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Critical Enablers for Knowledge Creation Process: Synthesizing the Literature

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Abstract

Purpose: Given the growing importance of knowledge management system in today's competitive markets, the paper aims at studying the concepts of knowledge creation process (KCP) and knowledge management enablers (KMEs) and highlighting the effect of KME variables on the KCP by conducting a comprehensive survey of the literature.

Design/methodology/approach: After gathering a great number of relevant papers from different academic databases, appropriate works are selected based on several criteria (importance, recentness, and relevance). The papers are integrated and classified to provide a detailed survey on the literature and shed light upon the paths for future research in the area.

Findings: The survey outcome indicates that the impact of KMEs on the KCP is quite significant. Moreover, most of the studies conducted on different case studies express that collaboration, trust, and learning (variables of organization culture enabler), T-shaped skills (variable of employees enabler), and information technology support (variable of technology enabler) have direct and positive effect on KCP, while centralization and formalization (variables of organization structure enabler) have direct and negative effect on the KCP.

Originality/value: The paper and its findings can provide a guideline for organizational managers to identify the relationships among the elements of knowledge management system, especially KMEs and KCP, and promote their organizational performance.

Keywords: Knowledge Management, Knowledge Management Enablers (KMEs), Knowledge Creation Process (KCP).

Article Classification: Literature review

1. Introduction

In today's global economy, knowledge is overturning the old rules of strategy. Global competition as the foundation of industrialized economics has shifted from natural resources to intellectual assets in such a way that current era is titled knowledge era. Knowledge is identified as a unique strategic wellspring to empower the businesses since it can efficiently propel the existing knowledge, distribute it throughout the company, utilize it within the processes, products, or services, and bring considerable competitive advantage (Grant, 1991).

In recent decades knowledge has had a remarkable growth so that more than 90 percent of world knowledge has been created in 20th century and currently the volume of knowledge doubles every five years and a half (Afrazeh, 2008). This great evolution both in the context of economy and knowledge has created a new approach in business management called "knowledge management". According to the Davenport (1994) it is defined as the process of capturing, distributing, and effectively using knowledge. While the definition holds the simplicity and is easy to comprehend, another definition was offered by Duhon (1998) which is probably the most cited and accepted one:

"*Knowledge management is a discipline that promotes an integrated approach to identify, capture, assess, retrieve, and share all of an enterprise's information assets. These assets can include databases, documents, policies, procedures, and previously un-captured expertise and experience in individual workers.*"

Having defined the knowledge management, knowledge management enablers (KMEs) and knowledge creation process (KCP) as well as their interaction delineate important aspects of knowledge management. Organizations need a driving force (KMEs) to manage their knowledge and generate new knowledge (KCP). KMEs have been classified in different ways and their impact on the KCP has been studied by many scholars. In this paper, first we discuss the concepts of KCP and KMEs and present some of their areas of application. Then, the previous studies regarding the impact of KMEs on the KCP is drawn upon and the relationship among the variables of these concepts is scrutinized to provide an insightful review for the future studies. The rest of the paper is as follows. Next section defines the KMEs and KCP and briefly surveys the most recent literature for each concept. Section 3 scrutinizes the effect of each KME and its variables on the KCP by integrating the previous works. Finally, section 4 discusses the findings, concludes the paper, and offers avenues for future research.

2. KCP and KMEs Concepts

2.1. KCP

Knowledge creation is defined as a continuous process in which the knowledge created by individuals becomes available and amplified within the organization's knowledge system (Krogh *et al.*, 2012). The success of companies in the today's competitive markets is highly dependent to the degree to which they create new knowledge. Integrating different types of knowledge and experiences is vital to foster innovation and learning (Pässilä *et al.*, 2013). These facts highlight the importance of KCP in any company.

The theory of knowledge creation was first introduced by Nonaka (Sundaresan and Zhang, 2012) which consisted of four distinctive interactions between tacit and explicit knowledge. The model was then reinforced and expanded in 1995 by Nonaka and Takeuchi (1995). According to the proposed definition, the KCP model concerns the conversions between tacit and explicit knowledge and is made up of four intertwined activities; Socialization, Externalization, Combination, and Internalization (also referred

to as SECI model). Figure 1 represents these four activities and the way they interact with respect to tacit and explicit knowledge.

