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ABSTRACT

A firm's capacity to efficiently create value from knowledge held by employees and embedded in processes is a key strategic resource. Knowledge Management (KM) seeks to systematically improve that capacity. The first critical step for implementing KM in organizations is the Knowledge Audit. Current audit practices use interviews and questionnaires to understand the KM processes that the organization holds and improved KM processes it wishes to implement, and to explore the organizational culture. In this paper we introduce the concept of capturing *tacit cultural perceptions* to identify *cultural barriers* that may interfere with a KM initiative. For this purpose, an analysis instrument was developed and used during the KM audit in a large international software development organization.

Keywords

Knowledge Management, Culture, Audit, Tacit Perceptions.

INTRODUCTION

The Knowledge Audit is considered as the first critical step for implementing knowledge management (KM) in organizations. This process includes the business needs assessment, cultural assessment, and an examination of what knowledge is needed, available, missing, applied, and contained (Liebowitz, Rubenstein-Montano, McCaw, Buchwalter and Browning, 2000).

> "Pioneering practitioners are coming to realize that embarking into knowledge management is far more complicated than they originally believed. It is not simply a matter of picking the right technology. Even approaching the problem with a proven system design effort can be ineffective. What is needed is a roadmap that reduces the inherent ambiguity and risk of knowledge management implementation." (Koulopoulos & Frappaolo, 2000, p. 418).

Most of the audit practices focus on knowledge in terms such as potential stores of knowledge, what kind of knowledge people possess, structural overview of the knowledge, knowledge creation, what are the sources for knowledge that contribute to innovation, knowledge flows and taxonomy, knowledge accuracy and quality and knowledge infrastructure (Liebowitz et al., 2000). Liebowitz et al. (2000) address the need to capture tacit knowledge, but only as a metadata of the knowledge itself (data about an explicit knowledge asset). Their audit instrument includes two questionnaires: One questionnaire aims at identifying what knowledge currently exists in a targeted area, and the other aims at identifying what knowledge is missing in a targeted area.

A culture audit is part of the overall organizational audit. The common practice is to use interviews and surveys to examine the organizational culture. In this paper, we introduce the concept of capturing tacit cultural perception in order to identify cultural barriers that may be encountered by a new KM initiative. The methodology we use in this study is based on the qualitative grounded theory approach (Strauss & Corbin, 1994). Using its inductive analysis tool, we map the KM statements

that participants expressed in open discussions and interviews to the KM life cycle activities. The analysis can serve as a tool for mirroring the organizational current KM culture status while highlighting the main challenges to implementing an effective KM strategy.

The research objective was to identify tacit cultural perceptions and barriers regarding a KM initiative in a large software development organization. In order to fulfill this objective, our research questions are: (1) What are the KM activities currently taking place in the organization? (2) What are the perceptions people have regarding these activities? (3) What are the cultural barriers that stem from these perceptions?

The paper is organized as follows: the next section presents the relevant existing literature and how it will be of use in this research; then we describe the empirical study we conducted and its findings; finally, we discuss the findings and conclude.

THEORETICAL BACKGROUND

Existing frameworks for KM

There are many frameworks for describing KM; these vary in scope and goals. For example, Holsapple & Singh (2003) describe potential sources of competitive advantage in a firm. They developed the knowledge chain model that identifies five primary knowledge manipulation activities and four secondary activities. The primary activities include: knowledge acquisition, knowledge selection, knowledge generation, knowledge internalization and knowledge externalization; the secondary activities include: knowledge leadership, knowledge coordination, knowledge control, and knowledge management.

Hooff, Vijvers and De Ridder (2003) identify processes that knowledge management should focus upon: determining what knowledge is needed, and how that knowledge is developed, accessed, shared, applied, and evaluated.

O'Dell and Grayson (2003) illustrate a comprehensive framework that includes the knowledge life cycle and the cultural and structural environment necessary for dynamic and successful KM processes. As part of this framework, they identify the following processes: Using, Creating, Identifying, Collecting, Organizing, Sharing and Adapting knowledge. According to Biloslavo and Trnavcˇevic (2007) KM is composed of the processes: knowledge generation, storage, transfer and usage. Burnett, Illingworth, and Webster (2004) present the following KM processes: acquisition and learning, storage and maintenance, application and exploitation, dissemination and transfer, knowledge creation and performance measurement.

