

THE KMOLI SPIRAL

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Abstract

The challenges facing today's managers are many and varied but largely consist of coping with an increasingly changeable and turbulent business environment at both the macro and micro levels. Suggested solutions to these challenges are also varied but often relate to developing strategies around the concepts of knowledge management, organisational learning, and innovation. The paper briefly examines these vital concepts and the links between them and proposes that they can be usefully integrated into one systemic meta-process (The KMOLI Spiral). It is suggested that this integrated meta-process is at the very heart of an organisation's core functions and capabilities. The paper also explores links between a range of current information technologies and their impact on various stages of the integrated meta-process.

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THE KMOLI SPIRAL

INTRODUCTION: MANAGEMENT CHALLENGES, RESPONSES

The environment in which contemporary managers must operate is a complex and turbulent one. Challenges and changes are abundant at the individual, organisational and wider system levels. At the macro level, hyper-competition, globalisation, and economic and social uncertainty all impact on managers and organisations. Added to this at the micro level are changing workplace relations, ongoing technological change, and growing pressure to cut costs whilst simultaneously building value. There are a number of responses by which managers are attempting to survive and prosper. Amongst these, developing an organisational capability to innovate is considered of great importance (Darroch & McNaughton, 2002; Hamel, 1998; Simpson, 1999).

Innovation, in simple terms, is the introduction of something new, often in response to an external change or new knowledge. The degree to which a firm effectively and productively manages the process of innovation is a key determinant of organisational success. Its importance is accepted, with the "broadly based consensus that change will remain a dominant feature of our societies in the foreseeable future, requiring both incremental adjustment and radical innovation," (Berthoin Antal, Dierkes, Child, & Nonaka, 2001:937). Successful organisations, those that adapt to the changing environment and survive to lead their respective industries, will be those that determine the best methodology, the best framework within which to understand the apparatus of functional creativity, and become continually innovative. As Välikangas (2003) suggests, "a company needs to manage innovation not as an *ad hoc*, exceptional event, but rather as a corporate capability" in order to succeed. Significantly, knowledge management (KM) and organisational learning (OL) have become important concepts for managers seeking the key to sustainable competitive innovation (VonKrogh, 1998).

Knowledge management and organisational learning are increasingly acknowledged as processes through which business may come to understand and master rapidly changing environments (Argyris, 1992; Sanchez & Heene, 1997; Senge, 1990; Stata, 1989). The two fields, whilst evolving from distinctly dissimilar foundations, have been described as two sides of the same coin (Hackett, 2000). Each is concerned with the need to generate or acquire both tacit and explicit information resources, to appropriately integrate and interpret that information into valuable knowledge, to make sense of it, and finally utilise it.

This paper explores the links between innovation, knowledge management and organisational learning and proposes that the three concepts be integrated into one systemic meta-process. It further explores the link between current information technologies and their impact on various stages of the integrated cycle.

KNOWLEDGE MANAGEMENT, ORGANISATIONAL LEARNING & INNOVATION

Innovation has been described as "the effort to create purposeful, focused change in an enterprise's economic or social potential", (Drucker, 2002:95). The similarity these words bear to Senge's characterisation of organisational learning as an effort to enhance one's capacity for effective action (Senge, 1994) is striking; the differences, it seems, lie more in the perception or disciplinary background of the practitioner than in any real distinction between the two constructs. The same has been said for comparisons of knowledge management and organisational learning (McLean, 2000). The two terms appear to be used to describe similar organisational processes. Those coming from a technology-focused discipline will tend to talk about knowledge management, whilst those from the organisational behaviour fields are more likely to consider organisational learning (Davenport & Prusak, 1998; Ives & Gordon, 2000). One might make the analogous association between these two fields and innovation; perhaps the divergent vocabulary,

and the reference to innovation rather than KM or OL, reflects a different (outcome-oriented, product driven) background more than any substantial differences between the concepts in reality. This paper asserts that by reframing innovation, not as a discrete event, but as a systemic process that shares an extensive range of precepts, tools, and theoretical frameworks with KM and OL, it provides for “transdisciplinary integration” (Berthoin Antal et al., 2001:927), an understanding of how each discipline can shed light on the processes of innovation. The path to the effective management of innovation is illuminated by a proliferation of literature exploring the coexisting fields (see for example Fulmer, 1994; Harvey, Palmer, & Speier, 1998; Huber, 1991; Mink, Esterhuysen, Mink, & Owen, 1993; Senge, 1990; Starkey, 1998, 1996).

