A review of the main approaches to knowledge management

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Abstract
The purpose of this paper is to order and connect different perspectives on the creation and management of knowledge. Several proposals for the classification of the main approaches to knowledge management are considered and their connections and differences discussed. Three main groups emerge: measuring knowledge, managing knowledge (either with greater emphasis on the human factor or on information technologies) and creating knowledge. After selecting and analysing selection of the most relevant studies in this area, these concepts can be arranged into a continuum from a more descriptive perspective to a more normative one. The main contribution of this study is the compilation of literature on knowledge management and creation, along with the analysis of our own proposal for the classification of different approaches, depending on their more descriptive or more normative perspective.
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Introduction

The proliferation of articles, books and special issues on knowledge and its management during the last few decades is a fact recognized by all. Ever since the transcendental study by Nonaka & Takeuchi (1995) – this book is the embodiment of several previous studies carried out by the authors. See Imai *et al.* (1985), Nonaka & Johansson (1985), Takeuchi & Nonaka (1986), Nonaka (1988a, b, 1990, 1991, 1994) among others, the array of work on this topic has been enormous, mostly of a theoretical nature. For example, numerous special issues have been devoted to the topic, such as the winter 1996 special issue that appeared in *Strategic Management Journal*, the spring 1998 issue of *California Management Review* or the March 2004 issue of the *British Journal of Management.* Several topic-specific journals have also appeared such as the *Journal of Knowledge Management* or *Knowledge Management Research & Practice*, which published their first articles in 1998 and 2003, respectively. Lastly, there are noteworthy forums for discussion and debate and sites on the Internet that act as an outlet for comments or articles, as well as publicizing events, seminars and conferences. These represent a means of connecting academics and professionals who share the same interests and concerns on the topic.

This can be considered as very positive both for academics and for the business world. However, it is also true that on a theoretical level there is still no consensus regarding the classification of the different perspectives and approaches that have arisen on this topic.

Therefore, the need arises to put the different perspectives on the creation of knowledge management that have been appearing in recent

years into some sort of order. This study takes on this challenge and tries firstly to lay down exactly what the term knowledge management involves. Secondly, it attempts to study certain proposals of classification of the main approaches of the study of knowledge management by underlining its connections and differences. In particular, we refer to the approaches identified by Andreu & Sieber (1999), McAdam & McCreedy (1999), Alvesson & Kärreman (2001), Takeuchi (2001), Earl (2001), Swan & Scarbrough (2001) and Moreno-Luzón *et al.* (2001). Third and lastly, and as the main contribution of this study, we will analyse our own classification proposal of the different approaches according to whether they represent a more descriptive perspective or a more normative one, underlining the most relevant studies in this area.

The concept of knowledge management
Just like knowledge itself, knowledge management is difficult to define (Earl, 2001, p. 215). However, we believe that defining what is understood by knowledge management may be somewhat simpler than defining knowledge on its own. The idea of 'management' gives us a starting point when considering, for example, the activities that make it up, explaining the processes of creation and transfer or showing its main goals and objectives without the need to define what is understood by knowledge. Consequently, in literature there are more ideas and definitions on *knowledge management* than just on knowledge, although these are not always clear as there are numerous terms connected with the concept.

An analysis of over 100 websites on knowledge management carried out by Quintas *et al.* (1997) revealed the following heterogeneous range of interests, perspectives and issues: economics, intellectual capital, engineering approaches (flexible manufacturing systems), aspects of computing and knowledge media, organization studies (based around anthropology, sociology, etc.), epistemology (including learning, situated cognition and cognitive psychology), other aspects of classification and definition informed by artificial intelligence, human resource issues, etc. (McAdam & McCreedy, 1999, p. 91).

The stream of research that forms the basis of this study sees knowledge as the answer to the new competitive challenges faced by firms today. Thus, knowledge management would include information and knowledge-creating systems, as well as strategic management and innovation. To address other disciplines (such as psychology, engineering, IT or economics) would imply covering too broad a research spectrum for any single study. We thus focus our closest attention on the field of business management.

Our objective is to strive to take a more in-depth look at knowledge management within this field. It is worthwhile, although, starting with some definitions of *knowledge management* that have appeared in the literature in chronological order.

Knowledge management 'is the process of continually managing knowledge of all kinds to meet existing and emerging needs, to identify and exploit existing and acquired knowledge assets and to develop new opportunities (Quintas *et al.*, 1997, p. 387).

Knowledge management seeks to facilitate knowledge flows and sharing to enhance the productivity of individuals and hence the enterprise (Guns & Välikangas, 1998, p. 287).

Knowledge management requires understanding firstly the organization's strategy under which knowledge will be developed and exploited; secondly the content and kind of knowledge; thirdly the organizational context ad, finally, the technological context that supports the architecture of knowledge in the organization (Martín & Casadesús, 1999, p. 73) – from Zack (1999).

Knowledge management is 'the process that continually ensures the development and application of all kind of knowledge that is pertinent to a firm, with the objective of improving its problem-solving capacity and thus contributing to sustaining its competitive advantages (Andreu & Sieber, 1999, p. 68).

…is the dynamic process of turning an unreflexive practice into a reflective one by elucidating the rules guiding the activities of the practice, by helping to give a particular shape to collective understandings, and by facilitating the emergence of heuristic knowledge (Tsoukas & Vladimirou, 2001, p. 973).

Knowledgee management can be subdivided into creating or developing new knowledge, retaining the knowledge, and transferring knowledge (Argote *et al.*, 2003).

