Knowledge management in the emerging strategic business process: information, complexity and imagination

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Abstract This article features a descriptive proposal that examines the different conceptual dimensions of knowledge (basically the epistemological, ontological, systemic and strategic dimensions) that are involved in the emerging strategic process of organizations. Included in this process are aspects of information, complexity and imagination that make up the spirals of knowledge. In this study we aim to shed light on knowledge management in strategy-making so that the different categories of knowledge may emerge and develop their potential within an organization and interact among each other. The goal is to create sustainable competitive advantages or essential competencies that help a business to succeed. Considering a constructionist approach to knowledge – specifically, the theory of knowledge creation developed by Nonaka and Takeuchi – we conclude that the formation of the strategy is a double-loop knowledge creating process. Finally, we outline some of the main practical implications of our position.

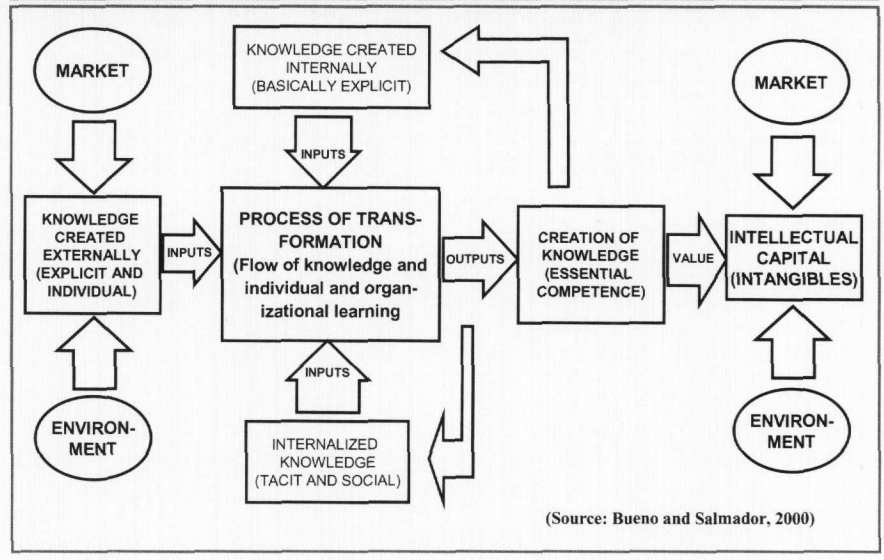
Keywords Knowledge processes, Knowledge management, Business strategy

Introduction

Current focuses in the strategic management and theory of businesses, based fundamentally on the "theory of resources and capabilities" (Wernerfelt, 1984), state that the modern company should be explained as a "system based on knowledge" (Tsoukas, 1996). Figure 1 shows the basic elements that make up this concept. Circulating within the system are kinds of basic knowledge of greatly varying nature, acquired from outside the business or already existing in it. After a certain period of transformation, this flow of knowledge will create new knowledge that is incorporated into the distinctive and essential competences of the company (Hedlund and Nonaka, 1993; Hedlund, 1994; Bueno, 1999). If the general competences create value for the business, this signals the presence of intangible assets (based on knowledge)

> **"The modern company should be explained as a 'system based on knowledge' (Tsoukas, 1996)."**

Figure 1 The knowledge-based system



that fall into the category of intellectual capital. The market will examine this capital through a model of identifying and measuring said intangibles (Institutio Universitario Euroforum Escorial, 1998). According to Spender (1996), this knowledge-based strategic focus constitutes one of the most important contributions of economic thought (Nelson and Winter, 1982; Grant, 1996), especially relevant for explaining the keys or laws which characterize the paradigm of the so called new economy (Kelly, 1997).

Conceptual dimensions and categories of knowledge within organizations

Within the context described, we essentially propose four conceptual dimensions of knowledge (epistemological, ontological, systemic and strategic). Stemming from these are the main classes or categories that we explain below (see Figure 2).

