

Full Length Research

Applying knowledge management models to managing beads making indigenous knowledge in the Eastern Region of Ghana

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Background: The Krobo beads making industry in Ghana performs a central role in the traditional and economic developments within rural communities, applying knowledge management models to managing beads making IK would help to halt its disappearance, preserve and protect this knowledge.

Objective: This paper sought to assess the application of knowledge management (KM) models in managing beads making indigenous knowledge (IK) in order to improve and preserve beads production activities within the Krobo communities in Ghana. This was done by assessing acquisition, sharing and preservation processes of beads making IK. The study also explored the significance of vision, the future potential of the beads making industry, ICTs, policies, legal framework, and culture in KM practices in the beads producing communities.

Method: Qualitative research design was adopted. Phenomenology strategy was used. Qualitative data was collected using semi-participant observation, semi-structured interview and focus group discussions. The study employed thematic data analysis technique. Data were extracted manually from the transcripts and summarized into various themes.

Results: The study revealed that IK was acquired and shared within socio-cultural practices that existed in the Krobo communities, and that IK was basically stored in the memory of IK holders which is aiding its disappearance. The study developed a KM model that would be applicable in regional IK management within the social-cultural context in developing countries.

Originality: The proposed KM model provides a special context and understanding of the management of indigenous knowledge in regions with rural communities in developing countries. Most of the KM models reviewed were developed based on formal organizational environment with western orientation; consequently they did not capture the needs of regions with rural communities. The proposed model therefore, makes a modest contribution to theory on KM in regions with rural communities in developing countries, and provides the relationships between KM facilitators/principles and KM processes.

Limitations/implications: The model proposed by this study for managing regional IK has not yet been tested. There is therefore, the need to test the developed model against existing KM models, in specific regions with rural communities in the developing world, to determine if it can be used to explain the link between KM facilitators/principles and KM processes.

Key words: knowledge management models, Indigenous knowledge, beads making, Ghana

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INTRODUCTION

The potential of traditional/indigenous knowledge in economic development of local communities is highly recognized all over the world (Iyoro & Ogungbo, 2013; WIPO, 2010), as it is seen as a set of techniques, perceptions, information and behavior that guide local community members to use natural resources (Iyoro & Ogungbo, 2013). Indigenous knowledge offers new models for developments that are both ecologically and socially sound (Posey, 1985:139-140), and in community development and poverty alleviation (Ellen & Harris, 1996). Beads making is an indigenous industry in the Krobo communities in Ghana. Apart from agricultural activities, one of the major economic activities engaged in by these rural dwellers is indigenous glass bead making (Lower Manya Krobo District Assembly, 2014; Upper Manya Krobo District Assembly, 2014). It is however, asserted that IK in Africa are being wiped out as a result of the rapid changes accruing from rapidly changing natural environments, and imported economic culture and political development models through globalization (Bray & Els, 2007:3; World Bank, 1997 cited in Mutema, 2013:59). Indigenous knowledge is under threat from modern technology because even in remote areas the powers that push global or just non-local content such as radio and television broadcasting and advertising among others, are much stronger than those pulling local content (Nyumba cited in Mapara, 2009). Again, indigenous and local people are often secretive and scared of documenting their knowledge outside their customary oral exchange (Okorafor, 2010). Consequently, most of the IK have largely remained undocumented in developing countries including Ghana (Mascarenhas, 2004:4). Failure to maintain adequate records and other systems of managing and preserve indigenous knowledge means that much of it is being lost (Agea, Lugangwa, Obua & Kambugu, 2008).

Further, the existing global intellectual property practices inadequately protect indigenous culture and knowledge from development, and often exploitation (Andanda, 2012:549; Anderson, 2010; Simeone, 2004; Wekundah, 2010). This is because the emphasis of the existing western intellectual property rights systems on individual proprietary rights, as well as the time limit within which IPR laws operate do not address the collective nature of traditional knowledge, indigenous clan designs, and rock art that first existed in material form thousands of years ago and remains part of the particular indigenous culture in perpetuity (Janke & Dawson, 2012:10). Therefore, due to the absence of any effective mechanism to protect IK, most of this knowledge has been exposed to what is termed the public domain (Anderson, 2010; Wekundah, 2010), thereby making it available for misappropriation.

ICTs have also been identified as one of the elements

that enhance knowledge management process (Small & Tatalias, 2000; UNDP, 2012; World Bank, 2008: 5). This study explored how technology could be used to capture, manage and make IK accessible (Ngulube & Lwoga, 2007), and the possibility of providing content management solutions if it is deployed with proper guidance from policies and knowledge manager (Ngulube & Lwoga, 2007). The purpose of this study was to make a modest contribution to the conceptual development of KM studies on management of indigenous knowledge with the attention on managing beads making IK in the Krobo communities in the Eastern Region of Ghana, and it has proposed a KM model that can be used to manage IK in rural communities.

