Knowledge management and organizational competitiveness: a framework for human capital analysis

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Abstract *Knowledge management literature highlights the fact that, in the new economy, the achievement of a sustained competitive advantage depends on firm's capacity to develop and deploy its knowledge-based resources. However, not all resources are equally important for the achievement of this competitive edge. In this sense, this paper proposes an integrative framework for the analysis of human capital combining the advances from three different areas of research: knowledge management, intellectual capital, and strategic human resource management. Juxtaposing two dimensions – value and uniqueness – it analyzes the different forms of firm's human capital. These are the following: idiosyncratic, ancillary, core and compulsory. Furthermore different human resources practices that should be used to manage such specific forms of human capital are described.*

Keywords *Human capital, Human resource management, Knowledge management.*

Introduction

Perhaps the organizational resources most difficult to control of all are people. Therefore, executives have traditionally based their competitive strategies on other factors, such as product and process technology, protected market niches, access to financial resources and economies of scale. However, in an entrepreneurial environment such as the present one, characterized by market globalization, the intensification of competition and the high rate of technological change, tangible assets no longer provide sustainable competitive advantages. As firms are focusing on their intangible assets, intellectual capital can be viewed as the future basis of sustained competitive advantage. This is particularly true in industries based on knowledge, such as information and software services. Competitive advantage depends more and more on "people-embodied know-how" (Prahalad, 1983). Accordingly, it is human capital, rather than physical or financial capital, that distinguishes the leaders in the market. For these reasons, and given the fact that employee knowledge, skills and abilities constitute one of the most significant and renewable resources which a company can take advantage of, the strategic management of this capital now has greater importance than ever (Ulrich, 1991).

The aim of this study, in keeping with Snell *et al.* (1996), is to provide a framework for the analysis of organizational human capital. This framework is based on a combination of three perspectives from the strategic management literature: knowledge management, intellectual capital, and strategic human resource management. In the first section, we emphasize the importance of organizational knowledge for the attainment of a sustainable competitive advantage. The different stages of which knowledge management is comprised are also

“ Tangible assets no longer provide sustainable competitive advantages. ”

presented. In the following section, we analyze the strategic importance of human capital. Following Snell *et al.* (1999), we establish a conceptual framework for the analysis of human capital. From this point, different forms of human capital are positioned within a two-dimension matrix of uniqueness and strategic value. Based on this matrix, we propose a classification of four forms of human capital: idiosyncratic, ancillary, core and compulsory. Finally, in the last section we analyze major conclusions and research implications from this paper.

Knowledge management and entrepreneurial competitiveness

Organizational knowledge and competitive advantage

The resource-based view of the firm (Barney, 1991; Peteraf, 1993; Ventura, 1996) examines the manner in which organizational resources are applied and combined, the causes which determine the attainment of a sustainable competitive advantage and the nature of rents generated by organizational resources.

On the basis of this theory, the firm is viewed as the accumulation of unique resources of a diverse nature (Wernerfelt, 1984). In general terms, resources are defined as assets of different types which enable the firm to conceive and implement strategies leading the firm to improve its efficiency and effectiveness, and generating an increase in its competitiveness (Amit and Schoemaker, 1993; Grant, 1991, 1996).

In order for organizational resources to become a source of sustainable competitive advantage, certain characteristics must be present. On the one hand, Barney (1991) argues that these resources must be rare, valuable, without substitutes and difficult to imitate. Moreover, Dierickx and Cool (1989) suggest the following characteristics:

- that they cannot be commercialized, as they are developed and accumulated within the company;
- that they display a strong intrinsic character as well as social complexity;
- that their origin lie in organizational skill and learning;
- that they should be strongly linked to the firm, with a high component of immobility; and
- that their development is path dependent, that is, being conditioned on the level of learning, investment, stocks, and previous activities.

Organizational knowledge is one of the organizational resources that presents these characteristics.

Typology of organizational knowledge: tacit vs. explicit knowledge

Despite the fact that the literature includes numerous typologies for organizational knowledge – scientific and practical (Hayek, 1945), objective and based on experience (Penrose, 1959), procedural (Winter, 1987), incorporated (Zuboff, 1988), migratory and embedded (Badaracco, 1991) and codified (Blacker, 1993) – the most frequently used is the one that distinguishes between tacit and explicit knowledge, proposed by Polanyi (1966) and later utilized by other authors.

