Using Information Systems to Leverage Knowledge Management Processes:  
The Role of Work Context, Job Characteristics and Task-Technology Fit  

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Abstract
In the modern business context, the capacity of generating knowledge and innovations has been seen as a critical factor for the achievement of sustained competitive advantage. Although, in the literature, such capacity is often attributed to organizations themselves, it is their employees that ultimately are responsible for creating and disseminating knowledge that will be the basis for innovation. Many companies have invested in Knowledge Management (KM) methodologies and the information systems (IS) that support the associated activities as a means to further continuous knowledge creation and innovation. With such trends as its background, this study focus on how an individual’s particular work context, job characteristics and knowledge-related job requirements affect the relationship between task-technology fit (TTF) and the use of information systems in knowledge management activities. Relevant constructs and their dimensions identified in the literature were integrated into a model. Its test suggests that providing appropriate IT tools that fit knowledge-related tasks alone does not guarantee their effective use to leverage the acquisition, transfer and reuse of knowledge. Instead, the relationship between TTF and actual use of IS for KM purposes seem to be indirectly affected by job and work context characteristics.

Introduction
In our contemporary business environment, managers increasingly recognize that the capacity for creating (or acquiring), retaining and storing, protecting, disseminating and reusing knowledge is crucial to gain competitive advantage for an organization in the long run (Duffy, 2001; Gallupe, 2001; Grant, 1996; Nonaka, 1991, 1994). In this context, Knowledge Management (KM) has emerged as a discipline that aims at enabling organizational members to collectively acquire, share, and leverage knowledge to achieve business objectives (Alavi & Leidner, 2001; Dyer and Hobson, 2000; Duffy, 2001). As such, the discipline identifies and sets directions for the application of a dynamic and continuous set of knowledge-related processes and practices that are embedded in individuals, as well as in groups and physical structures (Alavi & Leidner, 2001, p. 123).

Most KM initiatives involve the implementation of one or more supporting information systems (Grover & Davenport, 2001), which are usually referred to as knowledge management systems (KMS). KMS are designed and developed to support and enhance the organizational processes of knowledge creation, storage/retrieval, transfer, and application, thus giving organizational members the knowledge they need to make their decisions and perform their tasks (Alavi & Leidner, 1999, 2001; Davenport & Prusak, 1998; Gallupe, 2001). The expected benefits of knowledge management systems are usually related to enhancements in flexibility, innovativeness, responsiveness, decision making and productivity (Stata, 1997).

Nonetheless, Alavi and Leidner (2001) highlighted that quite often it is not the lack of knowledge that hinders organizational performance, but the lack ability to turn knowledge into effective action. As will be discussed below, a number of factors, related to individual traits, job design, and organizational systems and culture, may contribute to individuals not applying the knowledge they obtain to their activities in the workplace (e.g., Davenport & Prusak, 1998; Smith & McKeen, 2004). Alavi and Leidner (2001) suggest then that an
important, but lacking area of KM research would encompass “the identification of these factors and the development of organizational practices and systems to bridge the knowledge application gap” (p. 129; see also Grover & Davenport, 2001).

In the light of the above, this research aims at better understanding the factors that lead to the use of information systems (IS) to leverage knowledge management activities in organizations. We propose that the characteristics of a person’s job can have an effect on how (and even if) he/she applies information technology to obtain, transfer, and reuse knowledge. The characteristics of the job are at least partially determined by the person’s particular work context. As explained in the next sections, we argue that the fit between information technology (IT) tools and the tasks developed in a job will allow these tools to be applied in knowledge-related activities. However, providing appropriate IT tools that fit tasks alone is no guarantee that knowledge management processes will be leveraged, because not every job in an organization entails the need and opportunity for knowledge acquisition, transfer and application. We suggest that richer jobs (Hackman & Oldham, 1976) entail greater need and opportunity for knowledge acquisition, transfer and use, making those that have such jobs more likely to use IS in knowledge-related activities.

