

ARTICULATING A KNOWLEDGE MANAGEMENT STRATEGY BASED ON ORGANIZATIONAL MEMORY

Hernán Joglar, Julián Chaparro , Alejandro Orero, Sergio Araya

Universidad Politécnica de Madrid (UPM)

Abstract

This article draws on three different streams of knowledge creation theory to devise a model that provides guidelines for articulating a KM strategy based on organizational memory. This strategy is intended to achieve effective knowledge diffusion across space and time while preventing loss of knowledge appropriability.

Keywords: *Knowledge management strategy, culture, absorptive capacity, codification.*

1. Introduction

In our knowledge-based society, the management of knowledge (KM) is becoming increasingly significant as the firm's most important source of competitive advantage. (Prahalad and Hamel, 1990; Kogut and Zander, 1992; Nonaka, 1994; Grant, 1996). Accordingly, researchers and practitioners are showing renewed interest in several aspects of KM such as knowledge creation (Nonaka and Takeuchi, 1995; Cook and Brown, 1999; Janz and Prasarnphanich, 2003), knowledge diffusion (Albino et al., 1990; Szulanski, 1996, Minbaeva et al., 2003) and knowledge retention (Huber, 1991; Scarbrough, 1995). We are particularly interested in knowledge exploitation via effective diffusion across space and time and its protection from external capture. This topic is becoming progressively influential in organizations for two main reasons. First, the current tendency towards international expansion calls for the application of knowledge in a delocalized and extemporal manner (Jennex and Olfman, 2004; Rhee, 2005). And second, the increased valuation of knowledge (Sveiby, 1997; Quinn et al., 2005) demands that organizations dedicate themselves to reaping maximum benefits from it and that they prevent their competitors from gaining access to it (Spender 1995). Accordingly, we attempt to answer the following question: How can an organization articulate a KM strategy that enables increased present and future knowledge utilization while reducing the risk of losing knowledge appropriability?

This paper begins with a review of knowledge creation literature in order to distill the insights that are relevant for our purposes. Then, it describes those knowledge management strategies that appear as generally accepted in literature. It continues by proposing a model for the articulation of a KM strategy based on organizational memory. Finally, it discusses the model implications and effects.

2. Knowledge creation

2.1. The Philosophical approach

The most widely accepted philosophical theory of knowledge creation in management literature is Polanyi's approach (Polanyi, 1958). This author's work has been most commonly

recognized for the introduction of the concept of tacit knowledge, which has been extensively used by KM researchers. However, there are some other interesting concepts that may be distinguished from Polanyi's notions:

First, he separated knowledge —“the known”— from the process of acquiring knowledge —“knowing”. This distinction introduces the idea of knowledge being personal and linked to human effort. Thus, there are distinctive elements, such as experience, beliefs and skills of the individual knower that make up an important part of the knowledge that is acquired through a learning effort.

Second, Polanyi states that the “knowing” process encompasses two components: “knowing by attending”, which is a *focal* knowing, and “knowing by relying on”, which is a *subsidiary* knowing (Polanyi, 1962). He illustrates this argument with the performance of skills. When we ride a bicycle we concentrate on and become conscious of the general performance of the activity. However, we are not conscious of, and thus not able to see, other multiple and more subtle aspects of the performance, such as how we manage to keep balance while riding or in which direction to turn the handles to maintain equilibrium when riding fairly slowly. The latter knowledge, states Polanyi, can be said to be “tacit” as we cannot tell what the particulars about it are, and on the awareness of which we rely on in order to attend to the entity comprising them. Hence, he ascertains, “there are things that we know but cannot tell” (Polanyi, 1962, p. 601). This point suggests that, for a given individual, there is a disjunction between tacit and explicit knowledge as he will rely on his awareness of the particulars (the tacit part) in order to concentrate on the comprehensive entity to which it contributes. Hence, tacit knowledge acts as a background that allows the understanding of the element on which the attention is focused. Consequently, tacit and explicit knowledge are mutually exclusive. Besides, we can see that they are also complementary as they subsidize each other in order to build up a meaningful picture. Finally, they are inseparable, as the *focal* knowing comprises only the reduced number of variables we are capable of concentrating on, while the rest is managed through the *subsidiary* knowing. Therefore, no full understanding is possible without a combination of both kinds of knowledge.

