Delineating Worker-Centered Organizational Work: Blending BPMS and Social Software Features

Nancy Alexopoulou(✉), Christian Stary, and Stefan Oppl

Department of Business Information Systems – Communications Engineering, Johannes Kepler University, Linz, Austria

Abstract. Nowadays, companies seek for new technological enablers and adopt new business models to cope with the frenetic pace of change. Such an effort is depicted in the Enterprise 2.0 initiative. Knowledgeable workers should be empowered so that they can help, through their knowledge, the organization they work for to thrive in the today's highly demanding business environments. Empowerment concerns supporting them to easily gather the knowledge they need as well as to efficiently execute required tasks to accomplish business goals. To provide an efficient working aid, knowledge gathering and task execution should be supported through a unified environment. Towards identifying the features of such a unified environment, we conduct in this paper a two-phase analysis, which leads to the development of a coarse-grained conceptualization of this environment, reflecting a worker-centered organizational work model. This conceptualization is named Worker-Centered Organizational Work Wheel. The Wheel adopts features from both BPMS and social software to enable the integration of knowledge gathering and task execution. Apart from delineating how a knowledgeable worker should work, the Wheel also provides a roadmap showing what features should be offered by any implementation targeting this work model.

Keywords: BPMS · Social software · Social BPM · Knowledgeable worker · Organizational work

1 Introduction

The world is changing. The signs for this change are around us, reflected upon every human aspect, like consuming, travelling, learning, socializing, etc. Companies are obliged to follow this change pace in order to remain competitive or even alive. In alignment with these new demands, modern workers have to be knowledgeable [1] more than ever before. This means that they should be able to adapt and cope with change effectively, which, in turn, implies that they should be more functionally and

The research leading to these results has received funding from the European Commission within the Marie Curie Industry an Academia Partnerships & Pathways (IAPP) programme under grant agreement n° 286083.

B. Benatallah et al. (Eds.): WISE 2014, LNCS 9051, pp. 57–71, 2015.
DOI: 10.1007/978-3-319-20370-6_5

cognitively fluid and able to work across many tasks and situations. Thus, not only will they have to keep their technology skills up-to-date, but also they will need to be continuous learners in their knowledge fields.

To foster employees in being knowledgeable, it should be ensured that they are able to discover the knowledge they need fast and easily. Such knowledge should not concern only explicit information found in books, documents, data bases etc. It should also include tacit knowledge. Tacit knowledge [2] resides in peoples' heads. Thus, it is bound to persons and consists of their mental models, beliefs and experiences. For this reason, it is difficult to be explained and shared, as opposed to explicit knowledge which is usually formal, systematic and easy to codify, communicate and share [3]. Tacit knowledge can be even more important than explicit knowledge as, in rapidly changing environments, explicit knowledge may quickly become obsolete and consequently new or unexpected situations could only be effectively tackled based on the experience and intelligence of specific workers.

To endorse knowledge discovery and sharing through organizational collaboration, enterprises are moving towards the Enterprise 2.0 [4] business model, although the definition and understanding of this model is still in some flux. Enterprise 2.0 basically promotes the utilization of social software in organizational environments for efficient collaboration and knowledge sharing but it additionally represents a fundamental change in how businesses operate. In the traditional corporate environment, information flows through an ordered path from the top to the bottom, and suggestions are made from the bottom flow towards the top. Enterprise 2.0 changes this structured order and allows information to flow laterally as well as up and down, since it promotes a flat organizational logic as opposed to the currently established hierarchical model [5]. In alignment with Enterprise 2.0 model, work in organizations should become more worker-centered than merely be determined by top management. In this way, employees will become empowered and using their knowledge will help the organization to thrive in the today's highly competitive business environment.

As signified by the Enterprise 2.0 initiative, it has already been discerned that the introduction of social software in entrepreneurial environments may help workers with knowledge gathering [6–8]. Task execution, on the other hand has been traditionally supported through Business Process Management Systems [9]. To be true enablers for workers, however, these two environments should not function in an isolated manner. In contrast they should be integrated in a unique environment. Consider, for example, social networking platforms. By their nature, they can considerably contribute to faster discovery of relevant information and expertise (i.e. knowledge), helping workers to become more agile. However, uncontrolled social interactions may result in chaotic situations that may in turn lead to the opposite end, hindering significantly the on-time accomplishment of tasks and ultimately the effective pursuit of business goals. Therefore, it is necessary for workers to function under a guiding umbrella so that they know when and how to use social networking capabilities and thereby effectively utilize the benefits gained from changing work technologies. Such a guiding umbrella would prevent them from getting lost in perpetual communications and unfocused interactions and facilitate them to effectively pinpoint what they need in terms of informational resources and people with the appropriate knowledge and expertise. One way to achieve this is to tightly link social collaboration to business activities so that

employees can have as a compass the business tasks they have to carry out and the business goals they wish to satisfy [10].

