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# KNOWLEDGE MANAGEMENT PROCESSES AND INTELLECTUAL PROPERTY MANAGEMENT PROCESSES: AN INTEGRATED CONCEPTUAL FRAMEWORK

PROCESOS DE GESTIÓN DEL CONOCIMIENTO Y PROCESOS DE GESTIÓN DE LA PROPIEDAD INTELECTUAL: UN MARCO CONCEPTUAL INTEGRADO

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## ABSTRACT

Intellectual property management, knowledge management are disciplines that have been treated independently, both in academia and in the organizational field. Through the legal discipline of intellectual property, the former manages intangible assets that are eligible for protection (copyright, patents and trademarks, among others) leaving aside those assets that cannot be realized in any way. The latter is devoted to the processes of knowledge management in general, namely, the knowledge of the processes, people, documents, etc. without any special status for protected knowledge. This article is the result of an exploratory research that has focused on the description of the design of a conceptual framework that integrates knowledge management processes and intellectual property processes, addressing both protected and unprotected knowledge. This research was carried out in two phases: a relationship with the documentary revision and the other with the definition and design of the proposed framework.

## KEYWORDS

knowledge management, intellectual property management, protected knowledge, unprotected knowledge, process framework.

## RESUMEN

La gestión de la propiedad intelectual y la gestión del conocimiento son disciplinas que se han tratado de manera independiente, tanto en el campo académico como en el organizacional. La primera administra, a través de la disciplina jurídica de la propiedad intelectual, los activos intangibles que son susceptibles de protección: derechos de autor, patentes y marcas, entre otros. La segunda se dedica a los procesos de administración del conocimiento en general, es decir, al conocimiento de los procesos, las personas, los documentos, sin considerar un tratamiento especial para el conocimiento protegido. El artículo es el resultado de una investigación de carácter exploratorio que se han enfocado en la descripción del diseño de un marco conceptual que integra los procesos de la gestión del conocimiento, de la de la propiedad intelectual, el conocimiento protegido y no protegido de la organización. Esta investigación fue realizada en dos fases: una relacionada con la revisión documental y la otra con la definición y diseño del marco de referencia propuesto

## PALABRAS CLAVE

Gestión del conocimiento, gestión de la propiedad intelectual, conocimiento protegido, conocimiento no protegido, marco de procesos.

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## INTRODUCTION

Knowledge is the main asset of the new economy, as stated by Hanel (2006) and Paasi, Luoma and Valkokari (2010), hence the management and protection of knowledge have become part of the competitive strategies of companies. This situation prompted the creation of two disciplines that account for the largest amount of studies of this phenomenon: knowledge management (KM) and intellectual property management (IPM). Knowledge management refers to the set of practices that makes it possible for knowledge to create value in an organization. Intellectual property management is the management of knowledge assets, which are eligible for protection under intellectual property laws. Each of these disciplines addresses knowledge with different objectives, leading to a disintegrated conception and practice of knowledge and knowledge management in organizations: For knowledge management, specifically in knowledge creation theory (Nonaka, 1994) the author proposes that knowledge is both tacit and explicit while for intellectual property knowledge must be explicit to be protected. The same applies to the intellectual property (IP) variable: for knowledge management, IP represents only one way of protecting certain types of explicit knowledge, while for intellectual property management, it is an asset that must be processed on legal grounds only. As knowledge management and intellectual property management have been mostly addressed independently and separately, protected and unprotected knowledge in the organization are addressed individually and are not seen as parts of a whole - organizational knowledge, which leads to the loss of opportunities for generating value and creating new knowledge.

In another sense, in the global and knowledge economy, intellectual property is not only a protection tool but an important form of organizational knowledge that serves to create, store, transfer and use another knowledge. Since knowledge management is related with identification, exchange, creation, storage and knowledge assurance, it should also consider the protection of knowledge, its valuation, negotiation, commercialization and use as a source of organizational knowledge.

Hence the questions of this investigation were: knowledge management is interested in organizational knowledge generating value, why the operation of intellectual property is not included in the processes of knowledge management? And, how to manage intellectual property in organizational knowledge management?

The management of protected and unprotected knowledge is relevant in two senses: on the one hand, it is part of the guiding ideas of the Agenda Knowledge for Development; Strengthening Agenda 2030 and the Sustainable Development Goals (2017). On the other hand, this article points out the importance of protected and unprotected organizational knowledge as a management variable, it contributes to the integration of IP as part of the processes of organizational knowledge management and proposes a conceptual framework for the integration of knowledge management processes and intellectual property management processes.

This research is based on a review of monographs, doctoral theses and empirical and conceptual papers, mostly available in Emerald, EbscoHost, ISI Web of Science,

Science Direct, Scopus and Google Scholar. The works that served to develop the model were identified using keywords such as “knowledge management”, “intellectual property”, “intellectual property management” and combinations among these terms.

Thus, the article is structured as follows: first, we present the methodological aspects of the research, then we describe the conceptual aspects that support the propose framework, specifically the concepts related to knowledge management, intellectual property management and Kucza’s knowledge management processes framework. Later, we describe the framework propose and its processes, and finally, we present the discussion, conclusions and references.

## METHODOLOGY

The research has focused on the design of a conceptual framework that integrates knowledge management processes and intellectual property processes, addressing both protected and unprotected knowledge.

This research was carried out in two phases: a relationship with the documentary revision and the other with the definition and design of the proposed framework.

### Phase 1: document review.

In this phase we explored databases of libraries related to the topic of organizational knowledge and intellectual property such as *Emerald*, *EbscoHost*, *ISI Web of Science*, *Science Direct*, *Scopus* and *Google Scholar*. The documents published between 1980 and 2015, in English and Spanish. It is a period in which there has been significant production both in knowledge management and in intellectual property management. The documents that served to develop the framework were identified using the following search equation: “*knowledge management*” OR “*intellectual property*” OR “*intellectual capital*” OR “*intellectual property management*” OR “*process framework*” OR “*Intellectual property*” OR “*knowledge management*” AND “*intellectual property*” OR “*knowledge management*” AND “*intellectual capital*” AND “*Intellectual property*”.

