The Role of ICT in Knowledge Management Processes: A Review

Wahid Bakar Hamad
Assistant Lecturer & Head of ICT
Department of ICT
Institute of Social Work, Dar EsSalaam, Tanzania

Abstract:
Managing knowledge nowadays has become an important ingredient in enhancing and promoting the efficient role of knowledge within organizations. The KM aim of facilitating the organizational processes, improves operation, decision making, short customer response time and many other benefits to the system. Many organizations capture, create, transfer and reuse of knowledge deep down and outside the formations for the intent of achieving goals and clear competitive advantages. Thepurpose of this paper is to review the role of ICT in KM. Specifically, the report means to focus on the roles that ICT plays in knowledge management operations. The methods used to undertake this paper are collecting information from published journals, group discussion paper, and books from the range of the year 2000 to 2017.The results manifest that the ICT has proven to be a most important tool to enhance and advance the knowledge management and its processes within the arrangements. As well, all the same,it should note that the ICT does not make an organization capture, create, share/transfer and reuse of knowledge, but it simplifies the choice and opportunity of such operations.

Keywords: Knowledge, Management, KM, ICT, and KM Process.

I. INTRODUCTION

The world over around nowadays characterized by rapid information transmission through large geographic ranges with the use of the Internet (Mgijima and Flowerday, 2012; Omotayo 2015). Many businesses acquire internet to support business needs, irrespective of business sizeisan essential requirement to take advantage of the potential of Information and Communication Technology (ICT) (Martin and Matlay, 2001; Arreymbi, Agbor, & Adnan, 2008; Ndekwa 2014). The development of technology has borne on the approach of businesses function such as it translates the business systems and the degree of competition (Kohli and Devaraj, 2004; David et al., 2002; Tumolo, 2001; Saheer and Chris, 2003; Ongori, 2008), create a competitive advantage of the businesses (Dedrick, Gurbaxani, & Kraemer, 2003; Ongori, 2008; Arreymbi, Agbor, & Adnan, 2008) and affect business processes to cope with the changes in the business environment (Irani, 2002; Ongori, 2008). Further, the growth of Information and Communication Technology (ICT) is aggressively touching several countries around the world, driving changes and revolutions to business and socioeconomic development plans (Ion and Andreea, 2008; Costello, 2009; Modimongale, 2009; Kamel and Hussein, 2004; Skoko and Arnela, 2010; Apulu, 2012). As results, reflecting major implications on different economies, globalization and the global digital economy regardless of time and distance boundaries (Apulu, 2012; Omotayo 2015). The role of ICT has grown rapidly and the impact on different businesses and socioeconomic development in developed and developing nations (Kamel, 2000; American Chamber of Commerce in Egypt, 2002; Kamel and Hussein, 2004).As the consequence of this globalization has caused the emergence of knowledge-based economies Omotayo (2015), where Knowledge has become as amain key source of economic development of organizations in theglobal economy as it is the source of innovation (Carneiro,

2000; Kakabadse et al., 2003).Knowledge Management (KM) has been accepted as a critical factor for both organizational performance and success (Koskinen & Pihlanto, 2008; Kotnour, 2000). Due to these changes the knowledge and knowledge management (KM) has turned as important for business and organizations (Tyler et al., 2007). This implies that the adoption and actual utilization of ICTs is critical to all business survival and progress (Costello, 2009; Modimongale, 2009; Ahmed, et al., 2010; Harindranath et al., 2010; Skoko and Arnela, 2010; Apulu, 2012; Consoli, 2012; Naul, 2012; Olise et al., 2014; Tarutė and Gatautis, 2014). Yet, despite their best efforts, as several studies have addressed knowledge management operations and eventual they divide knowledge management into several processes, (Alavi and Leidner 2001; Parent, Gallup, Salisbury, 2000; Scharmer, 2000; Krogh, Nonaka, and Aben, 2001), only a few studies investigate the role that ICT plays in each KM process.Thus, the aim of this report is to survey the role of ICT in KM. Specifically, the paper intends to focus on the roles that ICT plays in each of the knowledge management processes. The KM processes which have been studied are Knowledge Capturing, Knowledge Creation, Knowledge Transferring and Knowledge Reusing.