Tacit knowledge (Spender, 1996a,b) is acquired through experience. It is a form of knowledge with which we are all intimately familiar. It appears as if it were acquired through “osmosis” when we enter into a new organization, or when we begin an activity that is different from what we are accustomed to. On the other hand, explicit or codified knowledge (Polanyi, 1966) is transmittable through formal, systematic language, and may adopt the form of computer programs, patents, diagrams, or similar (Hedlund, 1994). Essentially, tacit knowledge should not be considered independently from explicit knowledge, as there is a tacit dimension to all forms of knowledge (Polanyi, 1966). Table I shows the main differences between the two types of knowledge.

Table I Two types of knowledge	
Tacit knowledge (subjective)	*Explicit (objective)*
Knowledge of experience (body)	Knowledge of rationality (mind)
Simultaneous knowledge (here and now)	Sequential knowledge (there and then)
Analog knowledge (practice)	Digital knowledge (theory)

Source: Nonaka and Takeuchi (1995, p. 61)

On the other hand, much of organizational knowledge is tacit (Cook and Yanow, 1993). That is, it is generated through the experience which the daily work consists of. Due to these experiences, employees who make up the organization maintain a "shared meaning network". The creation of tacit knowledge is a continuous activity in organizations, and represents what Bateson (1973) denominated "analogical" quality as opposed to explicit knowledge, which is discretional or "digital".

Knowledge management: strategic management and operative management

Managing knowledge is a key element in the achievement and sustainability of a competitive advantage. The knowledge management concept is defined as the necessary identification of knowledge categories for the support of the global firm strategy, the evaluation of the firm's present state of knowledge management, and the transformation of the current knowledge foundation into a new, powerful basis for knowledge, filling in any existing gaps (Gopal and Gagnon, 1995). In this vein, knowledge management should be developed not only within organizations, but also among organizations (Earl and Scott, 1999). This last possibility is at least as attractive, if not more, than the first. It implies sharing knowledge between partners, allies, intermediaries, suppliers and customers.

Another definition of knowledge management states that it is a collection of processes that enables knowledge to be utilized as a key factor in adding and generating value. In this line, Garvin (1994) points out that it not only includes the processes of creation, acquisition and knowledge transfer, but is also a reflection of this new knowledge on organizational behavior.

Moreover, it is possible to differentiate between strategic management and operational management of knowledge (Tissen *et al.*, 1998). Operative management uses computer technology to organize and distribute information to and from employees. Strategic management (see Figure 1) is a process that relates the firm's knowledge to:

- the design of organizational structures that promote knowledge;
- firm strategy; and
- the development of knowledge professionals.

Any firm that undertakes initiatives in knowledge management tends to have a basic aim that is complemented with aspects of their other goals. These firms must evaluate the effectiveness of their objectives for knowledge management initiatives and their benefits, generally indirect, and establish a link between financial and knowledge results. This is a task that often shows difficulties (Eccles, 1991).

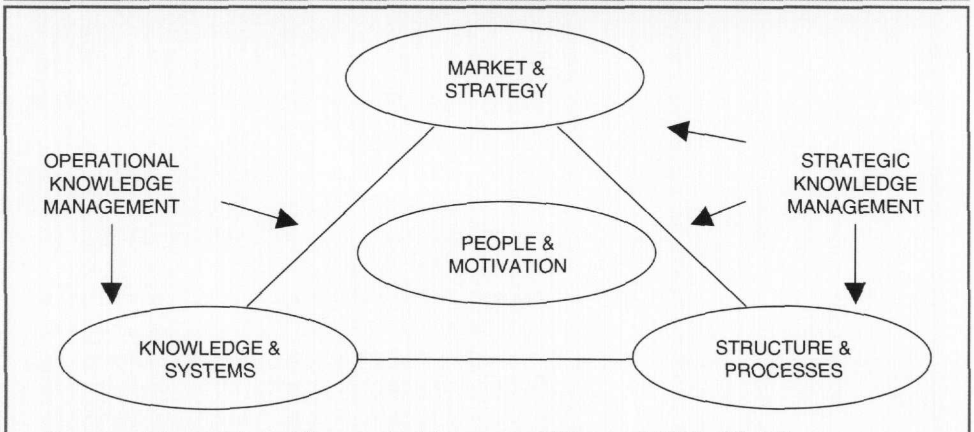
Stages of knowledge management

The aims pursued by organizational strategy for knowledge management are structured into four basic stages which constitute the knowledge management process (see Figure 2):

