# Harnessing Knowledge Management for Africa's Transition to the 21st Century

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# Harnessing Knowledge Management for Africa's Transition to the 21st Century

**The effective management of knowledge is a critical strategy for the development of Africa.**

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## INTRODUCTION

The purpose of this paper is to analyse the factors which make knowledge management an important resource for accelerating the development of Africa as we move into the 21st century. As African information specialists we are faced with the urgent challenge of making our full contribution to ongoing efforts, in our respective countries, to end poverty and underdevelopment on our continent. The key objective of this paper is thus to answer the question: What are the methods that information and knowledge management can use to address poverty and underdevelopment in Africa? In addressing this topic, the paper raises the following sub-questions:

1. What are the basic concepts underlying the information and knowledge management revolution?
2. How best can Africa manage the transition process to an information and knowledge-based economy?
3. What role does knowledge management play in national development?
4. What challenges face information specialists in the knowledge revolution era?

In addition to this introduction, this paper has five other parts. The next part provides basic concepts and definitions of knowledge management. The third part explores the management of the transition process from an agricultural society to an information and knowledge-based society. The fourth part focuses on the role information and knowledge plays in human development. The fifth part continues the exploration by analysing specific sectors of national development, and the sixth part looks at the challenges for information specialists in the knowledge revolution era.

## CONCEPTUAL FRAMEWORK OF KNOWLEDGE MANAGEMENT AND SHARING

### *The Knowledge Pyramid*

This part starts with a discussion of the concepts of data, information and knowledge to establish their meanings in the context of knowledge as a strategic resource for economic development. Davenport and Prusak (1998) assert that data is not information, and the latter is not knowledge. The conceptual relationship (data, information and knowledge) can be visualized as a pyramid of interdependent layers on top of each other, sometimes called the information pyramid (Marco, 2003). The bottom layer of the pyramid is data, defined as symbols, facts and figures which are the raw materials to be processed to create information. When data has been processed into a meaningful form it becomes information, while knowledge is information which has been evaluated and organized in the human mind so that it can be used purposefully (Feather and Sturges, 2003:341).

Knowledge can be subdivided into two sub-categories – tacit and explicit knowledge. According to Nonaka (1998:28) explicit knowledge is formal and written, tacit knowledge is personal knowledge based on an individual's experience, insights and intuition. He asserts: "tacit knowledge consists partly of technical skills – the kind of informal, hard-to-pin-down skills captured in the term 'know how'. A master craftsman after years of experience develops a wealth of expertise at his fingertips but he is often unable to articulate the scientific or technical principles behind what he knows. It is recognized that such tacit knowledge has a cognitive dimension, made up of mental models, beliefs, and perspectives so ingrained that they are taken for granted and cannot be easily articulated." The popularization of the concept of tacit knowledge by Nonaka has profound implications on the production of knowledge in society, as we shall attempt to show in a later section of this paper.

Embedded within tacit knowledge, is the concept of creativity (among others), which includes use of figurative language and symbolism to articulate and

share insights and intuitions. Nonaka explains how creativity (and lateral thinking) has been used by Japanese companies to spur the creation of new products such as cars, electronic products, and others because it enables the sharing of complex insights among the workforce.

The recognition of the high value of experiential knowledge (tacit knowledge) has led to a new awareness about the need to reassess how human resources are managed in organizations, and the need to revisit the cultural content of knowledge. Joseph Stiglitz (1999) the renown former world Bank Chief Economist, has noted that the shift towards a knowledge-based economy involves a shift in organization structures away from top-down hierarchical systems to horizontal structures such as networks, semiautonomous teams and other forms of matrix organizations. Stiglitz emphasizes the need for giving employees or citizens incentives to develop their own capacities, and confidence in using their own intelligence to empower change and learning activities. He makes a call for countries to shun external agencies which impose 'best practices' imported from elsewhere because this only reinforces impotence. For countries to succeed in applying knowledge management to development, according to Stiglitz, they have to rely on their own internal understanding, wisdom and culture. As Stiglitz would have it, Africans are the best suited to change their own culture in order to transform the continent into a viable, knowledge-based economy.

Relating libraries to knowledge management (KM), Vaagan (2004) claims that library and information sciences find it difficult to accommodate knowledge management because knowledge is more difficult to control or manage compared to information, which can be treated as a measurable unit to which one may apply the classical skills of cataloguing, classification and indexing and bibliography. However, it is my contention that libraries and information centres can operate in the domains of both information management and knowledge management. Data management is more suited to computer centres. However, it is important to recognize and plan for operating in the different domains, as they require different approaches, skills and roles.

### *Defining Knowledge Management*

There are many definitions of knowledge management, each of which has a different context and aim in mind. For the purpose of this paper, however, knowledge management can be defined as:

> … a disciplined approach to managing all the knowledge processes found in human collectives (a set of people with common goals). KM is what we do to accomplish our goals faster and more effectively by delivering the right knowledge to the right person at the right time and in the right context. By engineering human environments for optimal production, transfer, and usage of knowledge, we increase our ability to take effective action, compete, and survive. Knowledge management will ensure the survival of an organization by leveraging collective wisdom to increase responsiveness and innovation. (eknowledgecentre, 2005).

The same website describes KM as a cross-disciplinary practice that enables organizations to improve the way they create, adopt, validate, diffuse, store and use knowledge in order to attain their goals faster and more effectively.

### *Branches of Knowledge Management*

It has been claimed that KM has a long history, although it has only recently become a fashionable discipline (Davenport and Prusak, 1998) and is both a science and an applied science and is multidisciplinary in nature. As a science KM asks questions on how individuals and human collectives work naturally with knowledge processes such as production, acquisition, transfer, and use of knowledge. On the other hand KM applied these studies to improve knowledge processes and their products by developing management techniques and tools for improving knowledge processes (eknowledgecentre 2005:8).

Several writers have also claimed that KM falls into two theoretical models. McAdam and McGreedy (1999:93) for example, have noted that one model focuses on theories that concentrate on the knowledge of people and knowledge construction. The second model involves theories that focus on information technology, which is more interested in the creation of databases for storing information, making information available, in general handling of explicit knowledge (Steyn, 2004:4).

Commenting on these two KM models, Kidwell et al (2000:30) note that the early tendency was to focus on one type at the expense of the other, which

caused fierce debate between the experts advocating a techno-centric approach to KM and those advocating a learning-centric approach. It is concluded by these writers, however, that it is of little use to have robust technology solutions if the existing culture prevents knowledge sharing, and there is little benefit in having robust knowledge sharing without some technological means of making knowledge widely accessible.