To this end, we consider that workers within an agile organization either engage themselves in discovering and acquiring knowledge concerning the tasks they have to accomplish or in actual doing to execute a task. These two happen interchangeably, both utilizing and augmenting organizational knowledge, as depicted in Fig. 1.

Creating an integrated environment that will achieve such a linkage between knowledge gathering and task execution is not straightforward [11]. However, it may prove promising for enhancing organizational work and supporting employees in being agile and therefore, it is worthwhile further investigating it. This potential has already been identified by the research community, as revealed by a recently established field called *Social BPM* [12], which investigates the adoption of social features in the Business Process Management discipline.

Fig. 1. Aspects of worker-centered organizational work

Towards identifying the features of such an integrated environment supporting both knowledge gathering and task execution in a seamless fashion, we conduct in this paper a two-phase analysis, which leads to a coarse-grained conceptualization of such an environment, reflecting a worker-centered organizational work model. This model is built utilizing features from both BPMS and social software. Therefore, in the *separation-of-concerns* first phase, well-established BPMS and social software features are juxtaposed based on specific business process modeling perspectives proposed in [13, 14]. Subsequently, in the *integration-of-concerns* phase, the identified traits are fused into a single structure, yielding a high-level functional view called *Worker-Centered Organizational Work Wheel*. This view as implied by the word "wheel" was inspired by a wheel's structure and function.

The Worker-Centered Organizational Work Wheel depicts how prominent features identified in both software types, social software and BPMS, can be combined in a unified environment, and reflects a working model from the employee's perspective. Therefore, the purpose of the Wheel is threefold: (1) it prescribes a working model, delineating how a knowledgeable worker should work using the aforementioned integrated environment, (2) it helps towards a deeper understanding of the requirements for such an integration and (3) it provides a roadmap showing what features should be offered by any implementation targeting this working model. To this end, issues

regarding the implementation of the integrated environment that were extracted from the Wheel are also mentioned in the paper.

The rest of the paper is organized as follows. Section 2 includes related efforts of combining social software with BPMS and, in general, of adopting social features in BPM discipline. The two-phase analysis is presented in Sect. 3, where it is also unfolded how a knowledgeable employee should work using the unified environment. Conclusions and future work are given in Sect. 4.

2 Related Work

Business Process Management utilizing social software concepts has recently gained momentum, due to social software characteristics like weak ties and mutual service provision, which fulfill requirements of collaborative environments [15, 16].

In practice, although the phenomenon of social networking within an organization, as provided by enterprise social networks [17], is growing, as investigated by Richter and Riemer in [18], its usage is restricted in communication and information sharing. That is, the social software infrastructure is used only for exchanging information or performing trivial tasks, such as arranging a meeting, and not for integrated BPM solutions, which seems to be the step forward. Current trends indicate that enterprise social networks should not only facilitate communication but also help participants cooperate and substantially improve the way they work; for this reason, advanced services which target business task execution are required [17, 19].

On the other hand, literature is rich in contributions concerning the adoption of social software features in the BPM discipline. A part of this research focuses on how social software can be used to support collaborative business process modeling [20–22]. Other approaches focus on using social tagging mechanisms for relating models dynamically [23] or managing them in a model repository [24]. Collaborative business process modeling is also supported by commercial tools like IBM Blueworks (www.ibmblueworks.com) and Signavio Process Editor (www.signavio.com).

Blending the two software types for supporting business process execution has also been explored in various research endeavors. Brambilla et al. [25] have proposed a notation for social BPM defined as a BPMN 2.0 extension. It enables the annotation of specific tasks as collaborative ones and their potential execution within a social network environment. In [26] a BPM infrastructure bearing social software features is proposed, targeting both collaborative modeling as well as business process execution in a fashion that mashes up definition and operation of business processes. The corresponding tool, called AGILIPO, is currently under development and testing. In [27] the authors examine how the architectural principles behind BPMS and social software can be combined in order to develop a unified infrastructure supporting features of both software types. In [28] an approach for using wikis in an organizational context is presented along with a prototype implementation for developing a wiki-based workflow system. Xie et al. [29] examine the potential of combining social software with BPM through process-oriented mashups in order to enable users to easily build applications encompassing workflow logic. Khalaf et al. [30] focus on social production of workflows. Johannesson et al. [31] suggest a set of guidelines for augmenting

BPMS with social software features, which may be effective for knowledge-intensive process modeling, though the execution model is not clearly defined. Neumann and Erol [32] propose a wiki-based implementation of a workflow system. Moreover, Motahari-Nezhad et al., [33] introduce a framework for supporting Adaptive Case Management [1] in social networking environments.

