

Knowledge Management in ERP System Implementation

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Abstract

ERP (enterprise resource planning) systems became de facto standard (and a set-up cost) for running a company but there is a sentiment regarding the cost and time spent for ERP system implementation. One of the reasons for this problem is that companies do not implement ERP systems regularly but only once (or a few times), therefore the employees involved in the implementation do not have any (rather old, if any) experience with the implementation process. Knowledge gained during the implementation process is rarely documented. The paper discusses importance of knowledge management with regards to ERP system implementation and provides hints, which should improve the process.

Keywords: ERP (enterprise resource planning) systems, knowledge management

1 Introduction

The enterprise resource planning (ERP) system is an enterprise-wide information system that integrates information from the entire company. According to Pelsak (2006), ERP systems have become the de facto standard for large and medium companies to run all their major functional and process operations. Kumar, and van Hillegersberg (2000) go even further and describe ERP systems as the price of entry for running a business. The ERP system implementation and introduction into the company involves organizational transformation processes, with significant implications on the organization's management model, structure, management style and culture and people (Caldas and Wood, 1999). Data, information and knowledge have to be collected about companies processes, processes have to be adopted and the customizing and parametrization of ERP modules are necessary to fulfill company's needs. Knowledge management can help to support the implementation of ERP systems.

According to Davenport and Prusak (1998), knowledge management (KM) is a fluid mix of framed experience, values, contextual information and expert insights that provides a

framework for evaluating and incorporating new experiences and information. Knowledge sharing and knowledge creation requires time and effort on top of the daily activities of knowledge workers who are the main contributors to the system. It requires a critical mass of active knowledge workers in order to be successful. An active behavior of the users and adoption of knowledge sharing practices are critical success factors for KM solutions (Roda, Angehrn, Nabeth, and Razmerita, 2003). Specific challenges for achieving effective KM solutions can be associated with: how to motivate people to create and submit knowledge assets in the system, how to stimulate collaboration and knowledge sharing between knowledge workers irrespective of their location, how to alleviate information overload, how to simplify business processes and work tasks, etc. (Razmerita, 2007).

Our research question in this paper is how KM can support and improve ERP systems implementation. We approached this issue by conducting literature review. The second chapter describes data and methodology used in the paper. The third chapter contains reviews of the selected articles and their classification. And the fourth chapter concludes the findings of this paper.

2 Data and Methodology

The literature review is based on Web of Science articles. Web of Science, as opposed to e.g. EBSCO, was chosen because journals covered in Web of Science had to be approved are more likely to provide articles of higher quality. Altogether, 19 articles, which contained phrases “knowledge management” and “enterprise resource planning”, were retrieved on 27 January 2009. We did not include “implementation”, since we wanted to avoid loss of articles, which address implementation by a synonym. The distribution of the articles in time is presented in Figure 1. The higher number of articles from 2006 is due to the fact that the second issue of 2006 of the journal *Systems Research and Behavioral Science* was special issue on Knowledge Management in the ERP Era. Six out of nine articles from 2006 were published in this special issue.

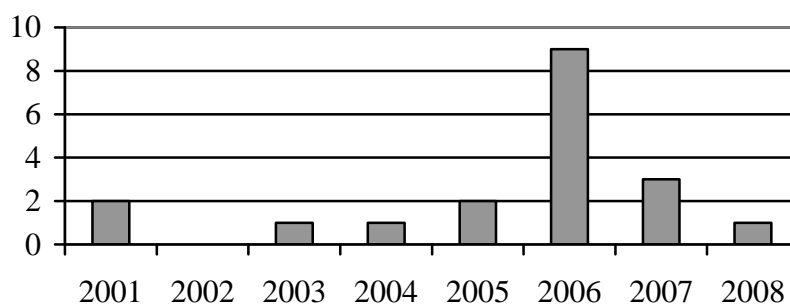


Figure 1: Distribution of articles mentioning ERP and KM in time

Rather surprising is the overall number of articles mentioning ERP systems and KM at the same time. There are 507 articles on ERP systems and 3530 articles on KM altogether in journal covered in Web of Science but only 19 of them mention also the other topic. Surprising is also when the first article mentioning both ERP systems and KM was published. It was in 2001, while the first article on ERP systems was published in 1994 (Morris, and Morris, 1994), and the first article mentioning KM was published in 1974 (Henry, 1974).