Socialization implies people that share knowledge through more traditional methods like direct person-to-person contacts and foster new tacit knowledge such as shared mental models and technical skills. Externalization codifies tacit knowledge to intelligible and explicit concepts. Combination converts explicit knowledge into more systematic sets by integrating key parts. Finally, internalization embodies explicit knowledge into tacit knowledge, while explicit knowledge institutionalizes to tacit knowledge in people.

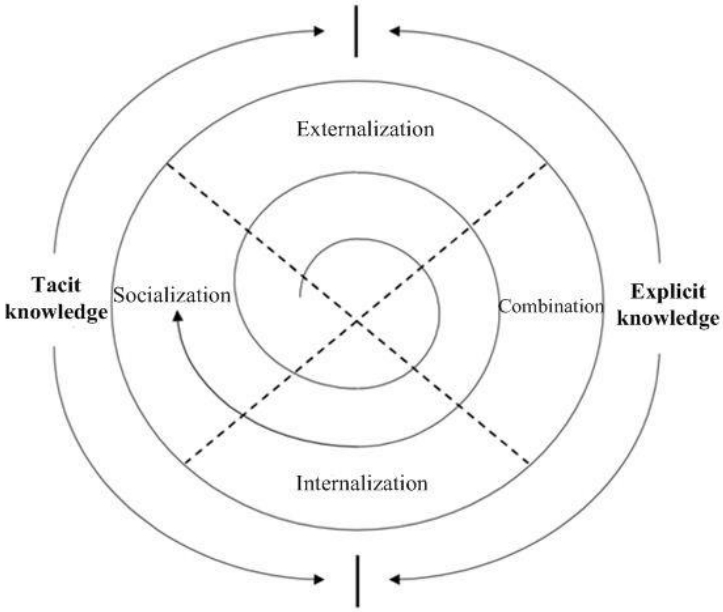

Figure 1: Knowledge Creation Process
Source: (Nonaka and Takeuchi, 1995)

The SECI model has been highly respected and applied by researchers since its introduction (Gourlay, 2006) and is known as the one of the most influential models in the knowledge management literature (Choo and Bontis, 2002). The model could show its usefulness and provides an empirical scaffold for many studies in a variety of fields. Pässilä et al. (2013) have linked an extended version of the SECI model to the methods of artistic mediation and applied it to a Finnish company for developing organizational processes. Sundaresan and Zhang (2012) used the SECI model to enhance the creation of knowledge for parallel teams simultaneously working on a single project. They have then studied the role of incentives and rewards on the management of parallel team strategies. In another study, Esterhuizen et al. (2012) have identified the knowledge creation process, and more specifically the SECI processes, as key enablers of innovation. They have proposed the use of KCP as a vehicle for improving the innovation practices.

2.2. KMEs

According to the definition of knowledge creation, several steps are to be taken for diagnosing organizational knowledge creation. Identification of KMEs is the most important and vital step to ensure the success of bringing in knowledge management (Wu *et al*., 2010). KMEs act as a mechanism to develop, share, and protect the knowledge of an organization and thus stimulate the KCP. Not only they are the driving

force for the creation of knowledge, but also are motives for the people to share their knowledge and experiences with one another (Yeh *et al.*, 2006). Previous research indicates that the importance of KMEs in knowledge management is being growingly highlighted. Ho (2008) found that KMEs have a strong influence on organizational performance.

Different kinds of KMEs have been introduced in the literature. Nonaka and Takeuchi (1995) have introduced five main enablers to support the SECI model. In another classification, Krogh et al. (2000) offered five KMEs to improve the innovation process in organizations. Szulanski (2003) has determined nine important obstacles that could cause knowledge stickiness. Finally, organization culture, organization structure, employees (people), and information technology are identified by several researchers as the four key enablers that seem to be more practical (Ichijo *et al.*, 1998; Leonard-Barton, 1995; Sawhney and Prandelli, 2000). In this paper, we focus on the previous classification of KMEs. To this end, the literature regarding the effect of these enablers on the KCP is integrated. The conceptual framework of the investigation is represented in Figure 2.