However, there is a much more comprehensive classification of knowledge management. Knowledge management can be classified into three branches: knowledge management of organizations, knowledge management of science and knowledge management of society. Each of these branches addresses similar questions but has different problem domains, and often has different tools and techniques.

A comparison of the three branches shows that knowledge management of science is the oldest, over 100 years, and has the production of scientific knowledge as its main concern. It seeks to improve the management of knowledge within the scientific communities and laboratories. Knowledge management of society is concerned with knowledge processes in society and culture. The concern of this branch of KM is with knowledge diffusion within society and cultures, for example how knowledge is transmitted in schools, and other groups in society. The youngest and fastest growing branch is knowledge management of organizations. This branch is further divided into four sub branches: knowledge management in business, knowledge management in non-profit organizations, knowledge management in government, and knowledge management in educational institutions. Of all these sub branches, knowledge management of business is the most active as it seeks to improve a firm's competitiveness and profitability through knowledge application (eknowledgecentre 2005:8).

There are overlaps between all these branches and many tools and techniques developed in one branch can be useful to other branches.

### *MAKING THE TRANSITION FROM AN AGRICULTURAL TO AN INFORMATION AND KNOWLEDGE ECONOMY*

How a society transforms from an agricultural economy to an information and knowledge society has not been clearly explained. The implied strategy is the increased use of computers in all spheres of society (Webster 1996). The issue has been further complicated by the infusion of a heavy dose of ideology and contested terms such as globalization, free flow of information, information superhighway, the information market place, deregulation, and privatization (Dick 2002:24).

There has thus been a tendency to define an information society from an information and communication technology (ICT) perspective. This techno-centric approach to KM has received added force from some documents provided by the United Nations. The UN has set 2015 as a target date for attaining the Millennium Development Goals (MDG) of halving the number of people living in extreme poverty by building digital opportunities and putting ICT at the service of development. In a recent speech the Secretary General of the United Nations, Kofi Annan, urges African leaders to mould their economies to become active participants in the global economy by adopting ICT. He said "unless African countries become full actors in the global information revolution, the gap between the haves and have-nots will widen, opening the possibility of increased marginalization of the continent. On the other hand, participating in the information society offers tremendous opportunities for Africa to leapfrog … into the future" (Annan, 2001). Many other leaders in Africa, including President Mbeki of South Africa, President Museveni of Uganda, former President Mkapa of Tanzania, and former President Nujoma of Namibia have spearheaded the expansion of ICT in their countries with the hope that this will accelerate development.

Vaagan (2004:234) and other social scientists have cautioned that "a country's high percentage of 'online' inhabitants means little when the sheer amount of information cannot be assimilated into knowledge". Vaagan calls this the "ICT trap" which highlights the danger of a one-sided ICT-driven process where explicit or codified knowledge is made available through ICT but not optimally shared or used by others.

A case in point is when the oil company BP undertook to introduce its knowledge management programme; a decision was taken to put the programme under an independent group rather than the IT division because "it was believed that the program would be less likely to fall into familiar IT patterns if a group drawn from different parts of the company ran it. Also the intentional absence of IT control would make clear that the project was about communication, business change, and corporate behaviour, and not technology for its own sake" (Davenport and Prusak 1998:20).

Several studies claim that the transition to an information society is a linear process, based on progression from an agrarian society to an industrial society and ultimately an information society. Several distinguished authors have pointed out that the information society represents an advanced form of industrial society but concede that information activities also played an important role in the industrial revolution process (Bell, 1973; Drucker, 1993). Supporting this viewpoint is data from a study by Shifflet showing that although the majority of information workers are found in the tertiary sector, both the secondary and primary sectors also have relatively smaller numbers of information workers, with the primary sector having the smallest proportion of information workers (Shifflet, 2001:168).

The question which is still open to debate, however, is whether informatization of society represents a fundamental change in the pattern of society – specifically, whether information has replaced industry as the major economic activity or whether it is an incremental process incorporating both new and old elements found in the earlier stage of development (Bell, 1973).

An African perspective to this debate concerns whether African countries can move from an agricultural economy to an information society without an established industrial base. A Ghanaian researcher on African information communication issues noted that

> a dream of transforming an agro-based economy into an information society must either be a flight of fancy or a thinking hardly informed by the industrial economic background of developed economies that are on transition to informational economies. For an economy with about half of its adult population engaged in food production sector, and about 70 percent of its development budget sourced from donor support, any talk of transition into an information society sounds like a far-fetched dream. (Alhassan, 2004)

Arguing from a slightly different perspective, Kaariainen (2005) support the same view and argues that realism is called for in promoting information societies and ICTs. There is no leapfrogging into the information age as touted. Progress towards the information society is a gradual process and needs to be measured by social and intellectual development and not solely by technological advancement (Kaariainen, 2005)

The views of Alhassan, Kaariainen and others would seem to indicate the need for Africa to research carefully its own path towards the information and knowledge economy rather than simply copying what has happened in developed countries without much effort to look critically at alternative approaches. The conditions, culture and level of industrialization of developed countries differ from those of Africa and the outcomes from using technologies to achieve development might not bear the same results (Whyte, 2000; Menou and Mchombu, 2004).

A compromise approach is to present the knowledge economy phenomenon as combining both the old and the new in one economy and the Internet being the platform for the economic fusion process, similar to Drucker's (1993) thinking. Proposing this view, British Prime Minister Tony Blair (2000) noted that the knowledge economy and the old economy are really one economy . He asserts "there is no new economy, there is one economy, all of it being transformed by information technology … it is a profound economic revolution." He further notes that "in this new environment the most important commodities of a nation are information and knowledge."

This thesis would appear to suggest, among others, that libraries and information centres should work towards harnessing the power of the Internet for their communities, and train users in information/knowledge literacy and the use of ICT in order to facilitate the transformation of their nations. However, it is the broader issues of the role that information and knowledge play in development that the next section explores.

## *KNOWLEDGE FOR HUMAN DEVELOPMENT*

This section looks at information and knowledge transfer as factors of production and ways that African countries can use to address the deficit of development information in the continent.

### *Knowledge as a Factor of Production*

It is now generally accepted that information and knowledge are a resource and commodity and key determinant in the progress of society. The *World Development Report* of 1998, subtitled 'Knowledge for Development', points out that knowledge is needed to transform the resources we have into things we need, and to raise standards of living, improve health

conditions, provide better education, and preserve the environment, and to do all these in the most optimum way possible. All these value addition activities require knowledge. The report concludes that " for countries in the vanguard of the world economy, the balance between knowledge and resources has shifted … [and ] … knowledge has become … the most important factor determining the standard of living – more than land, than tools than labour. Today's most technologically advanced economies are truly knowledge based" (World Bank, 1998).

