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MANAGING THE KM TRADE-OFF:
KNOWLEDGE CENTRALIZATION VERSUS
DISTRIBUTION

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2003

Managing the KM Trade-Off: Knowledge Centralization *versus* Distribution

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Abstract: KM is more an archipelago of theories and practices rather than a monolithic approach. We propose a conceptual map that organizes some major approaches to KM according to their assumptions on the nature of knowledge. The paper introduces the two major views on knowledge –objectivist, subjectivist - and explodes each of them into two major approaches to KM: knowledge as a market, and knowledge as intellectual capital (the objectivistic perspective); knowledge as mental models, and knowledge as practice (the subjectivist perspective). We argue that the dichotomy between objective and subjective approaches is intrinsic to KM within complex organizations, as each side of the dichotomy responds to different, and often conflicting, needs: on the one hand, the need to maximize the value of knowledge through its replication; on the other hand, the need to keep knowledge appropriate to an increasingly complex and changing environment. Moreover, as a proposal for a deeper discussion, such trade-off will be suggested as the origin of other relevant KM related trade-offs that will be listed. Managing these trade-offs will be proposed as a main challenge of KM.

Keywords: Intellectual Capital, Knowledge Markets, Mental Models, Communities of Practice, Retrospective Rationality, Bounded Rationality, Constructivism, Organizational Trade-offs.
Categories: A.0, A.1, H1.0, H.1.1

1 Introduction

It is quite evident that Knowledge Management (KM) today is more an archipelago of loosely connected and often contradictory theories and practices, rather than a coherent framework to support organizations in managing their knowledge. Moreover, it is clear that every approach is rooted within often implicit (but recognizable) epistemological assumptions about the very nature of knowledge. Such an epistemological reading of the different KM approaches, although well rooted in the KM literature (see for example [Nonaka, 95] and [Drucker, 94]), is obviously a major one, if we consider that KM aims at managing a resource whose nature has being debated for long and that is still, perhaps more than ever, object of a strong philosophical, cultural, and social debate. As we will suggest, such debate has implications that go far beyond a mere philosophical reading. In fact, different epistemological assumptions lead to very different answers on how knowledge and

learning must be organized, and on what is the role of management and technology. Moreover the exploration of the relationship between the very nature of knowledge and its organization, can provide not just a lens in order to explain the coexistence of heterogeneous approaches to KM. It also represents a chance to discover a type of issue which is particularly relevant to managers that have to make decisions; it hides a trade-off between two very valuable opportunities that implicate very undesired consequences. In particular, we claim that each epistemological view and KM approach can be considered as an "archetype" that responds to different, and often conflicting, needs. On the one hand, the need to maximize the value of knowledge through its replication leads to objectification-codification, whereas, on the other hand, the need to keep knowledge appropriate to an increasingly complex and changing environment leads to subjectification-contextualization. From a managerial stand point, this phenomenon should be red as a "good new": KM is more likely to be considered as a challenging managerial discipline since it deals with the capacity to choose, balance, compromise, and find an equilibrium between conflicting but valuable issues.

2   Objectivist Approach: knowledge as content

A first macro-approach to KM, which we call the rational objectivistic approach, has its organizational roots in the theory of rational decision making. In its "classic" version, this theory sees knowledge as an objective, non-problematic resource, whose availability and transparency is taken for granted. Later versions of the theory, inspired by Simon's work on bounded [Simon, 72] and procedural [Simon, 76] rationality, made clear that human beings have a limited capacity of elaborating information, that acquiring information costs money, and thus the information available when making a decisions is necessarily limited. In both versions, however, knowledge is viewed as an "object" or content that can be stored and used in a non problematic way, independently from subjectivity of producers and consumers.

Two are the major KM views that can derive from the objectivist-rationalistic perspective: the "knowledge as a market" approach, and the "knowledge as intellectual capital" approach.

2.1   Knowledge as a market

In analogy to what was proposed by [Hayek, 48], computational and cognitive boundaries lead people to manage knowledge through markets. Market mechanisms, in fact, are able to bring to each actor the needed piece of information in the right moment. Prices are proposed as an example of mechanism that provides decision makers with enough (even though not complete) information in order to take rational decisions. For example, a shock in oil supply means, for some reason, that oil becomes more scarce; from the perspective of a market buyer, higher prices are the informative vehicle that instantaneously provides him with the needed quantity of information. Through the market organizational form, the whole knowledge can be managed by the system without assuming that one needs to know everything.

