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SELECTED ISSUES OF SHARING PROCESS KNOWLEDGE IN MODERN ORGANIZATIONS

Abstract: In times of increasing competition and the need for greater agility, organizations are taking up the “process approach” to running a business. Applying the process approach in organizations implies changes in knowledge management. The article discusses the specifics and role of process knowledge which consists of information resources about process flows, entities engaged in the processes, key performance indicators, etc. Business Process Models have the potential to be important tools for knowledge management because they allow the transformation of informal into formal knowledge and facilitate knowledge sharing. The aim of this paper is to present the concept of process knowledge and review selected issues of process knowledge sharing by extension of modeling languages.

Key words: process knowledge, process orientation, process maturity, knowledge sharing, knowledge formalization

1. Introduction

In times of globalization, the increasing intensity of competition among enterprises and the emphasis on cost and quality, and knowledge management (KM) has been a broadly discussed subject. There has been much debate on concepts such as knowledge-creating organizations [Nonaka, Takeuchi 1995], organizational knowledge, learning and memory [Spender 1996; Senge 2006], knowledge work [Jemielniak 2008], and knowledge-based organizations [Mikuła 2006]. Particularly in large enterprises and corporations, knowledge management is regarded as the most important factor for gaining a competitive advantage [Perechuda (Ed.) 2008, p. 87]. KM is recognized as an organizational innovation that influences the overall business strategy and is implemented in everyday management practices as: generation, representation, storage, transfer, transformation, application, embedding, and protecting organizational knowledge.

Simultaneously many organizations are driving towards greater agility by adopting the so called “process approach” to running a business. This modern concept assumes viewing an organization as a series of interconnected processes. The processes depend on one another in a way that the output data of one process

establishes input to some other processes. In practice it means identifying and managing processes and their reciprocal relations [Romanowska, Trocki 2004, p. 44].

Applying the process approach in organizations implies managing process knowledge, which consists of information resources about processes flows, resources used during processes, key performance indicators, etc. Therefore knowledge management in process-oriented organizations should also be process-oriented to capture and reuse specific process-related knowledge. Process-oriented knowledge management prevents users against information overflow, increases knowledge usability and concentrates on important information of fundamental meaning for value chain [Nowosielski (Ed.) 2009, p. 125].

The aim of this paper is to present the concept of process knowledge, its role in modern organizations and review selected issues of process knowledge formalization by means of workflow models in BPM systems.

2. Process orientation and process maturity in modern organizations

The process-oriented approach gained increased attention in management theory in the 1990s along with business process reengineering. Process orientation was a move away from a functional view of an organization that had been the major paradigm for many decades. The traditional way of organizing enterprises into separated departments such as sales, finance, production, marketing, usually requires extended administration to control the workflow across department boundaries. The lack of coordination between departments in a functional organization usually causes efficiency problems. These problems appear because considerable resources are allocated to administrative tasks that do not generate quality, reliability of service and decrease value for the customer. In functionally oriented enterprises every worker is responsible for his/her discrete tasks not having in mind the overall company goal. Organization charts picture the functional view of the enterprise, but they do not communicate the goals of the organization and the ways of value creation.

Nowadays, when business practice has revealed some obvious pitfalls of the functional approach, managers realize that delivering value to customer requires cooperation, clearly communicated goals and responsibilities for the effects of work. The process approach to organizing business, facilitates companies to focus on the activities that create value for the customer. Business processes cross the boundaries of the functional units (such as departments and divisions).

The proliferation of the Internet, fast broadband connections and Web Services have enabled more intense inter-organizational cooperation exemplified by virtual enterprises and extended supply chains. The focus on processes is customer oriented, for networked companies it is easier to provide novel products and services that no single company can provide by itself. While taking up the process approach,

companies can start to automate and streamline their business processes. In order to fulfill the requirements of process orientation it is necessary to connect the activities and processes of the participants using commonly accepted technology standard (like ebXML) to provide a framework for facilitating cooperation.