CONCEPTUAL FRAMEWORK

Conceptual framework of a research explains either graphically or in a narrative form, the main things to be studied-the key factors, constructs or variables and the presumed relationships among them (Miles & Huberman, 1994). Choosing a suitable conceptual approach for KM practices requires an understanding of both the available KM approaches and the knowledge problem involved (Probst, Raub, & Romhardt, 2000). It is also asserted that relying on only one KM approach may limit organisations to a range of possible solutions for KM practices (Probst, Raub, & Romhardt, 2000). Consequently, the conceptual framework of this study was based on nine western oriented KM models (Nonaka and Takeuchi, 2000; Melkas, and Harmaakorpi, 2005; Boisot, 1987; Davenport, 1998; Probst, et al., 2000; Rowley, 2001 Kruger and Snyman, 2005; McAdam and McCreedy, 1999-2000.; 1995; Small and Tattalias, 2000).

Nonaka's (1994) dynamic theory of organizational knowledge creation posits that organizational knowledge is created through a continuous dialogue between tacit and explicit knowledge through four patterns of interactions, socialization, combination, internalization and externalization. Nonaka, Toyama and Konno (2000) further improved the model of knowledge creation which is made up of three elements: (i) the SECI process, the process of knowledge creation through conversion between tacit and explicit knowledge through socialisation, extenalisation, combination and internalization. (ii) *ba* which is a shared context in motion, in other words the environment and conditions within which knowledge is created, shared and utilized.

The extended SECI model of Uotila, Melkas, and Harmaakorpi (2005), added two knowledge conversion phases to the SECI model: potentialisation and visualisation that constitute a third form of knowledge. It emphasis the ability to sense the presence of the

potential of particular knowledge, to see what does not yet exist, which is usually associated with artists. Small and Tatalias's (2000) KM model emphasized that elements such as strategy, measurement, policy, content, process, technology and culture, can impact knowledge creation activities such as knowledge capture, knowledge exchange, knowledge reuse, and knowledge internalization. Earl (2001) schools of KM on the other hand stressed technocratic, economic and behavioral approaches to knowledge management. Technocratic schools address the idea that specialist knowledge should be validated, mapped, captured, codified, controlled and und updated in knowledge bases. The economic schools place more emphasis on exploitation of knowledge and less on exploration of knowledge while the behavioral schools promote the breaking down of knowledge barriers and sharing knowledge.

McAdam & McCreedy (1999) propose KM processes in a recursive flow, which include: construction of knowledge; embodiment of knowledge, dissemination of knowledge and economic use of knowledge. Rowley's (2001) KM model, the Learning with Knowledge Cycle (LK Cycle), outlines the KM processes in a sequence of a cycle, which includes: knowledge acquisition, creation and construction, knowledge articulation and sharing, knowledge repositories updating, knowledge diffusion, access and dissemination, knowledge use and knowledge revision. The Cycle represents the learning process within organisations and is applicable to both tacit and explicit knowledge.

Probst, Raub and Romhardt (2000) also identified six basic processes of KM principles. These are; (1) Knowledge identification: analyses and describes the company's knowledge from both internal and external environment. (2) Knowledge acquisition: imports a substantial part of knowledge from outside sources. (3) Knowledge development: focuses on generating new skills, new products, better ideas and more efficient processes. (4) Knowledge sharing and distribution: gets knowledge to the right place. (5) Knowledge utilization: ensures that the present knowledge is applied productively for the benefit of that organization, and (6) Knowledge retention: Selects stores and regularly updates knowledge for potential future value; knowledge goals and knowledge assessment which further extends the KM concept into a management system.

Davenport (1998) on the other hand provides ten principles that govern or guide KM in organizations. These principles include KM is expensive; effective management of knowledge requires hybrid solutions of people and technology. Others are KM is highly political; KM requires knowledge managers and KM benefits more from maps than models. In addition, sharing and using knowledge are often unnatural acts, KM means improving knowledge work processes; knowledge access is only the beginning; KM never ends; and KM requires a knowledge

contract.

Similarly, Kruger and Snyman (2005) proposed that knowledge management strategies will need to adhere to guidelines supplied by knowledge management principles (as encapsulated within policy) and governance supplied by business strategy (as encapsulated within a knowledge strategy). Thus before institutions embark on knowledge management initiatives they should decide on knowledge management principles and that not only should principles be encapsulated within policy, but also that the strategic management process (strategic requirements for knowledge leading to a knowledge strategy) be used to determining the priority of principles i.e. strategy acting as a filter in seceding the allocation of resources to successfully institutionalise principles (Kruger & Synman, 2005:78).

