1
The Search for an Integrated KM Framework

Meliha Handzic and Helen Hasan

The learning and knowledge that we have, is, at the most, but little compared with that of which we are ignorant.

Plato

Knowledge management (KM) is a vital and complex topic of current interest to so many in business, government and the community in general, that there is an urgent need to expand the role of empirical research to inform knowledge management practice. However, one of the most striking aspects of knowledge management is the diversity of the field and the lack of universally accepted definitions of the term itself and its derivatives, knowledge and management. As a consequence of the multidisciplinary nature of KM, the terms inevitably hold a difference in meaning and emphasis for different people. The initial chapter of this book addresses the challenges brought about by these differences. This chapter begins with a critical assessment of some diverse frameworks for knowledge management that have been appearing in the international academic literature of many disciplines for some time. Then follows a description of ways that these have led to some holistic and integrated frameworks currently being developed by KM researchers in Australia.
Introduction

Knowledge management is a new and exciting topic of academic research that has been adopted, over the past few years, by many diverse discipline areas, with a variety of points of view. In practice, KM is a cross-functional area in organisations and there is disagreement as to whether it should be considered a technical issue, a human resources issue, a procedural issue or a part of strategic management (Bollinger & Smith 2001). Popular business literature portrays knowledge management as an innovation with the potential to affect the whole of an organisation’s business, especially its processes and information systems (De Grooijer 2000). From a contemporary corporate perspective, knowledge management can be seen as a radical management approach for achieving cultural change in an organisation. In the current turbulent commercial environment, many firms are recognising that their organisational knowledge is an important resource for corporate success (Holsapple & Joshi 2000).

The background of most of the authors of chapters in this volume is in Information Systems (IS) and this is reflected in much of their approach to KM. Indeed, advances in information and communication technologies (ICT) have no doubt heightened the interest in knowledge as a strategic resource and knowledge management can be viewed as the latest in a long line of applications of ICT for the provision of business solutions in organisations (Bollinger & Smith 2001). From an ICT perspective, knowledge is the top of the data-information-knowledge hierarchy where information is meaningful, processed data and knowledge is information that is actionable. However, knowledge management encompasses much more than just technical disciplines, and the variation between different schools of thought on knowledge management is an indication of the problems to be faced. A recent sequence of articles has attempted to summarise and categorise the diverse approaches to organisational knowledge and knowledge management (for example Alavi & Leidner 2001, Earl 2001, Holsapple & Joshi 1999, McAdam & McCreedy 1999).
As a starting point for our search for an integrated KM framework, the following definitions are considered useful.

“Knowledge management caters to the critical issues of organisational adaptation, survival, and competence in face of increasingly discontinuous environmental change. Essentially it embodies organisational processes that seek synergistic combination of data and information processing capacity of information technologies and the creative and innovative capacity of human beings.”
(Malhotra 2000)

“The objective of knowledge management is make the organisation act as intelligently as possible and realise the best value from its knowledge assets, ie create a learning organisation that is capable of measuring, storing and capitalising on the expertise of employees to create an organisation that is more than the sum of its parts”.
(Bollinger & Smith 2001)

These statements allude to the complexity of the interplay between people and technology in innovative organisational processes. They suggest that, in knowledge management projects, it is critical to focus on human activities in pursuit of business objectives and to recognise the influence of the context in which this takes place, in particular the current changing environment where people work both as individuals and in communities of practice.

What is Organisational Knowledge?

Just as there is disagreement in the definition of KM, there are diverse views on the management and creation of organisational knowledge or at least what people perceive that knowledge to be.

There are two distinct views of organisational knowledge. One view sees knowledge as an object that can be codified and then stored in a computerised system to be made available on demand, and so the fundamental purpose of all knowledge management activity is to acquire, capture, access and reuse knowledge throughout the organisation. The implication is that knowledge can be separated from its source and context. The
other distinct view says that knowledge can only reside in people and that knowledge management allows individual knowledge seekers to identify and communicate with knowledge sources, i.e. experts. The implication here is that group knowledge is simply the sum of the knowledge of its members and the goal of knowledge management is to create a connected environment for knowledge exchange in a corporate memory.