A critical dilemma for African (and other developing) countries is that the past 20 years have witnessed the most massive accumulation of explicit knowledge and information in human history. Digital information and communication technologies, and new ways of thinking on knowledge management, have revolutionized the ways in which knowledge and technical know how move around the world. According to Whyte (2000:4) among others, this proliferation of access to information has widened the gap between rich and poor countries. She gives the example of the USA, where it is claimed that 75 percent of the population have access to the Internet, and Africa, where the Internet penetration is below 1.2 per cent. This is a dilemma because amidst this world of plenty in terms of information and knowledge, the African local content is also very low, because of lack of capacity to produce, transfer, and disseminate information. It is concluded that African countries and their institutions such as universities, research centres, library and information centres, service organizations and private enterprises are at a major disadvantage in the current knowledge economy. She calls on countries to change how they think about training, organizational management, and interaction in order to take advantage of the soaring knowledge economy.

Despite the examples cited above, the awareness of the central role knowledge plays in economic and social development is not new. One of the examples of this early awareness of the role of knowledge in human development, cited by Ramalingam, shows, for example, that former American President Truman had a clear focus on how the transfer and utilization of knowledge could help in human development. President Truman noted in 1949 that:

> … we must embark on a bold new program for making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas. More than half the people of the world are living in conditions approaching misery. Their food is inadequate. They are victims of disease. Their economic life is primitive and stagnant. Their poverty is a handicap and a threat both to them and more prosperous areas. For the first time in history, humanity possesses the knowledge and the skill to relieve the suffering of these people … The United States is pre-eminent among nations in the development of industrial and scientific techniques. The material resources which we can afford to use for the assistance of other peoples are limited. But our imponderable resources in technical knowledge are constantly growing and are inexhaustible. I believe that we should make available to peace-loving peoples the benefits of our store of technical knowledge in order to help them realize their aspirations for a better life…. (Truman in Speech, 1949, cited by Ramalingam, 2005:7)

The transfer of knowledge for development has proven to be a more complex process than these early statements suggest. That is why the transfer of' knowledge is still regarded as a novel concept today. In the case of President Truman's address it was backed by the Marshall Plan for Western Europe for reconstruction after World War 2. It is said that the USA gave financial assistance and technical knowledge transfer worth 10 times what it gives for development aid today (Sachs, 2005).

Preceding the World Bank Knowledge for Development report and its recommendations by some eight years was a report from the island state of Singapore entitled *Library 2000: Investing in a Learning Nation* (Singapore. Ministry of Information and the Arts, 1994). which noted that the future belongs to countries whose people makes the most productive use of information, knowledge and technology. Singapore had recognized that these were the key factors to economic success, not natural resources, which were very scarce.

In the information intensive society of today, knowledge production is taking place at a fast pace through out the world. Both knowledge and information are also becoming obsolete quicker – hence for African countries to compete internationally they need to have access to the latest knowledge and information, similar to the countries with which they are competing. Unfortunately, many libraries in Africa are often known for their huge stock of out of date materials rather than the current information they possess.

The reason for this situation might be lack of financial resources and lack of awareness of the critical and strategic importance of information and knowledge to a country's competitiveness and development.

### *Ways of Addressing the Knowledge Deficit in Africa*

Addressing the knowledge deficit that separates them from technologically advanced countries is a crucial challenge for libraries and information centres. The World Bank (1998) report referred to above has proposed four steps to address the existing knowledge deficit. These steps are:

1. To acquire knowledge developed elsewhere rather than 'reinvent the wheel' so as to save time and resources and adapt the imported knowledge to address information/knowledge deficits/gaps in a country.
2. Create knowledge locally through research and development (R&D) programmes. In fact the report proposes an investment of at least 1 percent of a country's GDP in research and development activities. (South East Asian countries are investing at least 2 to 5 percent of their GDP in R&D). The creation of knowledge locally should include tapping into indigenous knowledge resources that the population has, to assist in development activities.
3. Build the capacity of the population to absorb and apply knowledge through universal basic education, adult literacy and lifelong learning, tertiary education and an emphasis on science and engineering education.
4. Create a capacity to communicate knowledge throughout the country through the use of cheap telecommunications, mass media, and extension literature and services.

The World Bank's report is useful but its weakness is that it puts emphasis on explicit and external knowledge and largely ignores tacit knowledge.

We now turn attention to specific sectors of development which knowledge management needs to address for African countries to accelerate their development in the 21st century.

## *KNOWLEDGE MANAGEMENT AND THE KEY SECTORS OF NATIONAL DEVELOPMENT*

Only if knowledge management can speedily be translated to action can we see social change on a large scale to ensure Africa claims her rightful place among other continents in the 21st century. The six sectors which follow are vital areas to kickstart the revival and reconstruction of respective countries in Africa. However, as already indicated elsewhere in this discussion, knowledge does not act alone, like a magic bullet, to bring about widespread and sustainable social change. There are other factors which must be in place for knowledge management to make an impact on national development, namely:

1. a reasonably educated population to absorb and apply new knowledge
2. a financial system which can provide funding for the various social changes required
3. ICT (both old and new technologies) to be a vital tool to transfer and share information and knowledge
4. a policy framework which creates an enabling environment for sustainable social change.

In order to generate, transfer, share and apply information in an impact-bearing manner, each one of the key sectors forms an information and knowledge system (IKS) of its own. According to Salomon and Engels (1997) an IKS consists of a variety of different actors and stakeholders, including extension agents (or their equivalent), managers of various agencies, private and public sectors, research centres, education and training institutions, the non-governmental organizations (NGOs) and civil society, banks, and policy makers. In the tradition of knowledge management, all these actors possess both tacit and explicit knowledge which they manage, generate, transform, transmit, store, retrieve, integrate, and diffuse and use within the six sectors identified.

A big challenge for information specialists, in the area of explicit knowledge, is to map out who the stakeholders of the respective sectors are, identify the existing information and knowledge resources and repositories, the gaps which exist in these repositories, knowledge sharing and communication capabilities, and recommend how the existing IKS can be strengthened and improved to support social change and the transformation of the respective sectors. Each one of the sectors below would benefit from such an approach.

### *Poverty Eradication and Wealth Generation*

Poverty is a problem that requires deep reflection because poverty affects many people in Africa and

most of the previous policies have not worked well. It is estimated that 45 percent of people in Sub-Saharan Africa live in extreme poverty while 30 percent live in moderate poverty, thus making it an average of 75 percent of the population who are poor. Further recent data show that poverty has grown since the 1980s. The vision of MDG is to end extreme poverty by 2015. There is a real possibility that by applying knowledge management, Africa could make a major impact on combating both extreme poverty and moderate poverty.

