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Knowledge Management: an Analysis From the Organizational Development

Rodrigo Valio Dominguez Gonzalez¹, Manoel Fernando Martins²

Abstract

This research develops a theoretical framework on the implications of the organizational characteristics on the knowledge management (KM). The organizational characteristics are handled in this work as constructs, as they are complex concepts. This paper is based on a theoretical research, considering original and classic articles on KM. From a broad theoretical-conceptual research, the paper presents as a result five organizational constructs that support the KM process: human resources, team work, organizational culture, organizational structure and development and absorption of knowledge. The article presents the implications of these constructs in relation to the four phases of the KM process (acquisition, storage, distribution and use of knowledge).

Keywords: Knowledge Management; Human Resources; Teamwork; Organizational Culture; Organizational Structure.

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1. Introduction

As knowledge is recognized as the primary organizational resource of the 21st century, which is able to bring sustainable competitive advantage in the long term, several studies have focused on knowledge management (KM). Authors such as Davenport et al. (1998) showed, at the end of the 20th century, that several organizations around the world introduced initiatives for the KM based, typically, on information technology (IT), which promotes a broad dissemination and access to knowledge by individuals in the organization. However, the focus of several studies dealing with KM has moved to the study of organizational aspects, emphasizing the role of employee development (Gonzalez and Martins, 2014; Quigley et al., 2007; Cross and Sproull, 2004), an organizational culture that fosters knowledge sharing (Davenport and Prusak, 1998; Terziowski, 2003) and an organizational structure that allows the integration of employees and departments of an organization (Andrews and Kacmar, 2001; Pandey and Duta, 2013; Wilkinson and Young, 2006).

Such guidance is due to the fact that IT has become effective in the process of storage and sharing of data and information. Knowledge, however, should not be confused with information, as knowledge is more complex than information (Davenport; Prusak, 1998). Knowledge depends on the human action and results from the interaction of insights, judgment and intuition about information, being influenced by the personality, imagination and experience of its holder (Lee and Yang, 2000).

Considering that knowledge is in the tacit and explicit form (Nelson and Winter, 1982), the KM process becomes more complex than the use of IT. The explicit or codified portion of the knowledge can be stored in repositories and use IT as a tool to support storage and dissemination. Tacit knowledge, in turn, depends on an organizational architecture, including organizational structure and culture, which stimulates the interaction and cooperation between individuals (Lytras and Pouloudi, 2006). In this context, this article aims to analyze the organizational characteristics that enable organizations to effectively manage their knowledge, resulting in a sustainable competitive advantage.

Several authors such as Grant (1996) and Davenport and Prusak (1998) emphasize the role of knowledge as an organizational asset capable of generating competitive advantage. Other authors such as Walsh and Ungson (1991), Rowley (2001), Zheng et al. (2010) and Liao et al. (2011) propose models for KM based on phases: creation, storage, distribution and utilization of knowledge. However, there is a gap in the theory on KM about the factors or constructs that support the KM process in organizations. In this sense, this research aims to develop a theoretical framework that

answers the following question: Which internal contextual aspects should be developed to organization promotes the KM process? Since these constructs are mapped, another question that arises is: How each of these constructs relate to the stages of the KM process (acquisition, storage, distribution and knowledge utilization)?

In order to answer these two questions, this article is structured, in addition to this introduction, four other sections. The next section deals with the KM process, defining and bringing to light the issues that drive the organizational constructs that support KM. The third section explores five organizational constructs conceptually related to the KM process, human resource development, teamwork, organizational culture, organizational structure and knowledge development and absorption in order to answer the first research question. Next, the article assesses the implications of the five mapped constructs to four phases of the KM process, answering the second research question. Finally, the last section presents concluding remarks on the mapped constructs.

2. Knowledge management as a process

It is a known fact that KM is one of the principal means of achieving competitive advantage (Grant, 1996). All organizations need to process knowledge in order to promote their strategy, and KM is the process responsible for such processing. From a review of the literature, we can notice that there are different approaches to KM process (Table 1).

These different visions denote the diversity of subjects surrounding the KM. Two main characteristics can be observed from these approaches. The first addresses the KM as a subject restricted to the IT scope. One of the main problems about the contribution of the IT on the KM is the difficult and/or impossibility to register the tacit knowledge of individuals, because it is impossible to absorb or scan the contents of the human mind and store it in a database (Bhatt, 2002). Other approaches, in turn, are based on organizational development, with regard to the organizational structure and culture to facilitate and enhance the interaction between individuals, fostering knowledge sharing (Rowley, 2001).

KM should combine IT with the organizational development, including the organizational culture and structure, being an activity that develops, stores and transfers knowledge, aiming to provide the necessary information so that the organization members take the right decisions (Gonzalez and Martins, 2014; Alavi and Leidner, 2001).

Thus, this article has the main interest the analyses of the development of organizational characteristics, called 'soft',

