Towards a Technological, Managerial, and Socio-technical Well-balanced KM Initiative Strategy within Organizations

Michel Grundstein
MG Conseil, Nogent sur Marne, France
LAMSADE Paris Dauphine University, Paris, France
mgrundstein@mgconseil.fr

Keywords:
Knowledge Management (KM), Individual’s tacit knowledge, Commensurability of Individual’s Interpretative Frameworks, Strategic KM Initiative Orientations Phase, Information Tacit and Explicit Knowledge Process (DITEK Process).

Abstract:
In this paper, following a constructivist approach that is deeply rooted in our pragmatic experience within a large industrial Company, we argue that Knowledge is not manageable as if it was data or information. This leads to suggest KM as the management of activities and processes that help organization’s support and business processes enhancing their capabilities to utilize and create knowledge, more than focusing on knowledge itself. This change of paradigm induces to conceive a technological, managerial, and socio-technical well-balanced KM initiatives strategy. This pragmatic vision needs thinking about the architecture of an Enterprise’s Information and Knowledge System (EIKS), which must be a basis of discussion during the strategic orientation phase of a general KM initiative.

1. Introduction

In the foreword of the book untitled “The New Age in Knowledge” (O’Dell and Hubert 2011) Larry Prusak describes some of the main principles focused on knowledge management at the beginning days (p. xi): i) Knowledge is a fixed pool, a collection of resources that can be measured and used by standard management techniques; ii) Technology is the key tool to unlock the value of this resource – more technology, the better; and iii) Individuals are the critical unit of analysis in working with knowledge – the more productive the individual is the more knowledge is being used. He concludes: “It is now clear in hindsight that these principles were developed with information in mind, not knowledge, and that they were not at all suitable to working with such elusive intangible. It is because of these ideas that many knowledge management efforts ran into problems and that the whole subject began to fade in the minds of busy executives.”

However, although it does not always get the expected outcomes when put at work in organizations, the positivist paradigm of KM, influenced by computer science and information technology, is the most implicit recognized paradigm by researchers and practitioners in KM until now.

From our viewpoint, this paradigm needs to be enlarged to a general view resting on a constructivist paradigm

In this paper we put down background theory and assumptions; notably, we introduce the concept of “commensurability of interpretative frameworks,” and we propose an empirical model (DITEK) that attempts to describe the transformation process from data to information and from information to tacit and explicit knowledge. Then, we suggest a constructivist paradigm of KM within organizations based on three fundamental postulates. This leads to envisage new KM perspectives and to sketch out the architecture of an enterprise’s information and knowledge system (EIKS). Finally, we propose a well-balanced KM initiative strategy within organizations

2. Background Theory and Assumptions

2.1 Research motivations, method, and objectives

Our research follows a constructivist paradigm that is deeply rooted in our pragmatic experience in the real field. As a practitioner having to manage deployment of innovative technologies (such as
computer aided design, knowledge based systems, and others) in large companies just when these
technologies were conceived into universities and laboratories, we observed that we always needed
to elaborate a model with socio-technical perspectives, which could be used as a pattern of reference
for all stakeholders in order to engender the essential learning process that leads people to
appropriate and use these technologies. Later on, when becoming Associate Researcher in the
domain of KM, we perceived the lack of general model of KM that integrates socio-technical
perspectives. This point of view is often disregarded when considering the technical approach of KM,
although hundred of frameworks can be found in the literature (CEN-CWA 14924-1, 2004). As a
practitioner we always had to consider the constructivist paradigm that underlies the creation
of knowledge, and consequently KM approach. As a researcher we always had to be confronted with the
positivist paradigm that most often considers knowledge independently of its links with action, and the
context of organizations. Thus, our researches, notably in the domain of KM, are continuously
oriented towards a well-balanced use of positivist and constructivist paradigms within organizations.

2.2 The dominant positivist paradigm of KM

Numerous authors analyzed the notions of data, information and knowledge. Let us quote notably
Davenport and Prusak (1998, pp.1-6), Sena and Shani (1999), Takeuchi, and Nonaka, (2000), Amin,
makes the following synthesis: “The developing practice of knowledge management has seen two
different approaches to definition; one arises from information management and sees knowledge as
some higher-level order of information, often expressed as a triangle progressing from data, through
information and knowledge, to the apex of wisdom. Knowledge here is seen as a thing or entity that
can be managed and distributed through advanced use of technology…The second approach sees
the problem from a sociological basis. These definitions see knowledge as a human capability to act
(pp. 241-242).”