To reduce poverty one needs to address the causes of poverty, hence the success of KM would be measured in terms of how it impacts on reducing the causes of poverty. The key causes of poverty are (Sachs, 2005; Mkandawire and Saludo, 1999):

1. Low savings and capital formation. KM should provide ideas on alternative ways of generating savings from poor communities.
2. Low growth in trade, for example through agricultural surplus sales to nearby markets to generate more income. KM would have the goal of creating higher production and the introduction of high value crops to replace low value crops.
3. Capacity building through literacy, improved education for children including girls. KM intervention would include information support for education and take measures to increase the flow of technological know-how in the community. KM would have the goal of addressing all the human capital issues required in capacity building, literacy acquisition and improved education for all.
4. Poor health caused by infectious diseases such as HIV/AIDS, malaria, tuberculosis and malnutrition. This calls for KM interventions directed towards behaviour change. This is important to prevent such diseases from decimating the most productive members of the community and thus increasing poverty by creating child headed households and many orphans.
5. Lack of innovation, which may become common because of poverty restricting the flow of innovations from outside and within the community, thus robbing the community of new ideas to increase production, start small businesses and commercialize their agriculture to a higher level of production. KM should provide support and diffusion of innovations and transfer of technologies from outside and better sharing of technology and innovations within the community.
6. Population explosion because the poor choose to have many children as a form of old age insurance. Such children will not get good education and will in turn want to have many children, ultimately leading to overuse of resources, overcrowding in cities, etc. High population leads to deeper poverty and deeper poverty leads to high population and social conflict. The KM intervention would have the goal of family planning and cultural attitude change in favour of smaller families and improving women's position in society.

The importance of knowledge to development has already been raised by the World Bank (1998), UNDP (2006), international NGOs (Ramalingam, 2005) and various other agencies. In the context of urban and rural poverty, we can look at information and knowledge as two distinct components which dovetail into each other. Information refers to the poverty reduction ideas which are disseminated by agencies, the mass media, posters, video, interpersonal sources, and social networks. Knowledge is the information coming from different sources which has been consolidated, processed and internalized by individuals, a community or society in the context of what they know already, and can either add it to their knowledge base or reject it. Thus knowledge is filtered and contextualized information which can be used to take action against poverty.

Poverty reduction in Africa has been very disappointing, in spite of the continuing development of new programmes targeted at the poor, such as the Poverty Reduction Strategies (PRSP) of the World Bank, the Human Development Index (HDI) of the United Nations Development Programme (UNDP), and the Millennium Development Goals (MDG) of the United Nations. Part of the failure of these development programmes comes from a KM failure of the knowledge support structures for the urban and rural poor.

The link of KM to poverty eradication is very weak because of a number of reasons: the first one is the focus on information transfer activities without monitoring and evaluating how effective the information disseminated has been. In most cases the information needs of the urban and rural poor are seldom taken into account when they are supplied with information to solve their problem of poverty. The assumption being that because they know very little they are poor; thus the existing information and knowledge system of the urban and rural poor is totally ignored when supplying them with external information. Indeed, often their

very way of life and culture are held responsible for the lack of development.

### *KM and Diffusion of Innovations and Technologies*

Diffusion of innovations can be defined as a process by which a new idea is communicated through certain channels over time among the members of a social system (Rogers, 1995). Both Rogers and other innovation researchers have pointed out that although the new idea (technical knowledge) is a central matter, social change is brought about as a result of a collective capacity to learn, involving a large number of semi-autonomous actors – individuals, groups, and institutions. Innovativeness can therefore be seen as a social competence based on social interaction among many stakeholders, rather than individual ability (Salomon and Engel, 1997). Innovativeness is the key driver of economic growth and productivity of any economy and at the centre of transition to an information and knowledge society. "Without innovation there is no forward movement which means lagging behind, since standing still is neither possible nor an option in a time bound universe, that is in constant motion" (Kaariainen, 2005 ).

A national innovation system needs several things to be in place: an educated population, a functioning financial system and a culture of innovation (Kaarianinen, 2005). One should add to this list an information and knowledge system to support the process of innovation and knowledge production. Partly out of this realization, most advanced countries invest between 2 and 4 percent of their GDP into the research and development process (Sachs, 2005). Governments should invest heavily into both the early stages of research and the later stages of development (Sachs, 2005) It has been noted that the research needs of the Third World countries are not likely to be on top of the research agenda of developed countries, thus they need to prioritize their own research and technology needs and devote resources towards developing new knowledge in these areas. Priority needs for research have been identified in the following areas (Sachs, 2005:283; Brouwers and Khoapa, 2005:22):

1. Health – new preventive and diagnostic measures for diseases specific to tropical countries, including TB, HIV/AIDS, and malaria and other tropical diseases.
2. Tropical agriculture – new seed varieties (green revolution model), water management techniques, and soil management techniques.
3. Energy systems – special technologies for off grid power, renewable energy sources (for example solar energy, wind energy), improved batteries, and low watt illumination.
4. Climatic changes research – researching and coping with climatic changes, forecasting and seasonal variations, with a view to more accurate predictions and adjustments.
5. Water conservation – improved technologies for water harvesting, desalination, small-scale irrigation, and improved management of underground water resources. The importance of water management will increase because of increasing population and climatic changes.
6. Sustainable management of ecosystems – fragile ecosystems around the world (coral reefs, mangrove swamps, fisheries, rain forests, river sources, desertification, biodiversity, etc.) are being destroyed, with dire consequences. Poor communities do not have the technical capacity to monitor changes or to respond in an effective and sustainable manner.
7. New approaches to socio-economic development and the quality of life.
8. Poverty alleviation – an assessment of the effectiveness of various strategies to address poverty, and participation of various groups in society in poverty eradication programmes.
9. Health and behaviour change – monitoring of factors which support behaviour change in relation to health and development issues in society.
10. Education, knowledge management and development – improvement of education in relation to development, evaluating and strengthening education systems, knowledge management, and innovative strategies to create employment.

However, most developing countries find it difficult to invest in research and development. At times this means many of their scientists migrate to follow the better opportunities abroad (Sachs, 2005). At present poor countries have 37 per cent of the world's population and 11 percent of the world's GDP but contribute less than 1 percent of the US registered patents taken out by inventors in 2000. The top 20 countries accounted for 98 per cent of all the patents. This has created the innovation gap which allows the rich countries to move forward to more innovation, while the poor cannot get a foothold on the innovation ladder (World Bank, 1998, Sachs, 2005).