In our research we use the main KM processes and related categories that were elicited in our open discussions and interviews, and omit the KM processes that were not mentioned (e.g. KM measurements and evaluation).

KM audit review of current practices

KM Audits provide insight into current KM practices, by means of a 'snapshot'; this includes crucial processes and preconditions, as well as strategies and tactics for further KM development (Hooff et al., 2003). During the audit, participants respond to statements using a 5-point Likert scale that ranges from 'strongly disagree' to 'strongly agree'. The audit results are statistically calculated and presented according to the following categories: knowledge needed, knowledge development, knowledge access, knowledge sharing (within and between departments), knowledge application and knowledge evaluation. The audit also includes cultural aspects, e.g., openness, respect, autonomy, communication climate, clarity, commitment, simulation, feedback, and time pressure. Finally, the audit examines the usage and satisfaction with using the KM infrastructure.

Biloslavo and Trnavcˇevic (2007) applied an audit instrument to a higher education (HE) institution. The audit instrument was a questionnaire containing two parts: questions designed to collect some general data about the individual characteristics of the respondent, and questions concerning the nature and characteristics of KM processes, i.e., the generation, storage, transfer and use of knowledge, as perceived by the employees.

Burnett et al. (2004) describe a KM audit that took place in a multinational oil exploration and production company. Their audit was conducted according to the researches' KM conceptual model, which was based on theoretical models of knowledge processes. They used questionnaires and interviews to provide a critical first step in introducing knowledge management into the department, and establishing a plan of action. In addition, they used a knowledge map that provides a visual representation of the previous steps, which represent knowledge flows, bottlenecks and sources within the organization. This map represents quantitative and qualitative analyses of the data. Burnett et al. (2004) comment that using different methodologies gave evidence to inconsistencies found in employees' responses.

In this paper we will suggest to add another instrument to the audit process that is based on a qualitative grounded theory approach (Strauss & Corbin, 1994) for examining phenomena and iteratively developing a KM cultural perception model throughout the research (as opposed to developing it in advance).

Cultural constraints in implementing KM

An organization's culture must be understood before a KM solution can be successfully implemented. To be successful, the KM solution must support and be supported by the cultural norms, expectations and practices of the organization

Gold, Malhotra and Segars (2001) identify four knowledge processes: acquisition, conversion, application, and protection, and three KM infrastructure capabilities: technology, structure, and culture. Their research finds that both infrastructure and processes positively influence organizational effectiveness. A knowledge-friendly organizational culture has been identified as one of the most important conditions leading to the success of KM initiatives in organizations (Davenport & Prusak 1998). Alavi and Leidner (2001) claim that there are cultural barriers to KM that prevent employees from making knowledge available, sharing it with others, teaching and mentoring others, using their expertise to innovate, and finding ways of working smarter. In many organizations, members feel that their promotion depends upon the expertise they generate and not on the extent to which they help others. Another barrier is that people may not realize what aspects of their knowledge are relevant for others. Without a systematic routine for knowledge capturing, an organization might not benefit from its accumulative tacit knowledge. In many organizations, a major cultural shift is required to change employees' attitudes and behavior so that they willingly and consistently share their knowledge and insights.

Hooff et al. (2003) argue that openness, respect and open communication are preconditions for a culture in which mutual trust is created and new ideas and experiments are encouraged. In our study, we analyze the current culture and identify cultural practices that should be encouraged to support further KM improvements.

Uncovering tacit perceptions

Fahey (1998) claims that organizations often fail when conducting business processes reengineering (BPR) to overcome operating inefficiencies, organizational redundancies and work disconnections. One reason for this failure is the absence of attention to organizational knowledge and, especially, tacit knowledge that may even impede process changes. Tacit knowledge is knowledge that individuals often find difficult to articulate but which significantly shapes how they see the world, their choice of behaviors, and indeed, in many instances, their ability to act or behave. It consists of perceptions, beliefs, assumptions and projections. Although tacit knowledge is personal and based on personal experience, it is possible to talk about shared tacit knowledge among a group of people who have similar backgrounds, experiences and contexts.

