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Can models for knowledge management be successfully implemented to manage the diversity of indigenous knowledge?

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1 Introduction

With the dawn of the new political dispensation in South Africa, new frameworks emerged

on macro level for a better understanding of equality, empowerment and development. Among these were the Reconstruction and Development Programme, the government's Macro-economic Strategy (GEAR), the National System for Innovation and the African Renaissance. This set the scene for reconstruction, innovation and the establishment of human rights, sustainable development and democratization in South Africa.

On international level, attention was given to questions regarding diversity and the rights of indigenous peoples. The United Nations Conference on the Environment and Development (UNCED), held in Rio de Janeiro in 1992, had as its main focus the question of diversity, in particular biodiversity and the role of indigenous communities in protecting and utilizing natural resources (Odora Hoppers 2000:2). In November 1995, the Third Conference of the Parties to the Convention on Biological Diversity was held in Jakarta, Indonesia. Once the representatives of indigenous communities, governments and international bodies had reached agreement that indigenous communities should protect traditional knowledge systems that are closely related to conservation and the sustainable use of biological diversity, an indigenous knowledge programme was established.

The rise of a knowledge economy has lead to a shift in emphasis from products to knowledge, and also to the role of value-added, knowledge creating and knowledge-utilizing activities. Individuals are now considered the greatest asset of a business. Knowledge is the key to making production and distribution processes more efficient and enhancing the quantity and quality of products (IT and Knowledge-based Economic Summit 1997). To manage this knowledge more efficiently, new frameworks and models have been designed. The research question to be addressed in this article is whether these traditional knowledge management models can be implemented to manage indigenous knowledge in a meaningful way.

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2 Knowledge economy

The knowledge economy is based on the development, production, distribution and use of knowledge and information (Vaile 2000). Technology and knowledge are now the key factors of production. With increased mobility of information and the global work force, knowledge and expertise can be transported instantaneously around the world, and any advantage gained by one company can be eliminated by competitive improvements overnight. The only comparative advantage a company will enjoy will be its process of innovation – combining market and technology know-how with the creative talents of knowledge workers to solve a constant stream of competitive problems – and its ability to derive value from information (Enterweb 2005). The following characteristics distinguish the knowledge economy from a traditional economy:

- It is an economy of abundance.
- The issue of position/setting is not applicable.
- Value is attached to additional knowledge.
- The price and the value of a product or service are determined by its context.
- People capital, in other words, proficiency and skill, determine the value (Skyrme 1997).

Knowledge management arose from this knowledge economy. Drucker and Strassmann stress the importance of information and tangible knowledge as resources in enterprises, while Senge emphasizes the cultural dimension of knowledge management (Barclay and Murray 1997).

2.1 Knowledge management

Knowledge management is a natural process that humans use to maintain and improve their survival. Since the first tribe, humans have been governing the production, transmission and acquisition of knowledge. The survival and legacy of a tribe depended on how well knowledge was managed. Over long time spans, knowledge has been transmitted from generation to generation and from culture to culture through oral and written history, storytelling, teaching and so on. In a time of crisis, the tribe made rapid adjustments to its knowledge base if a portion of an essential knowledge base was destroyed. Throughout history, storytellers have recited a culture's oral history, passing it on from generation to generation. Knowledge management focuses on the collective rather than the individual; knowledge management studies and tries to improve individual knowledge processing by improving the collective process (Swanstrom 1999).

Barclay and Murray (1997) define knowledge management as a business activity. They believe that knowledge management and intellectual capital are part of the same activity, although they have two different strategies. Their definition includes the following:

- Dealing with the knowledge component of the activities of an organization as a tangible element of a business. This is reflected in the strategy, policy and activities.
- Establishing a direct link between the organization's intellectual capital – tangible (on record) as well as intangible (skills and personal knowledge) – and positive business results.

Other definitions state that knowledge management is the explicit and systematic management of necessary knowledge and the accompanying processes of creating, gathering, unlocking and developing this knowledge (Skyrme 1996). It can also be seen as the collection of processes that govern the creation, dissemination and leveraging of knowledge to fulfil organizational objectives (Gurteen 2005).

