

A FIVE DIMENSIONS APPROACH OF KNOWLEDGE MANAGEMENT: THE CONCEPT, RESOURCE, ENTITY, PROCESS AND CAPACITY VIEW

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“Learning is a treasure that will follow its owner everywhere.”

Chinese Proverb

The rise of the service economy, the increasingly rapid flow of global information, and the growing recognition of the importance of intellectual capital and intellectual property rights are turning Knowledge into a key critical resource and a source of competitive advantage in the modern global economy and determine enterprises to develop a Knowledge Management framework, making from KM an evolutionary rather than a revolutionary development. Knowledge is bound to human beings and it is therefore impossible to digitalise. Once it is captured in an explicit form, it becomes information, which has no value by itself, in the absence of human interpretation. Knowledge workers generate outputs according to their internal structures as individuals rather than according to external rules or procedures. The present paper describes an approach of KM to HRM as a social creation emerging at the interface between people and information, structured on a five dimension view.

Key words: knowledge management, human resources management, knowledge workers, knowledge work analysis, explicit knowledge, tacit knowledge, inhibitors of knowledge management

1. Information in the Context of Knowledge

Improving the productivity of knowledge workers is one of the most important challenges for companies that face the transition from the industrial economy to an economy based on information and knowledge. (Drucker, 1999)

However, most Knowledge Management efforts have failed to address this problem and focused on information management instead. Information management is the collection and management of information from one or more sources and the distribution of that information to one or more audiences and much of the literature of KM continues to reflect a techno-centric focus, similar to that of information management, which in essence regards knowledge as an entity that can be captured, manipulated and leveraged. This is a limited perception that disregards the social characteristics of the employees and the realistic understanding of knowledge and its incorporation into the management of organizations, its awareness of a range of views on the concept, including perceptions of knowledge as an entity (and not simply as information), as a resource, as a capacity and as a process.

Therefore, the structure of the present paper is based on the *Concept, Resource, Entity, Process and Capacity View of the KM* and aims to present knowledge as a social creation emerging at the *interface between people* - engaged in communication, knowledge creation, sharing and learning - *and information*. From this operational perspective, KM can be described as the systematic processes by which an organization identifies, creates, captures, acquires, shares and leverages knowledge and is based on the *distinguishment between the concepts of information and knowledge*.

„Most of the traditional Knowledge Management Systems rely on the assumption that knowledge can be assimilated to objects that can be identified, separated from their initial context, and handled in information systems.” (Nabeth et al., 2002)

As knowledge is bound to human beings it is therefore impossible to digitalise. Once it obtains an explicit form, it becomes information. Information by itself is not useful, as “information (...)

is simply the vehicle by which we attempt to provoke - or evoke - a human response. Information on its own is quite static and lifeless. It simply exists - on multimedia computer screens, in text books, magazines, movies, TV, CDs, reports, letters, emails, faxes, memos and so on - all waiting to be interpreted, all waiting to have meaning attached - by people.” (Miller, 2002)

Information becomes useful when it is interpreted by people, what we will refer to as *knowledge workers*. Therefore, KM remains an abstract concept in the absence of understanding what knowledge workers do and how they use information and knowledge to create value, making possible for the issue of knowledge worker productivity to be addressed.

„When it comes to knowledge workers, we pretty much hire smart people and leave them alone. No quality measurements, no Six Sigma, no reengineering. We haven't formally examined the flow of work, we have no benchmarks, and there is no accountability for the cost and time these activities consume.” (Davenport, 2003)

Thomas Davenport and Laurence Prusak offer the following pragmatic description of knowledge in organizations:

„Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers.” (Davenport, Prusak, 1998)

The differences between the two concepts are presented in Figure 1.

Figure 1: Distinguishment between Information and Knowledge
(Sveiby, 1997, as cited in Miller, 2002)

Information	Knowledge
Static	Dynamic
Independent of the individual	Dependent on individuals
Explicit	Tacit
Digital	Analogue
Easy to Duplicate	Must be re-created
Easy to broadcast	Face-to-face mainly
No intrinsic meaning	Meaning has to be personally assigned

2. Knowledge Management – A Concept developed from Existing Practices

Knowledge Management is a new concept that has grown and developed from existing practices following an integrated approach of the *knowledge-information-knowledge worker sequence*. Many enterprises downsize to adapt to more competitive environments. But unless they have captured the knowledge of their employees, downsizing can result in a loss of critical information. Similarly, as employees leave, organizations are likely to lose access to large quantities of critical knowledge. And as companies expand internationally, geographic barriers can affect knowledge exchange and prevent easy access to information. These kind of contextual situations determine enterprises to explore and develop methods for knowledge management.