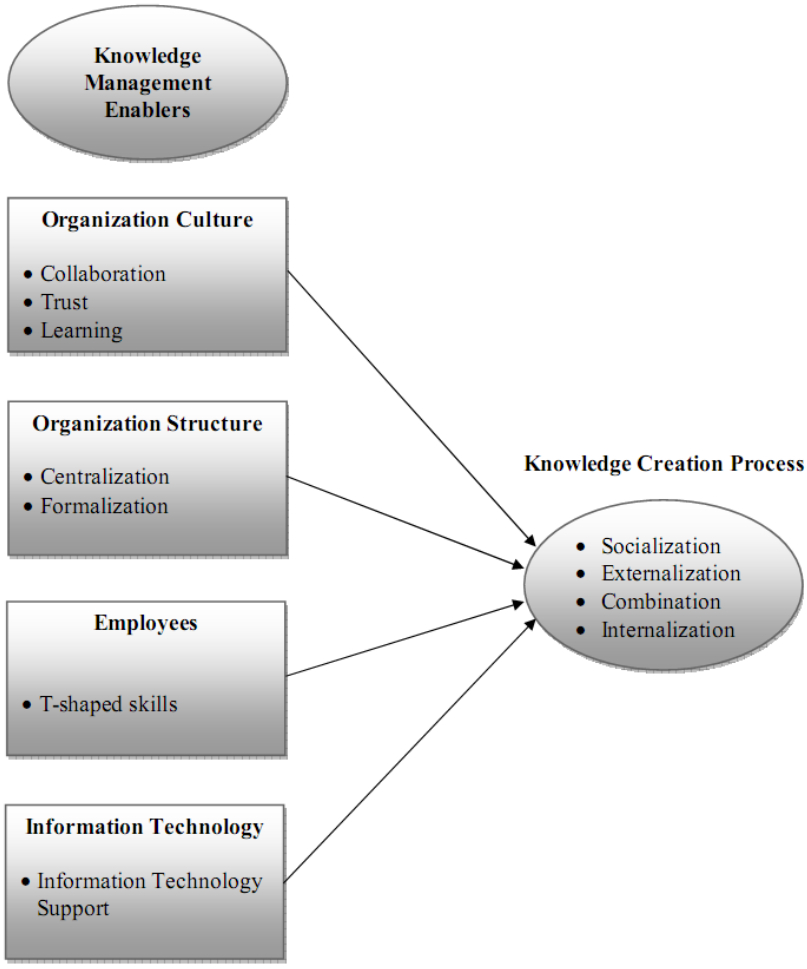

Figure 2: Conceptual Framework of the Paper

3. The Effect of Critical Enablers on KCP

In this section, the impact of KMEs and their variables is studied on the KCP through a survey of literature. Obviously, KMEs greatly influence the KCP (Shih and Chou, 2012), however, the studies conducted on the strength and type of the impact are

diverse. Therefore, we aim at reviewing different papers in the area to offer a unified context as a milestone study for future research.

3.1. Organization Culture

Culture can be defined as unique system within which values are shared and the comportment of employees is constructed accordingly (Jeng and Dunk, 2013). For the successful implementation of knowledge management, organizational culture is one of the most important considerations (Davenport and Prusak, 1998; Demarest, 1997; Gold *et al.*, 2001). The survey by Chase (1998) pointed out that 80 percent of people who had participated in the survey identified culture as the most important factor for creating a knowledge-based organization. When introducing knowledge management to an organization, culture provides the basic infrastructure for the implementation of knowledge management system. That is because it greatly affects how an organization accepts and fosters knowledge management initials. The organization culture determines not only what knowledge is valuable, but also what knowledge must be maintained for sustainable innovative advantage (Long, 1997). It is also important to note that for successful implementation of knowledge management practices, major cultural change is often necessary. The traditional rewarding system based on individual performance should be exchanged for a new system that esteems knowledge sharing (Jeng and Dunk, 2013).

Creating a knowledge-friendly culture is one of the most critical factors for a successful knowledge management (Ndlela and Toit, 2001; Davenport and Prusak, 1998; Lee and Kim, 2001). Organizations should support the culture that encourages employees to create and share knowledge inside an organization (Leonard-Barton, 1995; Holsapple and Joshi, 2001). Organization culture includes three major variables namely “collaboration”, “trust”, and “learning”. These variables are known as the main factors to achieve organization culture that supports knowledge management system (Krogh, 1998; Eppler and Sukowski, 2000). In the following, these major factors are discussed.

