Applying Earl's KM model in IK management: with reference to Kenya and South Africa

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Abstract

Purpose – The purpose of this paper is to show-case how modern Knowledge Management Models, specifically that of Earl, can be applied to manage Indigenous Knowledge (IK).

Design/methodology/approach – The paper is largely based on the review of both print and electronic resources.

Findings – Despite IK being tacit and marginalized it can indeed be managed by use of modern models just like modern knowledge.

Research limitations/implications – Validation poses a challenge and the future of IK will also be challenged unless stringent solutions are unveiled.

Practical implications – The paper suggests a number of ways in which IK can be managed using the contemporary KM models with specific attention to Earl's KM Taxonomy.

Originality/value – The paper shows how IK, a tacit knowledge, can go through the various KM processes of creation/production, storage, processing/codification, transfer and utilization successfully.

Keywords Indigenous knowledge, Earl's Model, Mapping and auditing IK, Kenya, South Africa, Knowledge management, Solutions

Paper type Literature review

Introduction and background

This paper is a review of Earl's model of a conceptual framework for Knowledge Management (KM) that can be applied to the mapping and auditing of Indigenous Knowledge (IK) in both Kenya and South Africa. The paper is based on a doctoral study that seeks to identify and explore the various IK management initiatives in the two countries. The study focused on the management of IK in terms of legislation, structures, centres, programmes and research trends. IK is tacit (intangible) knowledge, meaning it is highly personal and hard to formalize and is deeply rooted in action, procedures, routines, commitment, ideals, values and emotions. One of the tenets of knowledge management is the conversion of this tacit knowledge (Indigenous Knowledge – IK) to tangible knowledge. Intangible (tacit) knowledge becomes crucial in KM research because it is viewed as a major resource that holds the key to organizations' growth in terms of spurring innovation. This resource has to be identified and leveraged for it to be utilized, it thus has to undergo a kind of "metamorphosis" – be converted into visible and tangible formats. This process of conversion forms the driving force of KM (Nonaka and Takeuchi, 1995; Mooradian, 2005; Ocholla, 2007, p. 2).

Due to the nature of the study (mapping and auditing of IK), most of the existing KM models were not appropriate thus rendering Earl's model the most adequate one. Citing a few examples such as Nonaka and Takeuchi's (1995) Socialization, Externalization Combination and Socialization (SECI) model, this focuses on the conversion of tacit knowledge to explicit, while Hedlund (1994) concentrates on knowledge transfer and transformation. There is also Carayannis (1999) whose model envisions a technological platform for support, monitoring, capturing, measurement and enrichment of what he refers to as organizational cognition although it is more inclined to human resources.

Briefly, Earl's (2001) model, which went through several revisions since its inception in 1983, focuses on the different stages or phases through which organizations pass in planning their knowledge systems. It is holistic as it encompasses all that appertains to IK, which is tacit informing it on how to effectively manage it. The study therefore bases its study on the latest (2001) Earl revision that is based on three schools (with seven branches), as discussed in the following.

Whereas some scholars prefer the cultural approach to KM, whereby organizational learning with a focus on innovation and creativity is seen as the best approach to managing IK, this paper, finds Earl's taxonomy in KM more appropriate. His taxonomy is more holistic in that it encompasses all aspects that can accommodate an entire community's life cycle as will emanate from the discussion which follows.

According to the National Research Foundation (NRF) in South Africa, Indigenous Knowledge can be defined as a: "Complex set of knowledge and technologies existing and developed around specific conditions of populations and communities indigenous to a particular geographic area" (NRF, nd: np). indigenous Knowledge is thus seen as a form of knowledge management that is holistic and deeply embedded into the life system of the communities. This complex situation represents the conversion of intangible knowledge (nature of IK) to tangible format and cannot be separated from any realistic knowledge management paradigm.

The lack of any general consensus on an agreed definition of knowledge management (KM) by its scholars (such as Earl, 2001; Wiig, 1997a; Glisby and Holden, 2003; and Kakabadse *et al.*, 2003) illustrates why there are many different KM models and definitions that are currently in use. This has led to substantial confusion as to which model or definition one should adopt. Similarly, these factors also influence one's choices and inclinations, often depending on a given study's theme. Wiig's (1997b, p. 8), for instance defines KM as a process that focuses on, and manages systematic, explicit, and deliberate knowledge building, renewal, and the application of effective knowledge processes (EKP).