Figure 2 - Factors that determined the appearance of KM

Loss of Corporate Memory	Global Competition
Closer Relationships to Customers	Pace of change
Saving Time on Problem Solving	Stimulating Innovation and Creativity
Reducing Duplication of Effort	Repetition of Mistakes

Our approach of KM to HRM is based on focussing on the needs of the individual knowledge worker rather than the industrial perspective, which is focussed on organisational goals and defines Knowledge Management as “the attempt by an organization to explicitly manage and

control the knowledge of its workforce.” (Alvesson and Karreman, 2001). As other authors also noticed, „the fatal flaw in thinking in terms of Knowledge Management is in adopting the perspective of the organization as the relevant beneficiary. Discussions of Knowledge Management start from the premise that the organization is not realizing full value from the knowledge of its employees. While likely true, this fails to address the much more important question from a knowledge worker's perspective of 'what's in it for me?'”. (McGee, 2003)

Knowledge management can be formally defined as managing knowledge resources, typically by using advanced information technology, “the explicit and systematic management of vital knowledge and its associated processes of creating, gathering, organizing, diffusion, use and exploitation. It requires turning personal knowledge into corporate knowledge that can be widely shared throughout an organization and appropriately applied.”

As the discipline, Knowledge Management promotes an integrated approach to identifying, capturing, retrieving, sharing, and evaluating an enterprise’s information assets. These information assets may include databases, documents, policies, and procedures as well as tacit expertise and experience resident in individual workers. The resource-based view of the firm suggests that organisations will need to be able combine distinctive, sustainable and superior assets, including sources of knowledge and information, with complementary competencies in leadership and human resource management and development to fully realise the value of their knowledge.

The specific outcomes of KM are: shared intelligence, improved performance, competitive advantage, higher levels of innovation.

3. The Resource View: The growing importance of KM and its implications for HRM.

The Knowledge Workers

A term first used by Peter Drucker in his 1959 book, *Landmarks of Tomorrow: A Report on the New «Post-Modern» World*, the knowledge worker includes people working in the information technology fields, such as programmers, systems analysts, technical writers, academic professionals and researchers. In other words, a knowledge worker is anyone who works for a living at the tasks of developing or using knowledge. For example, a knowledge worker might be someone who works at any of the tasks of planning, acquiring, searching, analyzing, organizing, storing, programming, distributing, marketing, or otherwise contributing to the transformation and commerce of information and those who work at using the knowledge so produced.

If in the case of knowledge we encounter a wide range of theoretical acceptations in the specialized literature, *knowledge workers* can be simply defined as those employees whose work is primarily intellectual in nature and involves extensive and regular use of established bodies of formal, codified knowledge. From this perspective, knowledge workers:

- represent an occupational elite;
- are in the vanguard of the knowledge economy;
- their work contributes significantly to the performance of their employer.

The term is also frequently used to include people outside of information technology, such as lawyers, teachers, scientists of all kinds, and also students of all kinds.

“Knowledge workers appear to be the ideal employee” (Alvesson, 2006), because:

- they find their work intrinsically interesting and fulfilling;
- working patterns represent the norms within the communities they are a part of it;
- they provide the organization with their efforts in return for good pay and working conditions;
- they have the sense of identity as a knowledge worker.

There are some factors that contribute to the *distinctiveness of knowledge workers*:

- high qualification;
- greater importance knowledge and expertise;
- highly tacit and difficult knowledge and skills;

- relatively scarce knowledge and simultaneously highly valued which provides them extensive opportunities to change job;
- distinctive norms and expectations;
- work tasks are highly specialized in nature, as they are focused on the process of knowledge creation, utilization and application.

These aspects determine organizations to consider managing knowledge worker in distinctive ways, motivating and retaining them through HR effective practices.

As it is believed that «without loyalty knowledge is lost», it was given a greater importance to the sense of organizational identity. Alvesson identifies two broad types of loyalty:

a. *instrumental – based loyalty*: the workers remain loyal to their employer for as long as they receive specific personal benefits. This kind of loyalty can be developed through pay and working condition.

b. *identification – based loyalty*: is based on the workers having a strong sense of identity as being member of the organization, and the workers identifies with the goals and objectives of their organization. There are three strategies for developing identification-based loyalty:

- institutionally based strategy : the organization develops a particular vision or set of values that the workers identifies with it;
- communitarian based strategy: workers develop a strong sense of being part of a cohesive team;
- socially integrative strategy – combination of the two strategies.