Knowledge management refers to the systematic organisation, planning, scheduling, monitoring, and deployment of people, processes, technology and environment, with appropriate targets and feedback mechanisms, under the control of a public or private sector concern, and undertaken by such a concern, to facilitate explicity and specifically the creation, retention, sharing, identification, acquisition, utilisation, and measurement of information and new ideas, in order to achieve strategic aims, such as improved competitiveness or improved performance, subject to financial, legal, resource, political, technical, cultural, and societal constraints (Lehaney *et al.*, 2004).

Knowledge Management 'deals with the management of knowledge related activities such as creating, organizing, sharing and using knowledge in order to create value for an organization. It is promoted as an essential cornerstone for companies to develop sustainable competitive advantage and to remain at the forefront of excellence in a level playing field market (Yew & Aspinwall, 2004, p. 44).

Knowledge management is a rather young discipline promising to maximize innovation and competitive advantage to organizations that practice knowledge capture, documentation, retrieval and reuse, creation, transfer and sharing of its knowledge assets in a measurable way,

integrated in its operational and business processes (Dayan & Evans, 2006, p. 69).

Knowledge management is a developing area within both business practice and research, which may be described as the embodiment of the critical issues facing organisations in their broad processes of acquiring, retaining, sharing and using (and perhaps even retiring) knowledge and expertise. […] this is fundamental to the organisation's adaptation, survival and competitiveness in the face of increasingly rapid and discontinuous change. Essentially, we see knowledge management as being the development and ''maintenance'' of synergistic combinations of people, organisational systems and IT support (Aston Business School Knowledge Management Group, 2006) –information obtained from the website http://knowledge-mgt.abs.aston. ac.uk/newweb/AcademicGroups/OIM/MS/KM/ [consulted: April, 2006]

Taking the underlying ideas from these definitions, we will now present the following impressions as a kind of summary.

(1) Knowledge management *is related both to business practice and to research*. As far as research is concerned, the authors who have studied this concept come from varying disciplines such as psychology, sociology, economy, engineering, computing or business management, among others. Each of these fields provide important insights into one aspect or another of knowledge management, although, on their own, none provides an integrating framework. What is required is *transdisciplinary research* that goes beyond mere interdisciplinary research activity (Nonaka & Teece, 2001, p. 330).

(2) Knowledge management *goes further than technology management or information management.* Human intervention, learning and tacit knowledge, among others, are indispensable for getting the most out of knowledge. Information technologies are necessary for knowledge management but should not be the cornerstone on which processes of knowledge creation and transfer are sustained (Martín & Casadesús, 1999, p. 11; McAdam & McCreedy, 1999, p. 93; Sarvary, 1999, p. 5).

(3) Knowledge management is a broad concept, and is *made up of different* activities, all of which are related to the asset of knowledge. From among the related activities, we can underline identification, creation, development, sharing, transformation, retention, renovation, diffusion and application of knowledge use.

(4) Knowledge is principally found in people and is developed through learning. Effective knowledge management implies that such *knowledge goes from being a human asset to being a business* asset. In this process, we underline the importance of a definite commitment on the part of all members of the organization, a correct diffusion of knowledge in the firm and especially the successful incorporation of

processes and systems, products and services so that knowledge becomes institutionalized in the firm and remains with its members.

(5) The objectives or strategic aims of knowledge management can be varied although, in general, they follow similar lines. Knowledge can be managed with the aim of developing new opportunities, creating value for the customer, obtaining competitive advantages or improving performance.

In light of these reflections and in our view, knowledge management implies a series of policies and guidelines that enable the creation, diffusion and institutionalization of knowledge in order to attain the firm's objectives.

Main approaches to the study of knowledge management

As we have just seen, knowledge management is a complex, heterogeneous area and thus, at present, it cannot be stated that there is an agreed, solid framework for knowledge and its management. There are contributions that go from the most scientific extremes to the purely informative, from studies that focus on information technologies to those that are purely concerned with people, from the most genuinely descriptive (with regard to systemizing policies and particular policies and decisions coming from management) to an accounting perspective (concerned with financially quantifying the differences between the monetary value in actual terms and the stock market worth of firms) (Oltra, 2002, p.181).

Our objective will be precisely to review some attempts at classifying the different approaches to the study of knowledge management with the aim of offering a relatively wide panorama of the current schools of thought.

The research methodology used for obtaining the necessary data for this paper is as follows.

Firstly, we selected the area of knowledge management for analysis. As explained in the second section, the field of research we will be focusing on is closest to that of business management from a strategic perspective.

Secondly, we selected the main contributions to this field. Studies that have attempted to order and/or classify contributions to knowledge management with a certain amount of rigour have been few and far between. This study considers a total of seven classifications: Andreu & Sieber (1999), McAdam & McCreedy (1999), Alvesson & Kärreman (2001), Takeuchi (2001), Earl (2001), Swan & Scarbrough (2001) and Moreno-Luzón et al. (2001). These are the most widely cited classifications by authors in specialist literature. There are, however, other classifications that are worthy of note, for example Binney (2001), Wiig (1999), Swan et al. (1999), Hlupic et al. (2002) and Kakabadse et al. (2003), which we have not been able to use herein for two reasons. Firstly, to avoid overextending the study, as we believe that seven classifications offers a broad enough spectrum of approaches to knowledge management and secondly, to aid our attempt to provide

a coherent proposal whose contents were accessible to all, thus avoiding an overload of information that might hinder understanding of the crux of the study. Moreover, we will focus exclusively on the concept of knowledge management *per se*, leaving to one side other concepts more related to learning such as communities of practice (Lave & Wergers, 1990; Orr, 1990; Brown & Duguid, 1991), the learning organization (Senge, 1990; Pedler *et al.*, 1991; Gephart *et al.*, 1996) and learning laboratories (Leonard-Barton, 1992).