<table>
<thead>
<tr>
<th>focus/description</th>
<th>Administrative-pragmatic</th>
<th>Epistemologically-sourced</th>
<th>Economically-oriented</th>
</tr>
</thead>
<tbody>
<tr>
<td>focus/description</td>
<td>represent useful knowledge stocks and flows</td>
<td>are sophisticated, and scientifically grounded,</td>
<td>recognise competitive or survival value of knowledge</td>
</tr>
<tr>
<td>examples/knowledge types</td>
<td>-basic, applied; -product, customer, competitor, etc.; -data, information, knowledge, wisdom hierarchy;</td>
<td>-object, personal; -embrained, embodied, encultured, embedded, encoded; -formal, instrumental, informal, contingent, tacit, meta-knowledge;</td>
<td>-employee competence, internal structure, external structure; -know-what, why, who, when, where, how;</td>
</tr>
<tr>
<td>applications/benefits</td>
<td>audit, accounting, reporting</td>
<td>research, improved understanding</td>
<td>economic activity, strategic planning</td>
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</table>

Various existing knowledge classification systems can be grouped into three main clusters as shown in Table 1.1: administrative-pragmatic, epistemologically-sourced and economically-oriented classifications (Johnston, 1998).
Administrative-pragmatic classifications (Alavi & Leidner, 2001) simply represent a valuable picture of knowledge stocks and flows, but do not provide a sound basis for evaluation or strategic planning. Examples include knowledge about customers, products, processes and competitors; architectures, technology and business frameworks; project experiences; and tools used to implement a process.

Epistemologically-sourced classifications have largely emerged from the sociology of scientific knowledge and offer more sophisticated and grounded categories of knowledge. The examples include Blackler’s (1995) five knowledge categories: embrained (abstract, scientific), embodied (action oriented, transmitted face-to-face, rooted in context), encultured (shared understanding, socially constructed), embedded (resides in routines, relationships and technology) and encoded (recorded in signs and symbols, distilled). An alternative classification by Fleck (1997) proposes six knowledge categories: formal (coded, acquired through formal learning), instrumental (embodied in tool use, learnt through practice), informal (embodied in verbal interaction, learnt through interaction in context), contingent (context specific, acquired by on-the-spot learning), tacit (embodied in people, learnt through experience and mentorship) and meta-knowledge (embodied in organisational values, acquired through socialisation). These classifications hold considerable promise for the improved understanding and the development of improved models of knowledge management.

Economically-oriented approaches to the classification of knowledge focus on economically useful definitions. In general, these classifications provide the basis for an improved understanding of knowledge contribution and act as instrumental guidance to economic activity. Examples include Sveiby’s (1997) intangible assets of a company in terms of its employee competence, internal structure and external structure. The alternative classification proposed by Lundvall and Johnson (1994) includes know-what, why, who, when, where and how categories. This system acknowledges that each of the categories
can contribute to achieving desired outcomes in the appropriate context.

While all these views of organisational knowledge are acknowledged, there is a need to integrate and reconcile the demands of each view in relation to the capacity of ICT to enhance knowledge creation and learning.

**The Challenge of KM Research**

In this chapter we take the stance that the principal motive for KM research is to reliably inform KM practice. Business managers are often sceptical of the immediate practical value of academic research and so it is incumbent on researchers to allay that scepticism, at least in those who practise KM, for the following reason.

While there is a widespread belief that knowledge management is important to organisations in their struggle for economic success, there is little shared understanding of the phenomenon itself or proven techniques for managing the knowledge resource in organisations. Until such techniques become reliable, organisations are relying on anecdotal methods emanating from the shared experiences of KM practitioners. However, there are dangers in placing too much dependence on the stories of others. These include:

- a lack of objectivity, as those involved in KM initiatives are not always the best judges of their long term benefits, and
- a lack of generality, as KM methods are usually context dependent and not easily transferred from one organisation to another.

Objectivity and generality can be achieved through rigorous research such as that conducted in the management and information sciences. Academic research is a time-consuming process and published outcomes are not always of interest to practitioners who need immediate working solutions. However, they are surely a sounder basis for long-term knowledge management and should be supported.
In the research arena, objectivity can be achieved through a range of controlled studies, which can reliably establish what works, and what doesn’t, and under what circumstances. Once a substantial collection of such studies has been published, general concepts can be identified, leading to integrated frameworks and models that can then be tested, leading to proven practical applications.

Researchers in Australia have for some time been investigating the relationship between the diversity of KM issues, models and frameworks through case studies, analysis and experiments. Presented here is what they have determined to date, particularly in the light of the Australian context, which tends to be more pragmatic than either Europe or the USA and emphasises action or process-oriented frameworks.

