

Research Article

Utilization of ICT in Knowledge Management at the Ghana Volta River Authority

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Abstract: This study investigates the use of ICT tools in Knowledge Management in the Ghanaian state organization, Volta River Authority (VRA), in achieving set goals. Knowledge Management seeks to develop a strategy for capturing, sharing, distributing, using and transferring knowledge across an organization in order for it to improve efficiency and increase competitive edge. A Knowledge Management system creates an enabling environment to foster better knowledge and experience sharing, so that the organization can leverage its collective knowledge. The adoption and use of ICT has raised the need for organizations to come out with new methods, policies, tools and techniques to develop frameworks, processes and technologies so as to promote effective management of knowledge. Our research uses the SECI model for knowledge creation and sharing as its conceptual framework. Our findings show that the concept of ICT in Knowledge Management is still a relatively new at VRA, even though ICT tools are widely used. VRA management would, therefore, have to adopt a Knowledge Management policy, framework and governance and integrate the concept into its strategic plan in order to enhance meeting the organization's goals of competitive advantage.

Keywords: ICT use, knowledge creation and sharing, knowledge management, organizational learning, SECI model, VRA Ghana

INTRODUCTION

Like humans, organizations create and gather knowledge using various learning mechanisms. In business, knowledge has become a strategically important resource. Learning capabilities and innovations are becoming key roles to achieving job excellence (Rowley and Hartley, 2008). Under increasing competitive pressure, companies are examining how they can better manage their intellectual capital and transfer knowledge more efficiently across their organizations. The emerging field of Knowledge Management addresses the broad processes of locating, organizing, transferring and using information and expertise efficiently within an organization.

New market forces have prompted an interest in Knowledge Management (Randeree, 2006). These market forces include knowledge lost from down-sizing and knowledge lost from the departure of long-serving employees (who have in-depth knowledge that other staff could rely on) as well as the need to generally share information across the organization. The barriers to sharing of organizational information have been dramatically lowered by Information and Communication Technologies (ICT). Knowledge Management seeks to develop a strategy to capture, share, distribute, use and transfer knowledge across an organization in order to improve efficiency and increase competitive edge.

In this study, we investigate the use of ICT in Knowledge Management in achieving job efficiency at a Ghanaian national establishment called the Volta River Authority (VRA) (Kommey, 2011).

LITERATURE REVIEW

Data, information and knowledge: To get more insight into Knowledge Management, we need to consider two basic ingredients of knowledge; data and information. Information may be defined as knowledge given or received of some fact or circumstance. Aina (2004) contends that information performs the role of imparting knowledge to an individual, where it reduces uncertainty. Data are raw and unprocessed; information is processed data from which meaning arise and is communicated.

Knowledge is believed to be very distinct from data and information. While data, information and knowledge may all be viewed as assets of an organization, knowledge expresses meaning to an individual and hence tends to be much more valuable. To convert data to information and information to knowledge depends on the experience and analytical abilities of the individual.

Types of knowledge: There exist two quite distinct, divergent and widely accepted types of knowledge:

tacit and explicit. Explicit knowledge is knowledge that has been codified in documents, databases, web pages, etc. or written down and stored on computers. Tacit knowledge is the 'know-how' which is embedded in workers. It is explicit knowledge that most organizations try to capture, acquire, create, leverage, retain, codify, store, transfer, manage and share. According to Sison (2006) and Burke (2011), knowledge shared with the right intent can benefit all those involved.

The concept of knowledge management: The term 'Knowledge Management' describes approaches connected with the creation, processing and dissemination of knowledge and the technological know-how of it Laudon and Laudon (2010). A Knowledge Management system thus creates an enabling environment to foster better knowledge and experience sharing, so that organizations can leverage their collective knowledge. This involves making a direct connection between the organization's intellectual assets; both explicit (recorded) and tacit (personal know-how). In that way, employees are able to collectively use knowledge as they do their jobs in order to achieve efficiency.

According to Darroch (2005), the basic objectives of Knowledge Management are to increase, capture, refine, share and apply knowledge as an enterprise's information asset. These information assets may include databases, documents, policies, procedures, as well as the uncaptured tacit expertise and experience stored in individual minds. To increase knowledge includes discovering research, perusing and studying knowledge. To capture knowledge includes writing and recording knowledge. To refine knowledge includes verifying, correcting, updating, augmenting, clarifying and generalizing knowledge. To share knowledge includes presenting, publishing, distributing and discussing knowledge. And to apply knowledge includes planning, deciding, designing, building and solving problems.

If an effective Knowledge Management strategy is implemented in an organization, it can greatly facilitate the collection and sharing of meaningful knowledge. Thus employee knowledge can be converted to corporate knowledge via organizational learning. Learning by individuals within an organization happens through activities such as training and formal education. But organizational learning is the interaction that takes place among individuals. A learning organization actively creates, captures, transfers and mobilizes knowledge to enable it adapt to a changing environment (Wellman, 2009).