Implications of KM for HR Development

As KM involves recognising, documenting and distributing knowledge to improve organizational performance, it is of particular significance to HRD in training needs analysis and the planning of training to improve performance and deliver strategic results. KM challenges HR over intellectual property, professional identity and unit boundaries; KM perspectives move HRD's goal away from developing individual capacity to creating, nurturing and renewing organisational resources and interactions. Instead of devising training courses, HRD practitioners may need to identify organised elements that learners can reference as needed, depending on the particular challenges faced.

Implication of KM for HRM sustainability

In today's economy, where so much importance is attributed to the search for sustainable resources and institutions, knowledge-based theory underpins much of the strategic thinking in organisations. In the knowledge-based view, this organisational knowledge is acknowledged as the most valuable organisational asset and the ability to manage knowledge strategically as the most significant source of competitive advantage (Barnes, 2002). Knowledge is both the key resource and a basis for sustainability, but knowledge and associated Knowledge Management practices must also be sustainable. In the wider search for sustainability, issues of context, of culture and appropriateness are of paramount importance. In the realm of context, the focus should be on community as well as on process. In this way, Knowledge Management can enhance the potential for knowledgeable practices that are “envisioned, pursued and disseminated, with other actors encountering these new practices and learning from them to develop their own local knowledge” (Cushman et al, 2002).

Implications of KM for the role of HRM in promoting Innovation and Creativity

Knowledge itself is not of any value to an organization unless these contextual aspects are clearly understood. Much of the knowledge, both tacit and explicit remains largely untapped in most organizations; without a thorough understanding of context, it will not be possible for HRM or KM to support the development of management and leadership capabilities to support innovation and creativity. Much work in HRM has focussed on identifying facilitators and inhibitors of innovation, such as people (e.g. effective leadership behaviours associated with particular innovation phases), structure (e.g. the impact of centralisation, formalisation, complexity, stratification, lateral communications, matrix structures, requisite variety, double-loop learning) and organizational size or resource availability. Other approaches have found that strategic type,

organizational climate and culture, and organizational environment are also important facilitators or inhibitors of innovation. For example, Taylor et al (2000) using a large-scale survey have shown that the significance of inter-firm networking for innovation differs markedly between industry sectors, and that high innovating organizations often seek long-term, secure relationships with employees. Organizations also seem to adopt very different strategies towards staff directly involved in innovation as compared with staff in general, with less use of flexible employment policies for this group. An alternative is to see innovation as more dynamic and fluid, allowing for groups, individuals and collaborative partners to differ in their perceptions and interpretations of events.

4. The Entity View. General Framework for Knowledge Work Analysis

In a long term view, KM represents a convergence of ideas promulgated over the past decade, including core competencies and resource-based theories of the firm, *info-mapping* and *information resource management*, the *balanced scorecard* and *intangible/intellectual assets*, the *learning organization* and communities-of-practice, total quality management and business process re-engineering, the networked organization and *the boundary less firm*.

KM requires a strategic focus on valuable knowledge, concentrating on knowledge that will contribute to the improvement of organizational performance. It involves a holistic view of information, combines internal and external information with coordination of planning and monitoring information and consolidates informal-*soft* and formal-*hard* information. KM also requires a strategic focus on valuable knowledge, concentrating on knowledge that will contribute to the improvement of organizational performance.

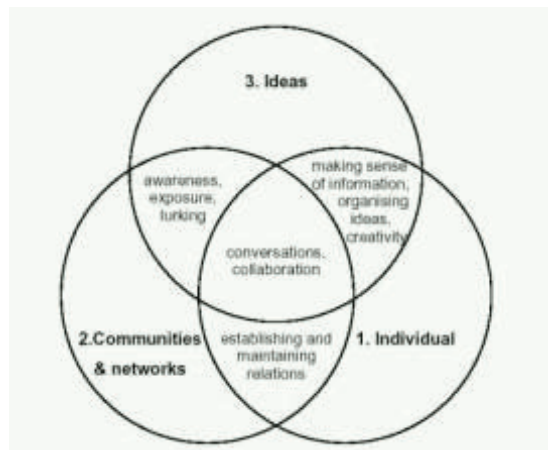


Figure 3: Framework for Knowledge Work Analysis (Efimova, 2004)

From this framework the following processes can be identified: organising personal information; making sense of information (personal); negotiating meaning (social); generating new ideas; establishing and maintaining a personal network; collaborating in communities.



