Smart Business Process Management

Dirk Draheim, University of Innsbruck, Austria

ABSTRACT

Now is the time that IT governance stakeholders start to think about enterprise application integration really strategically, top-down, instead of technologically, bottom-up. We foresee a completely new quality of IT to support the value-adding processes in modern enterprises by the systematic integration of BPM technology, knowledge management technology and social software. In excellent enterprises, all the value-adding processes, both the formal and strictly organized and the informal and social, are subject to management and IT support. We can distinguish between several horizontal fields of management, e.g., business process management, project management and knowledge management, and several vertical levels of management, e.g., strategy, tactics and operations. It is important to understand the huge potential of systematic integration of these fields and levels. Many important IT initiatives in the past aimed at overcoming information and control flow barriers between these management fields and levels. We want to characterize a conceptual level of thinking about IT integration and we use the term smart business process management for this. We give three examples, where the smart business process management perspective can help to design a new quality of IT support in modern enterprises: smart business continuity management, smart IT service management and smart production.

INTRODUCTION

Among business analysts there seems to be agreement that social software is the enabling technology of the future (Fenwick 2011). But if you ask CIOs, you might get a different impression, because a lot of CIOs might answer you that they will not systematically consider social software for the time being and that they rather want to wait a bit until they understand the real business value of social software better.

So, what can we really expect from social software? And what is the right way to use it? How is social software related to knowledge management? How can it be used to improve the business processes of an enterprise? In this article we want to discuss these and similar questions. We want to share some of our beliefs on the potential of social software. We think that the kind of interaction and collaboration that is supported by social software is a fundamental, crosscutting concern in enterprises. It is so fundamental that it always has been crucial in enterprises, i.e., it is not only of interest for some envisioned, especially socio-oriented enterprise in the future. It is not just a hype topic.

Enterprises are Social Entities

Enterprises are organizations of human beings, as such they are social networks and subject to social investigation and social efforts. What might be considered new in the current discussion is a focus shift onto social aspects of the enterprise, but even this is not new. In the four major, well-established "North-Atlantic" schools of management, i.e., scientific manage-

ment, human relations oriented management, operations research, and cybernetic management, the explicit orientation towards social aspects already started as early as with the human relations oriented management. A human relations oriented approach to management looks at the individual in its role and wants to improve the organization to develop the individuals to their best according to their potential. Another important strand of management research tries to understand and improve the group or the organization as a whole, i.e., it deals with organizational culture and its adoption to the needs of an always and ever changing environment (Schein 2004).

The Integration of Informal and Formal Processes

It is an interesting question for which functions of an enterprise the features of social software can be exploited. We think that there are three fields:

- **Problem-solving processes,** such that can be typically found in project-based activities, creative tasks at all levels of the enterprise, e.g., the adjustment of the enterprise's product portfolio, research and development activities or the continuous improvement of daily operations.

- **Knowledge-creating and -transforming processes,** such that foster the generation and distribution of new and established knowledge, i.e., those that are subject to what is known as knowledge management. These knowledge-creating and transforming processes are hard to distinguish from the aforementioned problem-solving processes; however, they are more pervasive and fundamental. It could be said that the problem-solving processes form the core or are subject to the knowledge-creating and transforming processes.

- **Social processes,** or genuine social processes, or social processes in a narrow sense, that have a rather indirect impact onto the value-adding processes, i.e., such that are related to human relationships in their own right.

Support for social processes is where the name of social software stems from. However, the field where social software products are actually used successfully in enterprises is the field of problem-solving, knowledge-creating and knowledge-transforming processes, whereas it seems that the usage, pre-conditions and impact of social software in the field of social processes in an enterprise is yet not really understood.

The knowledge-creating and transforming processes and problem-solving processes are of particular interest for us in this paper and we can and will say one little to social processes. We will delve into the discussion of these fields, there relationship to each other, their relationship to management and the exploitation of social software to support them further in the course of the article, but this discussion is neither meant to be exhaustive nor is it the main issue of this article. The main topic of the article is the integration of social software or, to say it more precisely, social software features with other enterprise applications.

HOW EXCELLENT MANAGEMENT EMERGES IN MODERN ENTERPRISES

In this article we want to distinguish between two dimensions of management. The first dimension is what we call the management levels, which distinguishes between strategy, tactics and operations. The second dimension is what we call the management fields, which distinguishes between business

process management, knowledge management and project management; please have a look a Fig. 1.