(1) generating or capturing knowledge;

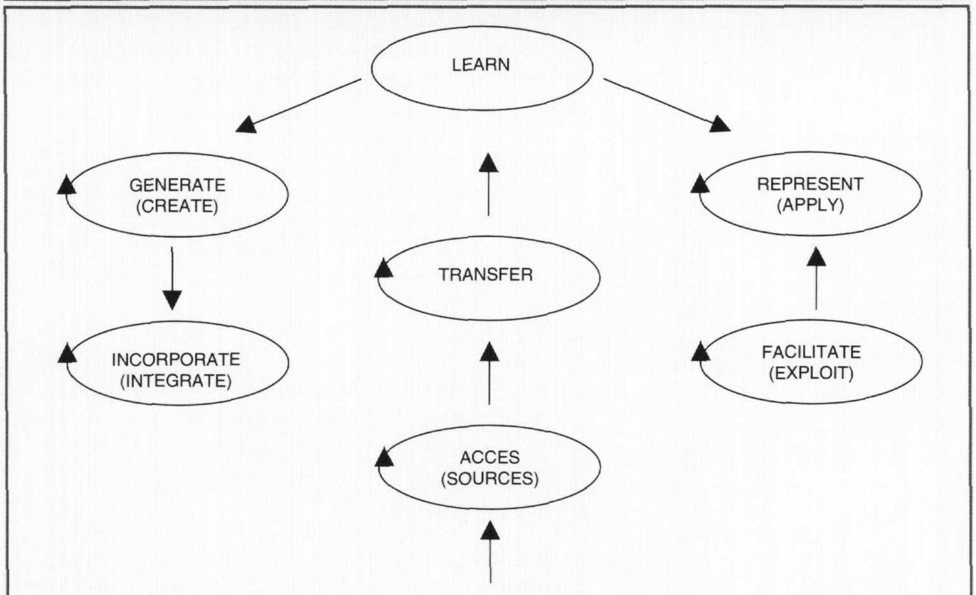
(2) structuring and providing value to gathered knowledge;

Figure 1 Knowledge management



Source: Adapted from Tissen, Andriessen and Deprez (1998: 26, 34)

Figure 2 Knowledge management cycle



Source: Bueno (1998)

(3) transferring knowledge; and

(4) establishing mechanisms for the use and re-use of this knowledge, both for individuals as well as for groups of individuals within the organization.

The attainment of these objectives is accompanied by the use of knowledge management tools; that is, technology that broadens knowledge and allows for the generation, codification and transfer of this asset. This enhances the knowledge processes within the organization. It is worth taking into account the observation made by Ruggles (1997), who points out that not all knowledge management tools are computerized. This author differentiates between three categories of knowledge management tools:

(1) Those intended for knowledge generation, which is one of the keys for the firm's long-term viability, as well as its competitiveness. This category includes the creation of new ideas, the

recognition of new models, the synthesis of separated disciplines and the development of new processes.

(2) Those applied to knowledge codification, as this intangible asset is not useful in an isolated form. Its results must be made available to others, within and outside the organization. These tools allow the representation of knowledge to take place in a manner that may be accessible and transferable.

(3) Those used for knowledge sharing, which face three important obstacles: (1) temporal distance, both historical (relating to organizational memory), as well as present (pertaining to the difficulty in coordinating two schedules to share sufficient common time to reach the desired interchange); (2) physical and spatial distance; and (3) social, which includes hierarchical, functional and cultural differences restricting common understanding. Some companies, such as Root Learning Inc., have developed tools such as the learning map process, used by Boeing, Pepsi-Cola and Allstate Insurance, among others, which facilitates the social translation of knowledge. These tools enable the following objectives to be attained: translating corporate-level plans into clear ideas, or breaking them down into goals and activities that give an impulse to organizational success; and opening a dialogue regarding these learning maps during the months following their implementation.