Importance of knowledge management: According to Mutt (2010), Knowledge Management is important in facilitating innovative thoughts, sharing of beneficial

work points and knowledge that would otherwise stay explicit. In the view of Singer and Hurlley (2004), Knowledge Management helps to make the best use of available knowledge, while creating new knowledge in the process (Zolfaghari, 2006). Knowledge Management helps in exploiting and realizing knowledge of the employees and building a culture where knowledge sharing can thrive. Knowledge Management is often facilitated by information technology (Jashapara, 2004).

Use of ICT in knowledge management: Moffett *et al.* (2004) explored the role and contribution of new Information and Communication Technologies (ICT) in the emerging field of Knowledge Management (Malhotra, 2005). According to Ajiferuke (2003), ICT is often used in Knowledge Management programmes to inform clients of latest innovations and developments in the business sector as well as to share knowledge among employees. Also, ICT facilitates accumulating organizational knowledge, providing access to retrievable knowledge and enhancing collaboration for knowledge sharing and creation (Ryan and Prybutok, 2001). The main role of ICT use in Knowledge Management is to step up the speed of knowledge transfer to workers. ICT facilities, infrastructure and applications (such as World Wide Web, Facebook, Twitters, YouTube, Multiply, video and teleconferencing) are catalysts in the Knowledge Management process.

In the view of Robbins and Coulter (2009), ICT has rapidly changed the way organizational members communicate. For instance, it has significantly improved a manager's ability to monitor individual's performance, allowed employees to have more complete information to make faster decisions and provided employees more opportunities to collaborate and share information. Besides, ICT has made it possible for people in organizations to be fully accessible, anytime, regardless of where they are. Ho (2007) notes that ICT has provided the infrastructure for economic development, helped create the knowledge society, contributed to innovation and created value for the economy.

In the first place, ICT enables knowledge collection, storage and exchange on a scale which was not practical in the past (Lee and Choi, 2003). Through the linkage of information and communication systems, fragmented flows of knowledge and multiple knowledge resources can be integrated, for instance, via Intranet, Internet, Database and News Groups. Secondly, ICT has become a critical element for knowledge creation. For example, business intelligence technologies help to generate knowledge with regard to the competition and economic environment. Knowledge discovery technologies enable a firm to find both

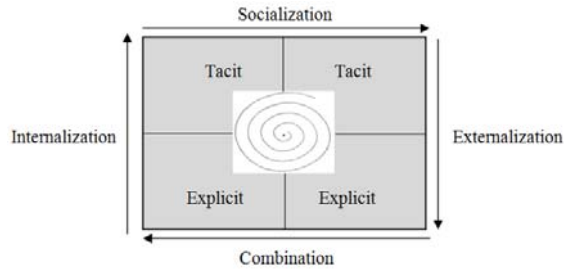


Fig. 1: The knowledge spiral (Nonaka *et al.*, 2000)

internal and external knowledge that is new and helpful to the firm. Thirdly, ICT facilitates communication, thereby assisting all modes of knowledge creation and transfer (Davidavičien and Raudeliūnien, 2010).

By efficiently selecting and organizing useful information, ICT plays a vital role in information retrieving, because it allows simple access to large amounts of independent information sources. For example, Yahoo, one of the most popular public web knowledge portals that evolved from information portals, is currently widely used in a variety of organizations to support internal knowledge retrieving, synthesizing and exchanging of tasks for knowledge workers (Mack *et al.*, 2001).

Challenges of ICT use in knowledge management:

There are also challenges of ICT use in Knowledge Management (Dierkes *et al.*, 2003). For example, transfer of tacit knowledge requires controlled interactions. However, the degree to which Knowledge Management is outpacing the tangible assets of companies has become an issue of concern for many organizations (Šarkiūnait and Krikščiūnien, 2005). Also, there are many barriers to effective Knowledge Management. These barriers include distance, cultural differences and language, the time-consuming nature of regular activities coupled with the human tendency to focus on immediate tasks, resistance to change and people’s reticence to share knowledge (Gupta *et al.*, 2000).

There is also the challenge of lack of trained staff and ICT facilities. Ajuwon and Rhine (2008) have reported that capacity building is a major problem in ICT usage. Without proper training and education, available resources will be under-utilized. They point out that there are many ways that organizations lose knowledge: lay-off and termination, retirement or death, employees walk away, excellent working teams split, databases become infected with virus or whole functions are outsourced, etc.

The SECI model for knowledge management: In our study, we investigate the use of ICT in Knowledge Management in achieving job efficiency at the Ghana Volta River Authority (VRA). As a conceptual framework, we adopt the SECI (Socialization,

Externalization, Combination and Internalization) model for knowledge creation and sharing, presented by Nonaka *et al.* (2000), based on the two types of knowledge named earlier (tacit and explicit). They proposed four ways that knowledge types can be combined and converted, showing how knowledge is shared and created in an organization. In the model, there are four modes of organizational knowledge creation (Fig. 1).

Socialization: This is the process of transferring tacit knowledge between individuals through observations and working with more skilled people (tacit to tacit). Knowledge is passed on through practice, guidance, imitation and observation. Examples here are face to face meetings, video and tele-conferences (Daneshgar and Parirokh, 2007).