Retrieved papers can be, according to knowledge management and ERP systems, classified in five categories. The classification is provided in Table 1. Most articles were published in the

area of the impact of KM in the ERP systems implementation process. It was not possible to classify (Soliman, Clegg, and Tantoush, 2001), since it was only remotely related to KM and the string “knowledge management” appeared only among keywords.

Table 1: Classification of articles on ERP and KM

Article categories	Papers
KM in ERP systems implementation	Vandaie (2008) Palanisamy (2007) Li, Liao, and Lei (2006) Xu, Wang, Luo, and Shi (2006) Topi, Lucas, and Babaian (2006) Pan, Newell, Huang, and Galliers (2007) Huang, Chen, Hung, and Ku (2004) Panagiotidis, and Edwards (2001) Hwang (2005)
KM-based tools for ERP systems	Koh, and Gunasekaran (2006) Chen, and Li (2006) Yang, Huang, and Chaudhry (2006) Gao, Aziz, Maropoulos, and Cheung (2003)
Enabling ERP systems for KM	Lengnick-Hall, and Lengnick-Hall (2006) Zhang, and Liang (2006) Li, Chaudhry, and Zhao (2006)
Literature review	Gunasekaran, and Ngai (2007)
KM systems usage and impact	Falk (2005)

3 Literature Review

During ERP system implementation, a company needs to look at their current processes, to evaluate them and also to reorganize them to achieve better productivity. All processes have to be documented and discussed before a reengineering can start. The ERP implementation team maps the user process into the ERP system. In order to define this process, the explicit and tacit knowledge of the user has to be collected and the current and reorganized process has to be modelled. Knowledge management methodologies can be applied here successfully, as we will show with a literature review.

Palanisamy (2007) discusses KM in relationship to ERP system implementation. According to the paper, KM is rarely used in ERP implementation process today. KM systems could help to create, transfer and apply knowledge, to build new organizational knowledge and to include the users in the implementation process.

Li, Liao, and Lei (2006) also believe that there is need for knowledge management system (KMS) in ERP system implementation. They suggest incorporating knowledge from the vendor, the consulting company and the implementer using five (cooperative working, knowledge transfer, individual KM, organizational KM, and consulting) platforms, in order to enhance organizational overall ability to cope with changes.

Xu, Wang, Luo, and Shi (2006) discuss implementation of ERP system and KMS. They suggest to implement both of them concurrently, to achieve the best performance. If the systems are already implemented separately, they suggest integrating them. They see the main importance of knowledge interface from ERP system to KMS in knowledge discovery, knowledge classifying, and knowledge storing; knowledge interface from KMS to ERP system includes knowledge identifying, and knowledge indexing.

Topi, Lucas, and Babaian (2006) discuss using informal notes, rather than a formal KMS discussed in previous articles, for sharing knowledge about the ERP system.

Pan, Newell, Huang, and Galliers (2007) discuss KM in relationship to ERP system implementation but it focuses on the importance of the bridging and bonding aspects of social capital during different phases of the ERP system implementation project.

Huang, Chen, Hung, and Ku (2004) point out that the failure rate of ERP systems implementations remains high and the concept of best practices has been applied not only to the practical business process flow or successful cases, but also to management perspectives such as implementation experience knowledge, project management knowledge, and risk management knowledge.

Panagiotidis, and Edwards (2001) outline Business Systems Purpose Analysis (BSPA) and present two examples, where BSPA was used in ERP system implementation. With BSPA, they unify the process of organizational learning with that of KM at the organizational level.

Hwang (2005) investigates impact of KM (reclassified as enjoyments), among others, on ERP system implementation. The relevant finding regarding KM is that perceived enjoyment (self-control) has a positive (and significant) effect on perceived usefulness.