This study will also unveil that the above-mentioned factors can operate as barriers to the use of information systems in KM practices. Some of the factors mentioned above stretch beyond the characteristics of the technological tools available in a given organizational setting. Although they are associated with the context in which individuals operate and the nature of their jobs, they can interfere with the effective application of IS tools in KM processes. Thus, unless those critical factors considered beforehand, investing in KMS alone may prove to be a feeble strategy to combat the impairing “lack” of knowledge that affect many corporations nowadays. For this reason, it is important to better understand the forces that limit the use of the available systems to leverage KM practices, because it translates into concrete opportunities for managers and organizational leaders to recognize and remove such obstacles. Awareness and careful evaluation of the extent to which job design and work context function to hold back effective KMS use is the first step towards eliminating or reducing such hindrance, and clearing the way for truly taking advantage of the installed IT base to support tasks related to knowledge creation, storage/retrieval, transfer, and application.

The paper is structured as follows. First, we review the KM and KMS literature to identify the critical factors and constructs associated with the success of knowledge management efforts. This information is then used to elaborate a model relating the individual’s particular work context, his/her job characteristics, task-technology fit, and actual use of IT to leverage knowledge-related activities. Next, the model is tested, and the results, presented and analyzed. The paper concludes with recommendations for future studies on these topics.

Knowledge and Knowledge Management Models

Knowledge Management has its intellectual roots in Economics (e.g., Kenneth Arrow’s concept of the learning curve), Sociology (e.g., Daniel Bell’s views on a knowledge-based society), Philosophy and Psychology (e.g., the concepts of tacit and explicit knowledge, and learning processes (Prusak, 2001; see also Grover & Davenport, 2001). It also draws on practices related to information management, the quality movement, and the human factors/human capital movement (Prusak, 2001).
As a concept of interest in a multidisciplinary arena, knowledge has instilled different perspectives in the various fields that have addressed it over the centuries. In KM, knowledge has been often defined as “a justified belief that increases an entity’s capacity for effective action” (Alavi & Leidner, 2001, p. 109; Huber, 1991; Nonaka, 1994). This definition highlights the cognitive aspect of knowledge, i.e., as something that is in the mind of a “knower”. Accordingly, some authors view knowledge as “personalized information”, that is, as information that individuals combine with experience, context, interpretation and reflection. As such, it would be indelibly shaped by the person’s needs, beliefs, and previous stock of knowledge (e.g., Alavi & Leidner, 2001; Gallupe, 2001; Grover & Davenport, 2001). Therefore, when knowledge is transferred in organizations, the ideas, concepts, etc. associated with it are actively interpreted by individuals and adjusted by them to their own situation and perspective. For this reason, “there is a continual shift in meaning as new knowledge is diffused in an organization” (Nonaka, 1991, p. 103).

In their review of the literature, Alavi and Leidner (2001) identified a number of perspectives and taxonomies related to knowledge. For instance, knowledge can be seen as: (a) a state of the mind associated with knowing and understanding; (b) an object that can be stored and manipulated; (c) a process of simultaneously knowing and acting, i.e., applied expertise; (d) a condition of having access to information; and (e) a capability that includes the potential to influence action and improve decision making. These many perspectives have guided the elaboration of distinct strategies for managing knowledge in organizations, and elicited different definitions of the role that information systems should play in the process.

One of the most cited classifications of knowledge is based on Polanyi’s (1966) distinction between tacit and explicit knowledge (e.g., Alavi & Leidner, 2001; Davenport & Prusak, 1998; Garvin, 1993; Nonaka, 1991, 1994). According to Polanyi, explicit knowledge refers to formal, systematic knowledge that a person can express, codify, and share with relative ease. On the other hand, tacit knowledge is difficult to express, codify, and formalize, being “deeply rooted in action and in an individual’s commitment to a specific context – a craft or profession, a particular technology or product market, or the activities of a work group or team” (Nonaka, 1991, p. 98). Furthermore, tacit knowledge is inherently connected to an individual’s mental models, beliefs, and perspectives, playing, therefore, an important role on how the person actually perceives the world around him/her (Nonaka, 1991).