**An assessment of existing KM Frameworks**

This section of the chapter gives an overview of the diversity of existing KM models and frameworks. In order to make sense of the variety of existing KM frameworks, some form of categorisation or grouping is needed. There are three groupings of knowledge management models in the KM review of McAdam and McCreedy (1999), namely: knowledge categories models, intellectual capital models and socially constructed models of KM. Earl’s (2001) taxonomy of KM strategies identifies three schools, the technocratic, economic and behavioural which are similar in turn to the three groupings of McAdam and McCreedy and so here they will be treated as approximately equivalent to the McAdam and McCreedy groupings. An alternative view can be seen in Alavi and Leidner’s (2001) MISQ review which identifies six knowledge perspectives and ten knowledge types, much in the mould of knowledge categories and will be dealt with here as belonging to that grouping. This review then discusses KM processes of knowledge creation, storage and retrieval, transfer, application and the enabling role of IT in KM initiatives. This identifies a fourth grouping of models and frameworks, which focus on knowledge processes and enablers.
The concept of a knowledge management life cycle belongs in this grouping.

<table>
<thead>
<tr>
<th>Source</th>
<th>Approach</th>
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<tbody>
<tr>
<td>Alavi &amp; Leidner 2001</td>
<td>six knowledge perspectives and ten knowledge types</td>
</tr>
<tr>
<td>Earl 2001</td>
<td>technocratic, economic and behavioural schools of KM</td>
</tr>
<tr>
<td>McAdam &amp; McCreedy 1999</td>
<td>knowledge categories, intellectual capital and socially constructed models of KM</td>
</tr>
<tr>
<td>Nonaka &amp; Takeuchi 1995,</td>
<td>knowledge processes and</td>
</tr>
<tr>
<td>Nonaka &amp; Kono 1998</td>
<td>enablers frameworks of KM</td>
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The intellectual capital model group of McAdam and McCreedy and the Economic School in Earl's taxonomy are well known in the business environment. The HR literature relies heavily on this grouping of KM models and frameworks, as does the Accounting discipline's work on intangible assets. From this perspective, KM focuses on hiring, retaining, training of personnel, ie 'intellectual assets'; and organisational knowledge is defined as the sum of the knowledge of its personnel. The framework of De Grooijer (2000), using the concept of performance scorecards, would fit into this grouping. However in the broader view of KM, this is just one aspect that would be included in an integrated approach.

The categorisation grouping of McAdam and McCreedy (Earl's Technocratic School) of models and frameworks, support and structure a large body of research into KM. The data-
information-knowledge hierarchical is one category at the foundation of much KM work within the field of Information Systems, as is the distinction between knowledge as an object, that can be stored in a computerised system, and knowledge embedded in people. Other categories of dimensions of knowledge are structured (v unstructured) codified (v uncodified), diffused (v undiffused) in addition to the types and perspectives list in Alavi and Leidner’s (2001) review.

Another interesting categorisation of KM is the universalistic versus contingent view. The universalistic view of knowledge management is based on the widely-held belief that knowledge processes and a variety of tools and methodologies for promoting the creation, sharing and leveraging of knowledge are universally appropriate. For example, each of the four Nonaka’s (1995) knowledge processes (internalisation, externalisation, combination and socialisation) is expected to enhance the effectiveness of knowledge management by providing individuals and groups in organisations with the knowledge needed to perform their tasks.

The more recent research by NASA (Becerra-Fernandez and Sabherwal, 2001) departs from the above-mentioned universalistic perspective by arguing that the effectiveness of a knowledge management process depends on the context in which the knowledge is being used. Taking the contingent theoretic approach, the NASA study focuses particularly on one aspect of the context, namely the nature of the task performed by the individuals and groups using knowledge resulting from the knowledge management processes.

Empirical results of the NASA study provide considerable support for the contingent view of knowledge management. In particular, the study indicates that the process of internalisation is only appropriate for focused and process-oriented tasks; combination for broad, content-oriented tasks; and socialisation for broad process-oriented tasks. However, the empirical support for the appropriateness of externalisation for focused and content-oriented tasks is lacking.
These findings suggest the need for developing and testing broader and more general contingency models of knowledge management that would include other contingent factors such as industry and product characteristics, business strategy and organisational structure, as well as various knowledge management tools and processes. The Handzic integrated framework, presented later in this chapter, is an example of one such broad and general contingency model of knowledge management.

