



Journal of Work and Organizational Psychology

www.elsevier.es/rpto



Learning culture and knowledge management processes: To what extent are they effectively related?



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ARTICLE INFORMATION

Manuscript received: 30/11/2013

Revision received: 15/09/2014

Accepted: 30/10/2014

Keywords:

Learning culture

Knowledge management

Organizational level of analysis

ABSTRACT

In the contemporary context of high competitiveness between organizations, organizational learning culture and knowledge management (KM) have been considered key concepts in both academic and managerial settings. This study aims to provide empirical support for the relationship between organizational learning culture and knowledge management, specifically concerning the prediction of learning culture on KM processes. Data collection was carried out through questionnaires in 50 Portuguese manufacturing firms. Data was analyzed at the organizational level using standard multiple regressions. The results showed a significant and positive relationship between learning culture and KM practices. Concerning the two dimensions of learning culture, internal integration was the main predictor for KM formal practices, KM informal practices and strategic management of knowledge, whereas the external adaptation dimension was shown to predict only the strategic management of knowledge. The present study contributes to theoretical and empirical findings concerning the relationship between learning culture and knowledge management processes.

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La cultura de aprendizaje y los procesos de gestión del conocimiento: ¿hasta qué punto se relacionan de hecho?

RESUMEN

En el contexto actual de alta competencia entre organizaciones, la cultura de aprendizaje organizacional y la gestión del conocimiento (GC) se consideran clave tanto en entornos académicos como directivos. Este estudio pretende proporcionar apoyo empírico para la relación entre la cultura de aprendizaje organizacional y la gestión del conocimiento, y más concretamente sobre el grado en que la cultura de aprendizaje es capaz de predecir los procesos de GC. La recogida de datos se realizó mediante cuestionarios en 50 empresas portuguesas de producción. Los datos fueron analizados al nivel organizacional usando regresiones múltiples. Los resultados mostraron una relación positiva y significativa entre la cultura de aprendizaje y las prácticas de GC. Con respecto a las dos dimensiones de la cultura de aprendizaje, la integración interna fue el principal predictor de las prácticas formales de GC, de las prácticas informales de GC y de la gestión estratégica del conocimiento, mientras que la adaptación externa fue capaz de predecir sólo la gestión estratégica del conocimiento. El presente estudio contribuye a hallazgos teóricos y empíricos relativos a la relación entre la cultura de aprendizaje y los procesos de gestión del conocimiento.

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Palabras clave:

Cultura de aprendizaje

Gestión del conocimiento

Nivel de análisis organizacional

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The idea of knowledge as a resource used by organizations to gain competitiveness also arose in the 1990s, when the importance of managing this resource, that is, the concept of knowledge management (KM), started to gain attention in managerial and academic contexts (Cardoso, 2008). Organizations' knowledge management capability has been pointed out as the main source of innovation within organizations (Gracia, Martínez-Tur, & Peiró, 2001).

Numerous empirical and theoretical studies about knowledge management have been carried out since the 1990s, and important advances have been made, but two research gaps can still be identified. First, although learning is considered a key process in efficient knowledge management, there is a lack of studies that integrate knowledge management and learning. We agree with Lytras and Poulodi (2006), who, after analyzing several KM frameworks, concluded that "the learning dimension has been under-represented and underestimated" and that "the inevitable relation of knowledge and learning seems to be taken for granted in most of the approaches" (p. 65). Second, despite the importance in the literature of organizational culture to knowledge management processes, research examining this relationship has been scarce (Chiva & Alegre, 2005; Lytras & Pouloudi, 2006; Oliver & Kandadi, 2006; Wong & Aspinwall, 2005). In this paper, we will contribute to shedding some light on both of these research gaps, analyzing the relationship between organizational culture, or more specifically, learning culture, and knowledge management.

Organizational Learning, Organizational Culture and Learning Culture

Organizational learning takes place when learning is transferred from the individual to the collective level in a dynamic process of interaction among different existing levels within the organization (individual, group, and organization). When conceptualizing organizational learning, authors mainly define it as either a technical or a social process. The former considers that organizational learning is mostly related to effectiveness in processing and interpreting information, both inside and outside the organization. On the other hand, the social view of organizational learning focuses on the way people make sense of their experiences at work. Organizational learning is then considered as a social process once it emerges from social interactions, normally in the work environment (Easterby-Smith & Araujo, 1999).

In the organizational learning and learning organization literature (especially in the latter), organizational culture is mainly seen as a facilitating factor for learning in (and from) organizations (e.g., Ahmed, Loh, & Zairi, 1999; Baetz, 2003; Campbell & Cairns, 1994; Conner & Clawson, 2004; Hill, 1996; Maccoby, 2003; Marquardt, 1996; Marsick & Watkins, 2003). In the literature, this orientation of a culture towards learning is called a learning-oriented culture or simply a learning culture. In short, it is the type of culture that a learning organization should have because, as Wang, Yang, and McLean (2007) state, "in practice, an organizational learning culture can be a vital aspect of organizational culture and the core of a learning organization" (p.156).