All the aforementioned approaches towards the integration of task execution and social software features may serve the concept of a worker-centered working model, though they are based on different technologies and technical solutions. Furthermore, they usually focus on effectively extending an existing working paradigm with specific new or advanced features, targeting the solution of the technical problems raised. Thus, they do target on specifying and supporting an alternative working model for worker-centered organizations, although they may support partial features of it. In practice, they contributed to the feasibility of the implementation of an integrated environment linking both task execution and knowledge gathering, as discussed in the following, and provide sound solutions for specific implementation issues that may arise.

3 Delineating Worker-Centered Organizational Work Through a Two-Phase Analysis

The provision of an integrated environment, supporting both knowledge gathering and task execution in a seamless fashion, is promising for promoting a worker-centered working model taking advantage of knowledgeable workers and, therefore, enhancing organizational work. Towards identifying the features of such environment, prominent characteristics of both social software and BPMS should be integrated, taking into account existing efforts, presented in the previous paragraph, to enhance task execution with social features. To do so, a two phase analysis was conducted.

In the first phase, notable features of both software types that should be offered in the integrated environment to support a worker-centered working model, are separately identified and presented in a juxtaposing manner [34]. Thus, it is characterized as a separation-of-concerns phase. It should be noted that the characteristics of social software are examined in the context of Enterprise 2.0 vision.

Subsequently, in the integration-of-concerns phase, the identified features are brought together in an integrated structure to prescribe a working model, delineating how a knowledgeable worker should work utilizing organizational knowledge and identify requirements and issues that should be resolved towards implementing such an integrated environment.

3.1 Separation of Concerns

To identify prominent features of both software types in a systematic manner, the business process modeling perspectives proposed by Curtis et al. [13] were adopted. According to Curtis et al. [13], a business process model can be viewed from a functional, behavioral, organizational and informational perspective. The functional perspective depicts what activities are performed. When and how activities are

performed constitutes the behavioral perspective, while where and by whom they are executed corresponds to the organizational perspective. What information entities are created and processed during each activity is examined in the informational perspective. We also include an intentional perspective, corresponding to the business process context perspective suggested by List and Korherr in [14], which focuses on the goals satisfied through a business process, reflecting the rationale behind it. We considered such a perspective important to clarify the intension of workers choosing to use either social software or BPMS in the enterprise environment.

Table 1 juxtaposes BPMS and social software characteristics distinguished in the aforementioned perspectives. As BPMS and social software have a different orientation, they reasonably bear diverse traits, which can even be regarded to a large extent contradictory. In the following, features of both software types are briefly discussed from each perspective.

Functional Perspective. The functionality of a business process is described through business-specific activities often called tasks [35], although a hierarchical relationship may also be defined between these two terms. A business activity can be anything performed within the context of a specific business process. However, there are strict descriptions of its input and output as well as the roles/participants responsible for its execution, which constitute parts of its definition. Activities supported in social software, on the other hand, have a more narrowed scope. They mainly regard information sharing and context creation. Context creation involves creation of metadata for the existing data. This can be accomplished through tagging (i.e. using keywords to classify data), evaluating (e.g. through rating or endorsing) and annotating.

Table 1. Juxtaposing features of social software and BPMS from five business process modeling perspectives

Business process perspectives	Social software	BPMS
Functional perspective	- information sharing - context creation	- business-specific activities (tasks)
Behavioural perspective	- wisdom of the crowds - social interaction - social production	- wisdom of the expert - prescribed task execution - predefined input from each participant
Organizational perspective	- egalitarianism - weak ties - public access	- role hierarchy - strong ties - access policies specified by top management
Informational perspective	- content or context information concerning artifacts or physical objects	- business or physical objects
Intentional perspective	- learning	- achieve business goal

Behavioral Perspective. Two fundamental features of social software are social interaction and social production. The first concerns the communication between individuals without predefined rules (e.g. Facebook), while the second is about the creation of artifacts by combining the input from independent contributors without a priori specification of the way doing this (e.g. Wikipedia). In contrast, using a typical BPMS, the interactions among participants are usually prescribed through rigid or flexible process models, specifying the order of tasks as well as the way each participant is involved, so that a certain business goal is reached [36]. Social software is based on "collective intelligence" [37] of many people that may sometimes lead more effectively to the solution of a problem than the knowledge of an expert who is sometimes difficult to be identified. This adheres to the "wisdom of the crowds" idea introduced in [38].