The Knowledge Creation Spiral: a Popular basis of KM

Perhaps the most frequently quoted and used category in the knowledge management literature is that which distinguishes tacit from explicit knowledge based on Polanyi’s (1966) original concepts. This has led to the knowledge creation spiral of Nonaka and Takeuchi (1995) which views organisational knowledge creation as a process involving a continual interplay between explicit and tacit dimensions of knowledge. Four levels of carriers of knowledge in organisations are assumed, namely individual, group, organisational and interorganisational. The model presented in Figure 1.1 describes a dynamic process in which explicit and tacit knowledge are exchanged and transformed through four modes. Socialisation enables tacit knowledge to be transferred from one individual to another. Combination allows the existing explicit knowledge to be combined into new explicit forms. Externalisation converts tacit knowledge into explicit knowledge in the forms of concepts and models. Internalisation allows individuals to absorb explicit knowledge and broaden their tacit knowledge so that new knowledge could be developed. Subsequently, Nonaka and Konno (1998) introduced the concept of ‘ba’, a Japanese word with a special meaning of the concept of ‘place’, to address the question of fundamental conditions for knowledge creation. They suggested that four types of ‘ba’ (originating, interacting, cyber and exercising) act as promoters of processes of socialisation, externalisation, combination and internalisation, and so enable knowledge creation.
The dynamics and scope of the Nonaka model, enhanced by the concept of ‘ba’, brings it from a knowledge category model, with just the two categories of tacit and explicit knowledge, into the realm of the socially constructed group of McAdam and McCreedy or the Behavioural School of Earl’s taxonomy. This group of models or frameworks addresses issues of complexity and change in areas of organisational culture and learning, change and risk management and the support of communities of practice. Research methods used to construct and test these models are often qualitative and interpretive with the resulting frameworks more descriptive than prescriptive for the KM practitioner. Frameworks in this KM grouping emphasise the dependence of knowledge on context.

The message of this overview of grouping of KM approaches is that KM Frameworks can encompass a broad range of issues, methods and theories. A recent review (Baxter and Chua 1999) reveals that western theorists show central preoccupation with codified repositories and information processing as enablers of ‘explicit’ objective and systematic knowledge. Eastern theorists,
on the other hand, focus more on ‘tacit’ knowledge that people derive from their experiences and through sharing. There is an obvious need to integrate this diversity of approaches to provide improved methods of KM in business practice.

It is argued here that there is a need for frameworks that will provide researchers with a holistic view, common ground, consistent terminology and units of analysis across a variety of research settings (Holsapple & Singh 2000). There is also a need for frameworks that can help practitioners to understand the sorts of knowledge management initiatives or investments that are possible and to identify those that make sense in their context (Earl 2001). According to Davenport and Prusak (1998) it is only possible to realise the full power of knowledge by taking a holistic ecological approach to knowledge management. Accordingly, this chapter brings together various perspectives on knowledge management and proposes a unifying research framework based on descriptive and inductive inquiry.

**KM in the Australian Context**

Australia has recently embraced the concept of KM with as much enthusiasm as any country in the world. The academic community has held annual KM conferences, AKMIDS, since 2000 and there is a considerable growth of KM within the information systems community, with a KM panels at many IS conferences and a special issue on KM in the Australian Journal of Information Systems in 2002. Standards Australia holds a series of workshops to bring the practising KM community together and have hosted an annual KM Challenge since 2002.

There are several projects worldwide working on standards for KM (in Britain, Europe, South Africa, Asia and the USA). Australia is well advanced in its process with an Interim KM Standard released in 2003 and the full Standard due in 2004. Some aspects of the Standard will be discussed in Chapter 16. The standards project aims to provide a national focal point for KM and to stimulate Australian advances in the area. The Standard initiative followed the publication by Standards
Australia of a preliminary document on KM (Standards 2001) developed with input from an extensive list of Australian KM researchers and practitioners and included the integrated KM framework shown in Figure 1.2.

![Figure 1.2 The KM Framework (Standards 2001)]
To illustrate the diverse directions of KM research in Australia, the authors of this chapter present contrasting approaches toward an integrated KM. Each will now be described followed by an indication of how it would apply in practice.

Handzic’s (2001a) framework incorporates the know-what and know-how dimensions of working knowledge. Working knowledge is affected by knowledge processes termed generate, transfer and apply. Technological and organisational factors act as knowledge enablers that influence knowledge processes.

Hasan’s approach will bring together KM models and frameworks based on socially constructed paradigms of KM. These will be related to a holistic view of KM based on a theory of the human activity.

The Handzic Integrated KM Framework

An integrated model of knowledge management adapted from Handzic (2001a) brings together different approaches to knowledge management and extends the initial work by Handzic and Jamieson (2001). The proposed framework shown in Figure 1.3 depicts main model components and their inter-relationships.