Figure 2 Conceptual dimensions and categories of knowledge

CONCEPTUAL DIMENSIONS	CATEGORIES OR CLASSES OF KNOWLEDGE	
EPISTEMOLOGICAL	• EXPLICIT: OBJECTIVE AND FORMULATED	
	• TACIT	•COGNITIVE: SUBJECTIVE •TÉCNICAL-EXPERT: EXPERIMENTAL
ONTOLOGICAL	•INDIVIDUAL: POSSESSED BY THE PERSON •SOCIAL: POSSESSED BY GROUPS AND THE ORGANIZATION	
SYSTEMIC	•EXTERNAL: INFORMATION AND TECHNICAL •INTERNAL: CREATED AND COGNITIVE	
STRATEGIC	•RESOURCE: BASICALLY EXPLICIT •CAPACITY: BASICALLY TACIT TECHNICAL •VISION: BASICALLY TACIT COGNITIVE	

(Source: Bueno and Salmador, 2000)

Epistemological dimension

In its epistemological dimension and from a constructionist[1] perspective, (von Krogh *et al.*, 1994; Nonaka, 1988, 1991; Nonaka and Takeuchi, 1995), knowledge can be tacit or explicit. Next we briefly synthesize the main characteristics of each kind of knowledge (Polanyi, 1958, 1966). On the one hand, explicit knowledge is easy to articulate and verbalize, systematic and objective, rational and logical, digital, sequential, comes from the past, and free of context. By contrast, tacit knowledge is difficult to articulate and verbalize, subjective, linked to experience and emotions, analogue, simultaneous, refers to the present and context-dependent.

Therefore, tacit knowledge is deeply rooted in action, procedures, routines, commitments, ideals, values and emotions. From this assertion it follows that tacit knowledge includes technical-expert elements as well as cognitive ones (Nonaka and Takeuchi, 1995). Or, in the words of Hedlund (1994, p. 75), it involves skills, experience and capabilities as well as mental models and precepts, or, as Scharmer (2000) proposes, it refers to incorporated tacit knowledge as well as to unincorporated tacit knowledge.

This differentiation between the two kinds of tacit knowledge is important for several reasons. First, the epistemological basis and phenomenological experience of tacit technical-expert knowledge is fundamentally different from tacit cognitive knowledge. While the former is based on an experience that derives from action, the latter is based on an aesthetic experience. In second place, the two kinds of knowledge require different kinds of infrastructure. Third, one of the sources of sustainable competitive advantage appreciated by firms operating in environments that are highly competitive and change quickly is tacit cognitive knowledge, such as, for instance, the ability to stir a client's imagination.

Thus, within organizations we may distinguish three categories of knowledge from an epistemological point of view: explicit, technical-expert tacit and cognitive tacit.

Ontological dimension

From this standpoint, knowledge is classified as individual or social. As von Krogh *et al.* (1994) point out, several authors have studied the behaviour of organizations and tried to build a bridge between the individual cognition and the social cognition of the organization (Argyris and Schön, 1978; Prahalad and Bettis, 1986, among others).

According to the constructionist viewpoint, individual knowledge is not abstract but rather embodied in the person. Therefore, in a strict sense only individuals create knowledge. Thus, in the epistemology of Nonaka and Takeuchi (1995) and Grant (1996), the individual is of vital importance. Nevertheless, individuals have experience that can serve as the basis for collective knowledge when the latter is transmitted via oral, written or body language (von Krogh *et al.*, 1994). Collective knowledge, which is not simply the sum of individual knowledge but rather something greater and different (Fiol and Lyles, 1985; Vicari and Troilo, 2000), is especially important to an organization's long-term survival (Spender, 1996).