II. RESEARCH OBJECTIVE

The objective of the researchis specifically focused on the following:

- To examine the role of Information and Communication Technology (ICT) in Knowledge Management processes.

RESEARCH FRAMEWORK

This study reviewed the role of ICT in KM processes within the organization. It is guided by KM processes Model developed by Owen and Burstein (2005).This model established to address KM processes for in the multinational corporations and/or

organization's environment which comprises of following interconnected processes: 1) Knowledge Capturing 2) Knowledge Creation 3) Knowledge Transferring and 4) Knowledge Reusing. This process has been reviewed in several studies at different project management and/or organizational contexts and it is appealing as a valid framework to be considered in the project and multinational corporations and/or organization's environments (Arroyo, Chang, & Sánchez-Guerro, 2010). Sokhanvar, Matthews, Yarlagadda (2014) adopt this model in their study conducted to examine the importance of Knowledge Management processes in a project-based organization and then improving by adding the numbers of associated sub-processes as displayed in a figure below.
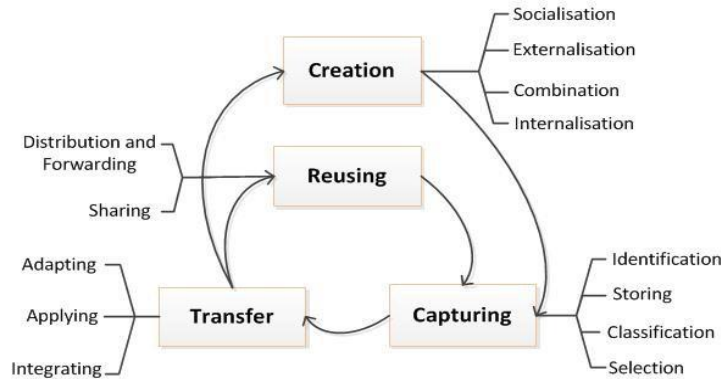
The KM processes Model

Figure.1. Framework for KM processes & sub-processes (Owen and Burstein 2005)

III. ICT IN KM PROCESSES

The technology is one of the important components of KM. With the developments of technologies, it has become a critical enabler and foundational component of a KM plan (Alavi and Leidner, 2001; Lee and Hong, 2002; Sun and Scott, 2005).ICTs refer to the wide range of computerized information and communication technologies. These technologies include product and services such as desktop computers, laptops, handled devices, wired or wireless intranet, business productivity software such as an editor and spreadsheet, enterprise software, data storage and network security among others (Manueli et al., 2007; Ashrafi and Murtaza, 2008; Sophonthummapharn, 2008). In the relation of this paper, ICT referred a system that supported the functions of information creation, construction, identification, capturing, acquisition, selection, valuation, organization, linking, structuring, formalization, visualization, distribution, retention, maintenance, refinement, evolution, accessing, search, and application. (Maier 2002; Beckinsale and Ram 2006) and KM referred as the systemic and organizationally specified process of creating, acquiring, capturing, sharing and use of both tacit and explicit knowledge to enhance performance in organizations (Skyrme 2001; Alavi and Leidner 2001). In this knowledge-based economy, many organizations have applied to gain, sustain and power their knowledge resources by turning to knowledge management initiatives and ICTs (Kankanhalli et al., 2005; Greiner et al., 2007; Anantatmula &Kanungo, 2006). Consequently, (Anantatmula &Kanungo, 2006) they also argue that the organizations haveto deal with issues such as products and process complexity, increased relevant knowledge base both technical and non-technical, shorter product life cycles, increased

focus on the core competencies, etc. Additionally, (Newell et al., 2004 and Alavi et al., 2005) arguesthat the knowledge management remains with the same main goal of enabling the organizations to be aware of their knowledge and shape the knowledge, in theorder they can effectively and efficiently use of knowledge. In this regard, there are four main processes in Knowledge Management as demonstrated by several studies conducted in the area of KM such as (Alavi and Leidner 2001; Skyrme 2001; Takanashi, 2002; Lee and Choi, 2003; Kayworth and Leidner, 2003; Zaim, 2006; Nasimi et. al. 2013; Fong and Choi, 2009; Arroyo, Chang, and Sánchez-Guerro, 2010;Turner et al., 2012; Sokhanvar, Matthews, Yarlagadda 2014; Omotayo, 2015; Xue, 2017) and it has been said that technology (ICT) has become a critical enabler and foundational component for the success of a KM implementation (Sun and Scott, 2005; Habib 2011).Similarly,(Alavi and Leidner, 2001; Lee and Hong, 2002) agree that ICT based systems have contributed to sustenance and boost the organizational processes of knowledge capturing /storage/ retrieval, creation, transfer,and reuse. What is not known is the extent to which the use of ICTs has facilitated the KM processes. The following are the Knowledge Management processes.