KM initiatives, similar to BPR, deal with a major organizational intervention, however, the organization's members may not fully understand the goals and structure of the initiative. Fahey (1998) demonstrates the importance of tacit knowledge in the early stages of BPR:

> "BPR was generally viewed as causing unnecessary upheaval in the organization (a tacit belief) and consuming the total organization's attention for a considerable period of time (a tacit perception).[…] These elements of tacit knowledge collectively shape how they feel about BPR, how they initially react to the introduction of a BPR initiative, and whether and how quickly they eventually support or refute it." (ibid, p. 112).

Fahey (1998) argues that the knowledge challenge at this stage is twofold: to build a shared understanding of the desired initiative and to involve as many people as possible in doing so. Because the initiative strikes at such sensitive nerves, tacit knowledge quickly become evident as organizational groups assess the state of current working processes.

> "If tacit knowledge of individuals or groups is not aligned with the proposed process change, then its execution is likely to run into multiple problems. The experience of many organizations vividly illustrates that these problems are often sufficiently severe to jeopardize process change." (ibid, p. 115)

Therefore, a critical phase when implementing KM program in an organization is accumulating the underlying individuals' words and actions that are evidence for each tacit knowledge element: perceptions, beliefs, assumptions, values. This phase should enhance the creation of "common understanding" of all the initiative's stakeholders regarding the program merits and potential, and should be continued through all the implementation stages.

In our study we use grounded theory (Strauss & Corbin, 1994) to interpret our interviews and open discussions, and to derive the tacit culture perceptions.

THE EMPIRICAL STUDY

Methodology and Settings

The main objective of this study is to capture tacit cultural perceptions of employees in order to identify barriers that might affect the adoption of KM solutions. When aiming to learn a phenomenon and identify its characteristics, rather than corroborating predetermined hypothesis, it is appropriate to use qualitative research methods and tools. In light of the research objective, the methodology used in this study is based on the qualitative grounded theory approach (Strauss & Corbin, 1994). The data collected is based on open discussions and structured interviews, which were transcribed and inductively analyzed. These sessions were conducted with selected employees in the organization for understanding both business and KM processes and how they are practically carried out in the field. Specifically, our aim was to identify the underlying perceptions of the people who are actively involved in these processes, thus anchoring the theory in the field.

The empirical study took place at two customer-facing divisions of an international software development organization. The data collection was conducted in two phases. The first was a series of open discussions with 9 people in different roles and superiority.

The goal was to learn about the current KM processes that take place in the organization, and the requirements and expectations for a new KM solution. Based on these focus groups discussions, a semi-structured interview was developed and conducted with 12 additional interviewees in different locations and by different members of the research team. The interview in the second phase was semi-structured for two reasons. While the aim of the initial data collection was to gain a wide perspective about users' requirements for KM processes in the organization, the second phase was focused on understanding the current KM processes. Additionally, from the methodological point of view, we wanted to make sure that the interviews would be comparable even though they were conducted by different interviewers.

The semi-structured interview included 16 questions focusing on the KM activities, how they are executed, their importance within the business processes, and how they may be improved. The interviewees were 12 employees with diverse seniorities from three different globally spread regions. Interviewers were permitted to ask additional questions in order to probe responses.

The data analysis was inductive and aimed at identifying categories of the interviewees' statements. First, we marked each statement and characterized it according to different aspects. After analyzing several interviews transcripts in this manner, the categories that emerged from the data analysis were defined and characterized. Then all interviews were analyzed, classifying each statement according to the identified categories. When needed, categories were added, joined or refined iteratively until achieving categories saturation. This was conducted in parallel by two researchers for validation purposes. Once the two researchers finished the analysis, the categories were discussed, some refinements were made and the data analysis was finalized accordingly. All together, 402 statements were isolated, analyzed and categorized.

FINDINGS

Our data analysis was based on these main activities in the KM lifecycle: create, share, access, use and maintain. During the data analysis, these categories were crystallized, and an additional category – infrastructure – was added. According to the data analysis we defined the categories unambiguously so we could classify each activity to one of these categories. In Table 1 we present these definitions and illustrate them using examples of interviewees' statements.

Category	Definition	Example
Create	The activity in which extracted knowledge is documented.	"I also have many notepads where I write and save my remarks." (Int. ih-1) "I built a [specific tool1] that provides a set of artifacts[…]" (Int. sg-1)
Share	The activity in which documented knowledge is published to other people (including adaptation of the document for publication).	"The […] notes are shared via email with other group member." (Int. sg-1) "We share information via email, wiki and chats." (Int. ih-1)

[1] We omit specific proprietary information.