3.1.1. Collaboration

Collaboration is defined as the degree to which people in a group actively support and help each other in their work (Gupta and Govindarajan, 2000). Collaborative culture is necessary for effective knowledge management (Hansen *et al.*, 1999; Ein-Dor and Segev, 1982). Collaborative interactions such as open discussion, social interaction, and joint activity can help to create organizational knowledge (Hedlund, 1994).

For a successful knowledge creation, exchanging knowledge amongst people is a prerequisite. This type of exchange can be fostered by collaborative interactions to reduce fear and increase openness to other members. The study by Zucker et al. (1996) has confirmed the significance of collaborative interactions for successful knowledge creation in the biotechnology industry. This shows that collaborative interactions should be encouraged, both formally and informally, among different members of organization. It also reduces individual differences between organizational members (Damanpour, 1991).

Collaboration can help people obtain a shared understanding about organization’s external and internal environments using supportive and reflective communication. Without established shared understanding among staff, knowledge creation is negligible (Holsapple and Singh, 2001). Hedlund (1994) believes that knowledge creation should be facilitated by the availability of a shared understanding between people. Therefore, many scholars considered collaboration as a key enabler for knowledge creation (Hansen *et al.*, 1999; Graham and Pizzo, 1996; Caruana *et al.*, 1998).

3.1.2. Trust

Trust is an anthropocentric notion, and as such inextricably linked to human beliefs, sentiments, and intentionality. It can be defined as maintaining reciprocal faith in each other in terms of intention and behaviors (Hurley and Hult, 1998). Trust can facilitate open, substantive, and persuasive information exchange (Iansiti, 1993; Hansen *et al*., 1999).

When trust is relatively high in people's interaction, they become more willing to exchange knowledge and participate in social interactions (Hedlund, 1994). Employees look for advice from trusted colleagues to increase their understanding of problems. The institutionalization of trust among employees can be thought as a breakthrough in knowledge transfer (Iansiti, 1993). Accordingly, increasing the knowledge transfer based on mutual trust results in knowledge creation.

It should be noted that knowledge exchange cannot be achieved by the enforcement of contracts. High levels of trust can quell fear, doubtfulness, and ambiguity from the employees' relations (Iansiti, 1993; Ichijo *et al*., 1998; Jarvenpaa and Staples, 2000).

Trust can conduct the organization's climate towards better knowledge creation by reducing the fear of risk and uncertainty. Trust is also critical in cross-functional or inter-organizational teams, because withholding information due to the lack of trust can be injurious to knowledge reflection and internalization (Hopper, 1990). It has been shown that distrust leads people to hide or hoard their knowledge (Johannenssen *et al*., 1999). In a distrusted environment, knowledge cannot be created, shared, and flowed properly. Therefore, facilitating trust among inter-organizational teams and employees is considered as the foundation for knowledge creation (Iansiti, 1993; Kanevsky and Housel, 1998; Chase, 1998).

3.1.3. Learning

According to a definition related to knowledge management, learning is explained as the acquisition of new knowledge by people who are able and willing to apply that knowledge to make decisions or influence others (Krogh, 1998). Organizations can help individuals play a more active role in learning and discovering new things about problems by emphasizing on learning and development. Kanevsky and Housel (1998) expressed that the amount of time spent on learning is positively related to the amount of created knowledge. Individuals should be encouraged to ask questions and be inquisitive for successful knowledge creation (Eppler and Sukowski, 2000).

The capacity of knowledge creation can be increased by various learning means such as education, training, and mentoring. Krogh (1998) has proposed training programs as a means of knowledge creation. Swap et al., (2001) have highlighted mentoring as a key means in creating organizational knowledge. Intense mentoring enables professionals to obtain a higher level of knowledge. For the organizations to be successful in knowledge creation, traditional training and development activities may no longer suffice; they need to nurture an environment with continuous and persisting learning (Lubit, 2001; Eppler and Sukowski, 2000).

Learning must be comprehensive enough to encompass all the hierarchy levels of organizations. Employees must be encouraged to ask questions, challenge, and learn. Pioneer industrial companies such as Nucor, the most innovative steel company in the U.S., have invested in continuous and multifunctional training programs for all their staff, from top to the bottom of the hierarchy, to preserve their competitive advantage in the market (Madhavan and Grover, 1998).

