

KNOWLEDGE AND INFORMATION MANAGEMENT AND SHARING IMPACT ON COMPETITIVE ADVANTAGE

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Abstract. *The purpose of this research is to test the existence of a relation between knowledge and information management in competitive advantage and innovation. Using a questionnaire, we collected 209 responses from different types of organizations. This questionnaire allowed us to test the proposed conceptual model that analyzes the relationship between the competent ones of a knowledge management system: processes, human capital and information systems and the information sharing practices, knowledge acquisition and identification practices and information and knowledge storage practices, and the process of creating innovation and competitive advantage. The results did not confirm most of the assumptions tested, nor did the knowledge management practices statistically reveal a relationship with the creation of innovation and with the creation of competitive advantages. However, there was a significant statistical relationship between process factors, human capital factor, innovation and the creation of competitive advantages.*

Keywords: *knowledge management; information; innovation; competitive advantage.*

Introduction

This study deals with knowledge management in organizations. Nowadays, society tends to rely on knowledge and information sharing to create value for organizations (Grant, 1996). Through knowledge and information sharing, organizations become more competitive, not only by reducing costs but also by optimizing capabilities and resources in the production of products or services. Thus, organizations will be responsible for building models for the management of all the information and knowledge they have, which will need specific management (Grant, 1996). In Drucker's (1985) opinion, knowledge is the unique base that companies use to build competitive advantage. Firms should "adapt and update their knowledge to maintain their competitive advantage" (Liao et al., 2017, p.1432).

One of the purposes of this work is to analyze the processes used by companies to promote the exchange of information and the creation of knowledge and value for the

organization. Therefore, the main goal is to understand the importance of information and knowledge shared in the organization in order to create innovation and competitive advantage.

Literature review

Currently, the opinions regarding the emergence of the vision of a knowledge-based enterprise development are consensual, agreeing that it is a fundamental strategic asset (Grant, 1996). If previously the company's wealth was strongly associated with tangible factors such as financial capital and physical structures, nowadays the main source of wealth and competitiveness seems to be knowledge. As Tsai (2001, 1003) claims, "An organization is a repository of knowledge". In the same vein, Argote and Ingram (2000) talk about reservoirs, because companies keep knowledge for future use. Knowledge management involves maximizing and leveraging the potential of the organization's human resources (Ponchirolli & Fialho, 2005).

Knowledge management is a systematic process that generates information, data and new knowledge so that it might be organized and used in the most correct way by companies. Only this process brings knowledge to the right people at the right time, this time will be needed for taking better decisions and to find better resolutions for recurring problems in the company's activity (Allameh, Abedini & Ahmad, 2012).

According to Maier (2007), the main goals of knowledge management are to provide cost reduction; improvement in communication and in external knowledge acquisition, cooperation and distribution. It also increases productivity; as well as the speed of innovation; and the new business development - this way reducing the risks taken by the company, (i.e. improving the ability to react according to the constant change in markets and the loss of valuable knowledge for the company. Consequently, improving stakeholder satisfaction, improving the quality of services and, when appropriate, improving response time (Santos, 2011). There is, therefore, a close relationship between knowledge management and competitive advantage (Hamel, 2002) and between this and innovation.

Knowledge management

The process of knowledge management and sharing is the result of a context that facilitates the creation and dissemination of this knowledge (Nonaka, 1994; Davenport & Prusak, 1998).

A knowledge and information management system is a set of procedures that aim to collect, create, absorb, use and distribute information and knowledge, which leads to the creation/improvement of the learning process in an organization. Tsai note that it is not only about absorbing knowledge, but gaining knowledge access (Tsai, 2001). In fact, "[i]n order to prevent imitation or duplication by competitors, most enterprises generally acquire new knowledge from a unit outside the organization or learn new knowledge introduced from a unit outside the organization and then integrate the new knowledge in order to develop knowledge that belongs exclusively to the organization" (Liao et al., 2017, p.1432), in a multiunit organizations, other units can be a source of new knowledge too (Tsai, 2001).

The management and sharing of knowledge are based on three fundamental dimensions: people, processes, and systems. Knowledge management and sharing lead to the creation of knowledge, which in turn creates innovation, altering existing processes and creating organizational competitiveness.