2.1.1 Frameworks for knowledge management

In the development of frameworks for knowledge management, one of three approaches are generally used, namely the mechanical, the cultural or the systematic approach.

- The mechanical approach focuses on the application of technology as facilitator for access to information.
- The cultural approach emphasizes innovation and creativity, which is important to the learning organization. New ways of doing things force organizations to follow a holistic approach in their relationship with the environment.
- The systematic approach uses systematic thought, which incorporates all aspects of knowledge management to ensure continuous evaluation and sustainability. However, this approach requires the acknowledgement and application of the various cross disciplines required to develop knowledge management systems and processes (Barclay and Murray 1997).

No individual, organization or community can, however, possess all the knowledge required for various situations. Similarly, the level and amount of knowledge that an individual, organization or community possess may not be sufficient for problem solving and decision making. The implication is thus that individuals must constantly learn, acquire new knowledge and be aware of who has the knowledge required for specific situations. In other words, the emphasis is on organizational learning and how to become a learning organization (Kaniki and Mphahlele 2002:24). Taking this into account, it is clear that models following the cultural approach will be more suitable for managing indigenous knowledge. The

following models comply with the cultural approach:

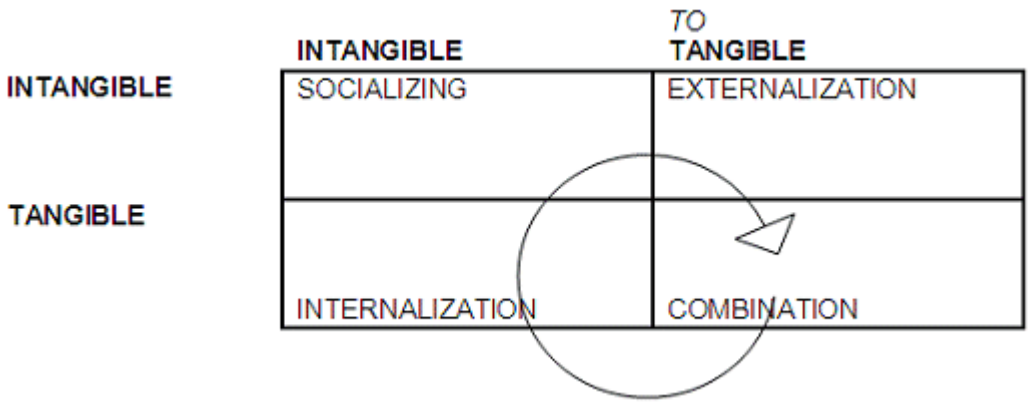
2.1.2 Knowledge conversion

According to Skyrme (1996), knowledge management is the conversion of intangible knowledge to tangible knowledge, where necessary. Nonaka and Takeuchi (1995:62) define this intangible knowledge as personal knowledge resulting from individual experiences. This includes factors such as personal convictions, perspectives and value systems. Tangible knowledge, on the other hand, is knowledge that can easily be conveyed in formal language. This is done by means of mathematical and scientific formulas, manuals and specifications. This type of knowledge is easily conveyed between groups and individuals. Tangible knowledge is the dominant form in the Western world, in contrast to the African tradition that emphasizes the importance of conveying intangible knowledge.

According to Nonaka and Takeuchi (1995:8), tangible and intangible knowledge are not two separate entities: they supplement one another. Knowledge is created and extended by the social interaction between tangible and intangible knowledge, and may be represented in four basic patterns:

- Intangible to intangible: *socializing* – where individuals share intangible knowledge during personal contact;
- intangible to tangible: *externalization* – where the knowledge base is extended by the codification of experience, insight and judgement so that it may also be utilized by others;
- from tangible to tangible: *combination* – where individuals combine the tangible knowledge of others to form a new whole; and
- tangible to intangible: *internalization* – where individuals use the codified knowledge of others to broaden their own intangible knowledge.

Figure 1 Four nodes of knowledge conversion (Nonaka and Takeuchi 1995:62)



Nonaka (1991:98) goes further to discuss the role of specific knowledge-based processes in a learning organization. In a knowledge-creating community, the process whereby personal knowledge is made available to others (articulation) for them to use to extend their own tacit knowledge base (internalization) is encouraged. Through this process, individual knowledge is tested and validated.