Organizational Perspective. Weak ties are formulated through social networks, as opposed to strong ties which are developed through relationships based on hierarchy and team structure. As indicated in [16], weak ties are spontaneously established contacts invoked not by management but by individuals. Egalitarianism [16] is about giving all participants the same rights to contribute, in contrast to organizational environments, where well-defined roles and role interrelationships determine responsibilities within the context of the organization, which in turn are depicted within BMPS environment. Access to information is also determined by roles and policies specified by top management, while social software environments allow for a wider access to information.

Informational Perspective. Information in social software regards objects like photos, songs, e-books etc. associated with metadata developed by participants using tagging, evaluating and annotating (see above). Utilizing the "wisdom of the crowds", participants may also classify information, formulating folksonomies, which may help others to seek the information they need. Thus, context information is available for the content created by participants. In contrast, information in BPMS is depicted onto business objects such as order forms, receipts, invoices, etc., which are strictly related to activities as input or output data. Creation of business objects is highly controlled and therefore a high quality can be better ensured in case of such information compared to the information produced in social software environments.

Intentional Perspective. Regarding BPMS, the intentional perspective implies the business goals that are meant to be satisfied through business processes [14]. In case of social software when considered within the Enterprise 2.0 initiative, the goal is learning, both individual and group learning, which contributes to organizational knowledge [6, 7].

3.2 Integration of Concerns

In the following, we identify the features of the two software types that should be integrated within the unified environment to promote a worker-centered working

modeling and discuss related decisions on how to utilize them. The discussion is made progressively, by exploring the different perspectives discussed above.

As already mentioned, workers are continually engaged in their everyday work, either in the acquirement and exchange of knowledge regarding the business goals they need to satisfy or in actual task execution (see Fig. 1). But how should workers be represented? The concept of the profile, popular in social software, is adopted. However, compared to typical social software profiles, worker profiles should convey richer semantics. Identity, background, skills and experience are attributes of one's personality, typically found in professional-oriented social networks like LinkedIn (www.linkedin.com), for example. Concerning reputation [39], it is also a factor that may considerably affect knowledge discovery in terms of identifying, for example, who is more competent or trustworthy to consult or refer to for the accomplishment of a specific task. However, apart from those common profile aspects already found in existing social networks, a profile in the integrated environment should include also roles, responsibilities and working data which constitute work-oriented parameters. The concept of role is used as defined within the Business Process Management community [40]. Responsibilities explicitly describe what an employee is accountable for performing within the company, based on his/her roles. It should be noted that two employees may bear the same role but have different responsibilities. Working data reflect runtime information of the employee's current activities. Essentially, the profile constitutes a representation of the employee's 'micro-world' in the broader organizational environment. In this respect, in their profiles, workers should be able to view their responsibilities, the goals and tasks that they should and/or could accomplish, data resources that they are allowed to access and events that are of interest to them, as well as run time information about the tasks under execution. Such an augmented profile essentially reflects the integration between the two software types.

To depict the interchangeable states of acting and knowledge gathering (see Fig. 1), a wheel's function has been used as a metaphor and the framework is named *Worker-Centered Organizational Work Wheel*, as depicted in Fig. 2.

Fig. 2. Worker-centered organizational work wheel

The hub of the Wheel is worker's profile, which is how the employee is represented in the unified environment. The spokes of the Wheel stand for the aspects mentioned above, which represent information related either to the workers themselves or the activities they are engaged in. This information is enriched as the wheel is turning, i.e. the person is working. In practice this information is part of the organizational knowledge related to the specific person, may be produced by him/her or others and may represent explicit or tacit knowledge (see Fig. 2).

Based on Table 1, which depicts the separation-of-concerns analysis, bringing together social software with BPMS from a functional perspective means that users may both execute business-specific tasks as well as engage themselves in context creation and information sharing, utilizing the content of their profile. Likewise, both types of interaction should be supported, predefined, according to specific process patterns and information access policies, or social, based on knowledge creation and sharing and social interaction, as indicated by the behavioral perspective. Both predefined and social interaction should be supported in either task execution or knowledge gathering.

Regarding the organizational aspect, it indicates that constraints stemming from organizational policies and business rules implemented in BPMSs should also be taken into account into the integrated environment. Social software does not dictate constraints from an organizational perspective, although, when considering the informational perspective in an enterprise environment, constraints associated with content quality and trust are imposed to social content production.

Lastly, the intentional aspect implies that the integrated environment should provide for both the accomplishment of business goals as well as individual and group learning. Figure 3 depicts the Organizational Work Wheel to a lower level of abstraction encompassing features directly or indirectly derived from Table 1.