**Model Components**

The core of the framework is the concept of *organisational knowledge*. It is defined as knowledge that an organisation should possess and utilise to sustain success. Previous discussions suggested two important considerations in managing knowledge: where does knowledge reside; and what is the nature of knowledge. These two considerations were used as the basis for present categorisation. The result can be viewed as a two-by-two matrix with ‘explicit’ and ‘tacit’, ‘know-what’ and ‘know-how’ knowledge dimensions. Explicit knowledge is defined as knowledge that has been externalised and exists in knowledge artefacts. Tacit knowledge, on the other hand, is defined as knowledge embodied within the minds of individual organisational members. This view of tacit knowledge is different
from traditional (Nonaka and Takeuchi 1995, Polanyi 1966) in the sense that it includes all knowledge held in people's heads, regardless of how hard or easy it is to articulate and communicate. This is the view adopted by the de facto school of thought, equating tacit knowledge with uncodified knowledge, as opposed to the difficulty school of thought promoting the notion that "we know more than we can tell" (Hedensstrom and Whitley, 2000). With respect to the nature of knowledge, know-what is conceptualised as cognitive knowledge that describes the state of some world, while know-how refers to technical knowledge, a step-by-step procedure for accomplishing some task.

![Figure 1.3. An Integrated Knowledge Management Framework (Handzic)](image)

Drawing from previous research, the framework distinguishes between three generic types of knowledge processes: those that generate new knowledge; those that transfer the existing knowledge; and those that utilise possessed knowledge to produce new knowledge. These generic processes have been derived by clustering together a number of similar processes discussed in literature. For example, new knowledge can be generated through creative thinking, study, experimentation and learning-by-doing, or through identifying novel and potentially useful patterns in captured data, and expressing them in an understandable form. Knowledge may be transferred by a social
process in which the newly acquired tacit knowledge is passed among people through person-to-person interaction. Alternatively, it can be passed on through knowledge capture and encoding of the tacit knowledge in the form understandable to a wider human audience, and the subsequent person-to-document interaction.

The framework further proposes two broad groups of socio-technological factors as major knowledge enablers. These include organisational environment and technological infrastructure. Most important factors within the organisational environment category include organisational structure, leadership and culture. Technological factors, on the other hand, cover a wide range of information and communication technologies and systems that provide a platform for knowledge processes. This broad classification of knowledge enablers helps organise various individual factors in a more meaningful way, as well as bring together different schools of knowledge management (Earl 2001, Alavi & Leidner 2001). Finally, the model incorporates a knowledge measurement factor in the form of a feedback loop to suggest the need for continuous knowledge audit and potential adjustment of knowledge management strategies over time.

Relationships between Model Components

The framework suggests that organisational knowledge is both the output and the input of knowledge processes. For example, explicit know-what that comprises concepts and theories captured in organisational databases or documents is a product of knowledge articulation and systematisation attempted to transfer knowledge among organisational members. Explicit know-how that includes rules and methods stored in model databases and manuals, or embedded in organisational procedures is an output of reinforcement and routinisation. Tacit know-what consists of individual or collective ideas and beliefs of organisational members built through sharing, while tacit know-how represents their instincts and expertise generated through long term personal experience
or coaching. The possessed knowledge may also be an input into knowledge utilisation process, which in turn, may lead to new knowledge output.

The important aspect of this framework is its recognition of the contingency nature of the effectiveness of knowledge processes upon the context in which the knowledge is generated, transferred and used. It suggests that two groups of socio-technological factors act as major knowledge catalysts that enable or facilitate knowledge processes and thus contribute to knowledge output. The primary role of interventions with respect to organisational structure, culture and leadership, is seen in creating an organisational environment conducive to knowledge development. It has been assumed that open networked structures, collective cultures and strong leadership all have positive impact on knowledge creation, transfer and application (Fink 2000).

The framework also suggests that the availability of information and communication technologies should have a positive impact on knowledge processes. Technological infrastructure is perceived as an enabling tool in facilitating knowledge sharing, representation and transformation, as well as improving people’s ability to acquire knowledge. By providing a network platform for collection, communication and analysis, it is expected that the technology would help people share and transfer knowledge (Davis 1998), as well as play an important role in knowledge repositories, data mining and decision support systems (Hahn & Subramani 2000).