Thirdly, we will attempt to descriptively though synthetically show these classifications. In doing so, we will point out their main contributions and weaknesses. Fourthly, we will connect and classify the different approaches in a common framework, basing our ideas principally on the renowned study by Takeuchi (2001). Fifth and lastly, we will present our own synthesis proposal by ordering the different classifications from a descriptive perspective and a normative one. The main contribution of this paper revolves around these last two stages.

The classifications considered herein are given below.

Approaches identified by Andreu & Sieber (1999, pp. 68–69).

The authors identified three main perspectives for understanding knowledge management – from the study by Alavi and Leidner (1999): one based on the concept of information, another much more focused on technology and a third, dominated by concepts close to the idea of the firm's culture. The latter is not as widely diffused and the dominating idea in this concept is learning. The other two are much more representative of what is commonly understood as knowledge management and what the name indicates.

The first perspective, which focuses on *information*, contains items such as ease of access to information, organization of data, information filtering, etc. All of these revolve around the idea that, in order to make knowledge management operational, it involves handling data and information; in other words, explicit and coded knowledge. This relates to the widely accepted idea that sharing information is always a good thing and the most practical way of doing so consists of coding data in order to be able to transmit it easily. However, there are flaws in this idea: a lot of knowledge cannot be coded and moreover, when that is the case, knowledge generally has a greater potential for contributing to sustaining competitive advantages.

The second perspective, which focuses on *technology*, is also very common. The technological point of view has the advantage of referring to very concrete matters. Items that typically appear are of the *data mining* type: *data warehouse*, system experts, search robots, *executive information systems, groupware,* etc. By nature, it almost exclusively includes aspects of treatment, storing, access and communication through the latest information technologies. In other words, it again focuses on codeable knowledge through information technologies.

The third and last perspective is that which focuses on *the culture of the firm*, the closest perspective to that of learning. The authors do not lay down exactly what this perspective consists of as they do with the other two. By exclusion, we understand that it is a perspective that is more centred on the individual, on the processes of learning and on knowledge that is not codeable. We agree with the authors that the majority of ideas, concepts and practices related to knowledge management do not go far enough or offer a complete perspective and therefore, do not uphold the existence of an integrative perspective. However, although the management of information and information technologies are distinctly separate topics or questions, the interrelation between the two is such that, in our view, they could be placed within a single approach.

The main contribution of this study is to provide clear, concise definitions of types of knowledge. It also offers an interesting definition and approach to the concept of knowledge management. However, the definition is fundamentally based on the conception of knowledge management as a source of competitive advantage. This entails ignoring other very interesting perspectives that come more within the bounds of knowledge creation. A second criticism might be that the information-based and technology-based perspectives could be represented by a single category – as pointed out in the main proposal of the study.

Approaches identified by McAdam & McCreedy (1999, pp. 95–98).

In this article, three approaches to the concept of knowledge management are identified: knowledge category models, intellectual capital models and socially constructed models.

These three approaches are identified from a first distinction proposed by Clegg *et al.* (1996) between the new and old paradigms of knowledge management that can be observed in Table 1.

From this distinction, three knowledge management approaches can be established.

Knowledge category models

In this group, the models of Boisot (1997), Hedlund & Nonaka (1993) and Nonaka & Takeuchi (1995) stand out. These models are characterized by attempting to categorize knowledge into discrete elements by differentiating between ontological levels (in the last two models, the individual, the group, the organization and the interorganizational level are studied). The authors give these models a dual character, insofar as the processes of socialization or sharing tacit knowledge would be placed closer to the new paradigm (the right-hand side of Table 1). However, with regard to the ontological division, they have a mechanistic approach to the categorization of knowledge, more consistent with the old paradigm (the left-hand side of Table 1).

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Table 1 Paradigms in knowledge management

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Old paradigm	New paradigm
Organization discipline	Organizational learning
Vicious circles	Virtuous circles
Inflexible organizations	Flexible organizations
Management administrators	Management leaders
Distorted communication	Open communication
Strategic business units drive product development	Core competences drive product development
Strategic learning occurs at the apex of the organization	Strategic learning capacities are widespread
Assumption that most organization members are untrustworthy	Assumption that most organization members are trustworthy
Most organization members are disempowered	Most organization members are empowered
Tacit and local knowledge of most members of the organization must be disciplined by managerial prerogative	Tacit and local knowledge of all members of the organization is the most important factor in success, and creativity creates its own prerogative

Source: Adapted from McAdam & McCreedy (1999, p. 94) – from Clegg *et al.* (1996).

Intellectual capital models

A typical intellectual capital model is the Skandia IC model. The model assumes that intellectual capital and knowledge management can be segregated into human, customer, process and growth elements that are contained in two main categories of human capital and structural/organizational capital.

These models ignore the social and political aspects of knowledge management. Also, similar to models of category, they assume that knowledge management can be broken down into objective elements rather than being a social and political phenomenon. Consequently, they are mechanistic models by nature and assume knowledge can be treated as an asset, similar to the other assets of the organization. This approximation is associated with the old paradigm (left-hand side of Table 1).