Knowledge management can be broadly defined as a management process that involves identifying, capturing, disseminating and exploiting the knowledge possessed by an organization for the benefit of both its employees and its clients. Similarly, Dana *et al.* (2005, p. 10) define KM as "the integration of information, ideas, experience, intuition, skills and lessons learned that create added value for a firm" Knowledge management is increasingly popularized in various societies, organizations and governments because of its confirmed importance in fostering knowledge creation, codification and transfer, and the development of knowledge capital capability.

Earl's Model: conceptualization

Earl's KM model is based on seven branches grouped into three major schools of knowledge management: the technocratic school, which consists of codified systems; the commercial school, which uses codified systems to manage intellectual assets; and the behavioral school, which is mainly concerned with personal knowledge (Earl, 2001, pp. 215-33; Blackman and Henderson, 2005, p. 152; Hicks *et al.*, 2007, p. 8 para; Hicks *et al.*, 2006, p. 25). Earl saw his model as a solution to what he believed to be the failure of preceding KM models. Earl was mainly concerned with the creation, provision, sharing, use, and protection of knowledge, which he believes is more often than not inadequately managed, even while being a sustainable source of competitive advantage (Earl, 2001; Zack, 1999, p. 8 para; Vasconcelos, n.d.; Martensson, 2000). The need for knowledge management interventions is of utmost importance for any organization to succeed and achieve the desired goals.

What makes Earl's taxonomy more appropriate than other classification systems with regards to this study is its holistic approach towards KM. Earl focuses on five parameters/indicators that allow the model to attain its goals, i.e. focus, aim, unit, success factors, and also the philosophy behind each school which is characterized by a "C" (Codification, Connectivity, Capability, Commercialization, Collaboration, Contactivity and Consciousness). These stand out in each school by factoring in the use of information technology for effective impact and in inventorying what is to be managed (Earl, 2001, p. 217).

Although Earl (2001, p. 216) avoided defining knowledge and KM, he does so in an indirect manner through the various schools in his taxonomy. What follows is an explanation of the relevance of the various schools (and branches) in Earl's framework with regard to this study.

Technocratic school (systems, cartographic and engineering)

In the Technocratic School, we find the Systems, Cartographic and Engineering branches. Their main focus is Information and Communication Technologies (ICT). ICT is used as a platform or an interface between the knowledge owners and knowledge seekers. This is best exemplified by the creation of relevant recording systems in different formats to suit each branch as they strive to achieve their goals of managing tacit knowledge. Achievement of such goals is made possible through the codified systems in form of knowledge bases, knowledge directories and knowledge processes. It is through these codified systems that aspects of tangibility, sharability, transferability and storability are achieved due to the tacit knowledge being converted into explicit knowledge. Explicit knowledge thrives through its visibility, access and use (Ocholla, 2007, p. 4).

Systems branch

Conversion of tacit knowledge to explicit knowledge is the main factor that is being exemplified by the systems branch, Earl (2001, pp. 218-19) poses various situations where such tacit knowledge of experts has been successfully captured and coded into explicit knowledge. A case in point is that of a Xerox engineer faced with a technical problem, which he solves through trial and error. By coding the solutions and having them assessed and validated by peers and experts, he is able to share the tacit knowledge with others. So too is the instance of a database created by Skandia International built over several years and made accessible to the entire Skandia network worldwide.

Citing the two examples raises several points that are relevant to this study with respect to Earl's model such as the, the recognition and appreciation that tacit knowledge is codifiable, that it is shareable, and that it is compatible with modern technology. So what does this mean in terms of IK? The implication is that since the future of IK is uncertain (mainly due to its oral nature), the need to preserve it is paramount, and this can only be achieved, by a repository (knowledge base), advocated by this school. The South African case, can be illustrated by South Africa Bibliography Network (SABINET), which hosts all the research carried out, and mostly all IK research is also captured here. A similar case of Kenya is exemplified through the Greenstone database that captures all Kenyan related research carried out within and without the country.

Cartographic branch
As the name implies, the cartographic branch is concerned with mapping organizational knowledge. It aims to record and disclose who in the organization knows what by building knowledge directories. The principal idea is to make sure knowledgeable people in the organization are available to others for advice, consultation, or knowledge exchange. Knowledge directories are not so much repositories of knowledge but rather gateways to knowledge, and the knowledge is as likely to be tacit as explicit. Since tacit knowledge is not easily explicated or articulated, the key issue is to identify who might be a source of knowledge anywhere in the firm through conversation and contact rather than through access to a knowledge base, which may not only contain inadequate knowledge, but also have answers to rather overly precise questions.