According to Schein (1992), organizational culture or group culture can be defined as: "A pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems" (p. 12).

A learning culture can be defined as a culture oriented towards the promotion and facilitation of learning by its employees. It encourages the sharing and spreading of what is learned, aiming at the development and success of the organization (Rebelo, 2006).

Concerning the characteristics that distinguish a learning culture from other types of cultures, convergence points among different authors (Ahmed et al., 1999; Hill, 1996; López, Peón & Ordás, 2004; Marquardt, 1996; Marsick & Watkins, 2003; Pedler, Burgoyne, & Boydell, 1997; Schein, 1992, 1994) can be detected. Among these points, we highlight learning as one of the organization's core values, a focus on people, concern about all stakeholders, existence of tolerance of a diversity of people and opinions to strengthen innovation, stimulation of experimentation, encouragement of an attitude of responsible risk, tolerance of error and readiness to recognise errors and learn from them, leadership's commitment and support, as well as open and intense communication.

Internal Integration and External Adaptation

Two dimensions of organizational culture. As mentioned above, the resolution of problems concerning external adaptation and internal integration is related to the concept of culture (Schein, 1992).

Internal integration consists of the structuring and coordination of internal processes in the organization (e.g., leadership style, the way work is arranged, the communication structure), whereas external adaptation is related to the orientation of the organization towards the environment (e.g., clients, competitors and other stakeholders), in order to successfully correspond to the existing demands.

According to Schein (1985), these two dimensions are considered basic functions of organizational culture: dealing with problems of internal integration and external adaptation. Both groups and organizations have to constantly manage these two aspects for their survival, which gives them a central role in culture in organizations.

In order to be competitive, companies need to constantly align adaptation to external changes and integration of internal processes (e.g., Salaman, 2001, cit. in Rebelo, 2006). The organization (that is, its employees and processes) needs to be well integrated in order to assure an adequate response to environmental changes. In other words, it is not effective to be exclusively oriented towards following clients' or competitors' movements or the environment if the organization cannot efficiently rearrange itself internally to respond to the necessary changes.

In the dynamics between internal integration and external adaptation, learning processes play a central role. Thus, orientation towards learning must be present on a daily basis in the organization in order to allow the assimilation of new information by the organizational members and an adequate internal reorganization (Rebelo, 2006). This is what learning organizations ultimately look at as a way to gain competitiveness (Easterby-Smith, Lyles & Tsang, 2008; Garvin, 2000).

Knowledge Management and Organizational Culture

Whereas the learning culture, as mentioned above, refers essentially to the existing attitudes, values and behaviors that allow for continuous learning in organizations, Knowledge Management (KM) can be considered a process of leveraging knowledge as the means of achieving innovation in processes and products/services, effective decision making, and organizational adaptation to the market (Yahya & Goh, 2002). Generally, it can also be defined as an approach to add or create value through the activation of know-how, of experience inside and outside the organisation (Ruggles, 1998).

Knowledge Management implies a set of actions and activities related to knowledge, using specific tools and techniques, in such a way that knowledge is available when the organization needs to solve problems or find solutions (Du, Ai, & Ren, 2007).

KM can also be seen as a system that enhances an organization's learning through facilitation of knowledge (both tacit and explicit)

exchange and sharing (Yahya & Goh, 2002). Explicit knowledge is transmitted in formal, systematic language. For this reason, it can be easily communicated and shared through product specifications, a scientific formula, or a computer program. Explicit knowledge is captured in records of the past, such as libraries, archives, and databases, and it is assessed on a sequential basis (Polanyi, 1966, cit. in Nonaka, 1994). On the other hand, tacit knowledge is highly personal, hard to formalize, and difficult to communicate to others. It is deeply rooted in action and in an individual's commitment to a specific context – a craft or profession, a particular technology or the activities of a work group or team (Nonaka, 1991, 1994). Processes that promote the socialization of individuals (into new tasks, activities, etc.) are a prior way of transferring this kind of knowledge. The sharing of extra information between individuals also promotes the sharing of individual tacit knowledge (Cardoso, 2008).

The notion of processes/phases is also an important aspect in understanding KM. According to Mayo (1998), KM is “the management of information, knowledge and experience available to an organization – its creation, capture, storage, availability and utilization – in order that organizational activities build on what is already known and extend it further” (p. 35). Davenport and Prusak (1998) analyzed knowledge as following a path with three main stages: creation, codification/coordination, and transfer. Creation can be achieved by acquisition or renting (e.g., getting new workers), definition of dedicated resources (e.g., groups of collaborators assigned to do this, like research & development departments), fusion, adaptation or networks. Regarding the second stage, the authors state that top management must define the organizational goals to guide codification, adequate knowledge for those goals, and proper support for its distribution. Finally, they emphasize that the transfer phase is an inevitable process with a formal or informal nature that must be kept in mind by managers.

Coleman (1999), Bhatt (2001), and Reinhardt (2001) propose additional stages for KM, such as knowledge validation, knowledge diffusion or knowledge mapping, and indexing.