Author	Approaches
Poynder (1998)	<ul style="list-style-type: none"> - KM is a restricted topic to IT, and networks of computers and GroupWare are the central subjects; - KM is a subject related to the human resources with an emphasis on the organizational culture and the formation of team works; - KM depends on the development of organizational processes that make it possible to measure and capture the know-how of the organization.
Swan <i>et al.</i> (1999)	<ul style="list-style-type: none"> - It-based model that focus on the processing and intense dissemination of information. This model is intended for the exploitation of knowledge, using technical means; - Community-based models, which emphasize dialogue and collaboration within a network; The goal of this model is the exploration of knowledge, focused mainly on the interaction between individuals.
Alvesson and Kärreman (2001)	<p>The KM models are established from the combination of two elements: the means of interaction (social and technostucture) and managerial intervention mode (coordination and control). From these two guidelines, the authors have defined four models for KM:</p> <ul style="list-style-type: none"> - Community-based, originated from the social interaction and coordination management intervention. Emphasis on the sharing of ideas; - Based on normative control, originated from the social interaction and control management intervention. Emphasis on the normative control. The organizational culture acts as a knowledge repository; - Based on stored experiences, originated from the interaction based on technostucture and coordination management intervention. Emphasis on the formation of a 'knowledge library'. - Based on rules and modes of action, originated from the interaction based on technostucture and control management intervention. Emphasis on the development of templates that describe specific modes of action.
Lee and Kim (2001)	<ul style="list-style-type: none"> - Managerial model: it has as central element the development of the 'knowledge worker', including leadership, autonomy, performance measurement and rewards, organizational structure and organizational culture; - Technical model: it has as central element the IT. This perspective emphasizes the facilitation of the process of storage and distribution of knowledge by means of knowledge management systems, including data mining, discussion forums, Internet and intranet.
Schultze and Leidner (2002)	<ul style="list-style-type: none"> - Objective model: knowledge seen as an object to be discovered. Knowledge is identified in a variety of ways and locations, and the technology has a leading role in the coding of this way of knowledge. - Subjective model: knowledge is inherently identified and related to the human experience through the social practice of knowledge, as seen in the work of community of practice (Brown and Duguid, 2001; Wenger, 1998 and Thompson, 2005).

Table I – Approaches to Knowledge Management

which support the KM process, positioning the tools, called 'hard', as support mechanisms for this process. In relation to the KM process, it can be defined as the management effort to promote and facilitate the activities of acquisition, storage, distribution and utilization of knowledge by individuals and groups (Gonzalez and Martins, 2014; Cormican and O'Sullivan, 2003; Zheng et al., 2010; Liao et al., 2011).

The acquisition relates to the intra-organizational process that facilitates the creation of tacit and explicit knowledge, from the individuals and integrating at the organizational level, as well as the identification and the absorption of information and knowledge from external sources (Gold et al., 2001). The acquisition process is also related to the organizational stimulus to learning of employees, which makes the company able to integrate, build, and reconfigure its internal competences to respond to environmental changes (Teece, 2007; Cohen and Levinthal, 1990), promoted through the development of a culture focused on learning (Skerlavaj et al., 2007; Irani et al., 2009).

The stage of knowledge storage refers to the process of organizational memory formation (Walsh and Ungson, 1991), in which knowledge is formally stored in physical memory systems, informally retained as values, standards and beliefs that are associated with the organizational structure and culture (Alavi and Leidner, 2001), and also retained in the organizational processes, tools and routines (Kane and Alavi, 2007).

The knowledge distribution refers to the process by which new information from different sources is shared and which eventually can drive the creation of new knowledge (Lee and Yang, 2000). The earlier works about the knowledge transfer process emphasized cognitive and social factors. Currently, the focus is on organizational factors that facilitate or inhibit the transfer process, including the absorptive capacity of the organization (Cohen and Levinthal, 1990), the development of a sharing culture (Skerlavaj et al., 2007), expertise developed by individuals (Cross and Sproull, 2004), motivational aspects (Amayah, 2013; Quigley et al., 2007) and technology that eases the transfer process (Kane and Alavi, 2007).

Regarding the knowledge utilization phase, Rowley (2001) defines it as the ability of the individuals of an organization locate, access and use information and stored knowledge in the formal and informal memory systems of the organization. The use can take on an exploiting character, when, through the existing knowledge base, decisions or improvements are made; or an exploratory character, when the primary organizational knowledge is used as a base for the creation of new knowledge in an innovative proposal (Cohen and Levinthal, 1990; Rowley, 2001).

These stages indicate that the KM process is more complex than information management and IT plays a supporting role mainly in the processes of retention and distribution of explicit knowledge. The processes of acquisition and use of knowledge requires the development of an organizational context that facilitates the search for new ways of doing things, stimulating exploitative and explorative learning, i.e. the refinement and improvement of processes from the same primary knowledge base, and innovation and improvement of processes from a technological paradigm shift and change of primary knowledge base, respectively. Thus it is possible to see that the KM process is based on development of human resources. It is from the human knowledge is created and put into practice. Without qualified employees no process KM.

The stages of storage and distribution with respect to the portion of the explicit knowledge are supported and expanded by the IT tools. Tacit knowledge is retained by culture, in relation to behavior, beliefs and way of doing the things, and also through the organizational structure with respect to the degree of formalization, allocation and hierarchy (Irani et al., 2009; Liao et al., 2011; Pandey and Duta, 2013). The organizational structure can be considered a key organizational feature for the KM process, because it is responsible for enabling the flow of knowledge between individuals and organizational departments, and also to create mechanisms for the integration of individuals (Chen et al., 2010).

Organizational culture also influences the knowledge distribution process, especially tacit knowledge. The culture of knowledge, a term used by authors such as Irani et al. (2009), Skerlavaj et al., 2007; Terziovski et al., 2003, is focused on cooperation and knowledge exchange between individuals.

Teamwork is another aspect developed by organizations which promotes the integration of individuals and exchange of tacit knowledge. Through teamwork, less experienced employees have contact with a body of knowledge hitherto dominated by more experienced employees. Teamwork is also important for KM because it facilitates the integration of multi-disciplinary knowledge, facilitating the knowledge acquisition and utilization.

Since organizational knowledge is disseminated, individuals begin to use knowledge in exploitative or explorative learning approaches. Thus, the organization develops new knowledge through the knowledge transformation cycle promoted learning process. Besides the development of external knowledge, the primary knowledge base is essential to promote the absorption of external knowledge.