The distinction between these two dimensions of management is not meant as a management theory or organizational taxonomy. It should just serve as a framework for our discussion. In particular, in the next section, we want to discuss concrete existing technologies against the background of the lattice formed by these two dimensions. Again, the assignment of certain technologies to certain management levels and fields is not meant to be exhaustive and is debatable. But we think that the proposed lattice is a good starting point for getting the complexity of the topic under control.
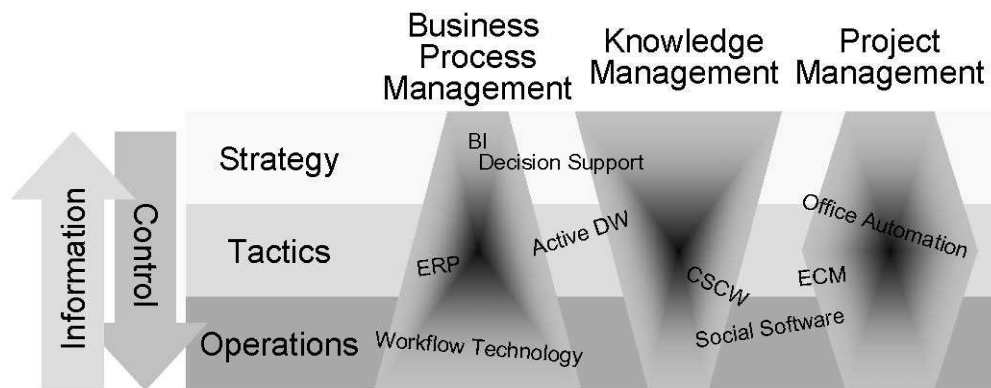

Figure 1: A management landscape: levels and fields

We can distinguish between strategy, tactics and operations. The strategic level can be associated with top management and the tactical level with middle management. The strategic level is the executive level; it is about the business model and the long-term business goals. Here is where the ultimate source of steering resides, i.e., it is about enterprise governance. Tactics is about the implementation of the business strategy. It is about organization and development of the enterprise's work forces, people management, high-level coordination and high-level control of the work. The operational level is about the daily activities that directly create the products and services and the direct administrative tasks that keep the enterprise running. In daily operations we find a low level of management activity which deals with the coordination of tasks, activities and workers. Figure 1 also shows the mainstream directions of information flow and control in enterprises. Managers at each level in the organizational hierarchy must be supplied with all the information they want from the lower organizational levels in order to have a solid basis for their decision and steering responsibility. Managers at one level plan, command and supervise the activities of the lower levels, a steering responsibility that we have abbreviated as control in Fig. 1.

Business Process Management

Business process management (Draheim 2010) is more than work organization or coordination of work activities. If done correct in an enterprise, it spawns and orchestrates steering and operating activities at the several levels of the enterprise. It recursively defines, controls and adjusts performance indicators across the several hierarchical levels. It formalizes processes and at the same time makes them transparent. Not all the processes in an enterprise are equally amenable for such formalization. Eventually, it controls

those processes in an enterprise that can be understood and defined as net of activities. In a process-oriented enterprise as much of the activity as possible is recursively defined in a cascade of processes. The definition of a process must not necessarily mean that the process is shaped step-by-step, for example, modeled with one of the available business process modeling languages. It just means, in particular at the higher levels, that the process obtains a sufficiently accurate description and that appropriate key performance indicators are identified and set. Key performance indicators are appropriate if they are sufficient to control and monitor the considered process. Identifying appropriate key performance indicators is an art in its own right and often it is even impossible to understand and control a process only in terms of key performance indicators. The processes that can be actually described by a business process model can be typically found at the level of daily operations. A process that is strictly describable is typically well-understood with respect to its main case and all its special cases, is done over and over again in the same or at least similar way and so on. Those activities that occur only occasionally and must often or always react to unforeseen circumstances might not be good candidates for business process modeling and business process management. The same is with highly creative tasks.

Knowledge Management

Knowledge management (Nonaka 2008) (Fransman 1994) enriches the aforementioned "North-Atlantic" schools of management with a new systematic viewpoint that focuses on the knowledge-creating and -transforming processes in enterprises. We can assume that in all successful enterprises, independent from the concrete organizational culture, there is an absolute awareness that know-how and knowledge are a core assets and mission-critical. However, the "North-Pacific" school of knowledge management (Nonaka 2008) approaches the emergence of knowledge in a different way, somehow smarter, somehow more fundamental, and somehow more systematically. It understands and cares for the social processes around knowledge creation and maintenance better or at least more explicit.