3.2. Organization Structure

Organization structure can encourage or inhibit knowledge management implementation (Hopper, 1990; Ein-Dor and Segev, 1982; Caruana *et al*., 1998). Ichijo et al. (1998) emphasized that firms should maintain consistency between their structures and how they plan to practically use their knowledge. Organization structure should be designed in such a way that it can create the foundation for knowledge creation and act in line with knowledge management system. It is important that organization structure is designed flexible enough to encourage creating and sharing knowledge across organization boundaries. Many researchers have recommended flexible organization structure for effective knowledge management (Menon and Varadarajan, 1992). Organization structure is one of the main KMEs that consists of two variables: centralization and formalization. Both are recognized as key variables underlying the organization structure and have strong effect on knowledge management (Grant, 1991; Johannenssen *et al*., 1999; Kanevsky and Housel, 1998; Tata and Prasad, 2004).

3.2.1. Centralization

Centralization implies the location of decision authority and control within an organization. The centralization of decision making authority inevitably reduces creative solutions. Scattering the decision making power facilitates spontaneity, experiment, and expressional freedom. These are the critical forces of knowledge creation. Thus, many researchers believe that a centralized organization structure makes knowledge creation harder (Nevis *et al*., 1995; Nonaka and Takeuchi, 1995; O'Dell and Grayson, 1999). Zaltman (1986) has stated that in a less centralized organization structure, more knowledge is created. In addition, centralized structure prevents free interdepartmental communication and sharing of ideas due to the high amount of time spent on communication channels (Raven and Prasser, 1995). It also causes falsification and standing of ideas (Nonaka and Takeuchi, 1995).

Without a continuous flow of communication and ideas, knowledge creation does not occur. A decentralized organization structure creates an environment where employees participate in KCP more willingly (Riggins and Rhee, 1999). Therefore, reducing the centralization can result into enhanced utilization and creation of knowledge. Some researchers proposed that knowledge-based organizations should decrease the concentration of decision making authority (Nevis *et al*., 1995; Roberts, 2000).

3.2.2. Formalization

Formalization refers to the degree to which decisions and working relationships are managed by formal rules, procedures, and standard policies (Chase, 1998; Hopper, 1990; Zucker *et al*., 1996). Knowledge creation requires flexibility rather than work rules. It seems that when strict formal rules dominate an organization, the range of new ideas shrinks. Thus, flexibility can provide better ways of doing things (Nelson and Cooprider, 1996). When flexibility increases in an organization structure, knowledge creation tends to increase as well. Knowledge creation also requires variation. In order to be more adaptable when confronting unexpected problems, an organization may accommodate variation in both of its processes and structure (Kreitner and Kinicki, 1992). The more formalization is wiped from the organization processes, the more openness and variation can evolve to support new ideas and behaviors. Through wide communications and interactions, knowledge creation is likely to be encouraged (Sawhney and Prandelli, 2000). Formalization restrains the communication and interaction that are necessary to create knowledge. Lack of formal structure enables

employees to interact and communicate each other to access knowledge and its fluent flow (Johannenssen *et al*., 1999).

3.3. Employees

People are at the center of creating organizational knowledge (Eppler and Sukowski, 2000; Gottschalk, 2000; Scott, 2000). There is an important adage that states knowledge management is 10 percent technology and 90 percent people (Scott, 1998). Updated knowledge can be acquired by admitting new people with specific skills (Nonaka and Takeuchi, 1995). In particular, T-shaped skills embodied in employees are amongst the core capabilities in knowledge management field that consist of different dimensions (Starbuck, 1992; Stonehouse and Pemberton, 1999). T-shaped skills refer to the specialists' capabilities that allow them to have significant and synergistic conversations with one another (Swap *et al*., 2001).

3.3.1. T-shaped skills

T-shaped skills refer to the skills that are both deep (the vertical part of the "T") and broad (the horizontal part of the "T"). Persons with T-shaped skills are those who are not only experts in specific technical areas, but are also intimately informed about the potential impact of their particular tasks. For instance, consider a ceramic materials engineer who has a deep knowledge about the ceramic materials discipline represented by the vertical stroke of the T. If he also knows how his expertise interacts with other fields such as polymer processing, the T's horizontal top stroke, he is considered as an employee with T-shaped skills (Starbuck, 1992).