From this review and based on relevance criteria to the research, 497 documents were selected, of which the metadata (author, title, year, journal or document source, abstract, key words, observations, reflections, Citations, among others) was recorded in a Excel file to generate a unified system of bibliographic description, called Technical Summary Updated - RAE. Subsequently, in accordance with the quality criteria: the relevance of the content, the relation of the objective of the document to the research, the methodological rigor and the scientific rigor were selected 83 documents related with the themes under study.

The literature review and analysis made possible the identification of authors who address knowledge management from different conceptual approaches and theoretical perspectives, such as Davenport and Prusak (1998), Davenport and Völpel (2001), Nonaka and Takeuchi (1993), Liebowitz (1999), Paasi, Luoma and Valkokari (2010), Wiig (1995), Kucza (2001), Galvis-Lista, E. (2015), and Galvis-Lista, Sánchez-

Torres and González-Zabala (2015). Due to its focus on processes, Kuczba bore a special interest for the design of the proposed framework. Additionally, we also identified scholars working in the field of intellectual property management, such as Fisher and Oberholzer-Gee (2013), Conley, Bican and Holger (2013), Loiola and Mascarenhas (2013), Spruson and Ferguson (2007), Narváez and Guerrero (2013), Luna and Solleiro (2007) and Sagarduy (2008), Capaldo, Lavie and Messeni (2017). All of these authors agree on the idea that both in knowledge management and in intellectual property management, knowledge assets must become major differentiators of organizational management. Paasi, Luoma and Valkokari (2010) study how knowledge and intellectual property are managed in collaborative innovation between customers and suppliers through a qualitative methodology of multiple case studies in Finland and in the Netherlands. Cammarano, Caputo, Lamberti, and Michelino, (2017) show the open innovation and the intellectual property as a knowledge-based approach. In other words "managing knowledge via intellectual property rights is integral to open innovation processes" (Bican, Guderian & Ringbeck, [ca] 2017, p. 12).

Wiig (1993) establishes the relationship between knowledge management and intellectual property management by proposing different strategies of knowledge management: knowledge strategy as business strategy, responsibility strategy of personal knowledge assets, knowledge creation strategy, knowledge transfer strategy and intellectual asset-management strategy. The latter focuses on the management of patents, technology, operational and administrative practices, customer relations, organizational agreements and other structural knowledge assets. However, the author refers to the management of patents only, leaving aside the management of other types of intellectual property. And finally, Dias and Casas, (2017) propose a theoretical-conceptual model supporting the analysis of the effects of small- and medium-sized enterprises (SMEs) networks on knowledge management and intellectual capital and they argue that the relation between knowledge management and intellectual capital is the basis on which organisational knowledge develops, and is also the result of knowledge itself.

### **Phase 2: definition and design of the organizational knowledge management process framework.**

In knowledge management there are authors that propose frameworks for different aspects, for example Nonaka and Takeuchi (1993) propose the Socialization, Externalization, Combination and Internalization (SECI) framework for the creation of knowledge, Davenport and Prusak (1998) propose a framework of general processes for the management, Wiig (1997) proposes frameworks of coordination for knowledge management, and Kuczba (2001) proposes a framework that integrates both management coordination processes and knowledge operations processes. As for the frameworks of intellectual property management processes, there were no frameworks that refer to administrative processes for intellectual property, but some authors who focus on the particular activities of intellectual property were identified.

As Kucza (2001) poses an integral view of knowledge management and presents in detail the coordination and operation processes, his proposal was taken as the main reference for the construction of the framework proposed in this article.

Departing from the analysis of the documentation, we simultaneously considered three possible alternatives for the design of a conceptual framework for the integration of knowledge management and intellectual property processes:

In the first framework we considered, the processes of knowledge management and intellectual property management are taken independently, but the framework defines relations between the independent processes. This is the traditional framework used for knowledge management and intellectual property management. It causes organizations to address protected and unprotected knowledge individually, not as parts of a whole –organizational knowledge– and it also reduces the opportunities for value creation.

In the second framework, the processes of knowledge management and intellectual property management are not independent, but they influence each other reciprocally through the linking of some of the processes. This may occur particularly when knowledge management includes processes that are related with explicit knowledge that can be either protected or unprotected. When knowledge is to be protected, the operational processes of intellectual property are put in place. This can result in redundant processing work, loss of information due to independent coordination processes, and the creation of policies and practices that do not consider organizational knowledge as a whole.

Finally, the last conceptual framework integrates both the processes of knowledge management and the processes of intellectual property management, thus allowing for a unique organizational knowledge management framework. This is the process framework we opted for.

## CONCEPTUAL ASPECTS THAT SUPPORT THE PROPOSED FRAMEWORK

### Knowledge Management (KM)

In terms of KM, different conceptions of what knowledge is, its usefulness and its management have been adopted. Davenport and Prusak (1998) argue that knowledge is a dynamic mix of experiences, values, contextual information, expertise and mental frameworks. They claim that knowledge is a framework for assessing and incorporating new experiences and information; a framework that is characterized by its dynamic nature, does not disappear with use, depends on the context and is difficult to measure. In summary, these authors believe that knowledge is a human creation.