Socially constructed models

This group of models assumes a broad definition of knowledge and views it as being intrinsically linked with social and learning processes within the organization. There is a large area of commonality between these types of models and those models seeking to represent the learning organization and organizational learning. The model by Demerest (1997) is the most representative in this category. It emphasizes the construction of knowledge within the organization. This construction is not limited to scientific inputs but is seen as including the social construction of knowledge. The model assumes that constructed knowledge is then embodied within the organization, not just through explicit programmes but also through a process of social interchange. Other similar models within the same category are those of Jordan & Jones (1997), which deals with knowledge acquisition, problem-solving, dissemination, propriety and storing; Kruizinga *et al.* (1997), a model that includes policies on knowledge, infrastructure and culture; and that of Scarbrough (1996), a model that covers strategic knowledge, structural and cultural knowledge, knowledge systems, communities of practice and routines.

According to these authors, this approximation is consistent with the new paradigm of knowledge management (the right-hand side of Table 1).

The main contribution of this approach to the concept of knowledge management lies in the association of each approach with the traditional paradigm of knowledge management (mechanistic model) or the new paradigm (organic model) Although the new/old paradigm dichotomy has already been discussed in the literature, the association of each approach with one or other model clarifies and enriches the spectrum of approaches that exist. In addition, authors consider the most representative bibliography of the three approaches, and even, as in the case of the model offered by Demerest (1997), contribute a revised version of the model. However, there is still a lack of models based on the use of information technology as a basis for knowledge management.

Approaches identified by Alvesson & Kärreman (2001, pp. 1003–1007).

For Alvensson and Kärreman, knowledge management is a broad concept that is used in a variety of ways. Their article focuses on ways of interpreting knowledge management and its inherent problems. Consequently, they are more interested in how individuals in the field of knowledge management define and reflect upon knowledge, management and knowledge management, than in expounding a specific vision of knowledge management. They thus identify four distinctive knowledge management orientations that prevail in theory and in practice, rather than seeking strict categories. These four orientations arise throughout two dimensions: the mode of interaction (social or technostructural) and the domain of management intervention (coordination or control), which leads to a matrix that can be observed in Table 2.

• Knowledge management as extended libraries

This type of knowledge management involves extensive use of the available technology (databases, advanced search systems, sophisticated communication systems,

Table 2   A typology of knowledge management approaches

	Mode of management intervention	
Medium of interaction	*Coordination*	*Control*
Social	Community (sharing of ideas)	Normative control (prescribed interpretations)
Technostructural	Extended library (information exchange)	Enacted blueprints (templates for action)

Source: Alvesson & Kärreman (2001, p. 1005).

etc.). One definition of knowledge management is that it involves blending a company's internal and external information and turning it into actionable knowledge *via* a technology platform. In this approximation, knowledge management is basically a process that is carried out by a central unit that is responsible for gathering, synthesizing and integrating more or less idiosyncratic work and project experiments for developing knowledge, in the form of methodologies that guide future work. Such methodology can be used more or less actively in the company's management, for example, through regulations and prescriptions for working.

• Knowledge management as community

Another view of management is less technocratic and adheres to a much 'softer' notion of hierarchy and control. This position is often grounded in an interest in tacit knowledge. Management is a matter of coping with diversity and of encouraging knowledge sharing through influencing workplace climate. Four challenges associated with knowledge management can be thus identified: (1) a technical one of designing human and information systems that make information available and help people think together, (2) a social challenge of developing communities that share knowledge and maintain diversity, (3) a management challenge to create an environment that truly values sharing knowledge, (4) a personal challenge of being open to the ideas of others and to share ideas. Therefore, in this approach, the community is recognized as a fundamental context for sharing knowledge with trust as its enabler.

• Knowledge Management as Normative Control

Knowledge management can be viewed as an attempt by management to exercise normative control. The authors of this approximation stress organizational culture, although they rarely develop or explore its connections with knowledge management. In reality, interest in the community from the viewpoint of the previous approach might be a version of organizational culture, although in that case, tacit knowledge is seen as a more complex and inaccessible phenomenon than the level of shared values, beliefs and regulations that authors on organizational culture focus on.

• Knowledge management as enacted blueprints

This type of knowledge management considers the orchestrated character of knowledge management as normative control, but attempts to engineer and control individuals closer to the behavioural level, rather than concentrating on values and ideas. Another important idea is that organizational knowledge can be extracted from individuals and converted into databases. The stored knowledge provides templates for thinking as well as action, thus making relatively unskilled workers productive on a higher skill-level more or less instantaneously. There are several similarities between this type of knowledge management approach and classical scientific management: it includes emphasis on efficiency, deskilling processes and a redistribution of power from users to designers.

One of the main contributions of this study by Alvensson and Kärreman attempts to provide theory on the concept of knowledge management, while classifying the different approaches to the concept. This contribution is both compelling and original, firstly because of the two criteria on which it is based: modes of intervention (coordination and control) and domain of intervention (normative and behavioural) that offer a wide-reaching and thorough vision of the concept of knowledge management. *Via* a case study of an international consulting firm, the authors show how the different approaches are seen by each of the groups included in the study. This implies that the study has implications for human resource management, particularly for the *Knowledge Management as Community* approach, and for information management, particularly for what is referred to as *Knowledge Management as Extended Libraries*. This classification might prove to be even more enriching if the authors were to cite the researchers and authors, along with the models they propose, in existing literature for each approach.