Individuals with T-shaped skills are highly valuable for creating knowledge since they can integrate varied knowledge sets (Damanpour, 1991). They are able to combine theoretical and practical knowledge. In addition, they know how their branch of knowledge interacts with other branches. Therefore, they can expand their competencies across several practical areas, and thus create new knowledge. Madhavan and Grover (1998) claim that the horizontal stroke of the T-shaped skills set enables employees to significantly interact with one another and participate in knowledge creation (Swap *et al*., 2001).

3.4. Technology

Technology infrastructure includes information technology (IT) and its capabilities (Jarvenpaa and Staples, 2000; Scott, 1998; Woodman *et al*., 1993). IT is widely used to connect people with reusable codified knowledge and facilitates conversations between the employees. It is qualified as a natural medium for the flow of data (Ein-Dor and Segev, 1982). Even for sophisticated knowledge management systems considerable investments in implementing IT infrastructure can be feasible due to the ability of such systems in reusing the knowledge. Such investments are unavoidable for boosting the knowledge management projects (Davenport and Prusak, 1998; Zack, 1999; Lee and Choi, 2003). Allameh et al. (2011) have shown that IT is the most significant variable amongst the KMEs to impact knowledge creation. The importance of IT can be explained according to its unique capabilities in supporting communication, collaboration, knowledge exploration, and learning.

Many researchers have introduced IT as a critical element for knowledge creation and transfer (Ein-Dor and Segev, 1982; Davenport and Prusak, 1998; Ghasemi, 2012; Madhavan and Grover, 1998; Zaltman, 1986). It affects knowledge in different ways. First, it assists knowledge creation and sharing process by facilitating rapid collection, storage, and exchange of data on a scale which was not practical in the past (Ichijo *et*

al., 1998) and helps employees to access the required knowledge easily (Eppler and Sukowski, 2000). Second, it integrates fragmented flows of information and knowledge into a single stream (Ein-Dor and Segev, 1982) which can overcome communicational barriers in organization departments. Third, IT fosters all processes of knowledge creation and is not limited to just explicit knowledge transferring (Jarvenpaa and Staples, 2000; Miller, 1996; Woodman *et al*., 1993). Among diverse variables of technology, "information technology support" is the main variable for utilizing IT (Roberts, 2000). It is the degree to which knowledge management is upheld by the use of information technologies (Ein-Dor and Segev, 1982). Knowledge management is more likely to be successful if a broader technology infrastructure and support is adopted (Davenport and Prusak, 1998).

4. Summary and Conclusion

As knowledge management becomes more and more important in creating competitive advantage for today's organizations, looking to the previous studies to shed light upon future paths seems necessary. This study has examined the effect of KMEs on KCP by a comprehensive survey on the literature of knowledge management. By this, we can identify KMEs that are more important in developing socialization, externalization, combination, and internalization. The relationships among knowledge management parameters have been empirically obtained from previous studies and are represented in Figure 3.