Following a similar trend, Nonaka (1994) defines knowledge as personal justified true belief. Based on the ideas of Polanyi (1958), Nonaka sees two forms of knowledge: tacit knowledge and explicit knowledge. Tacit knowledge is associated with tactile experiences, movement skills, physical experiences, intuition and unarticulated mental frameworks. It is characterized by being personal, difficult

to transmit, disjointed and tied to the senses. By contrast, explicit knowledge is formalized through language, can be easily transmitted through oral means, writing or drawing, and can be protected under intellectual property laws, thus creating the protected knowledge of the organization. Moreover, Nonaka (1994) also states that in the field of organizations, organizational knowledge is generated when the people involved in the organization interact and produce streams of knowledge that can be incorporated not only into each of those involved in the interaction but also in documents, repositories, organizational routines, processes, practices and norms. Thus, organizational knowledge includes knowledge that is both, protected or susceptible to be protected, and knowledge that cannot be protected.

The conceptualization of organizational knowledge management is composed of different approaches from multiple authors; therefore, it encompasses different concepts, frameworks and practices. For example: Wiig (1993) claims that knowledge management consists of activities focusing on the organization and aiming at gaining knowledge from their own experience and that of others. Furthermore, Wiig considers the application of that knowledge to fulfill the mission of the organization, and states that knowledge management is the construction, renovation and application of knowledge in a systematic, explicit and deliberate way to maximize efficiency and create knowledge assets (Wiig, 1995). Along the same line, Malhotra (1998) claims that knowledge management is defined as the process set to capture and use knowledge in an organization in order to improve organizational performance. Gupta, Sharma and Hsu (2004) say that, in general, knowledge management can be defined as a set of processes that govern the creation, dissemination and use of knowledge. According to them, it involves the creation of organizational support structures, facilitating organizational members, and the availability of tools to promote teamwork and dissemination of knowledge. In the same way, Yu-Yuan Hung, Ya-Hui Lien and McLean (2009) affirm that knowledge management is very to integrate organizational resources, align organizational business processes, creating an organizational learning culture, and improving organizational social capital.

Thus, knowledge management essentially organizes, stores, exchanges and uses knowledge as a powerful means to create value. The knowledge generating value is called intangible asset and is classified as human capital, structural capital and relational capital (including intellectual property and organizational capital), although others such as Bueno and Azua (1998), Bontis (1996), Sveiby (1997) and Edvinsson and Malone (1999), among others, propose different types of intangible assets.

In terms of knowledge management, the relevant processes integrate active practices throughout the organization, including knowledge that is acquired both internally and externally. Each process consists of a series of practices that, in turn, include related activities. Supyuenyoing and Swierczek (2011), quoting Liebowitz and Buckman (1998), determine different knowledge processes, i.e. the identification, acquisition, selection, storage, exchange, application, creation and sell of knowledge.

They also mention that, on the contrary, Alavi and Leidner (2001) propose four processes: creation, storage/retrieval, transfer and application, while Wong and Aspinwall (2004) classified the processes in creation and acquisition, organization and storage, transfer and exchange, use and application of knowledge. Although it should be one of the topics of interest to any organization in the knowledge society, none of these authors proposes particular processes for the protection of knowledge, and thus knowledge management does not account for protected knowledge management.

### **Intellectual Property Management (IPM)**

Intellectual property (IP) stands as one of the legal resources created for the protection of intellectual creations that represent the knowledge generated by the people in the organization or by those people working for the organization. These creations are forms of representation or formalization of knowledge. In other words, they are expressions of explicit knowledge preserved in documents, drawings, songs, sculptures and processes, among other types of expression. As expressed by the company Spruson & Ferguson, "IP is just another way of describing valuable knowledge - knowledge on the way you do business, knowledge on the way you make your products, your business processes, even your customer lists" (2007, p3). This company argues that the intellectual property management refers to the understanding of what the company is: when was the company created, which is the relevance of the knowledge it creates and how this knowledge could be protected to generate value. In other words, it is the use of systematic processes to understand other's intellectual property and generate their own.

According to Kalanje (2004), intellectual property management has to identify the most affordable and effective tools to obtain the maximum return on investments, and evaluate the intellectual property assets that the company owns and operates, since these could improve its competitiveness and even expand its market share. As presented by Sagarduy (2008), most successful companies are those who have managed to include all of the above in their strategy. This allows them to have criteria to define what is protected, what means should be used in each case, how to transfer technology or knowledge, how to receive knowledge safely, how to manage contracts that consider all the concepts presented, how to reach agreements with the staff handling sensitive information in the company, and how to position themselves in the market with assurances. Therefore, in its simplest form, managing intellectual property (IP) in an organization encompasses performing a series of processes to identify, capture, assess, protect and monitor the organization. In contrast to traditional views, it is evident that intellectual property management is not restricted to legal matters, but it aims at providing guidance for a proper management of IP to strengthen and secure the corporate strategy, and turn IP into a business matter. Agostini et al (2017) proposed that IP management integrates two areas: the first related with internal management of intellectual property rights



(IPRs), and the second concerns external management of IPRs (Pitkethly, 2001). This distinction follows the increasing tendency of firms toward opening their boundaries to complement internal with external knowledge, considered that new knowledge is at the basis of IP asset development. Appropriating the value of such knowledge sources requires a strategic approach toward IP management, which encompasses both a firm's internal management of IPRs aimed at managing the creation and preservation of the company's IP resources, as well as the external management of IPRs, which concerns how a firm acquires knowledge and IPRs from others firms and vice versa (Pitkethly, 2001). Finally, Al-Aali and Teece (2013) affirm that the management of intellectual property is integrated with the general design of the business model and corporate strategy.

What has been presented so far makes it possible to claim that knowledge management and intellectual property management share the common practice of dealing with knowledge assets, but since each type of management is performed independently, it is not possible to have an integrated management of organizational knowledge that includes both intellectual property -protected knowledge- and unprotected knowledge. However, authors like Paasi, Luoma and Valkokari (2010) do mention knowledge management when explaining IPM, but they do not include it in particular management processes. Housel and Bell (2001), Bueno, Salmador and Merino (2008), the European Committee for Standardization (2004), Bañegil and Sanguino (2007) and Wiig (1995, 2008) suggest that knowledge management should include intellectual property since IP is a particular form of knowledge assets that is part of the intangible assets within the organization. None of these authors describes any process related to IPM. Wiig (1995) proposes several knowledge management strategies, one of which is the management of intellectual assets, which focuses on the management of patents, technology, operational and administrative practices, relationships with customers, organizational agreements and other structural knowledge assets. But Wiig does not include other categories of intellectual property or specific considerations for knowledge that cannot be protected under legal regulations for intellectual property.