Towards an Integrated Model

As suggested, there appears to be an obvious overlap between KM & OL; many authors have described the concepts in a similar way – as a process consisting of a number of stages or phases and usually comprising a cycle (McLean, 2000). Huber describes organisational learning as consisting of four integral constructs including “knowledge acquisition, information distribution, information interpretation and organisational memory”, (1991:88). In a similar vein, Seemann (1992) describes knowledge management as a process of creating, capturing, sharing and using company-wide knowledge. Dixon (1994) employs comparable terminology in her *Organisational Learning Cycle* (OLC), referring to OL as a cycle of generation, integration, interpretation, and utilisation of knowledge. Her model is derived from the work of Kolb, Rubin and Osland (1995) and others (Argyris, 1981; Palmer, 1981; Pfeiffer, 1991), who have also described the learning process within individuals. They illustrate the cyclical process through which one encounters an experience, reflects upon it, generalizes the conclusions drawn from the experience, and actively tests new hypotheses. Every individual will complete the cycle in a different fashion, emphasizing different stages due to their personal learning style (Kolb et al., 1995).

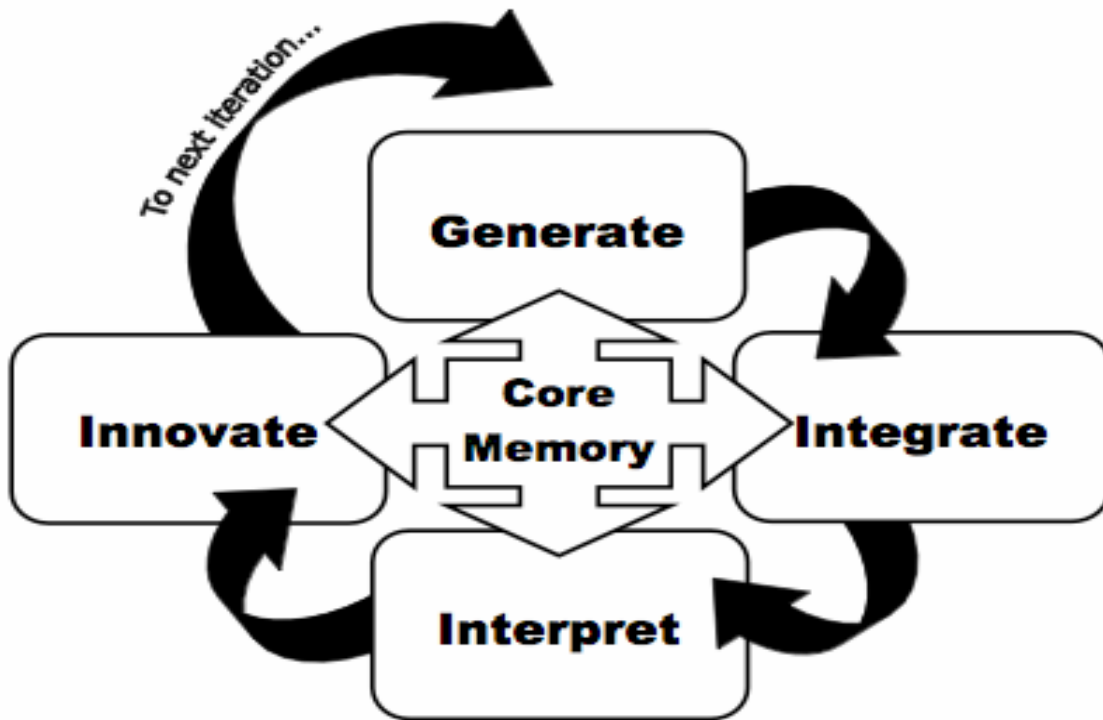
Dixon (1994) identifies learning at the organisational level, modifying and applying Kolb’s individual experiential learning cycle to account for the broader context within which it occurs. All members of a learning organisation must actively take part in the search for and creation of new information. This information must be integrated with the collective knowledge of the larger group; everyone must have access to the information held by every other group member. A collective interpretation of data may be achieved by consolidating personal interpretations. Finally, members of the collective act on the resulting interpretations, taking action which in turn generates new information and initiates the learning cycle once more.

