KNOWLEDGE MANAGEMENT MODELS AND THEIR
UTILITY TO THE EFFECTIVE MANAGEMENT AND
INTEGRATION OF INDIGENOUS KNOWLEDGE WITH
OTHER KNOWLEDGE SYSTEMS

Patrick Ngulube
University of South Africa, Department of Information Science, South Africa
ngulubep@gmail.com

Edda Lwoga
University of KwaZulu-Natal, Information Studies Programme, South Africa
207521242@ukzn.ac.za

ABSTRACT

Although indigenous knowledge is key to the development of sub Saharan Africa and the
preservation of its societal memory, it is fast disappearing due to a variety of reasons. One
of the strategies that may assist in the management and preservation of indigenous
knowledge is the utilization of knowledge management models. This article shows that
knowledge management models may also offer a window of opportunity to manage and
integrate indigenous knowledge into other knowledge systems. Despite the fact that
knowledge management models tend to focus on business or organizational settings with
formal structures, they may be adapted to manage knowledge in local communities.
Knowledge management should not be restricted to “closed” business systems with formal
structures. It can also be practiced in open systems or in “the wild” as expressed by
Hutchins (1995). However, the ways in which communities can access and manage their
knowledge assets remains a major challenge to those involved in the preservation and
management of indigenous knowledge.

Keywords: Indigenous knowledge systems, knowledge management models,
knowledge-creation processes, managing indigenous knowledge, integrating
local and external knowledge.

INTRODUCTION

Knowledge has widely been acknowledged as one of the most important factors
for sustainable development. The fact that indigenous knowledge and
indigenous knowledge systems can contribute to the sustainable development of
society is no longer debatable (Den Biggelaar 1991; Maila 2007; Ngulube 2003;
Payle and Lebakeng 2006; Shiruma 2004). Increasing attention is being given to
indigenous knowledge (IK) in the third world. The impetus behind the “renewed”
efforts to manage and preserve IK stems from the fact that (Toong Tjiek 2006:
123):

• west interested in IK more than before;
• erosion of belief that western knowledge had universal validity;
• rise of the knowledge economy with its emphasis on the development, production, distribution and use of knowledge and information (Vaile 2000);

• IK still poorly documented;

• dissemination of IK limited;

• inadequate policies for managing and preserving IK;

• IK collected in a haphazard manner;

• need to identify and collect local content; and

• growing ability of some indigenous people and their organizations to make their voices heard both in the national and international forums (Kalland 2000: 319).

Many scholars and developmental practitioners have turned to indigenous knowledge systems for illumination rather than, as they used to do, western codified knowledge. Despite the universal interests in IK by scholars they are not agreed as to what IK refers to. Scholars have used constructs such as indigenous knowledge, indigenous technical knowledge, ethnoecology, local knowledge, place-based knowledge, rural people’s knowledge, traditional knowledge, community knowledge, traditional ecological knowledge, traditional environmental knowledge, aboriginal tradition, cultural patrimony, folklore, expressions of folklore, cultural heritage, traditional medicine, cultural property, indigenous heritage (rights), indigenous cultural and intellectual property (rights), indigenous intellectual property, customary heritage rights, innovations and practices and popular culture or intangible components to refer to the concept (Ellen and Harris 2000: 2; Maila 2007: 76; WIPO 2002).

To Payle and Lebakeng (2006) IK is local knowledge, which is born out of the environment and a result of people interacting with their environment across cultures and geographical spaces. Stevenson (1996: 281) also described IK as a system that is based on the shared experiences, customs, values, traditions, subsistence lifestyles, social interactions, ideological orientations and spiritual beliefs unique to local communities. In a nutshell, IK systems are an inclusive repository or archive of the indigenous communities’ experiences and activities. The indigenous communities are “descendants of the original or pre-colonial inhabitants of a territory or geographical area and despite their legal status, retain some or all of their social, economic, cultural and political institutions” (Ermine, et al, 2004: 5).