Identification and acquisition of knowledge

According to Rollet (2003), the knowledge identification process is based on the planning and constant monitoring of knowledge and information management initiatives.

Organizations tend to focus on the past and present in terms of knowledge management, which is a frequent mistake (Fahey & Prusak, 2004). The most correct posture is to direct and prepare the position of the organization for the future. According to Rollet (2003), the process of knowledge management allows the organization to have an orientation towards the achievement of its strategic goals, which contributes to the incensement of organizational competitiveness. "Through the acquirement of new knowledge and the updating of existing knowledge, an organization can have better learning and innovation performance and thus develop a sustainable competitive advantage" (Liao et al., 2017, p.1432).

Davenport (1994) refers to the importance of determining the information and knowledge needs by a company, and Mcgee and Prusak (1994) point out the importance of the organization's perception of information and knowledge necessities in order to make the organization competitive. As Bierly et al (2000, in Bou-Llusar & Segarra-Ciprés, 2006, p.101) defend "Success does not necessarily go to the firms that know the most, but to the firms that can make the best use of what they know and know what is strategically most important to the firm".

It is important to bear in mind the relevance of knowledge identification in an organization, as well as its retention, capture, and analysis (Probst, Raub & Romhart, 2002). The same authors consider that external knowledge can be acquired through relationships with clients, by competing with other companies, suppliers, and others. It is important to note that information and knowledge can also be obtained internally.

H1: There is a positive relation between the practices of identification and acquisition of knowledge and knowledge management practices.

H2: There is a positive relation between the practices of identification and acquisition of knowledge and innovation.

H3: There is a positive relation between the practices of identification and acquisition of knowledge and organizational competitiveness

Innovation and competitive advantages

Knowledge creation and sharing influence innovation leads to competitive advantage (Mcadam, 2000). Internalization by the organization's tacit and explicit knowledge produces new knowledge that leads to constant organizational learning, and this leads to innovation that gives the organization a sustainable competitive advantage (Meso & Smith, 2000).

There are, therefore, conditions to foster knowledge creation such as the existence of a climate of innovation within the organization (Nonaka & Takeuchi, 1994), this factor will encourage the generation of a set of organizationally sustainable competitive advantages. Obtaining information and knowledge through internal and external means is a source of competitive advantages (Davenport, 1994).

H4: There is a positive relation between innovation and competitive advantages.

Retention of knowledge

Retention of knowledge is related to the integration of internal and external knowledge in the organization, avoiding the loss of knowledge (Rollet, 2003). The competitive edge in knowledge retention process, according to Birkinshaw and Sheehan (2002), comes through the organization's ability to access information and knowledge also in qualitative terms, increasing the failure of competitors trying to copy it. For these authors, gains will also be achieved in terms of organizational competitiveness.

The retention of knowledge to Probst, Raub, and Romhart (2002) depends on the retention of knowledge by identifying through documents, information and most important experiences observed in the environment of the organization. Mcgee and Prusak (1994) report also the importance of storage, classification, and authentication of information and knowledge. So, this must be inserted in the organization's production process, so that it can be superior to its competitors and gain competitiveness and competitive advantages.

H5: There is a positive relation between the practice of storing information and knowledge in the organization and its organizational competitiveness.

H6: There is a positive relation between the practice of storing information and knowledge in the organization and innovation.

H7: There is a positive relation between the practice of storing information and knowledge in the organization and knowledge management practices.

Sharing of Knowledge and Information

Knowledge sharing processes are important to increase the exchange of knowledge and information among members of the same organization (Rollet, 2003). Knowledge sharing has a positive effect on the creation of innovation which will expand to organizational competitiveness. Macgee and Prusak (1994) consider essential the treatment and dissemination of knowledge and information, in order to homogenize the treatment of knowledge and information according to the needs of the recipients.

Davenport (1994) refers to the importance of sharing information and knowledge according to organizational needs. Mcgee and Prusak (1994) point out the importance of elaborating strategies to capture, treat and share knowledge to satisfy organizational needs, as well as highlight the importance of analyzing, distributing and disseminating information, sharing it and also sharing knowledge according to the organizational needs of the company and the members of the same organization and use of it as support for the decision-making process.