The dominant positivism paradigm of KM is implicit in the DIKW (Data-Information-Knowledge-
Wisdom) hierarchy model. This model induced numerous computers and information researches. For
example, (Rowley, 2007) revisiting the DIKW hierarchy by examining the articulation of the hierarchy
in a number of widely read textbooks in information systems and knowledge management preferably
published in 2003 and later, noted that “there is a consensus that data, information and knowledge
are to be defined in terms of one another, although data and information can both act as inputs to
knowledge; the tangle of concepts can be explored at two levels – the relationship between data and
information, and the relationship between information and knowledge p.174);” and she raised the
question: “Is there a sharp divide between data, information and knowledge, or do they lie on a
continuum with different levels of meaning, structure and actionability occurring at different levels (p.
175)?”

More recently, (Muller and Maasdorp 2011) point out the dominance of the DIK model in information
science. They have three conjectures as to why knowledge management practitioners and authors
prefer the DIK model. The first one concerns information theory background, the second one is about
simplicity, and the third one rests on accumulative worldview. Their ideas are closely akin to ours.
Let’s quote some of their conjunctures: “the first possible explanation for the dominance of the DIK
model in KM is that it is an effect of background in information theory or communication theory of
the practitioner or the author; the second conjecture is that simplicity counts in management and that this
has the effect of privileging a theoretical position that is clearly linked to a working and productive
legacy in information system but more importantly, clears up the messy situation of exactly
understanding the notion of knowledge in organizations; the third conjecture is painted on an even
broader canvas. If one has a worldview that is cumulative and sees the world as consisting of
innumerable little bits (now not in the technical sense) of matter that all add up to the while by the
process of accumulation and simple organization and categorization, then a data information
knowledge model would make sense…That means that a mechanistic and positivist worldview is to
be found at the base of the easy acceptance of the DIK model.”

In fact, we think that, beyond all these studies, we have to position our thoughts in the contextual field
where the notion of data, information, and knowledge are used: in our case, the field of enterprises
and more generally organizations. That leads to conceive how the transformation process should be envisaged using the concept of commensurability of interpretative frameworks highlighted by (Tsuchiya 1993).

2.3 The concept of commensurability of interpretative frameworks

2.3.1 Creation of Individual's Tacit Knowledge

Our approach is built upon the assumption emphasized by Tsuchiya concerning knowledge creation ability. He states, “Although terms ‘datum’, ‘information’, and ‘knowledge’ are often used interchangeably, there exists a clear distinction among them. When datum is sense-given through interpretative framework, it becomes information, and when information is sense-read through interpretative framework, it becomes knowledge (p.88)”. In other words, we can say that tacit knowledge that resides in our brain results from the sense given, through our interpretative frameworks, to data that we perceive among the information transmitted to us. Or rather, Knowledge exists in the interaction between an Interpretative Framework (incorporated within the head of an individual, or embedded into an artifact), and data.

In a different way, Wiig (2004) who highlights a discontinuity between information and knowledge describes this process clearly. He states, “The process, by which we develop new knowledge, uses prior knowledge to make sense of the new information and, once accepted for inclusion, internalizes the new insights by linking with prior knowledge. Hence, the new knowledge is as much a function of prior knowledge as it is of received inputs. A discontinuity is thus created between the received information inputs and the resulting new knowledge (p. 73).”

Consequently, we postulate that knowledge is not an object processed independently of the person who has to act. So, we can say that formalized and codified knowledge that are independent from individual, are not more than information. Furthermore, as emphasized by Haeckel (2000) we must discern “the knowledge of knower and the codification of that knowledge (p. 295).”

2.3.2 Conditions for considering information as knowledge

Tsuchiya emphases how organizational knowledge is created through dialogue, and highlighted how “commensurability” of the interpretative frameworks of the organization’s members is indispensable for an organization to create organizational knowledge for decision and action. Here, commensurability is the common space of the set of interpretative frameworks of each member (e.g. cognitive models or mental models directly forged by education, experience, beliefs, and value systems). Tsuchiya states “It is important to clearly distinguish between sharing information and sharing knowledge. Information becomes knowledge only when it is sense-read through the interpretative framework of the receiver. Any information inconsistent with his interpretative framework is not perceived in most cases. Therefore, commensurability of interpretative frameworks of members is indispensable for individual knowledge to be shared (p. 89).”