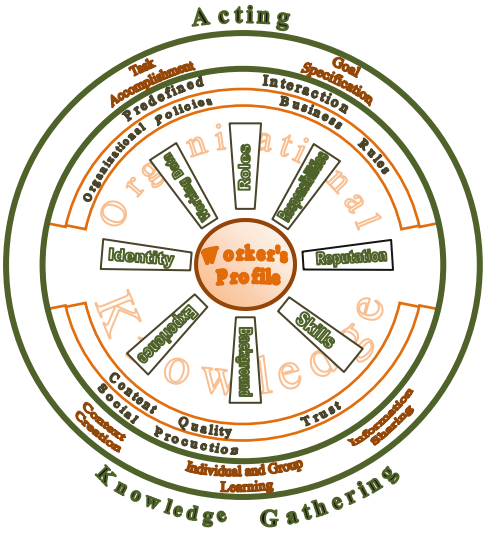

Fig. 3. The worker-centered organizational work wheel at a lower level of abstraction

What a worker can do in the corporate environment is depicted along the tire. The upper part of the tire shows the acting parameters, i.e. goal specification and task accomplishment, while the lower part illustrates the knowledge gathering aspects, i.e. information sharing, individual and group learning and context creation.

In Fig. 3, organizational policies and business rules are considered as some kind of "brakes" for the interaction among the employees, which may be to some extent predefined. Timing and resource management constraints may also be incorporated in them. "Brakes" herein refers to regulating entities, that determine the worker's access to, contribution to and/or involvement in the activities denoted in the outer area of the wheel. In contrast, social interaction which takes place when the stakeholders interact with each other, in order to exchange views, ideas, information and knowledge, is much looser [41].

During social interactions, workers augment their skills and knowledge [16]. In other words, they learn. Learning can be intensified through participation in groups sharing similar interests and responsibilities, creating thereby the stimuli for the externalization of tacit knowledge. Moreover, workers may create context by tagging, evaluating and annotating, contributing to information sharing and discovery. However, for a system to be both reliable and useful effectively supporting knowledge discovery, content quality and trust should be taken into consideration [41]. Content quality and trust are two parameters that can be considered brakes for the social interaction dimension of the wheel. Content quality to this respect addresses both, the idea that high quality content (i.e. well structured and written) can be more easily augmented with additional information and the idea that the quality of the content has impact on the willingness to access and share knowledge. Trust refers to the quality of interpersonal relationships which influence how and to which extent workers are willing to participate in knowledge sharing activities.

Organizational knowledge [42] constitutes the background of the Wheel, encompassing files and business objects as well as social production [15] data. Organizational knowledge constantly changes as the Wheel goes round, either because business data change during acting or as learning evolves within the enterprise. Moreover, along the Wheel's turning, organizational knowledge is shared. Sharing includes both exchanging existing knowledge and creating new knowledge in collaboration. During this process, individual knowledge is translated into organizational knowledge.

What should be made clear about the Wheel's turning is that as the hub with the spokes and tire are turning, the brakes remain stable, as indicated in Fig. 4. This has the following implications. Regarding acting, it means that during task accomplishment, the interactions may be predetermined (when acting is above the brakes referring to organizational policies and business rules) or ad hoc based on social interactions (when the acting part is above social interaction and social production). Likewise, depending on its current position, knowledge gathering may involve predetermined steps when the information sources already exist as part of the organizational knowledge and are known to the person that needs them or it may involve social interactions, for instance, for the acquirement of tacit knowledge.

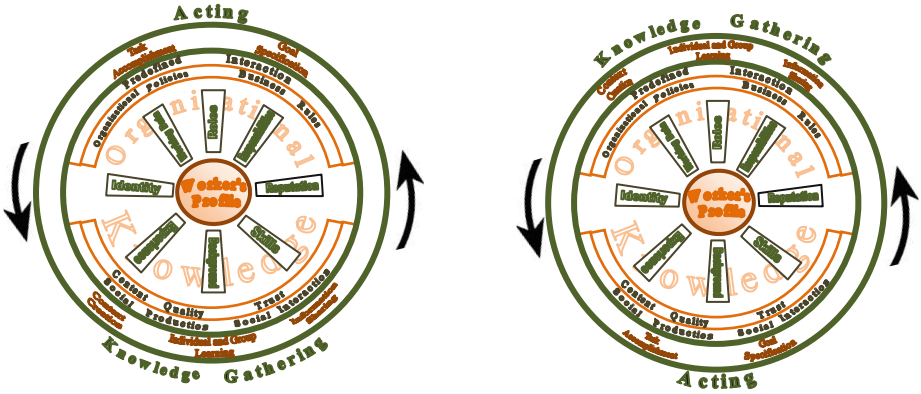

Fig. 4. The wheel's turning function

Enhancing the Worker-Centered Organizational Work Wheel

As agility is a very important aspect of the knowledgeable employee's work, the integrated environment should also enable the worker to handle events. Event streams should be fed into the environment and get instantly analyzed and recorded. Such capability may allow direct response to undesired situations as well as the uncovering of opportunities that could be exploited for competitive advantage. A CEP (Complex Event Processing) [43] mechanism should also be supported for the detection of meaningful patterns that could contribute to the organizational knowledge.