2.2. The Managerial approach

Polanyi's theoretical approach was brought into the field of management through the more practical perspective proposed in Nonaka's Spiral of Organizational Knowledge Creation (Nonaka, 1994), an epistemological and ontological knowledge creation model. Regarding the epistemological dimension, the cornerstone of this theory is the distinction between tacit and explicit knowledge. Tacit knowledge is characterized as personal, context-specific, and therefore hard to formalize and communicate. Explicit knowledge, on the other hand, is referred to as being transmittable in formal systematic language (Nonaka, 1994). This dynamic theory holds that organizational knowledge is created through a continuous “dialogue” between tacit and explicit knowledge via four interaction patterns (and knowledge conversion), socialization (tacit to tacit), combination (explicit to explicit), internalization (explicit to tacit) and externalization (tacit to explicit) (Nonaka and Takeuchi, 1995).

Regarding the ontological dimension, Nonaka follows Polanyi to emphasize that knowledge is deeply personal and that it is dependent on concepts such as “commitment” and “belief” that are deeply engrained in the individuals' value system. Besides, he borrows notions from the Japanese intellectual tradition “Oneness of the Body and Mind” to integrate both intellectual and physical human components into the knowledge generation process, which leads to

valuing personal practical experience over indirect intellectual abstraction. Accordingly, he states that “in a strict sense, knowledge is created only by individuals” (Nonaka and Takeuchi, 1995, p. 59), thus organizations are not able to create knowledge without individuals. Nevertheless, firms must support creative workers and provide the right context for them to generate knowledge.

2.3. The neurological and biological approach

A different approach to knowledge formation is described by the findings of some prominent biologists and neurologists in the field of evolutionary biology (Nightingale, 2003). According to this scientific branch, human cognitive capacities are rooted in our biology. Our neurological anatomy has evolved from the earlier formation of our neural chains and the brain’s limbic system. These two elements act together to define unconsciously both emotions and motivations that are important to the survival of the organism. Subsequent evolution has given shape to the brain’s cortical system of the senses that categorizes the world (Nightingale, 2003).

One of the earliest human cognitive activities is controlling the body parameters within a rather narrow range that is compatible with life. This is commonly accomplished through reflexes that generate biochemical adaptations. A more sophisticated process is achieved through the later developed combination of biochemical reactions and neural mechanisms that generate “emotions”. As the brain has evolved, it has become capable of forming representations or images of the environment and the body. These dispositional memories encompass both our innate and learnt knowledge, which are not necessarily conscious. Humans do not need to be conscious of the emotional changes or even perceptions that cause learning. Consciousness is a rather new evolutionary development, and anatomical evidence suggests that it is dependent on earlier non-conscious systems that are able to learn by themselves (Edelman, 1992). Consciousness is accomplished through unattended mental images. The brain revises these constantly changing neural images until the selected ones grab our attention, thus letting our consciousness shift, in terms of Polanyi, from *subsidiary* to *focal* awareness (Posner, 1994). Therefore, we can infer that consciousness can be stimulated and that it is a process in which tacit knowledge – in the form of neural images – is always involved.

Regarding the formation of the later evolving systems of learning, categorization and memory; it is relevant to note that these systems are biologically very difficult to separate from each other or the emotional system (Edelman, 1992). To explain the use of these functions, Edelman (1992) points out that, as reaching consciousness takes time (500 ms approximately), the brain develops a dynamic process in which hypothesizes on how the world will be, through the activation of implicit neural patterns within the higher-order association cortices. These patterns send stimuli to the early sensory cortices and generate images and activity there that topologically relates to the things being remembered. Neural hypothesis are generated as the body moves within its environment making memory and categorization dependent on the physical activity (Nightingale, 2003). The complexity of the human brain probably includes many of different types of memory, some can only be invoked through practice, others might be recalled through intellectual or combined stimuli.

It is also interesting to note that learning shifts its position within the brain as it reaches different levels of maturity. Neural activity location within the brain is modified as the learning takes place and evolves from consciously applying explicit rules (widely spread

activity) to tacit, unconscious performance (localized activity) (Tononi and Edelman, 1998). This means that the brain tends to optimize itself, as it is only capable of concentrating on one activity at a time, by moving established behaviors out of consciousness and into the tacit background knowledge where they can develop by themselves. Therefore we can state that, from the biological standpoint, as learning progresses, there is an important amount of knowledge that becomes tacit and is taken for granted, while concentration is focused on more novel and challenging ideas or practices. Those notions in the background however may be recalled through conscious searching that triggers neural image association. Hence memory and learning are dependent on stimuli and conscious exploration to retrieve memories.