Access	The activities of searching and finding specific required knowledge in available sources.	"I use the search on the [company repository]. For technical term I do a general web search, Google, use the MS site and wikipedia. I also search the intranet" (Int. tp-1) "I always succeed to find it in the required timeframe." (Int. ih-2)
Use	The activity of applying the knowledge found in a specific context.	"If I find a pdf file, I forward it to [another department]; if this is a response to a request, I cut and paste into email." (Int sg-2) I use this information in order to prepare documents and answer questions asked by others." (Int. ih-2)
Maintain	The activities of validating, refining and updating existing knowledge documentation.	"I think it would have been more effective if people could send suggestions for updating documents (but still that a single owner will be in charge of actually edit them)." (Int. ih-3) "I would never annotate a document that doesn't belong to me. I use (digital) "sticky notes", emails or write my notes in a notepad, which I save on my desktop." (Int. ih-1)
Infrastructure	Tools supporting KM activities.	"The Biggest complaint is that we have many sources of information […], no single point of contact." (Int sg-3) "[The firm] is built of many applications. It is important to connect them all and unite information resources." (Int. ih-2)

Table 1: Main KM categories emerged from the data analysis

Figure 2 presents the distribution of the statements made by the interviewees throughout the different categories. The most prominent evidence here is the high frequency of statements that deal with the access to knowledge.

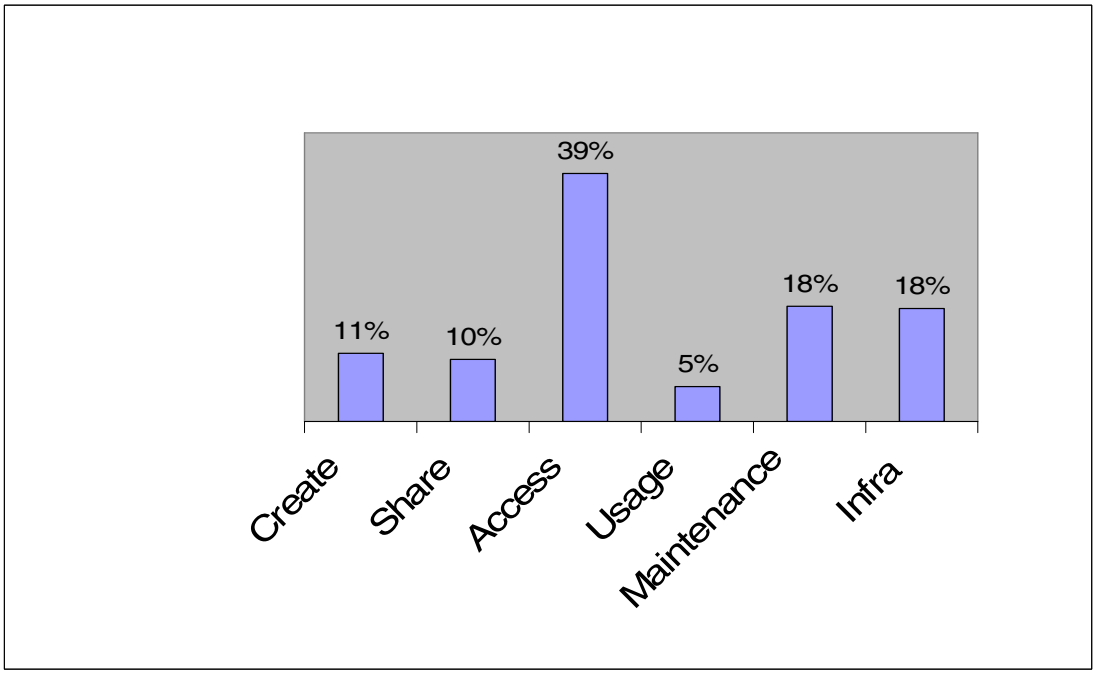

Figure 2: The distribution of statements among the KM categories

In addition to the above analysis, each of these categories was refined to active and passive forms. While the literature usually refers to the different activities from the execution point of view, the interviewees frequently referred to the activities either from the knowledge point of view or by referring to the action of a (nonspecific) third person i.e., the activities that need to be done, but not necessarily by the speaker. This was very apparent in the infrastructure category, where 92% of the statements were passive. Figure 3 presents the division between passive and active forms of each category. Note that the activities of Access and Usage have the highest active form rate.