Approaches identified by Takeuchi (2001)

Although there is a consensus on the importance of knowledge management, different countries have taken diverging directions during the early stages of their development. European companies have been concerned with *measuring* knowledge, while the Americans have focused more on the *management* of knowledge, maximizing the use of information technologies. The Japanese have centred their attention on *creating* new organizational knowledge from individual and group knowledge. In a broader sense, these approaches can be thus described.

Measuring knowledge. Europe

European companies have taken the lead in developing measurement systems for their intangible assets and publicly sharing information on their results. Some examples of firms are Skandia AFS, WM-data, Celemi or PLS-Consult, among others. They are all Scandinavian firms. Collectively, these companies have developed hundreds of indices and ratios in an effort to provide a complete vision of intellectual assets. For example, they have attempted to measure assets such 'business development costs as a percentage of total costs', 'percentage of production with regard to launching new products', 'investment in information technologies as a percentage of total costs', 'employees in information technologies as a percentage of total employees', 'percentage of employees who work directly with customers' and other data as indicators of intellectual capital. Moreover, these firms include this data in their annual reports to show how effectively their intellectual assets are established. The Skandia annual report, for example, shows the process of transforming human capital, an asset that the firm cannot make its own in terms of structural capital, which may be appropriate for the firm. Human capital is defined as combined knowledge, skills, capacity to innovate, and even values, culture and company philosophy. Structural capital is defined as hardware, software, databases, organizational structure, patents, brand names and anything that supports the productivity of employees. In other words, what employees leave in the office at the end of their working day. Capital structure also includes customer capital and the relations maintained with key clients.

Managing knowledge. U.S.A.

American companies have taken the lead in managing knowledge effectively by using information technologies. Best practices in service industries (where knowledge is effectively the product) mainly come from the principal American consulting firms such as Andersen Consulting or Ernst & Young; General Electric or Hewlett-Packard stand out among manufacturing firms. Knowledge managers are responsible for the codification and storage of new knowledge in databases, as well as eliminating those that have become obsolete. They attempt to make these databases accessible to more employees and for them to be able to use them easily.

Our view differs from that of Takeuchi with regard to this approach, in the sense that, although knowledge management covers all these ideas, we also believe that it includes a second aspect; an academic one. Numerous authors place their work within this framework, where information technologies are basic but also the human factor has an important role. We will look more deeply into this idea at the end of this section in our synthesis proposal.

Creating knowledge. Japan

It is obvious that the previous approaches do not focus on knowledge *per se*, but on measuring and managing knowledge in a mechanistic, systematic way. The Japanese perspective, on the other hand, influenced by the work of Nonaka and his advocates, reject this approach as important differences arise on several questions: (1) How they see knowledge. Knowledge is not simply seen as data or information that can be stored in a computer, but that it also implies emotions, values and intuition. (2) What the company does with knowledge. Firms should create new knowledge and not just manage it. (3) What key individuals are. Everybody in the organization is involved in organizational knowledge creation, with intermediate managers serving as knowledge engineers. From this standpoint, this approach distinguishes between knowledge and creating knowledge. Knowledge management is treated as existing knowledge, while for creating knowledge, two types of knowledge are necessary (tacit and explicit) that interact throughout the different ontological levels forming the spiral of the creation of new knowledge.

Takeuchi concludes his article stating that knowledge management is now moving into a new era. European companies are beginning to move beyond measuring knowledge and are looking for ways of better applying knowledge to work. American companies are beginning to realize the limitations of the IT-driven approach and incorporating the human factor into knowledge management. Japanese companies, on the other hand, are beginning to move beyond the tacit dimension of knowledge and exploring how databases can improve productivity. What began as three divergent approaches to knowledge management are coming together in this new era of synthesis to form a universal foundation. Metaphorically speaking, it is as though three different roots are becoming intertwined to form a solid trunk of a tree.

A later article by Zhu (2004) also offers a classification of the different styles of knowledge management along the same lines as Takeuchi (2001): the American, the Japanese and the European style, and adds a fourth style: the Chinese. When they suddenly recognized that their old as well as new competitors, that is, the Europeans, the Japanese and the Americans, all engage in knowledge management in a 'modern way', the Chinese were extremely shocked and decided to 'welcome knowledge management home'. They quickly embraced whatever appears useful into *wuli-shili-renli* (*WSR*) framework, which they claimed was inherited from Confucius. In *WSR*: (a) *Wuli* denotes the material-technical aspect of managing knowledge. (b) *Shili* is to facilitate the constructive-cognitive knowing process. (c) *Renli* is concerned with the governing of social-political relations among knowers.

The Chinese style appears less interested in debating on the nature/typology of knowledge, nor in articulating well-ordered processual knowledge creation models. The Chinese knowledge context, as an ideal-type manifested in *WSR*, attaches equal significance to a technological and an institutional dimension as well.

This approach described by Zhu (2004, pp. 71–73), although we consider it to be extremely interesting, it is also different in the sense that it encompasses heterogeneous aspects, and does not complement the proposed synthesis described at the end of the study and it is therefore hard to find relations and similarities between this and other approaches.

Turning once more to the work of Takeuchi, and contrary to other approaches to classification, it does not mainly focus on approaches to the concept of knowledge management. It is a study of a more general nature that also encompasses other aspects related to knowledge such as different types and natures of knowledge, the role of middle managers, etc. In this sense, more detail is needed in analysing each of the approaches (authors, models, etc.). However, for our purposes, this fact has turned out to be an advantage because, as it is such a broad, generalist classification, it can be used as a framework for the other classifications, as we will see in the synthesis proposal.

