INTEGRATION VS. FRAGMENTATION OF KNOWLEDGE MANAGEMENT, ORGANISATIONAL LEARNING AND INNOVATION – PHASE ONE OF A MULTI-PHASE RESEARCH PROJECT

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Abstract

This paper represents the first phase of a study designed to investigate the degree of integration (or fragmentation) of key knowledge management (KM), organisational learning (OL) and innovation processes that exist within Australian organisations, and to increase our understanding of the costs, benefits, drivers, and barriers for such integration. A review of the literature provides a clear indication of the links between KM, OL, and innovation. For example, innovation, conceived by Drucker as an effort to purposely develop an organisation’s economic or social potential, has been linked to OL, which Senge conceptualised as an effort to enhance an organisation’s capacity for effective action. Similar links can be seen between OL and KM, where the primary distinction between the two concepts appears to lie only within the mental model of the practitioner; one who comes from an IT–related discipline tends to adopt a KM bias, whereas those with a foundation in organisational behaviour will tend towards OL.

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INTRODUCTION

In organisational literature, knowledge management (KM), organisational learning (OL) and innovation represent three highly interrelated areas of theory and theoretical development that have largely been treated as independent disciplines. Recent work has displayed a trend towards a more unified approach, and given the benefits derived in other fields where integration has been attempted (supply chain, for example), it stands to reason that transdisciplinary integration would improve our understanding of the antecedents, consequences and processes involved in developing an organisation’s informational and intellectual resources for the purpose of enhancing its capacity to effectively achieve its goals. This paper represents the first phase of a project designed to increase our understanding of the costs, benefits, drivers and barriers to an integrated theory, and practice, of KM, OL and innovation.

BACKGROUND

Knowledge management, organisational learning and innovation are processes through which organisations respond to business problems. Heightened competition and the shifting nature of the worker-organisation relationship are among a growing list of factors that are pushing competitive activities away from the pursuit of incremental developments in existing products and services towards a generative reengineering of business; change is no longer a hurdle to be overcome, it is the race itself.

McLean and Page (2003) previously linked KM, OL and innovation, highlighting these concepts’ interdependence and the role that they play in the challenges faced by contemporary management. Table 1, developed from that earlier work, summarises the dimensions from which each construct, as defined, draws its contribution to an organisation.

Whilst distinctions can be drawn between each of the three fields, comparison exposes a high degree of similarity. At this level of analysis, they can be seen as fragments of a single meta-process through which an organisation more or less intelligently defines, acquires, processes and adapts to stimuli; they comprise the intellectual and informational systems by which an organisation pursues its objectives.

Table 1: Roles of KM, OL & Innovation, derived from McLean & Page (2003)

<table>
<thead>
<tr>
<th>Construct</th>
<th>Definition</th>
<th>Contribution</th>
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<tr>
<td>Knowledge Management</td>
<td>The process of capturing and utilising the knowledge resources of an organisation.</td>
<td>KM seeks to draw together the disparate intellectual and informational resources of a firm (including explicit intellectual property and tacit ‘know-how’) to enable the improvement of processes.</td>
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<td>Organisational Learning</td>
<td>An effort to enhance an organisation’s capacity for effective action (from Senge, 1994).</td>
<td>OL seeks to improve processes by building understanding of an organisation, its environment, and the manner in which it pursues its objectives (Fiol &amp; Lyles, 1985), increasing its capacity to innovate (Argyris, 1977). It involves the integration of individual learning with organisational knowledge (Kim, 1993), and feeds the KM process.</td>
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<tr>
<td>Innovation</td>
<td>The introduction of something new, often in response to an external change or new knowledge.</td>
<td>Innovation and innovation processes seek to implement improvements; drawing on KM and OL processes, innovation occurs when ideas, knowledge and understanding are applied to create a new product or process (Galbraith, 1996).</td>
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Besides the work of McLean and Page (2003), effort has been made to draw together KM, OL and innovation, or elements thereof (Hackett, 2000; McLean & Page, 2003; Nonaka & Takeuchi, 1995; Wang & Ahmed, 2002). To fully assess the value of such an integrated approach, it becomes necessary to understand the forces that work to move KM, OL and innovation closer together, or conversely, further apart. The current study aims to (1) clarify the relationship between KM, OL and innovation, synthesising the literature across a range of dimensions, and (2) to identify from that work likely drivers of and barriers to the integration of KM, OL and innovation as fields of scholarship and practice.

RATIONALE

Systems-theory tells us that all systems, as they grow and develop, will naturally move towards fragmentation and differentiation (Kast & Rosenzweig, 1985). We see this in the specialised purpose and behaviours of ants, bees, and quality-driven, high-volume production facilities. We see it in the evolution of species, and in the evolution of products and services, where differentiating one’s self from the crowd is the key to success.