Experience shows that development efforts that ignore IK systems generally fail to achieve their desired objectives (Brokensha, Warren and Werner 1980: 7-8; Mkapa 2004: 2). Limited documentation on IK poses problems for researchers, policy makers, human development practitioners (Dube and Musi 2002) and local communities. Hence, IK has been a system that is not fully utilized for development purposes (Morolo 2004; Prakash 2000). That necessitates a need to manage IK before it disappears altogether, since gaps or failures in the IK
Attempts to preserve knowledge of close to 7,000 indigenous societies around the world are being gradually made (cf. Hughes (2003: 20) cited in Ngulube 2003). The question of the best strategy to preserve and manage it has remained a contested field. For instance a pocket of some scholars believe that indigenous knowledge is too diverse to be managed (Kok 2005). To counter that proposition, some progressive scholars have demonstrated that there are many similarities between indigenous knowledge systems in Africa. For instance, Ayittey (2006: 20) pointed out that, “the basic African beliefs, political, legal, and economic institutions are strikingly and structurally the same across much of Africa”. That makes the development of generic IK management models feasible (Kok 2005; Ngulube 2003). Such models may contribute to the other strategies that have been formulated to manage and preserve IK in Sub Saharan Africa (SSA).

INDIGENOUS KNOWLEDGE VERSUS WESTERN KNOWLEDGE SYSTEMS

Colonial rule led to the dominance of Western knowledge systems in SSA at the expense of the indigenous ones. Rooted in its belief in the supremacy of Western thought and species, colonial rule totally ignored the indigenous knowledge systems. In the context of this article, Western knowledge refers to an “archive of knowledge and systems, rules and values” emanating from Europe and the Western hemisphere (Smith 1999: 42). The perceived differences between indigenous and Western knowledge systems led to the fallacious argument that the two were radically different and therefore it was anomalous to try and integrate them. Therefore, it was going to be suicidal for SSA to use Western models for managing its knowledge. That view still persists in some circles in the present decade. That outlook fails to acknowledge the fact that knowledge is just a condition of knowing something gained through experience, observation and engagement with the environment and nothing else (Maponya and Ngulube 2007: 76). Put differently:

Knowledge concerns the way people understand the world, the way in which they interpret and apply meaning to their experiences (Arce and Long 1992). Knowledge is not about the discovery of some final objective ‘truth’. It is the understanding of culturally subjective – conditioned products that emerge from complex and ongoing processes. Knowledge involves selection, rejection, creation, development and transformation of information. These processes, and hence knowledge, are inextricably linked to the social, environmental and institutional contexts they are found (Blaikie, et al, 1996: 218).

Knowledge can be both tacit and explicit irrespective of whether it is indigenous or Western. That is not to deny the fact that the knowledge validation mechanisms may differ from one society to another. The difference between knowledge in the Western tradition and indigenous knowledge is that the latter is
largely undocumented or unrecorded and predominantly tacit. Tacit and explicit knowledge depend on one another in a complementary way (Nonaka and Takeuchi 1995: 8). In fact the development of any form of knowledge is inseparable from tacit knowledge (Polanyi 1966). The notion of the universality of explicit knowledge and the validity of science and Western knowledge is questionable because knowledge is developed within a certain context and it tends to be an expression of social relations at a given point in human development (Higgs 2006).

All societies create, store, transfer and apply knowledge albeit in different formats and contexts. The aim of many societies is to make knowledge available to the appropriate people for better performance. Models of managing knowledge do not have to be differentiated on the basis of whether the knowledge is indigenous or external (Western) although they should be contextually relevant. What SSA needs to do is to adapt foreign systems to suit their local conditions. In other words, there is need to think globally and act locally. European and Asian firms are different, but they have used similar knowledge management (KM) models with reasonable success. The knowledge creation and conversion model of Nonaka, Toyama and Konno (2000) is based on Japanese experiences, but it widely accepted in the West as a meaningful model for managing knowledge. In that regard, there is need to learn from Western models in order to take the management of IK in SSA forward.