In the present study, Cardoso's (2008) definition of KM phases is followed. After an extensive literature review, Cardoso identified six processes considered relevant for KM in organizations: creation and acquisition, attribution of meaning, sharing and diffusion, organizational memory, measurement, and recovering, which must be structured according to the organizational objectives in order to obtain the desired results. The six processes were grouped into four different dimensions: (1) KM formal practices: correspond to the processes formally instituted in the company for the creation, sharing and use of knowledge, being mostly related to explicit knowledge; (2) cultural orientation towards knowledge: the orientation of practices, rules, procedures towards knowledge, which is considered a central value for the organization; (3) KM informal practices: related to social interactions at an informal level which contribute to the formation of a common language through which people make sense of the information available, being mostly related to tacit knowledge, and finally; (4) strategic management of knowledge: reflects an orientation of the organization towards the environment. This dimension focuses on the organizational capacity for making use of knowledge focusing on competitiveness, where information about clients and competitors has a leading role.

Cardoso (2008) states that the organization must be aware of the sort of knowledge held by competitors, the type of knowledge that can be shared and what cannot, etc. It is important to strategically manage knowledge in order to satisfactorily respond to environmental changes, considering the interests of all stakeholders and maintaining a sustainable competitiveness.

According to De Long (1997), even though the economic incentives are becoming clearer and technological capabilities now exist to support knowledge-based organizations, pioneers in knowledge management have found that behaviors supported by existing

organizational cultures are often a major barrier to knowledge-based organizations. As Davenport and Prusak (1998) state, effective knowledge management cannot take place without extensive behavioral, cultural, and organizational change.

De Long (1997) considers that there are four ways that culture and knowledge interact. The first refers to the fact that culture shapes assumptions about what knowledge is important. Cultures, and particularly subcultures, heavily influence what is defined as useful, important or valid knowledge in an organization and, indeed, whether knowledge is important to the business. They determine, for instance, the status of taking part in a skill-building training class compared to the status of performing daily tasks.

The second form of interaction occurs when culture mediates the relationship between individual and organization-level knowledge. Culture legitimates what knowledge belongs to the organization and what knowledge remains under the control of the individual. Cultural rules also determine who is expected to have what knowledge, as well as who must share it and who can hoard it.

The third way refers to support for social interaction: culture creates a context for interaction that determines the value derived from knowledge. Organizational culture determines how knowledge will be used in a particular situation. It does so primarily by dictating the rules, expectations, and penalties that govern social interactions between individuals and groups and shape individuals' perceptions of their range of options acceptable to the firm. For example, a company where it is not normal to share ‘lessons learned’ across projects or sites does not provide a behavioral context where one group's valuable experiences are likely to be passed on to another group in the firm, even if the technology makes it possible to do so. Thus, the added value of the knowledge for the organization is lost.

Finally, the fourth type of interaction between culture and knowledge occurs when culture shapes the organization's reaction to new knowledge, mainly by validating or rejecting it. One of the key steps in creating new knowledge for the organization is the ability to question cultural beliefs and existing ways of working, which is usually a difficult challenge for leadership.

Based on these arguments, it becomes clear that organizations should take a hard look at their culture before launching a knowledge initiative (Davenport & Prusak, 2000). According to Liebowitz (1999), the success of KM is 90 per cent dependent on building a supportive culture.

On the other hand, Oliver and Kandadi (2006) state that “despite the widespread recognition of organizational culture as a core factor in the KM arena, very little is known about creating an effective culture for knowledge management” (p. 6). Along the same lines, Van Wijk, Jansen, and Lyles (2008) pointed out that there are few studies that have looked at the relationship between culture and knowledge transfer.

Next, a review of the scarce empirical evidence relevant to this relationship is presented.

Organizational Factors that Impact Knowledge Management: Empirical Studies

A study with general managers or top executives of 195 Spanish companies (López et al., 2004) found that the collaborative culture – whose main characteristics are encouragement of communication and dialogue, trust and respect for individuals, teamwork, empowerment, ambiguity tolerance, risk assumption, and respect for diversity – was positively related to organizational learning and knowledge management initiatives in the form of knowledge acquisition, distribution, interpretation, and organizational memory. The results also pointed out a positive impact of such initiatives on the business performance of the firm.

Empirical research was carried out by Yahya and Goh (2002) in Malaysia with 300 managerial-level employees of companies

belonging to diverse sectors (manufacturing and processing, banking, consultancy, information technology, etc.). The relationship between companies' practices in four Human Resources Management (HRM) areas (training, decision making, performance appraisal, compensation and reward) and five KM activities (knowledge acquisition, knowledge documentation, knowledge transfer, knowledge creation, and knowledge application) was analyzed. The results indicated that HRM practices, such as training in leadership skills and other competencies like change management, creativity, and problem solving, were positively related to the development of KM activities in the organization.