While the specific number of, and names for, the steps in the KM/OL process may vary from one discussion to the next there is enough overlap to suggest that the ongoing separation of these two issues in much of the literature is not only confusing but that the “definitional differentiation is a major obstacle to the development of an integrated perspective on competency and the knowledge needs of innovating organisations”, (Simpson, 1999:170). This contention can be extended to encompass innovation itself, where references to iterative cycles of experimentation and feedback (Eppinger, 2001) and core processes designed to “generate and capture ideas, to assess and sift ideas and to select the ‘best’ ones”, (Vergaeghe & Kfir, 2002:411), reflect the common paradigm from which all three theoretical constructs are drawn.

The proposed model, in Figure 1 below, integrates KM, OL and Innovation (KMOLI) processes. It is based partly on the work of Dixon and the OLC described above. It redresses the tendency of each field to subsume the processes of the others by explicitly integrating elements from all three approaches, as well as including the additional important elements of organisational memory (Huber, 1991) and tacit knowledge (Nonaka & Takeuchi, 1995) as core memory, central to the overall cycle. The integrated KMOLI process is described in terms of an upwards spiral, rather than the more common cycle. This change signifies continual movement in an iterative process of continual learning and innovation, and is consistent in this manner with the work of Nonaka and Takeuchi (1995). Further, the KMOLI Spiral acknowledges the influence of the broader environmental constraints and processes, described in terms of Senge’s five disciplines (1990), as

well as the supporting and enabling infrastructure that makes the system work (Dixon, 1999), such as technology (Davenport & Prusak, 1998; Ruggles, 1997), reward systems (DiBella & Nevis, 1998), and commitment from leaders to the overall activity (Senge, 1990).

Figure 1: The KMOLI Spiral (Developed from the work of McLean, 2000)



The stages of the KMOLI Spiral, (1) *Generate*, (2) *Integrate*, (3) *Core Memory* (Retain & Recall), (4) *Interpret*, and (5) *Innovate*, are not considered discrete; the operation of the model is highly iterative and recursive at every phase with multiple feedback loops (which to aid clarity are not shown on the diagram). The first phase is about *generating* or acquiring raw data from both internal and external sources that forms the foundation from which knowledge, learning and innovation can emerge. Huber (1991) suggests that there are at least five separate sub processes that can be considered as relevant at this stage, including learning from experience, observation and the search for information about the organisational environment. The *integration* stage focuses upon the processes used by organisations to integrate, share or disseminate experiences, observations and discoveries to the benefit of all (DiBella & Nevis, 1998). At the centre of the KMOLI Spiral resides the *core memory*, which is not truly a stage of the process but rather interacts with all other stages. This element acts as the knowledge base containing both individual and collective, explicit and tacit knowledge and “is critical to an organization’s ability to solve problems and create new knowledge”, (Cross & Baird, 2000:70). The *interpretation* stage reflects the process of analysis, reflection, and evaluation, where some sense is made of the information gathered and integrated into the organisation. Finally, the *innovation* stage describes the change in behaviour or other outputs that result from what has been learned. Sometimes referred to as “*Utilise*”, this final stage is perhaps most closely related to those behaviours, decisions and activities that lead to innovation, where outputs (in terms of products or processes) can be seen to have a direct impact on a firm’s economic or social potential.

