THE BUSINESS PROCESS KNOWLEDGE FRAMEWORK

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Abstract: Organizations today are confronted with huge problems following and implementing their own business process models. On the one hand, due to a lack of planning and requirements analysis, process models are often unfeasible or difficult to execute in practice. On the other hand, process designers often ignore the importance of studying the different roles and their perspectives on a business process when constructing a process model. This leads to the deployment of process models that do not satisfy process stakeholders. This paper addresses such problems and proposes a business process knowledge framework as a possible solution. Our framework integrates three elements that we consider fundamental to model business processes: stakeholders' perspectives, knowledge types and views. We show how the business process framework can contribute to the improvement of the process knowledge acquisition phase of process design, and how it can support process knowledge communication to stakeholders.

1 INTRODUCTION

In spite of an abundance of approaches, methodologies, models, and standards for business process there is still a large gap between how organizations wants to function, and what actually happens in business process execution (BPM Study, 2006). Organizational practice and market analysis reports (e.g. Strohmaier et al., 2005) point out various reasons for the difficulties with which organizations are confronted. In this paper we propose a solution for two of them:

(a) "Inadequate" analysis of business processes (e.g. the way process models are built): One of the essential tasks in the contruction and adaptation of process models when using the incremental approach (Teng and Kettinger, 1995) is the process analysis (Biazzo, 2000). This is a complex and time-consuming task since the specific knowledge about processes is distributed in the "heads" of its various stakeholders (Habermann, 2001). On the other hand, it can also be found in working practice, documentation and supporting information systems. Often, important parts of the relevant information about business processes necessary for the analysis do not even exist within organizations. If it is available it is often not up-to-date, especially if it is documented, often understood wrong or contradictory. Different stakeholders, also those who actively participate in processes, have different views and convictions about "what is actually happening" in the organization and in performed processes. Frequently the people who have to manage and execute processes do not participate in the definition and maintenance of these processes. In short, incomplete analysis and deficient understanding of the organization lead to the creation of unfeasible process models, whose successful design and later implementation are impeded from the beginning.

(b) "poor" communication of process descriptions to stakeholders (e.g. too broad or too narrow scope, level of abstraction, and "language"): At the same time, even if process models are feasible, they are, from different process stakeholders' points of view, hard to follow in practice. The reason for this situation is that current process models only represent a restricted number of perspectives on the process (e.g. functional, data, organizational). The process models are designed and created mostly for one stakeholder using a

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modeling language that is not always easily understandable for other stakeholders. Therefore, the models very often have an inappropriate scope and level of abstraction. In short, process models that do not take into account process stakeholders' perspectives can hardly be expected to be executed properly.

2 PROCESS KNOWLEDGE

Business process knowledge (knowledge about business processes) is knowledge about the motivation behind processes, reasons for their existence, knowledge about process structure and logic, the required resources for their execution, as well as their interfaces, process environment, capability, performance and documentation. Business process knowledge can be seen as a part of business process improvement knowledge (Hrastnik et al., 2004), i.e. the knowledge required for process improvement, which in addition to business process knowledge also comprises knowledge about the organization's criteria (e.g. organizational goals), knowledge about employees' mental models (Johnson-Laird, 1983), personal attitudes, perceptions, awareness, understanding, motivation, and commitments.

Business process knowledge is a critical input for the process analysis process, where knowledge about the "as-is" situation, the current version of "to-be", and the discrepancy between the two collected in the knowledge acquisition phase. A new "to-be" model is again required in the implementation and process execution process.

Process knowledge is always available in people's heads. Examples include employees, customers, suppliers, partners and other external stakeholders. Process knowledge in people's heads differs strongly depending on its scope and its level of abstraction. In many cases process knowledge is also available in documented form as organization manuals, quality system documentation, lessons learned, best practices, and records of earlier process improvement initiatives. Beyond that, further relevant knowledge can often be won from workflow management systems, ERP systems and business process tools. External knowledge such as industry benchmarks or best practices of other enterprises can sometimes be procured on the market and/or be obtained by participation in appropriate initiatives.

2.1 Types of Business Process Knowledge

Process models can be seen from different angles. Several classifications of the parts of process knowledge and process models have been proposed in Curtis et al. (1992), Lonchamp (Lonchamp, 1993), Conradi et al. (Conradi et al., 1992), Benali et al. (Benali et al., 1989), and Scheer (Scheer, 2000). For the purpose of our business process framework, we integrate and extend elements of these into the following classification of business process knowledge: Process logic covers knowledge about process elements (processes, tasks) and their connections, operators, and conditions. Process information designates knowledge about inputs and outputs of processes as well as about resources needed for their execution. The process environment consists of knowledge about the critical success factors and possible obstacles of processes. Process capacity usually contains quantitative statements about process capacity as well as the measuring system standing behind it (e.g. metrics, measurement categories, measuring points, target values, performance indicators). The process justification gives answers to questions about the sense and purpose of both the existence and the particular characteristics of individual processes and their underlying process logic.

2.2 Perspectives on Business Process Knowledge

The distribution of competencies can, of course, vary from organization to organization. In the context of process management, however, several roles can be differentiated according to which types of knowledge are relevant to them: process owners (on different levels), activity performers, process designers, decision makers as well as internal and external customers. Since the needs for different process knowledge types are always similar, independent of the process abstraction level (organization, sub-processes, activities) (Zesar and Mesaric, 1999), we can operate with the same process roles on all levels of the process hierarchy. It is important to note that one role can be assigned to several persons, and one person can have several roles.