Furthermore, the framework emphasises the importance of continuous knowledge measurement at multiple individual and collective levels. By developing and implementing a multi-tiered, multidimensional approach to measurement, organisations should be able to better position themselves for future success. Good measures can provide focus, operationalise goals and strategies, and set standards. They can help organisations to evaluate their key professional competences and intellectual capital efficiency (Sveiby, 1997), as well as assess past, monitor

Finally, the framework proposes that organisational environment impacts the choice of technological infrastructure for implementing knowledge strategies. The proponents of a personalisation strategy are expected to invest primarily in communication technologies that connect people and support sharing of tacit knowledge through interpersonal interaction. On the other hand, the proponents of codification are more likely to select information technologies such as data warehousing under the assumption that knowledge can be effectively extracted, codified, stored, and indexed for later retrieval and use (Hanson et al. 1999). Recent laboratory research into the knowledge-process-enabler model of KM provides empirical support for the proposed relationships (Handzic 2000, 2001b).

Best Knowledge Management Practices

The Handzic integrated knowledge management framework suggests that organisational knowledge is enhanced through a series of interrelated processes of knowledge creation, transfer and utilisation. Companies that implement these processes may exhibit some of the following characteristics: systematic identification of knowledge gaps and well-defined processes to close them, development of sophisticated and ethical intelligence-gathering mechanisms, involvement of all workforce in looking for ideas, formalising the process of capturing and transferring knowledge, including documentation and lessons learnt, valuing and transferring tacit knowledge across the organisation through encouraging experimentation and socialisation.

According to this framework, knowledge processes are facilitated by a conducive organisational environment, that is usually demonstrated in terms of a strong leadership support and a collaborative organisational culture. The examples of leadership support may include: recognition of the central importance of managing knowledge to organisational strategy, understanding and developing marketing and selling strategies
that recognise the revenue-generating potential of the organisational knowledge assets, encouraging learning to support existing and create new competencies, developing human resources plans and reward schemes based on the contribution to the development of organisational knowledge. The evidence of a collaborative culture may include the environment that encourages and facilitates knowledge sharing, where a climate of openness and trust exists, where service value creation is the main objective of KM, where flexibility and a desire to innovate drive the learning process, and where employees take responsibility for their own learning. The following case study illustrates a good example of the knowledge-conducive organisationl environment.

The integrated framework also suggests that technological infrastructure has the potential to enable or facilitate knowledge processes by providing a platform for knowledge capture or sharing. Some examples of how technology can be successfully used to facilitate knowledge processes include: linking all members of the company to one another and to all relevant external stakeholders, creating an institutional memory that is accessible to the entire organisation, linking the organisation with its customers and partners, supporting collaboration among employees, fostering human-centred, real-time, integrated and smart systems.

Finally, the framework suggests the need for continuous knowledge measurement in order to monitor and adjust an organisation’s knowledge management strategy over time. Implementing good knowledge measurement practices is usually evidenced in finding ways to link knowledge management to financial results, developing specific sets of indicators to manage knowledge, including a balanced set of soft and hard, financial and non-financial indicators, as well as by allocating resources towards efforts that measurably increase organisational knowledge base.
The Hasan Holistic KM Framework

A team at the University of Wollongong has been using the Cultural Historical Activity Theory to conduct research into the socio-technical aspects of Information Systems and Human-Computer Interaction since the early 1990s. The Hasan approach to KM is a continuation of this work.

The Cultural-Historical Activity Theory, or Activity Theory for short, emerged from the work of the Russian psychologist Vygotsky (1978) during the first half of the 20th century and his student Leontiev (1981). The latter developed a holistic conceptual framework for a complete theory of human activity that is widely used in many fields today. In this theory, the pragmatic concept of ‘Activity’ is simply what people do, defined as the relationship between ‘Subjects’ (people) and ‘Objects’ (purpose). This relationship is mediated by ‘Tools’ (artefacts, language, ideas, models) and the ‘Community’ (context, environment, culture) which defines the rules and roles within which the subjects act. A common representation of ‘activity’ is shown in Figure 1.4.

![Figure 1.4. The Components of an Activity](Engström, 1987)
The psychological theory of Vygotsky, on which Activity Theory is based, has well-developed notions of human development that has parallels in Nonaka’s notion of knowledge creation described previously in this chapter. Two fundamental concepts of the theory are internalisation and externalisation, recognising that all human knowledge is socially constructed. The concept of internalisation is described by Vygotsky as the underlying mechanism for the origin of mental processes (eg thinking and learning). Mental processes are derived from socially mediated external actions through the course of internalisation. The process of externalisation relates to the dependence of overt human action on the planning and knowledge that takes place in the internal mental processes of the person performing the action.