Externalization: Externalization is the process in which a person turns his tacit knowledge into explicit knowledge through documentation, verbalization, etc., (tacit to explicit). Tacit knowledge is codified into documents, manuals, web pages etc., so that it can spread more easily through the organization. The most common form of this process is through electronic mail.

Combination: This is knowledge conversion involving the combination of different types of explicit knowledge (explicit to explicit). It happens when people exchange knowledge via documents, telephones and meetings. Here, codified knowledge sources (e.g., documents and web pages) are combined to create, capture and share new knowledge. Creative use of a database to get business report, sorting, adding, categorizing is an example of this combination process.

Internalization: This is the process where an individual internalizes explicit knowledge to create tacit knowledge (explicit to tacit). As explicit sources are used and learned, the knowledge is used to modify the user's existing tacit knowledge. Usually, organizations train their staff. By reading training manuals and documents, the staff internalizes the tacit knowledge and tries to create new knowledge. The entire organization learns when this new knowledge is shared in another socialization process.

The repeated succession of these four modes creates an upward spiral of organizational knowledge (Fig. 1) and this would accelerate further knowledge creation, sharing and distribution required in Knowledge Management (Greiner *et al.*, 2007).

We adopt this SECI model to bring up sharing, capturing, managing and distributing of knowledge in VRA (Long *et al.*, 2005). In the socialization process, training programmes may be initiated for staff through face to face and video conferencing means to manage, share, distribute and retain knowledge. In the

externalization process, electronic mail services can be adopted for intellectual capital and knowledge sharing. Creative use of database to get business report can also be adopted by VRA in the combination process as the staff internalizes the tacit knowledge and the entire organization learns from the cycle.

THE VOLTA RIVER AUTHORITY

The Volta River Authority (VRA) of Ghana was established in 1961 with a primary function to generate and supply electrical energy for the country. Today, it has assumed, as a secondary function; responsibility for the development of other energy potentials. VRA has three main constituent branches (Engineering, Services and Finance) and is governed by a Board appointed by the Government of Ghana. Being a state organization, VRA enjoys a great deal of autonomy in its affairs, operations and relationship with customers. However, the Board must ensure that it operates within the framework of the policies and interests of the Government (VRA, 2010).

VRA and knowledge management: VRA has, over the years, generated a lot of in-house intellectual capital which when well-managed, would facilitate innovation, strategic planning and continuing learning for the achievement of its vision. It is believed that the implementation of ICT in Knowledge Management programmes in VRA will improve customer services, development of new products to the market, innovations and reduce cost of business operations.

Our problem statement: In developing economies like Ghana, the infrastructure, hardware, software, people and communication networks are not well developed, shared, used and managed. There are also no proper ICT policies, platforms, strategies, governance and framework to make Knowledge Management effective (SFDIC, 2007). Even though the use of ICT in the production, processing, storage and dissemination of information and knowledge has brought a lot of returns to organizations like the VRA, less resources are allocated to this sector for the acquisition and maintenance of the infrastructures and systems.

VRA creates lots of explicit knowledge, but that knowledge is not properly managed for effective use. Furthermore, VRA has no unit or department in charge of Knowledge Management and hence no mechanisms for capturing, retaining and sharing of workers' knowledge. Long-serving employees usually have in-depth knowledge that may be relied upon by other staff. The loss of these staff can have negative impact on the level of knowledge within the organization. Although ICT facilities are commonly used in VRA, the desired impact on Knowledge Management to achieve job efficiency is not felt. This study aims to determine the

extent to which ICT facilities are available and applied to Knowledge Management at VRA (Kommey, 2011).

Objectives of the study: The specific objectives of the study are to:

- Determine how well knowledge is managed and shared in VRA.
- Determine the ICT role in capturing, storing, processing, managing and disseminating knowledge at VRA.
- Determine Knowledge Management tools used in VRA.
- Find out if there are proper information technology policy, infrastructure, platform, strategy and framework to make Knowledge Management effective in VRA.
- Find out the challenges of ICT use in Knowledge Management in VRA.
- Recommend solutions on how ICT use will support Knowledge Management in VRA, based on the findings.

We believe that the study would establish an empirical basis for job efficiency at VRA, in terms of ICT use in Knowledge Management.

METHODOLOGY

Research methodology according to Leedy and Ormrod (2010) is the general approach that a researcher takes in carrying out a research project. This approach dictates the particular strategy that the researcher would have to adopt to collect, manipulate and interpret data.

Research design: The case study research design approach was used in this project. According to Kumeopor (2002), this method involves procedures and techniques of investigation usually based on intensive interviewing. This enables researchers to get an understanding of an issue in order to take decisions. These decisions usually take into consideration the special circumstances surrounding the case investigated. Our project was carried out on the Volta River Authority of Ghana as a case study.

Sources of data: Data for the study was collected from both primary and secondary sources. The primary data was collected from two main sources, interviews and questionnaires. The secondary data included VRA documents, books, the Internet and academic journals.

Population and sample size: The target population for our study was the management and senior staff of VRA; a total of 1,266, (VRA, 2010) out of which 150 were selected, making a sample size of 11.9% (Table 1).