2.4. Summary of knowledge creation

Our brief journey across the neurological processes of knowledge formation confirms the principal notions in the other two approaches. Polanyi's ideas that describe knowledge as being highly personalized and linked to human effort are confirmed through the biological linkage between learning and the primitive neural activity that generates emotions. Moreover, we note that the disjunction between tacit and explicit knowledge is also explained through the conscious-unconscious dichotomy and their corresponding different locations in the limbic system or in the cortical areas. Additionally, the formation of consciousness and its accompanying neural images backs the complementarity of both kinds of knowledge, whereas their inseparability is explained through the brain's dynamic hypothesizing and its related process of neural image retrieval, which are brought from the more primitive systems where remembered notions are unconsciously stored.

Another insight extracted from the comparison of our three approaches above is the fact that stimulation — either emotional or intellectual — plays a crucial role in learning efforts as every cognitive process can be consciously initiated and linked to our primitive emotional system. In Table 1 we show several characteristic dimensions of the relationship between tacit and explicit knowledge.

Characteristic Dimensions	Relation
Identification	Distinct
Functionality	Complementary
Application	Joint
Linkage strength	Inseparable
Participation weight	Personal and particular for each case
Stimulation trigger	Consciousness and previous associated images

Table 1. *Characteristic dimensions of the relationship between tacit and explicit knowledge.*

We also highlight that we learn as our neurological system interacts with our environment to create a number of unconscious neural images. These, enable our subsequent conscious analysis through their association with new stimuli. Some of these images become conscious, others remain unconscious.

3. Knowledge management strategies

Two common approaches to KM strategies are identifiable in literature. The first one recommends aligning KM strategy with the firm's competitive strategy and capabilities

(Hansen et al., 1999) or with organizational resources and objectives (Zack, 1999). These ideas, though crucial, are still too general; hence they demand a more detailed analysis to select a strategy. A second common approach follows the characterization of knowledge as pertaining to the explicit or the tacit categories. In this vein, several authors have proposed two fundamentally different KM strategies: personalization and codification of knowledge (Hansen et al., 1999; Connel et al., 2003). The personalization strategy, which stresses the use of tacit knowledge, focuses mainly on accumulating knowledge embedded in people's minds and on diffusing it through social mechanisms. On the other hand, the codification strategy, which is centered on explicit knowledge, recommends codifying and storing knowledge in documents, databases or artifacts, so that it is retained and becomes available for future use. Both of these strategies are affected by the advantages and disadvantages of the knowledge categories they concentrate on. On the one hand, a codification strategy renders knowledge easier to store (Hansen et al., 1999) and communicate (Grant, 1996); but exposes it to higher risk of external capture (Hall and Andriani, 2003). On the other hand, a personalization strategy makes knowledge safer from imitation (Spender, 1995); but more difficult to store and diffuse (Ambrosini and Bowman, 2001), and susceptible to loss due to labor turnover (Boiral, 2002). Therefore, we can infer that in most situations the appropriate approach will be neither a personalization nor a codification strategy. The risk of losing knowledge vis-à-vis the need to internally diffuse it over space and time seems to be key for KM strategy selection.

Additionally, from our previous analysis we can also add that adopting any of these two strategies is conceptually wrong as tacit and explicit knowledge — although different — are complementary and inseparable, therefore any strategic approach to managing knowledge should be oriented towards orchestrating the management of both kinds of knowledge. This point follows the lines of previous authors that argued in this vein. Johannessen et al. (2001) asserts that overemphasizing any of the two strategies explained above at the expense of the other may result in competitive edge loss. Jasimuddin (2005) suggests the implementation of what he calls “symbiosis strategy”, an integrated approach that ensures the interaction of both personalization and codification strategies. He further argues that this should be a strategy that “renders certain categories of knowledge highly explicit to legitimate observers (those within the organization), but highly tacit to illegitimate observers (those outside)”.

4. A model for the articulation of a KM strategy based on organizational memory

Following Jasimuddin's call, we propose and discuss the model in Figure N° 1 in the following paragraphs. This framework depicts the relationships between the most important factors that have to be harmonized in order to devise a strategy that allows knowledge utilization at a different time and location. This approach not only accomplishes knowledge diffusion while hindering imitation, but also capitalizes on IT infrastructure and develops organizational memory (OM).