Although all the organizations carry out some range of business processes not all of them may be called process-oriented. The organization is process oriented when it is aware of its processes, manages them, identifies and models different workflows. Process orientation is not a sudden turnabout, it takes a long term evolution of management practices, structures and fine tuning of enterprise culture. An intensity of process orientation may be expressed as a level of process maturity in organization. There are a few models for describing process maturity (CMMI, OPM3, P3M3), all of them have some common features, usually they present 4-5

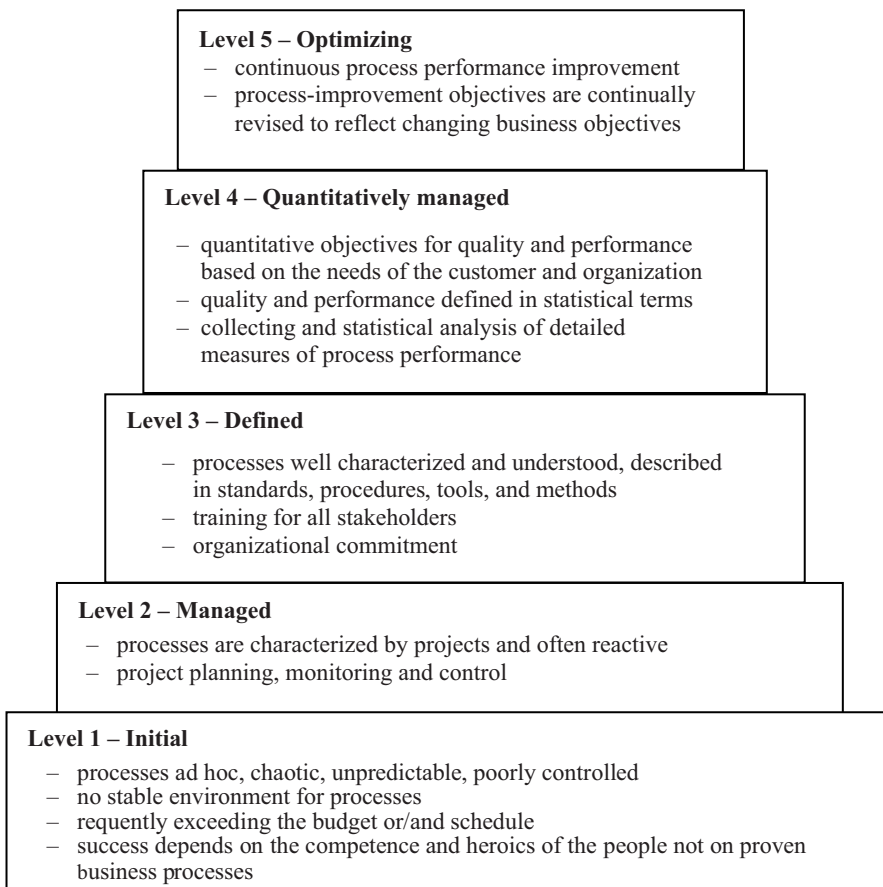


Figure 1. CMMI maturity levels

Source: own study.

maturity levels. Usually organizations go through the levels consecutively to achieve the highest process maturity. Some organizations are created from the beginning as highly process-oriented, this usually takes place when a new company is established on a base of know-how (for example: franchising, or some forms of fractal or network organizations). Process maturity models have been developed by independent organizations, each of them had its own custom approach to process management. Most of the models were introduced and popularized in the late 1990s and early 2000s, when process orientation had become a mainstream in management research, theory and practice. Some of them had been developed by consulting companies and tailored for their clients to steer them into purchasing more services, and other were developed by standards bodies and academics [Bonham 2008, p. 177]. The CMMI seems to be the most clear process maturity model. It comprises five phases (Figure 1).

The phases show the progress of process organization from unpredictable chaos to effectively operating self-improving mechanism. Up from level 2, organizations usually start to use BPM methodology. They face the problem of selecting and implementing Business Process Management Suite (BPMS) supporting the methodology of choice and process knowledge management.

3. The essence of process knowledge

Knowledge is a deliberately arranged collection of reliable and useful information about reality acquired by experience, reasoning and learning. However knowledge and information may be differentiated as follows [Bellinger 2004]: information tells us about what exists and strongly depends on context. Whereas knowledge is represented by patterns. A pattern tends to create its own context rather than being context dependent, it also is an archetype [Senge 2006, pp. 112–113] predictable and repeatable. Understanding patterns means possessing knowledge.

Knowledge can exist as:

- dictionary and encyclopedic knowledge (answers the question: what is it?),
- scalar knowledge (answers the questions: how many, how much?),
- historical knowledge (retrospective – tells us about what was before),
- procedural knowledge containing rules, norms (answers the question: how should it be?),
- prognostic knowledge (prospective – answers the question: what can happen?),
- instrumental knowledge – revealing dependencies (explains what decides about what),
- process knowledge (answers the question: how it happens?).