The KMOLI Spiral provides a framework within which the KM, OL, and innovation processes – and the influences upon it such as the external environment, internal cultural conditions, and technology – may be observed and measured in order to better facilitate the phenomenon as an intentional and managed behaviour. Of the external influences to play a role in shaping organisational practices in recent years, it is a series of advances in technology that have had the most evident effect (Kochan & Useem, 1992; Malhotra, 1993; McCune, 1999). The Internet is an excellent example; as a tool for business, education, and the individual user, the web and e-mail have experienced exponential growth over the last ten years and have changed the way that organisations operate. These information-based tools perform functions critical to the core learning and knowledge activities discussed above (Goodman & Darr, 1996; Malhotra, 1993), assisting workers to acquire, generate, integrate, interpret and act upon information (Page & McLean, 2000).

TECHNOLOGY AND THE KMOLI SPIRAL

To further illustrate the relationship between the KMOLI Spiral and the influencing factors introduced by the model, within the limited scope of this paper, we will discuss a range of technological tools as they impact upon the stages of the process. It is apparent that knowledge management involves more than just the collection of raw data. Drucker (cited in Wren, 1994:367) states that real knowledge is only gained after raw data has been processed and transformed into something that changes behaviour or a person's mental processes. The challenge for organisations, then, is to enable this transformation at the group level. Without doubt, some of the most important infrastructure for effective KMOLI today relates to the technological support available to organisations (Davenport & Prusak, 1998; Ruggles, 1997). We have seen that a large part of the process of KMOLI is about creating or acquiring, sharing or distributing, storing, interpreting, and finally utilising relevant knowledge. Information technologies such as the web, network computing, data storage and retrieval, and the ever-humble email are essential tools that assist in all phases of the process (Page, 1999).

It is the general application of these tools, however, that appears most significant to the KMOLI Spiral. The *generation* stage, for example, primarily makes use of communication technologies such as email and the web to improve the flow of information from external sources, as well as utilising feedback from previous iterations of the spiral through tools like customer relationship management systems. The *integration* stage uses tools like information management systems, weblogs, web-based discussion forums, and presentation and publication tools to intercede between *core memory* and organisation members, enabling the storage and dissemination of that data internally. This encompasses the critical issue of knowledge sharing through tools and technologies that enhance two-way communication. The *interpretation* stage of the cycle primarily utilises tools that provide for analysis, prediction and modelling, as well as expert systems; where this occurs at the group level, it is again those two-way communication technologies that play a key role. The *innovation* stage can result in both an output, which could include product or process innovation or a multitude of other outcomes (and thereby, might make use of a multitude of technologies), and an opportunity for learning through feedback via, for example, performance measurement tools, which returns us to the first stage and another iteration of the cycle.

This point is fundamental; the KMOLI Spiral operates as a continuous systemic process, so that the outcomes of one iteration produces feedback (either directly or indirectly) that become the inputs at the generation stage of the next iteration. The *core memory* element, central to the spiral, plays a role in each of the stages. Utilising storage and retrieval technologies like databases and document management systems, it acts as a repository, a knowledge base to which each cycle adds. This is, perhaps, where the benefit of technological support systems has been most obvious. As we have seen, though, the strength of technological tools seems to lie in their ability to draw together disparate flows of data; the effective utilisation of appropriate information technologies can assist at all stages of the KMOLI Spiral.

CONCLUSION

In conclusion, if coping with environmental turbulence and change are crucial challenges for the contemporary manager, then developing an integrated approach to the key concepts of knowledge management, organisational learning, and innovation supported by appropriate technologies is considered part of the ongoing solution.

The development and management of these crucial processes in many organisations has, however, been somewhat erratic and *ad hoc*. There are still considerable definitional and disciplinary differences that mean there has been only limited integration at this point in time. This paper has argued that these three concepts are largely synonymous, and that overall progress will be best served by developing them as an integrated systemic process: we manage what we know to enable learning and facilitate innovation.

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