Human capital and organizational competitiveness

From the strategic human resource management view, assuming that not all existing knowledge and skills are strategic, the first step is determining what forms of human capital exist in the firm and how they can be a source of competitive advantage. In this sense, following the work of Snell *et al.* (1999) and Ulrich and Lake (1991), now we will analyze the strategic potential of firm's human capital juxtaposing two dimensions: value and uniqueness.

Resource-based view of the firm indicates that resources are valuable when they allow improving effectiveness, capitalizing on opportunities and neutralizing threats. In the context of strategic management, value creation focuses on increasing the ratio of customer profits in comparison with the associated costs. In this sense, firm's human capital can add value if it contributes to lower costs, provide increased service or product features to customers.

On the other hand, Collis and Montgomery (1995) state that the importance of human capital depends on the degree to which it contributes to the creation of a competitive differentiation. From an economic view, transaction-costs theory indicates that firms gain a competitive advantage when they own firm-specific resources that can not be copied by rivals (Williamson, 1975). Thus, as the uniqueness nature of human capital increases, firms have incentives to invest resources into its management with the aim of reducing risks and capitalize on its productive potential.

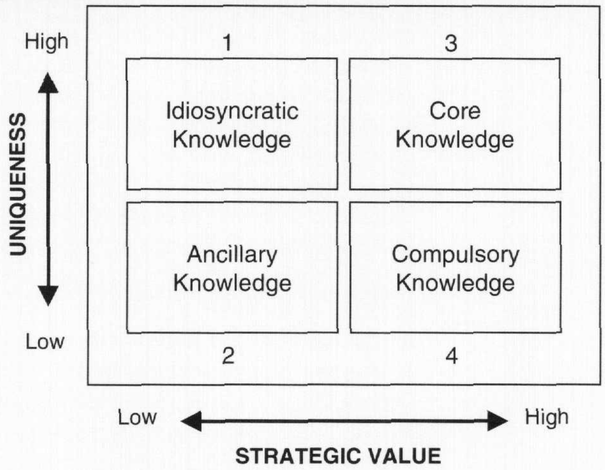
As shown in Figure 3, juxtaposing these dimensions (uniqueness and value) we build a matrix. It presents a conceptual framework for the classification of different forms of human capital that may exist in a firm. This framework is useful to study how these forms of human capital should be managed in order to maximize their contribution to the firm. In particular, it is stated that different human resource management systems are required to manage each type of human capital. So the use of one unified system throughout the organization may result counterproductive (Snell et al, 1999).

Idiosyncratic human capital (low value, high uniqueness)

Quadrant 1 represents human capital with strong uniqueness but not especially useful for creating customer value. This form of human capital is a potential source of differentiation

> **“ Value creation focuses on increasing the ratio of customer profits in comparison with the associated costs. ”**

Figure 3 Forms of human capital



Source: Adapted from Snell, Lepak and Youndt (1999)

because it is a firm-specific resource. Then, an important task is identifying how a firm can develop the potential value of this human capital while preserving its uniqueness.

Over the years, some very innovative firms have been those that use and support the development of idiosyncratic human capital. However, with the increasing need of reducing costs in the short run, many firms have started to analyze the value of this form of human capital and in some cases, their decision have been to disinvest. This is an interesting dilemma for the management of human capital because managers must avoid an overinvestment in idiosyncratic human capital but at the same time, they must warrant competitiveness in the long run.

According to Snell *et al.* (1999), the key to increasing the value of this form of human capital is to link it to other forms of human capital as well as with relational and organizational capital. To promote coordination and cooperation among these forms of intellectual capital, organizations should develop human resource systems based on collaboration to support the development of lateral relations, exchange programs, group-based rewards, team building and rotation, just to name a few (Lepak and Snell, 1999).