### **Knowledge management processes framework - Kucza**

The framework we proposed is based on Kucza's (2001) approach to the processes and activities to be performed to manage knowledge within an organization. Kucza's proposal is important because it separates knowledge management processes from the processes that affect knowledge directly, enabling knowledge management to be performed transversely in the organizations. The relevant concepts taken from Kucza to build the framework are described below.

This report presents the results of research into knowledge management (KM) performed at VTT Electronics, the Technical Research Centre of Finland. Based on literature analysis and prior experiences with software process improvement (SPI) projects, a process framework is proposed as an abstract and generic framework

to be used in KM projects. Its purpose is to enable one to understand knowledge management, perform analyses and plan processes in a structured way, as well as ensure that important aspects are considered in KM projects.

Kuczaj (2001) presents a framework of knowledge management processes comprising two types of processes: co-ordination and operation. The co-ordination processes describe the requirements to initiate and control the activities of knowledge management. They are the center of all knowledge activities within the organization and are organized in a cycle to support continuous improvement. Each process is broadly described below:

#### **Analysis of the state of knowledge management.**

In this process, the current state of knowledge and the improvement measures that are required for knowledge management are analyzed. The measures include the existent management policies, and the issues related to the company's culture. This process comprises the following steps: 1) Defining the scope within which the possible areas to perform management activities are chosen and defined, and the analysis of the possibilities to complete management activities based upon the costs, the expected benefits and the business impact. 2) Generation of knowledge maps showing the profiles of the holders of knowledge within the organization, the units where most knowledge is generated, the people working in those units and the storage places. 3) Analysis of knowledge management, including the exploration of knowledge maps to identify shortcomings in the organizational structure of knowledge management, learning about the knowledge used and needed to perform the processes, and discovering when knowledge is created, how it is created and who in the organization creates it. 4) Analysis of the cultural knowledge situation to determine whether knowledge is shared in the organization, to identify the factors that may hinder the creation or sharing of knowledge, and to specify how senior management assumes knowledge exchange in the organization.

#### **Defining the desired state of knowledge management.**

This process includes the configuration of the desired state of knowledge management, and the redefinition of the focus initially set and the goals to guide this redefinition in the organization. This process comprises the following steps: 1) Defining improvement goals by analyzing the results of knowledge management and its possible improvements throughout the organization. 2) Measurement planning to control knowledge management processes and their ability to achieve the proposed goals. Therefore, it is necessary to define if everything that could be measured should be measured and then collecting the data to support it, or if on the contrary, the measurement should be done only when there is a specific question that needs to be answered. 3) Analysis of knowledge culture goals in order to identify aspects that enable or prevent fulfilling the objectives of knowledge management in the organization. It is necessary to generate an adequate environment to create

knowledge and encourage knowledge sharing and to put in place proper planning to address any barriers that might be identified.

### Planning

In this process it is required to determine how the knowledge management objectives are going to be reached in the organization, and also the operational processes are defined, by determining the roles, rights, responsibilities and the infrastructure that supports processes. This process comprises the following steps: 1) Determining the specific domains of the organization to be included in knowledge management in each area of the organization in accordance with the knowledge nature. It includes the techniques and strategies adopted for preservation, creation or dissemination depending on the levels of access to the knowledge. 2) Definition of processes and methods to determine the operational processes as well as the techniques and metrics needed to achieve the goals and objectives, depending on the knowledge map and specific domain. 3) Definition of the roles, rights and responsibilities of knowledge management, which depend on the analysis of domains and processes that are needed to carry out the organizational knowledge management. In this step, specific roles such as the chief knowledge management, the knowledge management analysts or officers, among others, with their respective responsibilities and rights are defined. 4) Determination of the infrastructure needed by defining the technology and tools required to achieve the knowledge management objectives.

### Implementation of knowledge management

It encompasses monitoring, evaluating and updating the implementation of the processes to coordinate knowledge management in the organization. This process comprises the following steps: 1) Designing a knowledge management pilot test. 2) Measurement of knowledge management gathering the relevant general metrics and the metrics of the processes to assess whether the goals are reached and to identify weaknesses in the activity under assessment. 3) Evaluation of knowledge management activities through feedback activities to identify problems, shortcomings or improvements that can be corrected or implemented. 4) Update of knowledge management based on necessary changes identified in the shortcomings resulting from the metrics or from the collected feedback.

The operational processes are the type of schemes and activities that are directly related to the knowledge within the organization. They describe what is performed when KM activities are completed. Each operational process is described below:

### Identification of needs for knowledge

To determine the knowledge requirements in the organization. This process comprises the following steps: 1) Identification of needs through the analysis of the organizational processes to recognize weaknesses or opportunities related to knowledge. 2) Determination of requirements for searching or acquiring knowledge

by defining the type of knowledge needed, its specific requirements, and the cost for not reusing knowledge that is already available.

### **Knowledge pull**

Which refers to the search, acquisition and adoption of knowledge needed by members of the organization. It encompasses the following sub-processes: 1) Establishment of search criteria based on the requirements defined for knowledge in the organization. 2) Search for candidate knowledge sources following the defined search criteria. 3) Evaluation of candidates by analyzing them individually to determine their suitability for the criteria and requirements of knowledge, plus the analysis of the cost for adopting the selected candidate. 4) Selection of a candidate to determine whether this source of knowledge is adopted or a new one is created. For this, it is necessary to determine the best candidate, then to verify the cost of adoption against the cost of creating a new one. With this information, it is possible to reach a decision regarding whether to adopt the candidate or to create a new one. 5) Adaptation of the candidate so that it can be used by others.