The most comprehensive overview is given by Vandaie (2008). Vandaie discusses three lines of knowledge:

1. **Within ERP team members** - ERP team has to examine the 'as is' status, i.e. current business processes, identify the gap between the 'as is' status and the 'to be' status (determined by the best practices included in the ERP package), install the new processes, and train the users to use them. A major part of KM in every implementation project deals with facilitating the sharing of knowledge among members of the ERP team, since they come from different departments, and therefore carry the knowledge specific to their department.
2. **Between ERP team, and end users and user managers** - ERP team needs to become aware of end users' and user managers' expectations and communicate possible changes after the implementation. Sharing of knowledge is directly influenced by the users' capability of handling the changes in roles as a result of the new ERP system.
3. **Between ERP team and consulting firms** - ERP team should learn from hired consulting firms' professional knowledge how to integrate the selected ERP system into the organizational environment. Since the knowledge sharing is not restricted to the manuals and the documented information, it is important for the consulting staff to work side by side with ERP team members so that they can learn what is hard to document as instructions and manuals.

4 Knowledge Sharing in ERP System Implementation

The most crucial phase for the success of ERP implementation is the process where future changes are discussed between ERP team, end users and user managers. ERP systems usually do not cover all company's requirements. Business processes that are not mapped in the system have to be discussed and modelled. Users will trust the ERP system implementation, if they are sure, that the ERP team fully understood their current process, reorganized them together with the user and mapped them correctly into the system. Thus the involvement of the user is important in the implementation step.

In ERP system implementation, business workflows have to be defined together with the customer in a customer understandable manner. With CUTA (Collaborative Users Task Analysis), we can analyse processes in a simple way together with the customer (Lafreniere, 1996). CUTA is a card game (Muller, 2001). Each card is divided in three categories: an

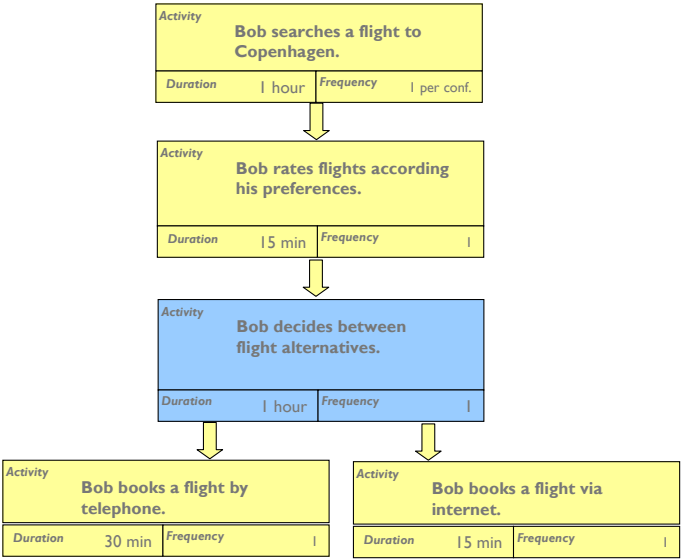


Figure 2: Typical Workflow with CUTA (Kirchner, Erfurth 2008)

activity describing a working step, its duration and frequency, see figure 2 for an example. Together with the user the card sequence will be determined representing a sequence of activities in a user specific workflow. During the card game the user can influence the CUTA sequence by correcting activities or by asking for additional cards with new working steps. With this method, the business process of the customer can be easier described and discussed. The user gives his knowledge about current company processes to the ERP team, it is easier to define an specific undocumented task that is usually based on the expert knowledge of the stakeholder. CUTA can also be used for the reorganization of working processes by changing the card sequence or include new cards. This user-understandable model can later changed to an event-process-chain that is the basis for implementation in the ERP system.

5 Conclusion

ERP system implementation *per se* is not the only goal of companies these days. Besides project success issues, such as staying on time and budget, companies try to achieve as good alignment between their ERP systems and their business as possible. Many of concerns can be addressed by better knowledge sharing during ERP systems implementations. The paper provided literature review of Web of Science articles, which cover the topic. Some of the analyzed suggestions were based more on day-to-day personal knowledge sharing, while other relied more on a formalized KMS. But a combination of both is suggestible in most of the cases. It is possible to expect more research, thus more papers, addressing the problem.

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