2.1.3 Demarest's model

Models of knowledge management that emphasizes the social construction of knowledge share common ground with work on learning organizations and organizational learning. Demarest's model is one example of such a model. He identifies four phases of knowledge

management:

- Knowledge construction
- Knowledge dissemination
- Knowledge use
- Knowledge embodiment (Demarest 1997:376).

According to this model, constructed knowledge is then embodied within a group through explicit programmes as well as through social interchange. Following embodiment, there is a process of dissemination of the espoused knowledge throughout the group and its environment. Ultimately, the knowledge is seen as being of economic use in regard to the group's ouput.

2.1.4 Learning with knowledge cycle

Rowley (2001:231) extends the model of Demarest and seeks to embrace both the social construction of knowledge and the systems view, emphasizing the relationship between knowledge and learning. This model places the processes associated with knowledge management in a sequence in a cycle. The processes both compare the learning process in a community or group. Each process in this cycle applies to both tacit and explicit knowledge, and seeks to identify a set of processes that are equally applicable to all of the knowledge in the group or community.

This model makes the link between knowledge management and learning more explicit. The cycle can operate at individual, team or group level. It also offers an insight into the complexity of knowledge management and learning and identifies some of the knowledge-based activities that need to be managed to support effective learning (Rowley 2001:228).

Only when all of the processes involved in knowledge management are part of the learning cycle of a group will knowledge management:

- be successfully embedded in the group, and owned by the community; and
- facilitate the learning that is key to success in changing organizations or groups and their environments (Rowley 2001:235).

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3 Indigenous knowledge

Indigenous knowledge may be defined as knowledge that has been created and developed over a period of time. Indigenous knowledge represents generations of creative thoughts and actions within a particular community in an eco-system generated to keep abreast of the ever-changing agri-ecological and socio-economic environment (Kaniki and Mphahlele 2002:17). It may, therefore, be seen as the sum total of the knowledge and skills of the inhabitants of a certain geographical area. These skills and knowledge have been shared for generations and have been adapted by every new generation to meet its unique requirements and environmental conditions.

Indigenous knowledge is unique to a given community and culture. Furthermore, it is dynamic and based on innovation and practical experiment. It is also called local knowledge or traditional knowledge and stands in strong contrast to Western, scientific and modern knowledge that is continuously being developed by research institutions and universities. The main characteristic of indigenous knowledge is that it is mainly conveyed orally and is thus largely undocumented. Although it has not always been made tangible, certain groups,

for example the Sankuyo and Xai-Xai communities in Botswana, do reveal this knowledge and convey it in a tangible way through, among other things, taboos, totem poles, indigenous laws, traditions and environmental values (Thakadu 1998:90).

According to the World Bank (1998), indigenous knowledge has the following characteristics:

- It is local, because it is anchored in a specific community, established within the boundaries of broader cultural traditions and developed by a specific community;
- it is intangible knowledge and consequently not so easily codified;
- it is conveyed orally;
- it is experimental knowledge rather than theoretical knowledge;
- it is learned by repetition; and
- it changes continuously, is created and recreated, discovered and lost, even though outsiders consider it to be static.

Indigenous knowledge is not only the production of artefacts for the tourism market: it also concerns the development of existing technology, including the production of jewellery, copper work, fishing methods, medicine, etc. The potential of such knowledge must, however, be repackaged to ensure participation by the community and to make a contribution to world development (Odora Hoppers and Mahlanghu 1998). However, it is important to have safeguards in place to prevent the potential exploitation of this indigenous knowledge by industry. Another important aspect of knowledge management, namely intellectual capital management, plays an important role here. The protection of this indigenous knowledge must also be addressed as a separate issue.

Indigenous knowledge is embodied in the following:

3.1 Beliefs

A community's indigenous knowledge is often reflected in the beliefs based on their religion and/or culture. For example, many African communities believe that to slaughter cattle, goats and sheep symbolizes cleansing. If the community's life, or the life of an individual, does not run according to expectations, it can be ceremonially cleansed by slaughtering an animal. Animals are slaughtered during marriage ceremonies to ensure a prosperous and happy marriage.