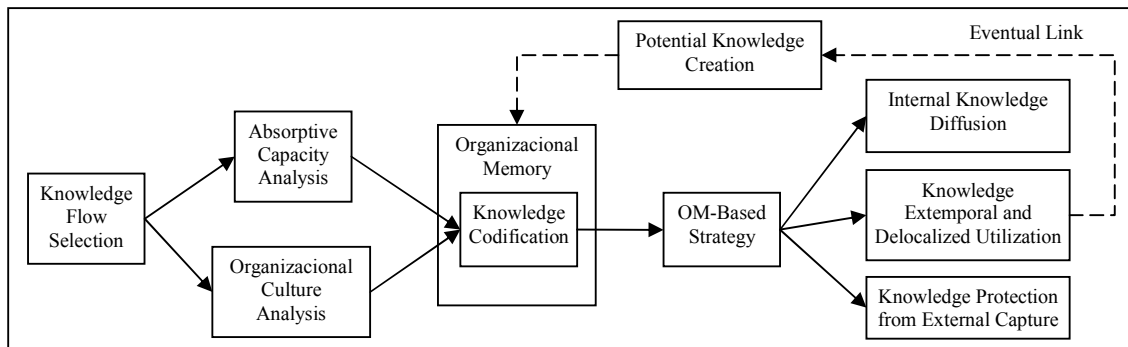


Figure 1. Model for the articulation of a KM strategy based on OM.

We contend that a KM strategy oriented to diffusing knowledge internally, protect it from external capture, and make its utilization in the future possible should be based on using the benefits of knowledge codification within an appropriate tacit background. This strategy should be supported by three key elements: first, a high absorptive capacity of the participant agents on the knowledge topic; second, a strong organizational culture shared among the participant agents, and third, a well devised OM, which is the means to relocate knowledge in space and time, and is chiefly based on IT.

4.1. Absorptive capacity (ACAP)

Absorptive capacity was originally defined as an organization's ability to recognize the value of new external knowledge, assimilate it and apply it to commercial ends (Cohen & Levinthal, 1990). The main components or dimensions of ACAP are: acquisition, assimilation, transformation and exploitation of new external knowledge (Zahra & George, 2002). Regarding the fundamental characteristics of ACAP, its most noteworthy features are that it is cumulative and path dependent, which means that it is a function of the previous accumulation of related knowledge, and that it develops incrementally over time. Therefore, absorptive capacity exists in an organizational unit when its members have progressively acquired the amount of previous knowledge that is necessary to value and understand new knowledge they gain access to (Cohen and Levinthal, 1990).

When knowledge codification takes place within a relationship where participant agents have high prior knowledge on the topic and enhanced awareness of the value of new external knowledge, the amount of knowledge that needs to be codified is reduced, which makes codification plausible. In this situation, the interchanging agents hold a great amount of tacit subsidiary knowledge in the form of neural images that will rapidly engage into a conscious process when exposed to the physical stimulus created by a piece of codified knowledge. Given the cumulative character of ACAP, when engagements are frequent the level of abstraction of the interchange may be progressively raised and codes may be increasingly specialized. Both, codification of knowledge and development of specific codes aid the diffusion of knowledge over space and time, while tending to protect knowledge from illegitimate observers. Moreover, keeping a high level of ACAP isolates codified knowledge from external agents with a lower level of previous knowledge. As Cohen and Levinthal (1990) explain, competitors become "locked out" of a knowledge area when they let their ACAP decay.

4.2. Organizational culture

Schein (1999), who is recognized as the father of organizational culture, provides the following definition: “organizational culture is the pattern of basic assumptions — invented, discovered or developed by a given group as it learns to cope with its problems of external adaptation and internal integration — that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems”. Culture is also viewed as a multi-faceted dimension that includes artifacts, behaviors, values, emotions, and motivational roots. (Hawkins, 1997). Hofstede et al. (1990) characterize culture as being holistic, historically determined, socially constructed, and difficult to change. Although every organization has its own culture, strong or weak, most organizations do not create their culture consciously; instead it is built and ingrained unconsciously (Schein, 1985; Kayworth and Leidner, 2004; Dalkir, 2005).

The characterization of culture above lets us view it as a significant amount of knowledge historically accumulated and intrinsically accepted by individuals, which has become *subsidiary* known. This highly tacit knowledge includes the deeply embedded notions that motivate people’s loyalty to certain values, that trigger their emotions and that foster their motivation. We can also ascertain that culture provides a good amount of neural images that, by means of localized brain activity, complement consciousness and condition its understanding.