### **Knowledge push**

Referring to the dissemination, the creation of knowledge sharing spaces and knowledge transfer. It encompasses the following sub-processes: 1) Announcement of the adapted knowledge or new knowledge so that the organization becomes aware of it. 2) Promotion of occasions for knowledge sharing among people in the organization.

### **Knowledge creation**

Focusing on the definition of an approach to create knowledge within the organization. It encompasses the following sub-processes: 1) Identification of new ideas to be developed in the future. 2) Evaluation of new ideas to determine their potential, impact, and the knowledge requirements necessary for their development to establish opportunities for organizational activities. 3) Collection of candidates: based on the detailed description of an idea or the requirements for the needed knowledge, knowledge candidates are searched for in both internal and external organizational sources. It is useful to consider as many potential candidates as possible. 4) Evaluation of candidates: analysis of the capability of each candidate against the requirements of the needed knowledge and estimation of the cost to develop the idea and its potential. 5) Selection of candidates: selection of a candidate from the set of available candidates based on the requirements of knowledge. The requirements may have been established during the identification of the need or the evaluation of a new idea. 6) Creation of knowledge: adaptation of the successful candidate to the environment of the organization. This involves the creation of knowledge based on the combination of existing knowledge with the new environmental conditions.

### Knowledge collection and storage

It is referring to the identification, evaluation, codification and storage of knowledge depending on its importance to the organization. It encompasses the following sub-processes: 1) Identification of created and existing knowledge, through the use of search mechanisms such as interviews and questionnaires applied to members of the organization. 2) Evaluation of existing knowledge: once the knowledge has been identified, it is necessary to evaluate it to determine whether it is relevant or appropriate to be stored in the organizational knowledge repository. 3) Knowledge package design: depending on the type of knowledge that is to be integrated, it is necessary to define a medium for its storage. For example, using documents or videos narrating stories, among others. The number of media available depends on the storage system. 4) Knowledge package codification: assign a code to define an identification element that allows an effective search and retrieval. For example, each package is given a name, a function, a description of the type of knowledge package and an application domain. 5) Package integration: after the package has been designed and codified, it is integrated to the knowledge repository. It is necessary to update the repository to make the package available. 6) Update of the knowledge map every time something is added, discarded or changed.

### Knowledge update

It intends to verify that the knowledge available in the organization is up-to-date and valid, otherwise it should be deleted. It encompasses the following sub-processes: 1) Identification of change to determine changes that have an impact on knowledge by regular audits that reflect this situation. 2) Evaluation of change impact to determine the type of knowledge update required and whether to perform the audit. 3) Knowledge update depending on the result of evaluation of change, discarding and marking knowledge as outdated.

As described above, Kucza (2001) proposes a set of processes to manage knowledge in an organization, but does not take into account whether such knowledge is protected or not. The Knowledge Pull, Push, and Update processes refer mainly to activities dealing with explicit knowledge, regardless of tacit knowledge. Finally, it can be concluded that Kucza's (2001) process framework takes into account knowledge update due to internal or external changes, but this is not quickly reflected on knowledge management so it is not a dynamic process framework. Therefore, in order to manage (protected and unprotected) organizational knowledge, it is necessary to include specific processes for the protection of knowledge, rethink some of the basic processes proposed by Kucza (2001) so that they include tacit knowledge, and even propose new processes that facilitate the management of this knowledge in the organization. In addition, it is necessary for the framework to be dynamic so that knowledge can be managed according to its own characteristics. To do this, we took some features of the complex adaptive systems theory, as discussed below.

## CONCEPTUAL FRAMEWORK OF PROCESSES OF INTEGRATED MANAGEMENT OF KNOWLEDGE AND INTELLECTUAL PROPERTY

The proposed framework integrates both the processes of knowledge management and the processes of intellectual property management to perform an adequate management of protected and unprotected organizational knowledge, as Hanel (2006, p.895) said “In this new economy, knowledge is the principal asset and its management and protection have become an integral part of a company’s competitive strategies”. Therefore, it is a holistic framework of organizational knowledge processes. Below, we offer a description of the processes that define the framework, including the features that give the framework its qualities: flexibility, recursion, self-regulation and adaptation to organizational context.

### **Processes for managing protected and unprotected organizational knowledge**

The proposed framework of organizational knowledge management adopts Kucza’s (2001) proposal to include two types of processes (co-ordination and operational processes). Thus, it considers knowledge from the point of view of management and guidance and includes the sub-processes and activities to be performed in different areas of an organization in order to reach proper knowledge management.

Since both tacit and explicit knowledge are present in the organization, it is necessary to have activities and processes that promote the proper management of each of them. Thus, the following operational processes are proposed for protected and unprotected knowledge:

### **Processes proposed based on Kucza (2001)**

#### **Knowledge Identification.**

It involves determining the knowledge that already exists in the organization and the knowledge that needs to be obtained. This is done through the analysis of the processes in order to identify weaknesses and opportunities related to the knowledge and the establishment of the search or acquisition requirements. This process is based on the processes of identifying knowledge needs and knowledge sharing.

#### **Knowledge creation.**

Defining an approach to generate new knowledge within the organization through the identification and evaluation of new ideas. This includes collecting ideas to determine which candidates are most suitable for development, and evaluating the candidates to establish whether they meet the knowledge needs in the organization. It involves selecting the knowledge candidates and creating new knowledge by adapting the idea to the organization environment.

#### **Knowledge storage**

This process includes identification, evaluation, storage, codification, preservation of knowledge and update map design, change or removal of knowledge.