Based on the distinction between explicit and tacit knowledge, Nonaka (1991, 1994) defined the process of knowledge creation in organizations as a spiral that passes through four basic “patterns”. After each cycle, more and more knowledge is developed and reused by people in the organization. The first pattern is associated with a process of socialization whereby a person’s tacit knowledge is absorbed by another person also as tacit knowledge. The second pattern refers to the articulation of tacit knowledge into explicit knowledge, often with the help of metaphors, analogies, and models. Nonaka (p. 101) suggests that metaphors help organizational members link contradictory perceptions and ideas. The ambiguity and inconsistencies embedded in the metaphors can then be resolved by using analogies. The created concepts are then formalized and embodied in a model or document, which can be used to make the knowledge available to the rest of the company. In the third pattern, explicit knowledge is recombined and applied to different situations, generating more explicit knowledge. The fourth and final pattern consists of the internalization of new explicit knowledge by employees, who appropriate it then to “broaden, extend, and reframe their own tacit knowledge” (p. 99). These patterns are highly interdependent and intertwined, relying on, contributing to, and benefiting from each other. Moreover, at any point in time, an individual may be engaged in different patterns simultaneously, interacting in each of them with the same or different groups of people (Alavi & Leidner, 2001; Marwick, 2001).
Although more sporadically, other taxonomies have been used in the Knowledge Management literature. One of them defines *individual knowledge* as that created by and existing in the individual, and *social knowledge* as that created by and inherent to the collective actions of a group (Alavi & Leidner, 2001, p. 111). Another framework distinguishes three types of knowledge: *declarative*, *procedural*, or *causal* (Zack, 1999). Declarative knowledge describes what something is; procedural knowledge elucidates how something is done; and causal knowledge explains why something happens (Gallupe, 2001, p. 63). In organizations, procedural knowledge is rooted in norms of behavior, standards of practice, and settings of equipment, while causal knowledge is more fundamental, allowing for the accommodation of exceptions, adaptations, and unforeseen events (Garvin, 1993, p. 85).

Acknowledging the concepts described above, we define knowledge in this research as validated experiences, beliefs and ideas that are combined and used to evaluate new events and situations, thereby enhancing our capacity to take action. Knowledge helps us to define what to do at a given moment, in a specific situation, and how to actually do it; to compare and contrast alternatives and make decisions.

**Knowledge Management Systems (KMS) and Task-Technology Fit (TTF)**

The term “information” appears frequently in the literature as something different from both data and knowledge (Grover & Davenport, 2001; Spiegler, 2000). Although the difference between data and information is reasonably clear and widely accepted, the distinction between information and knowledge is not so obvious. In an attempt to clarify this issue, Alavi and Leidner (2001) posited that “information is converted to knowledge once it is processed in the mind of individuals, and that knowledge becomes information once it is articulated and presented in the form of text, graphics, words, or other symbolic forms” (p. 109). Drawing on their perspective, we then argue that knowledge can be codified as information and stored in computer information systems in an organization. In addition, computer information systems can be used to transfer knowledge, in the form of information, among the members of an organization.

In the IT literature, the theme of KM has been approached primarily from the perspective of the development, implementation and management of knowledge management systems (KMS) (e.g., Alavi & Leidner, 1999; Duffy, 2001; Gallupe, 2001; Markus, 2001; Schultze & Leidner, 2002). Different types of IT tools have been used as building blocks or platforms of KMS. They include intranets; groupware and communication technologies; database, data warehousing and data mining tools; web-based information search and diffusion tools (e.g., browsers, portals, agents); decision support systems; expert systems; workflow management systems; more specific systems, such as knowledge maps and directories, and software that aims at enhancing idea generation, brainstorming, and learning (Alavi & Leidner, 1999, 2001; Duffy, 2001; Gallupe, 2001; Marwick, 2001). Although most of the systems designed to support knowledge in organizations may not appear to be particularly different from other forms of information systems, they tend to focus on “enabling users to assign meaning to information and to capture some of their knowledge in information and/or data” (Alavi & Leidner, 2001, p. 109; Gallupe, 2001).

The design of KMS should be rooted and guided by an understanding of the nature and various types of organizational knowledge. However, most applications focus on the management of codified, explicit organizational knowledge, neglecting other forms of knowledge created by and embedded in individuals and organizations (Alavi & Leidner, 2001). Knowledge emerges and evolves over time, not only through processes that are
intrinsic to an individual or a single group, but also through the interactions of different individuals and groups (Nonaka, 1991, 1994). Accordingly, the application of information technologies to support knowledge management should allow for an easy and coordinated capture, storage, retrieval, and update of knowledge by individuals and groups, as well as for the establishment and nurturing of the linkages between individuals and groups (Alavi & Leidner, 2001; Gallupe, 2001; Marwick, 2001).

