Examining the Use of Information Systems to Preserve Indigenous Knowledge in Uganda: A Case from Muni University

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ABSTRACT: Indigenous knowledge (IK), can be preserved using Information Systems in order to protect cultural heritage and disseminate local knowledge for development. These knowledge often passed on orally for generations has become significant in searching for answers to several world's critical problems, are at risk of becoming extinct. This "traditional wisdom" is highly useful in solving complex problems of health, agriculture, education, use of natural resources and the environment. The main challenges of IK is inadequate documentation and diminishing transmission channels. Both descriptive and quantitative methods are used in this study that focuses on highlighting the importance of indigenous knowledge in sustainable development process and illustrating ways in which technology can be used to preserve it, thereby enriching the development process from a holistic perspective. This research strengthens the preservation of local IK, enhances its adoption in formal educational settings, leads to improvement in scientific knowledge development and inspire sustainable community development using a holistic approach.

KEYWORDS: Information systems, Indigenous knowledge, ICT,Transmission channels,Quantitative methods

I. INTRODUCTION

Indigenous Knowledge (IK) is the local knowledge that is embedded in the unique cultural practices of regions or local communities and is often orally passed on from generation to generation by elderly knowledgeable people [1]. Often referred to as "traditional wisdom", IK is accumulated through long-term interaction with the natural environment and includes knowledge about traditional technologies like tools and techniques for hunting, agriculture and food security, fishing, midwifery, education, health-care, ecological knowledge, and conservation and became essential for the existence and survival of local inhabitants [2] and constitutes skills for existence.

IK is increasingly becoming essential as the world consolidates globalization and the key to development of local communities lies in IK. The concept of globalization increases the value of local information [3] especially when meaningfully stored and accessed from anywhere on demand. However, this essential local wisdom has been ignored by Western partners particularly former colonialists, in the development strategy for emerging regions and forgotten in the globalization of modern science and technology [3]. The oral tradition used by local communities to preserve IK, is no longer effective in this generation.

The younger generation, often known as the "dot com" generation are important stakeholders in the development process but are ignorant about IK, are also salient users of technology and digitizing IK will provide to them adequate access to IK through technology. As Akinwale explains, the older African generations are conversant with IK, but the "net generations" largely ignore such knowledge [4]. Using IS revitalizes endangered cultures, improves economic independence and sustainability while increasing community-based involvement in planning and development [5].

IK is a solution to problems of people living out of access to modern development because it represents a heritage and a rich body of time-tested local knowledge. The World Bank report indicates that IK provide problem-solving strategies for locals in poor settings and is an integral part of development process because the key to sustainable development is knowledge and not capital [6]. There are local experts who deal with local problems. For example, in some tribes there are traditional healers to treat whoever falls sick, and there are rain makers and stoppers to act in situations where climate has changed.

IK has a commercial value as Chouhan reveals that, IK has the potential of being translated into commercial benefits by providing leads for development of useful practices and processes for the benefits of mankind [7]. According to Lodhi&Mikulecky report that, IK is an important resource in the development process and sharing IK within and across communities can enhance cross-cultural understanding and promote the cultural dimension of development [8]. The UNESCO report states that IK provides the basis for local-level decision-making about many fundamental aspects of day-to-day life [9].

The objectives of the study are to: a) identify the relevance of Indigenous Knowledge towards sustainable community and national development, b) investigate the challenges Indigenous Knowledge face in this era of globalization and advancement of technology, c) examine how to use Information Systems to preserve and disseminate Indigenous Knowledge in this context.

The biggest challenge of IK is inadequate documentation and poor dissemination [3]. There are risks of IK becoming extinct if not preserved using modern methods. Again, oral traditions have become largely unavailable or inaccessible to many young people, who no longer have access to non-formal learning, many have decreased fluency in their mother tongues to keep them communicating to elders [10]. Also, formal education programs only promote foreign values, science, and health programs and downplay the importance of IK rendering it inaccessible.

II. RELATED LITERATURE

It is clearly evident that few studies have been done on IK preservation especially in the African context as reflected in the significantly low number of published articles related to this topic. Many of the available articles are publications of studies about IK in Asia and South American countries. This study reviews available literature related to IK and technology under the following sub-headings; technological advancement, indigenous knowledge systems, ICT for IK preservation and a theoretical framework.