Ancillary human capital (low value, low uniqueness)

Quadrant 2 of the matrix represents ancillary human capital, that is to say, employee knowledge that is neither useful for creating customer value nor is it particularly specific to the firm. In many organizations, this form of human capital is simply generated as a result of firm's activity. For this reason, it is not frequent that literature devoted much attention to the investment on this form of human capital. In this sense, Snell *et al.* (1999) state that probably the best approach to managing ancillary human capital is to dis-invest in employees. As ancillary human capital is formed basically by unskilled or semi-skilled employees that offer no source of competitive advantage, firms tend to automate this knowledge, that is to say, they substitute technology for employees (Snell *et al.*, 1995; Zuboff, 1988). Alternatively, if ancillary human capital markets are efficient, then firms may find that it is possible to decrease administrative expenses by externalizing certain employees. In fact, the use of external sources allow firms to reduce labor costs, increase flexibility and focus their investment on the development of human capital with better potential to build a competitive advantage.

Core human capital (high value, high uniqueness)

When human capital is highly valuable and unique it provides strategic benefits that exceed the bureaucratic costs associated with their development and deployment. Organizations have incentives to internally develop and invest in this human capital to maximize its value creating potential and differentiating characteristics. To do this, organizations may implement commitment-based human resource systems that focus on internal development of skills and long-term relationships (Rousseau, 1995; Tsui *et al.*, 1995). According to Arthur (1994), MacDuffie (1995), and Youndt *et al.* (1996) these systems include such human resource practices as staffing decisions on employee potential (e.g. cognitive ability, aptitude) rather than looking at current knowledge and skills, comprehensive training to develop unique or firm-specific skills, socialization programs, job enrichment, and cross-functional career paths that encourage employees to build idiosyncratic knowledge. At the same time, skill-based pay systems and developmental performance appraisals may be used to facilitate the development of firm-specific knowledge and competencies (Snell *et al.*, 1999).

Compulsory human capital (high value, low uniqueness)

Compulsory human capital may be valuable but it is not firm-specific or unique[1], so that investment decisions for this type of human capital differ from those in Quadrant 3 (core human capital). Compulsory human capital is not specific to any particular organization and employees are free, within certain limits, to sell their talents wherever they can achieve the greatest return (Rousseau, 1995). Due to this transferability, human capital theory suggests that organizations would not be likely to invest in this kind of human capital (Becker, 1964). Instead, organizations may rely on selective staffing processes to identify potential employees with the appropriate skills to generate immediate productivity. The hiring firm simply pays the market rate (or above) for these employees and takes advantage of their valuable talents immediately. These practices characterize a market-based human resource system (Lepak and Snell, 1999).

Nevertheless, in some cases the opportunity to move to the upper right corner (Quadrant 3) may exist. When generic human capital can be transformed into firm-specific human capital, investments in specialized skill development may have strategic value (Snell *et al.*, 1999)[2].

Conclusion

This paper puts forward and integrative framework that joins current research and theory on knowledge management, intellectual capital and strategic human resource management for the analysis of human capital. Combining the features of value and uniqueness, it has been shown the different forms of human capital that exists throughout the organizations. Traditionally, the literature has focused on core and idiosyncratic human capital, with limited reference to the other types of human capital (compulsory and ancillary). However, the firm must manage the entire system of human capital. For this purpose, it has been argued that different human resource systems are required for different forms of human capital and that one unified system used throughout the firm would be counterproductive.

In addition, organizations must also pay attention to the other forms of knowledge: social and organizational capital. Research is needed on how various combinations of knowledge (i.e. human, social, and organizational) can lead to competitive advantage. It must be taken into account that, in the new economy, organizations compete in complex and dynamic areas, so that the value and uniqueness of a firm's knowledge base is likely to shift as competitors create newer competitive strategies. As a result, the task of managing a firm's knowledge base is further complicated.

Notes

1. There are many examples of human capital in organizations that are highly valuable yet widely available in the labor market. The strike by the UPS delivery drivers highlights the fact that employees with highly standardized and replaceable knowledge, skills, and abilities can be vital to the success of the firm (Snell *et al.*, 1999, p. 182).

> **“ The firm must manage the entire system of human capital. ”**

2. For example, Federal Express found that it could take advantage of the detailed knowledge that drivers have about delivery routes and customers. The company has empowered its drivers to schedule their own routes, make changes quickly, and notify existing customers of new products and services. These practices helped Federal Express transform to transform its generic human capital into something that is more specific, at least in the short term (Snell *et al.*, 1999, p. 183).

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