Admittedly, tacit knowledge is difficult to communicate and formalise because it is “highly context specific and has a personal quality” (Inkepen and Dinur 1998: 456). Although IK is largely tacit and orally communicated, it can be articulated explicitly through artefacts that the indigenous people produce through traditional technologies, dance, storytelling, music and knowledge sharing, to mention a few. All these forms of IK need to be managed and preserved into the future. The rapid disappearance of IK containers, due to death, modernisation, urbanisation and globalisation is threatening the survival of IK in SSA.1 In fact, the loss of IK constitutes a brain drain that is hardly acknowledged in SSA.

MANAGING IN THE “WILD”

Knowledge management is associated with closed systems or formal organizations such as universities, banks, schools and law firms which have specific rules, structures, missions and goals to which members of the organizations subscribe. In fact, KM has been gradually established as a strong methodology to mainly support business viability, competitiveness and growth (Diakoulakis, et al, 2004). Knowledge management in formal organizations is likely to be easier than in the informal indigenous systems (Mosia and Ngulube 2005: 176). The integration and coordination of the members of a group is fairly complex and difficult in informal local environments. Capturing what the other

1 Information resources are referred to as “information containers” by Lester and Koehler (2003).
members of the group already know and adding one’s own knowledge is not easy in indigenous systems which are fairly “open” in nature.

An open system or what Hutchins (1995: 370) referred to as the “wild” is characterized by loose social networks. Although certain activities may bring individuals together, the rules, regulations and structures that govern the system and its operations are not “rigid” and are at times informal. The indigenous people do not have “rigid” formal structures that coordinate their knowledge as one would find in the business or corporate world. It is vital that knowledge should be managed in all human environments irrespective of their characteristics to enhance innovation and performance. Although, KM is mainly used within the corporate business environment, the need for KM in a social and rural context is becoming more apparent (Noeth 2006). Thus, it is imperative to assess the utility of KM principles to managing IK in the local communities’ context.

KNOWLEDGE MANAGEMENT MODELS

The need for a methodology to manage IK for community development is widely recognized (Kaniki and Mphahlele 2002; Ngulube 2003). Encoding indigenous knowledge into information is one of the keys to its successful management. To manage IK more efficiently, some authorities have emphasized on the development of a holistic approach based on KM theories, principles and practices (Kaniki and Mphahlele 2002). Knowledge management models may provide useful tools to develop strategies for managing IK and integrating it into other knowledge systems. That provides a possibility of creating knowledge that is relevant to the local communities as opposed to the predominantly Western knowledge that previously dominated the knowledge landscape of SSA.

For the purpose of this discussion, KM is defined as a process of creating, capturing, organizing, coordinating, retrieving, distributing, storing and using knowledge and experiences of individuals within a community and making that knowledge available to others in order to improve the community’s performance and individual learning (see Awad and Ghaziri 2003; Laudon and Laudon 2004; Maponya and Ngulube 2007). The core of knowledge management is to provide strategies to get the right knowledge to the right people at the right time and in the right format (Maponya and Ngulube 2007).

Knowledge management tools provide strategies that may be used to manage and integrate both tacit and explicit knowledge. There is an existing body of scholarship that discusses the models that are applicable to managing knowledge mainly in the Western tradition (Davenport 1998; Kruger and Snyman 2005; McAdam and McCready 1999; Nonaka 1991; Nonaka and Takeuchi 1995; Probst, Raub and Romhardt 1999; Rowley 2001; Small and Tatalias 2000).

Nonaka (1991) first suggested the SECI model in 1991, which was further refined and expanded for a broader audience in 1995 (Nonaka and Takeuchi 1995). Nonaka, Toyama and Konno (2000) later developed the model of knowledge creation to consist of three elements, namely:
• the SECI model: the process of knowledge creation through conversion between tacit and explicit knowledge;

• ba: the shared context for knowledge creation; and

• knowledge assets: the inputs and outputs of the knowledge-creating process.

Based on Polanyi’s (1966) distinction between tacit and explicit knowledge, Nonaka (1991) proposed the four stages of creating and converting knowledge, namely socialization, externalisation, combination and internalisation (SECI). Socialization (tacit to tacit) – experiences, ideas and skills are shared. Externalisation (tacit to explicit) – ideas and narratives are transformed into a format that may be transmitted easily. Combination (explicit to explicit) – achieved through combining different sets of explicit knowledge using, for example, databases, classification systems and web-based tools. Internalisation (explicit to tacit) is learning by observation and face-to-face meetings. The knowledge assets are marshalled and shared in Ba.