Technological Advancement

With the rapidly emerging new technology, digitization and dissemination of knowledge has created what is known as the knowledge economy whereby those in need of information and knowledge can easily access it with a click, from anywhere and at any time. Technology has changed the way we conduct business, communicate to each other, and relate to each other. While technology is becoming social, in other ways it has isolated people and has reduced the time people gather to chat and exchange ideas. Technology and ICTs in general and IS in particular has the potential to aid the identification, collection, storage and dissemination of IK in order to bridge the IK gap. For example, with the coming of Television, Internet and broadcast radios, the time community and family members come together to tell stories, or engage in activities that transmits IK from one person to another has greatly reduced since many members especially the young ones prefer to sit glued to their gadgets to watch, listen to their favorite program being aired. These kinds of technology has changed human behavior in a way that it affects the traditional indigenous systems, which is broadly based on oral tradition. This is the reason to utilize this kind of media to enhance the preservation of IK because it is at the verge of becoming extinct [11].

Indigenous Knowledge System

The traditional knowledge has its own system and method of preservation. It is often passed on from one generation to the next using oral tradition. This is known as the Indigenous Knowledge System (IKS). The elders are central to this system because they have lived longest, meaning that they have experienced more and therefore have more knowledge as compared to the rest of the community members. These elders are always looked up to, in case of problems or in situations of new problems without solutions. There were specific channels for knowledge distribution. For example story-telling was one way to transmit knowledge, songs and traditional dances were also used as means to transmit knowledge. The others included ceremonies performed during events such as harvesting, child birth and naming, and other cultural rites like circumcision which are often performed to initiate boys into manhood [8] suggests that Local knowledge systems often combine specific and general aspect of knowledge with great ease since everybody has local everyday knowledge about the environment. They further explained that IK systems are geared towards dealing with diversity in both natural environment and social organization and continues to evolve over time and they differ from scientific knowledge in their capacity to deal with local problems.Other reports indicates that, in IKS, generation of knowledge starts with "stories" as the base units of knowledge; proceeds to "knowledge," an integration of the values and processes described in the stories; and culminates in "wisdom," an experiential distillation of knowledge[12]. IKS are holistic and people centered in the sense that it strives to resolve human problems using time-tested solutions and ecological in nature as stated in [8], IKS are typically human centered, very diverse, applying technology of local origin with strong cross-linkages and is developed after the years of experiences and experiments, trial and error and incremental refinement. Rahman, suggests that in order for proper understanding and incorporating of indigenous knowledge systems for sustainable socio-economic development and poverty alleviation, the scientific community perhaps need to "unlearn" our old view of knowledge and should grasp the importance of local or indigenous peoples view [13].

The traditional or indigenous knowledge system is challenged by significant number of factors affecting its documentation and dissemination. Meyer explains that, information flow in an oral context is controlled by attitudes, perceptions, norms, values and belief systems inherent to indigenous people [14]. He even cited an example that, when people experience an information need, they will approach a knowledgeable person whom they trust. Other factors affecting IKS include things like formal education introduced by the colonialists and western religion such as Christianity as well as Islam. Eyong also revealed that IKS have suffered for several decades from several strategies of disinformation embedded in western centric, colonial and post-colonial education and western religion, science and technology [15]. He further explained that, often data on IKS are distorted to confirm the hypothesis of non-Africanist scholars". Also, Msuya, stated that younger generations who are exposed to formal education are less interested in indigenous knowledge, viewing such knowledge as outdated and primitive [16]. Indigenous knowledge is at risk of becoming extinct if appropriate measures are not taken to manage it to assure its accessibility to future generations [11].

Role of Technology in Preserving IK

Because technology is the center of human activities, there is need to introduce it to complement the traditional methods of IK preservation which revolves around "oral tradition" and is currently facing challenges of traditional knowledge becoming extinct. However, the introduction of technology must be minimalistic [8] but geared towards user friendliness, more context sensitive and representative of the local communities. Doubtlessly ICT in general has enormous potentials in improving the availability and accessibility and dissemination of IK while adding value to the IK system. Adam L[17] indicated that, Information and communication technologies play major roles in improving the availability of indigenous knowledge systems and enhancing its blending with the modern scientific and technical knowledge.

Using IS to preserve IK is inevitable because ICTs has become the platform for all human activities, including transmission and reliable information access from anywhere and at any time. ICTs such as computers, Internet and other mobile devices have been used by service providers for service delivery to beneficiaries, project task

collaboration and used in real time communication and exchange of information. From this viewpoint, using IS to preserve IK is central to improving the transmission and exchange of IK between the remote local communities and modern societies where western knowledge is practiced. LodhiandMikulecky highlight that, the application of ICT is essential to stimulate the flow of IK and incorporation of modern scientific and technological understanding of traditional knowledge [8]. The main use of ICTs in preserving IK could be to a) capture, store, transmit and disseminate IK to preserve traditional wisdom for future generations b) promote ease of accessibility of IK c) promote ease of integration of various forms of knowledge of heritage d) promote easy integration of formal and non-formal body of knowledge into the education programs e) potential promotion of copyright and patent on local knowledge, and f) promotion of economic value addition to local knowledge.