In their review of the literature, Alavi and Leidner (2001) identified three basic applications of IT in knowledge management initiatives: (1) in the coding and sharing of best practices; (2) in the creation of corporate directories; and (3) in the creation of knowledge networks. Indeed, most organizations have considerable difficulty to identify, locate, and retrieve the knowledge that resides within their own boundaries (Huber, 1991). Not surprisingly, the three types of application listed above focus on improving the capture, storage, and transfer of knowledge using either informal, impersonal means (e.g., discussion groups in Lotus Notes) or formal, personal means (e.g., helping people locate experts through knowledge maps and corporate directories) (Alavi & Leidner, 2001; Duffy, 2001; Gallupe, 2001). Nonetheless, quite often it is not the lack of knowledge that hinders organizational performance, but the failure to turn knowledge into effective action (Alavi & Leidner, 2001; Markus, 2001). As mentioned above, a number of factors, related to individual traits, job design, and organizational systems and culture, may contribute to individuals not applying the knowledge they obtain to their activities in the workplace (e.g., Davenport & Prusak, 1998; Smith & McKeen, 2004). Alavi and Leidner (2001) suggest then that an important, but lacking area of KM research would encompass “the identification of these factors and the development of organizational practices and systems to bridge the knowledge application gap” (p. 129; see also Grover & Davenport, 2001). For example, IT can be used to embed knowledge into organizational routines, allowing it to be applied across time and space (Alavi & Leidner, 2001; Marwick, 2001; Smith & McKeen, 2004). Alavi and Leidner’s suggestion becomes even more relevant if we consider that research on knowledge reuse has produced findings that “remained relatively dispersed and unintegrated” (Markus, 2001, p. 59).

Markus (2001) identified different types of knowledge reuse situations and, for each of them, the characteristics of the reuse process and the challenges that would hinder its success. Among those characteristics, she highlighted the difficulty to define and locate the information that is necessary in a given situation. Moreover, differences among types of knowledge reusers suggest that “the quality and content of their knowledge repositories are important factors in the success of knowledge reuse” (pp. 78-79). Therefore, the extent to which a KMS is effectively used seems to be linked to individuals’ perceptions of its usefulness, the quality of the information it provides, and the quality of the system itself (Alavi & Leidner, 2001; Markus, 2001). Attributes such as ease of use, the characteristics of human-computer interface, and the flexibility and effectiveness of search mechanisms are attributes often related to the perceived quality of an IS (Alavi & Leidner, 2001, p. 130).

Most of the concepts discussed above (e.g., usefulness, quality, effectiveness, etc.) are underlain by the idea of appropriateness, that is, by the assumption that the system must suit a person’s needs as they are related to the accomplishment of a certain task. In fact, research has shown that the utilization of an information system and the improvement in performance it may generate depend on the extent to which the technology provides features and support that “fits” the requirements of an individual’s portfolio of tasks (e.g., Dennis et al., 2001; Dishaw & Strong, 1998; Goodhue, 1995; Goodhue & Thompson, 1995). These ideas have been contemplated in the concept of Task-Technology Fit (TTF) and its associated models (e.g., Goodhue, 1995; Goodhue & Thompson, 1995), which have been employed to explain the actual use of different types of technology.
In the IS literature, the multidimensional construct TTF has frequently been adapted to reflect the characteristics of a particular task and information system (e.g., Dennis et al., 2001; Dishaw & Strong, 1998; Zigurs & Buckland, 1998). For instance, looking at use of the World Wide Web in international travel, D’Ambra and Wilson (2004) found that TTF factors (use for uncertainty reduction, as information resource, and for mediation) were relevant determinants of users’ perception of Web capability. Similarly, Denis et al. (2001) found in their meta-analysis that when there is a fit between group support system (GSS) structure and the task, GSS use: (1) increases the number of ideas generated, with considerable effects on decision quality; (2) reduces the time spent in the process; and (3) leads to greater participant satisfaction.

Based on the previous discussion and research evidence, we hypothesize that the extent to which a set of information technologies is actually employed by a person to obtain, transfer and reuse knowledge will depend on this person’s perception of fit between the technology and the knowledge-related requirements of his/her portfolio of tasks. The knowledge management models discussed above allowed us to identify as requirements: (1) the acquisition of relevant, precise information in a timely fashion; (2) the effective collaboration and communication with groups and persons across the organization; and (3) the possibility of introducing modifications in tasks, procedures, and workflow, in a timely fashion, as knowledge evolves in the organization. Therefore, we propose:

H1: The higher the person’s perception of fit between knowledge-related task and information systems characteristics (TTF), the more these systems will be used to obtain, transfer, and reuse knowledge (IS-KM).