Ba is a Japanese word, which means “place or platform” in which knowledge may be shared, created and utilized (Nonaka, Toyama and Konno 2000). Ba provides the energy, quality and place to create and convert tacit and explicit along the knowledge spiral (Nonaka and Konno 1998). Nonaka, Toyama and Konno (2000) defined four categories of ba that correspond to the four stages in the SECI model. They are defined as follows:

• originating Ba: It is a place where individuals can share feelings, emotions, experiences and mental models (socialization);

• dialoguing Ba: It is a space where individuals’ mental models and skills are shared, converted into common terms and articulated as concepts through images, symbols and language (externalisation);

• systematizing Ba: It is a virtual space that facilitates the recombination of existing explicit knowledge to form new explicit knowledge (combination) and;

• exercising Ba: It is a space where explicit knowledge is converted into tacit knowledge (internalisation).

Knowledge assets determine the inputs and outputs of the knowledge-creating process. They include tacit knowledge that is built through shared hands-on experience amongst and between members of an organization or community (skills and know-how of individuals), explicit knowledge articulated through images, symbols and language (product concept and design), systemized and packaged explicit knowledge (specifications and databases) and tacit knowledge that is embedded in the everyday actions and practices of the organization (organizational culture and routines) (Nonaka and Takeuchi 1995; Nonaka, Toyama and Konno 2000).

As Davenport (1998) Nonaka, Toyama and Konno 2000 are also of the view that a company has to “map” its stocks of knowledge assets in order to manage knowledge creation and exploitation in a meaningful way. The concept of
mapping knowledge assets, may be linked to the notion of knowledge identification as expressed by Probst, Raub and Romhardt (1999: 30).

Probst, Raub and Romhardt (1999: 30) identified core processes of KM principles as:

- knowledge identification: analyses and describes the company’s knowledge from both internal and external environment;
- knowledge acquisition: imports a substantial part of knowledge from outside sources;
- knowledge development: focuses on generating new skills, new products, better ideas and more efficient processes;
- knowledge sharing and distribution: gets knowledge to the right place;
- knowledge utilization: ensures that the present knowledge is applied productively for the benefit of that organization; and
- knowledge retention: selects, stores and regularly updates knowledge for potential future value.

Probst, Raub and Romhardt (1999: 33) further added two knowledge building blocks, namely knowledge goals and knowledge assessment which further extends the KM concept into a management system. Knowledge goals clarify the strategic direction of KM and the concrete objectives of specific interventions, while knowledge assessment provides a method for measuring normative, strategic and operational knowledge. The knowledge building blocks of Probst, Raub and Romhardt (1999) are almost similar to KM models of McAdam and McCreedy (1999) and Rowley (2001).

Rowley’s (2001) KM model, the Learning with Knowledge Cycle (LK Cycle), drew from the Demerest’s (1997) and Galagan’s (1997) KM models and embraced both the social construction of knowledge and the systems view. The social creation and conversion of knowledge is in line with the SECI model and the Ba process discussed above. Rowley (2001) suggested the idea of a knowledge cycle comprising six processes, namely knowledge acquisition, creation and construction, knowledge articulation and sharing, knowledge repositories updating, knowledge diffusion, access and dissemination, knowledge use and knowledge revision. Rowley (2001) emphasized that KM needs appropriate systems to store and disseminate explicit knowledge. It also needs a culture that not only ensures that knowledge is valued as a resource, and is recognized as a resource to be shared, but emphasized the role of knowledge in supporting individual and organizational learning.