Consequently, information can only be assimilated to knowledge when members having a large commensurability of their set of interpretative frameworks commonly understand it in the same way. In that case, we call it “information source of knowledge for someone.” Such is the case for members having the same technical or scientific education, or members having the same business culture. In these cases, formalized and codified knowledge make the same sense for each member; that enables to speak of knowledge bases, and flows of knowledge. However, one must take into account that interpretative frameworks evolve in a dynamic way: they are not rigid mindsets. Especially, when considering that, as time is going on, contexts and situations evolve. Thus, the contribution of scientific results, techniques and new methods, the influence of young generations being born with Web (Y generation or Digital Native), the impact of identity crisis and multiple cultures, modify the interpretative frameworks, and create a gap between individuals’ commensurability of interpretative frameworks.

3. From data to information, and tacit and explicit knowledge: the DITEK process model

Relying to the theories and assumptions set out above, we elaborated a model that attempt to describe the transformation process from data to information, and from information to tacit and explicit
knowledge. This model, called DITEK process model, describes at a first level the relationship between data and information, and at a second level the relationship between information, and tacit and explicit knowledge. Contrary to the idea of continuum between the concepts of data, information, and knowledge induced by the DIKW hierarchical model, DITEK process model shows a discontinuity between these concepts.

At a first level, we have to consider the relationship between data and information. This level must be thought as a basic process where data are discrete raw elements perceived, gathered, and filtered by a person before to be aggregated, supplemented, and organized into information. Let’s describe the transformation process (Figure 1).

**Figure 1:** DITEK process model level 1: From data…to information

A sender P₁ is acting in specific context and situation at time T₀. P₁ has pre-existing interpretative frameworks, previous tacit knowledge, and intentions. In an information creation phase, P₁, has direct access to a set of data outside himself. Then, P₁, according to a sense-reading process - that depends of his pre-existing interpretative frameworks activated depending of his context, his situation, and his intentions, filters some of these data that take sense for him. At the same time, a sense-giving process using P₁’s previous tacit knowledge enables P₁ to aggregate, supplement and organize selected data into information I(P₁,T₀). Once created this information becomes a static object independent from P₁, and time. It is this information that is passed-on by the individuals or by means of the digital information system (DIS) where it is stored, treated and transmitted as a stream of digital data. During this process, P₁’s pre-existing interpretative frameworks are not changing; previous tacit knowledge can be reorganized and modified into new tacit knowledge.

At a second level, we have to consider the relationship between information, and tacit and explicit knowledge. This level is in rupture with the first one, it presupposes that information already exists whatever are time and context in which it was created. Let’s describe the transformation process (Figure 2).
Figure 2: DITEK process model level 2: From information...to tacit and explicit knowledge

At a later stage of the first level process, at time $T_n$, when $P_2$ perceives the information $I(P_1, T_0)$ during a reception, self-reflection and observation phase, this information $(P_1, T_0)$ is captured by $P_2$, who is in different context and situation than $P_1$ who elaborates it. $P_2$ has his own intentions. Then, $P_2$ according to a sense-reading process, interprets this information $(P_1, T_0)$, filtering data through his pre-existing interpretative frameworks activated depending of his context, his situation, and his intentions.

At the same time, a sense-giving process that uses $P_2$'s previous knowledge operates, and engenders new tacit knowledge. That's the way that changes $P_2$'s pre-existing interpretative frameworks, and enriches $P_2$'s previous tacit knowledge enabling $P_2$ to understand his situation, identify a problem, find a solution, decide, and act. The results of this process are modified interpretative frameworks, and new tacit knowledge.

The process of transformation of information into tacit knowledge is a process of construction of knowledge. Created knowledge, can be very different from one individual to another when the commensurability of their interpretative frameworks is small, whatever are the causes of it. There are large risks that the same information takes different senses for each of them, and consequently generates a construction of different tacit knowledge in the head of the decision process stakeholders.

