Organizational Dimensions as Determinant Factors of KM Approaches in SMEs

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Abstract—In the current economy of increasing global competition, many organizations are attempting to use knowledge as one of the means to gain sustainable competitive advantage. Besides large organizations, the success of SMEs can be linked to how well they manage their knowledge. Despite the profusion of research about knowledge management within large organizations, fewer studies tried to analyze KM in SMEs.

This research proposes a new framework showing the determinant role of organizational dimensions onto KM approaches. The paper and its propositions are based on a literature review and analysis.

In this research, personalization versus codification, individualization versus institutionalization and IT-based versus non IT-based are highlighted as three distinct dimensions of knowledge management approaches.

The study contributes to research by providing a more nuanced classification of KM approaches and provides guidance to managers about the types of KM approaches that should be adopted based on the size, geographical dispersion and task nature of SMEs.

To the author's knowledge, the paper is the first of its kind to examine if there are suitable configurations of KM approaches for SMEs with different dimensions. It gives valuable information, which hopefully will help SME sector to accomplish KM.

Keywords—Knowledge Management, Knowledge Management Approach, SME, Organizational Dimension.

I. INTRODUCTION

THE business environment of the 21st century is perhaps the most turbulent in history. It is dominated by three powerful influences: globalization, the knowledge and information revolution, and structural change in organizations. Knowledge is thought to be the only meaningful resource in this knowledge based economy. The traditional factors of production have become secondary. It is straightforward to obtain them, provided there is knowledge [1].

Knowledge, if properly harnessed and leveraged can propel organizations to become more adaptive, innovative, intelligent and sustainable [2]. Businesses that can efficiently capture the knowledge embedded in their organizations and deploy it into their operations, productions and services will have an edge over their competitors [3].

Besides large organizations, the success of a small business or an SME can be linked to how well they manage their knowledge. SMEs, in particular, must pay close attention to knowledge management for several reasons:

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- SMEs compete on their know-how and hence have to use knowledge to their advantage, even more so than traditional resources.
- Besides, using the knowledge directly, the owner of SMEs must also transfer knowledge to employees. Seldom, do SMEs have the capabilities to recruit the best minds in the business; hence they must settle for less qualified but motivated individuals.
- SMEs are judged by the external world, such as lending institutions, investors, suppliers, and customers, on their knowledge and knowledge-exploitation capabilities.

Despite the profusion of research about knowledge management within large organizations, fewer studies tried to analyze KM in SMEs.

During the literature investigation, we face to a considerable question which prior KM researches have not paid enough attention to it: "Does SME's organizational dimensions act as determinant factors of KM approaches?"

We try to answer this critical question in our research. So, we present a framework that classifies different knowledge management approaches in SMEs and makes propositions about how the size, geographical dispersion and task nature of SMEs affect the portfolio of approaches suitable for each SME. This framework provides a systematic way of characterizing the varied set of KM approaches adopted by SMEs. Prior studies tend to examine only one or two dimensions of knowledge management approaches [6]. In this paper, KM strategy (codification versus personalization), KM tactic (individualization versus institutionalization) and KM tool (IT-based versus non IT-based) are highlighted as three distinct dimensions of knowledge management approaches. The framework's theoretical base comes from the information retrieval and analysis of the literature.

This paper is organized as follows: After introduction, Section two deals with the literature. Then, the conceptual framework and the research propositions are introduced. Finally, we present the conclusion of this work.

The paper has important implications for SMEs about the suitable portfolio of knowledge management approaches that should be adopted based on key organizational dimensions.

II. LITERATURE REVIEW

A. Knowledge Management

It is important to note that the main component of the knowledge-based economy is the knowledge-based

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organization, which presents some characteristics that clearly differentiate it from the traditional industrial economy [4].

The focus on an enterprise has changed from Porter's environmental view to a resource-based view and during the last decade many authors within the resource-based view have paid particular attention to knowledge as the key resource within organizations. Thus, KM has become increasingly important for all organizations [5].

The function of knowledge management is to allow an organization to leverage its information resources and knowledge assets by remembering and applying experience. Knowledge, and consequently its management, is currently being touted as the basis of future economic competitiveness. Knowledge, if properly utilized and leveraged, can drive organizations to become more innovative, competitive, and sustainable.