[1.] Knowledge Capturing
[2.] Knowledge Creation
[3.] Knowledge Transferring and
[4.] Knowledge Reusing.

[1.] Knowledge Capturing

The first step in KM process is knowledge capturing. In this step, knowledge is acquired and encoded so that it can be easily stored. In both types of knowledge (explicit and tacit) acquired by individuals within organizations should be captured. According to (Massey & Montoya-Weiss, 2006; Heisig, 2009; Ling et al., 2009) argues that properly organize and manage organization knowledge offer easier accessed. Moreover, knowledge capture/storage reflects diverse forms of knowledge that comprise digital documentation and paper (Takanashi, 2002). Furthermore, the integration and capture/stored of knowledge help to reduce the redundancy, as a result, enhance efficiency (Alavi et al., 2005). According to Nemati (2002) also indicated that knowledge capture/storage is not only essential for theeffectiveness of usage but also essential for reusing the knowledge.

Role of ICT in Knowledge Capturing/Storage

In accomplishing the process of knowledge capturing, the ICT has to play an important role at this stage. With access to information, ICT certainly plays a variety of roles and provide the way in which information can be acquired through the use of networks and databases (Takanashi, 2002; Nasimi et. al. 2013) to support an organization's KM process (Alavi and Leidner, 2001; Lee and Hong, 2002). Moreover, (Brunn et al., 2002; Schware, 2003; Beckinsale and Ram 2006; Chang & Lin, 2015) state that ICT empower information to be electronically captured/stored, accessed, delivered and retrieved for use of organizational decision making. Mutula and Brakel (2006) declared that ICT increase the e-readiness position to acquire, disseminate and apply information for knowledgeable decision making. Furthermore, (Turban, Leidner, Mclean, & Wetherbe, 2004) also claim that ICT in an organization can benefit in building the organizational memory and knowledge that can provide the

organization to tolerate with any challenges in the business environment at any given time.In this regards, the researcher concurs that the use of ICT at this stage of knowledge capturing is anessential tool for both effectiveness of usage and reuse of knowledge in facilitating the processes of identification, storing, classification and selection of required knowledge.

[2.] Knowledge Creation

Knowledge Creation is the second step in Knowledge Management process. In this stage, knowledge is created and discovery by knowledge-based staff through daily activities. The knowledge creation process involves the searching of new implemented knowledge and information, both indoor and outdoor of the organizations that developed through collaboration and partnership (Chen & Edgington, 2005; Carrion et al., 2012; Nasimi et. al. 2013). This process has been considered as a strategic weapon in today's global marketplace; lack of continuous creation of knowledge, a business is condemned to the uselessness (Parent, Gallupe, Salisbury, 2000; Bhatt, 2000; Malhotra, 2000). Similarly, (Bhatt, 2000; Malhotra, 2000; Carneiro, 2000; Kakabadse et al., 2003; Dul, Ceylan, and Jaspers 2011) state that the creation of knowledge within an organization is an important and essential feature and substituted as a key success factor and constant improvement of KM. Additionally, (Norman, 2004; Ajmal & Koskinen, 2008; Dul et al., 2011; Hislop, 2013) argue that through collaborative processes within organizations provide the ability to create, sharing and broadening of knowledge. As results, knowledge creation becomes crucial for the survival of any organization (Krogh et al., 2001; Fierro et al., 2011; Suresh, 2012; Sun and Scott, 2005; Olubunmi 2015).