For example, compared to business process management it approaches enterprise knowledge less technocratic. Business process management usually does not even mention challenges in coping with knowledge, not as a driving force and even less as a rationale. This is very interesting, because the problems of coping and dealing with knowledge are actually a major motivation for business process management. Knowledge of how things are done in an enterprise embodies power. Making explicit the way things are done causes a power shift towards management. Describing processes more and more precise and in the long run prescribing processes more and more, i.e., business process management, causes a power shift in enterprises towards management. From the employee's and individual stakeholder's viewpoint this fact is often expressed by fears to become exchangeable and less important. And actually, in some way it is fair to say that with business process management the process descriptions become the software of the enterprise and form an explicit core asset of the enterprise. There are other important motivations for business process management than this power shift, which are often explicitly and officially mentioned by business process initiatives, i.e., reactiveness and flexibility of the enterprise and the implementation of a

quality management system. Nevertheless, the power shift caused by business process management is an important implicit effect of it.

Knowledge management explicitly cares for social categories like group dynamics and organizational culture. For example, it tries to understand the way individuals are taught by groups, how knowledge can be improved and how improved knowledge can be brought back to groups. It aims at fostering the positive processes that improve and spread out knowledge in an enterprise. Therefore, knowledge management is particularly suitable for those informal, problem-solving and highly creative processes that might be hard to improve with classic business process management approaches. Also knowledge management needs appropriate IT support (Maier 2009) and we think that social software with its support for team collaboration is a natural candidate for this.

Project Management

Projects and project work is different from operations. In the PMBOK (project management body of knowledge) projects are defined via a comparison to operations: *"[…] Operations and projects differ primarily in that operations are ongoing and repetitive while projects are temporary and unique."* (PMI 2008). Whereas this definition is easy and intuitive, it is not completely correct and does not really grasp the essence of project work. Projects are limited in time and budget – so much is true. Of course, the single project is unique, but so is also the single process instance in operations. You might consider only strictly continuous production as operations. Here, there is only one ongoing process and this process differs from a project, which is temporary and therefore has a start and an end. But such ongoing process is not repetitive. In operations we usually deal with repetitive process instances. But projects are also repetitive. In enterprises, often the same kind of project is repeated over and over again, i.e., often projects are not unique. However, you would not stop to refer to these projects simply as projects. So what is the difference between operations and projects? It seems to be determined by the kind of work done in a project, i.e., projects seem to occur rather at the tactical and strategic level. But this statement is not suitable as a definition.

Projects occur rather occasionally, demand-driven. Again, this statement is not suitable as a definition. There are enterprises that are really project-based. Projects may be sold as part of the business model. Internally, a crucial amount of the work can be done in the form of projects. The more repetitive projects or certain kinds of projects are in an enterprise the more they become subject to standardization. Project guidelines and project manager handbooks are elaborated; project managers are trained and certified. The more projects are standardized the more similar they become to processes. Repeatability of projects can be seen as a basic criterion for the maturity of a project-based enterprise. For example, in the CMM, the capability maturity model (Paulk 1993), which a well-known project model of the software development community, repeatability defines the basic level of maturity.

Perhaps the best attempt to characterize projects is via the management efforts. Then, a project encapsulates such kind of work that is amenable to project management techniques, for example, each project has a project manager, and large projects also have a project director, a project steering committee and so on.

It is confusing and at the same time promising: projects are process-like; the knowledge about best project practices is a core asset in an enterprise. On the one-hand side, the differences between the process management world, the knowledge management world and the project management world must not be neglected. It is necessary to understand the special characteristics of each of these domains. On the other hand, there is a huge potential for integration, both conceptually and technologically.

REVIEW OF IMPORTANT IT APPROACHES AND TECHNOLOGIES

There are different styles of work in enterprise. There are different tasks and challenges in an enterprise that can be addressed appropriately only with different approaches to work organization, different mentality and different mode. Similarly, there are several kinds of technologies to support work in an enterprise. An ultimate goal would be to clearly understand the differences and commonalities of the different styles of work and their supporting technologies. In this section we review important, wide-spread classes of technology, how they emerged and how they are used in today's enterprises.

Enterprise Resource Planning Systems and Workflow Technology

Enterprise resource planning (ERP) systems implement software support for both the daily administrative and productive processes of an enterprise and tactical and strategic activities. The focus is rather on the daily operations and its control by the middle management. Enterprise resource planning systems maintain the master data, the transactional data and the inventory data of an enterprise. The master data represent the long-term core data of the enterprise. The transaction data stems from the daily operations. The transaction data can be considered temporary. It is aggregated over time to inventory data. The dialogues of an ERP system directly control the formal processes of an enterprise. The reports that are generated by an ERP system support the middle management in their planning activities and the control of the daily operation over mid-term time periods. More aggregated reports of an ERP system help the top management in strategic planning, however, strategic planning often requires better analytical capabilities and highly sophisticated reporting capabilities than basic decision support features, i.e., so called business intelligence features that encompass data warehousing and data mining. Such features also ship with today's ERP products; however, they are considered extra features beyond the usual reporting capabilities of the basic ERP system product.