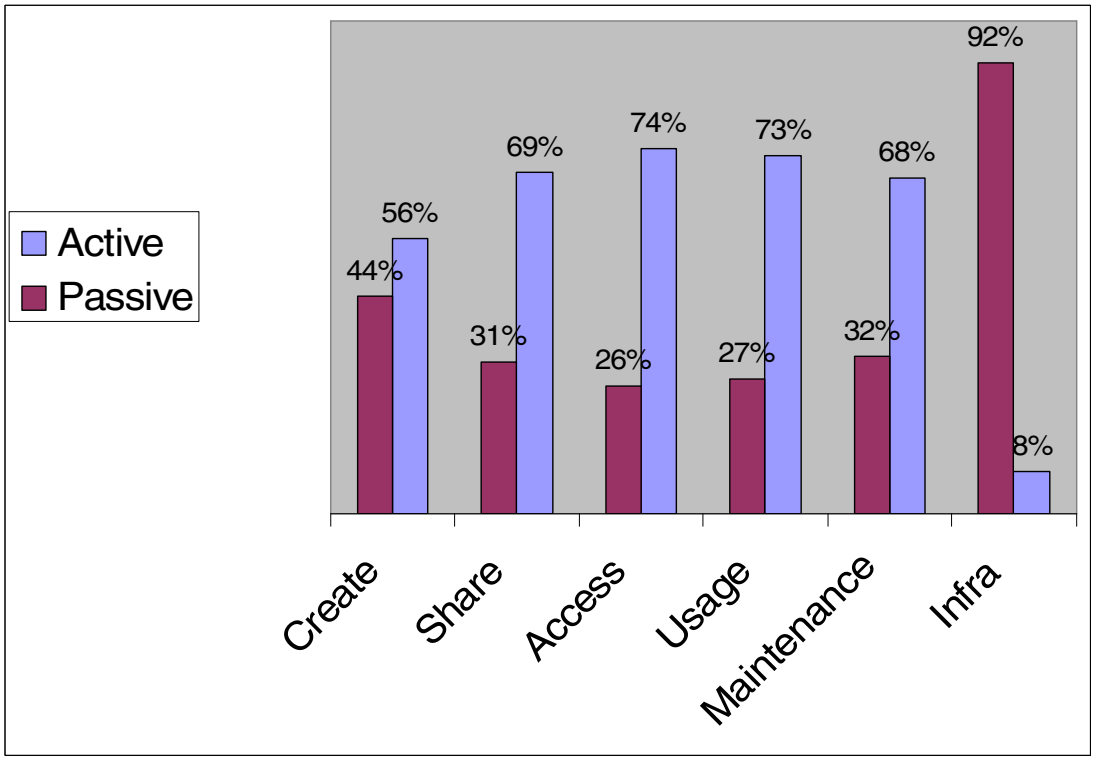

Figure 3: Main KM categories division to active and passive forms

At times the participants referred specifically to KM activities that regarded material for their own use, rather than public use. In most activities this phenomenon was marginal if at all, except for maintenance activities, where 36% of the active statements explicitly referred to knowledge items for personal (rather than public) use.

In addition to the above findings, our analysis revealed general concerns about KM processes. One that was often mentioned in the interviews, and confirmed in our conversations with management, was the additional work employees need to invest to document knowledge in a manner that will enable its subsequent sharing. For example, one interviewee explained that documents needed to be adapted for sharing: "I don't give them [my colleagues] access to my Word files – they include many personal notes I wrote for myself so that I can understand. In order to be able to share such a document, much editing and organization effort needs to be put into these files." Later in the interview, a need to allocate time was specifically expressed for this task: "It is important that we will have the time as an inherent part of our job, to dedicate for handling the information we found and created, to be sharable."

Another interesting phenomenon that emerged from the data was the participants' heavy reliance on social networking, in spite of the KM tools available in the organization. For example: "Most knowledge people have is in their minds and not written down. We are spending time waiting for response from people."

The interviewees pointed out additional aspects: "Many of the questions I get from my peers were already acted upon in the past. They simply make me search for the same information again instead of looking for it themselves, in the answers they already received."; "I think many of the questions they ask us, they could have looked for and found themselves if they had certain access to the system, especially in the context of […]. If they had some kind of system with this information, this would save both us and them much time."