Role of ICT in Knowledge Creation

The aim of managing knowledge within an organization is to increase profit by improving the efficiency of processes, increasing the quality and quantity of innovations, and enhancing competitiveness (Hislop, 2013; Dul et al., 2011) so that the organizations can effectively and efficiently use knowledge (Newell et al., 2004; Alavi et al., 2005).However, this anticipated advantage cannot be accomplished without proper knowledge formulation and being effectively used within the organization (Hislop, 2013; Dul et al., 2011). The ICT found to become more essential gears in knowledge creation. However, the creation of knowledge is primarily a human process; ICT provides tools used to facilitate knowledge creation process however, it cannot replace people (human) (Sun and Scott, 2005; Omotayo, Funmilola Olubunmi 2015). The role played by ICT in this process is to support and enhance the organizational processes of knowledge creation (Alavi and Leidner, 2001; Brunn et al., 2002; Schware, 2003; Chang & Lin, 2015). Moreover, ICT facilitates the creation of new knowledge (Krogh, G.; Nonaka, and Aben, 2001), the use of Internet-based technologies, and enable the sharing of knowledge throughout the organization (Takanashi, 2002; Wickramasinghe, 2003; Nasimi et. al. 2013). According to (Brunn et al., 2002; Schware, 2003; Beckinsale and Ram 2006; Chang & Lin, 2015) claim that ICT is a tool used to support information gathering, processing/creating, distribution and usage. Therefore, ICT has been used not only as a tool for automating existing processes, an enabler of organizational changes (Dedrick, Gurbaxani, & Kraemer, 2003)but also as teamworkgears that facilitate communication to be established

irrespective geographical boundaries (Takanashi, 2002; Nasimi et. al. 2013).In relation to that, the researcher agrees that the ICT plays an essential role in accomplishing astage of knowledge creation, and is a key and crucial feature for success and continuous enhancement of KM and its activities. Similarly, (Scharmer, 2000;Heeseok Lee and Byounggu Choi, 2003) state that the ICT support in enhancing activities such as socialization (S), externalization (E), combination (C), and internalization (I).

[3.] Knowledge Transferring

The third step in KM process is Knowledge Transferring. The knowledge transfer is conducted in different levels, which includes distribution and replacing knowledge between individuals to group, a group of people to the organizations (Alavi et al., 2005; Carrion et al., 2016), group to group (Takanashi, 2002), individual or network of people to explicit sources (Alavi et al., 2005; Carrion et al., 2016) and then transferred through formal and informal channels (Sun and Scott, 2005). Transferring of knowledge has become a very vital activity of effective KM (Krogh, Nonaka, and Aben, 2001; Lee and Choi, 2003; Rabiu, 2009; Gururajan and Fink, 2010; Epetimehin and Ekundayo, 2011; Paquette and Desousa, 2011; Ekeke, 2011; Dul et al., 2011; Hislop, 2013). Hence, the organizations committed to assuring that the transferred knowledge is converted from tacit to explicit knowledge to avoid the loss of tacit knowledge (Ko et al., 2005; Massey & Montoya-Weiss, 2006; Eskerod & Skriver, 2007; Ajmal & Koskinen, 2008; Pirkkalainen & Pawlowski, 2013). According to (Dul et al., 2011; Hislop, 2013) state that organizations struggle with knowledge loss causing employee turnover. In this regard, the effective utilization of knowledge once it is created to provide impact to the organization, it is important to share/transfer of knowledge with colleagues, teammates, and co-workers etc. (Sun and Scott, 2005; Alavi et al., 2005; Dul et al., 2011; Hislop, 2013; Carrion et al., 2016).

Role of ICT in Knowledge Transferring

According to (Storck & Hill, 2000; Al-Busaidi and Olfman 2005; Jones & Linderman, 2014; Merlo, 2016) argue that, the key determination to share/transfer knowledge has been done with several purposes in organizations; make the knowledge visible, show the role of knowledge, solve the problems through innovative solutions and inspire employees to foster behaviors of sharing and build the knowledge infrastructure. In this regards, ICTs are effective tools for transfer/sharing the knowledge withcollaboration tools that allow people and teams which are geographically dispersed to communicate regardless geographical limitations (Sun and Scott, 2005; Nasimi et. al. 2013). Moreover, (Southwood, 2004; Rosemary and Craig, 2004; Lukacs, 2005; Edvardsson & Oskarsson, 2011; Ha et al., 2015) state that ICTs are effective tools for improving outside communications, the excellence of services for established and new customers, faster response time and information access. Furthermore, knowledge acquired as results of information possesses in the people's minds or people's experience and understanding (Marwick, 2001; Alavi et al., 2005) and the role of technology is not making organization share/transfer knowledge, but to facilitate the range and opportunity of such exchanges, only if people want to share/transfer it (Sun and Scott, 2005). Therefore, the researcher of this paper agreesthat the ICT in knowledge transfer has played

an essential role to facilitate the whole process of knowledge transfer from one point to another throughout the world. The ICT found to be a catalyst in promoting organizations to adapt, apply and integrate their business processes and operations.