Workflow technology (Hollingworth 1995) can be considered an implementing technology for ERP systems. Many ERP systems are implemented from scratch on the basis of one of the many available implementing programming platforms. One major field of usage for workflow technology is enterprise application integration. Then, with the workflow technology the dialogues of existing ERP systems are orchestrated and further glue is provided by auxiliary dialogues that are implemented with respect to the hooks of the workflow technology. Today's business process management suites are, basically, workflow technologies that should be enriched with sophisticated features beyond workflow management, e.g., features for process monitoring, process simulation and integrated high-level business process modeling. Still, it is fair to say that there is a major overlap of the realm of enterprise resource planning systems and workflow technology resp. business process manage-

ment suites, which is the realm of formally describable and executable business processes.

Decision Support and Business Intelligence

Basic decision support is already provided by enterprise resource planning systems. The need for sophisticated analytical capabilities as required by strategic planning is provided by the family of business intelligence products with data marts, data warehouses and data mining technologies. The need for high-level decision support and business intelligence at the strategic level can be understood rather from a business process management perspective than a knowledge management perspective. High-level decision support corresponds to the corporate governance responsibility of the executive level. The information provided by decision support systems is at the top of the information pyramid of the enterprise, it is at the top of the knowledge pyramid. However, knowledge management is about systematically fostering knowledge creation and knowledge distributing at all levels of the enterprise. It is about the knowledge-creating and -transforming processes.

In enterprises that have established a robust knowledge management system the business process management system can profit from the knowledge management technologies as information sources. But as with all systems that feed the decision support processes and technologies, this does not come for free. Appropriate extractions and transitions must be designed and implemented. Similarly, a decision support system that has been designed to support the strategic planning of an enterprise can not be automatically considered as a knowledge management technology. It supports the knowledge workers at the strategic level, but it does not foster knowledge management as a crosscutting, holistic function of the enterprise. Nevertheless, the decision support systems of an enterprise embody important aggregated enterprise information and therefore should not be overlooked in each serious knowledge management initiative in an enterprise.

Active Data Warehousing

Active data warehousing (Hahn 2001) is about the idea to make data warehousing pervasive in the enterprise. This has two aspects. The first is simply the performance of the data warehousing systems. Active data warehousing is real-time data warehousing, i.e., it is about the idea that massive aggregated data is always easily at your fingertips. The second aspect of active data warehousing is that it adds the inverted information stream to conventional data warehousing and this way closes the information loop between the operational systems that are conventionally considered the data sources in data warehousing, i.e., the enterprise resource planning systems of the enterprise, and the analytical systems. The idea is to identify important decisions that then influence workflows and processes that are formalized in and controlled by the enterprise resource planning systems, so that the enterprise resource planning systems become more flexible, more active. No doubt, it is possible to find interesting applications of this idea, however, whether this concept has the potential to become a crosscutting paradigm for enterprise architecture is questionable, at least, if it should be established on the basis of today's application implementing technologies, in general, or today's workflow technology, in particular. Note, that adaptive workflow technology is still subject to research.

Eventually, active data warehousing is about making data warehousing available at all levels of the enterprise, in particular, in all tiers of IT technology in the enterprise. In that sense active data warehousing could actually be considered a knowledge management approach, albeit a very technology-oriented and mechanistic one.

Enterprise Content Management

Enterprise content management systems (Bell 2010) form central pillars of information infrastructures in today's enterprises. With enterprise content management systems you gather and maintain those data that emerges outside the control of enterprise resource planning systems. If you have established concrete guidelines and rules that enforce the usage of enterprise content management for the storage and exchange of information, an enterprise content management system is able to prevent an rank growth of information in your enterprise.

Therefore enterprise content management systems are important for work done in projects. There are the right tool to streamline efforts in daily office work outside the regulated and formalized processes, for example, correspondence with customers and other stakeholders in the context of your enterprise. The features of enterprise content management systems, i.e., document versioning and advanced access and access right control, are basic, crucial supporting features for each knowledge management initiative. We will discuss enterprise content management systems further and how they relate to social software later in the section on the usage of social software features in enterprises.

Computer-Supported Collaborative Work and Office Automation

Computer-supported collaborative work (CSCW) is a rather loose term that in general denotes a quite large class of software applications. In the past, the CSCW community considered all kind of software that somehow supports people to co-operate in the enterprise. With such a broad definition of CSCW, also workflow management systems, enterprise content management and, of course, also today's social software systems belong to the class of CSCW systems.