Figure 4 – Knowledge Management and the Business Process Analysis
Source: ARES Corporation¹¹

Knowledge creation, learning and renewal

Knowledge Management can be resumed as being a method for gathering information and making it available to others. Knowledge starts as *data* - raw facts and numbers. *Information* is data put into context and is readily captured in documents or in databases. When information is combined with experience and judgment it becomes *knowledge*.

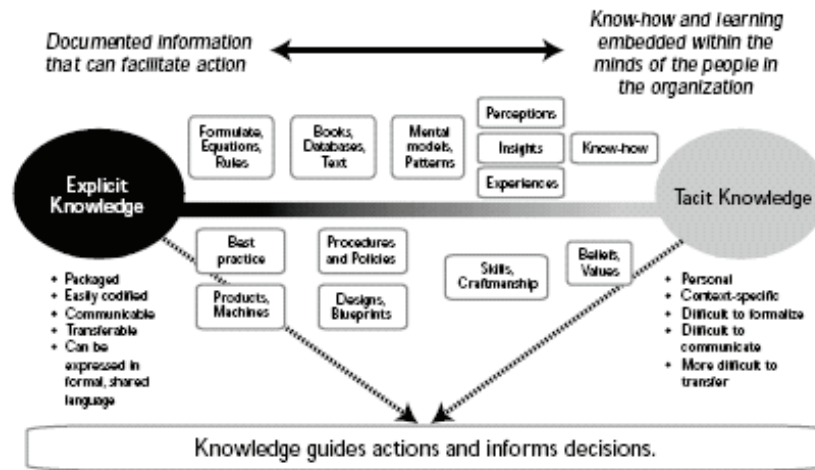
„Most of the traditional Knowledge Management Systems rely on the assumption that knowledge can be assimilated to objects that can be identified, separated from their initial context, and handled in information systems⁵” (Nabeth et al., 2002)

A wide speed framework for thinking about knowledge proposes two main types of knowledge: *explicit* and *tacit* (as shown in Figure 5). In developing a general framework for understanding KM, we refer to perhaps the most influential framework for knowledge creation developed by Nonaka and Takeuchi (1995) in their studies of knowledge creation and use in Japanese companies. Nonaka and Takeuchi (1995, p.8) distinguish between two types of knowledge, explicit and tacit (Figure 5). Tacit knowledge is basically experiential, whilst explicit knowledge is expressed, and often seen as transferable in one way or another; it includes cognitive and technical elements.

Explicit knowledge is documented information that can facilitate action. It can be expressed in formal, shared language. In an organization, examples of explicit knowledge are strategies, methodologies, processes, patents, products, services, formulas, equations, rules, and best practices. Explicit knowledge is: packaged, easily codified, communicable, and transferable.

Tacit knowledge is know-how and learning embedded within the minds of the people in an organization. It involves perceptions and insights based on past experiences. Examples of tacit knowledge in an organizational context are skills and competencies, experiences, relationships within and outside the organization, individual beliefs and values, and ideas. Tacit knowledge is: personal, context-specific, difficult to formalize, difficult to communicate, more difficult to transfer.

Knowledge originates in individuals, but it is embodied in teams and organizations, as shown in Figure 5.