### **Processes modified based on Kucza’s (2001)**

### **Knowledge sharing**

This paper aims to change the knowledge sharing process proposed by Kucza (2001). Kucza is more concerned with formalizing explicit knowledge and does not delve into the tacit knowledge management process. Nonaka and Takeuchi (1993) argue that knowledge sharing is more concerned with a knowledge socializing operation, that is to say, the reciprocity of tacit knowledge among people. This is the form of knowledge sharing adopted throughout this paper. Thus, knowledge sharing does not include the dissemination, transfer and acquisition of knowledge, but rather activities such as the possibility of internships, teamwork exchange, and knowledge cafés, among others.

### **Knowledge assurance**

Kucza (2001) refers to this process as knowledge update. However, this paper proposes knowledge assurance based on the concept of quality assurance - set of systematic activities planned and implemented within a quality system to guarantee that the requirements for the quality of a product or service are met -. It intends to ensure that the organization knowledge is in the proper form and quality. Thus, it involves the verification process to ensure that the knowledge is up-to-date and valid, otherwise, it should be removed. This is completed through the identification and evaluation of changes and their impact, and the following knowledge update based on the changes that have been encountered.

### **Additional processes to those proposed by Kucza (2001):**

The framework proposes three additional operational processes. Kucza (2001) presents these processes as knowledge sharing sub-processes. However, due to their relevance, their different strategies for implementation and their specific goals, these processes must be independent and fundamental in the knowledge management performance:

#### **Dissemination**

Implies raising awareness of the knowledge in the units of the organization where it is needed and where it should be distributed, in an appropriate way according to the receptor. That is, taking knowledge where it is required and in the required particular form.

#### **Transference**

It refers to the circulation of knowledge from one person to another or from one person to an explicit means so that the receiver can understand it and apply it.

## ACQUISITION

It refers to obtaining the required knowledge when it is not available in the organization. For example, purchase of knowledge, staff training, hiring consultants, among others.

Finally, the integration of protected and unprotected knowledge is proposed in order to treat organizational knowledge as a whole. The general structure of the framework has been defined in the following way: The co-ordination processes are presented in the periphery, the middle level includes the operational processes, and the core level presents knowledge in all its forms, protected knowledge -intellectual property, knowledge that could be protected and unprotected knowledge. Thus, it is necessary to establish the relationship between the processes of knowledge management and intellectual property management.

The process framework proposed establishes co-ordination and operational processes for intellectual property management by integrating the above-mentioned processes and considering intellectual property as organizational knowledge.

The co-ordination processes should be guided by a knowledge management team responsible for defining knowledge strategies in the organization, in accordance with the organizational mission. This team will also be responsible for initiating knowledge development projects and should become a facilitator for knowledge transfer, adoption and consolidation of knowledge strategies, and marketing and promotion of knowledge services in the organization. These processes are described in Table 1. Table 2. describes the operational processes performed for protected and unprotected knowledge in the organization.



Table 1  
Co-ordination processes for organizational knowledge management

PROCESS	DESCRIPTION
CURRENT SITUATION ANALYSIS	<p>Exploring the current state of protected and unprotected knowledge and the improvement measures to be implemented for knowledge management. This process comprises the following steps:</p> <ol style="list-style-type: none"> <li>Defining the scope of activities for protected and unprotected knowledge management</li> <li>Creating knowledge maps for the protected and unprotected knowledge</li> <li>Analyzing the knowledge map and the organizational structures it represents</li> <li>Analyzing the current organizational culture in relation to the protected and unprotected knowledge</li> </ol>
DEFINITION OF THE DESIRED STATE	<p>Defining the desired state of protected and unprotected knowledge management, and redefining the focus initially set and the objectives and indicators that will guide the management in the organization. This process comprises the following steps:</p> <ol style="list-style-type: none"> <li>Redefining the objectives of knowledge management</li> <li>Planning the evaluation of protected and unprotected knowledge management processes, and their ability to achieve the objectives</li> <li>Analyzing the cultural aspects that make possible the achievement of the desired state of protected and unprotected knowledge management, or the issues that hinder it.</li> </ol>
KNOWLEDGE MANAGEMENT PLANNING	<p>Determining how the objectives of protected and unprotected knowledge management will be achieved in the organization. Defining the operational processes by determining the roles, rights, responsibilities and the infrastructure that supports the processes. This process comprises the following steps:</p> <ol style="list-style-type: none"> <li>Identifying the domains to be considered regarding knowledge management in the different areas of the organization.</li> <li>Determining the techniques and strategies related to knowledge, according to the defined domains and the knowledge map.</li> <li>Defining the roles, rights and responsibilities of protected and unprotected management knowledge</li> <li>Designing the required technological infrastructure</li> </ol>
IMPLEMENTATION OR EXECUTION	<p>Monitoring, evaluating and updating the performance of the processes of protected and unprotected knowledge management in the organization. This process comprises the following steps:</p> <ol style="list-style-type: none"> <li>Designing a pilot test for protected and unprotected knowledge management</li> <li>Measuring protected and unprotected knowledge management</li> <li>Evaluating protected and unprotected knowledge management</li> <li>Updating protected and unprotected knowledge management</li> </ol>