For our discussion, we are interested in CSCW tools in a narrower sense, i.e., in such systems that simulate some human interaction and communication that exists also otherwise in the real world, i.e., E-mail, chat and IT-based video-conferencing. E-mail can also be considered an office automation tool. The class of office automation software consists of those tools that support individuals in an end-user friendly way to create and maintain documents of today's typical office tasks. The most typical office automation tools are document editors with rich formatting capabilities, slide show tools, spreadsheet applications and desktop databases. Also, lightweight single-user project management tools belong to the class of office automation.

Imagine an enterprise without E-mail infrastructure and without office automation tools. This seems simply impossible. Small enterprises often need no more IT support but office automation tools. In large enterprises the massive need and use of E-mail and office automation tools stands for the work that is done in informal processes or informal extensions to formal processes. Even in large enterprises, it is very common to have no explicit software support for projects. Formal, ERP-like and heavyweight multi-user project planning tools, the even more heavyweight multi-project planning

tools or project-planning tools that are well-integrated with the company's ERP systems are not the rule. Rather, project work is often supported only by office management tools, actually, usually supported and streamlined by an appropriate enterprise content management system.

On the Usage of Social Software Features in Enterprises

In the introductory section we have said that social software is actually used in enterprises to support problem-solving and knowledge-creating processes, whereas it is not yet really clear whether and how to use it for genuine social processes, the field from which social software got its name from. Similarly, it seems that some of the features of today's social software would be typically considered as genuine social software features whereas others would be rather considered features for computer-supported collaborative work. For example, you would tend to classify support for social networking as found in platforms like facebook.com and xing.com as the social software feature per se and support for collaborative editing documents as computer-supported collaborative work.

Let us have a closer look at social networking first. The purpose of typical social networking platforms is to bring together people with same interests, problems, needs, questions and so on. In a way, it is about virtualization of human relationships. Old friends from the real world can be re-found and new friendships can arise. The sociology of such virtual human relationships is special and an interesting subject to research in its own right. For example, it would be interesting to gain a deeper understanding of the mutual influence of relationships in the real world and relationships in the virtual world.

For example, we can observe group dynamics in social networks. As another example, we can see a trend that not only relationships between single individuals but also groups that have been formed in the virtual world out of humans that have never met in the real world start to de-virtualize, reify so to speak, into real-world groups. Now, for a CIO the benefit of establishing a social networking platform might be not immediately clear. You could argue that a social networking platform can be used in an enterprise to contribute to a good working atmosphere. But as a successful CIO is oriented towards benchmarking, he would ask: are there positive examples for this and how should this actually work? Are there also risks in the introduction of a social networking platform?

However, if you are not convinced to use a virtual social network for its intended purpose, i.e., social networking, this does not mean that there might be other useful ways to use social networking software features in your enterprise. For example, social networking software could be used to build a staff database to manage expert staff in project-based enterprises. If an enterprise has a matrix organization with people managers, project managers and skill managers, a social software could be a good choice to provide the glue for providing the necessary information and balancing the several interests. Note that the efforts in matching the right person to the right project in an enterprise have often the flavor of negotiations at the different stakeholder levels. Lack of information and lack of negotiation efforts can easily cause that the conventional people management hierarchy dominates a project-based enterprise in a way that the enterprise's skill pool can not exploited to its full potential. Here, a good skill management database can help

a lot. And if the skill management database is enriched with social software features like discussion forums and social tagging: even better.

Now, let us have a look at features for the collaborative creation and maintenance of documents. Up to now, this has been the domain of enterprise content management systems. Basically, enterprise content management systems offer a combination of version control and access right management and this way add significant value by helping to get the unstructured information that emerges in enterprises under control. The usage of enterprise content management systems is mainstream in today's enterprises. Still, the enterprise content management systems products (Bell 2010) are often considered different from social software products (Drakos 2010). However, the product classes converge and there are some products that are considered as both enterprise content management systems and social software systems.

What we want to express with this discussion is the following. We think that enterprise content management features are no genuine social software features but form a crucial part of social software products. And therefore they are another example for the fact that social software products can and will add value in enterprises even if they are not used for the support of genuine social processes.

TOWARDS SMART BUSINESS PROCESS MANAGEMENT TECHNOLOGY

In today's enterprises, IT support for the business processes is a crucial success factor. The business processes are supported by enterprise resource planning systems. Conventional workflow management systems and there successor products, the current business process management suites, are implementation platforms that guarantee a high degree of flexibility and maintainability of the realized IT systems. With respect to IT support we could observe the same story with respect to growth of IT and enterprise application integration again and again in the last decades. It seems that the demand for IT support for more and more business processes never stops in today's enterprises. Therefore both existing systems in an enterprise grow, but also more and more new systems emerge over the years in an enterprise. The several system are integrated ad-hoc and on the fly as they emerge, but often the enterprise's system landscape becomes so bloated and complex over the years that an enterprise application initiative becomes necessary.
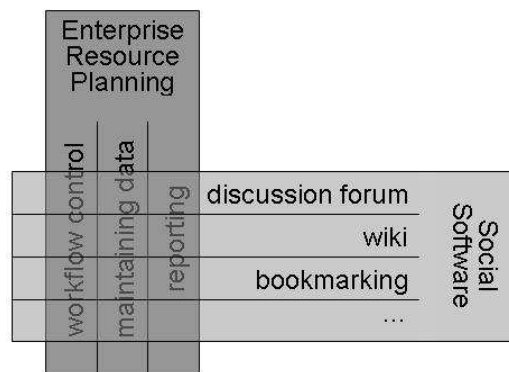