Unlike the information, knowledge is dynamic. Once constructed it cannot be considered as an object independent from the individual who built it, or the individual who appropriates it to make a decision and to act.

Later on, at time $T_{n+1}$, when $P_2$ as a sender communicates with a receiver $P_3$ during a tacit knowledge articulation phase, a sense-giving process enables $P_2$ to articulate a part of his new tacit knowledge into explicit knowledge that is no more than information $I(P_2, T_{n+1})$ for $P_3$.

As a result one can understand the importance to clearly distinguish static factual information, which allows describing the context and the situation that raise a problem, from the tacit knowledge of the individual who processes this information to learn and get knowledge he needs to carry out his tasks.

Consequently, paraphrasing (Kautz and Kjaergaard 2008) if technology provides the possibility of making information available across time and space (p. 49), we always have to keep in mind the role of individual in the knowledge sharing process, but we do also pay attention to how individual uses technology to share knowledge (p. 43).

Our approach is inspired by a KM constructivist paradigm. It induces to consider tacit and explicit
knowledge as the outcome of a sense-giving process that involves people engaged in actions, and mainly depend on the organizational context. It implies three fundamental postulates and leads to a definition a KM focused on activities and processes opening on Technological, Managerial, and Socio-technical Well-balanced KM Initiative Strategies within Organizations

4. A constructivist paradigm of KM

4.1 Three fundamental postulates

Our observations and experiments within the industry, led us to set forth three postulates: (i) Knowledge is not an object; (ii) Knowledge is linked to the action, and (iii) Company's knowledge includes two main categories of knowledge. We define these postulates below.

4.1.1 Knowledge is not an object

Knowledge exists in the interaction between an interpretative Framework (incorporated within the head of an individual, or embedded into an artifact), and data. This postulate comes from the assumption emphasized by Tsuchiya (1993) concerning tacit knowledge creation ability.

4.1.2 Knowledge is linked to the action

From an organization perspective, knowledge is created through action. Knowledge is essential for the functioning of support, and value-adding processes (Porter, 1985). Activities contributing to these processes utilize and create knowledge. Thus, the actions finalize the organization's knowledge. This viewpoint takes into account the context and the situation, which allow utilizing and creating knowledge. In particular, we must analyze the role of the actors - decision-makers - involved with these activities in order to achieve the organization's missions. Therefore, knowledge is linked to their decisions, their actions, and their relations with the surrounding systems (people and artifacts).

4.1.3 Company's knowledge includes two main categories of knowledge

Within organizations, knowledge consists of two main categories: on the one hand, explicited knowledge includes all tangible elements (we call it “know-how”); and on the other hand, tacit knowledge (Polanyi, 1966), includes intangible elements (we call it “skills”). Tacit knowledge can or cannot be articulated into explicit knowledge. The tangible elements are collective knowledge. They take the shape of formalized and codified knowledge in a physical format (databases, procedures, plans, models, algorithms, and analysis and synthesis documents), or are embedded into automated management systems, in conception and production systems, and in products. The intangible elements are inherent to the individuals who bear them, either as collective knowledge - the “routines” that are non-written individual or collective action procedures (Nelson and Winter, 1982) or personal knowledge (skills, crafts, “job secrets”, historical and contextual knowledge of environment, clients, competitors, technologies, and socio-economic factors).

4.2 Knowledge management perspectives

Relying to the postulates mentioned above, it appears that, KM addresses activities, which utilize and create knowledge more than knowledge by itself. With regard to this question, since 2001, our group of research has adopted the following definition of KM (Grundstein and Rosenthal-Sabroux, 2003):

“KM is the management of the activities and the processes that enhance the utilization and the creation of knowledge within an organization, according to two strongly interlinked goals, and their underlying economic and strategic dimensions, organizational dimensions, socio-cultural dimensions, and technological dimensions: (i) a patrimony goal, and (ii) a sustainable innovation goal” (p.980).

The patrimony goal has to do with the preservation of knowledge, their reuse and their actualization; it is a static goal. The sustainable innovation goal is more dynamic. It is concerned with organizational learning that is creation and integration of knowledge at the organizational level.