From the discussion of the nine KM models, it can be said that all of these models are based on formal organizational systems and institutions with western orientation. Although the extended SECI was proposed to facilitate regional KM, it was also based on formal institutions. The models also stressed the identification of KM principles that could be used to guide or influence the implementation of KM processes in organizations (Davenport, 1998; Probst, Raub & Romhardt, 2000; Nonaka et al., 2000; Small & Tatalias, 2000; Kruger & Snyman, 2005; Uotila, Melkas, and Harmaakorpi, 2005). Some of these principles are: the development of a policy, vision, future potential of a particular knowledge, strategy, leadership, and legal frameworks (Davenport, 1998; Probst, Raub & Romhardt, 2000; Small and Tatalias, 2000; Uotila, Melkas, and Harmaakorpi, 2005). Other principals include: measurement, content, culture, process and technology (Small & Tatalias, 2000).

Again, it is clear that these models emphasize the implementation of KM processes for the effective management of knowledge in organisations (Probst, Raub and Romhardt; 2000 McAdam & McCreedy, 1999; Small & Tatalias, 2000; Rowley, 2001.). Likewise, Uotila, Melkas and Harmaakorpi (2005) proposed the extended SECI model including self-transcending knowledge which will aid regional knowledge management by creating a vision to synchronise the network. This study adopted KM processes such as knowledge creation, recognition/identification, acquisition, sharing, preservation, and application/utilizing, as well as KM principles such as vision, policy, goals, culture, future potential, a legal framework, and ICTs which were to be used to guide or influence the implementation of KM processes in rural communities.

METHODOLOGY

This study mainly employed qualitative approach. Phenomenology strategy was used. Snowball and

purposeful sampling techniques were used to select the sample for the study. Purposive sampling technique was used to select the three Krobo districts and two villages/towns from each district due to the concentration of beads producers in these areas. The districts selected for the study were Yilo Krobo, Lower, and Upper Manya Krobo. The villages/towns involved in the study were Odumase-Krobo, Otrokper, Somanya, Tsebitche, Siblino, and Ahabaso. Purposive sampling was also used to select one chief and one queen mother from each of the two Krobo traditional areas. The traditional areas were Manya and Yilo Krobo. Further, purposive sampling procedure was used to select government officials who were directly involved in IK management. Snowball sampling technique was used to sample the bead producers in each village, in that they were scattered within the six villages/towns. With this sampling technique the researcher collected data on the few beads producers she could locate, and then asked those individuals to provide information needed to locate other beads producers whom they knew within their villages.

The data collection instruments used were semi participant observation, semi-structured interview, and focus group discussions through information mapping. The semi-structured interview guide focused on how the beads producers acquire, share and preserve beads making knowledge within the communities, where they acquired and share beads making knowledge and how they preserved beads making IK within the communities. The focus group discussions and semi-participants observation were used to supplement data collected from the semi-structured interviews. The different data collection methods were triangulated in order to compare their results for inconsistent, contradictory and convergent findings (Ngulube & Ngulube, 2017), so as to avoid errors or bias and to ensure the trustworthiness of the findings. Participants were recruited and interviewed until no new information is emerging from the participants' stories that is, when saturation was reached (Krueger & Casey, 2000:26; Glaser & Strauss, 1967; Morse, 1995).

A total of 57 beads producers and four (4) traditional rulers participated in the semi-structured interviews and focus group discussions. Forty one (41) participated in the focus group discussions while (20) of them were interviewed. One focus group discussion was held in each village within each district, and each focus group comprised of 6-7 participants. This was made of Yilo Krobo fourteen (14), Lower Manya fourteen (14), and Upper Manya thirteen (13). Again, a total of twelve (12) officials who were involved in IK management were interviewed. The officials included Registrar Generals' Department --1, Copy Right Society of Ghana--1, Folklore Board--1, National Commission on Culture---3, Librarians---3, Education officers---3.

Thematic data analysis strategy was used by the study.

Data were extracted manually from the transcripts and summarized into various themes. This was done by transcribing data, taking note of items of interest, coding across the entire data set, searching for themes, reviewing themes by mapping provisional themes and their relationships, defining and renaming themes, and finalizing analysis. In cases where most participants gave similar strong views to a particular issue during the interviews and focus group discussions three or more separate views from different groups of people were presented in series, and then a single quotation which illustrated the minority view was presented.

THE FINDINGS

The discussion of the findings was done based on the sources of acquisition, sharing and preservation of beads making IK within the communities, application of ICTs in managing beads making IK, the future potential of the beads making industry as well as the various laws available for protecting IK in Ghana.