Approaches identified by Earl (2001, pp. 215–233).

This author presents a taxonomy of schools of thought on knowledge management. These schools have arisen from four different sources: case study research in six companies; data collected from interviews with 20 chief knowledge officers about their roles and experiences and their knowledge management initiatives; workshop discussions of company knowledge management programmes; and accounts of company knowledge management programmes published in professional and academic journals. The result of all this research is that three main schools of thought on knowledge management are defined.

● Technocratic School

Three schools: the systems school, the cartographic school and the engineering school are all grouped under this name. They are all based on information or management technologies, in different degrees, that help the work of employees in their daily tasks.

The *system school* implies the formal approximation to knowledge management. The fundamental idea is to capture specialist knowledge in knowledge bases that other specialist or qualified people can access.

The *cartographic school,* as the name implies, is concerned with mapping organizational knowledge. It aims to record and disclose who in the organization knows what by building knowledge directories. Often called 'yellow pages', the principal idea is to make sure knowledgeable people in the organization are accessible to others for advice, consultation or knowledge exchange.

The *engineering school* is based at least on two ideas: (1) Performance of business processes can be enhanced by providing operating personnel with knowledge relevant to their tasks. (2) Management processes are inherently more knowledge-intensive than business processes. In particular, they are less structured and routine. Consequently, provision of not only decision-relevant information, but contextual and best practice knowledge should be beneficial.

● Economic school

It represents a more commercial orientation; explicitly revenue streams are created by exploiting knowledge and intellectual capital. It is represented by the *commercial school* that deals with protecting and exploiting a firm's knowledge or intellectual assets to produce revenue streams (or rent). In reality, it deals with managing knowledge as an asset.

● Behavioural school

This school conceives knowledge management from diverse policies that encourage individuals and convert management practices into practices for the creation, sharing and use of knowledge as a resource. Three schools: the organizational, spatial and strategic school are all grouped under this name.

The *organizational school* describes the use of organizational structures, or networks, to share or pool knowledge. Often described as 'knowledge communities', the archetypal organizational arrangement is a group of people with a common interest, problem or experience. These communities are designed and maintained for a business purpose and they can be intra- or interorganizational. The essential feature of communities is that they exchange and share knowledge interactively, often in non-routine, personal, and unstructured ways, as an interdependent network.

The *spatial school* centres on the use of space (or spatial design) to facilitate knowledge exchange. An alternative label for this school could be the social school, because the intention is to encourage socialization as a means of knowledge exchange. This school is perhaps as much concerned with the nurturing and utilization of social capital that develops from people interacting, formally or informally, repeatedly over time. However, the label 'spatial' is preferred because executives do seem to identify with the use of space to stimulate conversations and exchange.

The *strategic school* sees knowledge management as a dimension of competitive strategy. Indeed, it may be seen as the essence of a firm's strategy. This school is essentially concerned with raising consciousness about the value creation possibilities available from recognizing knowledge as a resource. This is why the rhetoric of corporate mission and purpose statements that embrace knowledge is important.

The similarity between this classification and the proposal of Takeuchi (2001) should be noted. Despite the fact that Earl (2001) is more detailed, identifying different schools within a larger one, we believe that the similarity between both classifications is obvious. The technocratic school is similar in the way it manages knowledge in American firms; the behavioural school has numerous connections with the perspective of Japanese firms, while the economic school is identified with European firms. We will later look further into the connections between different classifications. The main

contribution of this classification relies precisely in the authors' attempts to break down into different streams what other authors, like Takeuchi, regard as a single approach. Another characteristic of this study is that, unlike the others, it is based on an empirical study of a qualitative nature, a fact that undoubtedly adds and extra dimension to the quality of the research.

Approaches identified by Swan & Scarbrough (2001, p. 914).

These authors, in their introductory article to a special issue on knowledge in the *Journal of Management Studies*, distinguish between two perspectives of knowledge management. The first lays emphasis on the codification of knowledge through the introduction of information technologies and the second stresses on knowledge creation and sharing, essentially through social media, such as the development of communities of practice.

These two perspectives are also placed within the framework of the approach expounded by Takeuchi (2001). The first refers to the American perspective that is more focused on information technologies, and the second on the Japanese one that centres more on the creation and transfer of knowledge. It is thus a flaw in the study that the third approach, that of the European firms, is not represented.

Approaches identified by Moreno-Luzón *et al.* (2001).

These authors, although they do not lay down a classification of knowledge management approaches as such, propose an extremely interesting distinction between the knowledge-based theory of the firm and knowledge management.

The first of these, the *knowledge-based theory of the firm*, is found within the framework of strategic management, and arises principally as an extension or interpretation of the group of modern schools of thought based on the internal dimension of the organization, such as the resource-based approach (Wernerfelt, 1984; Barney, 1991; Grant, 1991; Peteraf, 1993) and the dynamic capabilities approach (Teece *et al.*, 1997). Within the same field, there are authors who discuss the relevance of organizational learning (Grant, 1996a; Spender & Grant, 1996) and the recognition of knowledge as the organization's main resource (Spender, 1994 a, b; Grant, 1996a; Spender & Grant, 1996). In turn, this approach proposes the adequate development and transfer of knowledge as the fundamental key to the existence of the business organization, as opposed to the alternative of the market (Kogut & Zander, 1992; Conner & Prahalad, 1996). It is from here that the basis is laid for enabling knowledge creation as the fundamental pillar of the development of idiosyncratic capabilities that are difficult for their competitors to imitate.