Source: created by the authors

Table 2  
Operational processes performed for organizational knowledge

PROCESS	DESCRIPTION
IDENTIFICATION	Determining the required knowledge and the knowledge that can be protected
SHARING	Carrying out activities which foster knowledge cooperation among people in the organization
CREATION	Establishing an approach to generate protected or protectable knowledge within the organization through the identification and evaluation of new ideas.
STORAGE	Conservation of organizational knowledge by means of evaluation, codification, maintenance and the definition of forms of storage for protected and unprotected knowledge. The activities require the search and identification of both types of knowledge, the analysis of the storage source of the knowledge in the organizational repository, and the design of a storage protocol and an update map for updating, changing or eliminating protected and unprotected knowledge.
ASSURANCE	Verification by the organization that the protected and unprotected knowledge available is up-to-date, that it is accessible when needed, is valid and complies with the necessary quality. Thus, the knowledge can be secured through signing and monitoring of contracts, and the follow-up of the use of protected and unprotected knowledge, either by individuals from the organization or by third parties. Regular audits are performed to define the needed changes and their impact on the protected and unprotected knowledge in the organization.
PROTECTION	Assessing and defining an action plan to determine a strategy to protect the knowledge generated or acquired in the organization. The steps for protection include evaluating the value generation that could result from the protection of knowledge, establishing the best categories or forms of knowledge protection, defining the protection purpose, time, territory and costs, and evaluating the target market, the competitors and the potential partners.
ASSESSMENT	Determining the value of the protected and unprotected knowledge generated or acquired in the organization, in order to establish what type of knowledge generates value to the organization to define its value for an eventual negotiation
COMMERCIALIZATION	Defining and analyzing the protected and unprotected knowledge that can be transferred to third parties, to establish the most suitable commercialization strategies, such as licensing, transfer or sale, among other modalities
NEGOTIATION	Analyzing the conditions under which the protected and unprotected knowledge is negotiated or traded
DISSEMINATION	Defining appropriate mechanisms to bring knowledge to the places and units where it should be and where it is needed
TRANSFER	Outreach, involving person to person circulation or from a person to protected or unprotected knowledge transfer formats
ACQUISITION	Attainment of knowledge that is needed for the organization when the organization does not have it and, thus, should buy, hire or lease the knowledge required depending on the needs

Source: created by the authors

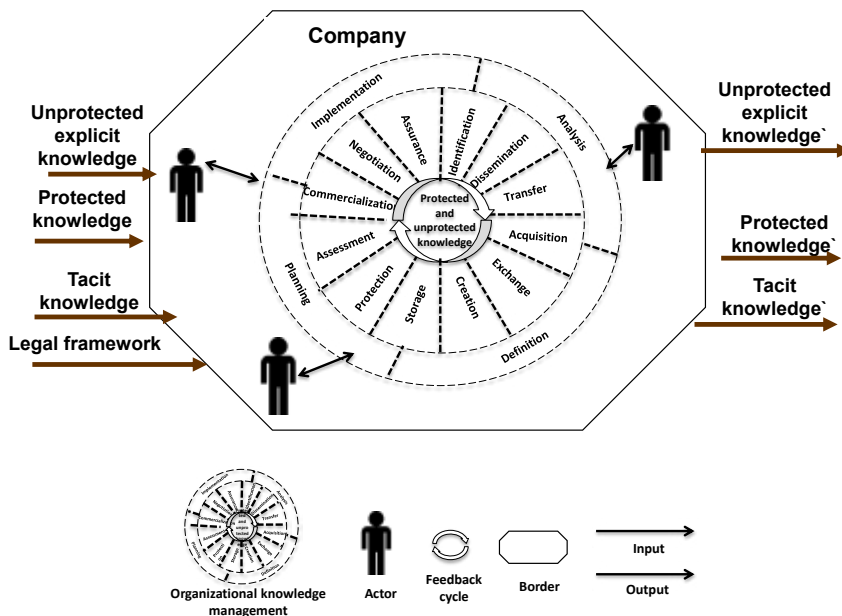
### CHARACTERISTICS OF THE FRAMEWORK OF PROCESSES OF PROTECTED AND UNPROTECTED KNOWLEDGE MANAGEMENT

The framework does not suggest a hierarchy for the levels of processes; co-ordination and operational processes work independently, but are related. In order to complete each co-ordination process, it is necessary to carry out some of the operational processes.

Additionally, to execute the operational processes, some co-ordination processes must be performed. Thus, depending on the situation, the processes become recursive and there is not a one-to-one or a deterministic relation between them.

Considering these circumstances, it is evident that the proposed framework recognizes that the organization exists in an environment that influences it. The organization receives inputs that affect it (unprotected explicit knowledge like guidelines, user requirements; protected knowledge like patents, licenses, etc.; tacit knowledge of customers, suppliers, among others; and legal framework of the context in which the organization is) and it requires adaptation and should provide responses. In this sense, the knowledge that comes from the environment (new or different unprotected explicit knowledge, new or different protected knowledge and new or different tacit knowledge), in its different forms, affects how knowledge should be managed. This is possible using a framework with adaptable and flexible processes. Additionally, the knowledge that is produced, in any form, is also a result that the organization will deliver to the environment. Thus, the graphic representation of the framework is as shown in Figure 1.

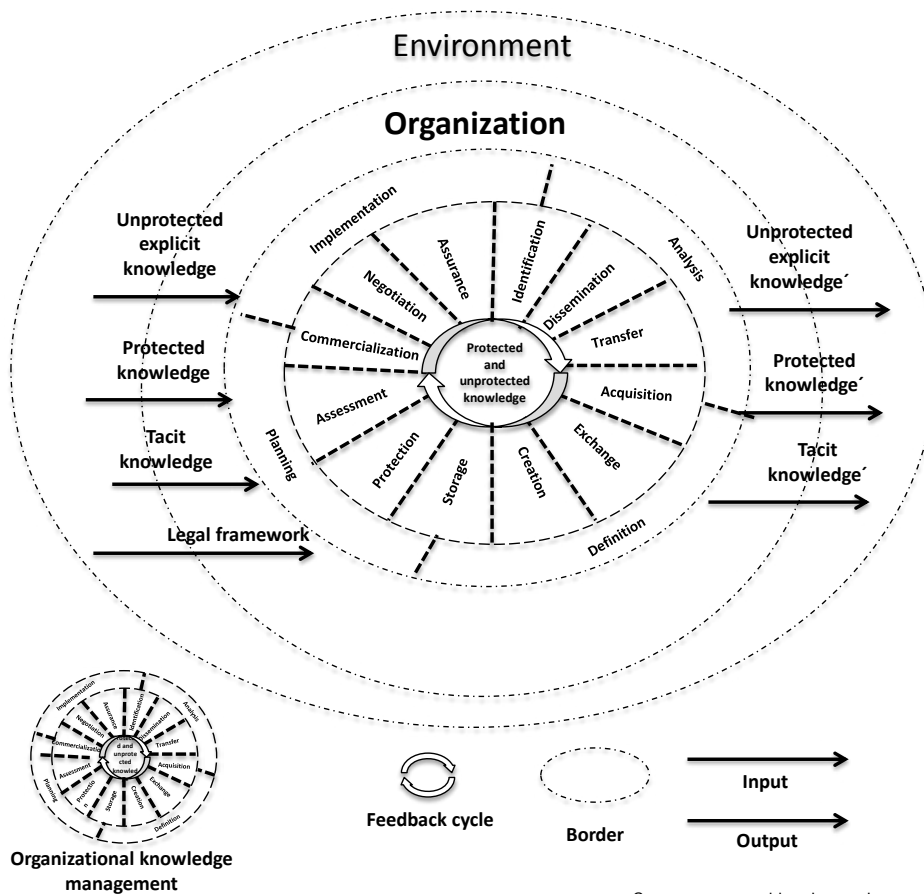
Figure 1.  
Framework of the processes of organizational knowledge management