Furthermore, a worker might need to find the appropriate person to refer to for the accomplishment of a task or to get information on how to carry out a task. In a sense, identifying "whom-to-ask" and "how-to-do" worker activities may directly reflect an intertwined view of acting and knowledge gathering perspectives.

In simple words, this means that while trying to accomplish a goal, a worker might need right before executing a task to use the social features of the integrated environment in order to acquire knowledge on how to proceed with the specific task. For instance, an employee may use the searching mechanism to identify the suitable person to refer to based on information found on workers' profiles and even take into account possible ratings or endorsements existing on the profiles. In another case, a worker might need to employ advanced recommendation mechanisms [21], which would explore what steps have been followed by other workers in the past for the accomplishment of the specific task. Alternatively, the worker, depending on how urgent the execution of a specific task is, may be engaged in discussions/forums with the other stakeholders in order to sort out how to carry out the task. A newly encountered situation from the perspective of a specific employee, for example, may trigger such intertwined task execution and knowledge processing activities. To this end, mining capabilities should be provided to the worker. More specifically, "whom-to" mine and "how-to" mine should also be performed by the knowledgeable worker. Figure 5 presents the enhanced version of the Wheel.

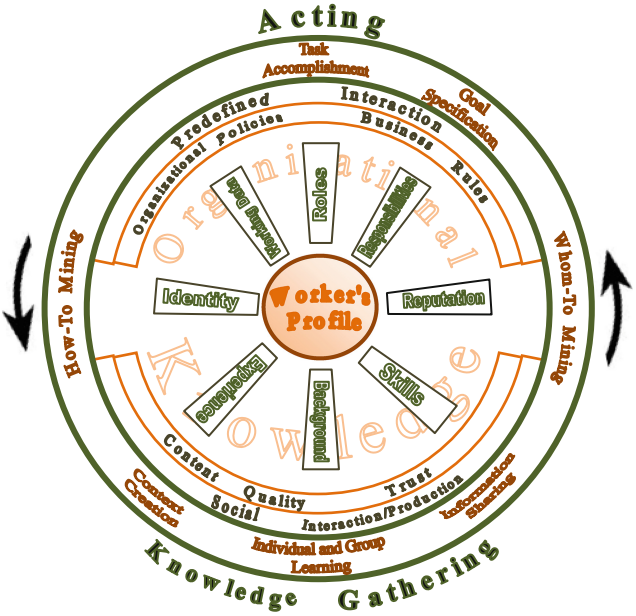

Fig. 5. The enhanced worker-centered organizational work wheel

4 Conclusions – Future Work

In alignment with initiatives like Enterprise 2.0, companies should adjust their organizational work practices in order to empower knowledgeable workers. Empowering knowledgeable workers means to support them in efficient knowledge gathering and task execution. For an efficient work however, knowledge gathering and task execution should be supported through a unified environment. Towards identifying the features of such a unified environment, we conducted in this paper a two-phase analysis, which resulted in the development of a coarse-grained conceptualization of this environment, reflecting a worker-centered organizational work model. This conceptualization was named Worker-Centered Organizational Work Wheel.

The Wheel may constitute a reference framework, illustrating in a compact and organized way the features of an environment that integrates knowledge gathering with task accomplishment by adopting features from social software and BPMS. Guided by this framework, we will elaborate our research by identifying research issues that need to be resolved for the implementation of the integrated environment. Based on the identified issues, we intend to specify an architecture for the implementation of the unified environment and ultimately to develop a prototype so as to verify the correctness and applicability if the Wheel framework. For the implementation of the prototype, enterprise social networks could be a candidate technology, which should be, of course, appropriately augmented with task execution capabilities. The first steps towards this direction would be to enrich user profile data to encompass working data information, as indicated by the Wheel, and also to enable task execution and

input/output data exchange between tasks within the social networking environment. Lastly, it should be noted that concepts from Adaptive Case Management [1] will be also closely examined, as they may be relevant to the implementation of a part of the Wheel's functionality regarding non-routine activities.