An exploratory study carried out by Cabrera, Collins, and Salgado (2006), with 372 employees of a large multinational company, analyzed some of the psychological, organizational, and system-related variables that may determine individual engagement in intra-organizational knowledge sharing. The results of the research showed that, among the organizational variables, the most important effect had to do with perceptions of support from colleagues and supervisors related to knowledge sharing.

Finally, Wong, and Aspinwall (2005), based on the perceptions of employees of 26 SME (Small and Medium Enterprises), found that among 11 CSF (Critical Success Factors) for Knowledge Management adoption (management leadership and support, culture, information technology, strategy and purpose, measurement, organizational infrastructure, processes and activities, motivational aids, resources, training and education, human resources management), the top two were management leadership and support and the culture, both being classified by the employees as very important factors for KM adoption. Thus, for the employees, culture is more relevant than information technology for building Knowledge Management adoption. In sum, some of the characteristics that were positively related to KM activities in the empirical studies reviewed are: management and colleagues' support, creativity skills, the company's learning orientation, culture, and cultural attributes, such as trust, collaboration, and openness. Looking at the definition of learning culture provided in this paper, it is possible to find many similarities between these characteristics and those of a learning culture. These similarities consist of a focus on people, stimulation of experimentation, leadership's commitment and support, openness and trust.

Thus, both the theoretical frameworks and empirical studies reviewed suggest the existence of a relationship between organizational culture, namely, a learning culture, and knowledge management practices. However, this relation has not yet been tested empirically. This will be the main contribution of this paper.

Aim and Hypotheses

This paper aims to provide support for the relationship between organizational learning culture and knowledge management. Anchored in the information presented so far, we propose the following research question: "What is the relationship between learning culture and processes and practices of knowledge management in organizations?"

Specifically, we intend to evaluate the relationship between learning culture and its dimensions (internal integration and external adaptation) and the KM processes, which correspond to three¹ KM dimensions systematized by Cardoso (2003):

- a) KM formal practices: the processes formally instituted in the company for the creation, sharing, and use of knowledge. They are mostly related to explicit knowledge.
- b) KM informal practices: related to social interactions at an informal level, which contribute to the formation of a common language through which people make sense of the information available. They are mostly related to tacit knowledge.

- c) Strategic management of knowledge: reflects an orientation of the organization towards the environment. This dimension focuses on the organizational capacity for making use of knowledge focusing on competitiveness, where information about clients and competitors has a leading role.

Organizational culture has an important role to play in creating less formal systems for knowledge building and transfer alongside more formal systems (Pemberton & Stonehouse, 2000). According to De Long (1997), practices are the most visible symbol of culture, and they provide the levers for changing behaviors needed to support knowledge management objectives.

As seen in the study by Yahya and Goh (2002), the focus of HR practices for the development of a knowledge management organization must be on the development of competencies such as leadership, change management, creativity and problem-solving skills. These characteristics coincide with some of the characteristics of a learning culture described by Schein (1992, 1994) and Marquardt (1996). In an organization with these characteristics it is very likely that top management has a clear understanding of the importance of learning and knowledge for the organization. As they are largely responsible for the decision to implement processes in a given organization, we understand that an organization with a learning culture has a higher propensity to engage in formal practices of knowledge management. Therefore, we propose the following hypotheses:

H1: Learning culture will be positively and significantly related to the implementation of knowledge management formal practices in organizations.

H1a: The internal integration dimension of learning culture will be positively and significantly related to the implementation of knowledge management formal practices in organizations.

H1b: The external adaptation dimension of learning culture will be positively and significantly related to the implementation of knowledge management formal practices in organizations.

As previous research has shown, firms that encourage social interactions, whether formal or informal, increase opportunities for knowledge diffusion over networks (Wenger, McDermott, & Snyder, 2002). Incentive to social interactions is related to openness to communication and collaboration, which, in turn, are characteristics of a learning culture. The sharing of extra information, or the "redundancy" of information between individuals, promotes the sharing of tacit knowledge (Nonaka, 1994). Thus, the following hypotheses are proposed:

H2: Learning culture will be positively and significantly related to the implementation of knowledge management informal practices in organizations.

H2a: The internal integration dimension of learning culture will be positively and significantly related to the implementation of knowledge management informal practices in organizations.

H2b: The external adaptation dimension of learning culture will be positively and significantly related to the implementation of knowledge management informal practices in organizations.

Learning enables organizations to build an organizational understanding and interpretation of their environment and begin to assess viable strategies (Daft & Weick, 1984; Donaldson & Lorsch, 1983; Starbuck, Greve, & Hedberg, 1978, all three cit. in Fiol & Lyles, 1985). The strategic options perceived are a function of the learning capacity within the organization (Burgelman, 1983, cit. in Fiol & Fyles, 1985).

According to De Long (1997), culture plays an important role in defining "what knowledge must be kept inside the organization to

support a core competency, and what should be transferred outside or shared to create strategic advantage” (p. 12). Companies whose cultures are most effective at creating and integrating new knowledge into the organization have norms and practices that demand broad participation in gathering knowledge and distributing information about the external environment (De Long & Fahey, 2000).