Two basic perspectives on TTF have emerged in the literature. Goodhue (Goodhue, 1995; Goodhue & Thompson, 1995) explicitly includes the individual’s characteristics in the definition of the task-technology fit (TTF) construct, which is viewed as “the correspondence between the task requirements, individual abilities, and the functionality of the technology” (p. 218). Nevertheless, other authors adopt a definition that encompasses only task and technology characteristics. For instance, Dishaw and Strong (1998) define TTF as “the matching of the functional capability of available software with the activity demands of the task” (p. 109). Following this second perspective, we defined TTF in terms of the adjustment between the functionalities of the set of systems used by a person, and the knowledge-related requirements of his/her tasks, as described in the previous paragraph.

Job Characteristics and Knowledge Management Potential

Insofar as knowledge management processes are concerned, it is important to consider the extent to which the overall design of a person’s job entails the need and provides him/her the opportunity to obtain, transfer and reuse knowledge. Together, these two aspects of the work performed by an individual define its potential for developing knowledge management activities. We argue, then, that such potential can influence the relationship between perceived fit and actual use of information systems in knowledge management processes. Greater knowledge management potential of a job means that the job characteristics: (1) involve greater need to acquire, transfer and reuse knowledge; (2) promote greater opportunity to acquire, transfer and reuse knowledge; or (3) include both of these aspects. As the intrinsic knowledge management potential of a job increases, having the appropriate tools to engage in such processes will become even more relevant to the overall performance. Thus, greater job potential for knowledge management imply greater impact of TTF on performance. Further
support for this line of reasoning is offered by Expectancy Theory (Vroom, 1964; cf. van Eerde & Thierry, 1996), as explained below.

In general terms, Expectancy Theory suggests that a person’s motivation to perform a task depends on his/her belief that his/her effort will result in the attainment of desired performance goals. This belief, or perception, is usually based on the person’s past experience, self-confidence, and the perceived difficulty of the performance standards or goals associated with the task. Drawing on Expectancy Theory, we can associate a job’s potential for knowledge management with the benefits a person may accrue from its adequate performance. Jobs with higher potentials can be perceived as offering the chance to obtain greater benefits. Even when the organization does not explicitly evaluate employees on some knowledge-related dimension, a person may actively (or not) seek and obtain new knowledge to help him/her improve his/her overall performance. The use of information systems in knowledge-related activities can be perceived, then, as a means to facilitate the achievement of such benefits. Nonetheless, it is reasonable to expect that the perceived probability of deriving the expected benefits from the use of a portfolio of systems should increase with the fit between the characteristics of the knowledge-related tasks and the functionalities provided by these systems. In this way, if a set of systems lacks the functionalities that are necessary to allow an individual to fulfill the knowledge-related demands of his/her tasks, he/she may consider it pointless to invest the effort (e.g., time and energy) necessary to use these systems to enhance his/her performance in activities related to knowledge acquisition, transfer and reuse. In contrast, if the systems are able to fulfill the knowledge-related demands of the tasks, the perceived probability of reaping the expected benefits from their use compensates the effort associated with their actual use. In this case, the person would tend to employ the systems in knowledge-related activities more intensively when the expected benefits associated with their performance are greater. For this reason, we propose the following hypothesis:

H2: The potential for knowledge management (KM-POT) in a person’s job moderates the relationship between task-technology fit (TTF) and the use of information systems in knowledge-related activities (IS-KM): the greater the potential for knowledge management (KM-POT), the stronger the effects of task-technology fit (TTF) on the use of information systems to obtain, transfer, and reuse knowledge (IS-KM)

A person’s need and opportunity to obtain, transfer and reuse knowledge in his/her work may vary with the specific characteristics of his/her job. For example, job designs that give individuals the autonomy to make their own decisions under a variety of situations may provide them with a broader range of opportunities to apply new knowledge. This idea is aligned with recent research that indicates that job design may be a direct antecedent of creativity and innovation, which are both related to the capacity of generating and applying new knowledge in the workplace (e.g., Parker, Wall & Cordery, 2001). Thus, in this study, we will try to verify whether job design actually determines a job’s potential for knowledge management. To accomplish this goal, it is necessary first to define a conceptual framework to identify and adequately assess the different characteristics of a job.