This process leads to the transformation of something that is isolated, such as information or knowledge, into something that the organization can use in the productive process and as a source of value creation and competitiveness (Probst, Raub & Romhart, 2002).

H8: There is a positive relation between knowledge sharing practices and information and organizational competitiveness.

H9: There is a positive relation between knowledge sharing and information practices and knowledge management practices.

H10: There is a positive relation between knowledge sharing and information sharing practices and the creation of innovation.

Knowledge management, innovation, and competitive advantages

There is a set of the complex relation between knowledge management and the creation of competitive advantages by the organization.

If there is a knowledge management system in an organization, this system will allow a competitive advantage to be obtained by the organization, through the identification of threats to the organization, reduction of reaction times and through an improvement of the process strategic planning and analysis, there is support for the decision-making process and promotion of innovation and creation of new products (Davenport, 1995; Meso & Smith, 2000; Nokata & Takeuchi, 1997). There is also the advantage of perceiving market trends in a proactive way - this capacity will implement a value creation strategy for the organization and for the customers, but will not be used by competitors, because of the fact that it is difficult to imitate.

According to Edwards (2011), knowledge management results from the relation between three factors: people, processes, and technology. Correct process management is essential for effective knowledge and information management.

H11: There is a positive relation between knowledge management practices and innovation.

H12: There is a positive relation between knowledge management practices and competitive advantages.

H13: The process factor positively influences the competitive advantage of the organization.

H14: Process factor influences positively the creation of Innovation.

H15: The process factor influences positively knowledge management practices.

H16: The human capital influences positively the organization's competitive advantage.

H17: The human capital actor influences positively the creation of innovation.

H18: The human capital actor influences positively knowledge management practices.

H19: The technological systems actor influences positively the competitive advantage of the organization.

H20: The technological systems actor influences positively the creation of innovation.

H21: The technological system influences positively knowledge management practices.

Hence presents the proposed model (Figure 1) which seeks to answer the research question – Is internal diffusion knowledge and information in organizations a factor of creation of competitiveness organization?