From all the types of knowledge mentioned above, the process knowledge is the most complex. It can encompass the elements of dictionary, scalar, procedural and instrumental knowledge). Process knowledge is also known as knowledge connected with process or “know-how”. Process knowledge is indispensable to running any kind of business.

Assuming that knowledge is a pattern, we can say process knowledge is a pattern of processes in a comprehensible, repeatable and predictable form. Another way of explaining the notion of process knowledge is to answer the question “where does the knowledge exist in processes?” There are multiple answers to this question [Nickols 2004]:

- inputs and outputs,
- controllers,
- processors,
- design.

As it was stated before, process knowledge can exist in many forms. Also business processes can be imbued with knowledge of a different level and character (more or less formalized, tacit or explicit, leaky or sticky). From a theoretical point of view processes in the organization may be characterized by the level of their intelligence.

Intelligent processes are relevant, personalized, and responsive. To accomplish this, they need to be based on both real-time and historic data, evaluate the present in the context of the past, and then trigger other processes. Intelligent processes are designed on the basis of the SIPOC convention [Grajewski 2007, p. 122].

On the other hand in organizations where business processes are characterized by intense repeatability and the firm competitiveness is dependent on performance and technical reliability, the processes are “less intelligent”. These kinds of processes often function in typically manufacturing companies. Unintelligent (or dumb) processes are dependent of external factors to a minor degree, they are highly repeatable and predictable.

In many branches, especially services, there is a growing demand for flexible and personalized business processes. Having an easy access to externalized and formalized knowledge is a key matter for business management. Process knowledge if documented and processable can bring the following advantages:

- enables to capture the possibilities of improvements in legacy process models,
- facilitates maximum exploitation of organization resources,
- makes it possible to compare and check process validity according to norms and standards,
- enables ongoing control and steering of process flows,
- increases rapidity of enterprise reaction for external impacts,
- makes it possible to estimate the risk in case of breaking the flow of a given business process.

Traditional knowledge management and BPM are two separate domains that function independently, usually they do not support each other or support it to a limited extent. The lack of easily accessible process knowledge is a reason for the poor understanding of processes and limits the ability of quickly reacting to environment changes. The problem is especially explicit in the business environment where the context is dynamic and processes must be adjusted accordingly. The lack

of a systematic approach to acquiring, storing and analysing of process knowledge results in an inadequate understanding of business prerequisites. With the lack of process knowledge all the attempts to improve processes are fallible.

Another important advantage of managing process knowledge is the ability to track some physical objects, documents and messages created while process initiation and functioning. The tools for business process management should have a function for retrospective and prospective tracking of the artifacts created during the process. Process knowledge is therefore essential for developing, maintaining and using of information system in a process oriented enterprise.

4. Formalization of process knowledge

In enterprise-wide processes, knowledge is fragmented, it is distributed across people, equipment, functions and even organizations (if the process is performed by an extended or virtual enterprise). Frequently, there is no single person – or even a group of people – that has a full understanding of the entire process. This fact points to the potential value of a KM effort that enables efficient access and sharing of high-quality, relevant, and timely knowledge up, down, and across organizational lines [Nickols 2004].

In every organization process knowledge can exist in a two-fold form: tacit or explicit. Tacit knowledge is personal it (exists in the human mind), relatively subjective, it is often hard to formalize and communicate. M. Polanyi [1958] provided the classic example of tacit knowledge as the ability to ride a bicycle. Other examples might be the intuitive know-how of an experienced craftsman, surgeon or musician. Tacit knowledge can be of a technical character (know-how) or cognitive (mental model/understanding), in both cases it is acquired by practice.

Explicit knowledge on the other hand is relatively objective, codified, it can be easily transmitted in formal, systematic language like written documents or spoken sentences, it is mainly acquired by learning. Explicit knowledge is articulated or written down. Knowledge can be converted between tacit and explicit form. According to I. Nonaka [Spencer 1997] there are four conversion patterns of knowledge: socialization, externalization, combination, internalization. Nonaka's model (illustrated in Figure1) is known as SECI.