KM is managing the corporation's knowledge through a systematically and organizationally specified process for acquiring, organizing, sustaining, applying, sharing and renewing both the tacit and explicit knowledge of employees to enhance organizational performance and create value [6].

In holistic terms, KM must be seen as a strategy to manage organizational knowledge assets to support management decision making. to enhance competitiveness, and to increase capacity for creativity and innovation [7].

The literature in KM distinguishes different types of knowledge in order to be able to propose its management. KM authors divide and typify knowledge in different ways. For example, some authors differentiate technical and strategic types. Some authors focus on issues related to problem-solving knowledge in work practices and knowledge associated with coordination and tactical issues. Finally, the more common characterization of knowledge is tacit knowledge and explicit knowledge.

Explicit knowledge is 'knowledge about' and can be easily stored, retrieved, shared and disseminated within organizations [7-8].

Tacit knowledge is 'knowing how' and is often embedded in organizational routines. If tacit knowledge cannot be codified it should be internalized by observation and practice, but its transfer is slow, costly and uncertain [8].

Enterprises are successful when they generate new knowledge by converting of implicit knowledge into explicit knowledge and put emphasis on the importance of linking internal and external sources of information [5].

B. SME

There are a number of definitions of what constitutes a small to medium-sized enterprise (SME). Some of these definitions are based on quantitative measures such as staffing levels, turnover or assets, while others employ a qualitative approach [4]. We used the "Department of Trade and Industry" (DTI) definitions of size of enterprise, which defines small organizations to have less than 50 employees, medium organizations to have less than 250 employees and large organizations to have more than 250 employees [9].

SMEs may be distinguished from large companies, by some or all of the following features: flexibility and volatility, skill (or expertise) shortages, very limited market power, market behaviors mainly affected by partners, or competitors [1].

Also, Ang (1991) has suggested a number of factors that distinguish small firms from their larger counterparts in the context of financial management practices. These include the fact that the securities of small firms are not publicly traded, owners investments are undiversified, limited liability is rarely present in a true economic sense, managers tend to have general rather than specific expertise, transaction costs of various sorts are high and, to the extent that management and ownership are separated, the relationship is nevertheless largely informal [10].

SMEs make substantial contributions to national economies and are estimated to account for 80 percent of global economic growth [11]. They are a vital part of any national economy because:

- They are important for contributing towards employment growth and providing new job opportunities for the majority of the population.
- They are a source of innovation in new products, services, processes and work practices.
- They are specialist suppliers of parts, components and subassemblies for large companies.
- They can be fast and flexible, and close to their customers.
- They can perform an important import substitution role.
- They can be a more human environment: on a human scale, small is beautiful [2-10].

During the literature review, we face to different classifications of SMEs. They can be classified into four different types, according to the structure of the market where they are located, to the prevalent innovation rate, and to their organization. SMEs can be in competitive markets with low innovation rates. They can also be in highly dynamic industries with high innovation rates. On the other hand, SMEs can be organized as production cooperatives (clusters), or in networks under the dominance of a large firm [4].

David Birch classified SMEs into three categories that are called gazelles, baby gazelles and mice [12].

The definition of a gazelle, based on US business categories, is a wealth-generating business that has achieved a minimum of 20 percent compound sales growth each year over the past five years, starting from a base revenue of at least $100000. Gazelles are primarily small and medium size (100-499 employees) companies. Baby gazelles are defined as very small size (5-49 employees) companies that have the greatest potential to become gazelles. Mice are defined as very small (5-49 employees) and small-size (50-99 employees) businesses comprised of income-generating companies.

Also, the literature has been paying attention to clusters and networks. The cluster concept is most often associated with the work of Michael Porter (1990) who suggests "clusters are geographic concentrations of interconnected companies,

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specialized suppliers, service providers, firms in related industries, and associated institutions (e.g. universities, standards agencies, trade associations) in a particular field that compete but also cooperate" [13].

UNIDO defines networks as groups of firms that cooperate on a joint development project complementing each other and specializing in order to overcome common problems, achieve collective efficiency and penetrate markets beyond their individual reach [14-15].