Even when countries are not inventors of technology, they can benefit through importation of technology and its diffusion through better knowledge sharing strategies within the country (World Bank, 1998) – importation of innovations through consumer goods, capital imports, foreign direct investment, textbooks, reverse engineering, conferences, and, of course, theft. However if a country is too poor such purchases may be difficult if not impossible. South Asia's development was kickstarted by success in attracting foreign investment in high technology enterprises, which served to introduce innovations into the region.

There are other forms of knowledge and innovation transfer which are mainly concerned with organizational matters to allow society to better confront the problems it faces. Examples of knowledge transfer which fall into this category include setting up NGOs which drive the development process forward modelled on those found in other countries which have worked very well, for example the Bangladesh Rural Advancement Committee (BRAC), an NGO which has done wonders in that country to uplift the state of the urban and rural poor. Bangladesh also offers another interesting innovation which could be adapted in Africa in the form of a micro-finance system for the poor – the Grameen Bank, which has successfully addressed the capital formation needs of the rural and urban poor so that they can start small scale commercial activities and other micro businesses. The system works by lending to groups rather than individuals so that repayment is the responsibility of the group. The Grameen Telecom program is another interesting innovation where a woman or man borrows to buy a cellphone which is used by the whole village and charges a small amount to customers. The Grameen Telecom programme has been able to build a customer base of over 1 million in rural Bangladesh and introduced good communication to the rural poor. There are many more innovations such as these described here – they need to be written up in the local language so that individuals and communities can have access to such information and start similar innovations in their own communities to bring about development.

One aspect of innovation which is not always visible is creativity in society. Creativity based on the opportunities provided by knowledge management and technology and new ways of thinking paves the way for an information and knowledge based society (Nonaka, 1998). Kaariainen (2005) maintains that: "the creative economy needs investment in education and training". This means, that the quality of basic education must be improved and creative learning environments must be developed at all levels of education and training. In an information society, learning continues throughout life; schools should, therefore, not only distribute information but build self-confidence and social skills, and help students to identify their talents and creative passions. The challenge of lifelong learning in the information society is that people must learn to learn (and unlearn). More attention needs to be paid to matters related to entrepreneurship at all levels of education.

Building inclusive societies should be the aim of an innovation system which has roots in different parts of the country. One item on the agenda of the recent World Summit on the Information Society was the digital divide. Given the concerns of developing countries about the international digital divide, it would be terribly hypocritical if they were to move towards an information society while at the same time perpetuating digital divides within their own borders. What is required are explicit policies which include equal access to knowledge and technologies for the whole nation so that the whole population and different parts of the population are part of the transition to a knowledge driven economy.

One source of innovation should be the cultural identity of people and their indigenous knowledge (tacit knowledge). The experience of Finland shows that a strong national cultural identity provides a platform to build technological capacity and develop social experimentation. Kaariainen concludes that "national and cultural identities are important sources of meaning and value, but only on condition that people and countries are engaged in multicultural dialogue" (Kaariainen, 2005:5).

### *Knowledge and the Education Sector*

KM is quite important to the education sector, partly because there are several points of intersection between the two. The strengthening of knowledge management and sharing is dependent on learning at organizational and national levels in order to meet the goals of the institutions or the nation. As noted by the Royal Tropical Institute (KIT) in Amsterdam:

> knowledge and learning also embodies a value system – an orientation of undertaking work that carries a democratic principle that all humans should be valued on their own terms, as should

> the knowledge they carry and they all should be given the opportunity to realize their potential as an individual and as a member of a team or organization. (KIT Website, 2004)

When reviewing knowledge management in the context of education, we can categorize the education sector in terms of two levels, i.e. the formal education sector and the non-formal/lifelong learning education sector. The formal education sector operates at both lower and higher levels. Primary and secondary school, for example, requires access to adequate information resources (school libraries, teacher resource centres, and public libraries) for both the pupils and their teachers. Adequate access to information resources helps to ensure that learning is done in a way that is not dominated by rote learning but offers opportunities for genuine independent and creative learning. To be able to cope with the demands of a knowledge society, countries need to reform education curricula, so that there is a balance between science and technological studies and the social and human sciences studies. These two branches of education should be given equal importance on a 50–50 basis. This ensures that lopsided systems of education are avoided, and there will be enough technicians and engineers in future. Access to ICT and the Internet can ensure that knowledge sharing takes place between teachers, pupils and education authorities regardless of where they are, or the time of day or night. Dedicated websites can be created which provide content mirroring the curriculum, examples of exercises, syllabi, and textbook summaries. Given the digital divide, and poorly supported school and public libraries, there is still a lot that needs to be done to make education interesting and exciting for the population of pupils, teachers, lifelong learners and education administrators.

The problems that affect education at the lower levels are also found in the higher education sector of most African countries. If Africa is not to be left behind, there is a need for the kinds of educational innovation which are now being practised in the fast developing countries of East Asia and other continents.

As shown in the preceding discussions, countries look towards advancements in technology and science as the source of a breakthrough towards a knowledge economy and in most cases look towards their universities to produce new knowledge through research and development, as well as consultancy projects sponsored through both public and private funding (Ryu, 1998). Apart from research and consultancy, universities are also active in teaching and curriculum delivery, as well as community service. Access to knowledge is vital for researchers and consultants in academic institutions to avoid 'rediscovering the wheel', which happens when they have no access to the latest knowledge in their specializations.

In the context of knowledge management, some of the issues found in lower levels of education are also present in the higher education sector. Hsiao (2005), writing about the Chinese higher education sector, noted that it urgently required new teaching methods and reforms to overhaul the curriculum, replace rote learning, and give students more responsibility for their own education. She called for a system of education that allows students to put together their courses across the university to reflect their career aspirations rather than a rigid system where everything is prescribed for the student. She argues that the focus of education must be creative and inquisitive to replace rote learning. Rote learning leads to students cramming, only to spit the information back in tests and examinations. According to Hsiao, this is the only way to move learning to a life long learning mode and make students learn to make critical decisions and open up to change.

Similar calls have come from India; for example, Josh and Murthy (2004) have called for a qualitative expansion of education and an end to the one way delivery of knowledge to make it more participatory and reciprocal. They believe that education must consist of "exploratory processes that allow the learner to make full use of his or her own multiple cognitive maps. The students mutually construct their learning environments, which grow in the learning process".

While we can debate the relevance of the type of education advocated by these two authors, there are few who will not agree that rote learning, and learning for the short term goal of passing examinations, should be reviewed to include more lifelong and creative learning strategies. Similar problems face African education systems at both lower and higher levels. The role of knowledge management is vital for such education to succeed, where the students have a responsibility to learn how to learn rather than cramming a set of facts. Equally important is the role of knowledge transfer for research to flourish, so as to create the knowledge required for countries to embark on innovation creation and on the journey towards a knowledge-based economy.