Organizational knowledge is shared by the members of the organization and therefore does not depend on any given individual. The autopoietic theory, which originated in neurobiology (Maturana and Varela, 1987) and is applied to the new theory of knowledge in a social system (Luhmann, 1990), emerges in the study of organizations and sheds light on organizational knowledge. There are two prerequisites for knowledge connections, defined as the ability of individuals to transmit the knowledge derived from their observations (von Krogh *et al.*, 1994):

(1) The presence of relationships, either of a formal nature, as defined in the structure of an organization, or of an informal nature. These relations facilitate communication between individuals and thus can foster development of organizational knowledge.

(2) The existence of a self-description, which Luhmann (1990) calls identity. The identity can be contained in strategic ideas, missions, strategic principles, guiding values, etc. The identity distinguishes "knowledge", which as such should be connected, from what is simply noise, preventing the organization from drowning in the complexity of information. Therefore, without language and identity, the system dies. Thus, in environments that are dynamic, diverse and complex, knowledge is not only found in agents but also in interactions.

Systemic dimension

If we study knowledge from a systemic approach (input-process-output), we may consider data as input, information as the process and knowledge as the output. Let us define these terms. Data are a discrete grouping of elements, symbols and signs. Information is a process of restructuring the data, giving them meaning for a given subject at a given point in time. This process means the requirement of being contextualized, calculated, corrected and condensed. The output of the process is knowledge as a set of experiences, values, information in context, perceptions and ideas that create a mental structure to evaluate and incorporate new experiences, ideas and information, as long as it allows one to compare, reach conclusions, connect and converse. In addressing the systemic dimension, it is important to specify our unit of analysis, in other words our level of observation. In this way the agent – individual, team, or organization – is defined, and thus that which is internal or external to the agent. The agent is at once open and closed. It is open with relation to data of different degrees. The bigger the manifest nature of the data, the easier it will be for the subject to obtain information and as a result of it, knowledge. On the other hand the agent is closed with respect to knowledge since for there to be knowledge there must be a system of interpretation. Thus, we must stress that in order for there to exist supra-individual knowledge, the two pre-requisites mentioned earlier must be met: first, the existence of relations that promote communication, and second, identity. There are authors who go a step further and speak of an essential competence. This concept is directly linked to the fourth dimension, which we discuss below.

Strategic dimension

The theory of resources and capabilities (Selznick, 1957; Penrose, 1959; Wernerfelt, 1984; Rumelt, 1984; Barney, 1991; Amit and Schoemaker, 1993; Peteraf, 1993) becomes extended, due to the evolution of the factors of economic production, a process predicted by Marshall (1890) and developed by Bell (1973). The theory grows to include knowledge among these factors with the aim of achieving greater performance by the organization and sustainable competitive advantages. Intangible resources are based on explicit knowledge. Capabilities are based on what we have described as tacit technical-expert knowledge and vision in what we have early

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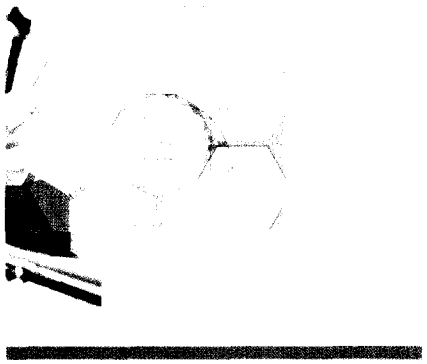


described as cognitive tacit knowledge. Therefore, to the tangible resources we must add intangibles resources, capabilities and vision, which are of a personal, organizational, technological and relational nature (Bueno and Morcillo, 1997). From the interaction of these, essential competences are born.

In this dimension we question the hypothesis of the role of the leader as the one who distributes and coordinates knowledge just like any other resource (Grant, 1996). The motive of our challenge is that from a representationist perspective (Newell and Simon, 1972; Nisbett and Ross, 1980), the leader can manage explicit knowledge contained, for example, in a data base. But from the constructionist approach, the leader cannot manage the experiences of the people in his or her organization, nor their mental models, because this knowledge is embodied in the persons that possess them. Still, in these cases, the leader can create the favourable context that allows these kinds of knowledge to emerge. Therefore, the leaders role goes from controlling and directing entities to bringing about interaction and creating the right contexts (Lissack and Roos, 1999).