III. METHODOLOGY

This study is a work-in-progress with a goal to probe how Information Systems can be used to preserve and disseminate Indigenous Knowledge, in an era of technological explosion. Descriptive and qualitative method was used at this stage of the study. The qualitative approach was used in the focused group interviews with both the students and staff members. However, in later stages, quantitative methods will be employed in the form of questionnaires. The target sample of the study was 90 students and 15 lecturers. The sample was selected using stratified random sampling technique from this higher institution of learning. A qualitative approach was used to prepare the two group discussions which were conducted to discuss the issues surrounding IK from three broad themes; a) Do you think that IK is important in the sustainable development, and why? and b) what is the main challenges surrounding IK as opposed to Western knowledge? And c) Do you think that IS is essential in preservation of IK of the local communities? How? Following this discussions, a questionnaire that is divided into five sections will be designed and administered to respondents and analyzed to verify the issues which came up during the discussions. The first part will contain the background of the respondents, the second part will comprise of direct questions requiring yes/no and multiple choice items, the third part will comprise of a five point likert-scale type of questions. The fourth part will contain the questions regarding opinions of the respondents on examining the use of Information Systems to preserve Indigenous Knowledge. Lastly, the fifth part will comprise of sections where respondents will be free to give their recommendations on the use IS to enhance preservation and dissemination of IK.

IV. ANALYSIS OF RESULTS

From the discussions, it is generally agreeable that IK is important for community development although the discussants seemed more concerned with cultural and historical preservation, creative in skills enhancement aspects of IK than the actual community development aspects. To some extent, the discussants may not have been aware of the context of development in question. However, on the issues of socio-economic empowerment through commercialization of culture, management and control of resources shows that they value the role played by IK in improving lives of local community members.

On the second theme, the discussants were well aware of the challenges facing IK. This could have been due to the fact that, much as the discussants were from a varying tribal and cultural backgrounds, they cited these challenges from the viewpoint of cultural inclination since it was the main reason for pointing out that IK is an important component of development. The discussants seem to realize the weakness of oral tradition as the sole traditional method for preserving IK the importance of documentation to preserve IK. Lack of documentation results in another problem of fear IK becoming extinct since its holders die with their knowledge. Another challenge is that IK is ignored by the central government in development process, the discussants could have cited this because they have a clear understanding of governance in that, solutions to community problems should come from the grassroots. Most government interventions to community problems are not very effective because it ignores the grass-root approach and by ignoring such approach, they ignore with it some very valuable IK which could have been effective. Also, another challenge of IK was cited as gender insensitive because it highly favors men. Here it shows that the discussants were

able to relate IK and cultural practices that inhibits development since gender equality is advocated for worldwide and it's known to be a recipe for development. Most cultures bars women from decision making since men are the heads of the families and therefore heads of communities in which they live. Also it is clear that moving from rural areas and settling in urban areas challenges IK in the sense that it creates a gap between the holders of IK who are elderly people in remote areas and the seekers of IK who are the younger generation who live and work in urban centers. And lastly, the discussants argued that, there is also a negative attitude of most young people especially the elite class and those who attend formal education since they think that IK is primitive in nature and anything Western is modern and civilized.

And the discussants agreed wholesomely that using IS especially to gather, record, store and disseminate IK in digital format would help to protect it from becoming extinct because this is vital knowledge which is hard to get since the holders and the seekers are separated by a gap. This IS would therefore act as a gap to access IK since technology is now inevitable in all aspect of human life.

Findings
These findings are from the two separate discussions held on the three themes. The first discussion was conducted with the staff (teaching and library) and the second, with the students.In both the discussions, similar answers were identified across all the themes.

On the first theme of the discussion, a) Do you think that IK is important in the sustainable development, and why, 28 out of 29 participants agreed that is important in the process of development and the reasons varied greatly, but cultural preservation, creativity in skill enhancement through craftsmanship and other creative methods such as farming, fishing and house construction, keeping track of history and self-discovery topped the discussions, in that order. Other reasons included socio-economic empowerment through commercialization of cultural tourism, socialization, management and control of communities and their resources, and alternative sources of other knowledge for example predicting rain by observing the wind direction and patterns. Also, participants cited reasons such as IK is the foundation of in-depth understanding of local problems, a way to impart a broader sense of responsibilities, acceptable norms and ethical standards to the younger generation to prepare them for future adult life since the local societies have a way of teaching gender roles to the younger people. The only one participant who said that IK is not important for development, cited time and energy consuming because it is manual as the reason.

