Managing Knowledge Assets in Project Environments

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Knowledge, as the main source of competitive advantage in today's knowledge-based society, is often a fuzzy concept, with no direct referent in the real world. In order to conceptualize it people use the metaphor of knowledge assets, assets that can be managed, evaluated, invested in, and that became the main source of value creation within the organization.
The paper's main purpose is to present an overview of the perspectives on knowledge assets for a better identification of what they comprise and stand for, and addresses the management challenges of managing these assets by presenting some strategies that can be applied in project environments.

Keywords: knowledge assets, knowledge assets dynamics, project environment

Introduction

The concept of knowledge has drawn multiple debates in the last decades. The society is now facing a shift from an information era to one of knowledge. We are now living in a knowledge-based society, where individual and organizational knowledge, as well as brainpower, have replaced physical assets as critical resources in the corporate world (Drucker, 1993). The shift made both managers and management scholars reconsider the sources of competitive advantage. Therefore, knowledge and the ability to create and manage it, represents the main source of

sustainable competitive advantage within the business environment (Nonaka, Takeuchi, 1995; Teece, 2000; Davenport, Prusak, 2000).

Despite the fact that knowledge is now perceived as one of the most powerful sources of competitive advantage (Teece, 2000, Schiuma, 2009a, 2009b), in itself, knowledge is a fuzzy concept that has no direct referent in the real world. According to Andriessen (2006), at unconscious level, people use metaphors to conceptualize abstract phenomena. The metaphors are used in order to provide both cognitive and emotional structures to help us conceptualize the way we see things. In a systematic metaphor analysis of the three most cited publications on knowledge management, Andriessen (2006) proved the existence of six broad categories of metaphors for conceptualizing knowledge:

1. knowledge as something physical;
2. knowledge as a wave;
3. knowledge as a living organism;
4. knowledge as thoughts and feelings;
5. knowledge as a process;
6. knowledge as a structure;

Also, the study indicates the existence of two approaches, the Eastern and the Western perspective, on conceptualizing knowledge.

Thus, in the Western knowledge management literature, the dominant way to conceptualize knowledge is through the treatment of the phenomenon as something outside the human being, that can be managed, manipulated.

On the other hand, in the Eastern knowledge management literature, the dominant metaphor is *knowledge as thoughts and feelings*, where knowledge is seen as wisdom, as truth (Nonaka, Takeuchi, 1995), with a subjective nature. Because of the large number of publications in the West, the perspective of knowledge as something that can be controlled, *knowledge as capital*, has gained numerous supporters. Capital is considered valuable, of great importance, it is an asset for the future, asset that can be invested in, it is additive, it allows for returns and most important can and must be managed and measured. The positive connotations of the word capital are therefore translated to knowledge, indicating that knowledge is something important, of great value, an asset of the owner.

Knowledge as capital metaphor not only underlines the possibility of control, but also adds the notion that a proper return on knowledge is to be expected (Andriessen, 2006), hence giving birth to the concept of *knowledge assets*.

Unfortunately, due to the relative novelty of the attention channeled towards the concept of knowledge assets, there is a lack of effective systems and tools for evaluating and managing them. Knowledge assets must be built and used internally in order for their full value to be realized, because they cannot be readily bought and sold (Teece, 2000).

Arguably one of the main challenges with knowledge assets is their dynamic nature. They are both inputs and outputs of the organization's knowledge creating activities, and as a direct result of that they are constantly changing (Nonaka, Toyama, Konno, 2000). In order to govern knowledge-based value creation mechanisms, an organization must measure and manage knowledge assets dynamics (Schiuma, 2009a).

Hence the importance for managers to understand what knowledge assets are, how they are interlinked, how they can be increased and evaluated. In the following sections we consider how the concept of knowledge assets can be managed in project environments, first by properly identifying what knowledge assets are and second by introducing some strategies for their management.

Knowledge assets

The concept of knowledge assets is not something new; it has been long used by the sixteenth-century alchemists that were undertaking precise measures to protect the secrets of their craft. What is new in the late twentieth century is that knowledge assets are coming to constitute the very basis of post-industrial economies (Boisot, 1998).

The new perspective on knowledge assets has raised multiple discussions among management scholars. According to Boisot (1998) knowledge assets are stocks of knowledge from which services are expected to flow for a period of time that may be hard to specify in advance.

For a better understanding of the concept the author has classified knowledge assets in two dimensions. On one hand the knowledge assets are classified according to how far they can be given form.

For example, knowledge embedded in artifacts has to be more systematically formalized and codified than knowledge embedded in text. In the end, it comes down to the distinction that Polanyi (1983) introduced with regard to knowledge. There is explicit knowledge; knowledge that can be found in books, rules, procedures, having as main characteristic the ease of codification; and there is tacit knowledge, knowledge embedded in experience, values, beliefs, that is very difficult to articulate and to codify.