Knowledge management in the emerging strategic process

Creating conditions for all the aforementioned dimensions of knowledge to develop, express their potential and interact amongst each other is an exciting and crucial challenge in companies' strategic agenda. In that regard, the knowledge management system, composed of the three parts or subsystems that we explain below, (Machlup, 1980; Bueno, 1999), emerges as a key model for developing and finalizing the strategic process:

(1) Creation of knowledge, a basic function in forming strategy.

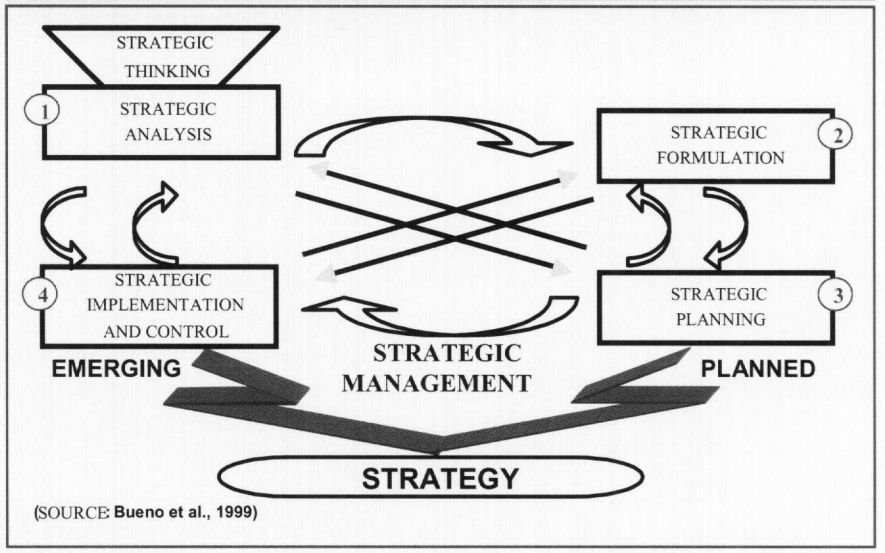
(2) Distribution of flows of knowledge, an operative dimension necessary for the strategic process to have the right information depending on the existing and required categories of knowledge.

(3) Measurement of the results obtained or of the intangibles that are developed. An expression of intellectual capital as a process of "accounting and explanation", from a strategic standpoint, of the value created or of competences based on knowledge.

These days the concept of the process of forming strategy, which expresses the dynamic that a company actually follows, is distinguished from the process of strategic planning as a prescriptive and formally defined system (Prahalad and Hamel, 1994; Bueno, 1996; Bueno *et al.*, 1999a). In fact, empirical evidence in the cases of Spanish companies has shown (Bueno *et al.*, 1999b) different dynamics in the process of forming strategy on the basis of this model. The dynamics are based on four kinds of strategy: planned (three dynamics), formulated (two dynamics), emerging (two dynamics) and completed (one dynamic). The eight dynamics meet the strategic challenge and the characteristics of the strategist.

In Figure 3 we see two different processes: the emerging one to the left (mainly built on strategic thinking; strategic analysis; and strategic implementation and control) compared to the planned process to the right, based on strategic formulation and planning. Also, we see the conventional sequence of the strategic process, in a clockwise sense following the arrows (phases 1, 2, 3 and 4), in the face of other possible movements, those of the actual strategic direction which combines different orders from the described phases, generating different dynamics depending on the nature of the competence of the industry and the characterstics of the company itself.

