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TOOL BASED ON KNOWLEDGE MANAGEMENT PROCESS: AN INTERVIEW PROTOCOL TO GATHER FUNCTIONAL REQUIREMENTS FROM SOFTWARE INDUSTRY EXPERTS

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Abstract

The company's knowledge is composed of different individual pieces of knowledge. In the software industry, the individuals use personal technologies to communicate to each other project issues, which generate a part of the organizational knowledge. However, using those tools in that manner, the software industry faces the knowledge fragmentation problem. It creates difficulty in utilizing Knowledge Management processes (e.g. capture, store, and recover) in their decision-making. Thus, this research proposes an interview protocol to gather functional requirements from software industry experts. The interview protocol is based on a literature review regarding Knowledge Management processes and tools over the past years. The result achieved in this paper is an interview protocol guided by knowledge management process validated by twelve experts.

Keywords

Bibliographic research, Questionnaire, Information technology, Tool, Knowledge management

1. Introduction

Organizational knowledge is a collection of knowledge acquired and created by the past and current enterprise's members (Maruta, 2014). According to Nonaka & Takeuchi (1997), identify the current knowledge enterprise is important to achieve a knowledge desired. Furthermore, according to Wiig (1993), the enterprise's knowledge need be stored within knowledge repositories to transform it into explicit knowledge. Thus, activities related to KM (Knowledge Management) can be seen as a transformation of the knowledge in assets aimed at achieving a continuous and sustainable growth for the software industry (Gaspar *et al.*, 2014). Yet to happen this effectively is necessary to use practical and able to support the development tools (Zaim, Tatoglu, & Zaim, 2007).

KM tools are defined by literature as a kind of tool to support applications performance, activities or actions regarding create, codify, and disseminate organizational knowledge. Using KM tools companies can create new knowledge to support current information updates (Osinski & Trindade, 2015), which facilitates the knowledge processes implementation (Tyndale, 2002).

Different tools based on technology support the KM processes in the software industry, e.g., WiKi, advanced search tools, document repositories and social network services (Young, 2010). However, using different tools can create problems as knowledge fragmentation, where

the knowledge not flows in entire organization keeping itself restricted to a person or group. Furthermore, the knowledge fragmentation problem causes knowledge-loss because people tend do not remind the discussed issue, even using technology tools.

Considering KM processes importance and the knowledge fragmentation problem faced by the software industry, this paper present a proposal of interview protocol. This one was assembled from a bibliographic research and aims to gather functional requirements for a KM tool concept to the software industry. Thus, this paper is structured as follows: a KM process and tools literature review are presented section 2; section 3 presents the methods; section 4 present findings; and conclusions are presented in section 5 followed by the references.

2. KM process and tools

The KM is not a simple task to be conducted by software industry because the "knowledge" is very complex and requires a rigorous and special attention by them (Januzzi, Falsarella & Sugahara, 2016). In addition, the knowledge is only considered useful whether it can be disseminated within the company (Orofino, 2011).

The knowledge should be externalized and socialized among company's employees to allow them to create a "new" one (Moreira, 2005). That is the reason why the companies should adopt information systems to identify, capture, store, and distribute their knowledge (Dorow, Calle, & Rados, 2015). These systems characterize the KM as a cyclical and dynamic process defined by different-interdependent stages of company's knowledge in such a way as to generate value when it moves on from one stage to another (Laverde, Baragaño & Dominguez, 2003).

Turban et al. (2006) highlight that KM is a cyclical process because the knowledge's environment is constantly changing and, consequently, knowledge needs to be updated to reflect these changes. According to Dalkir (2011), these processes compose the KM cycles and they have a relationship with each KM stage representing the path taken by the information and becoming a strategic asset for the organizations.

There are different theoretical approaches related to KM cycles and processes in literature, as showed in Table 1.1. According to Dalkir (2011), the KM cycles (or processes) most influential are Wiig (1993), Meyer & Zack (1997), Bukowitz & Williams (1999) and McElroy (2003).