Of particular interest to IS researchers is the concept that the subject-object relationship at the core of an activity both mediate, and is mediated by, the tools used and the social context of the work activity. This two-way concept of mediation implies that the capability and availability of tools, such as ICT, mediates what is able to be done and the tools, in turn, evolves to hold the historical knowledge of how the community behaves and is organised. It is through this process that learning occurs, both in the individual and in the society as a whole. Internalised concepts then become psychological tools that are manipulation in the Internal Plane of Action (IPA). The IPA is a concept developed within Activity Theory that refers to the human ability to perform manipulation with an internal representation of external objects before starting actions with these objects in reality. IPA is more general than the cognitive concepts of working memory and mental models and is well suited to the analysis of the processes of dealing with the ‘messy’, unstructured problems of communities of practice in the modern workplace. Kaptelinin (1996) views computer tools as an extension of the IPA of individuals and provides a platform for the collective IPA of groups of people. Information Technology thus provides the basis for tools that are unique in the history of human activity.
Figure 1.5: Four levels of contradictions in a network of human activity systems

The dynamic nature of the activity-based approach is demonstrated in the work of Engetrom (1987) who uses activity as a unit of analysis in his research into developmental work in organizations. In longitudinal case studies in the workplace, he follows the progress of a dominant activity, with any interacting secondary activities, as an activity system (idealised in Figure 1.5). Learning occurs from contradictions and tensions within and between the activities and their environment, which Engestrom depicts in the Cycle of Expansive Learning (Figure 1.6) as the dominant activity evolves into a more advanced form after one cycle.
Several international research teams have successfully applied Activity Theory Frameworks to areas such as organisational theory (Blackler 1993), organisational learning (Engestrom 1999), organisational memory (Kuutti & Virkkunen 1995) and organisational sense-making (Hasan 2000). Hasan’s activity-based approach to KM is cognisant of the similar work of two other research groups in Australia: namely Warne, Ali and Pascoe at the Defence Scientific and Technology Organisation (DSTO) with Linger, at Monash University (see chapter 9), and Cecez-Kecmanovic and Jerram, at the University of Western Sydney (see Chapter 4). The Hasan approach provides a framework for collections of people in organisations engaged in innovative activities that contribute to learning and knowledge creation. This emphasises that close relationship
between learning and doing as eloquently described in the following popular quotation:

“The great end of life is not knowledge but action. What men need is, as much knowledge as they can assimilate and organise into a basis for action; give them more and it may become injurious.” Thomas Henry Huxley.

The appeal of an Activity Theory framework for KM is the way it integrates disciplines that are traditionally distinct in Western research cultures, for example psychology and sociology, social and engineering sciences, technical and business. It brings together thought and action, individual and group-level phenomena, sense-making and culture, into a dynamic view of knowledge in support of work activity.

**An Activity-Based Knowledge Management System (KMS)**

A practical outcome of research into the application of Activity Theory to KM, published by the author has involved that development of an activity-based architecture to be used as the basis of a KMS (Hasan 2000, 2003; Hasan & Gould 2001, 2003). This architecture combines the elements the activity systems of Engeström from Figures 1.4 listed in Table 1.3, the activity-action hierarchy of Leontiev (see Figure 1.7 below) and the relationships between activities shown in Figure 1.5. These have been integrated into a workable architecture that has been implemented as an activity based KMS for innovative groups.

It should be made clear that activities are usually associated with long-term functions of the group and always have a significant purpose or ‘object’. Leontiev’s hierarchy, shown in Figure 1.7, plays a useful role in distinguishing between ‘activities’, driven by motives, and the other levels of the CHAT hierarchy. Activities, at the top of the hierarchy, are carried out by means of ‘actions’, undertaken to achieve specific ‘goals’, while ‘operations’, at the bottom of the hierarchy, are the steps used to perform ‘actions’ under specific ‘conditions’. Operations are the easiest to automate and can often be built into an ICT system.
Table 1.3 Components of Activities

<table>
<thead>
<tr>
<th>Component</th>
<th>Definition and Clarification</th>
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<tbody>
<tr>
<td>object</td>
<td>the purpose and motives that define the activity.</td>
</tr>
<tr>
<td>subjects</td>
<td>the person or people who carry out the activity</td>
</tr>
<tr>
<td>outcomes</td>
<td>both intended and unintended results of carrying out the activity</td>
</tr>
<tr>
<td>tools/instruments</td>
<td>both physical and non-physical instruments that are used in the conduct of the activity</td>
</tr>
<tr>
<td>community</td>
<td>the community in which the subjects carry out that activity</td>
</tr>
<tr>
<td>rules</td>
<td>the formal and informal rules that the community imposes on the subject</td>
</tr>
<tr>
<td>division of labour</td>
<td>relationships in the community that determine the roles that subject have in carrying out the activity</td>
</tr>
</tbody>
</table>