Source: Copyright 2000, PricewaterhouseCoopers LLP

Figure 5 – Tacit and Explicit Knowledge
Source: PWC, 2000

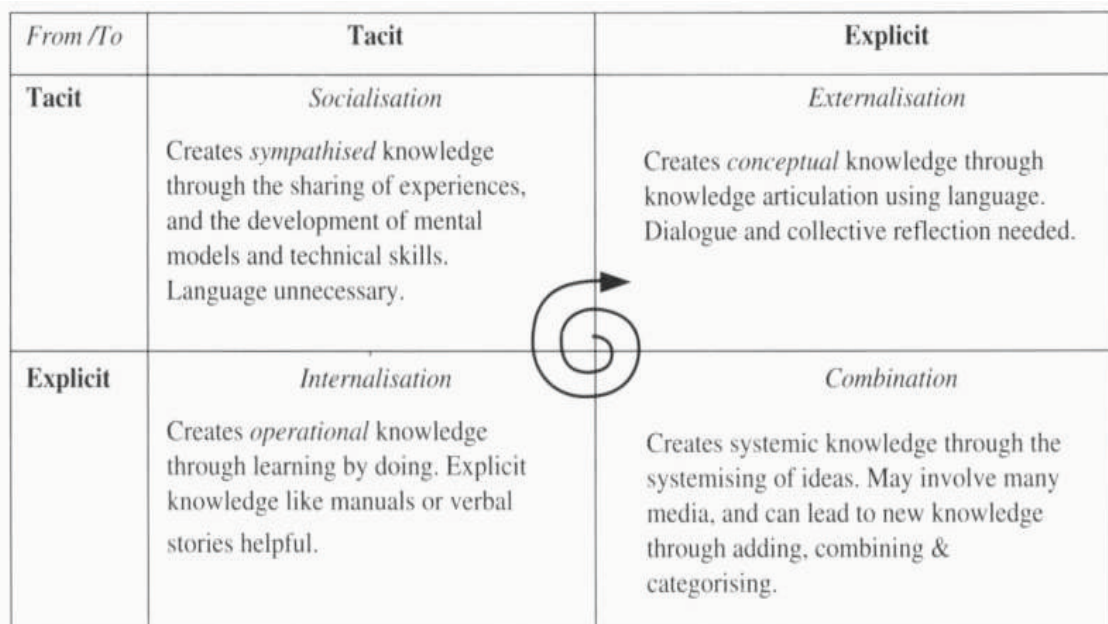
Most business actions require the guidance of both explicit and tacit knowledge. Cognitive elements operate through mental models, working worldviews that develop through the creation and manipulation of mental analogies. Mental models (like schemata, paradigms, perspectives, beliefs and viewpoints), according to Nonaka and Takeuchi, help individuals perceive and define their world. The technical element of tacit knowledge includes concrete know-how, crafts, and skills. Explicit knowledge is about past events or objects “there and then”, and is seen to be created sequentially by “digital” activity that is theory progressive. An alternative perspective on the distinction between explicit and tacit knowledge, to be developed later in this paper, is also presented in Figure 1. One difference is that the top row appears to be positivist in its orientation through its adherence to objectivity, whilst the bottom row is critical in nature.

Figure 6: Typology of knowledge (Nonaka and Takeuchi, 1995)

Expression of knowledge type	Explicit Knowledge	Tacit Knowledge
Nonaka and Takeuchi	Objective Rationality (mind) Sequential (there and then) Drawn from theory (digital) Codified, formally transmittable in systematic language. Relates to past	Subjective Experiential (body) Simultaneous (here and now) Practice related (analogue) Personal, context specific, hard to formalise and communicate. Cognitive (mental models), technical (concrete know-how), vision of the future, mobilisation process Informal, determined through contextual experience.
Alternative	Formal and transferable, deriving in part from context related information established into definable patterns. The context is therefore part of the patterns.	It will be unique to the viewer having the experience. Not transferable, except through recreating the experiences that engendered the knowledge for others, and then the knowledge gained will be different.

Nonaka and Takeuchi (1995, p.8) offer a SECI model of knowledge creation illustrated in figure 7. At its core are conversion processes between tacit and explicit knowledge that result in a cycle of knowledge creation. Conversion involves four processes: socialisation, externalisation, combination, and internalisation, all of which convert between tacit and/or explicit knowledge. Socialisation is the process by which synthesised knowledge is created through the sharing of experiences between people as they develop shared mental models and technical skills. Since it is fundamentally experiential, it connects people through their tacit knowledge. Externalisation comes next, as tacit knowledge is made explicit. Here, the creation of conceptual knowledge occurs through knowledge articulation in a communication process that uses language in dialogue and collective reflection. The use of expressions of communication is often inadequate, inconsistent, or insufficient. They leave gaps between images and expression, while promoting reflection and interaction. This therefore triggers dialogue. The next process is combination, where explicit knowledge is transformed through its integration by adding, combining and categorising knowledge. This integration of knowledge is also seen as a systemising process. Finally, in the next process explicit knowledge is made tacit by its internalisation. This is a learning process, which occurs through the behavioural development of operational knowledge. It uses explicit knowledge, like manuals or story telling, where appropriate.