Analyzing the KM processes showed in Table 1.1, it was noticed that some of those are implicit in a KM tool concept, such as "storage and recovery", "learn", "access", "discard", "refine", "integrate", and "feedback". On the other hand, it was observed that each phase of the process like "build", "build and support", "produce", "distribution" or "distribute", "apply", "presentation", "contribute", can be classified in categories, i.e., the phases "build", "build and support", and "produce" can be classified as "create and capture" process. Following this reasoning, this work suggests the KM processes presented in Table 1.2 as essential processes for a KM tool concept.

Table 1: *KM processes from the literature review*

Authors	KM processes
Wiig (1993)	build, retention, distribution, apply.
Meyer & Zack (1997)	acquire, refine, storage and recovery, distribute, presentation.
Bukowitz & Williams (1999)	acquire, uses, learn, contribute, access, build, and support, discard.
McElroy (2003)	produce, integration, feedback.

Source: Adapted from Dalkir (2011).

The three processes in Table 1.2 show how the knowledge flows within the organizations. According to Servin (2005), this flow not happens isolated and need join people and technologies. Thus, to create an organizational knowledge is necessary to perform all of those three processes. However, when the knowledge moves through from "capture and creation" to "dissemination and sharing" process, it is assessed in order to verify if it can be incorporated as part of the organizational knowledge. In the "acquiring and use" process the knowledge incorporated requires a contextualization to match it in a commonly understood language by all company's employees. Finally, the KM process cycle happens when an understood knowledge is used to create a new one.

Table 2: *Essential processes for a KM tool concept*

KM processes	Description
Capture and creation	Identify and code the organizational knowledge. Regarding identify and codify the organizational knowledge and/or create a new one from known information.
Dissemination and sharing	Regarding the knowledge flow (captured or created) within organization making knowledge available to people.
Acquiring and use	Regarding "to whom" the captured/created knowledge is addressed and where that one can be applied.

Source: The authors.

The KM processes and tools are essential to go on the knowledge cycle inside companies (Rossetti & Morales, 2007). Also, KM processes need to be supported by structures or tools based on technology to assure the efficiency and effectiveness of their functions. The KM tools based on IT allow employees to search and discover information quickly. It improves external communication, promotes the use of the current organizational knowledge and information, and allows solving problems more effectively and efficiently (Gonçalves & Vasconcelos, 2011). In doing so, the organizations have adopted KM tools based on IT in order to improve their outcomes (Gaspar *et al.*, 2014). Those tools have an important extraction role to transform tacit knowledge from people to explicit knowledge available for the whole company.

3. Method

This work was a bibliographic research with a literature review of KM processes and tools over the past years. The interview protocol was assembled based on Bukowitz & Williams (1999), APQC (2002), Fonseca (2008), Nair & Prakash (2009). Furthermore, it was followed seven steps suggested by Pinto et al. (2016) and the KM essential processes shown in Table 1.2. It was designed to be answered in approximately 45 minutes. The researcher must lead the interviews recording it whenever possible. Requirements gathered are analyzed by researcher and becoming functional requirements to be implemented. Figure 1 presents the research method process.

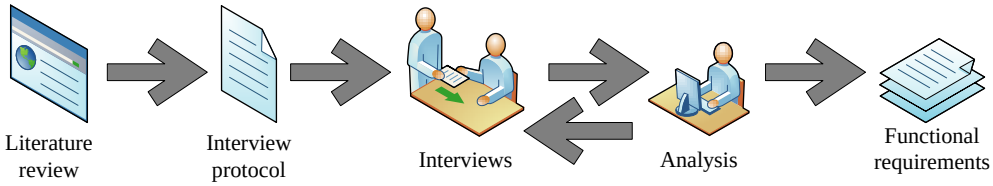

Figure 1: *Research method process.*
Source: The authors.