The next section discusses theoretically the content of these five constructs (human resource development, teamwork, organizational culture, organizational structure and knowledge development and absorption) as well as their relation with the four stages of the KM (knowledge acquisition, storage, distribution and utilization).

3. Organizational constructs related to knowledge management process

This section aims to determine the organizational constructs that promote each stage in the KM process, answering the following research question: Which internal contextual constructs should be developed to organization promotes the KM process? Constructs can be defined as the set of concepts that define the object searched; therefore, in this work, we raise the constructs, or set of concepts, from the organizational point of view that support the KM.

Many organizations face the obstacle arising from the “heritage” of the Taylorist approach of production in relation to the development of new knowledge as well as its subsequent distribution and use by the members. Such a model, based on the exclusion of employees of lower hierarchical level from the decision-making process, faces the most modern management proposals, which base their values and in group work and problem-solving, large involvement and training of workers, as well as shared identity and objectives by these groups. Thus, the development of human resources (HRs) is the first construct dealt with in this work.

The view ‘organization as a machine’ (Morgan, 1996) becomes increasingly outdated when it is aimed to study a form of management that provides the constant acquisition and distribution of knowledge (Rowley, 2001). The KM depends on a social context based on teamwork – groups that share ideas and professional skills (Brown; Duguid, 1991; Orlikowski, 2002) – which promotes the continuous learning of individuals. Therefore, the second construct associated with the organizational context that relates to the KM process is ‘Team work’.

Lytras and Pouloudi (2006) address KM as a phenomenon of technical and social order and present a model that integrates the three players involved in KM: persons, covering their experiences, skills, knowledge, cognition and learning ability; the groups, which use the synergy between individuals in order to achieve goals; and the organization, that guides the action of individuals and groups through the structure and culture established. Such integration is achieved from a dynamic flow of knowledge transformation.

Persons, through their experiences, attitudes and knowledge, dictate the behavior of groups. After their formation,

the groups go on to develop vision, values, processes, structure and culture over time. Lytras and Pouloudi propose that knowledge undergoes a process of transformation when circulating among individuals, group and organization. The knowledge of each individual is continually changing with the environment due to the group performance. Learning and knowledge flows link persons to groups, as well as these to the organization.

Thus, the ‘Organizational Culture’ is the third construct highlighted, responsible for the development of similar values and assumptions between individuals, which create an environment conducive to the sharing and integration of knowledge. And the ‘Organizational Structure’, regarding the degree of autonomy granted to individuals, the division and formalization of work and functional integration, is the fourth construct.

In relation to the development of the organizational knowledge, Nelson and Winter (1982) say that organizations evolve through their learning capabilities. Organizations learn and acquire knowledge through their routines and repositories, taking advantage of the power of cognition and articulation of knowledge by their individuals. Organizations develop, over time, a common knowledge base, which facilitates the absorption of new knowledge, as well as the learning process (Grant, 1996). This way, ‘Development and Absorption of knowledge’ is the fifth construct related to the organizational context.

The following sections explore the organizational practices related to the five constructs mapped and then we raise the implications of each construct in relation to the KM process.

3.1 Human resources development

The most modern approaches related to treatment of human resources (HRs) go from premises directed to development of the workforce, in order to constantly improve the skills (Zangiski et al., 2013; Zarifian, 2001; Leonard-Barton, 1998).

Research on the HR management suggests that practices related to the development of individuals can increase the performance of the company, facilitating the creation and flow of knowledge capable of generating innovation (Pandey and Duta, 2013; Collins and Clark, 2003).

KM initiatives depend on the willingness of persons to share their knowledge and expertise (Cardoso et al., 2012; Quigley et al., 2007). No organization can generate knowledge without qualified persons (Cross and Sproull, 2004; Zarifian, 2001). And yet, through the HR development practices, organizations can develop an organizational culture that en-

courages the acquisition and sharing of knowledge (Zangiski et al., 2013). In relation to the transfer of knowledge, the development of HRs is the key element for increasing the absorptive capacity and knowledge utilization (Sparkes and Miyake, 2000). It is important to note that the capacities of individuals built and sustained through HR practices are difficult to imitate, because these practices are specific to a company, socially complex and context-dependent (Collins and Clark, 2003). Table 2 presents the organizational initiatives related to HR development, extracted from six papers on the subject.

Thus, the first organizational initiatives related to the development of human resources that contribute to the KM process are geared to the selection, training and development of employees (Chen and Huang, 2009; López et al., 2006.). The KM process requires the organization to hire and train individuals with personal characteristics that fit into the company culture, and primary knowledge capable to contribute to the organizational primary knowledge (Cardoso et al., 2012; Vlachos, 2006). The failure in the selection and evaluation of

employees with personal characteristics that are adherent to the behaviors and beliefs of the organization can be considered the first step to failure of KM (López et al., 2006).

The lack of appreciation of individual or group initiatives to support the organization's strategy may mean a reduction in process of new knowledge exploration (Lopez et al., 2006). The organization of the performance management system with the awards and recognition systems are important aspects for maintaining and increasing employee motivation (Vlachos, 2008).