3.2 Medicine

Herbs are one of the key ingredients in traditional African medicine and are used for a variety of illnesses. Herbs are considered a primary ingredient in the treatment of ailments and are readily available to rural communities and poor city dwellers. The well-known African potato (*leraka*), for example, is used to strengthen the immune system and control high blood pressure. Bitter aloe is used to cleanse the blood of impurities. Furthermore, herbs are used as preventative medicine and in certain African communities people chew on the bark of trees to prevent tooth decay. For centuries the San community in the Kalahari chewed on Hoodia cactus leaves to still their hunger during hunting expeditions (Kaniki and Mphahlele 2002:17).

3.3 Knowledge technology

Certain communities do possess certain knowledge of the use of technology. In many traditional communities, women use cattle dung to decorate their homes, seal the floors and the lids of their pots to ensure an even temperature when baking bread, for example. Making

charcoal is also an age-old skill, where wet wood instead of dry wood is covered with sand, leaving small openings to allow for a flow of oxygen, which slows down incineration. This slow process produces charcoal instead of ash (Kaniki and Mphahlele 2002:17).

3.4 Education

Many traditional ways of education are reflected in initiation school activities. At these schools, young members of the community are taught the beliefs of their community, self-respect and respect for others (particularly one's elders). Learners are made aware of the relationship between man and the environment. Among other things, they are taught to look at natural phenomena, such as the behavioural patterns and migratory habits of carnivorous animals and indications in nature of changes in the weather (Kaniki and Mphahlele 2002:17).

3.5 Communication

Cultural festivities are organized for entertainment, to inform and to educate. Over the centuries the traditions of indigenous communities have been passed on to future generations through song, dance and drama.

3.6 Agriculture

The use of certain agricultural practices and farming methods contributes not only to indigenous knowledge, but also to much of the conservation of the world's biological diversity. The world is indebted to indigenous farmers who implemented age-old agricultural practices. These ecologically complex agricultural systems are associated with the genetic diversity that has been preserved and is now a source of biological wealth.

Indigenous methods of soil classification and planting herbs are largely in line with tested scientific methods. Indigenous communities apply intercropping very successfully. Intercropping grain, sorghum and beans allows nutrients to build up in the soil. Rural communities cover land that is not utilized during crop rotation with ash to protect it against unwanted insects (Kaniki and Mphahlele 2002:17).

In Rwanda, farmers distinguish a great number of potato varieties by the properties of the seed-potatoes and their culinary characteristics. Farmers in East Africa also distinguish between the taste, texture, storage time, marketing value and resistance to disease of the various kinds of grain. Furthermore they distinguish between nine different uses in their classification of grain (Haugerud and Collinson 1991:5).

3.7 Food technology

Over the ages, traditional communities have developed a variety of methods for preserving food. Mopanie worms are an important source of protein in rural communities. However, they appear only at certain times of the year when they must be harvested. The worms are preserved for a long time by simply boiling them in water, sometimes salting them, and then drying them in the sun. Similar methods are used to preserve African spinach, called morogo. Indigenous communities are also skilled in brewing beer (Kaniki and Mphahlele 2002:17).

3.8 Arts and crafts

For centuries, unique and sophisticated technology and techniques have been developed for making decorative and consumer artefacts. The Ndebele, for example, are exceptionally skilled at mixing specific kinds of soil with clay and cattle dung to decorate walls and floors. This is done with colourful, artistic effect. Indigenous communities also have skills in

selecting certain kinds of clay with which to make specific pots. The Zulus make special pots for cooking, brewing and storing (Kaniki and Mphahlele 2002:17).

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4 Application of knowledge management models with regard to indigenous knowledge

From the description and definition of knowledge management and the process thereof, it is clear that there are certain limits within which knowledge can be effectively applied in the management of indigenous knowledge. These limits generally fall within the parameters of formal organizations and enterprises. Within these parameters knowledge can be considered an asset and applied as such for profit.

The approaches suggested in 2.1.1, with regard to knowledge management, indicate that the cultural approach to knowledge management, in which organizational learning, with its focus on innovation and creativity, is the determining factor, is the obvious knowledge management approach for managing indigenous knowledge.