Figure 3 Dynamic model of the strategy formation process



When change is not something out of the ordinary but rather inherent, as it is happening in the socioeconomic environment of nowadays, which is more and more dynamic, complex and diverse, the strategic process is part of a descriptive approach which is typical of emerging strategies (Mintzberg, 1987). Such an approach seems to stem from the complex interaction of three interrelated concepts: shared strategic implementation, shared strategic analysis and shared strategic thinking (Bueno and Salmador, 2000). In this section we seek to develop a framework that allows us to understand the dynamics of knowledge in such emerging strategic processes. As knowledge cannot be observed directly, we will analyze social interactions (Berger and Luhmann, 1966; Nonaka and Takeuchi, 1995; Roos and Victor, 1999) in each of the three concepts in this process and this will lead us to a second stage, to the analysis of the conversion of the epistemological and ontological dimensions of knowledge.

One of the concepts we mentioned as interacting in the strategic process, that of shared strategic implementation, consists essentially of exchanging the experiences that come with know-how. Therefore, there is a conversion of socialization (Nonaka and Takeuchi, 1995), from tacit knowledge to tacit knowledge. Specifically, from tacit, technical, individual knowledge to tacit technical individual knowledge. This conversion essentially takes place not with language, but through observation, imitation and practice.

Another of the concepts cited above as being part of emerging strategic processes is shared analysis, a process based fundamentally on interaction among the following three basic processes: conceptualization of experiences, systematization of concepts and assimilation of common experiences. In the first of these, conceptualization of experiences, there is an externalization based on a conversion of tacit technical individual knowledge to explicit individual knowledge, triggered by the active thought

> **“ Intangible resources are based on explicit knowledge. ”**

by which a person takes the deliberate initiative of contrasting and validating his or her ideas and premises in light of new and unexpected events or information. Strategic, cognitive processes are characterized by reflection, re-evaluation, validation of hypotheses and double spiral thinking, not by mere accumulation of experiences. New horizons, which do not fit in with earlier beliefs, prompt a shift from an automatic processing to an active one. Therefore, on the basis of previous experiences the individual conceptualizes and articulates his or her experience in the form of analogies, metaphors, concepts, hypotheses or models. Strategic analysis works best when it is deeply rooted in the members of an organization. Thus, systematization of concepts is important so that explicit individual knowledge is converted into explicit social knowledge (combination). It occurs through documents, meetings, telephone conversations or communications networks. In the third of the aforementioned processes, this explicit social knowledge becomes tacit, cognitive and individual as the knowledge is internalized, in this case as shared and assumed mental models. Therefore, common experiences are assimilated, a process based on both collective deliberation and individual reflection. But shared strategic implementation and shared strategic analysis represent the first helix that only prepares strategic minds to go to work (Roos and Victor, 1999). A second spiral in the strategic process is also important: shared strategic thinking. The qualitative jump from the first to the second spiral comes in accordance with avalanche-style change, or the butterfly effect (Lorenz, 1995). Under this model, when a system reaches a critical point, minor events can have overwhelming effects. It is as if an idea fuelled by experience and reflection, and thought over thoroughly, causes a lightbulb to go off in our heads and the light reaches the surface.

The third concept we have referred to, shared strategic thinking, is based on a complex interrelation of the social processes and knowledge interactions that we describe below. The emergence of a new idea, based on the conversion of knowledge which is tacit, cognitive and individual but still not present into knowledge that is tacit, cognitive, individual and present, is the result of experience or strategic implementation and of analysis or strategic reflection as the main sources of inspiration (Roos and Victor, 1999). Once the idea has emerged, its externalization – individual tacit cognitive knowledge becoming explicit individual knowledge – is as important as the consent surrounding this emerging field (Scharmer, 2000) based on combining explicit individual knowledge into explicit social knowledge. Also, commitment to the new horizons is essential, as is the transformation of the identity as it assimilates the new knowledge (Roos and Victor, 2000) of each one of the members. Thus, explicit social knowledge is internalized and becomes explicit individual cognitive knowledge. The qualitative jump from this second spiral we have just described, and which forms shared strategic thinking, as we have explained, to the first spiral of a higher level comes with the implementation of the simple directory principles (Lissack and Roos, 1999; Oliver and Roos, 2000). These principles are an intermediate point between values and rules, and seem to guide action throughout the organization. They give it coherence and link what the organization believes and does.