Source: created by the authors

In short, the conceptual framework of integrated knowledge management and intellectual property management processes displays the set of processes that articulate a type of management that is comprehensive, flexible and adaptable to different organizational contexts. See Figure 2.

Figure 2.  
Framework of processes of protected and unprotected knowledge management.



Source: created by the authors

### PRECONDITIONS FOR APPLYING THE FRAMEWORK IN ORGANIZATIONAL ENVIRONMENTS

The framework is applied only when the organization recognizes knowledge as a differential asset to be managed, thus:

- Assign managers who allocate resources and direct knowledge management in the organization.

- Define strategies that guide the management of knowledge
- Apply each one of the coordination processes proposed by the framework.
- Depending on the results obtained in the application of the coordination processes, the operational processes of knowledge are initiated, which according to the above, must be carried out according to the needs of the organization.

## CONCLUSIONS

### About the framework

Within the organizational context, knowledge management and intellectual property management show that the co-ordination and operational processes, and the protected and unprotected knowledge are elements that adapt, interact and react as part of the organizational knowledge management, there for the framework is characterized for emergence, adaptation and recursion.

The elements of integrated management of unprotected knowledge and intellectual property are heterogeneous in nature due to their own characteristics and their particular goals.

Knowledge, the co-ordination processes and operational processes are organized according to the changes and the specific situations. The interaction among these elements generates an emergent behavior that cannot be anticipated in the proposed conceptual framework. Thus, the study of the individual elements and their behavior fails to reflect the performance of the framework as a whole.

The proposed framework does not have a single centralized monitoring unit that governs all processes, elements and actors. On the contrary, it establishes a relationship and articulation among them, so that their behavior is not usually explained by the sum of its parts.

Finally, the framework is represented in a picture including the two important viewpoints on KM: the management view and the operational view. Also, the picture shows inputs and outputs basic on the organizational knowledge management, it allows understand and address easily the knowledge administration, providing a possible framework for analyzing KM, and enabling a structured approach to KM projects.

In its current state the framework is quite abstract and, although pointing out what should be done, does not in all cases provide enough help for the way things need to be done.

### About knowledge and process

The proposed framework reflects relevant aspects of knowledge:

Knowledge can be obtained from outside sources or from the same organization, and the knowledge that is generated can be for the organization or for the context in which it operates.

Knowledge is dynamic and is affected by internal factors (e.g. culture, organizational policies) and internal and external knowledge (e.g. the law, the economy, the scientific knowledge, the knowledge of the people or companies involved and uncertainty). Additionally, knowledge can go from being protected to unprotected or vice versa, which imposes different processes. Hence, the processes of the proposed framework are also dynamic, and adapt and interconnect with each other, so that a decision or action within the framework has an influence on the other elements.

The process-centric approach to organizational knowledge management makes it possible to integrate organizational processes and knowledge operations processes, since the latter are performed in each one of the first. Also, the process-oriented view on KM with the activity description supports the integration with other organizational processes. Such integration ensures that KM processes are performed and that they support the other organizational processes. Additionally, the process-oriented view provides a means for analysis and planning of tool support for KM. It should be taken into account that these levels of processes can function independently, but in an interrelated way at the same time.

## OVERALL CONCLUSIONS

Frameworks can be understood in two ways: as a representation of a given reality or as a representation that allows discussion and intersubjective understanding between people. In this case, the framework we propose represents an ideal situation with a conceptual integration between the knowledge management processes and the intellectual property processes in an organization.

Although some authors relate knowledge management to intellectual property, it was impossible to identify a holistic approach accounting for the management of protected and unprotected knowledge in the organization.

Generally speaking, the different approaches to knowledge management and the frameworks that they propose indicate that knowledge management primarily involves knowledge identification, sharing, creation, storage and assurance, without any specific reference to its protection and other management processes, such as assessment, negotiation and marketing. Hence, the framework proposes the integration of processes for protected and unprotected knowledge.

The proposed framework considers an essential characteristic of knowledge: it recognizes knowledge as being dynamic and constantly changing. Thus, the framework takes into account that the processes required to manage knowledge are not static -remaining always the same- and ensures the dynamic capacity of the framework processes.

The implementation of the operational processes above is performed according to the organizational needs. The processes do not need to unfold sequentially. Additionally, given the dynamic nature of knowledge, the proposed framework must consider that at any time, knowledge can be transformed from explicit to tacit and vice versa, and from individual to organizational and vice versa.

Finally, the proposed is a framework of processes and includes the activities required to manage protected and unprotected knowledge within the organization. It does not provide practical, methodological, technological or technical guidance for those implementing the framework. Further investigation is required to test the framework and improve it, in order to generate an appropriate methodology, which is definitely needed.

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