Figure 7: The SECI cycle of knowledge creation (Nonaka and Takeuchi, 1995)



5. The Process View of Knowledge Management

Traditionally, organizations have rewarded their professionals and employees based on their individual performance and know-how. In many organizations, a major cultural shift would be required to change their employees' attitudes and behavior so that they willingly and consistently share their knowledge and insights. An effective way to motivate knowledge sharing is through the organizational reward and incentive mechanisms. Both McKinsey & Company and Coopers & Lybrand LLP (a management consulting and a professional services firm, respectively) use this mechanism to promote knowledge sharing among their consulting and professional staff. To make information resources productive, organizations should be converted to actionable knowledge, such a process introduces challenges relating to knowledge creation, capture, sharing, and maintenance. (Alavi, Leidner, 1999)

In their studies, Angus and Patel (1998) describe a four-process view of Knowledge Management that we have systematized into the figure 8:

Figure 8 – A Four Process View of the KM

Gathering	Data entry OCR and scanning Voice input Pulling information from various sources Searching for information to include
Organizing	Cataloging Indexing Filtering Linking
Refining	Contextualizing Collaborating Compacting Projecting Mining
Disseminating	Flow Sharing Alert Push

Also, the research made by Yahya and Goh (2002) suggest that a knowledge organisation requires a different management approach than the non-knowledge organisation. In terms of employee development, the focus should be placed on achieving quality, creativity, leadership, and problem solving skill. The design of a compensation and reward system should be on promoting group performance, knowledge sharing, and innovative thinking. The performance appraisal must be the base of evaluation of employee’s knowledge management practices, and an input for directing knowledge management efforts.

*Knowledge workers interpret information, generate outputs and solve problems according to their internal structures as individuals rather than according to external rules or procedures. By its human nature, each knowledge worker develops his own subjective configuration based on past experiences, the information he has absorbed and the particular context in which he has used his skills and abilities. Neglecting this aspect, corporate software programs aim to level or standardise the differences between individual workers. We suggests that should be **provided to knowledge workers tools which enable diversification of individuals’ outputs.***

6. The Capacity View of Knowledge Management

„The best single lesson I ever learned was to maximize the intellect of the company. You need to gather the knowledge of individuals, share those ideas and celebrate the sharing. That, in the end, is how a company becomes great.” (Jack Welch - former Chairman and CEO of General Electric, 1981-2001).

KM initiatives generally take several forms, but they usually involve selection of priority areas for initial effort in the attempt to make formal/explicit knowledge more visible and usable and private/tacit knowledge more explicit, public and useful. The key objective is to convert informal personal contextualized knowledge to formal systematic organizational knowledge, exemplified by creating databases of frequently asked questions (FAQs) searchable by both employees and customers, and lists of past mistakes and success in projects as guidelines for similar future undertakings. In addition to improving the visibility of knowledge, another aim is to develop its intensity, by creating a climate to encourage generation of ideas within workgroups, and generalization to other areas. At the same time, as organizations are concerned about information

overload, a further objective is to achieve a better balance between pushing and pulling it, by giving people just-in-time access to knowledge, allowing the need to know to be determined by the information user (not the owner).

Applications of Knowledge Management can be divided into the three broad categories:

- *Knowledge databases and repositories (explicit knowledge)* - storing information and documents that can be shared and re-used, such as client presentations, competitor intelligence, customer data, marketing materials, meeting minutes, policy documents, price lists, product specifications, project proposals, research reports, training packs;

- *Knowledge route maps and directories (tacit and explicit knowledge)* – containing document collections and datasets that can be consulted, for example, «yellow pages/expert locators» containing Curriculum Vitae, competency profiles, research interests;

- *Knowledge networks and discussions (tacit knowledge)* - providing opportunities for face-to-face contacts and electronic interaction, for example, establishing chat facilities/'talk rooms', learning groups and holding «best practice» sessions.

Examples can be found in all sectors of business and industry, especially among professional service organizations. The large accountancy and consultancy firms have led the way in launching formal Knowledge Management initiatives, closely followed by IT companies.

