management