As we have stated, the emerging process understood as a process of knowledge creation is on one hand similar to the original SECI concept of knowledge creation (Nonaka and Takeuchi, 1995) in which four modes of conversion evolve into one spiral movement: socialization (from tacit knowledge to tacit knowledge); externalization (from tacit knowledge to explicit knowledge); combination (from explicit knowledge to tacit knowledge); and internalization (from explicit knowledge to tacit knowledge).

These are modes that, according to Bueno's (1999) EACI model are linked to emphasizing, articulating, combining and incorporating, respectively. On the other hand it is a variation of the SECI concept because within the epistemological dimension of knowledge it specifies if this knowledge is tacit technical, tacit cognitive present or tacit and cognitive but not present, following Scharmer (2000). It also differs by relating knowledge to the strategic process, which contains the knowledge spiral twice.

We can thus propose that the emerging strategic process is one of creating double-loop knowledge, as shown in Table I and Figure 4.

Main practical implications and conclusions

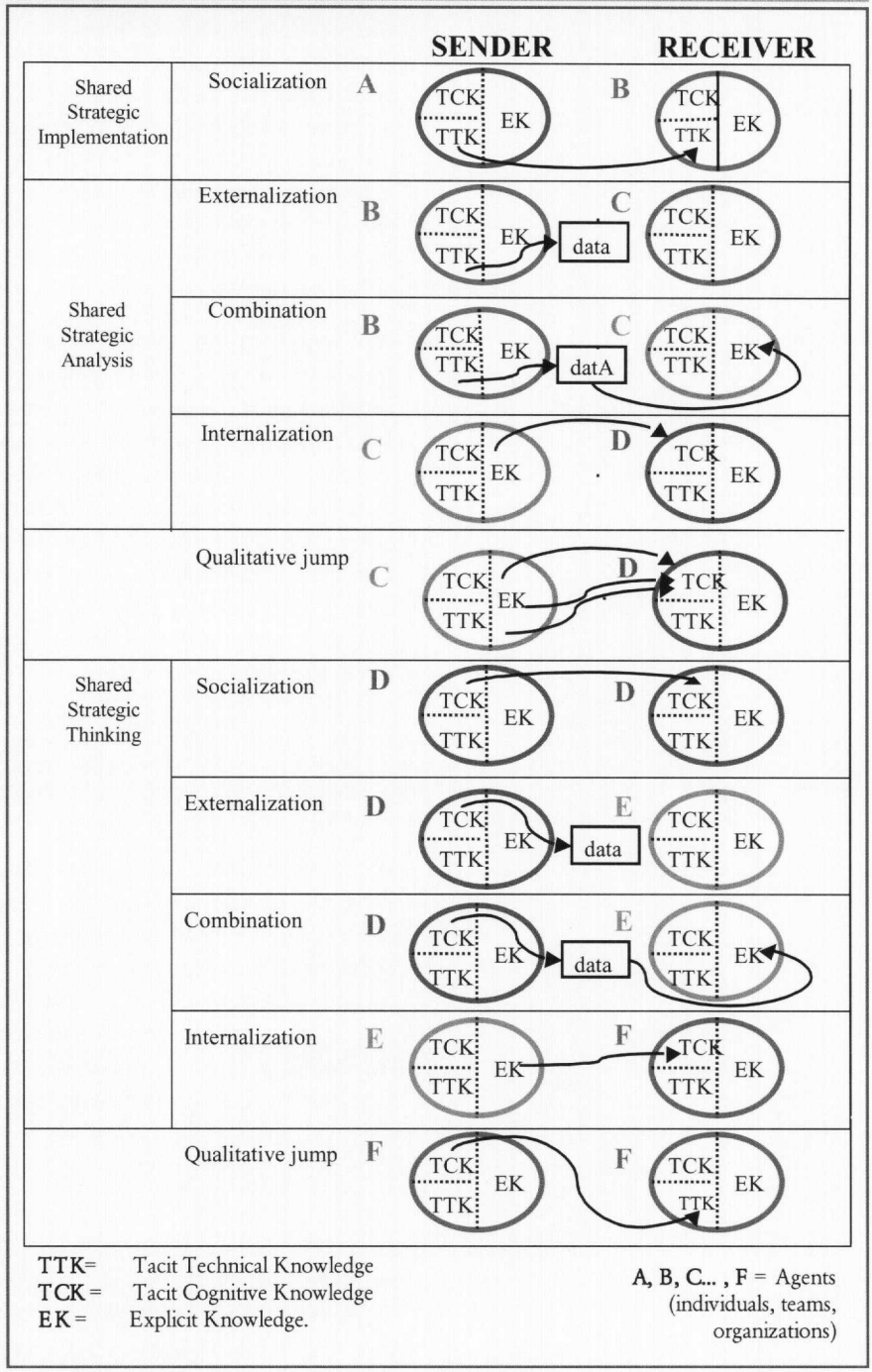
Understanding the emerging strategic process through the lens of knowledge may have important practical implications, about which we will make some final observations.