### *Knowledge for Improvement of the Agricultural Sector*

Agriculture plays an important role in the development of most African countries. In a country such as Tanzania, for example, according to a recent report by the country's Prime Minister, the Government has set out to improve the agriculture sector because "the sector contributes between 45 and 50 per cent to the national gross domestic product (GDP). Tanzania has 94 million hectares of arable land, 44 million hectares of which are good for farming and 50 million hectares suitable for livestock rearing. However, only 10 million hectares are under cultivation." He was concerned, however, that even the 10 million hectares are not exploited fully (Lowassa, 2006). The significance of the agriculture sector to development increases further because it also provides a livelihood to between 70 and 80 percent of the population of most African countries.

One key weakness of the agriculture sector is the poor transfer of knowledge to farmers (and other stakeholders) by research and innovation centres. It is estimated, for example, that in most of Africa, productivity in crop production in experimental research centres is ten times higher than the productivity of ordinary farmers just outside the gates of the centres. The problem is that the new knowledge being developed in the research centres is inefficiently delivered; often, the centres act as silos for hoarding knowledge rather than sharing it with farmers. Mlaki (2005) states that the knowledge gap in Tanzania is shown by the production of 8 tons of maize per hectare in a research environment, while a peasant farmer produces only 2 tons of maize per hectare. It is clear, therefore, that to turn around the productivity of the agriculture sector in a way that several African countries are planning to do requires several KM strategies:

1. Transfer massive innovative knowledge to farmers using the Green Revolution model, which was successfully adopted by Mexico and Asian countries e.g. India, Philippines and China, to promote high yield staple crop varieties. Such a strategy would ensure that the high yield varieties which grow faster – if need be with the application of fertilizer and irrigation – can increase the income of farmers to ten times the present level. The Green Revolution provided Asian countries with their first break through in economic development and Africa should adapt the same model (World Bank, 1998). This strategy would require more funding of agricultural research to adapt knowledge from Asian countries, and a complete overhaul of the system and strategies for sharing information and knowledge between farmers, research centres, infomediaries and other supporting institutions in a country to ensure better return on investments in research and development.
2. A useful suggestion regarding the application of knowledge management to the agricultural sector is to use knowledge to process agricultural products rather than selling them in a raw or semi raw state. UNIDO (United Nations Industrial Development Organization) has concluded that most developing countries do not pay sufficient attention to the value chain through which agricultural commodities and products reach the final consumers. This neglect leads to enormous losses of added value and employment opportunities. It is noted that 98 per cent of agricultural production in developed countries undergoes industrial processing, but barely 30 per cent is processed in developing countries (United Nations Industrial Development Organization, 2004). This is another area where the massive transfer of knowledge and technologies to develop an agro-industrial base would lead to employment creation and higher earning though the sale of processed agricultural products rather than raw materials to overseas and regional markets.

### *Knowledge Management in Small, Medium and Micro-Enterprises*

Small, medium and micro-enterprises (SMMEs) are essential actors in the development process because they play a leading role in job creation, income generation, and value addition through processing local products in the agricultural and natural resources sector. The United Nations Industrial Development Organization (UNIDO) (2004) concludes that SMMEs provide a seedbed for developing and testing entrepreneurial talent, the later being an important cultural foundation for risk taking, technological and managerial innovations, and the adaptation and diffusion of available technologies. As with other sectors of development, knowledge is an important source of both competitive advantage and survival in SMMEs.

The importance of SMMEs in bringing about equitable development among different regions of a country is great, as each local government authority

can be charged with the responsibility to promote the development of SMMEs through the following actions:

1. provision of information and direct assistance
2. bringing local small business together for meetings to discuss the legal and regulatory environment
3. acting as a catalyst and facilitator in identifying specific reform proposals and opportunities
4. advocating for local entrepreneurs on specific reform proposals
5. improving reporting and other regulatory procedures that fall under the control of the local authority
6. developing a local database on small business activity in the area
7. introducing specific policies and regulations that promote local small businesses (e.g. local purchasing policies) (White, 1997:7)

Many of these regional and local authority responsibilities have a clear information and knowledge dimension to them.

Possibly because of the low levels of education among SMMEs operators, the use of information and knowledge as an economic resource is still at a low level in most African countries (Mchombu, 2001). Thomas (1995) has elaborated on the need for information and knowledge among the existing SMMEs in Namibia by stating that:

> the lack of knowledge by SMMEs about market opportunities, prices, quality needs, market trends, the nature of competition etc is at the root of much of what goes through as "lack of market access". One way to address this problem is to improve the dissemination of such information. This can happen through private sector sources, like better newspaper coverage of these issues, a wider network of marketing consultants, stronger emphasis on marketing related topics in training courses aimed as SMMEs, and … other ways.

Looking at the same issue of information and knowledge needs for SMMEs from a different perspective, Levy et al (2003) have analysed the skills required by the SMMEs to be able to manage knowledge and information to gain success and become sustainable in a competitive and globalized world. According to these authors, SMMEs are unable to obtain sustainable competitive advantage from knowledge and innovation and need the following skills in knowledge management:

1. how to use both tacit and explicit knowledge for the purposes of day to day operations so they can invest in an information system rather than simply regard it as a cost
2. how to gather and use customer information for strategic purposes
3. how to use information for efficiency and financial control
4. how to use information to improve and coordinate on customer care
5. how to collaborate and exchange information with customers through use of systems such as email, postal mail marketing, etc.
6. how to use knowledge to manage business growth and identify new opportunities for the SMMEs, thus to reposition their business into new areas of operation.

Levy et al (2003) conclude that most of the skills that SMMEs have are in the area of using information and knowledge to achieve efficiency through basic record keeping, but there are few internal databases to get information needed for their business strategies.

The UNIDO (2004) diagnosis indicates that successful SMMEs are those which can apply new knowledge and innovation to improve productivity and facilitate market access. In most developing countries the sector suffers from failures in the provision of business information, which is often provided by standalone institutions, and is difficult to access, limited in scope, and not provided in an integrated manner. According to UNIDO, SMMEs need tailor made information solutions, i.e. business information services that assess, verify and apply information to a specific business problem.

The recommendation of UNIDO (2004), White (1997) and others is to set up business information services programmes which bring together information from different sources and transform them into solutions, including ICT and e-business support, in integrated networks that link all relevant national and international sources into a 'One Stop Shop'.