One of the most popular frameworks on job design is the Job Characteristics Model developed by Hackman and Oldham (1976). It was conceived based on the notion of intrinsic motivation, which is experienced by individuals when their jobs and the tasks they encompass generate the experience of three psychological states: (a) personal responsibility; (b) meaningful work experience, and (c) knowledge of the results of the effort. That framework
entailed the idea that jobs could be designed to generate such experiences. According to the model, the level of autonomy involved in a job would generate the experience of responsibility. On the other hand, the experience of meaningfulness would be generated by: (1) skill variety, which is present when a job offers an individual opportunity to apply a number of different skills; (2) task significance, which is present when the job has an impact on the life of others; and (3) task identity, which is present when a whole and identifiable job is produced. Finally, the amount of feedback present in a job should generate knowledge of the results of the exerted effort. The higher the presence of these characteristics in a job, the richer it is assumed to be.

In this study, we leave aside the motivational aspects of Hackman and Oldham’s (1976) model, and apply it to characterize a job in terms of its richness. We argue that jobs that present higher levels of autonomy, skill variety, task significance, task identity, and feedback will be associated with greater need and opportunity to acquire, transfer and reuse knowledge. In so far as a job involves greater richness concerning the portfolio of skills it requires (task variety) and increased responsibility and decision making (autonomy), an individual’s need to access and reuse knowledge will certainly be greater, with particular implications for overall performance. Similarly, understanding and participating in the several stages of work processes (job identity) and the availability of regular evaluations of progress in accomplishing tasks (feedback) will present an individual with more opportunities to obtain and share knowledge.

For instance, a job design can require the employee to discuss with a supervisor or senior worker the adequacy of the outcomes he/she generates. In addition to serving performance evaluation purposes, these talks can be used (by design or not) to identify and provide competencies that the employee may be lacking. The same reasoning can be applied to task identity. For example, call center clerks that act as the single interface of a company with its customers are usually expected to interact with different areas of the organization to provide an end-to-end solution for the customers’ needs. This process involves considerable levels of need and opportunity to acquire, transfer, and reuse knowledge that may reside in different parts of the organization.

The presence of skill variety may be also important to determine a job’s potential for knowledge management. For instance, a mid-level manager that is supposed to perform specific technical tasks and, at the same time, evaluate and manage the budget of his/her area, provide support for his/her team, interact with customers, etc. needs to exchange information with various groups, and to draw on different types of knowledge to perform his/her duties. In addition, the extent to which he/she perceives his/her tasks to have an impact on the life of others (task significance) may motivate him/her to obtain and apply new knowledge to his/her tasks. This would happen if the manager perceived that, by applying the new knowledge, he/she would be able to generate more positive outcomes for those who are affected by his/her job.

Based on the above, we propose the following hypothesis:

H3: The richer a person’s job is (JC), the higher its potential for knowledge management (KM-POT), i.e., the greater the need and opportunity to obtain, transfer, and apply knowledge in his/her tasks.

The Role of Work Context

Goodhue and Thompson (1995) suggest that TTF may not dominate the decision to utilize a technology. Instead, utilization would be also significantly influenced by factors such as
attitudes and social norms. This idea is echoed by Dennis et al. (2001), when they suggest that the way a group chooses to use a particular GSS technology is influenced not only by task-technology fit, but “by the fit of the technology with the group’s habitual routines – the social structures that evolve slowly over time” (p. 172).

Similarly, authors have also argued that the efficacy and long-term success of KMS depend not only on the characteristics of the technology, but also on the effective resolution of different cultural and organizational issues, the integration of systems and knowledge-supporting business processes, and the development of metrics to evaluate the actual benefits of the technology (Alavi & Leidner, 1999; Grover & Davenport, 2001; Marwick, 2001). For instance, Markus (2001) argues that adequate incentives need to be in place to encourage knowledge producers to articulate and record their ideas in ways that are useful to others, sometimes, in detriment to their own needs. Furthermore, according to Alavi and Leidner (1999), “in the absence of an explicit strategy to better create and integrate knowledge in the organization, computer systems which facilitate communication and information sharing have only a random effect at best” (p. 7).