Figure 2: Intertwining ERP and social software features

With the introduction of social software we should care about the enterprise application integration aspect. By supporting the informal processes by social software we run into the risks of a next island of specialized IT support and a next major wave of enterprise application integration problems. The ideal is somehow illustrated in Fig. 2, i.e., the integration of social software features as crosscutting concerns into the other IT systems of an enterprise. Such an ideal is hard to achieve, because it is not realistic to refactor all the existing IT systems of an enterprise just because we have identified some useful application scenarios for social software features. Of course, deploying a social software product out-of-the-box is much easier than refactoring existing systems. However, we think that the true intertwining of social software features with ERP functionality can be considered a promising notion and important guideline for social software initiatives. This intertwining represents the technical aspect of the smart business process perspective. For example, this notion can motivate us to analyze where the social software features are really needed in the enterprise and whether added value can be generated by re-thinking existing IT systems. It can help us not to forget about the potential of social software features when we build new IT support.
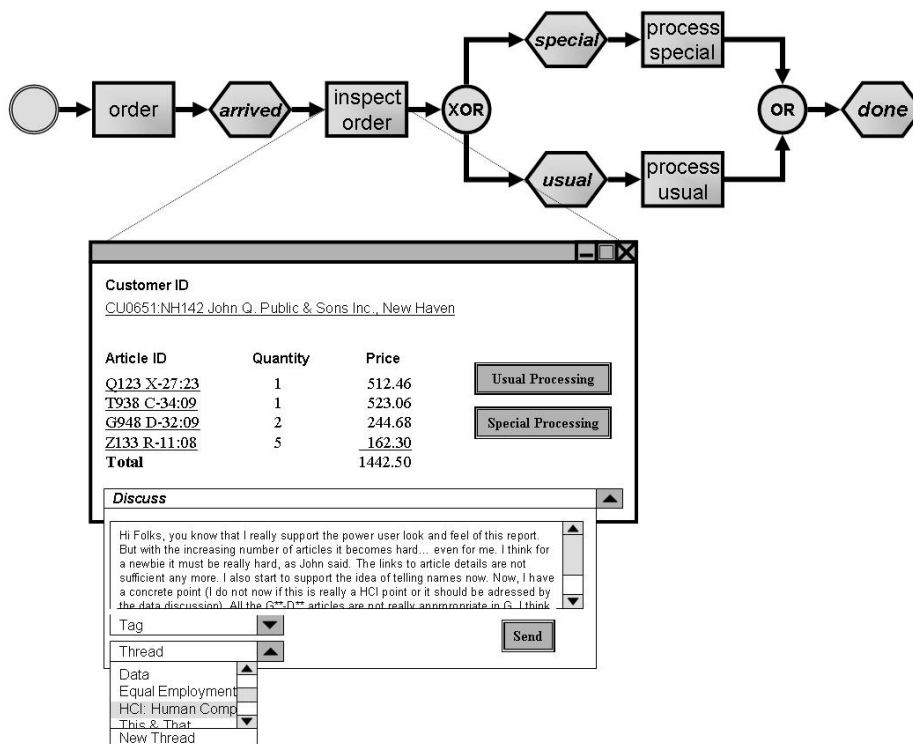

Figure 3: Example smart workflow implementation.

We believe that there is a huge potential for social software with respect to the formalized and automated processes in an enterprise. Figure 3 shows an example of a smart workflow implementation that allows the user to invoke a discussion forum thread and leave a comment on the current report and

form that he currently uses in an ERP system. The comment in the discussion forum will refer to the context activity in which it has been posted, e.g. by a link to the activity on a conceptual business process definition, or, even better, a link to an automatically generated screenshot of the report and form. Therefore, what we can see in Fig. 3 is actually an implementation of a continuous improvement process with respect to the ERP system that is intertwined with the mentioned social software feature.