The KM is supported from motivated employees to acquire, retain, distribute and use organizational knowledge. For this purpose, the organization must build a participatory internal context in which the employee is motivated to collaborate with a team from their ideas and knowledge (Chen and Huang, 2009). It is critical to KM that the employee is identified with your workgroup without this identification the worker has no motivation to collaborate and disseminate their knowledge (Laursen and Foss, 2003). Organizational

Initiatives	Definition
1. Selection process of employees	Organizations require new employees to contribute to the learning and to the knowledge base (Vlachos, 2008; López et al., 2006).
2. Training and Development	Important mechanisms for the process of knowledge acquisition (Chen and Huang, 2009; López et al., 2006; Vlachos, 2008).
3. Performance management system	Definition and measurement of the behaviors and skills that can highlight an organization of the competition (Chen and Huang, 2009; Vlachos, 2008)
4. Awards and recognition	Denotes the behavioral aspects valued by the organization. Should strengthen an attitude of risk-taking and promote the sharing of knowledge (Cardoso et al., 2012; Laursen and Foss, 2003; López et al., 2006).
5. Involvement and participation	Encourages employees to bring new ideas and exchange knowledge about innovative activities (Chen and Huang, 2009; López et al., 2006).
6. Performance of the managers	Managers are responsible for two groups of information relevant to innovation. The first concerns external information (customer relations, positioning of competitors, etc.), and the second concerns the selection and grouping of internal information from different groups and different departments (Chen and Huang, 2009; Jiménez-Jiménez and Sanz-Valle, 2007; Lee et al., 2012).
7. Decentralization	Increased delegation improves the process of discovery and use of knowledge in the organization (Laursen and Foss, 2003; Lee et al., 2012).
8. Work teams	Aggregates heterogeneous knowledge of individuals, resulting in non-trivial process improvements or new combinations that result in new products (Laursen and Foss, 2003; Pandey and Duta, 2013; Vlachos, 2008).
9. Job rotation	Extends the skills group dominated by the employees, making them versatile, intensifying the process of dissemination of knowledge (Laursen and Foss, 2003).

Table 2 - Main initiatives and authors related to the human resources development

initiatives aimed at decentralization, i.e. the exposition of the employees to take decisions on your level of expertise, it is also a strategy that contributes the process of KM. Environments with highly centralized power of decision are not favorable to the acquisition and use of knowledge (Laursen and Foss, 2003).

Organizational strategies that value multidisciplinary are promoting the processes of knowledge creation, distribution and utilization. Thus, the formation of groups with individuals holding complementary knowledge can be considered an important action for KM process. The practice of job rotation within workgroups is an organizational action in line with the valuation of multidisciplinary. The job rotation encourages employees to acquire and disseminate knowledge, increasing the variety of individual's competences (Larussen and Foss, 2003).

3.2 Teamwork

Teamwork is one of the main characteristics of the most modern forms of work organization, such as lean manufacturing and semi-autonomous groups. London and Sessa (2007), studying the maturity of groups, claim that, in immature groups, individuals maintain distinct points of view, each working on their own, often do not have commitment to the group and learn on their own. In mature or integrated groups, individuals work, learn and make decisions as a single unit. Table 3 presents the organizational initiatives related to team work, extracted from five papers on the subject.

A central aspect for the effectiveness of group work is the knowledge sharing process (Cummings, 2004; Liebowitz et al., 2007; Okhuysen and Eisenhardt, 2002). So that it becomes useful, the individual knowledge, which is the prop-

erty of individuals, must be integrated to the groups through a process of assimilation (Crossan et al., 1999) and institutionalized within the organization (Grant, 1996).

However, for the group to become a system, group members need to develop a state of mutual trust, a shared mental model, a shared identity and a cohesion state (Huang, 2009; Lee et al., 2013). Without these characteristics, the groups are collections of individuals (Okhuysen and Eisenhardt, 2002). Without mutual trust, the members of the group spend time and resource with activities of protection, control and inspection. The shared mental model is the convergence of the knowledge structure on the development of tasks that facilitates interpersonal interactions. The identification is the degree in which a group has a clear awareness of its existence, and it also includes cohesion, which is a kind of 'glue' that holds the group together. Cohesion is developed when the members of the group create a sense of commitment to the task, group pride and interpersonal attraction (Huang, 2009; London and Sessa, 2007).

Individuals working in workgroups must hold additional knowledge that can solve problems and continually improve the processes (Liebowitz et al., 2007; London and Sessa, 2007; Schuring, 2006). These two group activities consist of mechanisms that support the continuous acquisition and use of knowledge.

3.3 Organizational culture

The existing literature on KM stresses the inseparable relationship between organizational culture and KM (Cardoso et al., 2012; Davenport and Prusak, 2000; Skerlavaj et al., 2007; Terziovski et al., 2003). When an organization adopts a knowledge management system without worrying about the

Initiatives	Definition
1. Problem solving and improvement activities	Teams are composed of individuals with complementary multidisciplinary skills that promote the problem solving process (Liebowitz et al., 2007; London and Sessa, 2007; Schuring, 1996).
2. Common language	The groups are formed by individuals who share a common vocabulary, facilitating dialogue and intensifying the flow of knowledge (Brown and Duguid, 2001).
3. Operational autonomy	The groups have, especially when considered as mature, autonomy for decision-making in their scope of operation (London and Sessa, 2007; Schuring, 1996).
4. Knowledge sharing between individuals	Employee interaction facilitates the process of dissemination of tacit knowledge (Cardoso, et al., 2012; Cummings, 2004; Huang, 2009; London and Sessa, 2007).
5. Identity of the employee against the group	This is about the cohesiveness and reliable state conquered by group members (Huang, 2009). It is also important the feeling of being part of a team by the individuals (Brown and Duguid, 2001; London and Sessa, 2007; Huang, 2009)

Table 3 - Main initiatives and authors related to team work

cultural development that fosters it, the KM efficiency is limited (Zheng et al. 2010). Table 4 presents the organizational initiatives related to the organizational culture, extracted from six papers on the subject.