As Rowley (2001), McAdam and McCreedy (1999: 98) developed a model based on Demerest’s (1997) model, which focuses on the social construction of knowledge in an organization. The social paradigm feeds into the construction of knowledge which in turn is embodied within the organization through organization-wide programmes and social interaction processes. The knowledge is then disseminated and used throughout the organization and its environment.
In contrast to Probst, Raub and Romhardt (1999), McAdam and McCready (1999), and Rowley (2001), Small and Tatalias’ (2000) KM model at Mitre viewed KM from a two-dimensional perspective. The first dimension consists of activities that are critical to knowledge creation and innovation which are knowledge exchange, knowledge capture, knowledge reuse, and knowledge internalisation. All these processes build a learning organization which is skilled at creating, acquiring and transferring knowledge as well as adapting its actions to reflect new insights and innovation.

The second dimension demonstrates that knowledge creation and sharing activities are influenced by strategy, content, policies, measurement, culture, process and technology (Small and Tatalias 2000). This is almost similar to Teare’s (1998) characterization of a learning organization as being enabled by policy and strategy, leadership, people management processes and use of information technology. The second dimension of Small and Tatalias (2000) almost resembles the ten principles that govern or guide KM processes in organizations that were articulated by Davenport (1998). Out of ten principles, the following four principles are highlighted because they are relevant to the discussion at hand:

- knowledge management is expensive: knowledge is an asset, but its effective management requires investment of other assets;
- effective management of knowledge requires hybrid solutions of people and technology in complementary ways;
- knowledge management requires knowledge managers;
- knowledge management benefits more from maps than models and more from markets than from hierarchies.

In agreement with Small and Tatalias (2000) and Davenport (1998), Kruger and Snyman (2005) proposed that organizations should assess and decide upon knowledge management principles that would lead to the creation of a knowledge culture prior to embarking on formal knowledge management initiatives. In order to ensure uniformity in institutionalising KM principles, Kruger and Snyman (2005) emphasized that the principles should be encapsulated within a policy and strategic management process (strategic requirements for knowledge lead to a knowledge strategy). As in Small and Tatalias (2000), the knowledge strategy will act as a filter in deciding the allocation of resources to successfully institutionalise KM principles.

**LESSONS CAN BE LEARNT FROM KNOWLEDGE MANAGEMENT MODELS**

It is evident that KM principles may assist in managing knowledge to meet existing needs, to identify and exploit existing and acquired knowledge assets and to develop new opportunities (Quintas, Lefrere and Jones 1997). The emphasis on the usage of KM principles to guide or influence the implementation of KM processes is also acknowledged by different authors (Davenport 1998; Probst, Raub, and Romhardt 1999; Small and Tatalias 2000; Kruger and
Plans and strategies to manage knowledge should be based upon knowledge management principles (Davenport 1998; Kruger and Snyman 2005). The principles should be directed by knowledge goals and the knowledge vision of the community (Probst, Raub and Romhardt 1999: 33; Nonaka, Toyama and Konno 2000; Skyrme and Amidon 1997; Snyman and Kruger 2005). The knowledge principles may help the community to create and institutionalize a knowledge culture that is based on certain values and practices.

It is evident from the foregoing that communities that would like to manage and preserve their indigenous knowledge should first determine the KM principles which will guide the implementation of knowledge management processes. That step should be followed by the mapping of the knowledge in force in the community or group as suggested in the literature (Davenport 1998; Nonaka, Toyama and Konno 2000; Probst, Raub and Romhardt 1999). Mapping would establish the shared context for knowledge creation and the inputs and outputs or knowledge assets of the knowledge creation process (Nonaka, Toyama and Konno 2000). Mapping may also show that knowledge does not exclusively belong to the elders, as it is popularly believed. This is not to deny that elders are generally regarded as gatekeepers of wisdom and knowledge. Mapping knowledge can help to assess the knowledge to obtain from internal and external sources. Thus, selecting and identifying relevant knowledge that strikes a balance between indigenous and Western knowledge systems would be made possible.