Table 1: Population and sample size

Subjects	Total number	Sample size	(%)
Management: executives and directors	30	30	100
Senior staff	1236	120	9.71
Total	1266	150	11.85

Sampling technique: The study adopted the purposive sampling technique. According to Aina (2004), purposive sampling refers to a situation where the researcher will depend on his knowledge of the population and handpick certain members who have relevant information on the issue being studied. A major advantage of purposive sampling is that, it ensures that the researcher gets at least, some information from respondents who are knowledgeable and crucial to the study (Pickard, 2007). In our case, the selections were made from management and senior staff.

Mode of data collection: As stated earlier, data for this study was collected by means of questionnaires and interviews, including a combination of multiple choices, closed and open-ended questions. Personal interviews were conducted on five top management officers who, we believe, would implement the Knowledge Management function in the strategic plan of VRA; the Chief Executive Officer and his three deputies for Engineering, Services and Finance, as well as the Head, Document Management. All interviews were conducted privately and tape-recorded with permission. Also, 150 questionnaires were administered and 120 returned; a response rate of about 82%. The Statistical Package for Social Sciences (SPSS) was used to analyze the data and results presented in descriptive statistics, such as frequencies and percentages.

RESULT ANALYSIS

Demographic information: This section presents the background of the staff in terms of gender, age and number of years worked with VRA.

Gender of respondents: Out of the 120 staff that responded to the questionnaire, 46, representing 38%, were females, while 72 representing 60% were males (Table 2 and Fig. 2). Thus, the majority of respondents were males.

Ages of respondents: Also, the majority of respondents (60) were between the ages of 40-49 years, with the least (6) being between ages of 20-29 years. This majority depicts staff that has been in the institution for a long time-an indication of experienced staff that will be able to transfer their rich experience to the younger ones (Table 3 and Fig. 3).

Working years: We sought to find out the number of years respondents had worked with VRA. Out of the

Table 2: Gender of respondents

Gender	Frequency
Male	72 (38%)
Female	46 (60%)
Total	118 (98.8%)

Table 3: Ages of respondents

Age range	Frequency
20-29 years	6 (5.1%)
30-39 years	10 (8.5%)
40-49 years	60 (50.8%)
50-59 years	42 (35.6%)
Total	118 (100%)

Table 4: No of years worked at VRA

Working years	Frequency
1-5 years	4 (3.3%)
6-10 years	9 (7.5%)
11-15 years	50 (41.7%)
16-20 years	18 (15%)
21-25 years	14 (11.7%)
26-30 years	25 (20.8%)
Total	120 (100%)

Table 5: Do you use ICT in knowledge sharing?

ICT used in sharing knowledge?	Frequency/ (%)
Yes	118 (98.3%)
No	2 (1.7%)
Total	100 (100%)

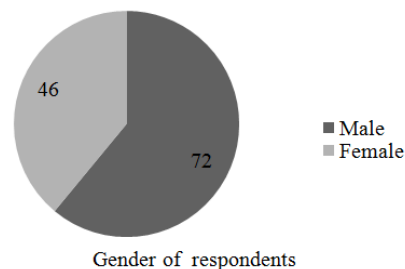


Fig. 2: Gender of respondents

total number of respondents, twenty-five (20.8%) had worked with VRA for the past 26-30 years and, thirty-two (26.7%) have worked with VRA for the past 16-25 years. The least, four (3.3%), have worked with VRA for the past 1-5 years. Thus, majority of respondents have worked with the VRA for over 16 years (Table 4 and Fig. 4).

Importance of knowledge management: This section sought to find out the importance of Knowledge Management in VRA. Respondents were asked whether it is necessary to use ICT to share knowledge in VRA, how staff understood Knowledge Management and the existence of Knowledge Management policy.

ICT use in knowledge sharing: Staff was asked whether it was necessary to use ICT in sharing knowledge in VRA. Out of the total responses (Table 5 and Fig. 5), 98.3% of the respondents answered in the affirmative and 1.7% in the negative. This depicts the

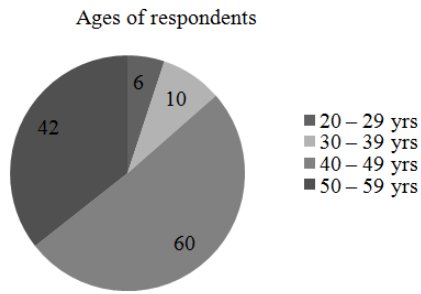


Fig. 3: Ages of respondents

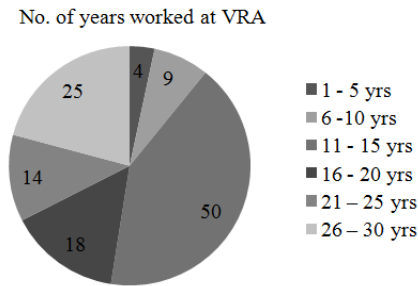


Fig. 4: No. of years worked at VRA

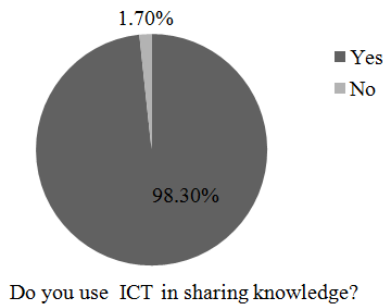


Fig. 5: Do you use ICT in knowledge sharing?

level of importance the staff has attached to the use of ICT in sharing knowledge.