Several issues related to organizational structure, systems and culture seem to be critically related to the success of Knowledge Management efforts. For example, it is important to build an organizational environment that stimulates and supports knowledge sharing and collaboration across boundaries and hierarchical levels, as a routine way of doing business (Alavi & Leidner, 2001; Duffy, 2001; Garvin, 1993). This requires an incentive system that favors risk taking, and “maintain accountability and control over experiments without stifling creativity by unduly penalizing employees for failures” (Garvin, 1993, p. 83). In view of that, the training programs offered by the company must promote not only the transfer of knowledge, but also the practice of new ideas, methods and techniques, as well as their application in the trainees’ own jobs (Garvin, 1993). Therefore, it is essential to allow employees to spend time reflecting, analyzing, discussing, and trying out new ideas (Alavi & Leidner, 2001; Garvin, 1993). Mechanisms should be in place to systematically assess, record, and disseminate the past successes and failures in the various experiments conducted in the organization (Garvin, 1993). In addition, other initiatives that stimulate the transfer of tacit and explicit knowledge among employees should be encouraged, including the use of written, oral, and visual reports, site visits and tours, personnel rotation programs, and standardization programs (Garvin, 1993).

Nonaka (1991) also highlights the importance of developing a vision for the company that is open-ended, and susceptible to a variety of different and even conflicting interpretations, but that gives a sense of purpose and direction to its employees. Managers should then provide a conceptual framework that helps employees make sense of their own experiences, so that they are used to generate knowledge that is conducive to the achievement of the organization’s goals (Nonaka, 1991). It is also their task to manage conflict that may arise from the inevitable discrepancies in meaning that occur as knowledge is diffused in a company. In this way, eventual conflicts can be used to foster the development of new ideas and new knowledge (Nonaka, 1991).

In the light of the above, we argue that the characteristics of an individual’s work context will be associated with the need and opportunity to obtain, transfer, and apply knowledge in his/her job. As indicated in the literature, we assume that organizational context can be designed to be more conducive to knowledge management processes. Nevertheless, the KM principles must be incorporated into an individual’s job to be actually put in practice. Hence, we propose the following hypothesis:
H4: The characteristics of a person’s work context (WCXT) will affect his/her need and opportunity to acquire, transfer and reuse knowledge in his/her job (KM-POT).

H4a: The effect of work context (WCXT) on the potential for knowledge management (KM-POT) will be fully mediated by job characteristics (JC).

H4b: The greater the support of a person’s work context to knowledge-relevant activities, the richer his/her job will tend to be.

These ideas discussed above and the hypotheses tested in the present study are summarized in the model presented below.

Figure 1: Proposed Model and Hypotheses

Research Methodology

The hypotheses proposed in this study were tested with a sample of 117 individuals, with ages varying from 21 to 51 (mean = 33.4), working in small, medium and large public and private companies operating in Brazil. Sixty percent of the participants were males, and 40%, females. About 90% of the individuals in the sample had at least a college degree, and all of them reported being comfortable using computers. They were evenly spread through all hierarchical levels of the organizations (top management, middle management, supervisors, and staff). These individuals were contacted through an MBA program, and volunteered to answer a questionnaire prepared for the purpose of this investigation.

Hackman and Oldham developed the Job Characteristics Survey (JDS) to access the overall motivating potential score of a job. That measure was used in this project to investigate the characteristics of jobs developed by those who participated in this study.

The instrument used to measure a job’s potential for knowledge management (KM-POT) consisted of 8 items related to the need and opportunity to obtain and apply knowledge to one’s work activities. The reliability of this measure was tested, generating a Cronbach’s alpha of 0.95.

As we expected, a factor analysis of the instrument developed to measure the fit of knowledge-related task requirements and information systems characteristics (TTF) indicated the presence of four factors. They were related to: (a) the acquisition of relevant information in a timely fashion; (b) the communication with peers; (c) the adequacy of the system to the workflow; and (d) the adaptability of the systems to changes in work structure. Although these factors were related, the results of the analysis showed a simple structure with each of
the 10 indicators being uniquely associated with a factor. The Crombach’s alpha for this instrument was 0.77.

The instrument developed to measure the application of information systems to transfer and reuse knowledge (IS-KM) was analyzed in a similar manner. The factor analysis confirmed the presence of two factors related to: (a) the application of new knowledge in a person’s activities; and (b) the transfer of knowledge to and from other groups and persons in the organization. The Crombach’s alpha for this instrument was 0.81.

In order to assess the work context (WCXT), we adapted the instrument developed by Tracey et al. (1995) to measure Continuous-Learning Culture. Our version used 18 of the 24 original items, based on their relevance to the transfer and reuse of knowledge. The reliability (alpha) of the scale in this study was 0.93.