Whether the objectives of a knowledge management strategy are to improve operational efficiencies, enhance organizational learning, intensify innovation, or speed up response to the market, culture is a critical part of it (De Long, 1997). One of the characteristics of a learning culture described by Schein (1994) is the focus on all stakeholders, including competitors and clients. Therefore, it is understood that this kind of culture has an influence on how the company manages its knowledge. Thus, we propose the third set of hypotheses for this study:

H3: Learning culture will be positively and significantly related to the strategic management of knowledge in organizations.

H3a: The internal integration dimension of learning culture will be positively and significantly related to the strategic management of knowledge in organizations.

H3b: The external adaptation dimension of learning culture will be positively and significantly related to the strategic management of knowledge in organizations.

Method

Design

This research has a correlational design and uses the organizational level of analysis. This level of analysis was chosen because both theoretical constructs studied, learning culture, and knowledge management processes have an organizational nature.

Standard multiple regressions were used for analyzing data. The predictor variables of this study are the two dimensions of the learning culture (internal integration and external adaptation), and the criterion variables are the three dimensions of the knowledge management process (KM formal practices, KM informal practices, and strategic management of knowledge).

Sample

The sample was composed of 50 Portuguese manufacturing firms. Concerning the studied organizations' main activities, twelve firms belonged to the textile industry (22%), seven to the metal-mechanical industry (14%), four to the poultry industry (8%), three to the furniture industry (6%), three to the wood industry (6%), three to the transformation and commerce of granite (6%), two to the automotive sector (4%), and others to different areas of activity (34%). According to the European standards for company dimensions in terms of number of employees (Official Journal of the European Union, 2003), 24% of the companies studied were small (less than 50 employees), 66% were medium (less than 250 employees), and 10% were big companies (more than 250 employees). The age of the organizations studied ranged from 2 to 54 years, with the mean being 11.6 years ($SD = 11$ years). All companies belonged to the private sector; 52% sold their production to both the internal and external markets, 42% kept it in the internal market, and 6% only exported. In terms of Quality Certification, 14 companies (28%) were certificated, 24 (48%) were not, and 12 (24%) were preparing themselves for the examination when the research was carried out.

In each company, the distribution of questionnaires was carried out based on the organization chart, so that the set of individuals chosen would constitute a proportional stratified sample of its worker population. Among the 7,020 workers who made up the 50

companies studied, 1,824 questionnaires were distributed, of which 1,547 were returned (response rate = 84.81%); 1,275 surveys were analyzed (70% of the number distributed), which corresponds to 18.16% of all the employees in the 50 companies.

Procedure

Data collection was performed in the context of a large research project funded by the FCT (Portuguese Foundation for Science and Technology). A written communication was sent to the 50 organizations with the purpose of making an initial contact and explaining the main objectives of the research. Taking into consideration the particularities of each organization, contact was made through written communication, telephone or personally, and also through meetings with the top management in order to clarify any remaining doubts about the research. In these contacts, information was obtained about the organizational chart and the distribution of workers among units, their work schedule, etc. with the purpose of designing the application of questionnaires. Questionnaires were distributed personally to the employees along with verbal instructions about filling them in. Employees in a diverse range of positions within different hierarchical levels received the questionnaire, which was distributed to various branches or units of each company.

Measures

The variables of this study, namely the two dimensions of the organizational learning culture (internal integration and external adaptation) and the three dimensions of knowledge management processes (KM formal practices, KM informal practices, and strategic management of knowledge), were assessed through two instruments: the Organizational Learning Culture scale (OLC) developed by Rebelo (2001) and the Knowledge Management Questionnaire (KMQ) by Cardoso (2003).

OLC - Organizational Learning Culture Questionnaire. According to Rebelo (2006), the OLC was developed in the year 2000, based on the learning culture models described by Schein (1992, 1994), Marquardt (1996), Hill (1996), and Ahmed et al. (1999).

The questionnaire uses a 5-point Likert-scale (from 1 = *hardly ever true* to 5 = *true most of the time*). Concerning construct validity, Rebelo and Gomes (2011) developed four studies focusing on the dimensionality analysis of the OLC. The two first studies consisted of Principal Component Analysis (PCA), using varimax and oblimin rotation, respectively. The third and fourth studies consisted of maximum likelihood confirmatory factor analysis and supported the bidimensional model of the OLC suggested by previous studies, being the final version composed by 20 items aggregated into two dimensions – internal integration (12 items, $\alpha = .91$) and external adaptation (8 items, $\alpha = .83$).

Sample items of internal integration include: “Leaders encourage the search for solutions by their subordinates” and “We have the habit of sharing information and knowledge”. Sample items of external adaptation are: “We know that if we work to quality standards we will assure organizational success” and “Clients' complaints are carefully analyzed in order to improve” (Rebelo & Gomes, 2011).

Reliability of the OLC questionnaire was tested for the sample of the present study, with a Cronbach's alpha for internal integration of $\alpha = .91$ (12 items) and for external adaptation of $\alpha = .84$ (8 items), values similar to those shown in previous studies with the scale.