The experience of Asian countries, however, shows that success in SMMEs for the internal market is just the first step towards creating SMMEs which can compete globally. Thus from cheap assembly shop shoes, textiles, and lower end electronic products, countries such China and India have moved on towards higher

end production in SMMEs based on the central role of knowledge based economies. According to Hsiao (2005), China

> … is laying the groundwork to become a global power in much more sophisticated, technology-intensive industries that also demand tons of capital. Billions of dollars are flowing into auto, steel, chemical, and high-tech electronics plants. Driving this massive spending push is voracious domestic demand for all manner of goods as well as a big shift by multinationals to manufacture in China. As a result, China is rapidly becoming more self-sufficient in key materials and components, and setting the stage to be a major exporter of high-end products.

These two countries have used other international programmes such as the African Growth and Opportunity Act (AGOA) of 2000 (United States Government. Trade and Development Act, 2000) the African Caribbean Pacific and European Union (ACP-EU) trade programme for developing countries strategically to take off in business development. These two programmes and other bilateral and multilateral programmes like them have produced vast amounts of information which needs to be packaged in a simple and integrated manner for the SMMEs to exploit fully.

It is possible for public libraries and specialized information centres to work closely with local authorities and chambers of commerce to provide SMMEs with information and knowledge support in their respective areas, and network closely with both the relevant government ministries and international organizations to achieve this goal. These new business information services for SMMEs would also include providing tourism information in the local authority area as well as district development information services based on the central government development plans of different ministries. Such SMME information services, be provided through documentation centres based at the district level, would go some way to address the information gap at district level one finds in most African countries.

### *Knowledge Management in the Health Sector*

Knowledge management is as vital to the health sector as it is to other development sectors. Health care information and knowledge is needed to deliver the safest and most effective healthcare possible with available resources (Pakenham-Walsh, 2000). It has been pointed out by Powell (2003) that by applying knowledge management, a country can achieve the following goals:

1. efficiency – which refers to helping people to quickly find the information they need, thus saving time and avoiding duplicating the efforts of others
2. effectiveness – refers to making people aware of lessons learned from research and experience and enabling them to adapt 'best practices'
3. creativity – refers to exposing people to new ideas and approaches
4. empowerment – refers to giving workers and individuals at different levels knowledge and confidence to make well-informed decisions on health issues.

When reviewing knowledge management in the context of the health sector we can categorize the sector into two broad target groups. The first group comprises health workers – doctors, researchers, other medical staff, and health managers. The second comprises members of the public who have to take responsibility for their health by preventing the spread of infectious and preventable diseases or by following closely advice from health personnel.

After reviewing the health information situation in developing countries, Pakenham-Walsh (2000) concludes that health care workers have little or no access to practical information. He noted that access to health information supports the generation of new knowledge and solutions based on the realities of the country, and helps in the critical interpretation of new information accessed through ICTs and health information resource centres.

Godlee et al (2004) argue that a knowledge-based approach to health care among health workers is hampered by several factors:

1. the poor state of ICT infrastructure to access the latest health information in most countries
2. lack of awareness of what information is available
3. lack of relevance of available information ( in terms of scope, style, language, and format)
4. lack of time and incentives to use information
5. lack of interpretation skills.

One could add lack of a knowledge sharing culture among health workers as an important problem preventing a knowledge-based approach to health care.

There have been several ongoing initiatives to address access to health information. The World Health Organization (WHO) has initiated the Health InterNetwork Access to Research and Initiative (HINARI) literature service, the setting up of electronic and virtual libraries (http://www.bvsalud.org), the publishing and distribution of health newsletters (http://www.healthlink.org.uk), and the setting up of small scale health libraries, for example, through its Blue Trunk Library programme, for district hospitals and other frontline health workers. The Blue Trunk Library provides selected essential health information materials. Despite these initiatives, there is still a lot that needs to be done to ensure the knowledge-based approach to health care in most of Africa.

Turning now to members of the public, health information is equally important to bring about sustainable behaviour change in preventable and infectious diseases. The outbreak of HIV/AIDS has highlighted the fact that members of the public also need to have access to adequate information in order to change their behaviour. This is the best way to prevent the spread of HIV/AIDS, which still has no cure. In the fight against HIV/AIDS, knowledge communication is required for improving the knowledge of sexually active members of the population to help them change their attitudes, and develop the ability to protect themselves by adopting new practices, e.g. condom use, abstinence, and being faithful to one partner (ABC model). In cases where infection has already taken place, information and knowledge play a key role in empowering the infected and affected individuals to live positively through better nutrition and a better health regime, and informing them how to take the antiretroviral medication, if available. Some of the information comes from health workers, the education system and NGOs. However, there is also considerable tacit knowledge from those who have experienced the pandemic (and other health problems) at first hand and can share their experiences and insights through support groups. The fact that information on HIV/AIDS prevention does not flow freely because of stigmatization, cultural barriers to sharing sexual information across age groups, fear, and gender barriers means there is a lot of work still to be done on how to create and design effective information and knowledge systems to address the HIV/AIDS pandemic.

In addition to HIV/AIDS, there are other preventable diseases such as malaria and tuberculosis, and various diseases which afflict children, such as polio, whooping cough, tetanus, measles, diarrhoea, smallpox and others. All these can be controlled or eradicated outright if the immunization plans are followed and the parents of a child use the knowledge that exists on how to bring up children. Sharing this information widely is done through campaigns in the media and interpersonal communication.

Access to basic health information can be improved by designing small-scale health information resource centres at the workplace, or in public, school and other types of libraries. Facilitating knowledge sharing through public discussion forums is also very important to translate information into attitudinal change, action and new health practices. It is also vital to work closely with both international, regional and national organizations such as WHO, HealthNet, national AIDS control programmes, and organizations which represent the affected and infected.

## *CHALLENGES FOR AFRICAN INFORMATION SPECIALISTS IN THE ERA OF KNOWLEDGE MANAGEMENT*

We have discussed Africa's need to harness information and knowledge management in order to make a successful transition to the 21st century, which is now regarded as the knowledge revolution era. This section identifies six key challenges which information specialists face if they are to reformulate their practices and become part of the transformation process. It can be done if we become part of the change process rather than an obstacle to change.