This cultural knowledge management approach focuses on organizational learning and its encouragement. The organization of people into communities of practice (CoPs) can be seen as one of the methods used. Stewart (1997:97) defines a community of practice as a group that facilitates the transfer of knowledge and innovation in people capital development. Wenger (1998) believes that these groups are the most versatile and dynamic sources of knowledge in an organization. Communities of practice are demarcated by their shared knowledge and have the right of existence. Participation benefits all members of the community, as they become part of the collective process of learning and share knowledge practices. In other words, knowledge is the impetus for applying newly acquired and shared knowledge in the newly developed processes. This flow of knowledge results in the creation and exchange of tangible as well as intangible knowledge.

The three main shareholders in such a community are:

- the community that has a shared interest because all the members possess certain knowledge that can contribute to the knowledge base;
- outsiders who also possess relevant knowledge that could be used by the community; and
- facilitators. As neither the community nor outsiders have the ability to manage this knowledge base, facilitators should take responsibility for establishing and maintaining the knowledge base (Bellinger 1999).

Examples can be found in communities that have become conscious of the available indigenous knowledge that could be applied to the advantage of the broader community. Networks and organizations have been established where experts on the subject can meet. For example, the Centre for Indigenous Knowledge for Rural and Agricultural Development (CIKARD), the Leiden Ethnosystems and Development (LEAD) and the Interim Committee for Indigenous Knowledge Systems in Southern Africa. The aim of these communities is to make scientists aware of the indispensable resource lying locked up in indigenous knowledge.

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5 Road ahead

From the investigation of available knowledge management models, it is clear that they can

be applied meaningfully to the management of indigenous knowledge. It is important that people with usable indigenous knowledge be organized into groups where this knowledge can be shared. The sharing that takes place in these communities of practice can lead to the invention of more practices which can be used to the benefit of the community. Learning among members of the groups will ensure the transmission of inherited knowledge and will also lead to creativity and innovation. This will bring new products and services to the foreground and will, in the end, contribute to the economic development of the group or community.

The biggest problem underlying the management of indigenous knowledge is, however, the management of property rights. The key question is the identification of the creators of this indigenous knowledge and therefore the intellectual capital of the community. Generally, ownership lies within the community that develops the indigenous knowledge and applies this knowledge within its own culture. However, it is sometimes difficult to assign indigenous knowledge to a specific community or certain persons, for example, the knowledge of *sangomas* and *inyangas*. Creativity and discovery should be recognized and protected in the interests of the individual or the community.

Although international conventions such as the Bern Convention on Copyright, the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) and international patent rights do try to protect property rights, it is true that these agreements do not always give full recognition to rights with regard to knowledge, innovation and practices of indigenous peoples and local communities (Quiroz 1994:13).

In South Africa a group known as Knowledge Management Development has been established in the Department of Communication. The aim of this group is to establish a knowledge strategy and one of the issues is how communities may benefit from the use of their indigenous knowledge (Gerber 2001). The Research Support Agency (RSA) of the National Research Foundation (NRF) has also established a focus area. Their aim is to promote understanding of indigenous knowledge and its role in the community within an integrated perspective. The contribution of indigenous knowledge towards local development should also be investigated. According to the NRF, indigenous knowledge should be placed in the mainstream so that it can take its place within the broader knowledge community. Both socio-economic and non-socio-economic values should be investigated. This research should be done in conjunction with the communities within which this knowledge was developed and applied (NRF 2003). The Indigenous Knowledge Systems Unit of the Department of Science and Technology has started working on the vision and goals of a South African indigenous knowledge systems (IKS) policy. This policy consists of four key areas:

- Affirmation of African cultural values in the face of globalization;
- development of services provided by indigenous knowledge holders and practitioners;
- contribution of indigenous knowledge to the economy; and
- interaction with other knowledge systems (Hart 2005).

In co-operation with the NRF and other local communities, programmes should be developed to harness technology and human resources so that available indigenous knowledge can be managed and developed in such a way that it can be applied and developed to the advantage of the whole community.

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