This definition of KM leads towards a technological, managerial, and socio-technical well-balanced KM initiatives within organizations referring to general model for knowledge management within organization so called MGKME (Grundstein, 2005a, 2007, 2008), which integrates managerial guiding
principles, *ad hoc* infrastructures, socio-technical environment, support and value adding processes, organizational learning processes, generic KM processes, and relevant methods and supporting tools.

Furthermore, distinguishing information from knowledge leads to conceive what we call Enterprise’s Information and Knowledge Systems (EIKS).

### 4.3 The enterprise’s information and knowledge system (EIKS)

#### 4.3.1 EIKS’ brief description

The enterprise’s information and knowledge system (EIKS) consists mainly in a set of individuals and digital information systems (Figure 3).

![Figure 3: The enterprise’s information and knowledge system (EIKS)](image)

EIKS rests on a socio-technical context, which consists of individuals in interaction among them, with machines, and with the very EIKS. It includes:

- A Digital Information Systems (DIS), which is artificial system, the artefact designed from information and communication technologies (ICT).
- An Information System (IS), constituted by individuals who, in a given context, are processors of data to which they give a sense under the shape of information. This information, depending of the case, is passed on, remembered, treated, and diffused by them or by the DIS.
- A knowledge System (KS), consisting of tacit knowledge embodied by the individuals, and of explicit knowledge formalized and codified on any shape of supports (documents, video, photo, digitized or not). Under certain conditions, digitized knowledge is susceptible to be stored, processed and spread with the DIS. In that case, knowledge is no more than information.

We insist on the importance to integrate the individual as a user and a component of the system as Chua and Brennan (2004) highlighted in their study on Collaborative Knowledge Management System (CKMS) design. They emphasized that “One of the most important components of CKMS is the knowledge workers, who are also the users of the system, and the workspaces they are associated with” (p.172). In fact, relying to our assumptions, we argue that knowledge resides primarily in the heads of individuals, and in the social interactions of these individuals.
4.3.2 An example of EIKS: The case of Community of Practice (CoP)

According to Wenger, McDermott and Snyder (2002), “Communities of practice are groups of people who share a concern, a set of problem, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis. ...These people don’t necessarily work together every day, but they may meet because they find value in their interactions. As they spend time together, they typically share information, insight and advice. They help each other solve problems. They discuss their situations, their aspirations, and their needs. They ponder common issues, explore ideas, and act as sounding boards. They may create tools, standards, generic designs, manuals, and other documents – or they may simply develop a tacit understanding that they share. However they accumulate knowledge, they become informally bound by the value that they find in learning together. This value is not merely instrumental for their work. It also accrues in the personal satisfaction of knowing colleagues who understand each other’s perspectives and of belonging to an interesting group of people. Overtime, they develop a unique perspective on their topic as well as a body of common knowledge, practices, and approaches. They also develop personal relationships and established ways of interacting. They may even develop a common sense of identity. They become a community of practice (pp. 4-5).”

CoP can be informal group of people as described above, or structured as corporate group in the firm that takes responsibility for some operational activities. Today, one can say that CoP greatly contributes to KM in our full meaning of the word. For example, let’s cite O’Dell and Hubert (2011): “Through more than a decade of APQC (American Productivity & Quality Center) research and experience, we have found that communities: provide the means to translate local know-how into global, collective knowledge; help employees exchange ideas, collaborate, and learn from one another; transcend boundaries created by workflow, functions, geography, and time; enable the speed and innovation needed for marketplace leadership; can integrate into fabric of your organization’s core work and value chains; can successfully align with formal governance structures (p. 62).”

However, whatever the nature of CoP is, the underlying group effort must be supported by a Digital Information System, which in that case is a Computer Supported Collaborative Work System. Thus, CoP can be seen as an EIKS that is group of people, interlinked through a digital information system, sharing information and transferring knowledge within a socio-technical context. Here, knowledge transfer must be understood as transmission, plus absorption and use of knowledge (Davenport and Prusack 1998 p.101). Consequently, in EIKS, the information and knowledge portals have become essential for the knowledge workers who have to share with colleagues disseminated all around the world. Furthermore, we must consider the impact of formal or informal groups when integrating CoP in KM initiative strategy.