References

1. Keith, S.: Mastering the Unpredictable. Meghan-Kiffer Press, Tampa (2010)
2. Polanyi, M.: Personal Knowledge - Towards a Post-Critical Philosophy. The University of Chicago Press, Chicago (1958)
3. Hopfenbeck, W., Müller, M., Peis, T.: Wissensbasiertes Management: Ansätze und Strategien zur UnternehmensführungInternet-Ökonomie (in German). Verlag Moderne Industrie, Landsberg (2001)
4. McAfee, A.P.: Enterprise 2.0: The Dawn of Emergent Collaboration. MIT Sloan Manag. Rev. **47**(3), 21–28 (2006)
5. Polaschek M., Zeppelzauer W., Kryvinska N., Strauss C.: Enterprise 2.0 integrated communication and collaboration platform: a conceptual viewpoint. In: AINA Workshops, pp. 1221–1226 (2012)
6. Fahd, Z.O., Ahmad, G.: Knowledge sharing and collaboration through social media. the case of IBM. In: Proceedings of the MCIS (2012)
7. Lester, H., Drury, J.L., Daniel, W., Damianos E.L., Donna, C.: Evaluating the uses and benefits of an enterprise social media platform. J. Soc. Media Organ. **1**(1) (2009)
8. Forrester: Social networking In The Enterprise: Benefits and Inhibitors. A commissioned study conducted by Forrester Consulting on behalf of Cisco Systems (2010)
9. Dumas, M., Aalst, W., Hofstede, A.: Process-Aware Information Systems. Wiley, Hoboken (2005)
10. Sandy, K.: Leveraging social BPM for enterprise transformation. In: Fischer, L., (ed.) Book Chapter in Social BPM: Work, Planning and Collaboration under the Impact of Social Technology. BPM and Workflow Handbook Series (2011)
11. Michael, L., Nina, C.: Toward an agile knowledge connection of employees with regard to business processes. In: HICSS, pp. 3436–3445 (2013)
12. Keith, S., et al.: Social BPM: work, planning and collaboration under the impact of social technology. In: Fischer, L. (ed.) BPM and Workflow Handbook Series (2011)
13. Curtis, B., Kellner, M., Over, J.: Process modeling. Commun. ACM **35**(9), 75–90 (1992)
14. List, B., Korherr, B.: An evaluation of conceptual business process modeling languages. In: SAC (2006)
15. Schmidt, R., Nurcan, S.: BPM and social software. In: Ardagna, D., Mecella, M., Yang, J. (eds.) Business Process Management Workshops. LNBIP, vol. 17, pp. 649–658. Springer, Heidelberg (2009)
16. Giorgio, B., Frank, D., Ben, J., Rania, K., Selmin, N., Michael, P., Marcello, S., Rainer, S., Rito, S.: Key challenges for enabling agile BPM with social software. J. Softw. Maint. **23**(4), 297–326 (2011)
17. DiMicco, J., Millen, D. R., Geyer, W., Dugan, C., Brownholtz, B., Muller, M.: Motivations for social networking at work. In: Proceedings of the 2008 ACM Conference on Computer Supported Cooperative Work, CSCW 2008. ACM, New York, pp. 711–720 (2008)
18. Richter, A., Riemer, K.: Corporate social networking sites –modes of use and appropriation through co-evolution. In: 20th Australasian Conference on Information Systems, Melbourne, p. 34, (2009)