The participants (Table 1) were made up (21, 34.4%) women and (40, 65.5%) men. The age distribution of the participants were, 18-23 (19, 31.1%), 24-32 (20, 32.7%), 33-40 (11, 18.0%), 41-45 (7, 11.5%), and (4, 6.5%) were 46 years and above. Most of the beads producers (49, 80.3%) had some form of formal education, while (12, 19.6%) did not have formal education. Those who had formal education include (13, 21.3%) primary education, (20, 32.7%) middle or junior high secondary education, (13, 21.3%) senior high secondary education, while (2, 3.2%) were polytechnic students and (1, 1.6%) had university education.

The IK management officials (Table 2) were made up of (7, 58.3%) males and (5, 41.6%) females. Most of them were between the ages of 39-60 (5, 41.6%), three (3, 25%) were between 32 and 38, two (2, 16 %) of them were above sixty years, while (2, 16.6%) were between 25 and 37. Majority (4, 33.3%) had first degrees, followed by (2, 16.6%) senior high secondary education, diploma, (2, 16%.6), M'Phil (1, 8.3%) MA, and (1, 8.3%) PhD.

Acquisition of beads making indigenous knowledge in the communities

The major source of IK acquisition mentioned by most 11 (55%) of the beads producers was family/guardian/parents. As indicated by one participants *"in our community bead making is part of the family, therefore children in our families pick up the skills in bead making by the time they reach adolescent because they are involved in all the processes, they learn from their parents, elderly siblings and other relatives"*. Other

Table 1: Background of beads producers and traditional leaders

Variable	Categories	Frequency (N)	Percentage (%)
Gender	Female	21	34.4%
	Male	40	65.5%
Age distribution	14-23	19	31.1%
	24-32	20	32.7%
	33-40	11	18.0%
	41-45	7	11.5%
	46 years and above	4	6.5%
Educational background	Non-Formal Education	12	19.6%
	Formal Education	49	80.3%
	Primary School	13	21.3%
	Middle/Junior High Secondary	20	32.7%
	Senior High Secondary	13	21.3%
	Polytechnic	2	3.2%
	University	1	1.6%

Table 2: Background of IK management officials

Variable	Categories	Frequency (N)	Percentage (%)
Gender	Female	5	41.6%
	Male	7	58.3%
Age distribution	25-37	2	16.6%
	32-38	3	25%
	39-60	5	41.6%
	60 and above	2	16.6%
Educational background	Senior High Secondary	2	16.6%
	Diploma	2	16.6%
	First degree	5	41.6%
	MA	1	8.3%
	M'Phil	1	8.3%
	PhD	1	8.3%

sources stated were apprenticeship 4(20%), husbands 3(15%), as one participant recounted “*when I married my husband he was making beads hence, I decided to learn it so that I can also contribute to bring income to the family*”. These women have been working with their husbands in the beads industry. Some 2(10%) of the participants indicated beads association meetings. Other sources mentioned were beads festivals 2(10%), friends and neighbours 2(10%), and formal sources, such as seminars, workshops, exhibitions and researchers 2(10%). From the information maps the participants disclosed that most 22(53.6%) of them learnt how to make beads from their immediate family members. Some

7(17.07%) said apprenticeship, others 7(17.07%) mentioned friends and neighbours, some 3(7.3%) stated their husbands. Other sources mentioned were beads making associations 3(7.3%) and workshops and seminars 2(4.9%). This could be attributed to the fact that these sources were readily available and reliable.

Sharing and distribution of beads making IK in the local communities

When the participants were asked to indicate how they shared beads making IK, they indicated that they did so

through folklore, cultural practices (child naming and marriage ceremonies, puberty rites for girls, festivals and funeral celebrations), apprenticeship, and beads making associations.

Folklore practices

The major folklore practice mentioned by the participants for sharing beads making IK was traditional dance 8(14.03%), others 5(8.8%) stated songs, some 4 (7.1%) indicated storytelling and appellation; some mentioned proverbs 2(3.5%) while one of them stated dirges 1(1.7%). From the information maps some 22(56.6%) of the participants indicated that the major folklore practice that influence IK sharing in the communities was songs, some 11(26.8%) indicated traditional dance, others 7(17.1%) mentioned storytelling, some 2(4.9%) stated appellation and proverbs while one 1(2.4%) of them mentioned dirges.

Child naming

According to most 43(70.5%) of the beads producers as well as the traditional leaders beads play a significant role when naming a child within the communities. They said this is because there were some special beads that were used for naming a child. They indicated that these beads were 'kōli, tovi and nyoli'. According to them one each of these beads are threaded together and put on the right wrist of the new born baby one week after the child was born on the day that the child would be given a name. According to the traditional leaders every family had these beads, and that in cases where a family loses any of them, then the family head would order for it to be made for the family.