If the cultural imprint on an organization’s members is strong enough, knowledge interpretation may be shaped by the uniformity of prior cognitive maps possessed by organizational units (Huber, 1991) or the degree of shared context between interchanging agents (Alavi and Leidner, 2001). Hence, stronger or more unitary cultures tend to foster environments with similar cognitive maps through analogous shared assumptions, beliefs and practices. The result of this will be higher degrees of shared interpretation throughout the organization, because values, emotions and motivational factors will be similar. Consequently, as in the case of high absorptive capacity, a strong culture enables a thorough understanding with diminished knowledge codification, since much of the information related to values and emotions is already engraved on interchanging agents. Specialized code development is also promoted by a strong culture. Thus, a strong culture tends to aid knowledge sharing across space and time, whilst reducing the risk of imitation by organizations with different cultures.

4.3. Organizational memory (OM)

Organizational memory is the set of repositories of information and knowledge whereby knowledge from the past is brought to bear on present activities (Jennex and Olfman, 2004). OM also includes the classification procedures that enable content access, and the updating procedures that keep content relevant. Two types of organizational memory are identified in the relevant literature, concrete and abstract OM (Morrison, 1997). Concrete OM includes the capture of structured information and knowledge in databases, documents and artifacts. This can be done through data collection and filling in of forms, reports and records. This OM can be partially automated through IT (Dalkir, 2005). Abstract OM involves the capture of unstructured information and knowledge, which is more difficult to obtain, since documents, databases and artifacts can only capture part of this information and knowledge. For this kind of OM, individuals have to capture knowledge and synthesize it into a format that can be stored, while using codes that can be understood by potential users.

OM is the component of our model that enables an organization to work with knowledge that is both extemporal and delocalized. What it does is to transfer the small part of knowledge that is susceptible of codification to the new location in space and time. There, it should be complemented with the existing background — already ingrained in the users — to form a contextualized and more complete picture. The codes used to articulate knowledge and its classification should be highly personalized for the potential users. This allows an enhanced future understanding, which facilitates knowledge transfer, and also protects knowledge from illegitimate observation.

4.4. Knowledge flow selection

Efforts towards an efficient knowledge strategy based on OM should be analyzed for each intended knowledge flow. All of the three factors we have explained in the paragraphs above may work and coordinate with each other smoothly. However, we emphasize that this model requires a high degree of customization to be efficient. It is very important to identify potential users of knowledge before codification takes place. This enables the codifier to deduce the area and level of expertise of the users, and what their underlying assumptions are, so that he is able to select the appropriate scope, tone, format, code and topic classification to apply. We contend that customized codification enables effectiveness in future knowledge usage.

5. Discussion

We believe our model offers several advantages. First, its effectiveness is based on the fact that it provides guidelines to use codified knowledge — and therefore IT's advantages — to reap benefits from the tacit images related to intellectual and emotional inputs that individuals naturally accumulate.

Second, the correct application of this model in an iterative manner may potentially yield new knowledge creation. If the application is cyclical, a process of “dialogue” between tacit and explicit knowledge unfolds (Nonaka and Takeuchi, 2005). When knowledge is codified in a customized fashion, its use generates an “internalization” process as recipients are able to reconstruct knowledge meaning. Then, when knowledge is used in a new context, new insights emerge. If these new insights are also codified to improve or complete the existing notions, an “externalization” process takes place. Both of these processes are sources of new knowledge.

And third, since our model requires knowledge codification, its application allows knowledge diffusion across space and time, and develops OM through the storage of knowledge. Also, it reduces the risk of external capture by capitalizing on peculiarities of organizational culture and ACAP.

Unfortunately, our model cannot be applied to a whole organization in a single effort. Within big organizations knowledge tends to specialize as do people's personal background. Moreover, subcultures emerge and different underlying assumptions are nurtured. Therefore, our solution must be implemented on a case-by-case basis, where every knowledge flow is studied separately.

6. Conclusions

We have analyzed knowledge creation from three different points of view. This effort has given us some insights that have allowed us to propose a model for articulating a KM strategy based on OM. This strategy emerges from the examination of subunit absorptive capacity and cultural elements, and subsequent knowledge codification. The results of this strategy should be fluent and safe knowledge diffusion and its application in an extemporary and delocalized way. Besides, its effectiveness should encourage its cyclical use to improve organizational memory content, which will enable new knowledge creation. Full operation of our model will be achieved only if particular requirements of each knowledge flow are satisfied. Besides, it will probably work best in environments where agents share a specialized knowledge base, and a strong organizational culture is profoundly embedded.

All in all, our model provides the general guidelines for the articulation of a strategy that not only achieves knowledge sharing across space and time while hampering imitation, but also fosters organizational memory development and, eventually, knowledge creation.

We believe that future research should attempt to validate this model empirically. It would also be interesting to carry out research into the appropriate approach to devise a KM strategy in organizations where the support of culture and ACAP to OM use is rather weak.

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