In the epistemological dimension, each kind of knowledge (explicit, tacit technical and tacit cognitive) needs its own kind of space, or "ba" (Nonaka and Konno, 1998) that allows the knowledge to be conceived and updated in the strategic process. Therefore, in their strategic process organizations must create conditions for each of the following spaces: the originating "ba" is a space where individuals share feelings, emotions, mental models (the case of tacit cognitive knowledge) and experiences (technical tacit knowledge). Among the usual ways a company shares knowledge are direct observation, narration, imitation, experimentation and comparison and

Table I The double loop of knowledge in the emerging strategic process

Spiral of knowledge in the emerging strategic process	*Subprocess of the strategic process*	*Social interaction*	*Interaction of knowledge in its epistemological and ontological dimensions*	
			From	*To*
SECI 1	Shared strategic implementation	To share experiences	Tacit technical individual	Tacit technical individual
	Shared strategic analysis	Conceptualization of experiences	Tacit technical individual	Explicit individual
		Systematization of concepts	Explicit individual	Explicit social
		Assimilation of common experiences	Explicit social	Tacit cognitive individual
From SECI 1 to SECI 2 of a higher level	Qualitative jump	System at "critical point" following accumulation of analysis and reflection	Explicit social	Tacit cognitive individual
SECI 2	Shared strategic thinking	Emergence of a new strategic idea	Tacit cognitive individual (not yet present)	Tacit cognitive individual (present)
		Externalization of the new idea	Tacit cognitive individual (present)	Explicit individual
		Consensus on the new emerging field	Explicit individual	Explicit social
		Commitment to the new horizons	Explicit social	Tacit cognitive individual
From SECI 2 to la SECI 1 of a higher level	Qualitative jump	Implementation of the shared basic principles	Tacit cognitive individual	Tacit technical individual

Figure 4 The double loop of knowledge in the emerging strategic process



participation in communities. In this space, face to face relations, care, love and trust are crucial (von Krogh *et al.*, 2000). There is also the interacting "ba", in which dialogue allows individuals' mental models and abilities to become externalized and conceptualized. Again, face to face relations are important. The cybernetic "ba" is a virtual place, like online networks, data bases, tools for group work and documents, etc. which help convert tacit knowledge into explicit knowledge. The exercising "ba", through training, practice and active participation, promotes and facilitates the conversion of explicit knowledge into tacit. The most delicate kind of knowledge is