Systems-theory also tells us that in all systems, as sub-processes fragment and differentiate, there is an imperative to seek convergence, integration, and consilience – to uncover the common principles that underlie those disparate fields of endeavour. Indeed, Wilson (1999) argues that the fragmentation of knowledge that we see in all fields of research (and the resulting chaos in philosophy) misrepresents the real world, and that this fragmentation is itself an artefact of scholarship, or our inability to see the bigger picture.

In organisations, as in all social systems, there is an ongoing paradox between the forces for differentiation or fragmentation and the counter forces for integration (Katz & Kahn, 1978). In practical terms these pressures can be seen in organisational settings in relation to the core processes of KM, OL and innovation. For example, in small organisations these three processes are usually combined or integrated into the activities of each member’s role in the organisation. As the organisation grows, however, there is pressure for increasing specialisation resulting in separate KM, OL and innovation specialisations. This process is consistent with that suggested by Kast and Rosenzweig (1985) above; it is important to realise, however, that while this specialisation brings potential benefits for the system (such as lower costs), it also brings a range of potential problems. These problems, or costs, can be seen especially in relation to maintaining organisational co-ordination and control and, for example, the duplication of effort. In relation to KM, OL and innovation, it is the authors’ contention that there are many potential advantages in seeking an integration of the concepts related to KM, OL and innovation. Most apparent, for example, is that seeing these three concepts as different aspects of a single generic process would provide a common language for people from differing areas to encourage dialogue and interaction.

THE KM, OL & INNOVATION LITERATURE

Work in the areas of KM, OL, and innovation has taken a number of forms, reflecting subtle qualitative differences in the paradigm (and body of work) that underlies each field. To a large extent, however, the substantive difference may be one of perspective only; such is the nature of the relationships involved that one can scarcely define OL, for example, without referring to KM (Wang & Ahmed, 2003). The same can said for innovation, which defined as the effort to create a change in an organisation’s economic or social potential (Drucker, 2002) reflects a key aspect of OL, defined as an effort to enhance an organisation’s capacity for effective action (Senge, 1994). Indeed, KM and OL are both identified as important concepts for managers seeking sustainable competitive innovation (Gieskes & van der Heijden, 2004; Landry, 1992; Von Krogh, 1998; Von Krogh, Ichijo, & Nonaka, 2000).
In this manner, the shift towards integration has not often been a conscious one. Von Hippel and Tyre (1995) seek to provide a better understanding of the behaviours involved in learning by looking at problems connected with knowledge re-use when dealing with innovative projects. Johannessen, Olsen and Olaisen (1999) look at aspects of innovation theory and KM, integrating OL through their discussion of knowledge integration and application. Lawson and Lorenz (1999) explore the relationship between codifiable and tacit knowledge and the development of collective learning. And Hackett (2000) identifies that one of the key drivers behind KM and OL, in practice, is innovation.

Approaches to KM, OL, and innovation (separately and as related entities) are varied, but the literature reveals a number of dimensions whereby comparisons can be drawn. Below, a selection of these dimensions is discussed.

**Evolution, Development & Location Within Organisation**

KM, OL and innovation each stem from, and are strongly influenced by, different roots. They have been undertaken across a range of academic disciplines and each has received differing levels of interest and attention from practitioners. Indeed, practitioners tend towards an either-or approach, where (influenced by their background in this or that field) little time is given to what might be learned by looking over the fence. It is this dimension of the divergence between the three fields that makes most evident the potential benefits of pursuing integration.

McLean and Page (2003) suggest that KM is a field that has largely grown from, and is dominated by, information technology, that OL is a concept more in keeping with the cognitive and behavioural lexicon of the organisational behaviour field, and that innovation theory has been driven by outcome-oriented product and service research and development. Anecdotal evidence as well as the work of the likes of Hackett (2000) suggests that this divergence is reflected in organisations, whereby the responsibility for each KM, OL and innovation is most often located (physically and/or logically) within a closely related department or division: for example, KM within information technology, OL within human resources, and innovation within research and development or marketing.

Given Nonaka’s (1991) assertion that creating new knowledge (an outcome claimed by all three of KM, OL and innovation) is not the specialised province of any particular group, but rather a way of being – an approach or mindset – that requires everyone to participate, there appears to be room for improvement. Localising any of the three within one area of responsibility is likely to have the unfortunate effect of establishing the perception that innovation (for example) belongs to them, and that no one else need bother; in reality, of course, innovation is a process combining a range of sub-processes (Mitra, 2000; Rostogi, 2000; Szeto, 2000), and involves everyone. Whilst this can be seen as an organisational structure issue, it appears there is also divergence with respect to the degree of understanding each locus of responsibility holds of the alternate fields and their related theories and processes (Hackett, 2000).