The survey conducted by Alavi and Leidner (2001) demonstrates that much of the success of the KM initiatives is from a cultural adequacy that encourages employees to share tacit knowledge acquired through experience in routine activities and in the process of problem solving, called culture of knowledge.

The culture of knowledge can be defined as the conditions established by the organization that value the sharing and integration of knowledge between individuals and groups (Cardoso et al., 2012; Fey and Denison, 2003; Irani et al., 2009). In relation to the sharing issue, organizations with more open values, and aimed at the mutual support between individuals, are predisposed to build a knowledge culture (Gold et al., 2001; Fey and Denison, 2003).

The sharing and involvement is also related to the degree of employee identification with the organization (Fey and Denison, 2003; Irani et al., 2009). When an individual does not feel belonging and accepted within a group, their capacity to contribute becomes limited. Managers, along with the staff, should be capable of creating an aggregator organiza-

tional context, i.e., capable of retaining employees, making them motivated to create and share knowledge.

The culture also defines the process of creating and adopting new knowledge (Skerlavaj et al., 2007). The attitude of the organization in the face of failures is an important element of the relationship between culture and the creative process. Irani et al. (2009) point out that failures are inserted into the creative context of organizations and it is up to the management to support employees so that they feel safe and encouraged to create. Thus, managerial action to punish their employees due to attempts that did not generate the expected results generates an organizational context that discourages the creative process and the use of organizational knowledge, i.e., the organization does not encourage the use of their knowledge base (Skerlavaj et al., 2007).

3.4 Organizational Structure

Since KM depends on social interactions and on the flow of knowledge between individuals and departments (Zheng et al., 2010), the organizational structure exerts great influence on this process (Chen et al., 2010; Chen and Huang, 2007; Tsai, 2002). According to Lee and Grover (2000), Liao et al. (2011) and Chen and Huang (2007), the organizational structure is defined from three elements, formalization, centralization and integration, related to KM process.

Initiatives	Definition
1. Encouraging the sharing of knowledge	The 'knowledge culture' has as main objective to encourage individuals to share knowledge, especially tacit knowledge (Alavi and Leidner, 2001; Davenport and Prusak, 1998; DeLong and Fahey, 2000; Skerlavaj, 2007).
2. Involvement and identification of the employee in relation to the company	Persons of all levels feel responsible for their processes, creating a direct connection with the goals of the organization (Davenport and Prusak, 1998; DeLong and Fahey, 2000; Fey and Denison, 2003; Irani et al., 2009; Skerlavaj et al., 2007).
3. Participative action of superiors	The managers of the organization engage in the process of dissemination of the knowledge culture (DeLong and Fahey, 2000; Fey and Denison, 2003; Irani et al., 2009; Skerlavaj et al., 2007).
4. Posture of risk-taking and stimulus to the creative process	The employees from all levels of the organization are encouraged to exploit and explore the acquired knowledge in improvement and innovation activities, in a process of trial and error (Irani et al., 2009)

Table 4 - Main initiatives and authors related to the organizational culture

Table 5 presents the organizational initiatives related to the organizational structure, extracted from seven papers on the subject.

The formalization refers to the level of coding that guides the behavior of employees. In highly formalized organizations, the existence of formal documents inhibits the generation of ideas and prevents spontaneous behavior necessary to stimulate innovations, while less formalized structures are conducive to innovation (Chen and Huang, 2007; Lee and Grover, 2000; Liao et al., 2011).

The centralization is related to the direction of the decision-making power to higher hierarchical levels (Andrews and Kacmar, 2001; Ramezan, 2011). The centralization creates a non-participatory environment, reducing communication, commitment and involvement among employees (Damanpour, 1991). In lean organizational structure, employees can determine what actions are most important, thus stimulating innovation and knowledge creation (Liao et al., 2011; Tsai, 2002).

Integration refers to the degree of interrelationship between individuals and the sectors of the organization (Germain, 1996). The KM requires a heavy flow of communication between members of different sectors of the organization and network structures encourage the sharing of information and knowledge by individuals (Wilkinson and Young, 2006).

Still on the increased flow of information through the organization, it is important to stress the IT role. Organizations depend on IT to store, formalize and distribute the explicit knowledge (Ramezan, 2011; Faraj et al., 2011; Leidner; Elam, 1995). Thus, this work considers IT as a facilitator of the KM process. IT is related in this work with the organizational structure because it provides mechanism that facilitates two key characteristics of the organizational structure: the formalization, providing mechanisms for knowledge retention, and integration regarding tools that facilitate the flow of information and knowledge between individuals and organizational departments.

3.5 Knowledge development and absorption

The absorptive capacity refers to the ability of an organization to recognize the value of a given knowledge, assimilate it and apply it, aiming a competitive advantage (Cohen and Levinthal, 1990). The fundamental notion of this concept focuses on the fact that organizations need to access their primary knowledge to assimilate and utilize new knowledge, that is, the accumulation of common knowledge increases the potential for further learning (Cohen; Levinthal, 1990; Holmqvist, 2004).