The transfer of tacit knowledge of one person to tacit knowledge of another person is called socialization. The process involves capturing knowledge through direct interaction with customers and suppliers outside the organization and coworkers. The process for making tacit knowledge explicit is externalization. This is the articulation of one's own tacit knowledge – ideas or images in words, metaphors, analogies. Once knowledge is explicit, it can be transferred through a process I. Nonaka calls combination. Explicit knowledge can be conveyed in documents, email, data bases, as well as through meetings and briefings. The key activities of knowledge combination are: collecting relevant internal and external knowledge,

dissemination, and editing/processing to make it more usable. Internalization is the process of understanding and absorbing explicit knowledge into tacit knowledge held by the individual. The internalization process transfers organization and group explicit knowledge to the individual.

One of the most urgent organizational challenges of the Information Age is ensuring that valued process knowledge will be accessible not just today, but in the future. It requires solutions that are also economic, social and technical. Present-day methods of representing business processes are not quite meant to externalize and formalize process knowledge – a lot of undocumented knowledge and context are lost after the process is completed. Teams performing the process are not always able to exploit knowledge that had been worked out before. That knowledge can be embodied in many resources and in many forms: text, hypertext, images, videos. This kind of information is usually stored in repositories belonging to company departments where they were created or used. Such a traditional – structural way of maintaining information and knowledge resources is not convenient for realizing process-orientation paradigm.

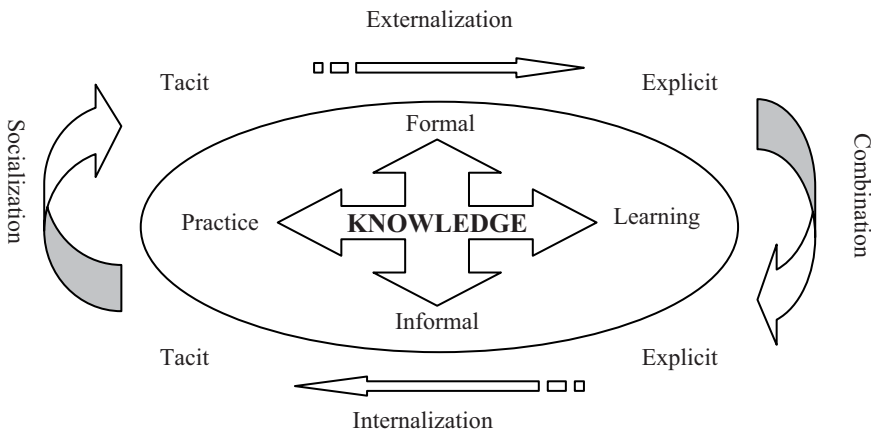


Figure 2. SECI Interactions in organization

Source: [Medeni 2006, p. 519].

In a process-oriented organization it is not the department, but the business process that can be the basis of a central knowledge management repository. Figure 2 presents the general classification of process knowledge resources. The following information and functionalities can be linked to the business processes model [Luyckx 2010]:

- the relevant work instructions, business forms and e-learning modules,
- the linkage to the DMS (Document Management Systems),
- searching for the relevant information by search and retrieval systems,

- sharing of relevant experiences, FAQ and virtual communities,
- linkage of expert systems and knowledge database,
- the persons who have experience with the execution of the process,
- communication groups with push-emails and groupware solutions,
- access permissions to the information connected with the processes,
- the current process performance indicators and the related benchmark information,
- business rules used during the process.