Whereas the cartographic branch takes note of knowledgeable people and informing others of their existence/location, Earl (2001, p. 220) argues that the principal idea is to make sure that knowledgeable people in the organization are available to others for advice, consultation or knowledge exchange, a point that this author concurs would or could translate to global knowledge partnerships, and this can only be achieved when people in developing countries participate as both contributors, partners and users of knowledge (World Bank, 1998, p. i). By mapping IK, the study undertook a survey on what has or is being done to IK with respect to identifying IK policies and legislation; structures in place; centres and systems; programmes and activities; and research and documentation in Kenya and South Africa. The net result is a detailed IK directory that doubles as an IK gateway to knowledge.

Earl bases the cartographic school on what he refers to as people connectivity, where IT plays a leading role. It is through intranets and extranets that it is possible to locate knowledge resources and providers using directories. He further explains this by illustrating how Mckinsey and Company employed knowledge mapping and developed their first guide to experts in different practices within the firm in the early 1980s. American Express did something similar, by mapping various types of knowledge sources in different offices. A similar exercise was also conducted in South Africa by the National Indigenous Knowledge Systems Office (NIKSO), whereby a national audit was done to locate various IKS databases, hosted by institutions countrywide.

Further on, the South African government through the National Indigenous Knowledge Systems Office (NIKSO) holds a weeklong exhibition that pools together

knowledge holders, researchers and developers to showcase their expertise in IKS related issues. The same is also replicated in Kenya whereby the Department of Culture in the Ministry of State for National Heritage and Culture holds a weeklong cultural fete in the month of August,

Engineering branch

How can IK be relevant to diverse personnel? The principle of decentralization makes the provision of knowledge relevant to the personnel available through connectivity. Earl (2001, p. 221) provides an example of best practices through HP, where the products and processes department mapped key knowledge areas within divisions in order to capture and make available known knowledge to support knowledge workers. HP has also mapped knowledge links between divisions so that ideas may be shared between different groups of knowledge workers. The issue of Selective Dissemination of Information (SDI), a marketing strategy used by the libraries to create awareness of various resources, which is exemplified by and how knowledge can be tapped and be accessible to knowledge seekers at their time of need.

IK initiatives, such as exhibitions, conferences and workshops provide an opportunity for what Earl refers to as connectivity. It is through such that experts in a particular discipline tend to exchange and share knowledge for their own benefit as well as their organizations. Both countries in this study have endeavoured to do this. One such example is the national exhibition and workshop held in 2008 in Pretoria that involved all the IK stakeholders. The exhibition was held through the courtesy of the South Africa government through the Department of Science and Technology (DST) and National Indigenous Knowledge Systems Office (NIKSO). A similar event was organized in 2006, by the National Museums of Kenya, whereby the key theme was to safeguard the endangered oral traditions of East Africa.

Economic School (commercial branch)

The commercial branch is classified as economic because the underlying success is through what Earl (2001, pp. 222-3) refers to as "protecting and exploiting a firm's knowledge or intellectual assets to produce revenue streams (or rent)", and its philosophy is pure commercialization of intellectual or knowledge property. One of the key issues with respect to intellectual property involves identifying the originator or owner of the know-how. A community that develops and applies particular IK in its culture generally owns the IK (Kaniki and Mphahlele, 2002, p. 11). Efforts should also be made to create databases that preserve IK. An inventory of patented products could be made available to patent offices all over the world to ensure that patents' claims that duplicate innovations contained in the register are rejected (Mutula, n.d., p. 131).

Due to IK's potential (financial benefits) and its danger of extinction, its protection is of paramount importance. For instance, the South African government, through the Department of Science and Technology (DST), recognized the complexities and challenges associated with IKS (Department of Science and Technology, 2004, p. 3) and hence proceeded to develop an IKS policy. The policy provides the framework for collaboration with other regional partners in Africa facing similar problems, e.g. bio-piracy, benefit sharing, and the poor recognition of knowledge holders. Kenya launched a similar cultural policy in March 2010.

The study integrates information from diverse sources to improve efficiency and instigate higher productivity and an increase in the revenues of rural communities by generating data to support the creation of a national IK repository/warehouse and/or an IK database, where financial benefits, would be garnered by the community at large.

Behavioral School (organizational, spatial and strategic branches)

The Behavioral school hosts three branches: organizational, spatial and strategic, which focuses more on the organization from the behavioral perspective.

Organizational branch

The main focus in the organizational branch is the social culture branch component, which brings out networking and sociability through linkages (Hicks *et al.*, 2006, p. 25). The organizational school describes the use of organizational structures or networks to share and pool knowledge. Often described as knowledge communities, the organizational arrangement consists of a group of people with common interests, problems or experiences.