Knowledge is dependent of the individual’s interpretative frameworks, and the context of his action. Consequently, as mental models and interpretative frameworks are directly forged by cultural factors, it induces to stress the role of cultural factors when social interactions, information sharing and knowledge transfer are essential to enable efficiency in the global economy. Therefore, the project manager should consider the individual (knowledge worker and decision-maker) both at once as a user, and a component of the EIKS. That is achieved by group efforts, notably by CoP organized as an EIKS.

5. A well-balanced KM initiative strategy within organizations

A general KM initiative shows willingness, at the highest level of the enterprise, to encourage all the steps, and to implement all the means leading to capitalize on knowledge to pull strategic advantages of it. Afterwards, we refer to our own studies about general KM initiative (Grundstein, 2005b).

There exist three main development phases: (i) The Strategic Orientation Phase which aim is to establish KM Initiative outline and agenda; (ii) Operational Management Phase which aim is to design and specify specific projects linked to capitalizing on knowledge problems; and (iii) Projects Deployment Phase which aim is to monitor and implement EIKS. For the purpose of this paper, we will focus on the first phase, the strategic orientation phase.
5.1 Strategic Orientation Phase

The strategic orientation phase of general KM initiative leads to establish KM initiative outline and agenda, taking into account priorities and available resources. It includes four steps (Figure 4): (i) Elaborating the Enterprise’s KM Vision; (ii) Aligning KM Strategy on Enterprise’s Strategies; (iii) Monitoring KM Maturity Study; and (iv) Establishing KM Initiative Program. Questions which must be considered focus notably on achieving alignment of the KM strategy on the organization’s strategy:

- How to articulate the general KM initiative with the Enterprise’s strategic orientations?
- How to make the Enterprise’s members, whatever are their hierarchical level, aware of KM interest for them, and the Enterprise?
- How to assess the Enterprise’s KM maturity and its capacity to implement KM projects?
- How to identify IS needs, KS needs, and EIKS needs?
- How to define the KM initiative outline, and the agenda?
- What are predictable impacts?
- How to gather constructive conditions?
- What are the activities to develop and promote?
- What are the indicators to set up?
- How to establish relevant organizational structures, and to attribute roles to stakeholders?
- How to create and support organizational learning processes leading towards more information sharing, and knowledge transfer?

Figure 4: The Strategic Orientation Phase

The strategic orientation phase is crucial and can avoid getting KM resources outcomes unused. We argue that, most of time, IT approach leads confusing notions of information and knowledge, and misunderstanding the goals: do we have to develop an Information System or do we have to implement an EIKS that integrate people as users and components of the system?

Therefore, the strategic orientation phase must help to build a general KM vision that makes a clear distinction between technology as a support to share individual’s tacit knowledge, and technology as a means to collect, store, and distribute explicit and codified knowledge that is no more than information. Beyond benchmarking studies, to deal with the strategic orientation phase, Enterprises need a Meta model that is a pattern of reference (a template) in order: (i) to integrate KM Governance principles (Grundstein, 2007, pp. 247-248); (ii) to adapt it to their own situation; (iii) to monitor KM Maturity study (Grundstein, 2008, p. 424); and (iv) to envision integrating Information systems and KM systems in the same both digital and human system that we call EIKS.
6. Conclusions and perspectives

Most of the time, the positivist paradigm of KM thought as a means to acquire, codify, store and disseminate knowledge, considers knowledge as an object, and so disregards the importance of individual’s tacit knowledge used in action. Although this paradigm of KM is greatly shared, without awareness, when elaborating KM initiative’s strategy, we can confuse the notions of information and knowledge. The constructivist paradigm of KM proposed in this paper is founded on the DITEK process model, and three postulates. It brings an open definition of KM focused on the activities and processes that enhance the utilization and the creation of knowledge within organizations; in doing so, it induces a well-balanced technological, managerial and socio-technical KM initiative strategy.

Changing the paradigm of KM induces an open definition of KM that leads to integrate the whole dimensions that should be involved in a KM initiative. Furthermore, distinguishing Information from Knowledge opens our mind on a different view of information systems: these systems based on Digital Information System (DIS) integrate people, both at the same time, as users and components of the system. This pragmatic vision needs thinking about the architecture of an Enterprise’s Information and Knowledge System (EIKS), which must be a basis of discussion during the strategic orientation phase of a general KM initiative.

7. References