Such perspective is reflected in all those theories of KM that see a KM systems as a sort of knowledge market (see e.g. [Davenport, 00]), populated by producers/

manufacturers, intermediaries and consumers of knowledge. The goal of a KM system is therefore that of bringing down the barriers which prevent such a market from becoming efficient. This means that one has to increase the completeness of information (making explicit the real value of knowledge), to overcome the information asymmetries (some have better access to knowledge than others), and to avoid localisms (knowledge can be shared across remote businesses).

The need to overcome or push forward the limits of rationality has emphasized the role of those information and communication technologies that can be used to strengthen and extend the human cognitive capabilities. [Borghoff, 99] shows that organizations use technology to provide its members with tools that allow them to increase the power to map, codify and transfer knowledge: thus, for example, information retrieval and text mining tools are used to facilitate the acquisition of new information from large bodies of documents, data mining tools are used to extract regular patterns from large collections of data, knowledge repositories and knowledge bases are used to expand the memory capacity, ontology and representation languages are used to improve the codification of information, document management and publishing technologies are proposed to facilitate the dissemination of knowledge.

2.2   Knowledge as Intellectual Capital

From another perspective, bounded rationality leads to the need of considering knowledge for the purpose of decision making in terms of local, rather than global, optimality. Since the acquisition of information has a cost that could be higher than the marginal outcome of its use, people need to rely on working heuristics and procedures when making decisions. In this sense, managing knowledge for decisions means reusing those solutions that worked in the past, even though the reasons why they work are not always clear, and as long as the value of each reuse is lower than the cost of acquiring additional information. Such a perspective seems to be collected by those approaches to KM that view knowledge as an asset that needs to be reused by the organization. In particular, the school of intellectual capital [Stewart, 97]; [Sveiby, 00] argues that people, through their activity, generate working solutions that are embedded, for example, in social relationships with customers and partners, procedures on how things must be done, and structures that tell to people who can do what. The simple production of such a knowledge has already generated a cost, visible in the organization balance statement. On the other hand, it still contains a potential value given by its reuse in similar situations. This intangible value –the intangible capital- is not visible in the organization's formal accounting documents, but is recognizable by the difference between the value of the tangible assets, and the market value of an organization. In order to exploit the value of the organizations' intangibles, knowledge must be codified, spread and reused across the entire organization.

From an IT perspective, this view emphasizes the role of knowledge bases that become the driving metaphor of knowledge as a resource that must be codified and reused in order to exploit its value. Moreover, since the IT revolution dramatically decreased the variable cost of information communication, it opened the opportunity to maximize the rate of information replication. In other words, the more the cost of communicating information decreases, the more there is an incentive to replicate information to each potential user that, through its use, can generate some value.

3   Subjective Approach: knowledge as context

A second macro-approach to KM, which we call knowledge as context, stresses the subjective nature of knowledge and its strong dependency on a social and a cognitive dimension. In general, the epistemological focus is shifted from a notion of knowledge as general and abstract content, to those interpretative "premises" within which a "piece" of content gets a meaning, this way becoming knowledge. In this sense, knowledge is described as a double face matter, made of content –such as traditional scientific statements, within an appropriate context – such as theories[1].

The contextual nature of knowledge has been described according to two main perspectives. The first one underlines the cognitive nature of interpretation, and views knowledge as a phenomenon that manifests itself mainly in terms of mental constructs (knowledge as mental models). The second underlines the social nature of interpretation and represents knowledge as a phenomenon that manifests mainly in terms of social relationships (knowledge as a practice).

3.1   Knowledge as mental models

The cognitive approach has its roots in the phenomenological-cognitive theory of organizations. These theories stress that the problem of rationality does not lie in the limited quantity of available information, but rather in the fact that the meaning of a piece of information changes according to the actor's goals and beliefs. Information is interpreted, and not simply received. The problem of knowledge is thus shifted from uncertainty to ambiguity, that is, from the problem of deciding when there is a lack of information (Simon) to the problem of deciding when information is abundant, but its meaning is ambiguous. Such a perspective, brought to its organizational consequences by [March, 91], underlines how people and organizations act on the basis of their roles and identities, and not on the basis of prospectively assessed goals. Rather on the contrary, goals are defined ex-post, once an action has been executed and some new situation has been achieved. Quoting March, organizations are seen as garbage cans, that is to say, collections of existing solutions seeking for new problems. In this sense, knowledge is viewed as a tool to celebrate and justify decisions, rather than a matter that describes a world in order to take a correct action.