**Organisational Size, Culture, and Structure**

The size of an organisation, its culture, and its structure are among a range of variables that can influence KM, OL and innovation. Also, each has additional prerequisite conditions.

Organisational culture plays a key role in KM, OL and innovation; an appropriately supportive culture is a prerequisite for behaviours that support each of the three processes, and together culture and process interact to determine (to some extent) organisational performance (Lawson & Lorenz, 1999). This interaction is indicative of an activity that comprises a high degree of voluntary behaviour; team members determine their level of contribution to KM, OL and innovation based on indicators within the organisational environment. Ideologies, values, and beliefs provide behavioural norms that facilitate participation to a greater or lesser degree (Hult, 2003). Similarly, managerial behaviour, policies, planning, control, and decision-making styles have a strong impact.
on learning behaviour (Gieskes & van der Heijden, 2004). The same factors have been seen to contribute to KM and innovation behaviours. Other researchers suggest that processes like learning and innovation cannot be separated from factors such as social interaction, which is argued to be vital to tacit knowledge creation (Brown & Duguid, 1991).

Lam (2000) developed a four-fold typology that illustrates the logic of institutionalised variation in organisational learning. She argues that knowledge configurations of firms and patterns of learning cannot be separated from specific organisational forms and institutions. McEvily, Das and McCabe (2000) use resource-based theory as a foundation for an examination of the impact of KM and OL on the quality of innovation processes. They demonstrate the interaction of static sources of competitive advantage (such as management processes and practices, technological infrastructure and business model) and dynamic sources of competitive advantage (such as organisational learning and other behaviours). KM and innovation, by their nature, are other examples of dynamic sources of competitive advantage that may be affected in the same manner.

Size is another dimension where some convergence can be seen between KM, OL and innovation theory. It has been indicated that small firms differ from large firms as to the way they perform in each of these areas, although some conflicting conclusions arise from the literature. Small firms, for example, are often characterised by a scarcity of resources, by a tendency for management to concentrate on less risky activities, and by the discontinuity of knowledge creation (Corti & Lo Storto, 1998). By contrast, others indicate that smaller organisations are more able to capitalise on knowledge, learning and the flexibility their size offers to produce more innovative outcomes (Peters, 2003).

**Type Classifications**

KM, OL and innovation are subject to a range of typologies, developed by theorists to help understand the antecedents, processes and consequences of each. The following describes some of the more prominent typologies; as can be seen, there is often a degree of interaction between identified types across the three fields.

Perhaps the most prominent type classification within the literature is that of tacit versus explicit knowledge. Nonaka (1991; 1994), among others, distinguishes between explicit knowledge (that which is easy to externalise from the individual and capture) and tacit knowledge, which incorporates mental models, experience, and know-how that is difficult to capture. OL and innovation theory also acknowledges the explicit/tacit type distinction; research has confirmed that tacit knowledge is an important factor in OL as well as successful new product innovation (Madhaven & Grover, 1998), and that tacit knowledge transfer (that is, the effective management of tacit knowledge) contributes to a firm’s innovation capability (Cavusgil, Calantone, & Zhao, 2003). In this way, a significant degree of convergence between KM, OL and innovation can be seen with respect to this dimension.

Type classifications have further been adopted to describe organisations by the manner in which they utilise information. Blacker (1995), for example, discusses organisations according to the type of knowledge they leverage (expert, routinized, symbolic-analyst or communication intensive). Lam (2000) uses similar types (embrained, embodied, encoded and embedded) derived from the explicit/tacit and individual/collective dimensions of knowledge. These can be compared to the organisational learning styles adopted by Ribbens (1997) and developed from the work of Gregorc (1985); Ribbens suggests that an organisation can be sorted on two dimensions, including abstract/concrete (a dimension comparable to tacit/explicit knowledge types, or to theory versus historical data) and sequential/random (the degree of order imposed on the collection and retrieval of information). Whilst a large degree of overlap exists across these typologies, further exploration of the extent to which each might inform the others would be instructive.

There would appear to be some support for the comparison of innovation types to learning types. March (1991) for example identifies a qualitative distinction between generative and adaptive
learning, arguing that generative learning is likely to be more effective in the long run (although possibly less in the short run) than the exploitative/adaptive learning style. Similarly, a distinction has been made between incremental and discontinuous innovation; McKee (1992) describes the OL skills involved in these innovation styles, clearly linking the fields with regard to this dimension.

Processes, Process Models

As processes, KM, OL and innovation have been modelled in a variety of ways. McLean and Page (2003) have sought to provide a single model to describe the three concepts as parts of an integrated system. Other models address KM, OL, and innovation with a focus on one or the other as determined by the field from which the model is drawn; in many of these divergent models, a high degree of intersection can be identified within the concepts depicted.