19. Bruno, G.: An approach to defining social processes based on social networks. In: Handbook of Research on Business Social Networking: Organizational, Managerial, and Technological Dimensions, pp. 272–286. IGI (2012)
20. Dengler F., Lamparter S., Hefke M., Abecker, A.: Collaborative process development using semantic MediaWiki. In: Proceedings of the 5th Conference of Professional Knowledge Management. Solothurn, Switzerland (2009)
21. Qu H., Sun J., Jamjoom H. T.: Scoop: automated social recommendation in enterprise process management. In: IEEE International Conference on Services Computing, vol. 1, pp. 101–108 (2008)
22. Koschmider, A., Song, M., Reijers, H.A.: Social software for modeling business processes. In: Ardagna, D., Mecella, M., Yang, J. (eds.) Business Process Management Workshops. LNBIP, vol. 17, pp. 666–677. Springer, Heidelberg (2009)
23. Fengel J., Rebstock M., Nüttgens M.: Modell-tagging zur semantischen verlinkung heterogener modelle. In: EMISA, pp. 53–58 (2008)
24. Reich, J.: Supporting the Execution of Knowledge Intensive Processes by Means of Expert and Best- Practice Mediation. Dr. Hut, München (2008)
25. Brambilla, M., Piero, F., Carmen, K., Vaca, R.: Combining social web and BPM for improving enterprise performances: the BPM4People approach to social BPM. In: WWW (Companion Volume), pp. 223–226 (2012)
26. Silva, A.R., Meziani, R., Magalhaes, R., Martinho, D., Aguiar, A., Flores, N.: AGILIPO: embedding social software features into business process tools. In: Rinderle-Ma, S., Sadiq, S., Leymann, F. (eds.) BPM 2009. LNBIP, vol. 43, pp. 219–230. Springer, Heidelberg (2010)
27. Bider, I., Johannesson, P., Perjons, E.: A strategy for merging social software with business process support. In: Muehlen, M., Su, J. (eds.) BPM 2010 Workshops. LNBIP, vol. 66, pp. 372–383. Springer, Heidelberg (2011)
28. Rossi, D., Vitali, F.: Workflow enactment in a social software environment. In: Ardagna, D., Mecella, M., Yang, J. (eds.) Business Process Management Workshops. LNBIP, vol. 17, pp. 716–722. Springer, Heidelberg (2009)
29. Xie, L., de Vrieze, P., Xu, L.: When social software meets business process management. In: Proceedings of the Fourth. International Conference on Computer Sciences and Convergence Information Technology, pp. 238–243 (2009)
30. Khalaf, R., Subramanian, R., Mikalsen, T., Duftler, M., Diament, J., Silva-Lepe, I.: Enabling community participation for workflows through extensibility and sharing. In: Rinderle-Ma, S., Sadiq, S., Leymann, F. (eds.) BPM 2009. LNBIP, vol. 43, pp. 207–218. Springer, Heidelberg (2010)
31. Johannesson, P., Andersson, B., Wohed, P.: Business process management with social software systems – a new paradigm for work organisation. In: Ardagna, D., Mecella, M., Yang, J. (eds.) Business Process Management Workshops. LNBIP, vol. 17, pp. 659–665. Springer, Heidelberg (2009)
32. Neumann, G., Erol, S.: From a social wiki to a social workflow system. In: Ardagna, D., Mecella, M., Yang, J. (eds.) Business Process Management Workshops. LNBIP, vol. 17, pp. 698–708. Springer, Heidelberg (2009)
33. Motahari-Nezhad, H.R., Bartolini, C., Graupner, S., Spence, S.: Adaptive case management in the social enterprise. In: Liu, C., Ludwig, H., Toumani, F., Yu, Q. (eds.) Service Oriented Computing. LNCS, vol. 7636, pp. 550–557. Springer, Heidelberg (2012)
34. Alexopoulou, N., Nikolaidou, M., Stary, C.: Blending BPMS with social software for knowledge-intense work: research issues. In: Nurcan, S., Proper, H., Soffer, P., Krogstie, J., Schmidt, R., Halpin, T., Bider, I. (eds.) BPMDS 2013 and EMMSAD 2013. LNBIP, vol. 147, pp. 18–31. Springer, Heidelberg (2013)

35. OMG: Business Process Management Notation. Version 2.0 (2011)
36. Martinho, D., Silva, A.R.: An experiment on the capture of business processes from knowledge workers. In: Lohmann, N., Song, M., Wohed, P. (eds.) BPM 2013 Workshops. LNBIP, vol. 171, pp. 113–124. Springer, Heidelberg (2014)
37. Selim, E., Michael, G., Simone, H., Sami, J., Ben, J., Paul, J., Agnes, K., Selmin, N., Davide, R., Rainer, S.: Combining BPM and social software: contradiction or chance? J. Softw. Maint. Evol.: Res. Pract. **22**(6–7), 449–476 (2010)
38. Surowiecki, J.: The Wisdom of Crowds: Why the Many are Smarter than the Few and How Collective Wisdom Shapes Business, Economies, Societies and Nations. Doubleday, New York (2004)
39. Nathaniel, P.: The role of trust and reputation in social BPM. In: Fischer, L., (ed.) Book Chapter in Social BPM: Work, Planning and Collaboration Under the Impact of Social Technology. BPM and Workflow Handbook Series (2011)
40. Martyn, O.: Business Process Management: A Rigorous Approach. Meghan Kiffer Press, Tampa (2005)
41. Shankar, K.: Social Process Design, Execution and Intelligence for a better Customer Experience. Infosys, white paper (2011)
42. Ikujiro, N., Philippe, B., Chester, B., Noboru, K.: Organizational knowledge creation theory: a first comprehensive test. Int. Bus. Rev. **3**(4), 337–351 (1994)
43. David, L.: The Power of Events. Addison-Wesley, Boston (2002)