tacit, cognitive non-present knowledge, including imagination. This kind of knowledge joins what is with what is coming to be (Bortoft, 1996). To foster its emergence, it is important for agents to have the possibility of obtaining rich experiences and reflections, both individual and shared, and as Hamel (1998) suggests, not only with agents that are inside but also outside the organization. Roos and Victor (1999) propose new techniques to bring about this emergence. Specifically, they speak of "serious play" as a facilitator of this tacit, cognitive, non-present knowledge. And they suggest that even though all strategists "play", perhaps some are not playing well enough, and pose the following questions: perhaps they are not stimulating their imagination well enough; perhaps they are not communicating well that which they have imagined; or perhaps they are not involved in a personal and emotional way.

With regard to the ontological dimension, there are two elements with practical implications for emerging strategic processes: identity and communication. The first is important because, as von Krogh *et al.* (1994) point out, it prevents the organization from drowning in complexity. But at the same time it must be flexible as boundaries are becoming more and more diffuse. Therefore it is important to recognize and modify who the organization is while getting to know its changing self better. Among practices that organizations can undertake in this regard, one is to create contexts that foster conversation and the constant challenge of questioning the basic assumptions that may allow the organization to find new opportunities in emerging industries. As far as conversation is concerned, it is important to improve listening and verbal skills[2].

Main practical implications and conclusions

The systemic dimension also has interesting practical implications. In this sense, it is important to think how all that which is outside the agent (be it an individual, community or organization) represents data. For that data to be transformed into knowledge, the information process is fundamental. A data base can contain highly valuable data but these remain useless until agents "digest" them. We must also take into account the process of self-reference, through which data do not become knowledge until they have been related to the agent's own experience. When referring to supraindividual agents the importance of identity and conversation, which we dealt with in previous lines, again arises.

In the strategic dimension, knowledge refers to vision, intangible resources and capabilities. Their nature is mainly human, technological, organizational, and relational as the sources that nurture them are persons, systems, processes and agents outside the organization (such as customers, suppliers, competitors, etc.) respectively. Clearly the nature of these sources is broad and diverse, so it is relevant for organizations to take this into consideration. For instance, when the sources are people, they are dealing with knowledge workers. In this extend, individuals embody to a lesser extent their explicit knowledge, which is a valuable resource for an organization. More embodied and of clear value to the organization is their tacit knowledge, including attitudes and skills. Therefore, caring of talent, motivation and employee satisfaction seems to be crucial for firms.

In conclusion, from these observations and proposals it might follow that knowledge (considering the broad range of conceptual dimensions discussed) and its management may emerge as one of the fundamental pillars in the strategic process of organizations.

Notes

1. For a detailed study see von Krogh, G. and Roos, J. (1995).
2. Scharmer (2000) proposes four logical areas of language to try to improve: Area 1: Speaking correctly. With an emphasis on education, so that one does not say what one thinks. Area 2: Speaking forcefully. With an emphasis on conflict and clashes, saying what one thinks. Area 3: Reflexive dialogue. With emphasis on encouraging the emergence of mental models and suppositions, so that one does what one says and one says what one thinks. Area 4: Generative Dialogue. With special emphasis on touching the sources of the emerging reality in such a way that what one does is seen, one does what one says and one says what one thinks.

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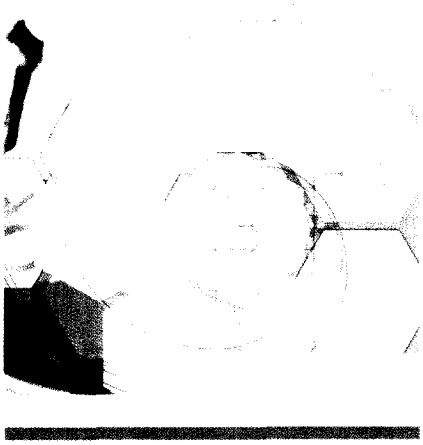

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