KMQ - Knowledge Management Questionnaire. The KMQ was developed in the year 2003 following the steps suggested by Hill and Hill (2000, cit. in Cardoso, 2008) and the integration of different perspectives of the KM processes in the literature reviewed through the identification of six dimensions or processes considered relevant

for knowledge management in organizations. These processes are: (a) creation and acquisition, (b) attribution of meaning, (c) sharing and diffusion, (d) organizational memory, (e) measurement, and (f) recovering.

The questionnaire uses a 5-point Likert scale (from 1 = *hardly ever true* to 5 = *true most of the time*). For construct validity purposes, a PCA using a varimax rotation was carried out, producing a four-factor solution, with 32 items remaining in the scale. The values found for Cronbach's alpha were, from the first to the fourth factor, $\alpha = .88$ (10 items), $\alpha = .86$ (11 items), $\alpha = .79$ (6 items), $\alpha = .76$ (5 items). Considering the literature in the field, the factors were named: (1) KM formal practices, (2) cultural orientation towards knowledge, (3) KM informal practices, and (4) strategic management of knowledge.

Sample items for the first dimension are: "We take part in seminars or conferences, read what is published or hire experts" and "We exchange information among ourselves (e.g., through reports, internal newsletters or e-mail)". Sample items loading on the second dimension are: "We think of how we dealt with problems in the past (successes and failures)" and "We try to understand why a certain activity or task turned out well". Sample items for the third factor include "We ask our colleagues how they have solved problems similar to ours" and "We talk about our activities". Finally, the fourth dimension includes the following sample items "We know our competitors have information about us" and "What we know is an important 'weapon' to overcome our competitors" (Cardoso, 2008).

As aforementioned, for the purpose of this research only factors 1, 3 and 4 were analyzed.

Data Analysis Technique

Standard multiple regression analysis was the main technique used for data analysis. The standard model was chosen over other multiple regression models because the predictor variables internal integration/external adaptation, besides consisting of distinct dimensions, are part of a main theoretical construct, the organizational learning culture. Once they are both theoretically and empirically correlated ($r = .58, p < .01$), the predictive power of the two variables in conjunction is also examined in this research.

As the level of analysis of this research is the organizational level, the initial 1,275 cases obtained were aggregated into the 50 organizations to which the respondents belonged. The statistical analysis was carried out using this new database.

In order to aggregate individual answers to an organizational score in a reliable way, Average Deviation Indices (ADI) (Burke & Dunlap, 2002; Burke, Finkelstein, & Dusig, 1999; Dunlap, Burke, & Smith-Crowe, 2003) were calculated to test the level of firm intra-homogeneity. In order to assure a satisfactory level of heterogeneity between firms, ANOVAs were carried out.

Concerning the OLC questionnaire, the AD_M mean for the internal integration dimension was 0.81 ($SD = 0.14$) and for the external adaptation dimension, 0.68 ($SD = 0.10$). The differences between firms were statistically significant in both dimensions, $F(49, 1159) = 4.713, p < .001$ for internal integration and $F(49, 1159) = 5.352, p < .001$ for external adaptation.

Regarding the KM questionnaire, the values of the AD_M mean for the three factors studied were: KM formal practices, 0.81 ($SD = 0.14$); KM informal practices, 0.67 ($SD = 0.12$); and strategic management of knowledge, 0.70 ($SD = 0.15$). In terms of level of heterogeneity among firms, results were also statistically significant for the three factors, $F(49, 1106) = 8.211, p < .001$ for KM formal practices; $F(49, 1176) = 2.999, p < .001$ for KM informal practices; $F(49, 1139) = 2.546, p < .001$ for strategic management of knowledge.

Following Dunlap et al. (2003), the practical cut-off value for a Likert-type response scale with five options is 0.83 or less. Therefore, examination of ADIs was found to be satisfactory for factors studied in both the OLC and KM scales. These results assure a reasonable intra-organizational agreement and heterogeneity between organizations, leading us to the aggregation of individual answers into an organizational score (mean of the organization) separately for all the studied dimensions (internal integration, external adaptation, KM formal practices, KM informal practices, and strategic management of knowledge) in all the firms of the sample.

The two predictor variables were, therefore, entered in blocks in the three regression equations: first they were entered with the criterion variable KM formal practices, then with the criterion variable KM informal practices, and finally with the criterion variable strategic management of knowledge.

Results

The data screening stage, carried out in order to verify assumptions of validity of the model, showed that the criteria for multicollinearity suggested by Belsely, Kuh, and Welsch (1980, cit. in Tabachnick & Fidell, 2007) and by Hair, Anderson, Ronald, and Black (1999) were met. The analysis of the histograms, normal P-P plots, and residual scatterplots supported the normality, linearity, and homoscedasticity of residuals assumptions.

Table 1 shows the descriptive statistics and correlation coefficients of the measured variables, Table 2 shows the results of the regression of the two predictor variables (internal integration/external adaptation) on the criterion variable KM formal practices, Table 3 shows the regression of the two predictor variables on KM informal practices, and Table 4 shows the regression of the two predictor variables on strategic management of knowledge.