3 PROPOSAL FOR A BUSINESS PROCESS KNOWLEDGE FRAMEWORK

A framework integrating types and perspectives of process knowledge can be further extended (Figure 4) to better cover process knowledge acquisition. Each person can contribute different views: first of all a subjective picture of the current condition ("as-is"), secondly an understanding of how it should be according to the organization (interpretation of the official "to-be") and thirdly a personal opinion of how it should be. The comparison of those three views can significant contributes to the better understanding of the "as-is" situation and detection of the improvement potential.

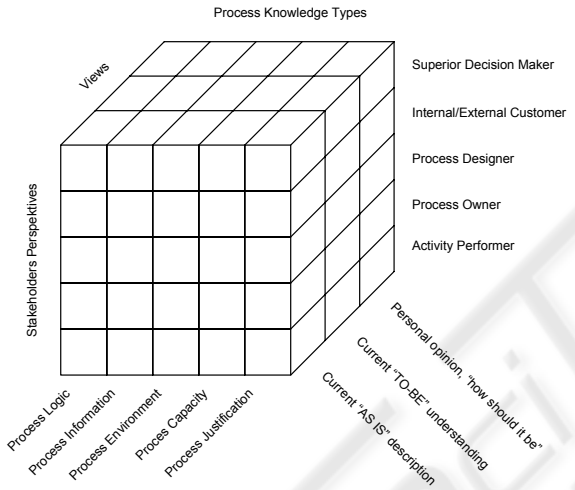

Figure 1: Extended Process Knowledge Framework.

This framework can offer several kinds of support: It helps to consider where certain types of process knowledge are located or can be acquired, which provides better orientation and can also minimize work. It is also a good aid for identifying alternatives and showing connections which are not always obvious. Furthermore, it helps with identifying sources of unexpected process knowledge as well as those in need of more.

For example, in the case documented process knowledge the different perspectives must be correctly interpreted (e.g. a process manual should describe how it should be according to the organization, whereas workflow management systems logs (van der Aalst and Weijters, 2004) permit conclusions on the current situation). With the help of the framework, it is easier to decide how much of which knowledge can be acquired with reasonable effort. Here criteria such as accessibility, reliability and employees' willingness are important.

After the successful collection of relevant knowledge, contrasting process roles with specific process knowledge types helps with generating a more feasible "to-be" model. Similarly, contrasting other dimensions of the framework with each other (e.g. process roles and specific views) can contribute significantly to the comprehensiveness of the identified improvement potential.

Finally, the communication stage is about transferring knowledge about processes to the employees in such a way that it is both understood and accepted. Here the framework helps with deciding what knowledge should be available to a given person. For example, the special knowledge needs of individual roles suggest the content of different process knowledge types to different extents and in different degrees of abstraction. The extent as well as the degree of abstraction of the content to be communicated in order to build up a certain level of knowledge in a person depend upon previous knowledge, in particular upon mental models (as basis for understanding), which in turn are often implied by people's roles.

The overall result is better employee knowledge about better-designed business processes – a key requirement for successful improvement of processes.

4 CONCLUSION AND FUTURE WORK

Knowledge about business processes is one of the most important assets of a modern organization today. The information about how an organization works, achieves its business goals, satisfies its customers' requirements, and how agile the company is in these respects is essential for its various stakeholders on every level, inside and outside of the organization. This knowledge is also an irreplaceable resource for the introduction and application of information systems, particularly for process management and automation tools.

Current process management practices reveal problems regarding process knowledge (e.g. the process owner doesn't know the skills of the activity performer, management is not familiar with the flexibility of organizational processes, Best Practices/Benchmarks are not accessible or are unknown). Organizations have to deal with distributed, undocumented, contradictory,

misunderstood, and often inaccessible process knowledge. The consequences are higher costs, poorer performance and quality, unfulfilled requirements and, in the end, unsatisfied internal and external customers.

Therefore it is important that knowledge about business processes is properly described or modeled, and that it is maintained. Only in that way can it be better acquired, analyzed, communicated, applied and continuously improved.

The business process knowledge framework is a tool that can support the management of process knowledge in various aspects. This paper has presented two of them. One is business process knowledge acquisition and analysis, where the framework helps organizations benefit from heterogeneous process knowledge sources and from different perspectives instead of seeing them as a burden. The other is process knowledge communication, where the framework can be of assistance in communicating knowledge about business processes to stakeholders in a fashion tailored to their different roles within or outside the organization.

Regarding future work, the most suitable way to deploy our framework is through semantic technologies. The four main reasons that make semantic technologies suitable for our framework are (Noy and McGuinness, 2001): (1) to share a common understanding of the structure of information among people or software (this way, the model can be understood by humans and computers); (2) to enable reuse of already specified domain knowledge; (3) to make domain assumptions explicit (concepts defined in the model have a well-defined and unambiguous meaning); (4) analysis of domain knowledge is possible once a declarative specification of the terms is available. Combining the advantages of semantic technologies with the business process knowledge framework will make organizations' efforts to improve their business processes much more effective.

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