The purpose of a model is to simplify complex processes or describe relationships between interrelated constructs; much of the OL literature places emphasis on the importance of transferring knowledge in tacit form or embedding it into processes and organisational routines (Nonaka, 1991), describing a complex relationship between knowledge and learning that spans KM and OL. Huber (1991) views OL as a series of three processes: knowledge creation or acquisition, knowledge dissemination, and knowledge use. This view again implies the interdependent relationship that exists between OL and KM, and also makes implicit reference to innovation as a process outcome. Crossan, Lane and White (1999) suggest that OL links cognition and action, differentiating it in this regard to KM and other fields that they argue deal only with cognition. It might also thus be argued that a directional relationship exists, where OL links KM (cognition) to innovation (action) by providing a means for members to learn from the organisation’s collective experience and act upon that information in a new way.

Innovation has itself been modelled as a knowledge-centric process. One such model focuses on sharing tacit knowledge in a social process that, in a manner reminiscent of OL models that aim to make individual cognitive processes a shared experience, employs shared concepts and metaphors, ideation and empathic design to develop an emergent understanding (Leonard & Sensiper, 1998; Leonard-Barton, 1995).

Regardless of the approach taken to the problem, the processes underlying each of KM, OL and innovation can scarcely be discussed without trespassing on theory sometimes considered the domain of one or the other field. It would be remiss to consider the shared learning process without thinking of how to manage the knowledge in question; it is short sighted to look to manage knowledge without thinking of the use to which that knowledge will be put. It is clear that the three fields converge at this point; a purposive effort to integrate the related concepts is likely to provide increased understanding of the issues involved.

DIMENSIONS OF INTERDEPENDENCE

It becomes clear, having addressed the literature to this point, that at one level a high degree of integration exists between KM, OL and innovation as fields of academic endeavour. A number of similarities, or convergences, can be identified. The domain that each occupies, for example, is similar – perhaps divided only by the paradigm adopted during the evolution of each field and the current location each occupies in most organisations. There are clear links between the fields and the interaction each has with organisational size, structure, and culture, and there are similarities between the type and process models adopted to describe each. Perhaps, if anything, the need to bring these fields together – to seek consilient frameworks and principles that might guide the development of intellectual and informational resources within organisations for the purpose of enhancing its capacity to effectively achieve their goals – has if anything been underestimated.
Drivers of and Barriers to Integration

The following table identifies a number of the barriers to and drivers for integration that the authors perceive from this and previous work. The second phase of this research project, addressed in a later paper, seeks to test the validity and relevance of a number of these items within the Australian workplace.

Table 2: Barriers to and Drivers for Integration

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<th>Domain</th>
<th>Barriers to Integration</th>
<th>Drivers for Integration</th>
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| Practice (i.e. within organisations) | • Concerns over loss of relevance (and thus jobs).  
• Reduced costs equates to reduced budgets, limiting activity in a given area.  
• Disciplinary allegiances.  
• Historical allegiances to specific areas.  
• Political (domain) conflict.  
• Conceptual challenge of integrating know-how from other areas (learning new vocabularies, re-learning critical concepts). | • Desire for greater coordination and control of intellectual and informational resources and resource development.  
• Cost reduction in intellectual and informational resource development (likely through less duplication of activity and related processes).  
• Desire for ‘turf’, i.e. an increase in relevance or domain for individual practitioners.  
• Increasing importance of KM, OL and innovation to the development and maintenance of competitive advantage within (often increasingly mature) markets. |
| Academe (i.e. within specific disciplines) | • Disciplinary allegiances.  
• Historical allegiances to specific areas.  
• Concerns over loss of relevance.  
• Conceptual challenge of integrating an extremely large body of work from the three distinct disciplines into a unified whole. | • Desire to improve understanding of the concepts related to KM, OL and innovation.  
• Desire for ‘turf’, i.e. an increase in relevance or domain for work in a given field.  
• Renewed interest in KM, OL and innovation as a source of competitive advantage. |
| System (i.e. systemic issues within overriding frameworks) | • Systemic pressures for differentiation and fragmentation within increasingly complex organisations. | • Counter-pressures from integration and consilience within those same organisational systems. |

CONCLUSION

Knowledge management fuels effective organisational learning processes that help shape an appropriate environment and enable innovation. These processes – KM, OL and innovation – are unlikely to occur separately from one another; given their interdependence, continued development within each of the areas depends to some extent to what can be learned from its counterparts. Whilst this paper has sort to clarify the relationship between KM, OL and innovation, and to identify some of the drivers for and barriers to integration of those bodies of work, further investigation is required to understand how these drivers and barriers effect practical intellectual and informational resource management. To this end, the second phase of this research will seek to extend our understanding of these problems with specific reference to the Australian workplace.
REFERENCES