March's critic opens the way to the constructivist approach, proposed by [Weick, 84], who moves the attention from interpretation to sense making processes. While the former assumes that there is an external world that needs to be interpreted through cognitive constructs, the latter stresses that through interpretation we act on the world and we modify it. The intrinsic ambiguity of an environment is now viewed as an opportunity to interpret a situation from a point of view and to change the world

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[1] In general, in this epistemological view the contextual layer is viewed as an intrinsically subjective construct that cannot be separated by people as an external matter. For example, a context is not the time and place where an event occurs, or the domain in which a statement is to be placed. Rather, it is a perspective through which events and statements are red, a lens that may change from person to person, from community to community. In this sense, the difference between content and context is not quantitative but qualitative; it is not an additional layer of facts that needs to be considered when interpreting some content, but rather an internal momentum through which facts, from the actor's perspective, gain sense [Giunchglia, 00].

accordingly. As a consequence, from a description of a given environment, knowledge becomes the tool both to retrospectively justify and prospectively construct reality (enactment).

As it is well described in [Senge, 90] and [Argyris, 02], a KM system must allow the emergence of those interpretation schemas and mental models that structure the way in which management perceives reality and, consequently, proceeds to action. The goal of such a process is to explicit the subjective nature of the current beliefs and business theories, to modify these models and thus act in a different way, and to encourage the communication and sharing not only of information, but also of those mental models underlying the interpretation of information. These KM solutions are characterized on the one hand by a higher complexity and "volatility" of the issues they deal with (e.g. the mental models, the vision) and, on the other hand, by a stronger impact on traditional organizational structures. For these reasons, these solutions become often the basis of methodologies (which have become fashionable in the 90s), which aim at making the top management aware of new methods of business leadership based on recommendations mainly focused on reasoning about, and exploiting mental models [Senge 1990] [Argyris, 02] [2].

3.2   Knowledge as practice

The other subjective approach to organizational knowledge, which we call the pragmatic approach, has its roots in the social theories of organizational learning, namely in the study of organizational cultures and the influence of social factors (such as the feeling of belonging to something, trust, and identity) on organizational dynamics. These studies, in a first phase, operated within the conception of sociality as a constraint to be taken into account in the designing and development of rational organizations (as in the case of the so-called human relations schools – see e.g. [Mayo, 34]). Here, learning is viewed as information acquisition, and sociality as a dimension that needs to be managed in order to improve traditional learning. However, a radically alternative approach emerged which envisions sociality as an intrinsic factor that determines the very nature of organizational learning tout-court. The strong link between knowledge and sociality was brought forward by several authors (see, e.g., [Brown, 91], [Lave, 90]), and is based on the idea that, in its essence, knowledge has a practical nature. In other words, knowledge, far from being an abstract matter based on a factual representation of reality, is closely linked to the context of social practices which are created, generated, and reshaped within a certain community. It is only by knowing the group dynamics and habits, that the outspoken and traditional knowledge acquires significance. Therefore learning, viewed as a

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[2] An interesting view that brings the cognitivist-subjective approach to its extreme is proposed by [Vopel, 03]. Basically, since knowledge is not a means to describe reality but rather a tool to reduce decisional ambiguity and celebrate actions, it is no longer relevant to have the "right" knowledge. What is relevant is to act, and to have some "knowledge" able to drive people's confidence on the goodness of a decision. In KM terms, since an ambiguous reality is not describable at all, this view leads to a solution similar to the one proposed by the intellectual capital approach, in which "centralization and control of the knowledge base(s)" and the building of "a single perspective" is a good KM strategy. But the reason is quite different; centralization becomes a means to merely legitimate actions; no matter what knowledge base or perspective is adopted.

generative process of creating a practice, is carried out first of all through active participation (engagement), and then internalized and transmitted through the practices of a community.