Figure 1.7 The Hierarchical Structure of Activity (Leontiev 1981)
There is often a major challenge in making the distinction between activities and actions, as well as appreciating their dynamic nature where, under different circumstances, actions can become activities and vice-versa. Experience dictates that this distinction is best explained with examples, the classic one being Leontiev’s example of learning to drive a car (Leontiev 1981). The point Leontiev makes is that to an accomplished driver, driving a car is rarely an activity in itself but just an action with a goal “to get somewhere” as part of some more meaningful activity. However when one is learning to drive, driving itself is the activity where the learner (the subject) has “being able to drive” as the object of that activity. The ability of a work-group to manage and create knowledge can be greatly facilitated by making the distinction between activities and actions, and then to ensure that the main focus of KM is on the activities and not the actions. A group can usually agree on what its activities are, but not always on the specific goals-oriented actions. Different people can effectively achieve good outcomes from the same activity, using different sets of actions.

Relationships between activity systems have been the topic of much of Engeström’s research, and Figure 1.5, taken from his work, is a useful guide as it shows some typical relations between one activity and its neighbours. In this diagram there is a central activity and five others, although there could be more. Three of these, those on the left, are quite straightforward. The instrument-producing activity creates the tools to be used by the central activity. For example a curriculum development committee may produce a curriculum that is used by the central activity of a teaching unit. The subject-producing activity could be one to train people for specific skills used in the central activity. Similarly the rule-producing activity could produce rules or guidelines that govern how members of the group should act when conducting the central activity, for example they might determine how people handle disputes in their community. The relationship that has guided most of Engeström’s research into learning by
expanding, is shown at the top right of Figure 1.5, where a new activity is a more advanced form of an older activity.

Most groups have one or very few core activities such as those that are identified in the group’s mission statement. The activity-based approach begins by identifying these activities by their purpose, for example the main activity of our group is to conduct research into KM. The subjects (people) engaged in that activity are then identified, the intended outcomes are established as well as the tools (resources) required by the activity. In addition, there are other activities conducted by the group that must be identified. These activities usually support the central activities, such as group management, or result from the central activities, such as publishing reports of outcomes.

<table>
<thead>
<tr>
<th>Table 1.4</th>
<th>Elements of the Activity-Based Architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activities: who is doing what, for what purpose</td>
<td></td>
</tr>
<tr>
<td>Elements of each activity as listed in Table 1</td>
<td></td>
</tr>
<tr>
<td>Relationships between those activities.</td>
<td></td>
</tr>
<tr>
<td>Actions and Operations by which Activities are carried out</td>
<td></td>
</tr>
<tr>
<td>An historical record of the above elements</td>
<td></td>
</tr>
</tbody>
</table>

The activity-based architecture is summarised in Table 1.4. The architecture has been implemented in a KMS, which is currently being evaluated.

Concluding Issues

The frameworks of Handzic and Hasan are based on very different dynamic approaches to KM practice and research, and both continue to go through the processes of development and testing against objective empirical investigation. A good deal of
cross fertilisation is currently taking place between the approaches of KM research within Australia, which is leading to more integrated models and practical spin offs. The advances that have been made through rigorous research should lead to practical, generalised approaches to knowledge management with the prospect for future practical application.

It is encouraging that this research is converging on some common elements that appear to be crucial to successful KM. Firstly, all integrated KM frameworks are dynamic with an emphasis on knowledge processes and activities in expanding cycles of growth where, as shown in the Handzic model, continuous evaluation feeds back to impact on the processes of knowledge creation, transfer and application. Secondly, KM is always a socio-technical undertaking enabled by social, organisational and technical factors which must be considered in any KM initiative. Thirdly, KM is severely dependent on context so that there is no ‘one size fits all’ prescription but rather a key component of a general KM framework is the identification of context and choosing the appropriate KM processes and enablers for that context.

These three elements are emerging from rigorous research as the main building blocks of any integrated KM framework. They will therefore be used to provide the structure of the following chapters of this book.

References


Hededstrom, T. and Whitley, E.A. (2000), What is meant by tacit knowledge? Towards a better understanding of the shape of
actions, Proceedings of the European Conference on Knowledge Management (ECKM 2000).