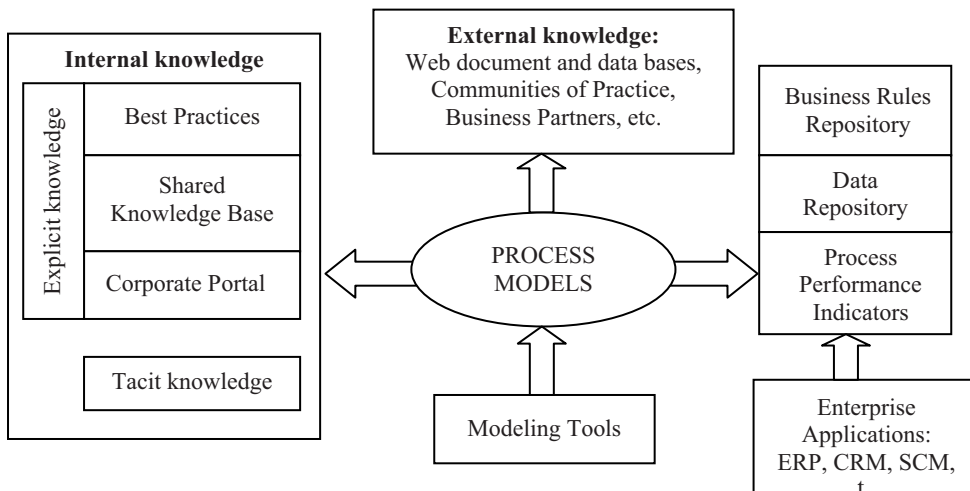


Figure 3. Resources of process knowledge

Source: own study.

The business process model seems to be the most appropriate framework for classifying and linking knowledge resources in a process-oriented organization. The knowledge needed for executing the process is not explicitly described in the workflow model but contemporary BPMS provide their users with many possibilities to extend business process models with the necessary attributes facilitating knowledge management.

In business process modeling languages (such as IDEF0, IDEF3, EPC, GRAPES BM, UML 2.0 activity diagram and BPMN 2.0), data, information and material flows are often represented by the same symbols and without any unambiguous definitions of these concepts. On the other hand, knowledge modeling languages (KMDL, GPO-WM, PROMOTE, and RAD) allow to model knowledge but do not address process logic to the full extent. Currently from the point of view of process knowledge management in organizations, the following features of business process modeling languages are not yet fully supported in any of the aforementioned languages [Businska, Kirikova 2011]:

- separation of knowledge, information and data during business process modeling,
- pointing the location (physical or virtual) of the knowledge resource and its format,
- identification of the owner of data, information and knowledge and access permission,
- definition of requirements that must be fulfilled by a person participating in a particular activity and linkage to the competence model or skill maps of the organization,
- differentiation of tacit and explicit knowledge resource,
- possibility to evaluate the amount of organizational knowledge loss if an employee leaves the organization,
- evaluation of knowledge usefulness, validity and relevance for particular activities in a process.

The analysis of process models in terms of knowledge resources used during the process may be very useful functionality. It would enable the identification of key competencies and the tacit knowledge that should be converted to explicit and formalized. Comparison between process knowledge requirements and organizational skill maps may point out the need for training employees.

5. Conclusions

The concept of process knowledge is a relatively new field and research dimension within the broad discipline of knowledge management. BPM systems have the potential to become an important tool for KM since they describe what happen in all of the most important information systems of the enterprise (such as ERP or CRM). However the effective use of organizational knowledge can only be obtained if the processes are explicitly documented along with knowledge resources used (or potentially useful) on each process phase. In process oriented organizations with high levels of process maturity the BPM models seem to be the most logical and appropriate frameworks for classifying, searching and retrieving knowledge resources. Modern modeling languages (ex: Business Process Modeling Notation 2.0) are developed to face this challenge. BPMN 2.0 gives the possibility to define custom extensions describing selected user-driven aspects of business workflow. The classification of knowledge resources and their attributes depends on organizational information needs. The decision of how they should be reflected in modeling language notations is the issue for further consideration and research.

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WYBRANE ZAGADNIENIA WSPÓLDZIELENIA WIEDZY PROCESOWEJ W NOWOCZESNYCH ORGANIZACJACH

Streszczenie: W dobie zwiększającej się konkurencji oraz potrzeby większej elastyczności organizacje często przyjmują procesowe podejście do działalności biznesowej. Zastosowanie podejścia procesowego stwarza konieczność zmian w dziedzinie zarządzania wiedzą organizacji. Artykuł przedstawia specyfikę i rolę wiedzy procesowej, która składa się ze

zbiorów informacji opisujących przepływy pracy, zasoby wykorzystywane podczas procesu, wskaźniki wydajności itp. Modele procesów biznesowych mogą potencjalnie służyć jako narzędzia zarządzania wiedzą, ponieważ pozwalają na transformację wiedzy nieformalnej na postać formalną i ułatwiają jej współdzielenie. Celem niniejszego artykułu jest prezentacja koncepcji wiedzy procesowej i przegląd wybranych problemów współdzielenia wiedzy procesowej poprzez wykorzystanie modeli procesów biznesowych.

Słowa kluczowe: wiedza procesowa, orientacja na procesy, dojrzałość procesowa, współdzielenie wiedzy, formalizacja wiedzy.