Puberty rites for girls

Most 52 (85.2%) of the participants indicated that the 'dipo' puberty rite performed for adolescent girls was used to share beads IK through its marketing, others 9(14.7%) mentioned its quality and value , some 7(11.5%) stated the wealth of a particular family depending on the quantities and quality of beads such a family had.

Festivals

According to all the participants the yearly celebrations of the two traditional festivals ('Ngmayem' and 'Kloyosikplem') in the area are characterized by intensive wearing of beads. According to some 25(40.9%) of the

participants during these festival celebrations different types of beads with different designs were used to depict the status and wealth of people in the society. In the words of the paramount chief of Manya Krobo traditional area and one bead producer "*kp̄s or bodom*" beads which are the biggest beads are worn by chiefs, queen mothers and some wealthy people in the society during festivals". Some 7(11.5%) of the beads producers indicated that during the "Ngmayem" festival some of them attended the festival to observe and identify some ancient designs that they could adopt to create their own designs. As one of them illustrated "*during this festival the chiefs put on quality beads with ancient designs*"

Funeral celebrations

According to some 7(29.1%) of the participants who were interviewed during funerals, the corpse is dressed with beads; others 4(16.7%) indicated that sympathizers who come to the funeral also dressed with beads, while few 2(8.3%) of them indicated that the designs of funeral beads tell unique stories as noted by the Queen-mother of Manya Krobo traditional area, "*the designs of the beads that are put on during funerals are sometimes used to identify especially a widow in the case of when one husband dies*" Most 33(82.5%) of the participants who took part in the focus group discussions and the non-participant observations by the researcher confirmed that beads making knowledge were acquired and shared during these socio-cultural ceremonies in that beads were used extensively during all these celebrations in all the three districts surveyed.

Apprenticeships

According to some 13(54.1%) of the participants who were interviewed beads making IK is shared through apprenticeships in the Krobo communities. Apart from beads making, Gari processing 4(16.6%) (a powered food processed from cassava), was the predominant form of apprenticeship practiced in the communities, followed by basket weaving 2(8.3%), carpentry 2(8.3%), tailoring/dressmaking 1(4.1%) blacksmith/goldsmith and pottery 1(4.1%). These apprenticeships were location specific; for instance, bead making, blacksmith and basket weaving were practiced in all the three districts, whilst, goldsmith and pottery were found in the Lower Manya and Yilo Krobo Districts.

Preservation of beads making IK

When the participants were asked to indicate how they preserve their beads making knowledge, most 13(65%)

of them said they preserved IK in their memory, only few 5(25%) of them said they preserved still pictures of their designs. Others 4(20%) indicated storing still pictures of their designs on their mobile phones while some 3(15%) stated drawing of their designs on walls and in books. Only few 2(10%) of the participants said they had written down the process of making beads in books. From the information maps most 29(70.7%) of the participants said they basically preserved their IK in their memory, only few 11(26.8%) of them indicated that they preserved their knowledge on beads making in the form of still pictures, others 5(12.2%) stated that they stored their designs on their mobile phones, some 5(12.2%) mentioned drawings of their designs on walls and in books, others 2(4.8%) indicated that they had recorded the process of making beads in books, while three 3(7.3%) of them said they stored processes of making beads in the computer. Through the various observations the researcher had realized that few (3) of the participants had written down the processes of producing some of the beads in books.

Culture influence on IK

From the various observations and interviews it was realized that IK was transmitted according to gender due to cultural practices that existed in the local communities. According to most 32(52.4%) of the participants apprenticeship for example, was practiced according to gender in the local communities. Some 21(34.4%) of the participants said although both girls and boys could learn bead making, goldsmith, sewing, and 'gari' processing, young women usually learn pottery and hairdressing, while young men were allowed to learn carpentry, blacksmith, basket weaving, welding, palm wine tapping, and of repairing cars, car tires, fridges, radio, and cycles. One 1(1.6%) of the participants however, said these days some girls learnt some of the trades that hitherto were the preserve of boys. Again, the participants said in the local communities surveyed, puberty rites were performed for only adolescent girls and during this period a lot were learnt about beads. Hence, traditional culture dictated the extent to which women and men could access and share different forms of IK within the communities.