A policy framework for codifying IK should be formulated on the basis of the knowledge principles. That will enhance the processes of discovering, capturing, sharing, preserving and utilizing IK. Furthermore, a policy framework has a possibility of institutionalising knowledge creation processes and their management and preservation. The policy would guide the strategy that will bring about the infrastructure that will manage and preserve IK. In South Africa for instance, the Department of Science and Technology through the National Indigenous Knowledge Systems Office (NIKSO) have started formulating policies for the management of various aspects of IK based on KM principles (Department of Science and Technology 2007). A policy framework may guide people on what IK requires to preserve and how to go about the process. The process of codifying IK might seize to be ad hoc as it is the case in many instances. NIKSO is providing a leadership by making sure that policies for the identification, classification, accessibility, preservation and utilization of IK are formulated and implemented. Leadership has been highlighted as one of the keys to implementing a successful KM strategy (Awad and Ghaziri 2003; Nonaka, Toyama and Konno 2000).

In addition to strategy and policies, Small and Tatalias (2000) pointed out that the other KM elements that enable knowledge management activities are content, measurement, culture, process and technology. Technology should be used to capture, manage and make IK accessible. Technology facilitates the presentation of knowledge in databases and documents. Open standards should be preferred and adopted ahead of proprietary technology, especially when it
comes to the use of databases. Technology has the possibility of providing content management solutions if it is deployed with proper guidance from policies and knowledge managers. The knowledge management activities should be measured against established indicators of innovation. Measurement will assist indigenous communities to determine the value of their knowledge assets and track the growth or decline of knowledge in the community.

Space and context may be added to the list of Small and Tatalias (2000). The context is going to determine who would participate and how they would participate in the knowledge creation, use and preservation processes. The space for knowledge creation, use and preservation is required or what Nonaka, Toyama and Konno (2000) refer to as ba. A policy framework is key to determining the processes in creating the space for knowledge integration, sharing, use, dissemination and preservation. The process of creating and converting knowledge in the ba may be facilitated by technology, but Nonaka and Konno (1998) emphasized that social interaction was key to the creation of the originating Ba. This fact underscores the fact that knowledge creation is a social process and that technology may be used to enable the process as emphasized by Kruger and Snyman (2005) and Rowley (2001), for instance.

CONCLUSIONS AND RECOMMENDATIONS

From the above KM models, it can be concluded that the KM models provide a framework that creates a mechanism for exchanging and creating knowledge within a community or an organization. It can also be asserted that most of these models emphasize the implementation of knowledge management processes for the effective management of knowledge. In a sense that, they all emphasize the knowledge management processes of discovering, capturing, sharing, preserving and utilizing the available knowledge for the organizational achievements over its competitors. In a nutshell the models that have been outlined highlight the following in differing emphasis:

• knowledge is a resource;
• knowledge must be shared;
• knowledge stock available in a community must be assessed and mapped;
• knowledge should be transferred throughout the whole community taking into consideration areas of specialisation;
• individual knowledge should be integrated into the community’s knowledge stock;
• knowledge management requires knowledge managers;
• knowledge must be systematized and retained within a community;
• knowledge must be represented in databases and repositories;
• managing knowledge largely depends on policies and structures;
• management of knowledge requires hybrid solutions of people and technology (Davenport 1998);

• managing knowledge should be governed by proper classification system to facilitate information exchange and its retrieval;

• knowledge management leads to organizational learning;

• knowledge needs space and time for it to be shared and used; and

• knowledge must be evaluated.

The use of KM models to manage IK will enable the local communities to codify their knowledge base in an innovative and improved way. Information processing and collaboration and coordination may also be enhanced. Integrating IK with other knowledge systems might be made easier than before if we experiment with KM models as the community and knowledge managers recognize that the existing knowledge in the community must be mapped, transferred, systematized and made accessible irrespective of whether or not it is from external or internal sources.

Sustainable development may be better served by a system that incorporates both local and external knowledge systems (Shiruma 2004). Research shows that the more the local people experiment with exogenous knowledge elements, the more they strengthen their own knowledge and practices (Lemma and Hoffmann 2005; Pottier 2003: 5). For example, Dove (2000) observes that the successful production of rubber resulted from the confluence of local and non-local knowledge in Southeast Asia. Karlsson (1995: 53) calls this integration of indigenous and exogenous systems as the third form of knowledge namely synergistic knowledge. This indicates a need to integrate scientific knowledge systems into IKS for improved farming activities in the local communities.
REFERENCES