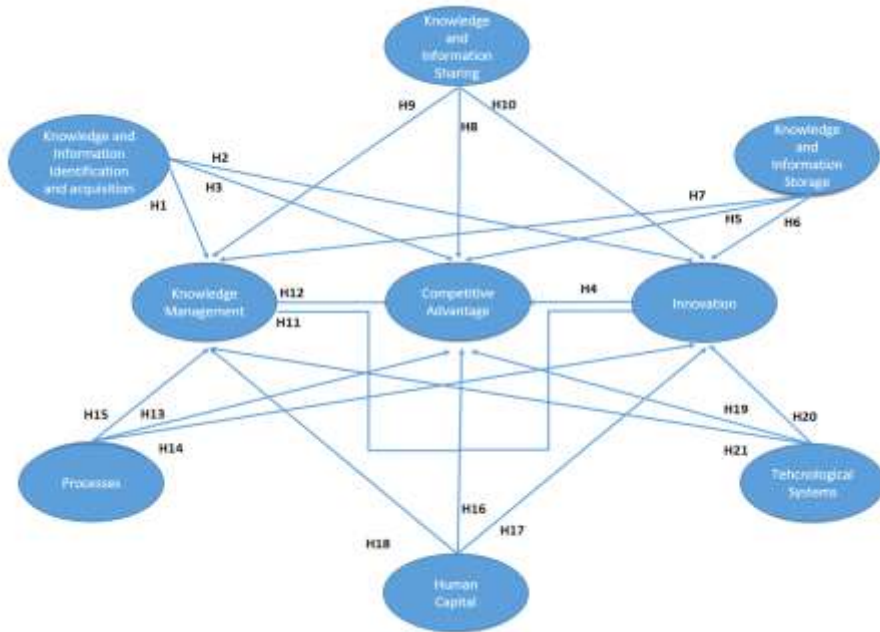


Figure 1 - Knowledge Practices and Competitive Advantage

Research methodology

Table 1 - Structure of the Questionnaire

QUESTIONS	Subgroup	
8	Firm characterization	
4 – Likert Scale	Knowledge Management - PGC	MacGee and Prusak (1994)
10 – Likert Scale	Knowledge identification and acquisition - PAIC	Davenport (1995)
9 – Likert Scale	Processes – FP	Fonseca (2006)
8 – Likert Scale	Human Capital - CH	Probst, Raub and Rombar (2002)
5 – Likert Scale	Technological Systems - FST	Fonseca (2000)
6 – Likert Scale	Knowledge and acquisition Storage - PARIC	Edwards (2011) MacGee and Prusak (1994)
6 – Likert Scale	Knowledge and Information Sharing - PPCI	Davenport (1995)
3 – Likert Scale	Competitive Advantages - VC	Sigalas (2013)
4 – Likert Scale		Own elaboration
9 – Likert Scale	Innovativeness - I	Uzkurt, Kumar, Kimzan an Sert (2012)

We opted for Structural Equation Modeling (SEM), Zwicker, Souza and Bido (2008) reporting that the SEM is a set of instruments that allows the combination of a structural model and a measurement model, both being evaluated simultaneously.

Results

There were 327 responses, 209 valid answers, all answered by members of the organizations that participated in the decision-making process.

In terms of company size, in the sample 19.1% of the organizations, it had more than 250 employees; 21.8% of the responses between 51 and 250, and the majority (59.1%) less than 50; most companies (39.1%) had a turnover lower than 2,000,000€, 28,2% between 2,000,000 € and 10,000,000 €, 15% between 10,000,000 € and 50,000,000 € and 17,7% with a value of more than 50,000,000 €. We found that most businesses are SMEs.

36.8% of the companies belong to the manufacturing industry, 12.3% for scientific and technical consulting activities, 9.5% for financial activities and insurance, 9.1% wholesale and retail trade; 8.6% in other services activities, 5.9% in construction, and 17.80% in other sectors of activity.

Measure model validation

Table 2 – Confirmatory Factorial Analysis

	Alfa de Cronbach	CR	AVE
PGC			
VC	0,919	0,935	0,675
PIAC	0,921	0,934	0,591
FP	0,923	0,937	0,623
FCH	0,918	0,933	0,635
FST	0,933	0,952	0,832
PARIC	0,873	0,904	0,615
PPCI	0,957	0,965	0,823
I	0,904	0,922	0,575

To validate the model, we calculated Cronbach's alpha, CR, AVE, and R2. The PGC construct was not subjected to these tests because it is a formative variable. All scales have indicators above the required.

Interpretation and discussion

The estimation was done through the Bootstrapping calculation, due to this calculation; we obtain a large set of random subsamples, resulting from an original data set, which supports the PLS model, allowing the same statistical significance of the variables (Hair Jr., Hult, Ringle & Sarstedt, 2016).

Table 3 – Bootstrapping Results

H1-There is a positive relation between the practices of identification and acquisition of knowledge and knowledge management practices	pvalue=0,000 T=3,607 Not Rejected (5%)
H2-There is a positive relation between the practices of identification and acquisition of knowledge and innovation	pvalue=0,128 T=1,526 Rejected
H3-There is a positive relation between the practices of identification and acquisition of knowledge and organizational competitiveness	pvalue = 0,752 T=0,316 Rejected
H4-There is a positive relation between innovation and competitive advantages	pvalue=0,000 T=5,030 Not Rejected (5%)
H5-There is a positive relation between the practice of storing information and knowledge in the organization and its organizational competitiveness	pvalue=0,324 T=0,988 Rejected
H6-There is a positive relation between the practice of storing information and knowledge in the organization and innovation	pvalue=0,037 T=2,093 Not Rejected (5%)
H7-There is a positive relation between the practice of storing information and knowledge in the organization and knowledge management practices	pvalue=0,226 T=1,213 Rejected
H8-There is a positive relation between knowledge sharing practices and information and organizational competitiveness	pvalue=0,968 T=0,040 Rejected
H9-There is a positive relation between knowledge sharing and information practices and knowledge management practices	pvalue=0,686 T=0,404 Rejected
H10-There is a positive relation between knowledge sharing and information sharing practices and the creation of innovation.	pvalue=0,123 T=1,546 Rejected
H11-There is a positive relation between knowledge management practices and innovation	pvalue=0,730 T=0,345 Rejected
H12-There is a positive relation between knowledge management practices and competitive advantages	pvalue=0,628 T=0,485 Rejected
H13-The process factor positively influences the competitive advantage of the organization	pvalue=0,037 T=2,087 Not Rejected (5%)
H14-Process factor influences positively the creation of Innovation	pvalue=0,513 T=0,654 Rejected
H15-The process factor influences positively knowledge management practices	pvalue=0,021 T=2,318 Not Rejected (5%)
H16-The human capital positively influences the organization's competitive advantage	pvalue=0,004 T=2,902 Not Rejected (5%)
H17-The human capital actor positively influences the creation of innovation	pvalue=0,216 T=1,238 Rejected
H18-The human capital actor positively influences knowledge management practices	pvalue=0,790 T=0,266 Rejected