On the second theme of, what is the main challenges surrounding IK as opposed to Western knowledge, several issues were brought up as the main challenges. The issues which topped the list of the discussion was inadequate documentation of IK, ignored by the central government system, excluded from formal education system, death of elders who die with their knowledge. The others included issues surrounding lack of enough information on IK, gender insensitive since culture favors only men, negative attitudes towards cultural practices especially in these days of modernization and urbanization, IK cultures are not flexible therefore does not adapt with changing times and needs. They go on to explain that IK is overshadowed by Western knowledge, some of the practices especially in agriculture degrades the environment, and lastly, the discussants stressed that some of the IK practices division within communities since its basically unique to tribes.

Regarding the third theme of the discussion, (Do you think that IS is essential in preservation of IK of the local communities? How), 28 out of 29 discussants agreed that IS is essential in preserving IK because a large number of people especially the youth use technology daily and for nearly anything. A narrow variation in the responses was encountered. Most of the responses revolved around using IS for digitizing and keeping records of IK and to provide easy access, management and dissemination of the contents from anywhere. It was however, unclear why one of the discussants said that IS is not important in preserving IK since there was no explanation that reasoning.

V. DISCUSSION

It is clear that local community members fairly understand the importance of IK and are aware that it is fading and there is need for interventions protect it from becoming extinct. They also realize that technology offers significant potentials in the preservation and dissemination of IK but technology should be used in ways to protect the origin and ownership of the traditional knowledge because it is unique to a local community. They clearly understand the importance of IK is and how it could change many lives and be used to find solutions to societal problems. IK is an underutilized resource in the development agenda, particularly in developing countries. It is a tool to be employed by all development partners in order to achieve effective solutions to community problems. It is clear that local community members fairly understand the importance of IK and are aware that it is fading and there is need for interventions protect it from becoming extinct. They also realize that technology offers significant potentials in the preservation and dissemination of IK but technology should be used in ways to protect the origin and ownership of the traditional knowledge because it is unique to a local community. They clearly understand the importance of IK is and how it could change many lives and be used to find solutions to societal problems. IK is an underutilized resource in the development agenda, particularly in developing countries. It is a tool to be employed by all development partners in order to achieve effective solutions to community problems.

VI. CONCLUSION AND RECOMMENDATIONS

Based on the issues raised and discussed in this paper and those in related literature, we conclude the following; first, IK is an essential resource for sustainable community development but is either underutilized, neglected or ignored for various reasons such as those that are associated with western knowledge, lack of framework for IK inclusion, and formal education. And because of its ineffective oral tradition methods of preservation and transmission, IK is fading off and it is feared that it will become extinct. Second, technology presents significant potential in preserving IK since the traditional preservation method of oral tradition is no longer effective. Therefore, digital preservation shall add value to IK and as such, we expect that using IS to preserve and transmit IK would increase its relevance and therefore increase the need to search for and integrate it into the relevant areas of development by stakeholders, particularly to education and health since demand for herbal medicine is increasing. Using IS shall also enable preservation of collective memory of local communities by collecting, storing, archiving and disseminating historical and cultural heritage of unique communities in a central repository for access from anywhere and at any time, therefore acting as a bridge to the IK gap among communities. Third, digitizing IK has a potential for commercialization of cultural tourism due to the documentation of historical and cultural heritage which increases value to such cultures. Lastly, the preservation of IK will also lead to bridging the mindset gap of the new generation of community members to believe in their heritage and knowledge as opposed to most developing country mentality of thinking that any knowledge generated by the West is superior to their own IK. However, significant challenges still remain and needs to be overcome to ensure that such studies realize their goals both to the owners and users of the knowledge. Although they may be technical challenges, there are also socio-economic, political and inadequate knowledge of local knowledge.

And from the conclusions above, we do recommend that there should be massive sensitization about IK and its relevance in solving human problems as well as its value in education. Therefore, educational institutions ought to adopt IK into their learning environment to facilitate dissemination and awareness creation about its value. Secondly, all development stakeholders particularly governments and non-governmental organizations should exhaust all local options in formulating solutions to community problems and should step up its efforts to integrate IK into development plans and objectives. Due consideration should be given to IK and a framework for addressing origin and ownership of IK should be formulated. IK center(s) should be established to enlighten the masses about IK and to provide reliable access to such vital local knowledge. Thirdly, we recommend further research about the contextual use of technology to preserve and disseminate IK due to the fact that has changed the way we search for information and knowledge especially at the time traditional the methods of preserving and transmitting IK are no longer sustainable. Lastly,

research needs to be conducted about the use other media such as TVs, social media, and broadcast radio to transmit and disseminate IK because these new media has changed the way people socialize, relate and exchange knowledge.

Since this is a work-in-progress, it marks the beginning of a longitudinal and ethnographic research into how to improve the preservation and dissemination of IK especially to the urban dwellers and the educated population who have no direct or consistent connection to the remote areas which is the cradle of IK.

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