This school brings out an important feature of knowledge communities in that they bring together knowledge and knowledge owners (Earl, 2001, p. 224). The idea is to capture what everybody knows and to connect people who know. Such communities are designed and maintained for a business purpose and can be intra- or inter-organizational. The essential feature of communities is that they exchange and share knowledge interactively, often in non-routine, personal and unstructured ways in an interdependent network.

Earl (2001, p. 224) further cites a typical productivity-through-knowledge project in BP, named "how we work now". Knowledge or expertise on critical operational tasks is first documented, then collected, synthesized, and codified in a system. Whenever a new experience occurs or a project is completed, post action reviews are conducted to assess initial goals, explore what actually happened, and analyze the difference between the outcome and intent. In this way, new knowledge is generated, validated by those who went through the experience as well as by experts.

Spatial branch

This branch specifically focuses on the provision of space to facilitate knowledge exchange. It is also relevant to the study, particularly where IKS related programmes and activities are concerned. IK, which forms part of knowledge management, has crucial functions and importance in the knowledge management process, i.e. creation/production, storage, processing/codification, transfer and utilization, etc., and therefore requires significant attention, hence the development of knowledge capital capability. This is achieved through the various workshops/conferences that provide space and platforms and also facilitate knowledge exchange.

Strategic branch

Earl (2001, p. 227) views knowledge management from a competitive perspective, where it may be seen as the essence of a firm's strategy. A good example is Skandia, which has positioned intellectual capital as its corporation's core capability; the former CEO Bjom Wolrath stated that: "Intellectual capital is at least as important as our financial capital in producing truly sustainable earnings". Likewise CLARICA, the Canadian insurance and

financial services company, has pursued a program of intellectual capital development and located it within its corporate strategy unit. Both companies have developed conceptual models to articulate and explain the purpose and character of intellectual capital, and both have invested in complementary knowledge management initiatives to develop human competences as well as capture and share learning and know-how. This provides mechanisms for sharing this knowledge and integrating it with modern science and technology to enhance information dissemination, thus promoting social and economic development. One other aspect that Earl and Scott (1999, pp. 29-30) highlight is the position of the Chief Knowledge Officer (CKO), arguably thought to be the driver and coordinator of knowledge management in organizations.

What this means for developing nations

What then are the implications of such a KM framework to the developing nations? The eminent danger of IK extinction should no longer pose a challenge due to its oral nature. It is now evident that the existing technological channels are capable of capturing, storing and disseminating IK in conventional formats (Hunter, n.d., p. 113). A South African initiative through the Department of Science and Technology (DST) is an excellent example. DST established a pilot project with the University of Zululand, whereby an IKS centre was established. The IKS Centre was mandated to collecting and recording information, codifying and registering the information, protecting the information by giving the owner recognition and creating a database of the information (Murray, 2008, p. 6). Three rural communities (uMhlabuyalingana, Nkangla and Mkhwanazi) were identified and selected to take part under the IKS center. The aspect of Access and Benefit Sharing (ABS), comes out strongly in the aforementioned project, besides the government and the communities concerned acquiring a database for future generations, other benefits accrued from such a project, e.g. economic benefits arise and are enjoyed by the communities too. Similarly, sustainability of such projects, is expected to be attained, and achieved.

The importance of IK cannot be underscored. According to WHO, countries in Africa, Asia and Latin America use traditional medicine (TM) to help meet some of their primary health care needs. In Africa, up to 80 per cent of the population uses traditional medicine for primary health care. This is a clear indication that unless measures of protection of IK are beefed up then the previous scenario may never be actualized.

With the few cited examples, its clear that IK can be integrated and mainstreamed into the global knowledge system if given a chance, recognized and appreciated by all stakeholders involved.

Conclusion

Various studies have been carried out either based on Earl's model or using it as a point of reference, e.g. Blackman and Henderson's (2007) "Ontological analysis of knowledge management systems from Popperian and Heideggerian perspectives"; Blackman and Henderson's (2005) "Examination of the epistemological and philosophical problems in knowledge management"; and Handzic *et al.* (2008) in auditing KM practices, to name a few. Others have lamented its shortcomings. For instance, one study has argued that whereas there was evidence of knowledge transfer occurring, there were problems with effectively measuring the knowledge transfer

process. The study therefore argued that it was clear that measures of knowledge are not universal or even generic.