In the following section, we discuss the results obtained and presented here through the lens of culture auditing in order to identify the perceptions and cultural barriers influencing KM processes implementation.

DISCUSSION

In this research, we analyzed and categorized the prominent activities taking place in the routine work at the organization, in accordance with the literature survey and the text analysis of the open discussion and interviews.

The KM activities that are currently taking place in the organization (research question #1) include: create, share, access, usage, and maintenance. An additional category, orthogonal to the activities, is the KM infrastructure. The participants related to the infrastructure as an enabler for execution of KM's different activities.

Based on the KM interviews we identified perceptions people have regarding KM activities (research question #2). We found that the effort distribution and emphasis put into the different activities is not equally balanced. The access activity is the most stressed one. The knowledge construction activities for public domains are mostly discussed in passive or third person form. This reflects that knowledge construction related activities (create, share and maintain) are not highlighted within the responsibility of their daily work. Specifically, the interviewees relate to the existing infrastructure and its contribution to their work mostly in the context of knowledge consumption rather than construction. They treat the infrastructure as a passive form of knowledge and not as a dynamic embedded tool in their working processes.

In general, it seems that the interviewees view knowledge consumption as an inherent part of their work, while knowledge construction is often considered as overhead or an activity that needs to be separately dealt with. We find this cultural phenomenon a critical barrier (research question #3). Such barrier will be addressed in our KM implementation. The culture of preferring consumption to construction is a natural one (Cress & Martin, 2006). It is obvious that while the benefit of consumption is inherently evident (in KM the benefit would be the required knowledge), in order to construct and provide to others, the provider needs to be motivated. Thus, the knowledge market will be developed where there are both sellers as well as buyers. In Davenport and Prusak (1998) words:

> "There is a genuine market for knowledge in organizations. Like markets for goods and services, the knowledge market has buyers and sellers who negotiate to reach a mutually satisfactory price for the goods exchanged. It has brokers who bring buyers and sellers together and even entrepreneurs who use their market knowledge to create internal power bases. Knowledge market transactions occur because all of the participants in them believe that they will benefit from them in some particular way. In economists' jargon, they expect the transaction to provide "utility."" (p. 25)

A culture shift is needed to ensure that everyone takes responsibility for the overall lifecycle, by creating a knowledge sharing and collaboration atmosphere and embedding all KM related activities in the routine working processes. Specifically, the price of sharing knowledge in public domains (including incentives) should be acknowledged and enhanced with adapted tools that best fit the users' preferences (Davenport & Prusak 1998, Hooff et al., 2003, Sackmann & Friesl, 2007).

While cultural aspects are well recognized in the literature, we wish to emphasize the importance of eliciting cultural barriers during a KM audit, by capturing tacit knowledge (Fahey, 1998). On this basis, an organization can choose the solutions that overcome these barriers.

CONCLUSION

KM audit and in particular identifying organizational KM cultural aspects that affect KM practices (Alavi & Leidner, 2001, Davenport & Prusak, 1998) is considered to be a crucial step towards implementing a KM initiative in an organization (Hooff et al., 2003). The current KM audit techniques for analyzing culture perceptions are based on participants' responses in interviews and surveys that are designed according to theoretical KM models (Biloslavo & Trnavcˇevic, 2007, Burnett et al., 2004). In this paper we presented an empirical study conducted in order to identify KM related tacit perceptions and cultural barriers that may challenge KM initiatives in an organization, similarly to other BPR efforts (Fahey, 1998). Analyzing transcribed discussions and interviews we classified statements referring to different KM activities: create, share, access, use and maintain, and an additional category of KM infrastructure, and identified sub-categories indicating tacit perceptions.

Further analysis of participants' statements in the context of the different categories, both qualitatively and quantitatively, revealed several tacit perceptions leading to the identification of existing cultural barriers that influence KM initiatives. The most prominent one was the imbalanced attitude towards the different activities in the KM life cycle.

It is important to note that the findings of this study are based on a large, multi-located and highly distributed, yet single, organization. Thus generalization of these results should be done cautiously; and additional research needs to be conducted in

order to further validate them. Nevertheless, the principle of identifying tacit perception and cultural barriers illustrated in our study may be helpful in any organization. Identifying the issues that need to be addressed before implementing a KM solution is critical for a successful implementation

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