The contact of organization with new knowledge from the external environment is critical to maintaining and increasing its competitiveness (Teece, 1997), however, when the organi-

Initiatives	Definition
1. Formalization of activities	Refers to the degree that the activities of the organization are standardized through formal documents (Andrews and Kacmar, 2001; Chen and Huang, 2007; Liao et al., 2011)
2. Intra-organizational knowledge and information flow	The knowledge flow between functions (horizontal) and the vertical one (top down) allows the dissemination of knowledge (Chen and Huang, 2007; Lee et al., 2012; Lee and Grover, 2000; Leidner and Elam, 1995; Liao <i>et al.</i> , 2011; Pandey and Duta, 2013 Ramezan, 2011)
3. Lean organizational structure	It is the decentralization of the decision-making power (Andrews and Kacmar, 2001; Lee et al., 2012; Ramezan, 2011; Liao et al., 2011; Pandey and Duta, 2013).
4. Functional integration	Refers to the degree that an organization stimulates the interaction between individuals and functionally distinct departments, promoting multidisciplinary activities that allow problem solving and innovation (Chen and Huang, 2007; Lee and Grover, 2000; Liao et al., 2011; Tsai, 2002).
5. Use of IT to facilitate the process of storage and dissemination of information	IT is a tool that facilitates and increases processes of knowledge storage and distribution (Lee et al., 2012; Lee and Grover, 2000; Ramezan, 2011).

Table 5 - Main initiatives and authors related to the organizational structure

zation fails to develop their primary knowledge, their ability to access and incorporate new technologies to their routines becomes reduced (March, 1991; Volberda et al., 2010).

While organizations with higher level of absorptive capacity tend to be more dynamic (Teece, 2007; Volberda et al., 2010), that is, are able to explore opportunities in the environment, regardless of the current performance; organizations with lower level of absorptive capacity tend to be more reactive, because they seek ways to correct their flaws, based on standards of performance that do not mean technological advancement (Anand et al., 2010).

Exploration and exploitation represent two fundamentally different models for organizational learning. The first involves a company's behavior aimed at the research, discovery and experimentation, while the second is characterized by refinement, implementation, efficiency, production and selection (March, 1991; Volberda et al., 2010). The returns associated with the exploration are more variable and of long-term, while the returns related to exploitation are more precise and of short-term. In other words, companies that explore new knowledge produce a wide range of performance, while the use of exploitation leads to a more stable performance (March, 1991).

There is a complementary effect between the two strategies: the exploitation promotes static optimization, and exploration supports dynamic optimization (March, 1991). The success of a company to compete in stable environments involves the exploitation of consolidated skills, while to survive in dynamic environments involves the development of new skills. Thus, the two strategies are essential to maintain a competitive advantage and their combination is implied in recent concepts that address the dynamic capabilities of an organization (Eisenhardt; Martin, 2000). Table 6 presents the organizational initiatives related to the development and absorption of knowledge, extracted from seven papers on the subject.

4. Implications of organizational constructs on the KM process

The two previous sections performed a theoretical survey on the KM process and on the organizational constructs that sustains it. This section aims to raise the implications of organizational constructs on the KM process, answering the second research question: How each of these constructs relates to the stages of the KM process (acquisition, storage, distribution and knowledge utilization)? In order to achieve this goal, this section conducts a relationship for each construct with the four phases of the KM process (Knowledge acquisition, storage, distribution and utilization). Tables 7-10 summarize the existing relationship between the four phases of KM process and the five mapped organizational constructs.

Initiatives	Definition
1. Ability to absorb new knowledge	Refers to the ability of an organization to assimilate and apply a knowledge for competitive advantage (Anand et al., 2010; Cohen and Levinthal, 1990; March, 1991; Volberda et al., 2010)
2. Exploitation and exploration of knowledge	Refers to the knowledge utilization acquired. The exploitation refers to the use of the same knowledge base, while exploration involves research and discovery of new knowledge, generating innovation (Cohen and Levinthal, 1990; Holmqvist, 2004; March, 1991; Volberda et al., 2010).
3. Primary knowledge utilization in order to increase competitiveness	The organization stores in its organizational memory a knowledge base that facilitates the acquisition of new knowledge (March, 1991; Volberda et al., 2010).
4. Access to new technologies	Partnerships, alliances and associations with other companies and universities are sources of generation of new knowledge (Anand et al., 2010; Eisenhardt and Martin, 2000; Teece, 2007).
5. Dynamic capability	Refers to the ability of the organization to rebuild its core competencies, remaining competitive (Anand et al., 2010; Teece <i>et al.</i> , 1997; Teece, 2007; Zollo and Winter, 2002).

Table 6 - Main initiatives and authors related to the development and absorption of knowledge

Human Resources Development	Team work	Organizational culture	Organizational structure	Development and absorption of knowledge
Knowledge creation depends on the accumulation of skills of persons (Chen and Huang, 2009; Lee and Yang, 2000) and training programs are important mechanisms for knowledge acquisition (Vlachos, 2008). The cognitive ability of individuals stimulates the creative process (Sparkes and Miyake, 2000). Award systems should strengthen an attitude of risk-taking (Laursen and Foss, 2003).	The creation of knowledge depends on a work context in which there is communication, collaboration and connection between individuals (Huang, 2009; Lee, 2013; Liebowitz et al., 2007). All knowledge is originated from the thought that surrounds a group (Brown and Duguid, 2001).	An organizational environment that encourages experimentation and learning promotes the creation of new knowledge (Gold <i>et al.</i> , 2001). The knowledge-oriented culture encourages the employee to propose ideas and develop trial and error activities (Cardoso, et al., 2012; Skerlavaj <i>et al.</i> , 2007).	More rigid hierarchical structures reduce the decision-making and, as a result, the process of learning (Andrews and Kacmar, 2001). The creative process is extremely influenced by communication between the various areas of the company (Chen and Huang, 2010; Lee et al., 2012).	Organizational learning enables the development of new skills (Crossan <i>et al.</i> , 1999). The creation of knowledge depends on the common knowledge base developed by individuals (Cohen and Levinthal, 1990; Holmqvist, 2004). The common knowledge base of the organization promotes the reconstruction of core competencies of the organization, that is, those related to the dynamic capacity of the organization (Zollo and Winter, 2002; Teece <i>et al.</i> , 1997; Teece, 2007).