Others, like Blackman and Henderson (2005, p. 158), fault other issues in some of the schools of Earl's model, e.g. the cartographic school. According to them, the school enables the sharing of "how, what, where and which" kinds of knowledge but does not address the "know why", which makes it difficult to validate the knowledge that the school alludes to. Second, it leaves a gap of not being able to understand why a particular problem happens, therefore relying on what is already documented. This is where intangibility poses a challenge when trying to answer such questions as to "why". The issue here is lack of evidence of the validation process whereby the process in question has to be tested over time and be used for problem solving (Ocholla, 2007, p. 4). Their argument is that the lack of validation explains why managers who solve problems based on expert directories could lead to poor outcomes.

This is also intensified in instances where problems are ill-specified – the language and processes deployed by the expert's knowledge may take precedence over the description of the problem as it is experienced. The net result here is the existence of an informal body of knowledge with experts likely to supersede formal knowledge management systems (KMS). Third, as outlined earlier in the text about Earl's main concerns with the creation, provision, sharing, use, and protection of knowledge, he gives less attention to its transformation, which is intertwined with this process. Also missing is any mention of semi-articulated ideas which are still too immature or naïve to be entirely made explicit for the purpose of implementation and are nonetheless still consciously or unconsciously part of brainstorming activity (Gabberty and Thomas, 2007, p. 4). Belsis *et al.* (2005), p. 191) are skeptical that the technocratic school in particular is more objective by emphasizing information technology as a way of capturing, storing, and disseminating knowledge, thereby ignoring the subjective.

The important role played by information technology and knowledge management as strategic enablers have been emphasized in Earl's model. IT and KM enable organizations to shift gears in managing knowledge so that they can create and maintain what is referred to as superior organizational routines that result in competitive advantage (Kakabadse *et al.*, 2003, p. 87). Earl's model is inclined to be cognitive in its approach, since it focuses on some aspects such as the reutilization of knowledge and the adoption and efficient exploitation of IT, especially in the codification, storage, retrieval and transfer processes (Kakabadse *et al.*, 2003, p. 82).

Earl's model stands out as a firm guide for appreciating critical issues that face developing countries such as Kenya and South Africa. The current financial crisis facing major global economies such as the US, the UK and Japan raises many questions, especially in terms of what lessons can be learned by us – the so called weak and marginalized economies.

Global to local IK initiatives are a key indicator of the important role played by IKS. This importance is exemplified by the emphasis in Earl's organizational school on networks for pooling and sharing knowledge. This trickles down to global initiatives such as the World Bank's IK development initiative, where the bank has partnered with ECA (Economic Commission for Africa), CISDA (Centre for Information Society Development in Africa), the IDRC (The International Development Research Centre), the ITU (International Telecommunication Union), UNESCO (United Nations Educational Scientific and Cultural Organization), UNDP (United Nations

Development Programme), WHO (World Health Organization), CIRAN (Centre for International Research and Advisory Networks) at Nuffic (Netherlands Organization for International Cooperation in Higher Education), SANGONet (Southern Africa NGO Internet Provider), WIPO (World Intellectual Property Organization), and ILO (International Labor Organization) (World Bank, 1998, p. 15).

The World Bank's initiative has successfully given birth to:

- A promotional brochure on IK in English, French and Portuguese.
- IK practices database (about three dozen practices are synthesized and referenced).
- "IK-Notes", a monthly periodical used to disseminate IK practices as encountered by the bank to external audiences (15,000 mailings per issue). An IK web page can be accessed at: www.worldbank.org/html/afr/ik/index.htm
- Contributed "Box" on IK for the 1998/1999 "World Development Report: Knowledge for Development" (World Bank, 1998, p. 16).

The 1992 Convention on Biological Diversity (CBD) recognized the value of traditional knowledge in protecting species, ecosystems and landscapes and also traditional knowledge's direct bearing on conservation, sustainable use and benefit sharing. IPRs were included as part of the negotiations, and it became apparent that the issue of IPRs is contentiously viewed when the Bush administration refused to sign the convention in Rio. This was just one of many manifestations of the challenges facing IKS, especially in its global recognition and acceptance.

More research needs to be undertaken on how to integrate, harmonize, and effectively fuse IK into the global knowledge system while also appreciating its tacitness and considering ways and means of effectively codifying it to the point that it can be effectively disseminated. This also means finding the best way to tap into IK without it losing its original value and meaning; considering other issues pertaining to its protection; and taking into consideration communal ownerships and appropriate modes of access and benefit sharing. The New Partnership for Africa's Development's (NEPAD) concept of "African solutions to African problems" (Economic Commission for Africa, 2007, p. 2) should also be empirically researched for future application in the effort of recognizing and appreciating IK, and especially in mainstreaming it into the global knowledge system.

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