In KM terms this vision[3] brings the attention onto the social nature of practical knowledge, this way stressing the collective, rather than the individual, dimension of knowledge creation [Wenger, 98]. People participate to informal communities in which they learn through practice, and generate knowledge by contributing to the update and modification of these practices. Therefore, a KM system cannot aim only at making explicit the implicit knowledge of individuals, but rather at facilitating the creation and social dissemination of practical knowledge. This happens by encouraging the creation and vitality of the Web of informal relationships, which feeds the system of communities of practice also through the use of open, weakly structured and mainly collaborative technologies (like groupware systems), capable of supporting the creation of traditional, or even virtual communities[4].

4   Managing KM Trade-offs

As a discussion hypothesis, we propose that the heterogeneity that characterizes the different KM approaches derives not just from different views on knowledge; rather they represent the expressions of a "natural", unsaid, and typically unintentional, debate around the dualistic nature of knowledge that happens within organizations. In other words, we believe that the "ontological dualism" between subjectivity and objectivity is not simply a matter of debate on the foundations of KM, but a real contradiction afflicting researchers and practitioners whose task is to manage knowledge within complex firms. In particular this ontological dualism manifests itself in terms of a very concrete trade-off between two opposite needs. On the one hand, managers need to foster value and control, and try to achieve the latter through knowledge standardization and the former through knowledge replication. Such a need is legitimated by an objectivist approach to KM, and drives actions oriented towards the creation of centralized repositories and efficient communication networks. On the other hand, managers face the need, expressed by organizational communities, to keep knowledge appropriate to context specific business environments. Such a need is legitimated by a subjectivist approach to KM, and

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[3] The view of knowledge as practice generated another famous approach, due to the work of [Nonaka, 95], that brought the attention of companies to the concept of implicit knowledge: knowledge created by individual workers, and therefore strongly dependent on the personal experience of its producers, can become of great value to the company through a process of explicitation, refinement and crystallization. This way, drawing a conclusion similar to those that belong to the objectivistic tradition, knowledge can be transformed into a general and abstract object, that can then be applied and re-used in contexts, which are different from the original one.

[4] Compared to Nonaka's approach, communities of practice had a greater impact on concrete KM solutions and techniques since the former proposes a very costly process of knowledge exploitation, based on putting a manager side by side with workers. On the other hand, a common managerial interpretation of the community-based approach, supports a vision in which knowledge workers, independently from the organizational will or desire, participate to the processes of exploitation simply by taking part in the life of their community.

drives actions oriented towards the enablement of informal networks, and the recognition of the value generated by semantic specialization and differentiation. The ontological dualism becomes a trade-off if we consider how the two tendencies generate conflicting side effects: while standardization tends to reduce appropriateness, contextualization tends to reduce replicability. In fact, as underlined elsewhere [Bonifacio, 02], in complex environments standard knowledge tends to become useless since too general to be applied and generate value. On the other hand, highly contextual distributed "knowledges" tend to be "solipsistically" owned by communities and organizations in order to merely justify their actions; each "knowledge" becomes unable both to represent some reality and to be communicated to another community. As a consequence, complex firms that face heterogeneous environmental conditions, such as PSFs [Bonifacio, 00], are likely to promote, more or less intentionally, both types of approaches as appropriate answers to the need/opportunity to crystallize knowledge through centralization (in stable or controllable environments), and the need/opportunity to mobilize it through distribution (in uncontrolled and dynamic settings). Moreover we propose that this fundamental trade-off is the basis of some other relevant ones:

> ? Replicability vs appropriateness: as said, the former is sustained by heterogeneity (distribution) while the latter by standardization (centralization);
> ? Innovation vs improvement: while the former is sustained by heterogeneity (availability of alternative solutions) the latter by standardization (consolidation of existing ones);
> ? Diversification vs specialization: while the former is sustained by innovation (new capabilities) the latter by improvement (better capabilities);
> ? Efficacy vs efficiency: while the former is sustained by diversification (more chances to achieve a goal), the letter by specialization (optimize the use of resources).

In managerial terms, our thesis entails that the role of knowledge managers should be mainly focused on balancing the KM related trade-offs; in this sense, a good knowledge manager must be able to tune centralization vs distribution dynamics on the basis of a pragmatic evaluation of environmental conditions, privileging the former in stable conditions, and the latter in turbulent settings. Moreover, it is a challenge to identify organizational processes that are able to systematically and extensively manage and balance such a dynamics.

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