Using ICTs to manage beads making IK

This study explored how ICTs could be used to acquire, share, preserve, manage and make IK accessible to users. The beads producers were asked if they had used ICTs to acquire beads making IK. Some 11(55%) of the participants interviewed indicated using mobile phones to acquire bead making IK, others 5(25%) mentioned radio

while a few 2(10%) of them also stated television and Internet 2(10%). According to some 7(35%) of them they used mobile phones to access information on sources and cost of raw materials, colour work, and adoption of colleagues' designs. Others 4(20%) indicated that mobile phone, radio and television were used to find out current prices of beads, while some 2(10%) indicated that they used e-mail to find out about current prices of beads. Some 7(35%) said they used mobile phones to receive and pay monies to their customers and suppliers respectively. From the information maps most 23(56.1%) of the participants confirmed that the main ICT they used to acquire beads making IK was mobile phones, some 13(31.7%) confirmed using the mobile phone to receive and send money to their customers and suppliers, some 6(14.6%) indicated radio, others 3(7.3%) stated television, while a few 2(4.8%) of them said they used Internet and e-mail to acquire IK.

In sharing beads making IK only nine 9(45%) of the participants indicated using ICTs to share their knowledge. This was done through mobile phones 6(30%) while few 2(10%) of them indicated that they used e-mail and Internet to share beads making IK. From the information maps, only 11(26.8%) of the participants said they used mobile phones to share IK, while few 2(4.8%) of them noted using e-mail to share their knowledge on beads making.

Further, some 8(40%) of the participants said they had preserved beads making IK (pictures of their designs) on their mobile phones, while few of them 2(10%) indicated using computers to preserve bead making processes, as well as pictures of their designs. From the information maps most 31(75.6%) of the participants indicated that they did not use ICTs to preserve IK, while few 10(24.3%) of them indicated using mobile phone and computers to preserve IK in the form of designs, methods and processes of making beads. The findings illustrate that the major ICT used by the participants to manage IK was the mobile phone. This findings also revealed that some 19(31.1%) of the participants indicated that they did not use ICTs to manage IK due to lack of initial money to acquire smart phones, television, computer and its accessories, other modern means of communication as well as maintenance cost, lack of electricity, lack of ICT infrastructure and technical know-how.

Vision

In order to be able to create and manage knowledge successfully, there is the needs to have a vision which directs the knowledge creating and management process. When the knowledge intermediaries were asked to indicate their visions for the beads industry/IK in general, some 3(25%) of them visualized a system where all the departments and agencies dealing with IK within

and outside the region would be automated to facilitate interaction among them. Others 2(16.6%) indicated that their vision was to see a situation where IK in the region is recorded and preserved in written format in order to halt IK disappearance, to some 2(16.6%) their vision was that the cultural villages should be built, while others 3(25%) also wanted to see the inclusion of beads making in the curriculum of basic schools to help preserved its knowledge.

Future potential of the beads industry

The knowledge intermediaries were asked to rate the future potentials of the various IK industries within the region. According to some 6(50%) of the knowledge intermediaries among the indigenous industries in the Eastern Region of Ghana bead making had future potential followed by plant medicine 3(25%), carpentry and joinery 2(16.6%), cane basketry 1(8.3%), wood curving 1(8.3%), pottery and ceramics 1(8.3%). According to some 6(50%) of the participants the beads industry had a vibrant future potentials, in that bead is a jewelry that is recognized and used throughout world, and that Krobo beads are well known all over the world. The beads producers said currently a lot of beads traders from other countries such as Nigeria, Cote D'ivoir, Niger and the USA come to buy beads from Ghana. According to the officials of the National Commission on Culture, the three Districts involved in this study are blessed with a lot of tourism sites such as the Boti Falls in the Yilo Krobo Distirct and the "Ancestral Home" of the Krobo on the Krobo Mountain in the Manya Krobo District. To them if the cultural villages were built and well managed it would have impact on other clusters such as tourism, traditional catering, fashion and design, the hotel industry, and emergence of new markets which would bring in foreign exchange and eventually create jobs to alleviate poverty.

Importance of policies and laws in IK management in Ghana

The traditional authorities were asked if they had put some policies/laws in place to protect IK. According to the participants there were no formal traditional policies or laws put in place to facilitate beads making IK protection/management in the area. When the knowledge intermediaries were asked if there were laws that protected IK in Ghana, according to the official of the Folklore Board the Copyright Act of 2005 (Act 690) protects folklore in Ghana. This includes verbal expressions such as folk tales, folk poetry and riddles; expression by musical sounds such as folk songs and instrumental music; expression by human body such as folk dances, plays and artistic forms of rituals; and in the

last category were drawings, paintings, carvings, sculptures, pottery, terracotta, mosaic, woodwork, metal ware, jewelry, basket weaving, needle-work, textiles, carpets, costumes, musical instruments and architectural forms (National Folklore Board, 2005). However, beads making had not been included in the list of folklore activities that were covered under the copyright act of 2005. Again, according to the official of the Registrar General's Department the technology of producing these folklore products were not covered by the Act. According to the participant currently, Ghana has no laws on traditional knowledge and genetic recourses, and that the drafted Bill on plant breeders' right (plant varieties protection) which was first prepared in 2002 had not yet been passed by Parliament.