### *Repositioning Information Specialists in the Knowledge Pyramid*

One of the challenges to information specialists lies in the concept of the knowledge pyramid, which holds that data is processed to information, from which people make their own sense to turn it into knowledge. Libraries, records and other information centres thus need to facilitate the process of converting information to knowledge. This process can be facilitated by providing access to adequate information resources, but also by creating an environment which permits face to face forums and network formation to discuss and debate issues of concern to the population. The role of information specialists becomes that of infomediaries managing the process of turning information into knowledge for action. A key challenge is

to train trainers in information centres who can train communities and organizations in the use and sharing of knowledge for development to build collective intelligence. The older concepts of information literacy and information retrieval now need to be revisited to include knowledge management literacy, so as to keep up with the knowledge revolution. The new revolution calls for the use of knowledge as a strategic resource and behavioural change among people so that hoarding of information is replaced by sharing and communication of both tacit and explicit information to empower organizations and communities to meet development challenges.

### *Knowledge Sharing, Communication and Information Delivery*

Information sharing is vital to ensure that information does not stay in silos isolated from the day-to-day problems facing society. Without an active communication programme in place, information becomes static and stays in the same place and does not add value to the production processes in society. Thus the role of information centres must also include clear information delivery strategies to deliver information in appropriate formats, languages and subject matter. Delivery strategies should use multiple communication methods, including word of mouth, visual materials, drama, games and cultural interaction, and networks, to reach out to the whole community without excluding some groups such as women, youth, and minorities. An important challenge is to foster a culture of knowledge sharing among the community members to overcome information hoarding tendencies. This would also include addressing the problem of the organizations and communities not knowing what they know, and at other times, not knowing what they do not know. It is normal for disempowered communities (and Third World organizations) to undervalue the vast resources of knowledge among their members. The belief among the poor is that those who come from outside the community have superior knowledge.

### *Assessing and Mixing Technology Options*

ICTs currently enable one to exchange and communicate information with anyone in the world at any time. ICTs are also developing very fast and Internet access, international telephone service (Internet telephony or VOIP), and wireless communications are becoming better and cheaper every few months. However, as stakeholders in technology use, we need to assess technologies and mix and match them to achieve the best results. Other technologies such as cellphones, CD-ROM, DVD, radio, video, films, and posters in some cases might be more appropriate and more accessible than the latest technologies. Above all the information use behaviour should drive the revolution and we should not fall into the trap of technological determinism.

### *Designing Demand Driven Information Systems*

Most information centres were designed to build collections representing the subject profiles of their developers. However, the challenge now, given scarcity of resources, is to design information and knowledge systems that are demand driven and accurately reflect demand for information. Through a combination of user needs studies and national sectoral knowledge needs assessment we should be in a much better position to design national information and knowledge systems that reflect the vision and development aspirations of the country and its organizations. This should include investigating the existing information and knowledge system (IKS) and what exists in the system, so as to identify gaps and ways of strengthening the system already in place rather than try to replace it with an externally driven system. Ultimately, clear systems of monitoring and evaluation also need to be put in place to demonstrate the impact that information and knowledge centres can make on social change.

### *Local Content Creation*

In most cases information centres in Africa are known for the global content they offer, rather than local language content which is more relevant to the local situation. Certainly one area that needs to be included in information services reform is the indigenous knowledge of the community, which is the knowledge that is part of the culture and heritage of the community and nation. The challenge here is for information centres to learn how to produce their own information products and repackage information which is rich in local content, rather than perpetuating various forms of intellectual and cultural dependence. A related challenge concerns the need to step up digital content creation to offer online services to users 24 hours a day and seven days a week.

### *Lobbying to Influence Policy Making*

Library and information associations need to be better organized to influence policy and voice their opinions when policy issues related to information and knowledge management are being tabled in their country or international forums. The recent World Summit on the Information Society was one such instance. It was initially ICT driven, and only later, partly due to the intervention of organizations such as the International Federation of Library Associations and Institutions (IFLA) and UNESCO, did the organizers realize that the driving force of what they were doing was information and knowledge, not the ICT gadgets. Even the concept of WSIS was a misconception; it should have been the World Summit on the Knowledge Society (WSKS). Most countries have formulated ICT policies which masquerade as information and knowledge management policies – such polices need to be challenged and modified and information specialists have a lot of lobbying ahead of them to achieve the goal of policy reformulation.

## CONCLUSION

The effective management of knowledge is a critical strategy and function in the development of Africa. The transition from a predominantly agricultural to knowledge based society need to be managed strategically if Africa is to accelerate her economic growth and become an internationally competitive continent. The knowledge gaps in key sectors of the economic and social sphere require to be identified and addressed urgently. Information specialists must reposition themselves in a new role of knowledge managers because they have a vital contribution to make to Africa's transition to the 21st Century.

### *Note*

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*Abstract*

**The paper starts with an exploration of knowledge management which focuses on the knowledge pyramid concept. The successful management of the transition from an agricultural to a knowledge based society, it is argued, should go beyond formulating information communication technology policies to include knowledge management policies as well. The contribution of information and knowledge systems in six key sectors of the national economy is described as vital to kick start the revival and reconstruction of Africa. The sectors identified are: poverty eradication and wealth generation, transfer of technologies and innovations, education sector, agricultural sector, small, medium and micro enterprises, and health sector. The new era of knowledge management challenges information specialists to**

**reinvent and reposition themselves as infomediaries and knowledge managers who can manage efficiently the process of converting data and information into knowledge for development.**

**Keywords:** Knowledge management; Development; Africa

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*MORE ON KNOWLEDGE MANAGEMENT IN AFRICA*

**Empowering Africa's development using ICT in a knowledge management approach.**

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Purpose: The purpose of the paper is to explore the role of information and communication technology (ICT) using a knowledge management (KM) approach. The knowledge in the context of this paper refers to indigenous knowledge. Design/methodology/approach: The paper is based on a literature review. Findings: The discussion suggests that, in spite of various infrastructural limitations in Africa, KM applications can still play a vital role in indigenous knowledge management and consequently empowering Africa's development. Research limitations/implications: The major hindrance is the fact that Africa has thus far achieved little on its own; rather it has been emulating the progress made in the developed world. Because of this, there is a scarcity of in-depth knowledge related to an African context. In truth, some areas in which ICT has the potential to change, pertaining to the economy and society, have not been observed in any way. More research is required to identify specific needs of a country. Practical implications: The paper supposes that in spite of all these variations and implications KM can be adapted for indigenous knowledge. The paper contributes in terms of the literature review to showing how tacit knowledge can be managed using ICT. It can be useful for the researchers and knowledge workers. Recommendations are made concerning what needs to be done to improve ICT conditions in Africa such as: ICT policy formulation; literacy programs; legal and regulatory framework; manpower training; and empowerment of local people. Originality/value: Little has been done in Africa to explore the potential of using ICT as a mechanism with a knowledge management approach, in the thrust of Africa's development. This paper proposes how it is possible to use ICT to manage and disseminate indigenous knowledge. (Author abstract)

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