Awareness of knowledge management: On the subject of ‘Knowledge Management’ and how it was understood by the staff, responses indicated different understandings and opinions. From Table 6, twenty-nine (24%) respondents indicated that Knowledge Management is the data, fact and figures. Twenty-six (21.7%) respondents indicated that Knowledge Management is simply relevant information. Nineteen (15.8%) respondents indicated that Knowledge Management is the advanced form of ICT.

We deduce that respondents saw Knowledge Management as comprising all of the above definitions and their combinations.

Familiarity with knowledge management: The research also sought to find out if VRA staff was

Table 6: What is knowledge management (KM)?

Responses	Frequency
KM is the advanced form of ICT	19 (15.8%)
KM is the data-fact and figures	29 (24.2%)
KM is simply relevant information	26 (21.7%)
KM is the advanced form of ICT & KM is simply relevant information	8 (6.7%)
KM is data-fact and figures & KM is simply relevant information	11 (9.2%)
KM is the advanced form of ICT & KM is data-fact and figures	23 (19.2%)
Total	116 (96.7%)

Table 7: Familiarity with knowledge management

Responses	Frequency
Intellectual capital	32 (29.6%)
Intellectual assets	8 (7.4%)
Learning organization	41 (38%)
Occasionally e-learning	5 (4.6%)
Organizational learning	4 (3.7%)
Intellectual assets and organizational learning	2 (1.9%)
Intellectual assets, learning org. and org. learning	2 (1.9%)
Intellectual capital, intellectual assets and learning org.	4 (3.7%)
Intellectual capital, intellectual assets & e-learning	2 (1.9%)
Intellectual capital & organizational learning	2 (1.9%)
Intellectual capital & learning organization	6 (5.6%)
Total	108 (100%)

Table 8: Does knowledge management policy exist?

Does knowledge management policy exist?	Frequency/ (%)
Yes	27 (22.5%)
No	88 (73.3%)
Total	100 (100%)

Table 9: Important knowledge-carriers in VRA

Responses	Frequency
People	39 (34.5%)
Paper	14 (12.4%)
Social networking	2 (1.8%)
Databases	4 (3.5%)
People and media	3 (2.7%)
People and paper	6 (5.3%)
People and social networking	2 (1.8%)
People, paper and social networking	16 (14.2%)
People, media and databases	14 (12.4%)
Paper, social networking and databases	2 (1.8%)
Media, social networking and databases	2 (1.8%)
People and databases	9 (8%)
Total	113 (100%)

familiar with what Knowledge Management involves. From data gathered as shown in Table 7, forty-one (38%) respondents know Knowledge Management as a learning organization and thirty-two (29.6%) acknowledged it as intellectual capital. Others saw it as occasionally e-learning and a combination of the above definitions. One can thus conclude that staff of VRA has a fair idea of knowledge management and what it means.

Knowledge management policy: The study also sought to find out whether a Knowledge Management policy existed in the organization. Out of the total responses (Table 8 and Fig. 6), 88 representing 73.3% of respondents answered in the negative whilst 27

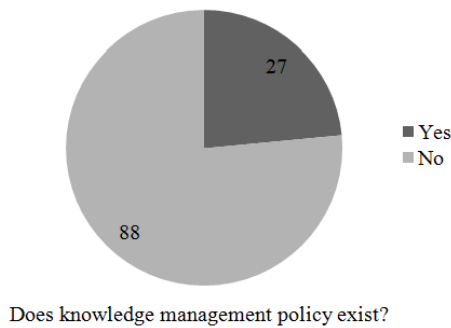


Fig. 6: Does knowledge management policy exist?

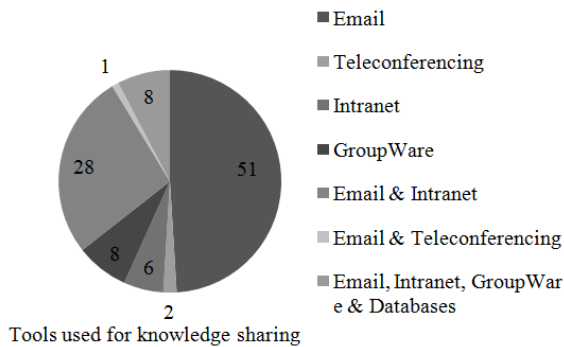


Fig. 7: Tools used for knowledge sharing in VRA

representing 22.5% answered in the affirmative. Thus, it can be deduced that no official document on Knowledge Management existed in VRA.

Knowledge carriers: This section deals with knowledge carriers used in VRA. In Table 9, thirty-nine (32.5%) respondents affirmed that the main carrier of information was through people. Fourteen (11.7%) respondents indicated that the means of carrying information was paper. Sixteen (14.2%) stated that the carrier of information was people, paper and social networking as compared to fourteen (12.4%) who indicated people, media and databases. Thus, a slight majority of respondents indicated that the main carrier of information was people in the organization. This is a major reason why the organization needs to tap into these people so that knowledge may not be lost when they leave the employment.