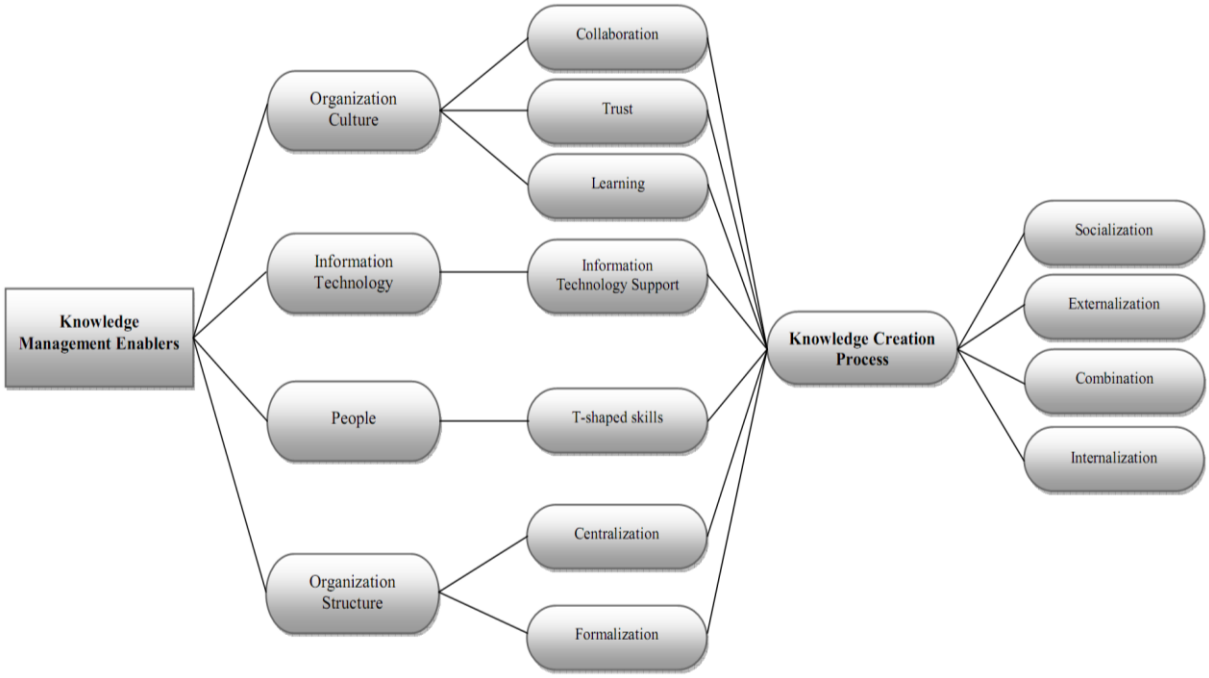

Figure 3: Relationships among Knowledge Management Parameters

The review of previous research studies shows that KMEs significantly influence the KCP in any organization. This states that organization managers must draw their attention to the identification of KMEs that best suit their organization. It has been shown that identification of appropriate KMEs can lead to organization effectiveness (Yeh *et al*., 2006).

Another conclusion can be drawn from the survey conducted in this paper which specifies the positive or negative effect of KMEs on the KCP. According to the most of

previous studies, organizational culture which consists of cooperation, trust, and learning variables is found to be the most effective enabler among KMEs. This reveals an important point: all knowledge management programs are strongly dependent on organizational culture. An organization with inappropriate cultural environment is likely to fail in its knowledge management programs or improving its organizational performance. If collaboration does not exist, internalization process cannot be done. Externalization process will be absurd if trust is not available. Internalization is meaningless if the staff do not pay enough attention to learning. The absence of any of these variables can put up serious barriers against knowledge creation and may fail the company in the establishment of a successful knowledge management system. Therefore, every firm must ensure about the presence of qualified organizational culture prior to the implementation of knowledge management infrastructure (e.g. software and hardware). All the three variables, collaboration, trust, and learning are found to have direct and positive effect on knowledge creation. It has been shown that when people trust the information they receive, internalization process is done in the best way. Moreover, learning has positive effect on externalization process (Zucker *et al*., 1996).

The second KME is organization structure that considers two variables: centralization and formalization. Formalization is an obstacle on the way towards externalization, integration, and internalization processes. Zucker et al. (1996) have found that less centralization and formalization can lead to higher degrees of knowledge management implementation and process flow at all levels of the organization.

The third KME is employee or people and particularly T-shaped skills. It is not surprising that T-shaped skills have positive effect on socialization and externalization processes. That is because when employees have general information about other operations, they carry out other processes such as socialization process, information interactions, knowledge sharing, idea development, and externalization with more enthusiasm. In addition, when people feel that there is no concern or risk about their position during the exchange of knowledge, they become more willing to share it.

The Fourth KME is technology. The current study focuses on information technology support as its vital variable. IT often affects the KCP in a positive way. It also has a strong relation with integration process which is the most important variable in explicit knowledge distribution. In the absence of proper software and hardware foundations, implementing knowledge management projects cannot be successful.

The scaffold exploited in this paper is viable for every organization that tends to identify the key KMEs and examine their effect on the KCP. However, the degree to which each of these parameters can be influential may vary from one organization to another. For example, Gholipour et al. (2010) conducted a case study on the small and medium enterprises (SMEs) of a province in Iran and could find out that the firm's culture such as trust and collaboration are the most dominant variables in such SMEs while IT support is neutral. Whilst in another study, Soon and Zainol (2011) concluded that for Malaysian SMEs learning and T-Shaped skills are the main promoters of organizational creativity and performance. Even for a single organization with several subsidiaries in different countries, the KMEs may influence differently on the KCP for each branch (Magnier-Watanable *et al*., 2011). Hence, we recommend examining the degree to which each of knowledge management parameters can be influential prior to the implementation of knowledge management system in every company.

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