[4.]   Knowledge Reusing

The fourth step is knowledge reuse. The reuse of knowledge needs consumers to request it in the required time and ability to understand how to use it (Takanashi, 2002). In this process of knowledge management involves the usage of knowledge in adjusting the strategic direction (Markus et al., 2002; Orlikowski, 2002; Marqués & Simón, 2006; Loureiro et al., 2015), improving the efficiency (Markus et al., 2002; Orlikowski, 2002; Bhatti & Qureshi, 2007; Byukusenge et al., 2016), solving the problems (Takanashi, 2002; Markus et al., 2002; Orlikowski, 2002), making decisions (Markus et al., 2002; Orlikowski, 2002), and reducing costs (Markus et al., 2002; Orlikowski, 2002). The knowledge reuse, without doubt, requires the active contribution of knowledge employees that are planned in groups within the organization (Hislop, 2013; Dul et al., 2011) to make use of the knowledge possessed by other individuals (Hegazy & Ghorab, 2014). Therefore, knowledge should be used by the employees at all levels within the organization and have to make a systematic effort in applying the knowledge offered at different points of their activities (Hislop, 2013; Dul et al., 2011).

Role of ICT in Knowledge Reusing

In providing value and effectively reusing of knowledge to the organization once it is created, it essentially be shared with colleagues, teammates, and co-workers etc. (Hislop, 2013; Dul et al., 2011). ICTs play an important role in facilitating the processes by providing an improved external communication and quality of services (Lukacs, 2005; Rosemary and Craig, 2004) through the use of Internet-based technologies (computers, Internet, websites, mobile phones, other wireless communications devices and computer networks) that allow the reuse of knowledge all over the world and within organization (Wickramasinghe, 2003; Manueli et al., 2007). Additionally, in the study conducted by (UN 2007; Modimongale, 2009; Apulu, 2012), state that ICTs credit organizations and indeed all organizations worldwide the ability to reuse the knowledge to become efficient, innovative and competitive. Moreover, ICT enables electronically stored, rapid search, access, delivered and retrieval of information, and support collaboration and communication between organizational members for the use of knowledge (Alavi and Leidner, 2001; Brunn et al., 2002; Lee and Hong, 2002; Schware, 2003) and information gathering and processing (Beckinsale and Ram 2006). As a final point, the researcher claims that ICT in the stage of knowledge reuse is important and has played an extremely work in supporting organizations to reuse the knowledge indoor and outdoor of the organization and shorten the process of distribution and forwarding.

IV. CONCLUSION

The survivor and development of the organizationin today's global marketplace depend on the effective and efficient managing of knowledge. It has been said that capitalization in knowledge management results in improvement of both organizational performance, project success (Koskinen & Pihlanto, 2008; Kotnour, 2000), increase profit by improving the efficiency of processes, increasing the quality, quantity of innovations, and enhancing competitiveness (Hislop, 2013; Dul et al., 2011). Similarly, (Takanashi, 2002; Ipe, 2003) claim that for organizations to benefit from the knowledge, it must understand on how the knowledge is captured, created, transferred and used as these processes are the basis for an effective organizational knowledge management. In this regards, the effective application of knowledge management within organization facilitated by the effective integration of ICTs to all organizational knowledge management processes. The results show that ICTs impacted in all studied processes of knowledge management in organizations. Recognizing superior results will be attained by understanding how knowledge captured, created, transferred and practical application. The integration of ICT into organizational knowledge management offered at different points within the organization is not only just a tool for systematizing present processes but also is an enabler of organizational changes. The result of this review, however, does not answer the question on to what extent the ICT has proven to benefit the organizations adopting management of knowledge. This the author has remained as a subject of discussion in a future paper.

V. ACKNOWLEDGMENT

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