The second dimension of knowledge assets in Boisot's (1998) vision is as a function of their degree of abstraction. Knowledge that is embedded in artifacts, for example, of necessity has to be more concrete than knowledge that is set out in documents or in people's heads, even if it incorporates quite abstract principles. A crucial difference between concrete and abstract knowledge is that the first type is confined to specific applications in space and time whereas the second type is more general and less restricted in its scope.

Continuing Boisot's intercession, the Japanese authors Nonaka, Toyama, Konno (2000) define knowledge assets as firm-specific resources that are indispensable to creating value for the firm. Knowledge assets are regarded as having moderating character in the knowledge creation process. Developing Boisot's classification on knowledge assets, Nonaka, Toyama and Konno (2000) introduce two more dimensions, thus categorizing them as four types: experiential knowledge assets, conceptual knowledge assets, systemic knowledge assets and routine knowledge assets (Table 1).

In the first category of knowledge assets, experiential, the authors (Nonaka, Toyama, Konno, 2000) introduced the skills, know-how acquired by individuals in experiences at work. Also emotional knowledge, care, trusts, loves are categorized as experiential knowledge assets. In this category are included the shared tacit knowledge of members of the organization and because the experiential knowledge assets are tacit they are difficult to evaluate, manage and trade. Conceptual knowledge assets, on the other hand, have tangible forms, and include explicit knowledge articulated via images, symbols, language. The systemic knowledge assets consist of systematized explicit knowledge, where manuals, product specifications, stated technologies are just some of the examples. The fourth category of knowledge assets, routine knowledge assets, includes organizational routines, organizational culture in carrying out the daily

business. The third perspective on knowledge assets (Schiuma, 2009a) considers them as cognitive artifacts, that is organizational resources made of knowledge or representing knowledge that define the knowledge domains of an organization. Metaphorically knowledge assets can be depicted and analyzed as the "roots of a tree", where the tree denotes the business model of and organization including capabilities, processes. The development, deployment, exploitation, protection and acquisition of knowledge assets influence organizational capabilities but also core competencies. Once the managers have identified what are the knowledge assets within the organization the challenge is to determine how to manage them. The next section focuses on the management of knowledge assets in project-based environments. Project-based work is a part of the wave of 'new organizational forms' that has entered most industries during the past two decades. Project business denotes the activities of a company that carries out project deliveries to its customers.

Table 1: Categories of knowledge assets

Experiential knowledge assets	**Conceptual knowledge assets**
Tacit knowledge shared through common experiences • Skills and know-how of individuals • Care, love, trust, and security • Energy, passion, and tension	Explicit knowledge articulated through images, symbols, and language • Product concepts • Design • Brand equity
Routine knowledge assets	**Systemic knowledge assets**
Tacit knowledge routinized and embedded in actions and practices • Know-how in daily operations • Organizational routines • Organizational culture	Systemized and packaged explicit knowledge •Documents, specifications, manuals • Database • Patents and licenses

Source: Nonaka, Toyama, Konno (2000)

Managing knowledge assets

One of the main problems with knowledge is that, if trapped inside the minds of key employees, in filling drawers, databases, is of little to no value to the company or the project undertaken. It has to be supplied to the right people at the right time in order to be of full value. As knowledge is boundary less, the management has to redefine the project on the basis of the knowledge it owns (Nonaka, Toyama, Konno, 2000). Without a proper administration in a project it is very difficult to know exactly what that the team knows. In order to overcome this situation the management has to constantly read the situation, to determine what kinds of knowledge assets are available for them. One possible solution to the problem would be to undertake an inventory of knowledge assets and on this basis to construct the strategy in order to effectively utilize the available knowledge assets.

Another solution was proposed by Nonaka and Takeuchi (1995). The solution consists of creating an environment where knowledge assets can flow freely from the people who own them to the people who are in need. In order to create the environment the leaders have to supply the necessary conditions: autonomy, creative chaos, redundancy, requisite variety, trust. *Autonomy* is considered to increase the chances of finding valuable information and motivating the members to create new knowledge. Autonomous individuals set task boundaries for themselves in the pursuit of the goal set by the organization, customer etc. In project environments, autonomy is a prerequisite condition. An autonomous team can perform many functions, amplifying and sublimating individual perspectives to higher levels (Grant, 1996). Closely connected with autonomy is *creative chaos*, which stimulates the interaction between the team and the external environment. The main purpose of creative chaos is to impose a sense of crisis among the members of the team by proposing challenging goals, thus breaking routines, habits and cognitive frameworks and transcending existing boundaries. One of the biggest problems in any team, organization is knowledge inertia (Liao, Fei, Liu, 2008), and the difficulty to diverge from the course set by previous experience. The main problem with creativity is that it lies on the thin border between chaos and order. In order to maintain the balance between the two, *requisite variety* is a helpful instrument.