Mixing social software features into other IT applications has the risk to bloat these applications. On the other hand side, it stands for a real intertwining of formal processes with informal processes. The credo of the business process management paradigm, or the process-oriented enterprise paradigm is to formalize as much of the processes of an enterprise as possible. From a management viewpoint this remains debatable. We do not express an opinion here in favor of a total process orientation or in favor of agile management approaches. But anyhow, we believe that even with a very strict process-oriented management approach, many of the formalized processes will represent only the core of otherwise informal processes and informal knowledge.

APPLICATIONS OF SMART BUSINESS PROCESS MANAGEMENT

In this section we apply the notion of smart business process technology to three areas, i.e., business continuity management, IT service management and production.

Smart Business Continuity Management

Excellent enterprises must care for the robustness of their business processes and they must be prepared for the failure of their business processes in case of major incidents. These issues are addressed by business continuity management (BSI Group 2006). Business continuity management (BCM) is about severe incidents that substantially impact the operation of the business in a way that prevents the organization from fulfilling its mission with high impact on costs and revenues, e.g, fire, flood, utility outage, supply chain disruption, industrial action and so on. Business continuity management consists of analyzing the business with respect to critical actions, systematically addressing critical actions, designing reactions to unavoidable incidents, and exercising and maintaining those reactions. It is therefore a major crosscutting activity, which must be really embedded in the enterprise in the sense of awareness and support.

In the design of IT support for business continuity management, typical social software features are necessary (Draheim 2011). Let us consider business continuity from a documentation-oriented viewpoint. There are several important documents for the most important results of a BCM initiative, e.g., a BCM policy, which expresses the alignment of BCM with business goals, a business impact analysis documentation, risks and threats assessments, awareness programmes, training programmes and plans for incident management, business continuity and business recovery. All of these documents are the result of team collaboration. The resulting artifacts stand for creative processes and team-efforts. The broader the team can be organized, the broader is the knowledge base and the better are the results. Today's social software features are the natural candidates for the coordination of such distributed teams.

Smart IT Service Management

The IT Infrastructure Library (ITIL) with its corresponding high-level standard ISO 20000 (ISO 2005) is an example for an externalized body of knowledge of a concrete work domain, i.e., IT service management. Teaming together IT service management with IT governance as expressed by ISO 38500 (ISO 2008) is a good example for the hierarchical structure of management systems that are oriented towards business process management.

ITIL is itself an externalized body of knowledge. Some of its best practices have aspects of knowledge management with respect to the concrete IT service provider. For example, the so-called problem management process is about capturing data about the single incident-solving activities and a systematic analysis of this data for the purpose of proactively managing future incidents.

In Fig. 4 we illustrate the design of a smart IT service management platform. The platform offers usual support for the IT service management processes combined with social software features plus some aspects of ubiquitous computing (Weiser 1991).
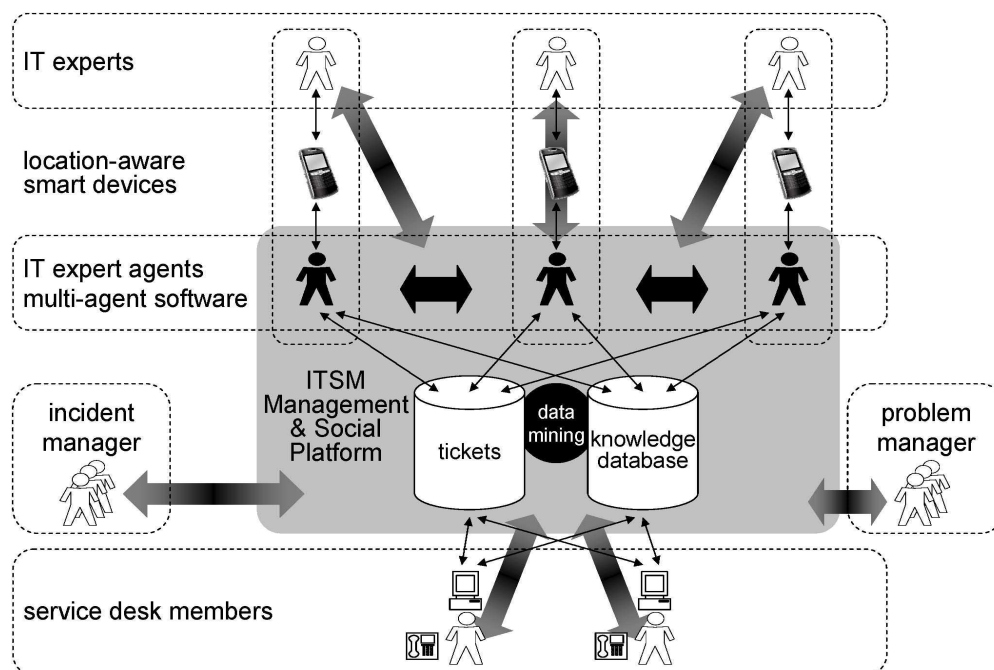

Figure 4: An ITSM management and social platform.