ICT use in knowledge management: This question sought to find out how knowledge was used and shared using ICT in VRA. From Table 10 and Fig. 7, fifty-one (49%) of the total responses indicated e-mail while twenty-eight (26.9%) combined e-mail with the Internet. Thus, a slight majority of respondent's use and share knowledge through electronic mail ICT facilities.

Internal knowledge sharing: This section dealt with the modes of knowledge sharing within the VRA. From

Table 10: Tools used for knowledge sharing in VRA

Respondent	Frequency
Email	51 (49%)
Teleconferencing	2 (1.9%)
Intranet	6 (5.8%)
Group ware	8 (7.7%)
Email and intranet	28 (26.9%)
Email and teleconferencing	1 (1%)
Email, intranet, group ware and databases	8 (7.7%)
Total	104 (100%)

Table 11: Modes of sharing knowledge internally

Respondent	Frequency
Face to face	13 (11.5%)
Email	9 (8%)
Telephone	10 (8.4%)
Report	2 (1.8%)
Courses	2 (1.8%)
Face-to face, email and telephone	13 (11.5%)
Face-to face, email, telephone and courses	14 (12.4%)
Email and telephone	5 (4.4%)
Face-to face, virtual meeting and report	4 (3.5%)
Virtual meeting and telephone	3 (2.7%)
Face-to face and virtual meeting	2 (1.8%)
Face-to face, email and report	18 (15.9%)
Face-to face, email and report	12 (10.6%)
All the above	6 (5.3%)
Total	113 (94.2%)

Table 12: The use of electronic tools in VRA

Responses	Frequency
Increasing job efficiency	48 (42.5%)
Lowing cost	2 (1.8%)
Better access work	6 (5.3%)
Creating new contact	2 (1.8%)
Increasing job efficiency and lowing cost	5 (4.4%)
Better access work and new knowledge in VRA	6 (5.3%)
Better access work and creating new contact	2 (1.8%)
Increasing job efficiency and better access work	18 (15.9%)
Increasing job efficiency, better access work and new knowledge in VRA	14 (12.4%)
Increasing job efficiency, lowing cost and new knowledge in VRA	10 (8.8%)
Total	113 (100%)

Table 13: Usage of ICT tools

Responses	Frequency
As data storage devices	29 (25.7%)
As communication devices	18 (15.9%)
As knowledge gathering devices	24 (21.2%)
As data storage devices, as communication devices and as knowledge gathering devices.	17 (15.1%)
As data storage devices, as data processing devices and as communication devices	12 (10.6%)
As data storage devices and as data processing devices	7 (6.2%)
As data storage devices, as communication devices, as knowledge gathering devices and as analysis and decision support tools	6 (5.3%)
Total	113 (100%)

Table 11, the most common modes of knowledge sharing are the face to face, telephone and email, constituting 11.5, 8.4 and 8%, respectively. It must be noted that, people did combine the above modes as seen from Table 11. Those who combined face to face, telephone and e-mail constituted 13 of the respondents, representing 11.5%.

Table 14: ICT tools used for documentation and preservation

ICT tools	Frequency					Total
	Very often	Often	Quite often	Not often	Not very often	
Computers	45 (69.2%)	16 (88.9%)	8 (80%)	4 (57.1%)	3 (23.1%)	76 (67.2%)
Video cameras	12 (18.5%)	2 (11.1%)	1 (10%)	-	6 (46.2%)	21 (18.6%)
Tape recorders	8 (12.3)	-	1 (10%)	3 (42.9%)	4 (30.8%)	16 (14.2%)
Total	65 (100%)	18 (100%)	10 (100%)	7 (100%)	13 (100%)	113 (100%)

Table 15: Challenges of ICT use for organizational learning

Respondent	Frequency
ICT platform and ICT policy for learning	17 (16.3%)
ICT infrastructure and ICT enablers are not well established	8 (7.7%)
Organizational e-learning is not well established	8 (7.7%)
Education on ICT application is limited to few personnel	5 (4.8%)
Lack of policy that will inform and strategically bring efficiency	5 (4.8%)
More training programme to prepare staff's mind on ICT in KM	7 (6.7%)
Lack of trained personnel and facilities	36 (34.6%)
Rapid changes in tech, cyber-crime and misuse of facilities by staff, management of malware and spyware	10 (9.6%)
Behind best practice	8 (7.7%)
Total	104 (100%)

Table 16: Literacy in knowledge management tools

Knowledge management tools	Response		Total
	Yes	No	
Group ware	6 (18.8%)	18 (32.7%)	24 (27.6%)
Share point	2 (6.3%)	26 (47.3%)	28 (32.2%)
Document management system	8 (25%)	11 (20%)	19 (21.8%)
E-learning systems	16 (50%)	-	16 (18.4%)
Total	32 (100%)	55 (100%)	87 (100%)

Work habits to achieve efficiency: This question focused on Knowledge Management tools used in achieving organizational efficiency in VRA (Table 12). Out of the total 120 respondents, forty-eight (42.5%) responded that management tools have increased their job efficiency. Eighteen (15.9%) stated that the tools

have increased job efficiency and given them better access to work. Also, fourteen (12.4%) of the respondents indicated that the tools have increased job efficiency and given them better access to work and new knowledge in VRA.