H19-The technological systems actor positively influences the competitive advantage of the organization	pvalue=0,794 T=0,261 Rejected
H20-The technological systems actor positively influences the creation of innovation	pvalue=0,677 T=0,417 Rejected
H21-The technological system positively influences knowledge management practices	pvalue=0,944 T=0,07 Rejected

Taking into account the values obtained in T-Statistics and P-Value, it is verified that only the hypotheses H1, H4, H6, H13, H15, and H16 are statistically relevant, i.e. those with T-Statistics values greater than 1.96, in the same way, the P-value is less than 0.05.

Using the literature studied, it would be expected that knowledge management practices would have an influence on innovation and, directly or indirectly, on competitive advantage. But these were not found in this study. Meso and Smith (2000) consider that an organizational system of knowledge management is the result of the interaction between technological infrastructure, organizational infrastructure, corporate culture tacit knowledge, explicit and people. They also consider that the practices of knowledge management create new knowledge that leads to innovation and the consequent creation of competitive advantage on the organization part.

The effect of the human capital factor on innovation is also not statistically significant. Although human capital is referred in the literature as the main factor contributing to innovation, in practice we have verified that the relation between knowledge sharing and information practices and the relation between the human capital factor and innovation is not statistically significant. So, as there is no sharing of knowledge and information, it is perfectly normal and consistent with the literature, that human capital does not have a significant effect on innovation. Moreover, knowledge sharing implies codification, transforming tacit knowledge into explicit knowledge, which is easier to imitate and more difficult to protect (Bou-Llusar & Segarra-Ciprés, 2006).

The human capital factor and the process factor have a statistically significant effect on the competitive advantage; however, the technological systems factor has no statistical impact on the competitive advantage of the organization. One possible explanation for this fact is that advances in the field of technology in organizations might provide competitive advantages to that certain organization. Due to this, the advantage can be reduced or eliminated as systems can be easily replicated even when protected by copyright, patents, and licenses. Meso and Smith (2000) report that competitive advantage becomes sustainable when current and potential competitors are unable to imitate the strategy and resources of the company that holds the same competitive advantage. However, information systems can be easily imitated and improved and, for that reason, they will not constitute a sustained source of comparative advantage. In opposition to the human capital, that is inimitable and carries unique characteristics.

We can infer from the obtained results that the process factor works as an inter-mechanism between the knowledge management practice and the competitive advantage - this conclusion is consistent with the literature regarding this subject.

In fact, Edwards (2011) considers that the organization should give greater relevance to the process factor, since this represents the way in which the organization and people give use to the technological factors, both being essential for the process of knowledge management and, consequently, for the process of creation of competitive advantages.

Information storage practices have a statistical influence on the competitive advantages of organizations, albeit through their influence on innovation. Edwards (2011) states that the human capital factor and the process factor have a direct impact on the competitive advantages, being supported by repositories or by the existing knowledge systems in the organization. Following the same order of ideas, Mcgee and Prusak (1994) mention the importance of storing, classifying and authenticating information and knowledge. According to this, it should be inserted into the production process of the organization, in order to be able to excel before their competitors and increase the competitiveness of the company and their competitive advantages. In this study, this relation is not presented directly as in the sample selected for the study, the practices of information and knowledge storage do not have a statistically significant effect directly on the competitive advantages, but have, on the other hand, a statistically proven effect in the variable innovation.