From a more normative perspective appears the broad, heterogeneous field of *knowledge management* appears. This perspective attempts to bring together a group of tools and decisions provided by the firm's management in order to precisely optimize the development of the process of organizational learning and knowledge creation so that these processes and knowledge management would be two sides of the same coin. The work of Quintas *et al.* (1997), Brown & Duguid (1998), Fahey & Prusak (1998), Leonard & Sensiper (1998), O'Dell & Grayson (1998), Von Krogh (1998) or Andreu & Sieber (1999) are worthy of mention in this field.

Despite the simplicity of the distinction between these two streams: *knowledge-based theory of the firm* and *knowledge management*, this study provides a good deal of clarification in an attempt to complete the spectrum of approaches to the concept of knowledge management. There are many studies on one or other stream, although practically none whatsoever in which authors have made this distinction.

Synthesis proposal

At this point we will attempt to synthesize and homogenize the different knowledge management approaches considered herein. As we will now see, some of their approaches coincide and allow for the creation of a combined model, represented in Table 3.

We have considered the classification of Takeuchi (2001) as a benchmark. In our view, it is the broadest classification. It is therefore of a very general nature but at the same time, the way this study delimits and defines the different approaches is, in our view, the clearest, simplest and most original. This allows us to consider it a reference framework in which the others can be placed. However, the fact that it is such a broad, general study means it must be completed with proposals from other authors, which is one of the main contributions of this research. It should be remembered that three broad approaches are identified: (1) *measuring* knowledge, the perspective of European firms, (2) *creating* knowledge, the Japanese perspective and (3) *managing* knowledge, the perspective of American firms. With the aim of being able to place the other classifications within this framework, we thought it suitable to divide this last approach into two perspectives (Argote, 2005, p. 45), one more focused on the human factor and the other more centred on information technologies. This author identified two main paradigms of knowledge management: the computational paradigm and the organic paradigm. The computational view of knowledge management approaches knowledge as identifying empirically validated facts and managing them through technology. By contrast, the organic paradigm includes people, group dynamics, social networks and cultural aspects of knowledge and includes tacit as well as explicit knowledge. This distinction will allow us to filter the classification more. Although there are many approaches that can be globally framed in 'managing knowledge', some put more emphasis on individuals and others on information technologies.

Such is the case of the classification proposed by Andreu & Sieber (1999). The three perspectives they

Table 3   Approaches to knowledge management: a proposed synthesis

Takeuchi (2001)	Measuring knowledge (Europe)	Managing knowledge (U.S.A.)		Creating knowledge (Japan)
Argote (2005)		Greater emphasis on the human factor	Greater emphasis on information technologies	
Andreu & Sieber (1999)		Perspective focused on the culture of the firm	Perspective focused on information/Perspective focused on technology	
McAdam & McCreedy (1999)	Models of intellectual capital	Socially constructed models		Knowledge category models
Alvesson & Kärreman (2001)		KM as community/KM as normative control	KM as extended libraries/KM as enacted blueprints	
Earl (2001)	Economic (commercial) school		Technocratic school (systems/cartography/ engineering)	Behavioural school (organizational/spatial/ strategic)
Swan & Scarbrough (2001)			Capture and codification of knowledge through the introduction of information technologies	Creation and sharing through social media
Moreno-Luzón et al. (2001)		Knowledge-based theory of the firm/Knowledge management		

propose are within the framework of knowledge management. The first two, the perspective focused on *information* and the perspective focused on *technology*, imply approaches that have greater emphasis on information technologies. The third one is the perspective focused on the *culture of the firm.* Although the authors do not describe their characteristics in detail or what they consist of, we believe that it supposes a greater emphasis on the individual and, therefore, on the human factor.

The classification proposed by McAdam and McCreedy is one that best fits the proposal of Takeuchi (2001). These authors even expressly quote Japanese models and models of intellectual capital of Scandinavian firms. Therefore, the *intellectual capital models* can be associated with measuring knowledge and the *category models*, with knowledge creation. *Socially constructed* models correspond to knowledge management, although they focus on people, due to the importance they give to social aspects and the processes of learning within the organization.

The approaches of Alvesson & Kärreman (2001) are contained exclusively in the area of knowledge management. We believe that when the interaction medium is social, as in the case of *knowledge management as community* and *knowledge management as normative control*, greater emphasis is placed on the firm's human factor. When the interaction medium is technostructural, as in the case of *knowledge management as extended libraries* and *knowledge management as enacted blueprints,* this indicates the importance of information technologies.

The classification by Earl (2001) represents three main schools. The first of these, *the economic school,* fits

perfectly into the perspective of European schools that measure knowledge. The *technocratic school* is apposite with the way American firms manage knowledge, putting special emphasis on information technologies. Owing to its characteristics, the *behavioural school* is similar to the Japanese perspective.

Lastly, the proposal of Moreno-Luzón et al. (2001) involves managing knowledge. The distinction that the authors make between the *knowledge-based theory of the firm* and *knowledge management,* is not considered by any of the previous classifications, we have therefore not considered it necessary to distinguish between the two. In our view, both fit in well within the perspective of knowledge management of authors who put more emphasis on the human factor and others on information technologies. However, due to the interest this distinction has for the academic world in general, and for our study in particular, we will comment on it and will now give details via Table 4.

Now that we have observed the different management approaches, we now present *our own classification proposal on approaches to knowledge management.* We have taken into account the classification of Takeuchi (2001), as we see it as extremely broad and it allows us to present a very general perspective on all the approaches.