In the case of KM formal practices, 68% of its variance was explained by the two predictor variables ($p < .01$). While external

Table 1
Means, Standard Deviations and Correlations among Variables

	Internal integration	External adaptation	KM formal practices	KM informal practices	Strategic management of knowledge
Internal integration	--				
External adaptation	.58**	--			
KM formal practices	.80**	.34*	--		
KM informal practices	.55**	.31*	.69**	--	
Strategic management of knowledge	.90**	.70**	.76**	.62**	--
<i>M</i>	3.2	3.9	2.7	3.2	3.3
<i>SD</i>	0.3	0.2	0.4	0.2	0.2
<i>N</i>	50	50	50	50	50

* $p < .05$, ** $p < .01$

Table 2
Regression Analysis Summary for Organizational Learning Culture Variables
Predicting KM Formal Practices

Variable	<i>B</i>	<i>SEB</i>	β	sr^2
Internal integration	1.21	0.13	.92**	.57
External adaptation	-0.29	0.14	-.20	.03

Note. $R^2 = .68$ ($N = 50$, $p < .01$)

** $p < .01$

Table 3
Regression Analysis Summary for Organizational Learning Culture Variables
Predicting KM Informal Practices

Variable	<i>B</i>	<i>SEB</i>	β	sr^2
Internal integration	0.47	.12	.56**	.21
External adaptation	-0.01	.14	-.01	.00

Note. $R^2 = .31$ ($N = 50$, $p < .01$)

** $p < .01$

Table 4
Regression Analysis Summary for Organizational Learning Culture Variables
Predicting Strategic Management of Knowledge

Variable	<i>B</i>	<i>SEB</i>	β	sr^2
Internal integration	0.63	0.05	.75**	.38
External adaptation	0.24	0.06	.26**	.04

Note. $R^2 = .87$ ($N = 50$, $p < .01$)

** $p < .01$

adaptation did not show a significant predictor effect for this variable, internal integration did show this effect and positively predicted it ($b = 0.92$, $p < .01$). Therefore, hypotheses $H1$ and $H1a$ were supported by the results, while $H1b$ could not be supported. In terms of the variance explained individually by the predictor variables, the internal integration dimension explained 57%, while external adaptation explained only 3%. The two criterion variables shared an amount of prediction of 8%.

For KM informal practices, the set of predictor variables accounted for 31% of the variance explained ($p < .01$). Once again, external adaptation was not significant ($b = -0.01$, $p > .05$) for the prediction of this variable. Internal integration was significantly and positively related to the variable ($b = 0.56$, $p < .01$). Hence, hypotheses $H2$ and $H2a$ found support, which was not the case for $H1b$. The internal integration dimension individually explained 21% of the variance in knowledge management informal practices, while external adaptation explained 0% individually and shared 10% of the variance with internal integration.

Concerning the third criterion variable, strategic management of knowledge, both predictors showed a significant and positive relationship. The total variance explained was 87% ($p < .01$). Internal integration was the stronger predictor ($b = 0.75$, $p < .01$), followed by external adaptation ($b = 0.26$, $p < .01$). Therefore, for strategic management of knowledge, hypotheses $H3$, $H3a$, and $H3b$ were supported by the results of the study. The amount of variance explained by the set of predictor variables in this case showed a different picture from that of the first two variables: the amount of variance shared by the variables was 45%, whereas the internal integration dimension individually explained 38%, and the external adaptation dimension explained 4% of the variance.

Discussion

Two research gaps had been identified in previous empirical and theoretical studies about knowledge management: a lack of studies

that integrate knowledge management and learning (Lytras & Poulodi, 2006), and a lack of research linking organizational culture and knowledge management (Chiva & Alegre, 2005; Lytras & Poulodi, 2006; Oliver & Kandadi, 2006; Wong & Aspinwall, 2005). In this paper, we have contributed to shedding some light on both research gaps, analyzing the relationship between organizational culture, or more specifically learning culture, and knowledge management.

The results obtained in this study are consistent with what was previously argued by De Long (1997), De Long and Seemann (2000), and Davenport and Prusak (2000), but had not previously been tested empirically, namely, that organizational learning culture is an important factor in the development of knowledge management practices. According to the results from testing hypotheses $H1$, $H2$, and $H3$, it is possible to say that companies in the sample that develop knowledge management processes and practices are companies that stimulate their employees to experiment and take an attitude of responsible risk, focus on people and on all stakeholders, learn from errors and communicate intensively and openly. In such companies, leaders are highly committed to creating, maintaining and disseminating these ideas and attitudes throughout the company.

The support for hypotheses $H1a$, $H2a$, and $H3a$ implies that the internal integration dimension has a significant impact on KM formal practices, KM informal practices, and strategic management of knowledge, respectively, which makes perfect sense considering what has been suggested by the literature.