Knowledge is worked and transformed into material available in printed material or knowledge bases, which have a positive effect on the creation of innovation, supporting the statistically significant relation between practices of information and knowledge storage and innovation. It is relevant the direct statistical proven influence that human capital has on the competitive advantages of an organization which comes in line with Edwards opinion (2011). The OKA model (2006) claims the importance of human capital is a more qualified learning process, based on training and providing knowledge and information with the purpose of improving the company's performance

It is to consider that the factors process and identification of practices and knowledge acquisition have a statistically significant influence in the practice variable knowledge management and this correlation confirms what was already expected. For Davenport (1995), information and knowledge management are defined as a set of structured activities that include how companies can obtain, distribute and use information and knowledge.

It should be admitted that, in most organizations, only people and technology stand out, excluding other factors of extreme importance (Edwards, 2011). It is necessary to keep in mind that the process is the way in which organization inserted people use the technology with relevance in the practices of knowledge management. Argote and Ingram (2000, p.164) note that "people play the most critical role in the success of technology transfer. The unequivocal contribution is proven by the statistical significance of the hypothesis that relates these two variables (factor processes and practices of knowledge management).

Conclusions

The purpose of this study was to understand if there was an effective relationship between knowledge management practices and information and the creation of competitive advantages by organizations.

The results of this study do not confirm that, in general, knowledge management components have a positive effect on innovation and competitive advantage. Only the variables human capital factor, process factor and innovation have a statistically significant relation with the creation of competitive advantages. This reinforces the idea that "human may be the most difficult to imitate" (DeNisi, Hitt & Jackson, 2003, p.4). As far as innovation is concerned, only the practices of storing information and knowledge in the organization have a statistically significant influence in this factor. Through the process of knowledge and information storage practices, we classify the type of knowledge and information that the organization holds and where it is located in order to manage, organize and integrate it. This type of tool supports the strategic decision of a company, transforming data into information and knowledge, leading to the creation of innovation and comparative advantages, according to Choo (2006). This author states that in an organization, the storage of the information captured and created in files and databases through different information systems will facilitate the sharing of knowledge retrieval and information relevant to it.

The process factor is important since it constitutes the bridge between human capital and technology.

To point out the positive effect that human capital factor has in competitive advantage should theoretically be the most important thing in the process of knowledge management, being the largest source of knowledge and information within an organization. However, this hypothesis was not confirmed statistically. The valuation of the human resources of an organization is a propelling factor in the creation of organizational competitiveness, in such a way that it provides the human resources with greater information and knowledge to perform their functions and to create added value to the organization they are part of

Another conclusion of the study is that innovation is a factor propelling the creation of the competitive advantages process. In the model created, the knowledge management practices, which are a mediator variable, have a direct relation with the creation of innovation which, in return, has a direct relation with the creation of competitive advantages. Despite the fact that the relation between knowledge management practices and the creation of innovation, or the relation between knowledge management practices and the creation of competitive advantages, have not been statistically proven.

Based on this study, organizations should invest in the developing of their knowledge management systems, as well as an appreciation of its employees by encouraging training, learning, personal and professional development and integration reviewer on the process of creating new knowledge. Only after completing this process, the organization is capable of differentiating itself from competitors, by creating new products and services and by improving existing ones resulting from the organizational innovation process.

Thus, creating new processes, new technologies and a growing improvement in the skills and qualifications of the human resources is not enough to support the process of creating knowledge and information. It is essential to implement an organizational culture that fosters the storage and the sharing of knowledge and information. Since knowledge and information are increasingly seen as a valuable resource for organizations and for all the economy, the potential for knowledge and information enhance and creation is virtually unlimited.

The present study presents some limitations that limit the obtained results. That way, it is suggested as pertinent in future investigations to improve the method of collection and measurement of data, as well as to increase the size of the sample. Another limitation to be pointed out is related to the variables of the proposed conceptual model, as this is a very complex issue other variables must be included and study.

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