C. SMEs and Knowledge Management

It is expected that in the next few years commerce based on knowledge will overtake that based on tangible products and SMEs must position themselves firmly in this marketplace. This may entail the setting up of a successful learning organization underpinned by an effective, shared corporate knowledge base [16]. SMEs need to make operational, tactical, and strategic decisions and without accurate information they will struggle to undertake this role.

The studies both by Gustavson and Harung (1994) and by Choueke and Armstrong (1998) have shown that collective consciousness, and shared experience and meaning have an impact on organizational learning and ability to change, and thus, also on the competitive advantage of SMEs. They should thus be able to enhance their performance and competitive advantage by a more conscious and systematic approach to knowledge management [17]. Also, Schermerhorn et al. (2003) reported that as many as 60-80 percent of new businesses fail in their first five years of operation. So a SME that has survived for more than five years is most probably doing something right, including undertaking a viable approach to managing knowledge [4].

Although the drivers for KM in SME may be shaped by large organizations (Philips, 2002), they do not have a monopoly on the use of information and knowledge [2].

SMEs do not manage knowledge the same way as larger organizations. They normally do not have deep pockets to spend on resources such as land, labor, and capital. SMEs must do more with less [18]. They have understandable resource constraints, and hence have to be creative in working around these limitations in order to manage knowledge.

There are two complementary perspectives about KM importance in SMEs. "Pull" perspective, which identifies the potential benefits or improvements that are crucial for small businesses, include for example improved competency, efficiency, innovation, learning and knowledge sharing. And "push" perspective, which deals with the external or environmental thrusts that push them to the forefront of KM, include amongst others, competitive pressure, globalization, movement of large companies toward knowledge based organizations [2].

The role of information technology in managing knowledge has been a center of debate.

It was specifically addressed by Corso and et al. (2003), who state that IT applications can "play a key role in this process, By providing quick and easy access to external sources of knowledge and new and more intense communication channels with partner organizations, IT can erase traditional constraints on SMEs innovation ability, while leveraging their flexibility and responsiveness" [19].

Niosi and Rivard (1990) reported that "SMEs, as niche producers with a smaller range of technologies to offer, may provide easier learning opportunities to industrial firms in developing countries" [4]. In general, ICT adoption and use appears to be related to the size of the firm, with larger and growth-oriented SMEs using far more IT applications and functions than other firms [19].

In small organizations, most knowledge identification is done through informal networks, but as organizations grow these networks cannot possibly be aware of the entire knowledge [20].

During the literature review, we face to some KM challenges in SMEs. Lack of time, lack of communication skills and rapid change in information technologies are highlighted as some of the main concerns for knowledge dissemination. In SMEs, some attempts made to transform tacit knowledge into explicit knowledge have, in the main, been unsuccessful. It is also accepted that knowledge creation is a challenge, which to some extent could be seen as an indication of the lack of resources in SMEs to identify and use important external sources of scientific expertise and advice in generating new knowledge.

SMEs need to develop their understanding of KM, as a key business driver rather than as a resource-intensive additional initiative. While introducing KM, a logical sequence is to be used to minimize effort and cost because SMEs by nature do not have much financial backing and investment on KM programmes.

III. THE FRAMEWORK & PROPOSITIONS

We identify three dimensions of KM approaches: KM strategy (codification versus personalization), KM tactic (individualization versus institutionalization) and KM tool (IT-based versus non IT-based).

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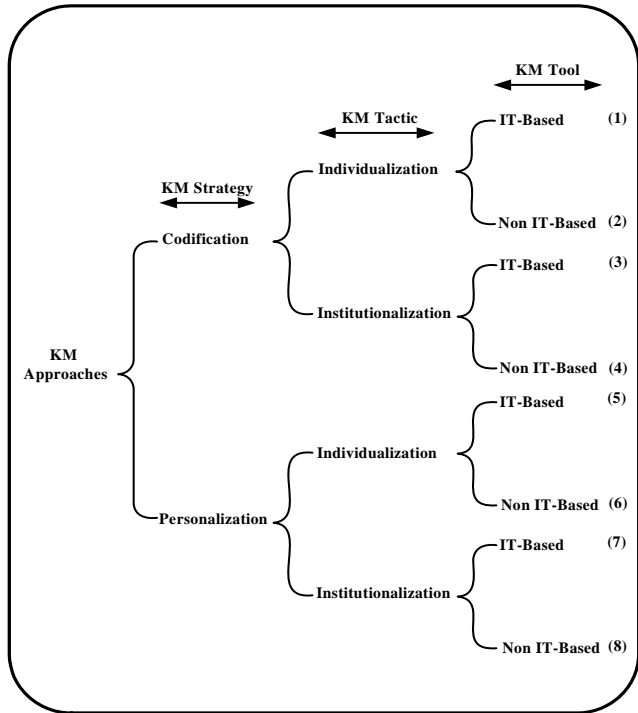Vol:2, No:9, 2008