Due to length restrictions, the scales developed in this research are not included. Nevertheless, they can be made available by the authors upon request.

Analysis and Results

Because of the moderation and mediation effects proposed in the model, and the reasonably small size of the sample, the model was tested in two steps, using hierarchical linear regression analysis. In the first step, we tested the mediation of the relationship between work context (WCXT) and potential for knowledge management (KM-POT) by job characteristics (JC). The second step consisted of the test of the moderation effect of KM-POT on the relationship between task-technology fit and the use of IS to leverage knowledge-related activities. Due to length restrictions, we will not present our findings in a tabular form, preferring to discuss the statistical evidence in the subsequent analysis.

To test the mediation effect of JC, we first regressed WCXT on KM-POT. In spite of the small amount of variance explained by WCXT, the $R^2$ (.061) was significant ($F = 7.59, p < .01$). Next, we entered JC in the regression equation. The increment in $R^2$ was significant ($\Delta R^2 = .16, F = 23.15, p < .00$), as well as the effect of JC on KM-POT ($\beta = .43, t = 4.81, p < .00$), confirming hypothesis H3. Furthermore, the introduction of JC in the equation made the coefficient of WCXT non-significant. Then, we regressed WCXT on JC, finding a significant $R^2$ (.16, $F = 22.11, p < .00$), and coefficient ($\beta = .40, t = 4.70, p < .00$). These last results confirm the full mediation effect hypothesized in H4a, as well as the positive relationship between WCXT and JC proposed in H4b.

The second part of the analysis was the test of the moderation effect of KM-POT on the relationship between TTF and IS-KM. A hierarchical regression analysis was conducted. In the first step of the hierarchical regression, we entered in the model the variables associated with the different dimensions of TTF (info. acquisition – FITInf; communication – FITCom; task alignment – FITTask; and adaptability – FITAdap), together with KM-POT. In the next step, we entered the interaction terms created as the product of each of those variables and KM-POT. The results for the full model were significant ($R^2 = .22, F = 3.38, p < .00$). Moreover, the first model was significantly improved, although marginally, when the interaction terms were added ($\Delta R^2 = .07, F = 2.21, p < .06$). The following coefficients were significant: FITInfo ($\beta = .95, t = 1.84, p < .05$); FITCom ($\beta = .64, t = 1.77, p < .10$); FITAdap ($\beta = -1.18, t = -2.35, p < .05$); and the interaction term for FITAdap and KM-POT ($\beta = 1.44, t = 2.51, p < .01$).

These results partially confirm the hypothesized relationships. The positive direct effects of FITInfo and FITCom on IS-KM give support to hypothesis H1. Although FITAdap was
also significantly related to IS-KM, the direction of the effect was contrary to what was hypothesized. FITAdap represents the adaptability of the set of information systems used by a person to modifications introduced in the tasks and structure of his/her job. The negative sign of the corresponding coefficient could be explained, therefore, by the difficulty one may experience when the systems are adapted to the new conditions of the job. Insofar as such changes may require a considerable amount of effort to learn how to fully utilize the new functionalities of the systems, the individual may face problems to adequately use them to obtain, transfer, and apply new knowledge. It is important, though, to highlight the positive coefficient observed for the interaction term. This coefficient indicates that the greater the knowledge-related need and opportunity experienced by a person in his/her job, the higher the probability of this person overcoming the initial challenges associated with the use of systems, and thereby actually employing them to leverage his/her knowledge management activities.

Conclusion

This research contributed to the identification of important relationships associated with organizational context, job design, and the use of knowledge management systems in organizations. As suggested in the literature, this has been an area where results tend to be fragmented, lacking a systematic empirical investigation based on quantitative methods. The model proposed in the present article represents a first step towards integrating different factors previously cited in the literature as critical factors contributing to the success of knowledge management initiatives, and the effective use of KMS.

Although the test of the model did not confirm all of our hypotheses, we believe this can be partially attributed to the small sample size used in this investigation. Therefore, more data must be gathered to properly investigate the relationships proposed here. A larger sample size would also allow the simultaneous test of the proposed moderation and mediation effects using a more sophisticated tool, such as Structural Equation Modeling (SEM). In addition, future studies would benefit from the use of data collected in other countries. The impacts of national culture on the variables and relationships contemplated in our model could be evaluated in this way. This becomes even more relevant in face of the recent trends towards globalization, business process outsourcing, and the offshoring of IS development.

References