In the case of KM formal practices, characteristics such as simulation of experimentation and encouragement of an attitude of responsible risk by leadership, which are related to the internal integration dimension of learning culture, allow people to act autonomously. According to Nonaka (1994), this autonomy may increase the possibility of introducing unexpected opportunities for the production of knowledge. Such organizations are more likely to maintain greater flexibility in acquiring, relating and interpreting information, especially explicit knowledge, which is managed mainly by formal practices of KM.

Concerning the KM informal practices variable, as previous research showed, firms that encourage social interactions increase opportunities for knowledge diffusion over networks (Magnier-Watanabe & Senoo, 2008). As Nonaka (1994) stated, redundancy, that is, the sharing of extra information between individuals, promotes the sharing of tacit knowledge. In another way, extensive communication and incentives for socialization practices, which also consist of characteristics of the internal integration dimension, effectively impact KM informal practices.

For the criterion variable strategic management of knowledge, the two dimensions of learning culture were shown to be significant predictors, supporting hypotheses $H3a$ and $H3b$. Easterby-Smith et al. (2008), in a revision of papers related to inter-organizational knowledge transfer, point to culture as one of the factors that influence the recipient firm's absorptive capacity, which is its ability to recognize the value of new knowledge and assimilate and use that knowledge. Absorptive capacity and intra-organizational transfer capability are interrelated in the sense that an organization which is good at absorbing external knowledge should also be well equipped for diffusing the knowledge within its own boundaries (Easterby-Smith et al., 2008). Thus, the idea is reinforced that both dimensions of the learning culture (internal integration and external adaptation) need to be present and well aligned in the organization in order to achieve an effective strategic management of knowledge.

Although the results support the impact of the external adaptation dimension on the strategic management of knowledge, this effect is unexpectedly not verified for the criterion variables KM formal practices and KM informal practices.

The internal integration dimension is related to the structuring and coordination of internal processes in the organization, whereas external adaptation is related to the orientation of the organization

towards the exterior (e.g., clients, competitors, and other stakeholders). Therefore, it is possible that KM formal practices and KM informal practices are mainly related to internal integration matters, such as leadership style or communication incentives, rather than to the organization's focus on the external context. Thus, the exterior orientation of the organization is not in itself sufficient for the development of formal and informal practices of knowledge management if it is not supported by adequate internal processes.

The preponderance of the predictor internal integration is also reflected in the case of strategic management of knowledge, where internal integration accounted individually for 38% of the variance, whereas external adaptation accounted for only 4%. Similarly, studies on the concept of organizational market orientation stemming from the management field (Baker & Sinkula, 1999, cit. in Jiménez-Jiménez & Cegarra-Navarro, 2007) emphasize the importance of internal processes (e.g., interdepartmental dissemination, consideration, and processing and the organizational use of information) in the organization's adaptability to the external environment.

These arguments shed light on the importance of the internal integration dimension in predicting all three criterion variables of the study. In line with Liebowitz (1999), which states that the success of KM is 90 per cent dependent on building a supportive culture, the results of this study show that the organizational learning culture is an important factor in the development of knowledge management practices.

Conclusion

The findings of this study are consistent with literature that supports an impact of this particular kind of culture, a learning culture, on the knowledge management processes of organizations. Namely, the internal integration dimension of learning culture was shown to have a stronger influence on the different KM processes studied.

A strength of this study is the investigation of cultural phenomena and their relationship to other organizational phenomena on the organizational level. Thus, the results obtained were not based solely on individual perceptions of employees about the learning culture or knowledge management processes in their organizations; instead, the conclusions were drawn in terms of how these processes are structured in each of the 50 organizations studied.

Limitations and Practical Implications of the Research

The cross-sectional design can be considered a limitation of this study. After dealing with the prediction of learning culture in knowledge management processes, a longitudinal design could allow a deeper understanding of this relationship.

Regarding practical implications, as Van Wijk et al. (2008) suggest, cultural aspects are rarely 'visible'. The idea of 'making explicit' pragmatic aspects of a certain culture may also increase the interest of managers or HR professionals in the subject. Other implications of this research are related to the production of information for the development of a literature to assist managers in assessing learning and knowledge management possibilities, which is considered by Lyles and Easterby-Smith (2003) to be necessary in the OL/KM area.

Conflict of Interest

The authors of this article declare no conflict of interest.

Financial Support

The data collection for this study was carried out in the context of a large research project funded by the FCT (Portuguese Foundation for Science and Technology).

The participation of Francisco J. Gracia and Inés Tomás in this article was supported by a Research Grant (GVPROMETEO2012-048).

Acknowledgements

The authors express their gratitude to PhD Leonor Cardoso, Professor of the Faculty of Psychology and Education Sciences of the University of Coimbra, Portugal, who worked as a researcher in the aforementioned project, for the support received, permission to use the KM questionnaire, and information provided about the questionnaire.

Note

¹For the purpose of this research, only factors 1, 3 and 4 described by Cardoso (2008) were analyzed. Factor 2, cultural orientation towards knowledge, was not included in the analysis once it was considered redundant to evaluate the impact of the dimensions of organizational learning culture on this variable.

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