We have considered it worthwhile to order the different models according to whether they are situated in a *more descriptive perspective*; in other words, they describe the firm as a creator of knowledge or what is understood to be knowledge management, or according to whether they have a *more normative perspective*, that is, they ask the

Table 4 Approaches to knowledge management: A selection of the most relevant studies

| DESCRIPTIVE PERSPECTIVE | | | NORMATIVE PERSPECTIVE | |

Knowledge management models *Knowledge-based theory of the firm*	Intellectual capital models *European models*	Knowledge creation models *Japanese models*	Knowledge management models	
			U.S. models	
			Academic perspective	*Consultancy perspective*
Grant (1991, 1996a, b, 1997, 1998, 2001), Spender (1992, 1993, 1994a, b, 1996a, b), Spender & Grant (1996), Demsetz (1991), Kogut & Zander (1992), Teece *et al.* (1997), Conner & Prahalad (1996), McEvily & Chakravarthy (2002)	SKANDIA AFS CELEMI WM-data PLS-Consult INTELECT (Euroforum, 1998) (NOVA, 1999)	MODEL OF HEDLUND AND NONAKA (Hedlund & Nonaka, 1993; Hedlund 1994) MODEL OF NONAKA AND TAKEUCHI (Nonaka, 1991, 1994; Nonaka & Takeuchi, 1995, Nonaka & Konno, 1998; Nonaka *et al.*, 2001) MODEL OF BOISOT (Boisot, 1995a, b) MODEL OF CHOO (Choo, 1998) MODEL OF BALBASTRE *et al.* (2003)	Wikström & Normann (1994), Leonard-Barton (1995), Quinn *et al.* (1996), Quintas *et al.* (1997), Brown & Duguid (1998), Fahey & Prusak (1998), Leonard & Sensiper (1998), O'Dell & Grayson (1998), Von Krogh (1998), Davenport & Prusak (1998), Andreu & Sieber (1999), Alavi & Leidner (2001), Tanriverdi (2005)	GENERAL ELECTRIC HEWLETT PACKARD ANDERSEN CONSULTING PRICE WATERHOUSE ERNEST & YOUNG XEROX SHORKO FILM McKINSEY & Co.

question of what a firm should do if it wants to manage knowledge effectively.

This distinction between the descriptive perspective and the normative one allows us to filter Table 3 and to create a new proposal (Table 4). We believe that one part of knowledge management, that which corresponds to what Moreno-Luzón *et al.* (2001) have called *knowledge-based theory of the firm*, is the most descriptive perspective of all, as in no case do the others ask what a knowledge creating firm must do. We will now consider *intellectual capital models* that attempt to evaluate and account for intangibles, but still do not state what has to be done in order to manage knowledge. We have placed the *models of knowledge creation* in a hybrid or mixed framework. These models are the most complete in the sense that they describe what a knowledge-creating firm is and how knowledge is created from whence recommendations or suggestions can be extracted for managing knowledge. Lastly, we place the models of knowledge management closer to the normative perspective. These models are not concerned with the processes of creation and transfer of knowledge but attempt to explain what a firm should do in order to effectively manage knowledge. Within the *academic perspective* some focus more on information technologies, as in the case of Quinn *et al.* (1996), and others focus more on the human factor such as the studies by Brown & Duguid (1998) or that of Von Krogh

(1998), but they all attempt to offer guidelines, recommendations or suggestions for managing knowledge effectively. The study entitled 'The eleven deadliest sins of knowledge management' by Fahey & Prusak (1998) is very significant in this group. It shows the pitfalls incurred by the great majority of initiatives in knowledge management. The *consultancy* perspective represents the most normative one as its aim is to search for knowledge management tools that aid particular firms to manage their knowledge effectively.

Conclusions

In recent years, the creation and management of knowledge has been one of the questions that has attracted the most interest, not only in the business world, but also in the academic field. Although empirical research, both of a qualitative and quantitative nature, is still in its infancy, numerous articles, books and special issues have been published on a theoretical level.

This proliferation of studies has led to the fact that, presently, there is still no clear consensus on the different approaches that have arisen in the literature. The main contributions of this study are threefold: the first is the compilation, relation, synthesis and criticism of diverse, fundamental studies related to the different approaches to the concept of knowledge management, that is, Takeuchi (2001), Andreu & Sieber (1999), McAdam & McCreedy

(1999), Alvesson & Kärreman (2001), Earl (2001), Swan & Scarbrough (2001) or Moreno-Luzón *et al.* (2001).

The second contribution is to synthesize and connect the different perspectives presented by these authors. In this sense, we have considered the proposal of Takeuchi (2001) to be basic as it shows the difference between the perspective of European firms that attempt to measure knowledge, the perspective of Japanese firms that try to create knowledge and the American perspective that attempts to manage knowledge. To achieve greater precision, we have divided this last concept into two groups according to whether they put greater emphasis on the human factor or on information technologies. Using this classification, it has been possible to place the

other approaches within a framework, thus presenting an interesting synthesis proposal.

Lastly, another relevant contribution of this study has been our own proposal on approaches using a broad selection of the most representative studies. We have ordered this proposal from a descriptive perspective to a normative perspective. According to this criterion, the following concepts would be included in the framework: the knowledge-based theory of the firm (knowledge management models), European models (intellectual capital models), Japanese models (knowledge creation models) and American models according to the academic perspective and that of consultancies (knowledge management models).

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