Table 7 – Implications of organizational constructs on the knowledge acquisition process

Human Resources Development	Team work	Organizational culture	Organizational structure	Development and absorption of knowledge
Employees are an important part of the organization's knowledge assets. Individuals are responsible for the storage of tacit knowledge, retained in the form of experience and skill (Walsh and Ungson, 1991). The organization must create mechanisms for performance measurement and awards that include the explanation of knowledge in order to institutionalize it (Collins and Clark, 2003).	The members of a group store knowledge and common language, as well as the decision-making mechanisms and relationship specific to the team (Brown and Duguid, 2001).	The retention of knowledge requires from the organization discipline in identifying new knowledge and encoding them when possible (Alavi and Leidner, 2001; DeLong and Fahey, 2000), as well as keeping the human capital in order to maintain the tacit knowledge and know-how acquired over time (Rowley, 2001).	Storage of explicit knowledge through procedures, manuals and instructions is inherent to the formal structure of the organization (Andrews and Kacmar, 2001; Liao <i>et al.</i> , 2011). IT is a tool that can help in the process of knowledge storage (Ramezan, 2011; Leidner and Elam, 1995).	The knowledge stored by the organization is the basis for the exploitation of opportunities (Volberda <i>et al.</i> , 2010). The accumulation of knowledge over a period of time makes it easy the acquisition in later periods (Cohen and Levinthal, 1990).

Table 8 – Implications of organizational constructs on the knowledge storage process

Human Resources Development	Team work	Organizational culture	Organizational structure	Development and absorption
The development of skills enables the individual to absorb new knowledge (Zangiski <i>et al.</i> , 2013; Pandey and Duta, 2013). This way, the motivation and the skill level of individuals support or restrict the process of distribution of knowledge (Rowley, 2001). The group-based incentives reinforce cooperation, encouraging the dissemination and integration of knowledge (Leonard-Barton, 1992; Vlachos, 2008).	Work teams share goals and language, favoring the exchange of knowledge (Brown and Duguid, 2001). Much of the knowledge is not converted to the explicit state and, thus, its spread is given by group work (Schuring, 1996; London and Sessa, 2007).	The culture of knowledge must promote the dissemination of knowledge (Davenport and Prusak, 1998), as well as a sense of trust between individuals (DeLong and Fahey, 2000). The identification with the company is required so that the employee can feel motivated to share the acquired knowledge (Fey and Denison, 2003; Irani <i>et al.</i> , 2009).	Organizations should intensify the flow of knowledge and create sharing environments (Chen and Huang, 2007; Lee and Grover, 2000) and IT facilitates this process of dissemination (Lee and Grover, 2000). Organizational barriers, created between departments, prevent the dissemination of knowledge (Tsai, 2002). Horizontal structures promote the flow of knowledge (Tsai, 2002).	The process of distribution of knowledge depends on the learning ability of individuals (Rowley, 2001), and the capacity to absorb and assimilate knowledge, internally or externally to the organization, requires a common knowledge base by the individuals (March, 1991; Eisenhardt; Martin, 2000). The distribution of knowledge is a process of interpretation and integration of knowledge, that is, development of a common language and shared understanding (Crossan <i>et al.</i> , 1999).

Table 9 – Implications of organizational constructs on the knowledge distribution process

Human Resources Development	Team work	Organizational culture	Organizational structure	Development and absorption of knowledge
Competence refers to the ability of individuals to use the acquired knowledge in practical situations in order to solve problems (Zarifian, 2001). Systems for performance management and rewards should reinforce a proactive attitude of employees, aiming at problem solving and continuous improvement (Chen and Huang, 2009).	The individuals of a group share goals and are encouraged to develop problem-solving activity in order to achieve the goals proposed to the group (Liebowitz <i>et al.</i> , 2007; Schuring, 1996). The group has multifunctional characteristics due to the complementary skills of the individuals that compose it, facilitating the process of problem solving (London and Sessa, 2007).	The knowledge culture assumes that there is a virtuous cycle of dissemination and subsequent knowledge utilization (Skerlavaj <i>et al.</i> , 2007). The culture of knowledge emphasizes the constant reflection on the actions taken (Irani <i>et al.</i> , 2009).	Knowledge utilization can occur automatically, reflecting a recovery process through an organizational routine (Walsh and Ungson, 1991). The use also occurs through the rescue of explicit knowledge, encoded in an information system (Leidner and Elam, 1995; Ramezan, 2011). Less vertical hierarchical structures decentralize decision-making and, consequently, the use of knowledge (Andrews and Kacmar, 2001; Liao <i>et al.</i> , 2011).	Knowledge must be used as the basis for the creation of new knowledge (Teece <i>et al.</i> , 1997). The use assumes an exploiting role, i.e. decision-making using the same knowledge base, or an exploratory one, when the knowledge base is used as a common knowledge to create new knowledge (March, 1991). The use of acquired knowledge is associated with the dynamic capability of an organization (Teece <i>et al.</i> , 1997; Teece, 2007; Zollo and Winter, 2002).

Table 10 – Implications of organizational constructs on the knowledge utilization process

Considering that knowledge depends on action, and the human is the organizational agent able to mobilize efforts, the development of HRs can be considered the organizational construct that is the base of the KM process. A skilled employee is able to assimilate knowledge that is internal and external to the organization, developing a common knowledge base, which enables the exploration and exploitation of knowledge in innovation and improvement activities, facilitating and intensifying the dissemination of knowledge, such as best organizational practices (Rowley, 2001).