DISCUSSION OF FINDINGS

The findings of the study established that the main type of beads making knowledge within the communities was tacit, in that according to the bead makers they acquired this knowledge from local sources such as family/guardian/parents, apprenticeship, husbands, neighbors and social groups gathering. The participants made little use of formal sources, such as seminars, workshops and bead exhibitions to acquire IK. Likewise, printed materials such as books were not consulted so much by the bead producers in their bead making process. These findings were in consistent with Akullo et al. (2007) and Lwoga (2010) who reported that local sources were the major sources of agricultural IK by farmers as compared to formal sources of knowledge in Uganda and Tanzania respectively. Probst, Raub and Romhardt (2000) on the other hand indicated that indigenous knowledge could be acquired from within and outside the communities of IK users

Again, according to the beads producers they share IK within the communities through apprenticeship, bead making associations, folklore practices (songs, traditional drumming and dancing, appellations, dirges), and cultural practices (naming ceremonies, puberty rites, marriage, festivals, initiation of chiefs and queen mothers). Lwogah, Ngulube and Stilwell (2010) reported that similar practices were used to share IK within the communities in Tanzania.

The participants also said they basically preserved beads making IK in their memory which is highly prone to its gradual disappearance due to memory lost and death. Out of the fifty seven (57) bead producers involved in the study 42(73.7%) said they basically stored their knowledge in their memory. Only 15(26.6%) reported preserving their knowledge in explicit form. This finding supports Mearns and du Toit (2008) study which showed that the rate of indigenous knowledge conservation at cultural villages was rated as fairly poor in South Africa.

Likewise, Lwoga (2010) reported that only (24, 13.3%) out of 181 respondents indicated preserving their knowledge in explicit form.

Further, the findings revealed that only few of the beads producers used ICTs to acquire, share and preserve bead making IK. This finding supports Mwakaje (2010) cited in Arua (2016) who noted that even though 72% of the respondents owned mobile phones only 23% of them used ICTs to access market information.

Harmaakorpi and Melkas (2005) and Uotila, Melkas, and Harmaakorp (2005) posit that Visualisation is where self-transcending knowledge is embodied from the abstract to visions, feelings and mental models. The findings established that most of the knowledge intermediaries visualized a system where all the departments and agencies dealing with IK within and outside the eastern region of Ghana would be automated to facilitate interaction among them. Others indicated that their vision was to see a situation where IK in the region is recorded in explicit form in order to aid its preservation to halt IK disappearance. To some their vision was that the cultural villages should be built as well wanted to see the inclusion of the beads making in the curriculum of basic schools to help preserve its knowledge.

The Extended SECI model indicated that potentialisation forms the basis for sensing the future potentials of the beads making industry and seeing what does not yet exist (Harmaakorpi & Melkas, 2005; Uotila, Melkas, & Harmaakorpi, 2005). According to knowledge intermediaries the beads industry had vibrant future potentials, in that Krobo beads are well known all over the world. The participants said currently a lot of beads traders from other countries such as Nigeria, Cote D'ivoir, Niger and the USA come to buy beads from Ghana. They said if the cultural villages had been built in the Krobo three districts, and well managed it would have impact on other clusters such as tourism, traditional catering, fashion and design, the hotel industry, and emergence of new markets which would bring in foreign exchange and eventually create jobs to alleviate poverty.

The findings also established that Ghana had no laws that protect IK and that the most weakest part of IPRs system in the country was its enforcement, which had resulted in misappropriation of IK by both nationals and foreigners under the pretence of intellectual property rights. Likewise, Ojomah and Onoyeyan (2015) revealed that indigenous knowledge in Ilishan Remo in Nigeria at various points in times had been misappropriated and that Ilishan community protects its IK by restricting non indigenes from viewing and participating in their indigenous practices. Further, they indicated that local laws used in deterring third parties from having knowledge of the community's culture is not supported by the government's law in Nigeria.

CONCLUSION

The findings of the study revealed that the KM models reviewed were developed based on western and formal institutions orientation. Consequently, they did not capture issues pertaining to rural communities. The study revealed that IK was acquired and shared through various socio-cultural practices within the communities, and that it was preserved in the memory of participants. Hence, some of the participants said they have lost the techniques of producing some ancient designs. Again, the findings showed that only a few of the participants acquired, shared and preserve IK using ICTs. It also showed that vision, policy, laws, culture and future potential of IK are relevant in facilitating management of IK in developing countries with rural communities.