Current IT service management platforms emerge as extensions of existing bug tracking or issue tracking system products. This way, more and more IT service management processes and information is supported in these platforms. Eventually, an IT service management platform is an enterprise resource planning systems. In an internal functioning of an IT service provider pervasive debates and lively discussions of technical and conceptual issues are crucial for success.

A lot of formal IT service management processes must be accompanied by informal problem-solving and solution-negotiating processes. For example, the process of managing a service catalogue boils down to publishing and maintaining steps, but needs a broad discussion basis that exploits the experience of several internal stakeholders, because service level agreements should be based on a solid understanding of the service provision. The same is even truer for operation level agreements. The customers of an IT service provider require that change management is formalized by the definition of appropriate documents and that changes are regulated by a change advisory board. However, in order to trigger the right changes at the right time a broad expert basis is needed. Similarly, if an IT service provider is able to organize a systematic externalization and distribution of implicit technical know-how, this can contribute a lot to the competitiveness of the IT service provider.

Therefore an IT service management platform should foster and support informal discussion and knowledge exchange in extension to and centered around the formal IT service management processes. That is the basic notion of the smart IT service management platform shown in Fig. 4. The distributed on-scene team of IT experts that handle the IT incidents is connected to the platform technically via mobile devices and conceptually via a multi-agent software tier. The purpose of the multi-agent software tier is to bring the right ticket to right person, based on the individual skills and preferences of the IT expert staff, but also based on the current localization of the several IT experts. IT experts, incident managers, problem managers and service desk members all have equal access to the platform's features to discuss issues, create and exchange knowledge, ask for help and advice, share opinions, recommendations and ideas, propose improvement and so on.

Smart Production

Excellence in production is a fundament of today's modern businesses and economy (Hayes 1984). In today's manufacturing enterprises you find well-distinguishable tiers of IT systems and software. Again, we have enterprise resource planning systems to control administrative processes and higher-level applications for business intelligence. However, there are tiers below the enterprise resource planning system for controlling the production processes at a finer level of granularity – see Fig. 5.
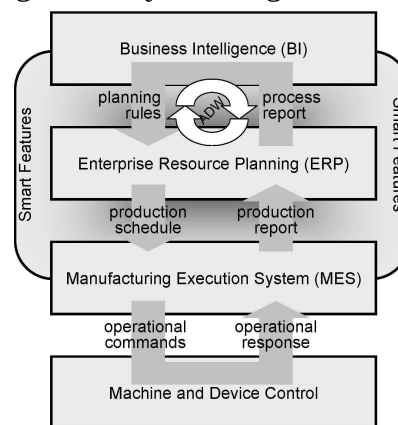

Figure 5: Smart features crosscutting manufacturing systems.

The so-called production planning systems belong to the tier of enterprise resource planning. The production planning systems exchange production schedules and production reports with the so-called manufacturing execution systems. At the lowest and fastest level of control you find the systems and software for machine and device control resp. numerical control.

The product classes of production planning systems, manufacturing execution systems and numerical control systems are separated from each other. Also, if developed from scratch, the tiers are usually well-distinguished in manufacturing enterprises. It is crucial for the functioning of the system landscape, to implement and guarantee a robust and performing exchange of data between the systems in the different tiers (Draheim 2008). Again, we believe that the integration of social software features into this manufacturing application stack – from the manufacturing execution systems upwards – can be enabling technology for the continuous improvement of the work processes and IT applications.

CONCLUSION

The main arguments of this article can be summarized as follows:

- Knowledge management is about the systematic externalization and distribution of implicit knowledge and know-how that exist in enterprises.

- Social software cannot only be used for genuine social processes.
- Social software features can be exploited very well to support knowledge management.

- Social software features can be exploited very well to support all kinds of informal processes and project management activities.

- Many formalized processes in an enterprise are accompanied by necessary informal processes.

We should be aware of the risk that social software initiatives and projects can again lead to new islands of IT functionality and a next wave of enterprise application integration problems.

Based on these observations we have coined the term smart business process management for approaches that foster the interplay of formal and informal processes, in general, and the technical integration of social software features into enterprise resource planning systems as an instance of this principle, in particular.

We have argued for the usage of social software features in enterprises from the viewpoint of improving business process management and knowledge management. We have not needed arguments from the school of human relations oriented management. However, we recognize and appreciate that the usage of social software features has potentially positive effects with respect to human relations orientation. If social software capabilities are experienced by employees as improving the participation of individuals and as an appreciation of their knowledge it can become a motivating factor at work. A precondition for this an organizational culture, in which knowledge is not considered as a property that has to be defended against potentially threatening initiatives and technologies.

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