Teamwork is the construct that promotes the interaction of individuals. Through interaction, it becomes possible to transfer knowledge, in particular, the tacit portion (Okhuysen; Eisenhardt, 2002). The groups develop, over time, a common identity, sharing language and culture, making them cohesive (Brown; Duguid, 2001). This state of cohesion and common identity, along with the characteristics of complementary conceptual, management and human skills present in groups, facilitate interaction and exchange of knowledge, as well as the development of activities aiming at problem solving and improvement (Lee et al., 2013; Huang, 2009).

Organizational culture carries with it assumptions and values considered acceptable and correct by a group of individuals, directing the way of acting of individuals (Skerlavaj et al., 2007). The KM depends on persons who are engaged in sharing and integrating knowledge (Fey and Denison, 2003), allowing its transformation.

The organizational structure is related to the degree of centralization, formalization and integration (Chen et al., 2010; Chen; Huang, 2007). Thus, the organizational structure interferes with the decision-making process, which interferes with learning and mobilization of individuals (Andrews; Kacmar, 2001; Damanpour, 1991), the routine maintenance through procedures, instructions and manuals (Chen; Huang, 2007), and the flow and integration of knowledge among distinct employees and departments (Liao et al., 2011).

The absorption capacity and knowledge development address the ability of individuals to develop and retain a common knowledge base, which promotes learning. The learning process can mean the exploitation, related to the use of the same knowledge base, or exploration of knowledge, which deals with the research and discovery of new knowledge, generating innovation (March, 1991). This exploratory and exploiting learning ability dictates the level that the organization has to rebuild its skills, that is, its dynamic ability (Zollo; Winter, 2002; Teece et al. 1997). Tables 7 to 10 summarize the existing relationships between the four stages of the KM process (acquisition, storage, distribution and use of knowledge) and the five organizational constructs mapped.

5. Conclusions

This study points to the fact that KM is much more complex than the management of information and adoption of tools focused on IT, in turn, must be understood as support mechanisms for KM. The theoretical study performs a mapping of four phases of the KM process. From the characteristics of the KM process five organizational aspects, called organizational constructs that support the KM process are identified: human resource development, teamwork, organizational culture, organizational structure and knowledge development and absorption.

The human resource development is the basis for the KM process, because, since knowledge is related to the practical activity and manifests itself through the individual, the development of competences and skills becomes critical to the creation of a common knowledge base.

Teamwork is an important organizational aspect in order to create people with common language and identity, encouraging the dissemination of knowledge. In the work are formed problem solving and incremental improvements teams that enable the processes of knowledge acquisition and utilization, stimulating exploitative and explorative learning, responsible for the transformation of knowledge. In addition, teamwork is responsible for the distribution of knowledge, since employees of different skill and experience level are put together, and also allows employees make contact with multidisciplinary knowledge, considering that groups are formed of individuals by different areas of expertise.

Organizational culture primarily functions as a repository of knowledge, as it determines how individuals act and behave. The knowledge-oriented culture stimulates the continuous dissemination of knowledge between individuals and also favors the development of improvements and innovations related to the exploitation and exploration of knowledge.

The fourth construct is called organizational structure, relates mainly to the integration of employees and functions of the organization. Structures that enable the flow of knowledge and horizontal interaction between individuals encourage interdisciplinary activities. The structure also refers to the level of autonomy that employees have for making decisions impacting the learning process, and formalization, which refers to the storage of explicit knowledge. More formalized and hierarchical structures tend to inhibit the creative process, because they are focused on repetition. Lean structures are more receptive to the acquisition and dissemination of knowledge.

Finally, development and absorption of knowledge is the construct related to the ability of individuals in building a

common knowledge base, which favors the integration of new knowledge, internally and externally to the organization, and also to the dynamic capability, i.e., the ability of the organization to rebuild its skills, becoming innovative (Teece et al., 1997; Zollo; Winter, 2002).

Thus, this article points out that the KM process requires from the organization the development of characteristics that go beyond the use of information technology. IT becomes important as a mechanism of support to the process of knowledge storage and distribution and organizational constructs become fundamental for the development of an organization effectively focused on knowledge.

5.1 Implications for managers

It consolidated the concept of the importance of knowledge for organizational competitive advantage. Moreover, many publications address the need of organizations to treat knowledge as an organizational asset of the first order, being necessary to manage this asset. However, a question that may arise on the part of organizational managers in understanding which is related to the internal organization contextual factors must be developed in order to support KM. This article contributes to the company managers defining a theoretical framework that deals with the phases that make up the KM process (knowledge acquisition, storage, distribution and use), and also identifies a group of five constructs or organizational factors that should be considered by managers in order to support this process. Without managerial commitment to develop appropriate organizational characteristics, any initiatives to KM return evasive results. Thus, this paper focuses its contribution around five constructs related to organizational KM: human resource development, teamwork, organizational culture, organizational structure and knowledge development and absorption. For each construct considerations on initiatives that support the KM are performed, moreover, the paper also discusses the implications of these constructs on the four phases of the KM process.

5.2 Limitations of the study and future research directions

This paper develops a theoretical mapping of the factors that impact the KM process. From a theoretical framework about the KM, constructs from the organizational development viewpoint that support this process are identified. A limitation of this study relates to the selection of constructs. This work focuses on a contribution related to the internal context characteristics, however, does not consider environment aspects, e.g., the size of the organization, the industry that the organization operates and sectoral technological characteristics. Thus, a proposal for future work is to theo-

retically evaluate the exogenous aspects of the organization that relates to KM process.

Since this is a theoretical study, another limitation also refers to the empirical validation of these constructs, and the relative importance of each construct across the KM process. Thus, future work can search empirically these two issues.

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