Fig. 1 The Conceptual Framework of Knowledge Management
Approaches in SMEs

The interaction between these three dimensions results in a framework that generates eight classes of KM approaches (as shown in Fig. 1). We discuss each dimension of the framework below (Table I depicts the research propositions which are based on SMEs dimensions: size, geographical dispersion and task nature).

TABLE I
PROPOSED KM APPROACHES BASED ON SMEs DIMENSIONS

SME Dimensions	KM Approaches
Routine Task Nature, Small- Sized, Geographically Dispersed	Codification, Individualization, IT-Based
Routine Task Nature, Small- Sized, Geographically Concentrated	Codification, Individualization, Non IT-Based
Routine Task Nature, Medium-Sized, Geographically Dispersed	Codification, Institutionalization, IT-Based
Routine Task Nature, Medium-Sized, Geographically Concentrated	Codification, Institutionalization, Non IT-Based
Innovative Task Nature, Small- Sized, Geographically Dispersed	Personalization, Individualization, IT-Based
Innovative Task Nature, Small- Sized, Geographically Concentrated	Personalization, Individualization, Non IT-Based
Innovative Task Nature, Medium-Sized, Geographically Dispersed	Personalization, Institutionalization, IT-Based
Innovative Task Nature, Medium-Sized, Geographically Concentrated	Personalization, Institutionalization, Non IT-Based

A. KM Strategy

The whole organization must share a common KM orientation. KM strategy describes the overall approach an organization intends to take to align its knowledge resources and capabilities to the intellectual requirements of its strategy, thus reducing the knowledge gap existing between what a company must know to perform its strategy and what it does know. The KM strategy chosen should create value for the firm's customers, turn a profit for the firm, and focus on how the firm's employees deliver on the value and economics. Hansen et al.'s (1999) typology of knowledge strategies has become the most supported and referenced one [21]. They suggest two different knowledge management strategies have been discussed for sharing tacit and explicit knowledge: codification and personalization.

Codification strategy involves securing knowledge then storing it in databases for others to access and reuse. The knowledge is independent of the person who initially created it [22]. Codification can be a good mechanism to store large amounts of knowledge and to create an organizational memory for all employees [6]. Codification strategy focuses on codifying knowledge using a ''people-to-document'' approach.

On the other hand, personalization is a strategy to manage the knowledge that is produced by human interaction. This knowledge is difficult to codify and store because are unable to replicate the human qualities used when resolving an issue [22]. Personalization strategy focuses on dialogue between individuals, not knowledge objects in a database. It is a person-to-person approach where knowledge is shared not only face-to-face, but also by electronic communications, thus building networks of people [21].

Codification mechanisms typically do not provide a rich medium for communication. Personalization, on the other hand, provides a rich medium for communication, as it is concerned with the use of people as a mechanism for sharing knowledge [6].

Firms should not attempt to implement and excel at both strategies. Rather, they should use one strategy primarily and use the second strategy to support the first [23].

Hansen, Nohria and Tierney [6] argued that you need to start by identifying what kind of organization you have and what your information needs are, and then primarily focus either on a personalization or a codification strategy [24].

The codification strategy is assumed to be successful for these companies whose business strategy requires re-using existing knowledge [25].

If the business strategy focuses on generating new or customer specific solutions or product innovations the personalization strategy should be chosen rather than the codification strategy [25]. Hence we propose that:

"Codification strategy is more suitable for SMEs conducting tasks that are more routine in nature; while personalization strategy is more suitable for SMEs conducting tasks that are more innovative in nature".

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B. KM Tactic

Another key dimension in the proposed framework is KM tactic. This label encompasses both the differentiations between individualization versus institutionalization aspects of KM approaches.