Proposed regional IK management model

Based on the findings, this study is proposing a KM model for managing regional IK in local communities, which stipulates that the potential of knowledge for the development of the beads making industry be conceptualized within the framework of the targeted community. Since majority of the bead producers' knowledge is tacit and it is woven in oral communication and cultural practices, rather than in knowledge asserts or ICTs. According to the beads producers they basically acquired and shared IK through face-to-face communication, while they preserved IK in their memory. Acquisition and sharing of IK were done between individual beads producers and amongst beads making association's interactions, as well as through folklore, and cultural and religious practices in the local communities.

The knowledge intermediaries at the centre of the model interact with the bead producers (at individual and group levels) to aid them collect and preserve this knowledge while at the same time helping the beads producers to acquire new skills such as product finishing, product branding/packaging, marketing and ICT skills. The knowledge intermediaries are NGOS, librarians, information centres, researchers, and government officials such as the National Commission on Culture and the Folklore Board who work directly with the beads producers. Policy makers in the bigger circle coordinate the activities of the beads producers and the knowledge intermediaries. This is important because without their oversight responsibility and provision of resources the anticipated vision for IK management within the region may not be achieved.

Based on the review of the various KM models and the findings of this study, the KM model proposed by this study for local communities in regional IK management in developing countries is emphasizing that the principles (facilitators) at the top of the model should first be

determine in order to facilitate KM process in the local communities and the region. Knowledge vision gives a direction to the knowledge-creating process and the knowledge created in it, as well as defines the value system that evaluates, justifies and determines the quality of knowledge that the network creates. Policy emphasized management of knowledge and guides the strategy that brings about the infrastructure that manages and preserves IK.

The goals guide the activities of the key stakeholders within the knowledge management processes; identification of future potentials of a particular IK helps to identify knowledge clusters within the region that a particular IK management initiative may influence. This will help to identify activities that will be initiated to develop those clusters too. Mapping helps in identifying and selecting relevant knowledge that needs to be supported, developed and knowledge barriers. Committed leadership coordinates KM activities, relevant ICTs facilitates acquisition, sharing and preservation of IK, culture of the local people influence KM activities to be perused; and conducive context and space supports knowledge creation. ICTs are relevant in fast tracking the activities of KM, however, unavailability of ICTs in the communities should not be a hindrance to embarking on IK management projects in the local communities, since according to most of the beads producers they acquired, shared and preserved IK through oral communication and the various socio-cultural practices within the communities. Thus, IK is rooted within certain socio-cultural norms and practices in their localities.

Further, the KM processes are presented in a cycle beginning with knowledge recognition or identification, knowledge acquisition, knowledge development/generating, knowledge validation, knowledge application, knowledge sharing/distribution, and knowledge preservation. With this process each stage of the process incorporates both tacit and explicit sources of indigenous knowledge within the communities. (Figure 1)

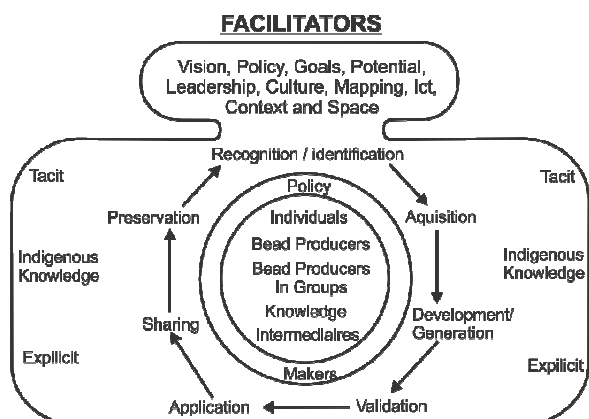


Figure 1. Proposed regional IK management model

LIMITATIONS OF THE MODEL

The proposed KM model by this study is expected to explain a means of understanding and managing IK within regional innovation programmes in developing countries. The proposed model has not yet been empirically tested. There is therefore, the need to conduct a research study through a qualitative approach using the proposed model. This should be done in comparison with other tested existing KM models in specific context such as regions with indigenous communities in developing countries to determine whether it can be used to explain the relationship between KM facilitators/principles and processes. The relationship between KM facilitators/principles (vision, policy, goals, future potential, leadership, mapping, culture, ICTs, space and context) and KM processes (knowledge recognition/identification, knowledge acquisition, knowledge generation/development, knowledge validation, knowledge application, knowledge sharing, and knowledge preservation) need to be studied to help improve upon the model. Again, the model was developed to be applied in managing indigenous knowledge in regions with rural communities.

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