4. Findings

The interview protocol contains eight open questions and two multi-choice questions. The question #1 was designed aiming to identify if the company already use some kind of KM tool. The questions #2 to #5 were designed aiming to investigate how the company capture, create, store and disseminate its knowledge currently. The question #6 was designed aiming to investigate if the company uses some previous project database (e.g., lessons learned) to decision-making support in new projects and, if yes, which project databases they use. The question #7 was designed in order to investigate "if / how" the knowledge tracking occurs within the company. The question #8 was designed in order to investigate "if / how" the company measures organizational knowledge currently. Finally, the questions #9 and #10 was based on Likert scale (Likert, 1932). The question #9 was designed to investigate the interviewees understanding the degree to adoption the KM tools to support project decision-making. Finally, the question #10 was designed to investigate the company's KM importance degree to taking decisions in a project.

Table 3: *Interview protocol designed to gather functional requirements for KM tool concept*

Goal: This form aims to identify functional requirements of the Knowledge Management processes within IT companies for a KM tool concept. **Target audience:** IT professionals / entrepreneur / businessman; KM professionals / researcher	
Questions	**Description**
#1. How is the knowledge managed within the company?	Investigate if company use some KM tool currently.
#2. How is the knowledge (or can be) captured/created within the company?	Investigate how the company capture, storage and create its knowledge currently (based on Table 1.2).
#3. How is the knowledge (or can be) stored within the company?	

#4. How is the knowledge (or can be) shared/disseminated within the company?	Investigate how the company disseminate and shared its knowledge currently (based on Table 1.2).
#5. How is the knowledge (or can be) accessible/used for the whole company?	Investigate how the company acquire, access and use its knowledge currently (based on Table 1.2).
#6. When a new project begins is searching some information in previous project knowledge databases? If yes, what kind information is searched? If not, what kind of information could be searched?	Investigate if the company uses some previous project information.
#7 Are there any strategies to track the knowledge within your company, i.e., what person or team has knowledge about a specific subject? Does is possible to know what knowledge degree this person has? If yes, how that is done? If not, how that could be done?	Investigate if and how the company tracks its knowledge.
#8 Is there any strategy to measure the knowledge person/team within your company? If yes, how that is done? If no, what strategies could do that?	Investigate if and how the company measures its organizational knowledge.
#9 Do you believe that a software-based tool focused on the company's knowledge management helps you in the decision-making process into company projects?	Investigate the interviewees' understanding degree to adoption the KM tools in their decision-making process. Answers: 1. Never; 2. Almost never; 3. Rarely; 4. Sometimes; 5. Almost always; 6. Usually; 7. Always.
#10 Do you believe that KM helps your company in project's decision-making?	Investigate the company's KM importance degree to taking decisions in a project. Answers: 1. Never; 2. Almost never; 3. Rarely; 4. Sometimes; 5. Almost always; 6. Usually; 7. Always.

Source: The authors.

The interview protocol was validated by ten software development leaders and two KM experts. They answered questions about (i) interview time; (ii) questions content; and (iii) appropriated questionnaire for the software industry. All of them have agreed regarding questions (i) and (iii). However, two of them suggested an adjustment in (iii), it adjusts the questions #7 and #8 presented in Table 1.3.

5. Conclusion

This paper proposed an interview protocol in order to gather requirements for software industry KM tool concept. A KM tool concept can help software industry to use knowledge management benefits achieving competitiveness and innovation. The interview protocol was based on a literature review regarding knowledge management processes and validated by twelve experts from the software industry.

Additionally, this study is meaningful to understand how the organization deals with their knowledge. The next step is performing the interview protocol within a software industry enterprise and the outcomes will be analyzed and discussed in the future work.

For the present, the functional requirements for a KM tool are still not crisp for the software industry. Also, there is not functional requirements defined nor an interview protocol suggested by the literature. This work intends to break new ground aiding software industry gather requirements to develop their own KM tools. Finally, KM is in its initial stages in software industry if compared with other organizational processes.

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