Determining effective knowledge strategies suitable for different types of organizations has emerged as an important topic in the knowledge management literature (Hansen, Nohria & Tierney 1999, Zack 1999, Earl 2001). The Hansen *et al.* model was developed from the analysis of consulting firms approaches to knowledge management, given the nature of the business of these organizations and distinguishes between two main KM strategies:

- *The Codification Strategy*, focused on capturing, storing and codification of knowledge in explicit forms so that it can be readily transferred and used by others within the organization and is linked to a business strategy of knowledge re-use. Information technology is used to support the storage of this knowledge. Codification can be viewed as a «people-documents approach». (Hansen *et al.* 1999)

- *The Personalization Strategy*, focused on person to person sharing of tacit knowledge, linked to a business strategy of knowledge creation. Personalization can be viewed as a «people-people approach». (Hansen *et al.* 1999)

7. Inhibitors of Knowledge Management Initiatives

The success of the Knowledge Management initiatives can be inhibited by the lack of willingness among staff from different function to share knowledge, due to a historical culture of inter-functional rivalry; and to the perception that software programs reduce the level of employee' autonomy and lead to greater levels of standardization.

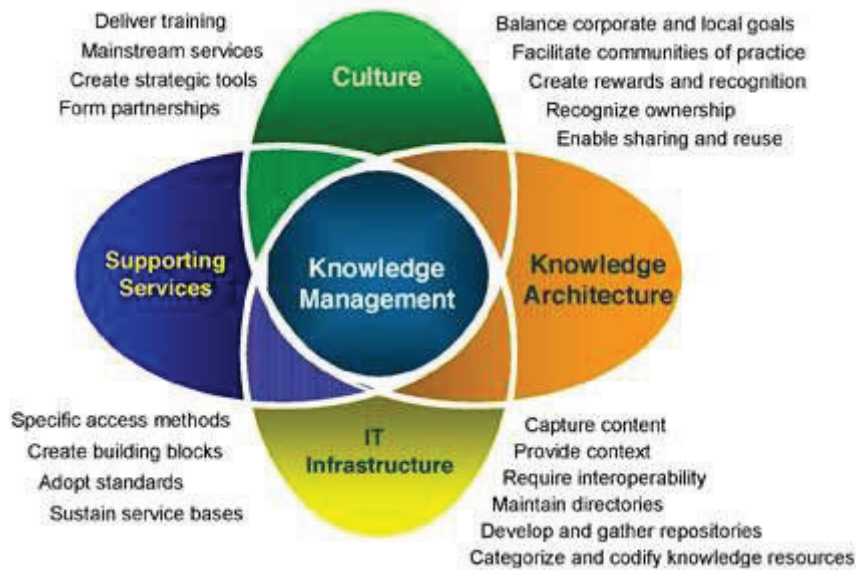


Figure 9 – Knowledge Management Integration
Source: NASA¹³

There can be identified some factors that influence the willingness of workers to participate in KM initiatives:

- A. *Structural factors* – which are beyond the control of organizational management:
 - a) *possession of knowledge* – significant source of power and status in organization;
 - b) *the nature of employment relationship* - results in the interest of workers and management not always being totally compatible;
 - c) *potential for inter-personal/group conflict*.
- B. *Socio-cultural factors* – which are within the control of management:
 - a) the existence of interpersonal trust and good working relations among co-workers;
 - b) the existence of trust and good inter-personal relations between workers and their managers;
 - c) proper recognition and reward for work efforts and use of individual knowledge.

Workers are most likely to be willing to participate in organizational Knowledge Management initiatives when the general organizational climate/culture is fair and positive. Based on these socio-cultural factors, the most common HRM policy areas that can be developed to support Knowledge Management initiatives are:

- training and development – to encourage reflexivity, learning through experimentation and how to conduct critical dialogues with others;
- pay and reward system – which recognizes the efforts of workers;
- performance appraisal.

Conclusions

„Today knowledge has power. It controls access to opportunity and advancement.”- Peter Drucker

This paper has argued that the increasing importance of knowledge, and knowledge management, (KM), to organizations challenges the nature, role and boundaries of HRM in significant ways, not always as yet recognised by HRM theorists, researchers and practitioners. By presenting a five dimension approach of KM as a Concept, Resource, Entity, Process and Capacity, *the present work suggests that tools which enable diversification of individuals’ outputs should be*

provided to knowledge workers. In addition to discussing the challenges posed to HRM in general, it has also been discussed the ways in which specific functional areas of HRM (employee resourcing, career management, HRD) can respond to these challenges, as well as discussing the implications of the knowledge worker in implementing KM. Tools that have been developed in KM focused on information management and do not support many of the key knowledge work processes. *Neglecting the fact that each knowledge worker develops his own subjective configuration based on past experiences, the information he has absorbed and the particular context in which he has used his skills and abilities, corporate software programs aim to level or standardise the differences between individual workers.*

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