One possible way to realize requisite variety is by developing a flexible structure with multiple interlinks, thus giving fast and equal access to information, or by a redundancy of information. *Redundancy* is regarded (Nonaka, Takeuchi, 1995) as the intentional overlapping of information about business activities, management responsibilities. The main purpose of using redundancy in project environments is to speed up the process of knowledge creation, because, team members can easily understand their role in the team, which in turn, functions to control the direction of their thinking and actions, thus leading to a self-control mechanism for achieving the desired goal. The existence of trust in teams has been highly underlined in the literature (Daveport, Prusak, 2000; Holste, Fields, 2010).

For knowledge to be shared and created there should be strong love, caring, trust among the members of the team. It is very important for them to feel that there is an atmosphere in which they are safe to share their knowledge.

As mentioned earlier, groups, organizations continuously develop, update, lose, and acquire knowledge assets in order to improve their capabilities, actions that, in turn, imprint to knowledge assets a dynamic character. To analyze and manage the knowledge assets dynamics within an organization Schiuma (2009a, 2009b, Carlucci, Schiuma, 2005) identified three managerial processes (as depicted in figure 1): knowledge assets identification, knowledge assets mapping and knowledge assets flow.
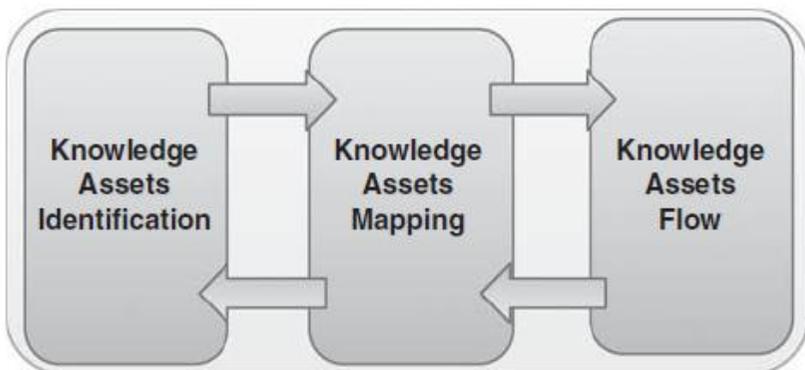

Figure 1: The managerial foundations of knowledge assets

Source: Schiuma, 2009

According to the model the first step in managing knowledge assets is the identification of key organizational knowledge assets. In this step the project manager becomes aware of the knowledge and intangible assets domains that are to form the basis of project value creation mechanisms.

Through knowledge assets identification is located the knowledge resources held, and available for the project, which can be further employed, developed. The second step, knowledge asset mapping allows an investigation of the relationships linking the different knowledge assets between them and among them. A knowledge map, whether it is an actual map, knowledge "yellow pages" or a cleverly constructed database, points to knowledge but it does not contain it (Davenport, Prusak, 2000).

Just as an organizational chart, where spatial relationships are communicated, the knowledge maps point out the relationships in the effort to utilize knowledge (Wexler, 2001). Having a dynamic character, knowledge assets interact with each other affecting, thus, the transformation and the development of capabilities (Schiuma, 2009a). Whereas, studying the flow of knowledge assets determines how they are functionally linked, developed and renewed over time.

Unfortunately, if the first two steps proposed by Schiuma (2009a) in order to manage the knowledge assets have established methods of implementation within the project environment (knowledge inventories, knowledge maps), the third step, the study of knowledge assets flow, is facing a lack of mechanisms of implementation. There are not many research contributions in this regard, thus, proving a gate for further research in the field of knowledge assets dynamics.

Conclusions

The shift towards a knowledge-based society made knowledge as the center stage of obtaining the sustainable competitive advantage within every aspect of the human life. Nowadays, knowledge is perceives as being of great value, of great importance, as an asset for the future, asset that can be invested in, it is additive, it allows for returns and most important can and must be managed and measured, thus, reinventing the concept of knowledge assets. Despite the multiple perspectives on knowledge assets,

the management scholars all agree on the fact that knowledge assets are the basis for value creation within any organization, project.

The present article's main purpose was to present an overview of the perspective on knowledge assets for a better identification of what they comprise, and addressing the management challenges of managing these assets by presenting some strategies that can be applied within the project environments. The dynamic character of knowledge assets is a relatively new field of research and there is an obvious lack of mechanisms and tools of addressing this dynamics, thus, proving a gateway for further research in the field.

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