

Distributed Knowledge Management

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INTRODUCTION

In dynamic markets (characterized by the specialization of work, outsourcing processes, just-in-time and distributed productions, etc.), firms have moved from hierarchical structures to networked models. These are based on both intraorganizational networks among strategic units, divisions, groups, and so on; and interorganizational networks, such as industrial districts and knowledge networks (Hamel & Prahalad, 1990). Production is based on the coordination of a constellation of units, some of which are part of the organization (administration, R&D [research and development], etc.), and others refer to different companies (such as specialized outsourcing production, logistics, etc.). All these units might not totally be controlled by a unique subject, and might grow and differentiate their activities in an autonomous way, coexisting as in a biofunctional system (Maturana & Varela, 1980) and creating unexpected combinations of processes and products (Chandler, 1962).

From a knowledge management (KM) point of view, the need of sharing knowledge among units in a very complex organization, or among networked organizations, increases the importance of introducing new ICT technologies and effective KM systems. For a long time, KM systems and ICT technologies have been proposed and applied as neutral tools whose implementation within the firm does not have any impact on knowledge flows. In particular, for technical reasons, centralized systems (for instance, enterprise knowledge portals [EKPs]) have been developed with the aim of making knowledge sharable and available in a general, objective, context-independent form, avoiding the persistence of noncorrect and nonconsistent information. Opposed to that point of view, studies focused on structuration theories (Giddens, 1984; Orlikowski, 1991) do not consider technology as a neutral asset of organizations. According to these theories, there are

strong relationships and interdependencies among human actions, institutional roles (the organizational model de facto), and the technology architecture of KM systems applied within the company. One of the most important results in this area is that ICT technologies and KM systems should be shaped on the processes, practices, and the organizational models in which they are implemented; otherwise, they are bound to failure. As a consequence, in a complex organization composed by a constellation of units that manage in an autonomous way specialized processes, ICT technologies and KM systems must take into account the distributed nature of knowledge, and should allow coordination among autonomous units. In such a scenario, a KM system should satisfy two different needs: supporting the creation of specialized knowledge within a unit, and enabling the coordination of knowledge (and activities through which knowledge is exchanged) among units. These dual needs reflect the tension between the necessity for both highly specialized organization of work and flexible intergroup cooperation within and outside the organizations. This is reflected in the duality between the need for highly articulated local perspectives that make up the communication and knowledge-creation tissue of each community, and the need for sharing cultures and instruments that allow communication across different units (Mark, Gonzalez, Sarini, & Simone, 2002).

The first aim of this article is to describe how, according to structuration theories, a centralized KM system can be replaced or supported by a distributed one, in which the fact of having multiple and specialized “local knowledge bodies” is viewed more as an opportunity to exploit than as a problem to solve. The second aim of this article is to present a specific approach to designing systems for managing knowledge distributed across different units, called distributed knowledge management (DKM), whose principles and main concepts will be introduced and explained in the second part of this article.

BACKGROUND

Even though current KM systems use different technologies, tools, and methodologies (for in-depth discussion, see Davenport & Prusak, 1997; Nonaka & Takeuchi, 1995; Stewart, 2001; Wenger, 1998), most projects eventually lead to the creation of large and homogeneous knowledge repositories, in which corporate knowledge is made explicit and is collected, represented, and organized according to a single, supposedly shared, vision. Such a vision is meant to represent a shared conceptualisation of corporate knowledge, and thus to enable communication and knowledge sharing across the constellation of units composing the entire organization. All these activities are based on the common assumption that raw forms of knowledge, called implicit knowledge by Nonaka and Takeuchi, and tacit knowledge by Polany (1966), can be “cleaned up” from all contextual elements, and that the resulting “objective form” of knowledge can be explicitly represented in an abstract (independent from the original context) and general (applicable to any similar situation) form. This standard architecture of KM systems reflects a traditional view of management, in which managers try to centralize the control on the company processes by allocating and distributing resources and tasks to employees, and monitoring the proper execution of tasks and use of resources. This view of the managerial function leads to an approach to KM where processes of knowledge (resource) production and dissemination (tasks) must be centrally driven (allocated) and controlled (monitored). This condition is met only if knowledge is thought of as an object, which can therefore be kept separate from the people who produce it. Otherwise, as far as knowledge remains embedded within subjective dimensions, it becomes a resource that falls outside the boundaries of managerial control.

The typical outcome of this kind of vision is the creation of an EKP, namely, an interface (Web based) that provides a unique access point to corporate knowledge (Davenport & Prusak, 1997). Such an architecture is generally based on the following:

- technologies like content management tools, text miners, search engines, and so forth, which are used to produce a shared view of the entire collection of corporate documents
- common formats, such as HTML (hypertext markup language), XML (extensible markup language), and PDF (Portable Document Format), which are used to overcome the syntactic heterogeneity of documents from different knowledge sources
- chats and discussion groups, which are used to enable social interactions

Most business operators claim that this traditional approach is the right answer to the needs of managing corporate knowledge. However, many KM systems are deserted by users, who instead continue to produce and share knowledge as they did before, namely, through structures of relations and processes that are quite different from those embedded within the corporate-wide KM system. For instance, workers continue to use nonofficial tools such as shared directories, personalized and local databases, and so on (Bonifacio, Bouquet, & Cuel, 2002; Bonifacio, Bouquet, & Manzardo, 2000). In theory, KM systems are sold as systems that combine and integrate functions for the contextualized handling of both explicit and tacit knowledge throughout the entire organization or part of it. But, in practice, traditional KM systems manage knowledge according to a technology-oriented approach, which considers the cleaned-up and objective knowledge as the good and sharable knowledge (best practices, documentations, etc.) within the firm and among companies. In spite of the declared intention of supporting a subjective and social approach (through community and groupware applications), the way most KM systems are designed embodies an objective view of knowledge and reflects a marginal notion of sociality. In other words, KM systems aim at managing knowledge in an abstract, general, and context-independent form without taking into account the fact that knowledge is dependent on the context of production (the particular viewpoint of the individual), is embedded within subjective dimensions (the daily practice of work), and is not straightforwardly replicable.

Many authors who stressed the subjective nature of knowledge argued also that meanings are not externally given; rather, individuals give meaning to situations through subjective interpretation. Interpretation is subjective since it occurs according to some internal interpretation schema not directly accessible to other individuals. These schemas have been called, for example, mental spaces (Fauconnier, 1985), contexts (Ghidini & Giunchiglia, 2001; McCarthy, 1993), or mental models (Johnson-Laird, 1992). Internal schemas can be made partially accessible to other individuals through language since language is not just a means to communicate information, but also a way of manifesting an interpretation schema. As a consequence, when interpretation schemas are deeply different, people will tend to give a very different meaning to the same facts. Conversely, in order to produce similar interpretations, people need to some extent to share interpretation schemas, or at least to be able to make some conjectures on what the other people's schemas are. For in-depth discussion, see the notions of paradigms in Kuhn (1970), sociotechnical frames in Goffman (1974), and thought worlds in

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