Individualization describes socialization tactics that are individual and informal, while institutionalization describes socialization tactics that are collective and formal in terms of the contexts in which organizations provide information to newcomers [6]. It is important to know that knowledge can be more valuable when accessible, shared and combined with other knowledge in order to create even more powerful knowledge for the organization or the individual.

Individualized tactics support knowledge sharing at the individual level. They have limited reach, or there are a limited number of people who are able to access the knowledge. Individualization tends to be based on the random decisions of individuals and is unique to individuals or small groups, while institutionalization supports knowledge sharing at the collective level, as they enable the transference of learning and knowledge from an individual to a large number of individuals. Institutionalized tactics have a wider reach, or are usually accessible to a large group of individuals in the organization.

When our tactic is individualization, knowledge is considered as a tool for personal achievement and an output of the organization for the benefit of the employee. When our tactic is institutionalization, knowledge is seen as benefiting both the organization and the employee and is perceived as both an input and an output of the organization to the employee and reciprocally [30]. Individualized tactics allow knowledge sharing to take place using an informal and decentralized approach so in small organization, individualized tactics may serve the knowledge sharing needs of the organization adequately as employees frequently meet each other in the hallways or at cafeterias. On the other hand, Institutionalized tactics allow the organization to amplify the knowledge embedded in individuals to the collective level and to ''push'' information and knowledge to others, instead of simply depending on individuals to ''pull'' knowledge from the right sources so institutionalization helps large organizations facilitate knowledge management across a larger group of individuals [6]. Hence we propose that:

"Individualization tactics are more suitable for small-sized SMEs; while Institutionalization tactics are more suitable for medium-sized SMEs".

C. KM Tool

Another key dimension in the proposed framework is KM tool. This label encompasses both the differentiations between IT-based versus non IT-based aspects of KM approaches. The main IT-based tools are, decision support technologies, groupware, electronic knowledge bases and main non IT-based tools are, spontaneous knowledge transfer initiatives, mentoring, teams and communities of practice.

It is important to know that a firm must take a global and consistent vision when managing its knowledge and selecting the KM tools to be implemented [21].

The key to achieving harmony between KM and IT is to understand the very basic principle: there are things that computer and technology do well, and there are things that humans do well [27]. Many of the failures of IT and KM are the result of repeated attempts to force one paradigm to operate within the realm of the other.

Although a recent study from the "American Productivity and Quality Center" shows that organizations embarking in knowledge management efforts generally rely, for accomplishing their goals, on the setting up of a suitable IT infrastructure [26], many investigators insisted that knowledge management initiatives could be successful without using IT tools (McDermott and O'Dell, 2001; Hibbard and Carillo, 1998), and IT should be adopted only when it is necessary [27]. Dougherty (1999) argues that IT should be seen as a tool to assist the process of KM in organizations. Such a process relies more on the face-to-face interaction of people than on static reports and databases [28]. Others argue that IT is strategically essential for global reach when organizations are geographically distributed because of increasingly difficulties for them to know where their best knowledge is and to know what they know [29]. IT can assist teams, who in today's world may meet only occasionally or even never, to share experiences on line in order to be able to build and share knowledge, and more generally to work effectively together. If properly used, IT can accelerate knowledge management capabilities in both time and space dimensions. Locality, timing, and relevancy factors determine the expediency and the strength of IT's role in KM initiatives [27]. It should be mentioned again that IT cannot be considered the magic bullet that makes a KM initiative a complete success. So, IT has to be part of a balanced and integrated set of components. Hence we propose that:

"IT-based tools are more suitable for SMEs that are geographically dispersed; while non IT-based tools are more suitable for SMEs that are geographically concentrated".

IV. CONCLUSION

Considering the rapid changes in the competitive era, SMEs should adapt themselves with the harmony of change, and while knowledge is assumed to be the main resource of organizations, KM is important for SMEs to lead their efforts towards competitiveness.

As a result of the research effort, we established the conceptual framework of knowledge management in SMEs. The framework helps SMEs successfully select a proper KM approach, based on their organizational dimensions.

Last, in order to conclusively validate the link between the SME's dimensions and KM approaches, a quantitative analysis using large data sets drawn from questionnaires is needed.

It will remain for future research to refine and expand the proposed framework.

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