Thus, our research can conclude that electronic tools have aided job efficiency and given better access to work in the VRA organization.

General usage of ICT tools: With Knowledge Management in an organization, the use of ICT tools, to facilitate access to knowledge is very important. This section sought to ascertain the use of ICT tools in VRA. In Table 13, twenty-nine respondents (25.7%) indicated that they used ICT tools for data storage while twenty-four (21.2%) affirmed that they used these tools for gathering of knowledge. Also, eighteen (15.9%) indicated that they used ICT tools for communication and seventeen (15.1%) confirmed that they used them for data storage, communication and knowledge gathering. Thus, most of the respondents indicated that they use these ICT tools for storage and gathering of knowledge in the organization.

ICT tools use for knowledge preservation: ICT is believed to facilitate Knowledge Management by accumulating organizational knowledge, providing access to retrievable knowledge and enhancing collaboration for knowledge sharing and creation. This section sought to find out how often ICT tools were used for documentation and knowledge preservation.

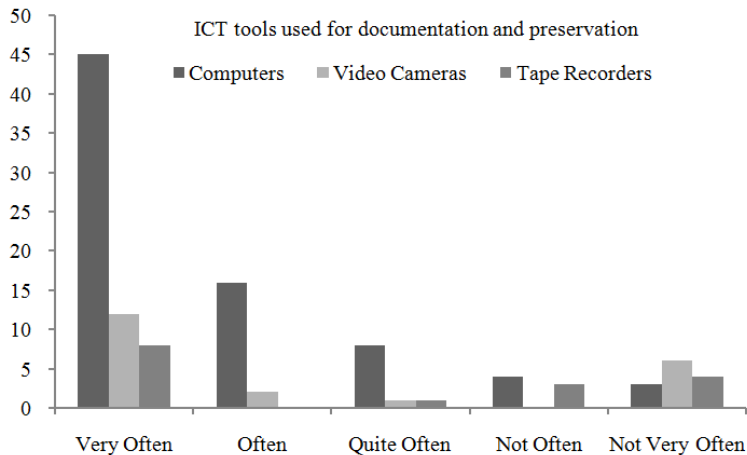


Fig. 8: ICT tools used for documentation and preservation

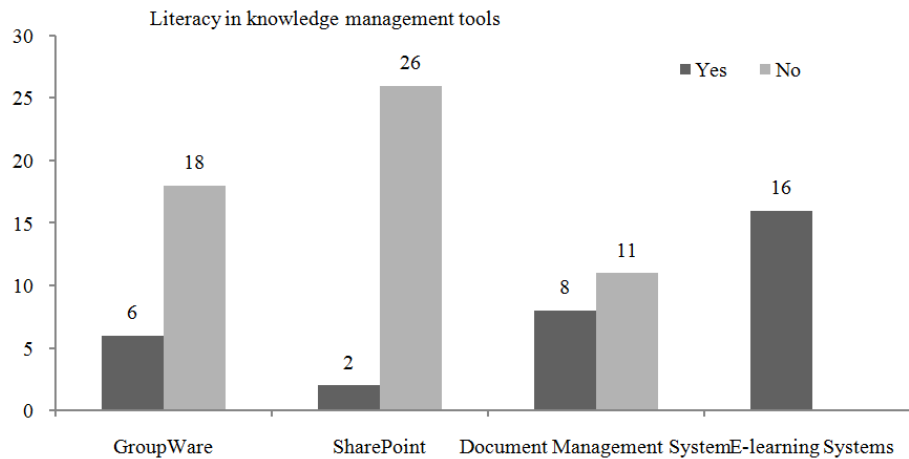


Fig. 9: Literacy in knowledge management tools

In Table 14 and Fig. 8, forty-five (69.2%) respondents used the computer very often for documentation and preservation of knowledge as compared to twelve (18.5%) who used the video cameras very often. Also, sixteen (88.9%) respondents used the computer often for documentation and preservation as compared to two (11.1%) who often used the video cameras. Thus, majority of respondents saw the computer as a major ICT tool for documentation and preservation of knowledge in VRA.

Challenges of ICT use in knowledge management:

This section sought to find out the challenges of ICT for organizational learning in VRA. From the data gathered, the most striking challenge of ICT is the lack of trained staff and facilities, indicated by 34.6% of respondents. Other major challenges include lack of ICT infrastructure, platform and policy for learning, organizational e-learning were not well established, as well as education on ICT applications had been limited to few personnel. Another area of concern was the rapid changes in technology, cyber-crime, misuse of facilities by staff as well as management of malware and spyware. Table 15 gives a description of the above information.

Literacy in knowledge management tools: From the data gathered, it came to light that staff with knowledge about Knowledge Management tools constituted only 32 of the respondents (Table 16). About half of the staff (55) was ignorant of these tools. Thirty three (33) of the respondents gave no response to the use of these tools. Table 16 and Fig. 9 give further explanation.

DISCUSSION OF RESULTS

We now briefly discuss the findings from our study relative to some of what have already been obtained elsewhere in the literature.

Familiarization with knowledge management:

According to White (2004), Knowledge Management is a relatively new discipline in the information systems environment applicable to organizations, but it enhances conversion of organizational resources into capabilities. Our study revealed that most of the staff has a fair idea of the concept of Knowledge Management and was therefore familiar with it. This is good for VRA to leverage upon.

ICT use in knowledge management:

ICT provides tools for creating, sharing, managing, storing and retaining knowledge. These tools allow for the exchange of information via websites, social networks, etc. Our study revealed that respondents had a low literacy rate in Knowledge Management tools. Gan (2006) also exposed the situation from Malaysian perspectives; most Malaysians do not understand well what Knowledge Management is and its functions and tools. Since Knowledge Management makes a business organization efficient and effective in information sharing, policy making, strategic planning and coordination between employees, literacy rate in Knowledge Management tools should be improved in VRA (Hendriks, 2001).

The study further revealed that the computer is a major ICT tool for gathering, documentation and preservation of knowledge in VRA. This is in consistence with Ryan and Prybutok (2001) that ICT, of which the computer is a part, helps to store, create, share and distribute organizational knowledge and provide access for the retrieval of that knowledge (Chourides *et al.*, 2003).

Our study also confirms the findings of previous research by Lakshman (2007) that ICT is important in knowledge sharing process. VRA respondents deemed the role ICT plays in knowledge sharing as very necessary. The study revealed that majority of respondents use the electronic mail for sharing

knowledge in VRA. Sison (2006) states that ICT makes the inter-link between people and enterprises with indirect knowledge transfer and sharing through the internet and databases (Singer and Hurley, 2004).

Knowledge carriers: From our study, human beings are the main carriers of knowledge at VRA. This is in agreement with the assertion that knowledge is always embodied in a person, taught and learned by a person, used or misused by a person. The essence of the Knowledge Management concept is to disseminate existing knowledge and make full use of it so as to create more value in productivity Liebowitz (2008).

Knowledge management policy: We have also found that there is no policy for Knowledge Management in VRA. This also confirms studies by Lashgarara *et al.* (2011) in Iran that the non-existence of a Knowledge Management policy is a great challenge to the country. Policies are very important with respect to the implementation of systems and concepts in an organization. For the effective use and implementation of Knowledge Management, there need to be a policy in VRA to guide that process.

Work habits to achieve efficiency: It was revealed in the studies that the use of Knowledge Management tools have increased job efficiency. This view is supported by Mohammad *et al.* (2004) that many organizations realize that knowledge is a strategic tool for maintaining organizational performance. With ICT in organizational learning, companies are bound to achieve efficiency (Tasmin and Woods, 2007). The findings of this study confirm the Amlus *et al.* (2006) assertions that knowledge management focuses on activities to enhance organizational efficiency.

Challenges of ICT use in knowledge management: Some of the challenges of ICT for organizational learning are the lack of trained staff and ICT facilities. Ajuwon and Rhine (2008) have reported that capacity building is a major problem in ICT usage. Without proper training, available resources will be under-utilized. Data gathered on VRA revealed that training must be provided to encourage full utilization of the tools installed.

CONCLUSION

The purpose of this study was to investigate the use of ICT in Knowledge Management in the Ghana Volta River Authority. Our findings do reflect the use of ICT in Knowledge Management in VRA. Firstly, management and staff deem it necessary to use ICT in handling, acquiring, processing, managing, sharing, retaining, storing and disseminating information to enhance productivity and efficiency. This is done

mostly through the use of E-mails, Intranet, people and telephone.

In addition, they perceive Knowledge Management as relevant information, data, fact and figures and an advanced form of ICT. Knowledge Management makes use of ICT tools such as computers, video cameras, tape recorders, television and video conferencing to facilitate documentation and knowledge preservation at VRA. With respect to ICT, the most striking challenges that VRA has are the lack of trained staff and facilities. Hence literacy level on Knowledge Management tools is low. There is also the challenge of the non-existence of Knowledge Management policy.

RECOMMENDATIONS

The study raises a few recommendations for ICT use in Knowledge Management at VRA and Ghana:

- There should be policies, framework, governance and procedures to guide the implementation of Knowledge Management systems at VRA. Awareness should be created by VRA Management to ensure that staff is familiar with the Knowledge Management concept.
- Information and tacit knowledge that are documented or captured should be preserved and made available. There should be a section in VRA to manage knowledge assets and capabilities. Employees at all levels should be encouraged to use Knowledge Management tools and systems for efficient and effective decision making and they should inculcate the habits of sharing knowledge so as to achieve job efficiency.
- The rich experience of staff above forty years of age who have served VRA for more than twenty years should be retained, tapped, managed and shared via a Knowledge Management system as a way of knowledge retention.
- There should be adequate provision of ICT facilities and tools for use at VRA. Finally, VRA should intermittently organize training programmes to educate staff on the use of ICT in Knowledge Management.

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